

November 15, 2012 / Vol. 48 No. 24

# WESTERN NEWS

WESTERN NEWS  
CELEBRATES  
40 YEARS

PM 41195534

# INTO THE FUTURE

40 THINGS YOU  
NEED TO KNOW  
ABOUT THE NEXT  
**40 YEARS**

ILLUSTRATION BY JENNIFER WILSON



## Coming Events

NOV 15 – 21

### // THURSDAY

#### DEPARTMENT OF VISUAL ARTS

artLAB - *Dig it*. A juried show with a pure focus on the media arts. Runs until Nov. 22.

12-6 p.m. Monday-Friday. 12-8 p.m. Thursday.

#### LEARNING SKILLS PRESENTATION

Improve your concentration. Register at [sdc.uwo.ca/learning](http://sdc.uwo.ca/learning).

11:30 a.m.-12:30 p.m. Western Student Services, room 3134.

#### CENTRE FOR TRANSITIONAL JUSTICE

Rahma Abdulkadir, New York University (Abu Dhabi). *Can the Somali xeer or customary law lead to a model of transitional justice that accounts for Somali women's voice?*

12-1 p.m. SSC 9420.

#### KING'S UNIVERSITY COLLEGE

Religious Life Lecture. Elizabeth Johnson, Fordham University, NY. *A Faith that Loves the Earth*.

7:30 p.m. Labatt Hall 105.

#### DEPARTMENT OF ENGLISH

*The Knight of the Burning Pestle*. Tickets \$10 students/seniors, \$15 non-students. Available at Western Connections, UCC and at the door.

8 p.m. Conron Hall, University College.

### // FRIDAY

#### DON WRIGHT FACULTY OF MUSIC

*Tafelmusik*. The Early Music Studio again welcomes a short residency by members of the Tafelmusik Baroque Orchestra.

12:30 p.m. von Kuster Hall.

#### FACULTY MENTOR PROGRAM

*International Research Connections*.



Program details and registration available at [uwo.ca/tsc](http://uwo.ca/tsc).

1:30-3:30 p.m. Teaching Support Centre, Weldon Library, room 121.

#### EARTH SCIENCES COLLOQUIUM

Ulrich Kretschmar, Claim Lake Resources. *Syngenetic Gold: Lode Vein Geology and Exploration Implication*.

3:30-4:30 p.m. B&G 0153.

#### 9TH ANNUAL PLANETARY SCIENCE DISTINGUISHED PUBLIC LECTURE

Apollo astronaut Harrison 'Jack' Schmitt. Reception to follow. Information and tickets at [cpsx.ca/2012\\_lecture](http://cpsx.ca/2012_lecture).

6 p.m. Natural Sciences 145.

#### WOMEN'S HOCKEY

UOIT at Western.  
7 p.m.

#### DEPARTMENT OF MODERN LANGUAGES AND LITERATURES

Spanish Film Series. *Viva Cuba*.

7 p.m. UC 84.

#### DON WRIGHT FACULTY OF MUSIC

Opera: *Lehar's Merry Widow*. Tickets available at the Grand Theatre 519-672-8800, online at [tickets.grandtheatre.com](http://tickets.grandtheatre.com). \$25/\$20.

8 p.m., Nov. 17/18.

### // SATURDAY

#### FALL PREVIEW DAY

For more information visit [welcome.uwo.ca/preview/visitus/fall.html](http://welcome.uwo.ca/preview/visitus/fall.html).

#### MEN'S / WOMEN'S WRESTLING

Harry Geris Memorial Duals at Western.  
9 a.m.

#### MEN'S HOCKEY

Brock at Western.  
7 p.m.

### // MONDAY

#### MCINTOSH GALLERY

Adrian Norvid: *Showstoppers, Whoppers, Downers and Out Of Towners*. Runs until Feb. 16, 2013. [mcintoshgallery.ca](http://mcintoshgallery.ca).

#### LEARNING SKILLS PRESENTATION

Manage your time for mid-year exams. Register at [sdc.uwo.ca/learning](http://sdc.uwo.ca/learning).

11:30 a.m.-12:30 p.m. Western Student Services, room 3134.

#### THE CHINESE PROGRAM AT HURON

Lunch Hour Conversation. Anyone wishing to speak Chinese is welcome. Email [hww1@huron.uwo.ca](mailto:hww1@huron.uwo.ca).

12:30-1:30 p.m. International Lounge, Huron.

### // TUESDAY

#### SENIOR ALUMNI PROGRAM

Douglas L. Jones, Physiology & Pharmacology & Medicine, Western. *"Tick...Tock" Heart arrhythmia and its treatment*.

9:30 a.m. McKellar Room, UCC.

#### DON WRIGHT FACULTY OF MUSIC

Percussion Ensemble.  
8 p.m. Paul Davenport Theatre.

#### SCIENCE STUDENTS' COUNCIL

*Bill Nye the Science Guy*, scientist, engineer, comedian, author and inventor. Ticket pre-sale: \$15 student, \$30 nonstudent. Regular \$20 student, \$30 non-student. Visit [westernssc.ca/?p=702](http://westernssc.ca/?p=702).

7 p.m. Alumni Hall.

#### DEPARTMENT OF MODERN LANGUAGES AND LITERATURES

Italian Film Series. *Io sono l'amore (I am love)*.

7:30 p.m. UC 84.

### // WEDNESDAY

#### DEPARTMENT OF MODERN LANGUAGES AND LITERATURES

Comparative Literature Research Forum. Reza Ashouri Talooki, Comparative Literature, Western. *The Homecoming Nation: Identity Construction in Postrevolutionary Iranian Novels in Persian and English* by Nahid Rachlin and Azadeh Moaveni.

11:30 a.m. UC 288.

#### TOASTMASTER'S CAMPUS COMMUNICATORS

Build your confidence in public speaking. Visit [9119.toastmastersclubs.org/](http://9119.toastmastersclubs.org/). Contact Donna Moore, [dmoore@uwo.ca](mailto:dmoore@uwo.ca) or 85159.

12-1 p.m. UCC. room 147B.

#### LUNCHTIME FINANCIAL WORKSHOPS

Faculty and staff are invited to three free workshops to get some advice on making the most of your pension plan, sorting out your savings options and on personal financial management. *Dollars & Sense: Personal Financial Management*. Debt management strategies that work, how to establish and stick to a budget, set financial goals and find a financial planner.

12:05-12:55 p.m. Talbot College, room 343.

#### DON WRIGHT FACULTY OF MUSIC

Gwen Beamish and friends celebrate Canadian composers.

12:30 p.m. von Kuster Hall.

#### VISITING SPEAKER IN CHEMISTRY

Ian Burgess, University of Saskatchewan. *Insights on Nanocrystal Formation and Stability Using Classical Electrochemical Techniques*. Visit [uwo.ca/chem/seminars/2012-2013.htm](http://uwo.ca/chem/seminars/2012-2013.htm).

1:30 p.m. Chemistry Building, room 115.

#### LEARNING SKILLS PRESENTATION

Maximize your memory. Register at [sdc.uwo.ca/learning](http://sdc.uwo.ca/learning).

3:30-4:30 p.m. Western Student Services Building, room 3134.

#### THE DEPARTMENT OF MODERN LANGUAGES AND LITERATURES

*La Tertulia*. Anyone wishing to speak Spanish welcome. Email [tertulia@uwo.ca](mailto:tertulia@uwo.ca).

4:30 p.m. UC 205.

#### BIOMEDICAL IMAGING RESEARCH CENTRE AND THE LONDON CHAPTER OF THE ENGINEERING IN MEDICINE AND BIOLOGY SOCIETY SEMINAR SERIES

Alexander Oraevsky, Tomowave Laboratories, Houston. *Laser optoacoustic ultrasonic imaging system (LOUIS) and its applications*.

5:30-7 p.m. Auditorium A, UHI, 3rd floor, room B3-246.

#### DEPARTMENT OF MODERN LANGUAGES AND LITERATURES

German Film Series. *Keinohrhasen (Rabbit without Ears)*.

6:30 p.m. UC 207.

#### LET'S TALK ABOUT EDUCATION SPEAKER SERIES

George Gadanidis, Faculty of Education. *I don't like math ... I love it! How to get kids and parents excited about math*.

7 p.m. Faculty of Education, room 1139.

**WESTERN NEWS**  
**40!!**

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### // ACADEME

#### PHD LECTURES

**Jacob Wibe**, Economics, *Essays on International and Environmental Economics*, Nov 15, N/A.

**Makoto Mikawa**, Music, *Anarchy in the Unity: Compositional and Aesthetic Tensions in Mauricio Kagel's Antithese*

für einen Darsteller mit elektronischen und öffentlichen Klängen (1962), Nov 19, N/A.

**Inusa Abdullahi**, Chemical and Biochemical Engineering, *Controlled Synthesis of Single-Walled Carbon Nanotubes by Methane Decomposition and their Application as Heterogeneous Partial Oxidation Catalyst*, Nov. 21, TEB 434, 1:30 p.m.

### // STUDENT BULLETIN

#### STUDENT CENTRAL IN-PERSON HOURS

Monday, Tuesday, Thursday and Friday from 9 a.m.-4 p.m. Wednesday from 10 a.m.-5 p.m.

#### STUDENT CENTRAL HELPLINE HOURS

Monday-Friday from 9 a.m.-4 p.m. 519-

661-2100.

#### MID-YEAR EXAMINATIONS

The mid-year examination period is Dec. 8-19. The end of term is Dec. 20 and students are advised not to book a flight until after this date. The preliminary examination schedule is available at <https://studentservices.uwo.ca/secure/Exams>.

#### SDC PSYCHOLOGICAL SERVICES

Got stress? Check out a variety of free multi-week psychological skill-development groups and psycho-educational lectures on such topics as: managing anxiety and stress, regulating emotions, and dealing with thesis stress. Space is limited. Registration required. Check out [sdc.uwo.ca/psych](http://sdc.uwo.ca/psych) for more information.

#### SDC WRITING SUPPORT CENTRE

The Writing Support Centre is open and ready to help you with your paper. Call

for an appointment 519-661-3655. Book early. Writing Workshops and GradWrite presentations are now available. register at [sdc.uwo.ca/writing](http://sdc.uwo.ca/writing). The Drop-in Writing Centre at Weldon is now open, Monday to Thursday, 2-7 p.m., and 12-3 p.m. Saturdays.

#### UNDERGRADUATE COURSE REGISTRATION DATES

**Nov. 30:** Last day to drop a full course and full-year half course (on campus day and evening and Distance Studies) without academic penalty.

**Dec. 1:** Last day to receive admission applications: Dentistry for 2013. Last day to receive admission applications, transcripts, and supporting documentation: Education for 2013. (If December 1st falls on a week-end or holiday, then the deadline date will be decided by the Association of Education Registrar's of Ontario).



## Western

Western News (ISSN0316-8654), a publication of Western University's Department of Communications and Public Affairs, is published every Thursday throughout the school year and operates under a reduced schedule during December, May, June, July and August.

An award-winning weekly newspaper and electronic news service, Western News serves as the university's newspaper of record. The publication traces its roots to The University of Western Ontario Newsletter, a one-page leaflet-style publication which debuted on Sept. 23, 1965. The first issue of the Western News, under founding editor Alan Johnston, was published on Nov. 16, 1972 replacing the UWO Times and Western Times. Today, Western News continues to provide timely news, information and a forum for discussion of postsecondary issues in the campus and broader community.

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## TODAY, WE ARE CELEBRATING THE 40TH ANNIVERSARY OF WESTERN NEWS IN THE ONLY WAY WE KNOW HOW – BY CELEBRATING WHAT WE DO WELL AS A UNIVERSITY.

In this special section, you will read about the **40 THINGS YOU NEED TO KNOW ABOUT THE NEXT 40 YEARS** thanks to insight provided from 40 (OK, 43, actually) Western researchers. Their assignment: Tell us what we should expect to see over the next four decades in their particular area of expertise.

As we're looking to the Year 2052, it took a bit of summoning their inner Ray Bradbury to write these pieces, but I hope you agree their reflections make for an interesting and exciting journey – no matter if they are talking neuroscience or James Joyce.

I think this is a fitting way to celebrate the last 40 years of this publication – by casting our eyes 40 years into the future.

But allow me a bit of reflection for one moment.

Over four decades, a cast of thousands has helped this publication become what it is: Editors, reporters, designers, advertising representatives, advertisers and printers. To each, thank you for your hard work.

From its earliest days, the support shown by this university is a tribute to

its commitment to such an open, honest forum for its people. This experiment in community journalism has not been without its starts and stops, but through it all, a wonderfully connected community has been built. Thank you to the university, and the many administrations throughout the years, for the support.

Lastly, and most importantly, thank you to our readers. As editor of a small community publication like this, I enjoy the relationships I can build with our readership. I enjoy helping them with the smallest detail or the biggest story. It's a true pleasure to be at your service as editor. Without you, and your involvement, we wouldn't be where we are today, nor will we get to where we want to be tomorrow.

And now, off to the future ...

Jason Winders  
Western News editor



BY JACQUELYN BURKELL

**YOU'VE BEEN CALLED IN** for a second interview for that job you really want.

Excited and nervous, you walk into the room where the interview panel has gathered. But something isn't right – and when the chair of the panel looks up from her computer, everything becomes clear.

"As you know," she says, "we conduct background searches on all our applicants – including a careful review of online profiles."

What's the problem? That depends.

In 2012, it is likely to be the photos from that wild party you were at last weekend – the ones your friend took and posted to his Facebook page, tagging you and everyone else who attended that never-to-be-forgotten event.

In 2052, it is more likely not having such photos – in fact, not having a rich and varied enough online presence – will be the cause of their concern. Because

in a world where surveillance is the norm, and digital archiving and sharing of life events is standard, the absence of those party pictures could mark you as someone antisocial, untrustworthy or, potentially, even criminal.

The problem won't be you shared too much, but rather you shared too little.

What happens to privacy in a world where sharing is not only the norm but a social requirement? The signs have been around for a long time.

In 1999, Scott McNealy, CEO of Sun Microsystems, (in)famously opined: "You have zero privacy anyway... get over it."

McNealy, and others who came after him, were focused largely on information that is collected, archived and shared solely within the online environment. Today's ubiquitous technologies, by contrast, are increasingly likely to knit together the online and offline worlds, with mobile

devices supporting real-time 'check-ins' that disclose your current location, surveillance cameras monitoring an ever-increasing number of street corners, and radio-frequency identification the size of a grain of sand that uniquely identify many of the objects you carry. The privacy implications of these technologies are even more significant.

We have yet to reach the world of *Minority Report* (admittedly, set in 2054) in which even our inner thoughts and indeed our futures are subject to surveillance, but there is no doubt the technology is headed that way.

Software developers are even now working on 'emotion recognition software' that can identify how you feel and serve up ads appropriately; it is not unimaginable we will eventually be able to use fMRI for brain 'surveillance' of thoughts, intentions and beliefs.

Every step of the way, we are presented with technologies that make our lives easier, safer, more interesting and more fun. And each technology invites us to share more of our thoughts, our actions, our intentions ... ourselves.

The march of technology is inevitable – the only question is how we, as individuals and as a society, will choose to control it.

So, what happens to privacy? If we follow the road we're on, the answer is clear. As Steven Rambam, a private investigator, pronounced in 2008, "Privacy is dead."

But right now, it is on life support and your finger is on the switch. You decide.

*Jacquelyn Burkell is a professor in the Faculty of Information and Media Studies, who is also associated with Western's Rotman Institute of Philosophy.*



# FUTURE OF OCEANS

BY CHARLES TRICK

**TO LOOK FORWARD 40** years, I need to look back a few decades. I need a running start for this discussion.

As a boy from the prairies, the oceans represent the greatest unknown on the planet. Like most bewildered youngsters, large meant powerful, solid, unmovable – like the Incredible Hulk. It meant mysteries, potential, exploration and exploitation.

It was there for the taking.

Yet it took very little time in my graduate studies to hear this vision was not only untrue, but almost the exact opposite of what I believed. The mysteries were there for sure, but the understanding was built on the unpredictable fragility of its biology, chemistry and physics.

At that time there were only two-three billion people on the planet, we earned and expected far less from the Earth by way of resources. Our personal footprint was smaller and global demands far less than today.

Yet, during a class by Dr. Karl Banse at the University of Washington, I learned of a monumental loss of an ocean species – a loss that would make the world less joyful, less interesting, less imaginative – forever. As he said at the time:

The mermaid had been weeded out and would be forever gone.

(That would be my first extinct species of significance, although the dodo bird comes a close second.)

For many, the mermaid was only known through caricatures, drawings and Saturday cartoons. But to Banse, mermaids existed. These sirens were a mix of folktales and characters on nautical charts. They called to landlubbers and sailors alike. They depended on the sea.

They perhaps got perturbed when two-legged land animals entered their environment – and then, perhaps, lured the curious out to meet them to the

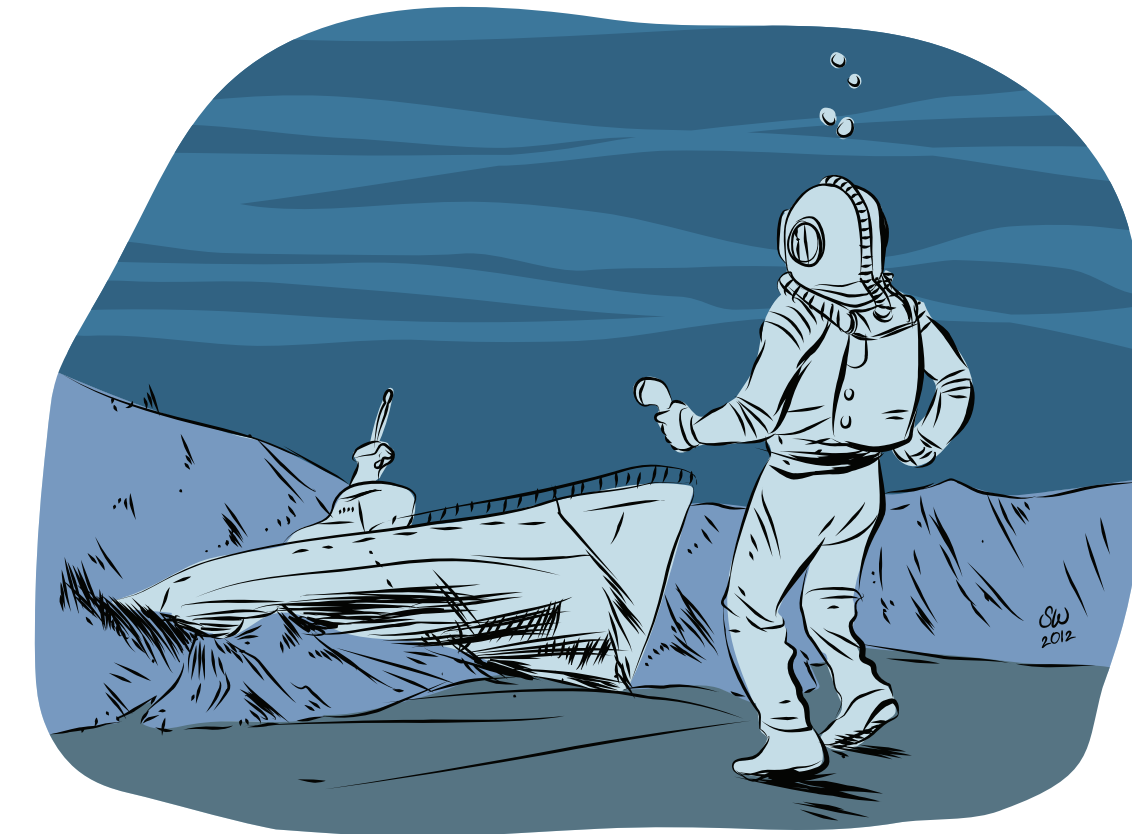


ILLUSTRATION BY SCOTT WOODS

visitor's ultimate death.

Their demise was not due to the aggression of the human hunter, but rather due to factory fishing removing the foundation of the food chain. It took a substantial number of steps in a food chain to meet the diet of the mermaid, and humans' increasing need for fish stripped the colder coastal waters. Mermaids starved with only smaller and smaller remnants, like the jellyfish, remaining.

Shrinking the steps in the food chain was the first attack by humans the oceans, and what a price we paid.

Today, we don't talk about mermaids –

but we are only seeing the last vestiges of the ocean, as we knew it. Since ocean ecology does not quickly disappear, we are witness to the age of the Zombie Ocean. Dead zones, bleached corals, lost fisheries, low-energy food chains giving us jellyfish instead of tuna and salmon.

Looks a lot like the old ocean; but it's not. But can it recover?

We have almost no ability to predict ocean ecology. We don't know the rules.

But what's even more dangerous, we think we know the rules. We think we can make predictions based on changes we have never had a chance to test or understand.

To paraphrase classical pianist Artur Schnabel's comments on Mozart: Solving the ocean health problem is "too simple for children, too complex for adults."

What we produce, ends up in the ocean. So stop the pathways and slow the release into the environment.

As the global population levels off, we will reduce the demands on the ocean. But with depleted soils and modified weather patterns (drought and flooding), we may seek even more from the ocean. We may take more because we cannot see the consequences.

The revenging of the ocean resources over the centuries has shown we can take

**The ocean is not resilient; it tends not to recover, but heads in a new direction – a new trajectory. The replacements are not always desirable and, usually, of lower quality.**

from the ocean at a pace far faster than the ocean can replace. And the ecological hole will be filled with an unpredictable ecology.

The ocean is not resilient; it tends not to recover, but heads in a new direction – a new trajectory. The replacements are not always desirable and, usually, of lower quality.

Now, that was the running start. Here's the leap to hope.

Oceans will always remain aloof from the hearts of most people. Humanity will be concerned about the margin waters – where we normal people swim and boat. And we will assume beyond the margin nothing damaging will be going on.

It's too big to damage. It's too large to care about. It's not resilient. It will not recover; it will transform and dwindle. And it is alone.

It needs a global vision of protection. It needs the care of a global community. It is my hope the world will stand up and say it's time to care for our wastes and adjust our demands.

We cannot ask our fragile neighbor to do what we have the ability to do ourselves.

*Charles Trick is a the Beryl Ivey Chair for Ecosystem Health in the Faculty of Science.*

UWOpera presents

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BY RAYMOND PIROUZ

**“MORE PRESSURE ON THE accelerator,”** Brenda suggests playfully. “You want to accelerate out of a turn, especially on sunny roads overlooking treacherous shorelines.”

The next turn comes so fast I can’t risk even the slightest glance away from the winding road ahead.

Brenda maintains her professional demeanor as I almost drive us off the cliff. “The energy storage and kinetic renewal technologies run the length of the vehicle, centered along its chassis, creating an even weight distribution that – when combined with the proper tires – produces the ultimate handling experience,” she proclaims proudly as I pull over to wipe the sweat off my forehead.

“I think I’m done for now,” I tell Brenda. “Maybe I can try it again tomorrow night?”

Brenda smiles, “You can try again anytime. I’m not going anywhere.” She hands me her business card. “Be sure to analyze your stats to see how you can improve next time,” Brenda instructs me, her voice trailing off as my eyes slowly open to the heat of the early morning sun.

“Good morning, Dave, you have a card from Brenda. Would you like me to project it?”

The soothing fairy godmother voice belongs to the amazing EnCon (short for *Engaged Consciousness*) add-on to my bedroom’s *Personal Health and Wellness Suite* of technologies. EnCon’s multiple sensors throughout my living quarters constantly scan for my facial features and respond to my various moods throughout the day with customizable tweaks to the environment – from soothing audio if I’m sitting down to unwind with a glass of wine to

automatic lights-out when I lay in bed and close my eyes.

When my eyes open for a set period of time after having been asleep, I am greeted by whatever voice I choose, but I like the fairy godmother and haven’t thought about changing it.

Amazingly, EnCon lets me know to go back to sleep if I happen to wake up too early (based on when it knows I tend to wake up). If you can believe this, it also acts as something of a guardian angel, alerting medical personnel if I fail to wake up or am unresponsive for an extended period of time.

My grandfather tells me that before I was born in 2023, personal digital assistants still lived in antique devices people carried around and used primarily to call other people. In 2052, however, digital assistants are like genies out of their bottles. They travel across the Internet of things and can communicate through any connected furniture or appliance in the home – from beds to couches, stoves and more.

Still in bed, I sit up and remove the PDS (*Programmable Dream State*) add-on module, an extremely light and flexible apparatus that fits around my head, and lay it on the bedside table. It communicates wirelessly with the *Personal Health and Wellness Suite* of technologies to deliver custom or random dream state content (DSC for short) based on my expressed wants, needs, preferences and desires.

I’ve been thinking of buying a new car lately so I’ve programmed my desire and have been solicited with exhilarating experiences for the past five nights.

I’ve been told – again, by my grandfather – that in the past, advertisers tried to convince people they needed their products or services, often through annoying or interruptive means. Today, we are rarely if ever interrupted by advertisers because we have so much control over our technology and environments.

Today, we express our hobbies, wants, needs and desires in the hopes advertisers are listening and ready to serve us with experiential advertising using technology. Some of my friends don’t drive because they’re totally into hugging trees and protecting what’s left of the environment. They’re not complete Luddites, however, because their dream state content revolves around hiking or canoeing trips to far-away locations or trying on the latest pair of Birkenstocks before they’re released to the general public.

My point is we’re all consumers of something or other, and rather than being hounded to buy into things we may not really want, today our wishes are fulfilled by advertisers who know how to use technology to engage us in ways that are most meaningful to us. Before experiential advertising, static images and scripted video represented preconceived norms for mass consumption and adoption.

The best part of experiential advertising is the fact even though certain products or experiences may be out of reach financially, they can nevertheless be experienced in our dream state consciousness for free in consideration mode, or a small fee for extended and enhanced experiential mode.

For instance, if I can’t afford to travel to Hawaii but

want to experience being there, I can pay a small fee to go to Hawaii (while I sleep) over a span of five dream states. In fact, I’ve slept all the way through Hawaii each summer for the past three years, but am thinking about New Zealand this summer.

“Yes, please project Brenda’s card.”

My bedroom wall illuminates with a *Tranz Motors* logo which fades to Brenda, the digital persona of a real-life brand representative who has shown me two different vehicles over my last two dream states. I’m curious to know how I did with last night’s vehicle because – as powerful as it was – it felt difficult to control relative to the first car Brenda showed me.

“Stats,” I command, and the projected image on the wall flips to reveal acceleration, braking, maneuvering, degree of control and other stats for each of the two vehicles I test drove. Just as I thought, even though the second vehicle was much more powerful, I did far better with the first vehicle.


“Deborah,” I command and the projected image flips back to Deborah and her smile. “Hi, Deborah, the last vehicle was too much for me and while I can see how to improve if I want to master it, I would like to try the third car tonight.”

Deborah blinks and replies, “Sounds great, I’ll have it ready for you. Any particular track you’re interested in?”

I think for a few seconds and respond, “Surprise me.”

*Raymond Pirouz is a Marketing professor in the Richard Ivey School of Business HBA and MBA programs.*





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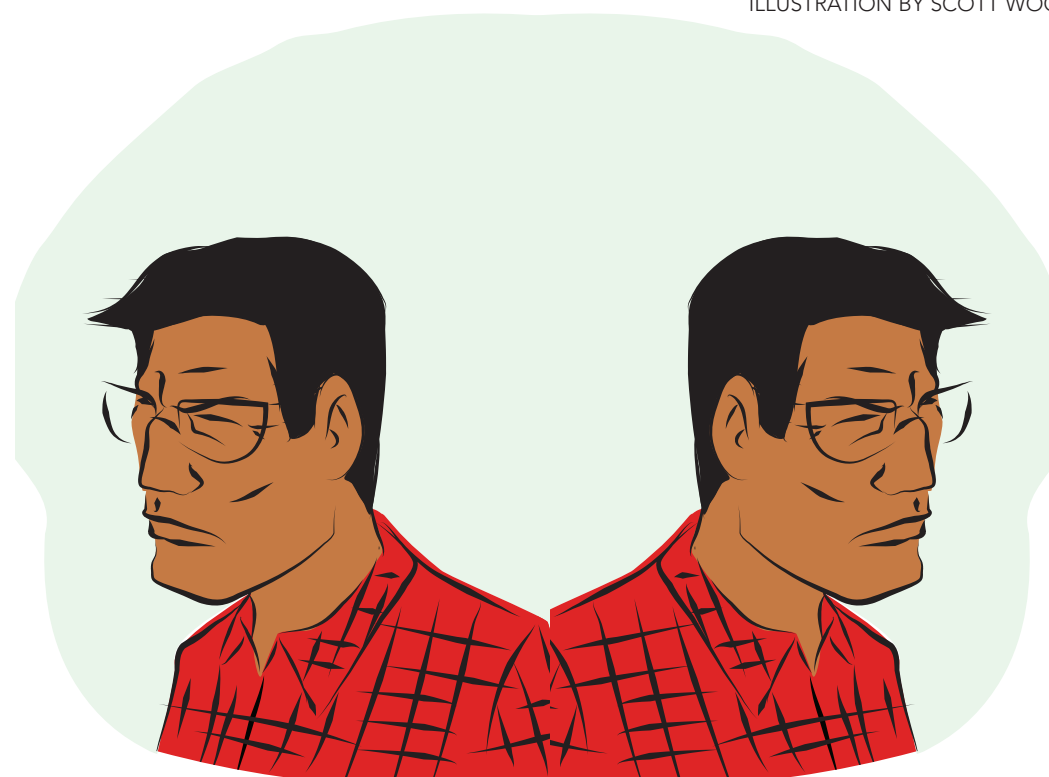


ILLUSTRATION BY SCOTT WOODS



# FUTURE OF RECONCILIATION

BY PAULINE WAKEHAM

**F**ar too often, when non-Native Canadians think of Indigenous peoples, they think of the past. Media images project fantasies of Natives posed in a romantic state of nature, frozen in a distant moment of history.

But the reality is different. Indigenous peoples are a vital part of Canada's present and future.

According to Statistics Canada and the Department of Aboriginal Affairs, Indigenous peoples are the youngest and "the fastest-growing segment of the Canadian population." In Saskatchewan, if current demographic trends continue, Indigenous people could comprise the province's majority population by the mid-2050s.

But what will this future look like? What does this mean for Indigenous and non-native Canadians alike?

The answers depend upon what we, as members of a diverse national community, do right now.

We are living during a time of reckoning with the history and ongoing effects of colonialism in Canada. The media, government and some Indigenous organizations have called the present a time of reconciliation. In June 2008, Canada became the first G8 nation and established liberal democracy to hold a Truth and Reconciliation Commission (TRC) — a type of forum usually convened in the aftermath of civil war or corrupt political regimes.

The fact the federal government and church organizations agreed to participate in such a forum suggests an implicit recognition that, within our own borders, gross human rights violations have occurred.

Canada's TRC is an independent commission tasked with investigating the history and continued impacts of compulsory residential schooling for Indigenous children, a system that, for more than a century, separated children from their families, prohibited the use of their languages and subjected many students to malnourishment and sexual and physical abuse.

But these are not the only violations Indigenous peoples have experienced under colonialism.

Colonialism in Canada also involved the expropriation of Indigenous lands, the forced relocation of Indigenous peoples to reservations and remote locations and, as legislated under the Indian Act, the suppression of Indigenous cultural practices and ceremonies, and the prohibition of Indigenous peoples' right to obtain legal counsel.

What does it mean to try to reconcile the terrible legacy of colonialism in Canada, a legacy that, for some, seems irreconcilable?

Across the country, scholars, politicians, lawyers, Indigenous leaders and communities are grappling with this question. Although there is no easy consensus, many Indigenous intellectuals and activists agree on several common themes. Reconciliation requires active remembering — not 'forgiving and forgetting' — so colonial violence is not repeated in the future.

Reconciliation must be about more than saying sorry; it must be about enacting social change. Reconciliation will remain hollow without forms of restitution, including the honouring of the Aboriginal and treaty rights already enshrined in section 35(1) of the Constitution Act. Reconciliation does not have a fixed end-point. It is about an ongoing process as the future continues to unfold.

Such a future of reconciliation in Canada — a future of honest dialogue, equity and justice — has the potential to be a great one. There are no statistical formulae that can ensure its arrival, but there are ways to start working toward it now.

Education and engagement are two vital elements.

As Justice Murray Sinclair, TRC chair, has frequently said, it was through residential schools so many problems were created and it is now through the education system we might resolve them. Too many generations of non-native Canadians have passed through the public school system without ever learning about the full extent of colonialism in our country. Too many generations of students have been denied the gift of learning about First Peoples through their own words and perspectives, their own extraordinary storytelling, writing, arts and ecological and scientific knowledge.

Such learning is key to combating stereotypes, cultivating respect, and building foundations for good relationships.

Engagement is the complement to education. To me, it means putting knowledge into practice, seeking out opportunities to participate in conversations, and learning to see the places we live or the people we encounter differently.

*Pauline Wakeham is a professor of Indigenous literary and cultural studies in the Department of English in the Faculty of Arts & Humanities.*



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# FUTURE OF CLIMATE

BY BRENT SINCLAIR

**I'M AFRAID I FIND** it hard to have a positive outlook for the biosphere in the next 40 years.

A lack of political leadership and will means we have almost certainly missed the boat for preventing significant climate change. In 40 years time, the biological impacts of our accelerating greenhouse gas emission will have moved from the subtle signals ecologists currently report to the blindingly obvious.

Unfortunately, climate change is only one of the drivers of global (and local) biodiversity change.

An expanding human population will continue to lead to wholesale habitat destruction and fragmentation as we seek new land to feed two billion more mouths. The expanded scope of international trade will have led to ever more invasive species with implications for disease, agriculture and biodiversity. Continued overfishing will likely have left us with empty oceans, having fished our way down the food chain so that only inedible species, like jellyfish, remain.

The impact of all of these changes on global biodiversity will be visible forever in the fossil record as a mass extinction event. For example, it is widely accepted that 30-50 per cent of frog species will be extinct by 2052. Invasive insects like the emerald ash borer will have decimated our forest diversity, and many birds that require unfragmented landscapes for breeding will also be gone.

This loss of biodiversity will not mean a desolate wasteland. As species diversity declines, weedy species, like European starlings or the garlic mustard that already dominates the understory of campus forests, will thrive.

We will have lost much of our biological richness, and exchanged it for a drab sameness the world over.

Sometimes I find grim solace in humanity's inability to control its resource use – the world's oceans may be saved by rising fuel prices which make fishing less and less economically viable. Increasingly, however, I do not see hope, unless there is a very big change in the way we collectively prioritize our energy and money.

Much biodiversity loss, in Canada and elsewhere, could still be arrested for a fraction of the cost of bailing out a medium-sized bank, but the political zeitgeist toward short-term economic gain means, at the current rate, by the time we get around to investing in nature, it will be too hard and too expensive.

It is still possible to change that, but I fear in 2052, we will be looking out on a warm, weedy, worse world, spending huge amounts of money conserving species we currently think of as common and trying to pinpoint where it all went wrong.

*Brent Sinclair is professor of Biology in the Faculty of Science.*



ILLUSTRATION BY JENNIFER WILSON

# FUTURE OF GAMING

BY MIKE KATCHABAW

**(THE LATE) NEIL ARMSTRONG** has been quoted as saying, "People expect too much in one year and not enough in 10 years."

This is certainly true of video games. While everyone waits (impatiently) for Nintendo's Wii U and the next generation offerings from rivals Sony and Microsoft that are coming in the next year or so, it's almost impossible to look out 10 years, let alone 40.

Let's look backwards for some perspective.

Forty years ago, video games were in their infancy. (So was I, for that matter ...) Pong was just emerging on the scene, and took the world by storm with its blocky, monochromatic take on table tennis. That was the state of the art in 1972, and people fell in love with it.

It's so hard to believe how far things have come since then – rich, vibrant worlds rendered in lush 3D, deep and immersive stories with interesting and believable characters, natural interactions through voice, gestures and motion, and expansive experiences that, in some cases, have no end to them.

Forty years ago, there'd have been no way to predict the state of gaming today. Technology that is commonplace today simply didn't exist back then. Our abilities to compute, interact

and present information have come so far, it's absolutely mind-boggling. (The typical smartphone carried around in your pocket can out-perform the top supercomputer from back then, using substantially less power, space and money.)

The relatively brief history of video games has shown time and time again that change and, at times, rapid, drastic, unforeseen change is the norm. One constant since the beginning of things, however, is their ability to immerse, engage and entertain.

Simply put, they've been fun to play, regardless of how primitive or advanced the technology has been.

So, 40 years out, we can expect technology vastly more powerful than what we have today, as well as technology not yet to be envisioned. This technology will allow the creation of games capable of doing much more than they can now, in ways we can't even begin to imagine.

No matter how much the technology evolves though, our games will still be fun. (And, if this then-octogenarian, is wrong, he'll be going back to Pong.)

*Mike Katchabaw is a Computer Science professor in the Faculty of Science.*

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# FOUR EDITORS REFLECT ON FOUR DECADES OF PUBLICATION

INTERVIEW BY  
**Paul Mayne**  
PHOTOGRAPHS BY  
**Paul Mayne**

An award-winning weekly newspaper and electronic news service, *Western News* has served as the university's newspaper of record for four decades.

The publication traces its roots to *The University of Western Ontario Newsletter*, a one-page leaflet-style publication which debuted on Sept. 23, 1965. The first issue of the *Western News*, under founding editor Alan Johnston, was published on Nov. 16, 1972 replacing the *UWO Times* and *Western Times*.

Today, *Western News* continues to provide timely news, information and a forum for discussion of postsecondary issues. Western News reporters publish not only in the Thursday newspaper, but also on the Daily News Service on the homepage. Revenue from advertising has grown to cover the costs of design, printing and distributing 10,000 copies a week, 34 times a year.

In four decades, *Western News* has had only four editors – Alan Johnston, Jim Anderson, David Dauphinee and Jason Winders. Reporter Paul Mayne recently sat down with those editors to discuss the dawn of and changes to the university's newspaper of record.

• • •

**WHAT WAS IT LIKE IN THE EARLIER DAYS - AND SUBSEQUENTLY AS THE DECADES CHANGED - IN DEALING WITH THOSE WHO FELT THE IDEA BEHIND STARTING WESTERN NEWS WAS TO HAVE A SOAPBOX FOR ADMINISTRATION?**

**JOHNSTON:** I don't think it's totally true. There was the student press at the time and you have to remember this was a period when the students were striving for a little more emphatic voice, so they were trying to get on board. The idea was to combine the *UWO News* and *Western Times* and take it into a broader circulation tabloid.

The student press was pretty hard on the administration, so I think they looked around and they said, 'Well, Waterloo has a tabloid.' I think they wanted an objective voice and they saw that we would support that. We'd make our own decisions editorially, but they wanted it balanced; you can do any story and they wouldn't look at it. I remember another colleague saying that everything probably went through the front office.

**ANDERSON:** I got it, too, when I was editor from some of the faculty – jokingly referring to it as Western's *Pravda* – but I don't really think that was the case. Like you said, some had the impression that all our copy was approved by the front office folks, and I used to tell them that we'd never get a paper out if that were the case. It would take too long. They read it when everyone else read it and sometimes we got negative feedback from administration, too.

There was a case when Paul Davenport was president, and I forget exactly what the story was that I wrote, it came up in Senate and people were questioning him about the story in *Western News*. I think it might have been about the possible closing of the dental faculty. They wanted to know what was going on and Davenport stood up and said 'Look, I do not control what *Western News* writes.'

**DAUPHINEE:** I was given the same line about it being *Pravda*, but I think that slowly went away. What takes it away is a change in generation of faculty. A generation that has an opinion and hangs on to it no matter what the facts are. It's not until they retire and new people come in with fresh perspectives do you get a more balanced perspective. The university pays the freight, so you follow the money and when it comes to a publication like this, you will find stuff in there that reflects the interest of the university, but there's lots of room for other stories as well.

For a university publication, we were on a very long string. And you earned that string through trust, reporting fairly and in an even-handed manner. You always knew they could jerk it back.

**WINDERS:** I think I heard the *Pravda* line from a faculty member after I had been on the job about 10 minutes. Honestly, my first thought was, "Who makes *Pravda* references anymore?"

**ANDERSON:** We were never told not to do a story. We were told to be fair and tell both sides. When I took over after Alan retired, I think a lot of it was testament to Alan and what he built and his leadership, but the reputation of the paper had been established over those years. The greatest compliment I ever got was one faculty member who told me he read the paper every week, although he didn't always agree what was in it. He knew what was going on in his own faculty, but not with the rest of the university, so it (*Western News*) was the only way he could find out. He made a point of reading it every week.

**ALAN:** My three key words in looking back are integrity, independence and quality, and I think those have stuck with the paper all along. Through my time, I had some five presidents and numerous senior administrators and open communication is what we upheld as an institution. They thought it should have more student stuff in it, even though there was the *Gazette*; faculty thought we should have more faculty biographies; staff



Alan Johnston is the founding editor of the *Western News*, serving the university community for 27 years, until his retirement in 2000. A graduate of the journalism program at Carleton University, Johnston worked at the *Kingston Whig-Standard* prior to joining Western. He continued to write freelance articles for the paper and assist in other Department of Communications and Public Affairs projects on a post-retirement basis.



An Honors BA (History) graduate of McMaster University, Jim Anderson worked as a reporter for newspapers in the Hamilton area before coming to Western in 1976. He was named *Western News* associate editor in 1983, and appointed editor in 2000, following the retirement of founding editor Alan Johnston.



After spending most of his journalism career at the *London Free Press*, which included him covering the 'university beat,' David Dauphinee came to Western in 2004 when Anderson retired. Dauphinee stayed until his retirement in 2010.



After spending most of his journalism career in The States, most recently as executive editor of the *Athens (Ga.) Banner-Herald*, Winders joined Western's Masters in Environment and Sustainability program in 2009, and then the *Western News* as its editor in 2010.

thought all we wrote about was faculty.

**EACH OF YOU LED THE PAPER AT A DIFFERENT TIME – LITERALLY AND FIGURATIVELY. HOW DID YOU SEE THINGS CHANGE UNDER EACH OF YOUR TERM AS EDITOR?**

**JOHNSTON:** There have been huge changes. One of the early changes I remember was the introduction of paid advertising in the 1980s. There were some hesitations and questions at first. I had some editors contacting me saying they'd never start advertising in their paper. We were doing it very well and it picked up momentum and it was paying for itself. It did create design issues.

**DAUPHINEE:** The design issues made the papers bigger. Sometimes you were driven in a particular week, not by what you planned in advance, but by the amount of space you were given.

**ANDERSON:** When I first joined as a reporter, I remember our basic papers, before advertising, were basically eight pages. Then it grew to 16 and sometimes 32. It became a space issue and we had to find ways to keep the paper under control.

**DAUPHINEE:** We used to do a piece on every PhD, right?

**JOHNSTON:** Ya, that's right. Weren't we also giving free classifieds when you joined us, Jim?

**ANDERSON:** That was to get them hooked in and later we started charging them. (Laughs.)

**JOHNSTON:** Can you imagine, we'd run two or more full pages of classifieds? We'd also run the entire Senate meeting notes, which was a nice offer to administration. In time we said, 'Hallelujah, we got rid of it.' Not that I had anything against Senate, but it took up a lot of space.

**THE INFLUX OF SOCIAL MEDIA HAS CHANGED THE WAY NEWS IS COLLECTED AND DISTRIBUTED TO THE MASSES. INSTANT NEWS, IF YOU WILL. HOW WOULD THIS HAVE AFFECTED YOUR TIME AS EDITOR?**

**DAUPHINEE:** It's just another way to get the information to the readers. The objective of any paper, such as *Western News*, is to serve the readers first and foremost; not administration or special groups, but the reader, whatever person you think that is. And if the readers change and now want their news in a particular format then who cares, you're still getting them the news.

I don't have a cell phone, so I'm one of those who have a hard time shifting technology. I can't personally see it changing the way the job is done. It's the same job just presented slightly different.

**JOHNSTON:** I don't want to seem like an old fogie, but there are still people out there who still like the feel of paper.

**WINDERS:** There are many, in fact. I hear it all the time, "Please don't stop printing the paper." I think that's why such a strong commitment has been made not only to the print product, but to a quality print product – one that looks good, feels substantial and reads well.

I am an audience guy, and short of reading it to them personally over their breakfast table, I'll deliver content to them any way they want. We're offering *Western News* to readers in at least a half dozen ways now, and I think each are exciting ways to get Western's news and views out there.

**WITH SUCH A LARGE TURNAROUND IN FACULTY, STAFF AND STUDENTS EACH YEAR, DID YOU FIND YOURSELF HAVING TO REINTRODUCE WESTERN NEWS ALL THE TIME?**

**JOHNSTON:** If you're talking about transitions, say from President (David) Williams to (George) Connell, for example, I don't think it was that rough. It was relatively smooth. They were all different.

**ANDERSON:** Each president had a different personality they brought to the job, and a different approach to things. It didn't really change the way we did things, however.

**WAS THERE THAT ONE BIG STORY OR EVENT EITHER OF YOU REMEMBER FROM YOUR TIME AT WESTERN**

**NEWS?**

**DAUPHINEE:** It was the year the Board of Governors office went to war with the President's Office over (Henry) Morgentaler getting an honorary degree. You had the president saying 'yes' and the chair of the board saying 'no,' and you had everyone else with their opinions. The office was inundated with thousands of letters and phone calls, a lot of them fine with it and others expressing concerns.

That was an example when a newspaper can serve a community by putting out all of these opinions, showing that we're open to all these opinions, and keep feeding them back to people and letting them make up their own minds.

**JOHNSTON:** You won award for that coverage, didn't you? (*Western News* was awarded a grand gold medal from the Council for Advancement for the Support of Education for its coverage of the awarding Morgentaler honorary degree.)

**DAUPHINEE:** That's right. We had to decide how we were going to cover this. The first day, when we did the story about his getting the degree, Jim did a story about all the people responding and you had a Q&A with Morgentaler. I see that as an example of where we were useful to the readers.

**ANDERSON:** For me the most memorable, or controversial event, I remember covering was surrounding Philippe Rushton. (He reported in his research that East Asians and their descendants average a larger brain size, greater intelligence, more sexual restraint, slower rates of maturation, and greater law abidingness and social organization than do Europeans and their descendants who average higher scores on these dimensions than do Africans and their descendants.)

A lot of people called on him to be fired, but the president said no and stood by behind the idea of academic freedom. The Premier of Ontario (David Peterson) demanded he be fired because he has so-called racist views, and the university refused. They said we don't subscribe to his theory but he has the right to speak his views. Similarly to Morgentaler, we got tons of letters both ways.

**JOHNSTON:** I remember they stole our animals. (Laughs.)

**LOOKING BACK AT YOUR TIME AT THE PAPER, WHAT WAS YOUR OVERALL EXPERIENCE LIKE AT WESTERN?**

**JOHNSTON:** I would say it was the most exciting and interesting years of my life. There were plenty of days when things didn't go the way I wanted, but they sure as hell were interesting. Administration, by and large, have always been supportive. Not necessarily in agreement (laughs), but supportive.

**WINDERS:** Well, it's because of these guys, and particularly Alan, that my job is as fun as it is today. They laid the groundwork, and I get to piggyback on the stellar reputation they built.

**ANDERSON:** There were times when I wondered, 'What have I taken on and am I crazy to be doing this?' Just like Alan, I found my five years as editor, and a bit more than 20 years as a reporter, very rewarding overall. I felt we were doing something important for the university. We couldn't afford to make too many mistakes because we had a lot of critics out there. You had to make sure that when it went in the paper it had to be right. Don't think I'd want to relive it though. (Laughs.)

**DAUPHINEE:** I went out on a high two years ago. It was a great job where I could probably try anything new because there was enough trust in me to do so, and I really liked that about my employer. If things didn't happen it was because I didn't make them happen. I was pretty fortunate that way. I have a hard time ranking jobs, but I'm really pleased with that chance given to me.

**WINDERS:** I am still amazed by, and quite frankly proud of, an institution that would support such a publication for its community. To support an independently edited publication like *Western News* speaks volumes on the university's commitment to an open community conversation. To be able to tell the stories of our people, as well as give them a window into the university's operations and research expertise, well, I am a lucky guy to be a part of that. I consider *Western News* a 40-year-old experiment in community journalism, yielding results which are perhaps even more important tomorrow than they were yesterday. **WN**



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# FUTURE OF REPRODUCTION

BY ANDY WATSON

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**WHAT'S WRONG WITH NORMAL** ways of reproducing? Well, nothing really. But even back in 2012, it was clear societal changes were enforcing dramatic shifts in how we reproduce.

Back then, one in three Canadian couples over the age of 35 required the assistance of a fertility clinic to conceive. That number seems incredibly low now (in 2052) as more than 80 per cent of all of our children come into the world with the assistance of a fertility clinic. In fact, only half of our couples decide to have children at all, and when they do, they tend to be in their late 40s or early 50s and most of the time have just one child.

Our overall reproduction rate is only three-quarters of a child per couple. This, of course, is well below our population replacement rate and, even with enhancements to immigration, Canada's population is shrinking; the overall world population has peaked and is beginning to slowly fall back downward as well.

What led to these profound changes? Education is a huge factor. Worldwide, the majority of women now complete high school and most also continue on to complete a university degree. In every country where the education of women has advanced that country has become less violent and more progressive. However, this is also accompanied in every case by sharp declines in population growth and family size.

Our civilization has also become more in touch with our impact on the planet and the most important principal driving our society now is 'sustainability' not 'constant growth'.

How have we adjusted to these profound societal changes? Well, science, as always, has led the way.

Even back in 2012, it was possible to produce children and families by the application of assisted reproductive technologies. Science was beginning to understand how to develop methods such as fertility preservation, create artificial gametes (eggs and sperm) and determine which embryos have the best chances of creating a pregnancy and which ones do not.

In 2052, it is now routine for everyone to have their genome sequenced, stem cells collected and banked, and put off having a family until the late 40s and early 50s simply because average lifespan is now well into the 90s for both males and females. To enable these events, it is now common for women to undergo ovarian biopsies so their ovarian tissue can be cryopreserved to retain their youthful fertility and be re-implanted back into their bodies later on to allow for natural conception to occur. In addition to extending their fertility, this also staves off menopause, improves cardiovascular health, reduces bone loss and greatly prolongs female longevity.

Human cloning has been possible for decades now, but is still considered to be unethical and thus is not used

as a reproductive technology in 2052. However, stem cells are now being routinely used to fight disease and maintain overall health. They are also being used to create artificial gametes that enable couples who cannot provide their own natural gametes to reproduce.

These methods of reproduction have freed couples to have a family when it is the best possible time for them to do so. Women no longer worry about a 'biological clock'. Very few unwanted pregnancies occur now and virtually all children are brought up in healthy family situations and nurtured to adulthood.

Science has allowed the application of these methods to the reproduction of animal species as well. We now have bio-banks where the genetics of every mammalian species is preserved. We have learned to apply assisted

reproductive technologies to ensure the reproduction of most mammals and this has had a direct impact on ensuring that endangered species will not disappear from our planet.

Collectively, these advances in reproductive science have disconnected intercourse from reproduction and have reinforced the social bonding of this intimate act, resulting in a much more benevolent society that is not perfect, but is certainly more idyllic - all due to a bit of science freeing us from the biological constraints of our reproductive function.

*Andy Watson is a professor in the Departments of Obstetrics & Gynaecology and Physiology & Pharmacology in Western's Schulich School of Medicine & Dentistry.*

IN 2052, IT IS NOW ROUTINE FOR EVERYONE TO HAVE THEIR GENOME SEQUENCED, STEM CELLS COLLECTED AND BANKED, AND PUT OFF HAVING A FAMILY UNTIL THE LATE 40s AND EARLY 50s...

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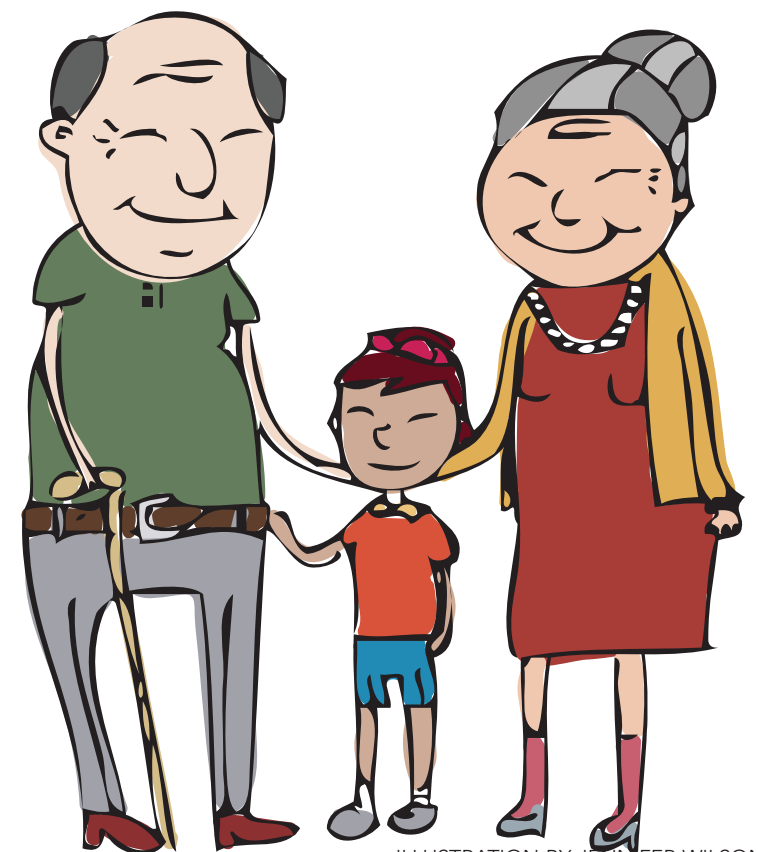


ILLUSTRATION BY JENNIFER WILSON



# FUTURE OF HUMANITIES

BY MARK MCDAYTER

**THE HUMANITIES, WE ARE** being told, has no future as technology has already rendered it obsolete. There is little new in this, of course; the demise of the humanities has been imminent for at least 30 years. What is, perhaps, different now, is it has a new champion, one that will putatively reinvigorate and renew our disciplines, but simultaneously cause some disquiet among many it has come to 'save.'

That champion, the digital humanities, resides at the intersections of traditional humanistic learning and new digital technology. It employs code, markup, visualizations, and data mining to produce fresh insights into old texts and images. As such, it is unsurprisingly viewed with suspicion by some.

Can technology really save us from technology? These digital innovators think so.

Some have asserted all future humanists will be digital humanists. Is this arrogant? Perhaps. Yet are we not already halfway there? If you've ever used an online library catalogue to find a study of the novel, read an

electronic article on a work of art, Googled a subject relevant to the history of philosophy or even just used word processing software to write a lecture, you have been, in some sense, 'practicing' digital humanities.

If technology is the 'enemy,' it is not merely at our gates; it is lounging in our banquet hall, loudly ordering dinner.

And this is just the beginning. Within five to 10 years, the textbooks from which we teach will be almost exclusively digital, and so too will be the venues in which we publish. Digital pedagogy – in online courses, or through 'blended learning' – will similarly be commonplace. These are not daring prognostications; they are near certainties.

The issue then is not whether the humanities will be 'digital'; it is whether we will be masters of our own virtual house. There is some danger that we will not. The online and computing tools with which we teach, research, and write were not designed by or for us. Embedded within these technologies, even down to the level of code, are ideological and theoretical

assumptions that are often deeply alien to what we 'do' as humanists.

We are too often like gardeners trying to cultivate a flower bed with wrenches, hammers and screwdrivers.

This is why digital humanists are not mere consumers or critics of technology; they are builders and tool-makers. These tools enrich rather than threaten humanist inquiry, and ensure that it is we who control our technology, and not the other way around. And they are teaching their students how to build and control their own technologies too.

Digital humanities, then, will ensure the arts and humanities continue to thrive and generate invaluable insights into our lives. It will empower the humanities by placing at our command digital resources made by humanists, for humanists.

For this reason, I, for one, will welcome our new digital overlords. I will welcome them because they will not really be 'overlords' at all – they will be us.

*Mark McDayter is an English professor in the Faculty of Arts & Humanities.*

# FUTURE OF WORKPLACE AND DOMESTIC VIOLENCE

BY PETER JAFFE

**IN THE NEXT 40** years, domestic violence will be a rare occurrence.

Warning signs of violent and abusive relationships will be apparent to friends, family and co-workers. Potential victims will receive support. Potential perpetrators of abuse will be encouraged to get help and think about how their behaviour affects others. Prevention programs in workplaces, colleges, universities and schools will be an integrated part of the environment.

In the next 40 years, schools will be reporting on the quality of healthy relationship among students on dimensions such as respect, responsibility, equity and inclusiveness – the scores on these relationships will be seen as critical as math and English achievement levels.

*Peter Jaffe is a Faculty of Education professor who holds cross appointments in the departments of Psychiatry and Psychology.*



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# FUTURE OF SPACE EXPLORATION

BY GORDON OSINSKI

**IF ONE LOOKS BACK** at the last 40 years, there have been incredible accomplishments and technological advancements and amazing scientific discoveries. But it is also worth noting it has been exactly 40 years since any human stood on another planetary body. (In December 1972, U.S. astronauts Harrison 'Jack' Schmitt and Eugene Cernan spent three days exploring the Moon during the Apollo 17 mission.)

During the next 40 years, we *will* see humans venturing forth once again into the solar system. This time, however, it will be to stay.

If we could fast-forward a thousand years and pick up a history book, I am sure we would see the next 40 years portrayed as the second space revolution.

Why such a bold statement?

Regardless of what is going on with the world's national space agencies, we have entered a period where space travel is no longer the remit of government agencies. Indeed, 2012 has seen the first launch of a private rocket to the International Space Station (SpaceX's Falcon 9 rocket). Other companies are in hot pursuit.

In 2013, we will witness Virgin Galactic launch its first commercial space tourism flight. There are already more than 500 people signed up for the \$200,000-per-person ride into space.

Flights into low Earth orbit will become routine and space travel will be within reach of a large part of the

world's population. Within the next 40 years, costs will fall and, whereas today a trip of a lifetime may be a cruise to Antarctica or climbing Mount Everest, it may be a trip in to space. How cool would that be?

Another important development is the extraction of resources from asteroids and other planetary bodies in the solar system. This has largely been in the realm of science fiction until recently. But with new private companies, such as Planetary Resources Inc. (backed by multiple billionaires and the likes of director James Cameron), we will see an economically viable market for mining in space by 2052.

This commercialization of space travel will also have major implications for government space agencies. In essence, as noted by John Holdren, U.S. President Barack Obama's chief science adviser, "This expanded role for the private sector will free up more of NASA's resources to do what NASA does best – tackle the most demanding technological challenges in space, including those of human space flight beyond low Earth orbit."

So, what are the frontiers for space exploration beyond?

Sample return missions to the Moon and Mars are some of the highest priorities for the international scientific communities. A Mars sample return has been in the planning stages for decades, but always

seems to be 20 years in the future.

In the next 40 years, this *will* become reality. It has to.

The motivation for the return of samples from Mars is simple. We will never be able to send instruments to Mars as capable of those in laboratories on Earth. And the questions we're asking – such as "Is there life on Mars?" – are so complex they can likely only be answered by extensive analysis of rocks in multiple laboratories on Earth.

But why return to the Moon? We've been there, done it, haven't we?

Well, actually, we haven't. We landed at six locations on the nearside of the Moon. We've never landed on the farside of the Moon or the polar regions. And, as seen in recent orbital missions, these are some of the most interesting locations.

Indeed, there have been major discoveries on the Moon in the past couple of years. We've discovered water ice, regions of eternal sunlight, and weird rock types we never thought possible. Together, these results have shattered our view of the Moon as a geologically simple and 'dead' planetary body. We must return.

These future sample return missions to Mars and the Moon will likely be with robots. But what about humans?

Within the next 40 years, I am certain we will return

to the Moon, step foot on Mars and may land on an asteroid, too. Just as it did 40 years ago, this will inspire a new generation of scientists and engineers capable of tackling some of the most challenging questions.

If we look beyond our closest planetary neighbours, there are many exciting places to visit. Some of the moons of Jupiter and Saturn – such as Europa and Enceladus – may harbor life at the present-day under thick icy shells. Titan, with its lakes of liquid methane and other carbon compounds also possesses the building blocks of life.

Some of the most exciting discoveries may come from outside of our solar system. The next generation of space telescopes will have the capability to detect Earth-like planets around stars literally millions of light years away.

The next 40 years will be the most exciting ever in the history of space exploration – a time where the gap between science fiction and reality are finally narrowed. The number of people who have ventured into space will no longer be counted in the hundreds, but in the thousands. And we will finally answer the age-old question, "Are we alone in the Universe?"

*Gordon Osinski is the NSERC/MDA/CSA Industrial Research Chair in Planetary Geology in the Faculty of Science.*



# FUTURE OF LITERARY MASTERS

BY MICHAEL GRODEN

**JAMES JOYCE'S ULYSSES, THE** novel I spend much of my time teaching and thinking and writing about, is full of predictions, as chapters confidently assert what will happen in a horse race later today, in the careers of men in public life and in their friends' futures. Occasionally, these characters' predictions are correct, but usually they are wrong.

When experts were asked in 1999 to predict which then-prominent literary works would still be famous in another hundred years, *Ulysses* was at or near the top of most lists. When other knowledgeable literary people were asked which works would be forgotten a century later, *Ulysses* headed many of those lists, too.

I take these examples and my own generally dismal record of prediction as warnings about feeling too confident about anything I might say about the future.

*Ulysses*, however, is that threatened species: a book.

Joyce wrote his novel with an awareness it would be printed in magazine pages and as a book. He also did what he could to both exploit and extend the possibilities of fictional works in print and to overcome limitations that he perceived.

For example, *Ulysses* includes poetry, 150 pages of playscript and musical settings. Long sections avoid paragraph breaks and even punctuation; a chapter that takes place in a newspaper office looks somewhat like a newspaper as large, boldface, upper-case inserts resembling newspaper headlines interrupt the text every 15 or 20 lines.

*Ulysses* is very much tied to its physical existence as a book in print. Substantial parts of it are lost when it is presented

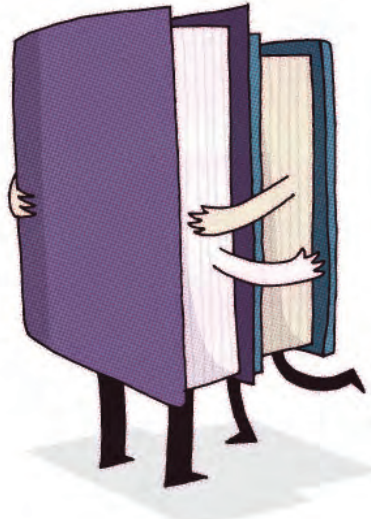


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ways in which iPhones, iPads, Kindles and other smartphones and tablets would come to pervade society, it would be folly to speculate on the forms those machines might take.

Many, but probably not all, works written for those machines will differ greatly from works written for print. And that is all to the good.

Perhaps *Ulysses* will be read in its original form only in rare-book libraries. If most people encounter it on a screen, some of its features, even ones some of us consider crucial, will be stripped of the significance they enjoy in a print text: the newspaper episode's use of headline-type inserts, for example, will not mean much to people who have never read a print newspaper.

Much will be sacrificed, but, importantly, much also will be gained.

Easily accessible annotations, photographs of buildings that are named, audio versions of mostly forgotten songs that are mentioned or sung in the text might make some difficult aspects of *Ulysses* less forbidding and turn a reading experience as a digital text into, as they say, the new normal. I take heart from the students I have had the honor to teach – students who, faced with all kinds of reasons not to read, have not only persisted in reading literature but have become Honors English majors and graduate students in English – and predict that *Ulysses*, and other works of serious literature from the past and from times to come, will continue to find audiences and continue to thrive.

Michael Groden is a Distinguished University Professor in the Department of English in the Faculty of Arts & Humanities.

in digital, audio, graphic form, as it often is today.

In what is sometimes called the 'late age of print,' however, what is really lost?

Homer's poems were originally spoken aloud; Chaucer's presented only in manuscript form; Shakespeare's in print but with unstandardized spelling and punctuation so that many of its words and sentences can look unrecognizable to us in the 21st century.

And yet *The Iliad* and *The Odyssey*, *The Canterbury Tales*, *Hamlet* and *King Lear* all continue to be read.

Forty years in the future, reading will surely seem like a quite different activity from the way we think of it. Perhaps people will read mostly on digital machines, although, since no one even six years ago would have imagined the

# FUTURE OF SUSTAINABILITY

BY ROBERT KLASSEN

**SUSTAINABILITY FOR BUSINESS TRANSLATES** into effectively managing the triple bottom line – financial, environmental and social outcomes – whether now, or 40 years from now. Will business be more sustainable in four decades? I see both signs of hope, and indications history will repeat itself.

But let me begin with three quick caveats. First, natural resources always will be crucial for business (and us). Second, business is making much progress, and continued progress is expected, but the pace of change will not be faster than consumers and communities are willing to substantively support (beyond mere lip-service). Finally, a forecaster is always wrong, but like horseshoe pitching, being close counts.

For business, two key resources will become ever more important: energy and water. To be sure, access to inexpensive energy limits growth and widens the divide between those that have and those that don't.

The good news is I expect us to make significant strides toward non-carbon energy. Nuclear energy will grow in absolute terms. But thankfully, with accelerating technology improvement, renewable energy will form a greater portion of this non-carbon energy.

Perceived social costs and risks also increasingly favour renewable energy.

Now the bad news: I expect the speed of this transition depends on the cause of the next global crises – economic, environmental or social. (For a variety of reasons, we can all predict that a crisis of some form is unavoidable.)

For example, you might recall the financial crisis of 2008 derailed many development efforts for renewable energy. Consumer-driven cost pressures further prompted faster development of inexpensive carbon-based fuels (e.g., natural gas fracture drilling).

So, while I predict the 'slow-train wreck' crisis around global warming will push firms to ramp up intended development of nuclear and renewable energy, one must assume we dodge catastrophic economic crises. If another large-scale financial crisis occurs, society will again favor low-risk, inexpensive carbon-based energy, to the detriment of our climate.

The second key resource, water, is both different, and yet, very much related. Water has few substitutes other than conservation and reclamation. So, business will rush to expand business models and develop technologies that purify and conserve water (inexpensive energy might help, too).

But global warming and market growth can be expected to exacerbate current water shortages. Thus, a negative spiral occurs: economic crisis spurs use of inexpensive carbon-based fuels, which accelerates climate change, which further raises water and food prices. And higher prices for these staples spurs more use of carbon-based fuels.

Overall, not a pleasant set of predictions.

So, for me, making substantive gains in triple bottom line sustainability in 40 years comes down to a push by both business and the regulators to improve financial governance, accountability and transparency, while simultaneously investing in renewable energy and water conservation.

We will not get every one of these 'bets' exactly right, but like a portfolio manager, supporting multiple approaches to these issues will yield high-value sustainability winners.

Robert Klassen is the Magna International Inc. Chair in Business Administration in the Richard Ivey School of Business.

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# FUTURE OF THE PAST

BY ELIZABETH M. GREENE

Students always ask in my archaeology courses: “But hasn’t everything there is to find already been found?” And I always tell them: “Goodness, I hope not, or I’d be out of job.”

In reality, I know not.

Forty years ago, archaeologists weren’t too concerned to take a soil sample of every square metre of earth they removed the way we are today; or to consider microscopic data such as seeds and pollen analysis to discover new info about landscape and diet of people in the past; nor did they use isotope analysis of teeth to discover where an individual spent their childhood.

We had certainly come a long way since the days of Heinrich Schliemann wandering the sands and fields of Turkey and Greece with his Homer texts, searching for the legendary centers of Troy and Mycenae; but it would have been difficult to imagine, even 40 years ago, the incredible level of detail we can now attain about the human past from hundreds and thousands of years ago – especially considering this information can come from a four-litre bucket of soil.

The other thing I tell my students is they better hold onto their hats this year because one never knows when archaeology will change, when a new discovery will alter everything I’m saying right now.

Okay, so it isn’t always that exciting, but it can be.

Archaeology is a constantly moving target. One day I’m telling students this or that building is absolutely unique in the archaeological record of Italy, and then I get a ‘bing!’ from my Explorator feed, and oh look, they’ve found another one of this or that building. Suddenly, it’s not so lonely out there in the Roman countryside and our viewpoint shifts, our analysis changes, our understanding of life in the ancient world takes a new trajectory.

So no, not everything has been found; I would argue that we’re not even close.

The next 40 years have as much promise as the last 40.

We will continue to squeeze as much information out of single bone, a bucket of soil or perhaps gain this knowledge without taking spade and trowel to the earth.

We can already see below the ground with geophysical prospection equipment, but this will become more reliable, will look deeper into the earth and who knows, a new technique might even collect isotope data and photograph some seeds while it’s down there, without ever even breaking the soil.

Now, I happen to like to make mud patties and get a little bit dusty, so I’d prefer to keep my trowel handy for now, at least until I retire just a bit before 2052. Still the innovation is endless, and it’s not all microscopic.

There are whole cities out there waiting for us to discover, lying dormant under meters of soil, water, rubbish, brick and concrete. Somewhere in the earth around the Mediterranean lie inscriptions written by Romans that will change everything about how we view imperialism or cultural change. Somewhere in the Middle East, there is a complex awaiting discovery that will alter our conception of the relationship between humans and their gods.

We will find new ways to analyze old data. Scientific testing such as ceramic petrography, which takes thin sections of pottery to determine clay sources, will become hand-held and commonplace enough to keep next to the trench for immediate identification of origin and trade patterns. We will do away with clunky and time consuming total stations that survey archaeological features and with a wave of a hand and a click of a button we will produce 3D models of our work that will be ready for analysis in seconds in front of us. We will upload this information into a worldwide database to click in with its immediate surroundings, to fit into its world, to be used immediately by other researchers ...

... Unless, of course, it was all built by aliens and they return with the manual ...

Until then, you’ll be happy to know archaeologists of today are always thinking about the possibilities of tomorrow, so much so, we intentionally leave parts of sites untouched, awaiting these new technologies.

Time to get to work.

*Elizabeth M. Greene is a Classical Studies professor in the Faculty of Arts & Humanities.*

# FUTURE OF JUSTICE

BY JOANNA QUINN

**THERE ARE TRADE-OFFS BETWEEN** the kinds of justice that victims and others rightly demand, and the compromises that must be made to take dictators and warlords out of power, or to maintain the functioning apparatus of government, and so on. Such was the case, nearly 50 years after Nuremberg, when the United Nations set up international criminal tribunals for the former Yugoslavia and for Rwanda.

With the intense demands presented by the large-scale violence that has taken place in the years since, transitional justice has been stretched every which way. A number of unique ways of ‘doing’ justice has resulted – one that simply couldn’t have been envisioned even a couple of decades ago.

More than 35 countries have opted to use truth commissions, for example, in the aftermath of abuse. The Canadian Truth and Reconciliation Commission is one example of this, established as a result of the Indian Residential Schools Settlement Agreement in 2008. In other cases, successor governments are taking responsibility for their actions and appointing their own judicial bodies to decide fairly and impartially what should be done with those people who have committed illegal acts. Some governments have even issued apologies to the people who were harmed.

Of course, the establishment of a permanent international court, the International Criminal Court (ICC), that stands as a court of last resort, when countries are themselves either unwilling or unable to act, is a significant step forward.

My own work is in Uganda, the scene of untold violence at the hands of rulers such as Idi Amin. It is home to a number of different transitional justice experiments, including two truth commissions and a referral to the ICC. More than 20 armed insurgencies have been carried out against the current president – himself a rebel leader who seized power by means of the gun.

To be sure, African countries present their own unique circumstances, not least of which has been a reluctance on the part of the international community to engage in activities to support African states in making credible and legitimate decisions around questions of succession and transition.

And yet, looking ahead to what the next 40 years will bring, I am optimistic.

The dramatic rise in the amount of attention being paid to transitional societies today indicates a growing awareness of the needs of communities after conflict. There is no doubt this consciousness will continue, and efforts will be redoubled to become much more responsive to the needs of these communities. This will mean, for example, countries like the United States will need to become more open to solutions like the ICC. Through continued engagement, these mechanisms will become stronger and more effective.

The international community has already begun to move beyond the kinds of ‘cookie-cutter’ mechanisms that were employed in post-war Germany and Japan, to consider more specialized and appropriate methods of dealing with these kinds of crimes. New and innovative ways of responding will continue to be developed. As they do, the mechanisms by which criminal masterminds are held accountable will become more responsive, and the instruments themselves finer and sharper.

As nationals of countries like Uganda are able to attain levels of education that allow them to perform on the top international stages, ‘Made in Africa’ (or Latin America, or elsewhere) solutions, using traditional methods but coupled with the latest jurisprudence from around the world, will produce more appropriate outcomes – based on customary understandings and circumstances. By incorporating thinkers from around the globe, the way justice is done will become more nuanced and sensitive.

Indeed, as the world becomes a smaller place, the importance of fields like transitional justice will have a deeper and more lasting impact.

*Joanna Quinn is a Political Science professor in the Faculty of Social Science.*





ILLUSTRATION BY SCOTT WOODS

# FUTURE OF NEUROSCIENCE

BY ADRIAN OWEN

**WITHIN THE LAST 40 YEARS**, extraordinary technological developments in the field of brain imaging have produced a cornucopia of new techniques for examining both the structure and the functioning of the living human brain.

Exquisitely detailed anatomical images, acquired through computerised tomography (CT) and magnetic resonance imaging (MRI), can now be combined with moving pictures of the brain 'in action,' acquired with positron emission tomography (PET), functional magnetic resonance imaging (fMRI), high-density electroencephalography (EEG) and magnetoencephalopathy (MEG), to investigate many different aspects of normal and abnormal brain function.

In line with this technological revolution, there has been a relative explosion of scientific articles, journals and books devoted to all aspects of brain imaging – from no-nonsense descriptions of the basic physical principles to ingenious studies designed to shine a light on the very essence of what it means to be human.

Media interest has never been higher. It is a rare week, indeed, when a brain imaging study claiming to have unearthed the neural basis of jealousy, fear or the love of chocolate does not hit the international headlines. Such coverage has also had a measurable effect on popular culture. Several recent best-selling crime novels have relied on these new brain-imaging methods to drive plots, while Hollywood hasn't been slow to equate 'brain imaging' with 'mind reading' for the purposes of family entertainment.

In short, extraordinarily rapid advances in neuroimaging technology have had an enormous impact on the way that both scientists and society view the relationship between brain and behaviour.

And herein lies the main problem for any observer bold enough to try to

predict the next 40 years; brain imaging is technology-driven. The rate of progress in this field is so rapid that any prediction about what will happen next is likely to be obsolete even before it is printed.

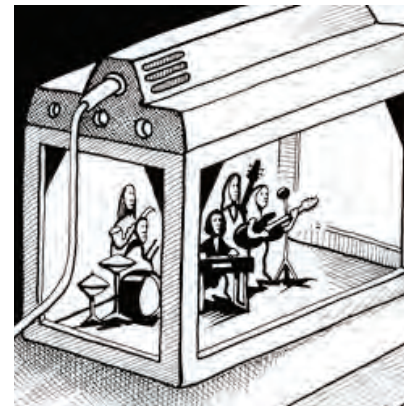
That said, one thing is certain: Regardless of what emerges technologically to allow us to acquire images of the human brain better and faster than ever before, what will undoubtedly change is what we will learn to do with that information.

Right now, the gulf between technological know-how and depth of understanding has never been wider and many of the most recent developments in this field have yet to find solid applications in the real world. That is to say, the development of reliable, valid and efficient means for interpreting and understanding the information contained within a single scan of the human brain still lags far behind our ability to acquire these beautiful images.

With advances in cognitive theory, computational modeling and systems neuroscience, this gap will close. This change is likely to be most keenly felt in the field of clinical neuroimaging. Thus, although both functional and structural brain imaging have already contributed dramatically to our understanding of the causes of various medical conditions, their diagnosis and management, the real clinical promise of many of the latest technical advances, has yet to be fully realised.

Forty years from now, a typical 'brain scan' will be as unrecognizable, awe-inspiring and magical as the scans of today must have been 40 years ago.

*Adrian Owen is the Canada Excellence Research Chair in Cognitive Neuroscience and Imaging in the Faculty of Social Science.*



# FUTURE OF MUSIC

BY OMAR DANIEL

**O**ften, we think of music as entertainment. We go to a concert, enjoy familiar tunes and go home hopefully feeling at least as good as when we arrived. However, for me, music has the potential to bring one into the realm of the unknown, closer to the unknowable, and finally, to a state of grace.

Artistic endeavour will play a crucial role in the coming years. The performing arts provide perhaps the most binding experience in a world where people are inclined to interact with one another through an electronic medium, or even with the electronic device itself. Live music will remain one of the few compelling reasons for us to venture out of our discrete cubicles and cubbyholes and participate in the community of living things.

The best moments in my life have been when I have allowed myself to be part of this community.

To participate in music making at the highest of levels, facilitated by my presence here at Western, is a gift as well as a responsibility. University music programs are the place where the search for truths about human existence must be nurtured; the researcher/teacher free to explore new ways of creating the magical bond between creator, performer and listener and the student eager to boldly and bravely carry the torch of artistic endeavour into the future.

Art is never static, and the next few decades will demand of artists the greatest feats of craft and imagination.

*Omar Daniel is a Composition professor in the Don Wright Faculty of Music.*

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BY CONSTANZA BURUCÚA



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In 1995, to celebrate the 100th anniversary of the French *cinématographe*, the Lumière Museum gave the original film camera and projector to some of the most interesting and well-respected film directors of our time, inviting them to shoot a film in the same conditions that the pioneers used to do it.

The short experiments are collected in a film called *Lumière and Company*.

The people from the museum also took this opportunity to pick the brains of these filmmakers asking them a few questions about the 'nature' of cinema. One of these questions concerned its death: Will cinema die?

Mikael Haneke, always as lucid as his films, bluntly argued that, like every other living organism, cinema is meant to die ... but, of course, only in the sense it would necessarily transform into something else.

If we think about it, the device crafted by the Lumière brothers and, for that matter, also the one made by Thomas Edison (the kinetoscope), as well as that of every other inventor who, at the turn of the century, came up with a similar piece of equipment, has been mutating ever since its inception.

Looking at the history of cinema in terms of the medium's technology, we can count its many lives – before and after the advent of sound, before and after the use of color and Technicolor, the impact of digital technologies and CGI (computer generated images), 3D, IMAX and whatever will come next. And something

similar could be argued in relation to how much our patterns of consumption have changed since television, followed by the introduction of home video, began to compete for audiences with film theatres.

There are now screens of all sizes, in theatres, at home, in computers and in a wide range of portable devices (from DVDs to mobile phones and tablets). People now enjoy movies – and all sorts of moving images – when and where they want, and the use of the word in plural, movies, is purposeful because the multi-screen mode of audiovisual consumption is becoming ordinary.

Every day, millions of people watch more than one film and/or TV show simultaneously while also discussing them in online forums and social media.

Acknowledged as a fast-growing phenomenon, even by the most mainstream sectors of the industry, which, in their aim to maximize profits, are now beginning to conceive new projects in terms of multi-platforms, multi-formats and multi-screens. This new habit is radically changing the way stories are being narrated, images are being produced and, perhaps more importantly, the way we perceive them.

At the same time, never before has so much audiovisual content, from almost every corner of the planet, been readily available for us to watch – primarily, though, if you have an Internet connection, a condition that actually leaves most of the planet's population outside of the picture.

So, predicting what will be of cinema in

the next 40 years is perhaps as difficult now as it was 40 years ago to imagine that something like the Internet was going to change so radically the way humans communicate, the way we learn, the way we read, the way we watch (films and otherwise).

However, having been invited to participate in this kind of fun game of predictions, I would venture to say, in terms of content or stories that we are going to be offered by the films to come in the next 40 years, there will hopefully be a few utopias, or these exercises of the imagination in which human beings transpose the present into the future from an optimistic perspective, and there will surely be even more dystopias, or those tales of hopelessness in which the future appears to be even bleaker than the present.

I would also dare to argue what is currently perceived as a renewed passion for documentary filmmaking will transcend the fashionable to become something more established than a trend, given our infinite interest for humankind, its deeds in all its forms and the world we live in, is being somehow matched by both the technology and the media which, by their very 'nature' and the many ways in which they are being used, are gradually and steadily opening up to an increasing democratization in the circulation of contents.

*Constanza Burucúa is a Film Studies professor in the Faculty of Arts & Humanities.*



ILLUSTRATION BY SCOTT WOODS

# FUTURE OF POP CULTURE

BY TIM BLACKMORE

I have to laugh silently (who laughs out loud in this crammed world of ours without bringing the lifebots?) when I look back to what my grandparents (too bad their brains exploded during the first Implant Wars — they were 35 years young, all five of them) called the ‘media cycle.’ They tried to tell me that classically™™abUsed™™, washed up once were objects like Snooki appeared on what they called ‘crowd-sourced’ media like YoursTube (or something) to make themselves into hits.

And ‘viral’? That was before everyone caught BugZilla, a neural update that gave half its victims a stroke because it subjected them to a 24/7/365 supermix of ABBA mashups. What a way to go.

Nobody calls something viral by accident these days — it isn’t a metaphor. Last week, I saw someone suffering the last stages of Eimboz, a virus downloaded from the Zombie channel — they had almost fully regressed to age 12.

Now that’s a nightmare; relive your adolescence every week.

A lot of people dropped the show, but the channel more than made up for it by signing on oldsters over the age of 30. If I ever live to 30, I won’t be doing Zombie, that’s for sure. I’ll be relaxing on GamerPlanet!

These days, I’m undecided about who to channel. My apartment (it’s really just a room the size of my bed, but it seems so much bigger because the neural net I always wear — my Ne(x)Tension™™@# — convinces my body I exist on a Greek isle, unless I’m data-diving) is a war zone for different crowd providers. The top one at the moment is™™GoBing

™™GoBing™™, a pro-shopping, pro-digital channel. (The name is some kind of lame antique joke, as I understand it, but if it happened last year, who has “bandwidth to care or a terabyte to spare,” as the saying goes?).

Yeah, if Boing, whoever *he* was, could see what the inside of my head looked like, they might not be too thrilled with all those crowds that can ‘source’ things. I’m just cranky because my ‘newtreat’ drip is low on glucose.

I’m busy looking at thousands of screens a day. If I see something I want, I just step into a screen, it wraps around me, and now I’m channeling it. I can even see them when I’m asleep.

I try not to outsource my brain for galactic computing (it used to be called ‘vapor computing,’ or something?). Whatever. Outsourcing cuts down on what it costs me for uninterrupted sleep. But lately, I’m just making bed-rent, so I’m not getting ambitious.

Still, I can dream, can’t I? Okay, technically I can’t because I have ads, but you get the gist — a cool word I datamined from some old guy at some Media Department.

Each day, my Ne(x)Tension& nerve suit comes on line, extends my nervous system and starts pumping images into my brain, dumping me on the Plaza. I get all the SSVS (sounds, smells, & various sensations) in my actual body thanks to my Ne(x)Tension& suit that opens up the enormous world that is part game, part a wall of images and sensations, part limitless meeting ground where you can see millions of users disappearing into a haze of distance.

**Nobody calls something viral by accident these days — it isn’t a metaphor. Last week, I saw someone suffering the last stages of Eimboz, a virus downloaded from the Zombie channel — they had almost fully regressed to age 12.**

I’ve never walked the whole Plaza, but apparently if you do it at normal speed instead of ‘forward flying’ (at a good rate, like 1024x or so), you won’t get to the end before your body dies or you become™™abUsed™™.

I pick up my current channels: 21 nanoseconds of G/L/lympics (“Workout with the Amateurs” is their motto); 30 nanoseconds (n-sex as they’re called) of consensual crowd-sourced sex with about 8,000 people in my age, body-type and kink of choice; 10 n-sex of time with the HyperLander (this week the rover lands on a planet in Alpha Centaurii — I’m curious to see how the prospects are for colonization); 63 n-sex of actual work (scouting deep memory for cool retro things I can sell to advertisers — old people, like, older than 25, are fantastic for junk mind resales).

They used to talk about ‘Reality TV,’ but everything is real all the time, now. I connect with and live in

the heads of another 40 people in the next few milliseconds, downloading their last few terabytes of memories and physical sensations. (One file has a warning on it — crossed nerve bundles — looks like someone had their neural net yanked during the broadcast ... that’s supposed to be painfully ugly so I’ll just delete the channel.) I have a week’s subscription to InnerU, which allows any idiot with a Ne(x)Tension& suit to set up a channel and broadcast their selves.

Usually a waste of time, but the memories can be good for datamining.

I’m working toward enough credit to take a whole day ad-off. Because I can’t afford true screening, the ads come in with every channel, every image, sound and sensation I get. A good chunk of credit will let me buy 3Block3 that turns off all unwanted ads for as long as 24 hours. I’ve heard the conglomerates are going to force the time down to 20 hours — it’s just too expensive to have people’s lobes unavailable for a whole day.

I’ve been thinking about channeling some eDdew, as they call it because it’s so dull, but learning even a little bit of something might give me a chance at more quiet time, or it might draw other people to my own InnerU channel. That’d be interesting, for once, to make people live my life.

Somebody once said there was such a thing as popular culture, but these days, or really n-sex, there isn’t anything else.

*Tim Blackmore is a professor in the Faculty of Information and Media Studies.*



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# FUTURE OF RELIGION

BY BILL ACRES

**THE WORLD RELIGION MODEL** will become a great deal more complex. Add in people with dual-conscience religious lives, hybrid and new religious movements, the obvious importance of First Nations' values and systems, and there will be a very different set of social patterns in 2052. We may well be witnessing a shift to intercultural religious awareness, away from the multicultural model where religion was, almost universally, a second-tier identity. Intercultural may mean learning more about other cultures in order to manage and transact daily business and friendly exchanges.

Canadians did not embrace neutrality in this regard because we are just boring. Ours is a history of religious conflict that has been, thankfully, resolved in some ways to public peace. When you encounter resistance to public expressions of religion, you are encountering a generation (mine and older) for whom the memory of religious strife and prejudice is lasting.

We live in a world in which legal gender constructions, marriage, family models have been radically altered in the last 40 years. Religion, in our social imaginary (to borrow from Charles Taylor), is seen to be private, voluntary and expressed in legal rights as individual, not corporately bound.

I cannot imagine this changing too radically in the Canadian context. On the other hand, I never thought I would live to see same-sex marriage. Rights may be universal, but religious rights are often on a collision course with legislated rights. I think of the gay-straight alliances in Catholic schools as an example where the resolution really calls for looking at religious identities and their legal rights, whether there will be exceptions made, or whether current constructions of human identity will be regarded as universal in our society.

It will be fascinating to see what aspects of religious identity in the public sphere become routinely admitted as an expression of individual legal rights. Lawyers and their organizations are watching these developments closely.

It will be fascinating to see if one hard-line aspect of 'secularism,' of the Christopher Hitchens and Sam Harris variety, gains a religious designation. In some respects, it bears the dogma that all religion is bad (with sometimes odd proofs for these assertions), an argument that poses as a species of

aggressive neutrality. No religion is always an absolute. That is the first thing you learn: People practice, believe and follow and do so in ways that really are not taken from the world religions' textbooks. The widely situated and differing cultures of the Victorian progenitors of world religions model are now found in the same places, freely and obviously interacting, the connection with earlier places, times and spaces is barely even there. You can see this any day at Western or the affiliates. In a global world, as is often said, the connections have become instant and bewilderingly so.

The next 40 years will see excellent and painstaking historical inquiry into the marrow of this shibboleth. Secular society will be one model among many, and perhaps not just on the global scale. How the diplomatic minefield of international relations and religious rights and identity will be negotiated will be a new field for scholars, lawyers, diplomats. We have seen these trends already. We have some hard choices ahead. Religious skepticism may be seen as one monocultural value competing with others, even in the same places and institutions—rather than being a standard of enlightened thought, rejecting religious identity may become a mark of ignorance.

That 'all religion is good' is as vacuous a proposition as 'all religion is bad'. I think the next four decades will continue to let light into the historical and current excesses against people and populations in suffering because of a religion or because of their religion. The whole landscape deserves detailed study and engagement. Absolute maxims are not helpful, neither are the rallying calls of the past in such a profoundly changed world.

So, in this sense, we continue world religions as a first coat of paint, a basic view, an undercoating of knowledge. But at the same time, the diorama based on a vast pools of information once settled and located in a globe before the sweeping changes alluded to above are not going to be particularly useful except as scholarly artifacts. Of note will be how we study the way in which global mixtures have deeply inflected religions: look at how everyone knows of karma, meditation, ashrams and so on.

*Bill Acres is a Theology professor at Huron University College.*

# FUTURE OF ACADEMIC RESEARCH

BY NADINE WATHEN



**TO TRULY REALIZE THE** value of publicly funded research, a key priority of the coming years and decades will be to mobilize knowledge derived from scholarship for the public good. This will involve both technology (i.e., harnessing digital media and developing information visualization tools mapped to interactive and engaging interfaces that synthesize complex data) and tapping into our new (and old) social connectedness to share, shape and expand knowledge.

Whether in epigenetics and cancer or violence prevention, we need to truly connect people making all kinds of decisions with contextualized and usable knowledge. From historical insight to frame public policy development to the latest in nutritional science to inform day-to-day food purchases, bringing our research to bear - directly or indirectly - on public discourse underpins the academic exercise.

The trick will be to balance needs and expectations to provide 'evidence' for existing concerns, with the freedom to explore new knowledge areas that lead to true game-changers.

*Nadine Wathen is a professor in the Library and Information Science program in the Faculty of Information and Media Studies.*



# FUTURE OF RENEWABLE ENERGY

BY FRANCO BERRUTI

**BORN ON OCT. 30, 2011, DANICA MAY CAMACHO WAS THE SEVEN BILLIONTH HUMAN ON THIS EARTH.**

From the Stone Age to the Middle Ages, the world population grew to 370 million. We reached one billion in 1800, two billion in 1930. During the past century, however, the rate of growth has rapidly increased – four billion in 1980, projected to reach eight billion in 2025

In 2052, it is expected that 1.5 billion people will populate the industrialized world, and 8.5 billion will live in developing countries.

The world energy demand has followed a similar, but much steeper trend. Over the past 150 years, the world population has increased by a factor of five, while the energy consumption by a factor of 24, with 80 per cent of it attributed to fossil fuels, and today, corresponding to more than 1,000 barrels per second.

The exponential increase in population and the corresponding increase in the amount of resources to sustain it – food, water and energy – have led to an exponential accumulation of atmospheric greenhouse gases causing effects on the global climate. Human population, food, water, health, environment, education, economic wellbeing and wars are all linked to the availability of energy.

Today, we are using more energy than what the biosphere can sustainably generate.

Will it be possible for all the Earth's growing numbers to live sustainably, and for poor countries to improve their quality of life without devastating the entire planet?

The most plausible answer is no, unless we implement a very significant change.

Lack of sustainability will lead to changes, which could be dramatic, if not controlled. Further complications are linked to all aspects of globalization and, most importantly, to the chronic economic volatility experienced by both industrialized and developing countries in recent years.

Therefore, whether we like it or not, significant change will happen over the next 40 years – be it well managed and controlled or erratic and unpredictable. This change will greatly depend on the availability of resources and, mostly, on energy.

We are close, or we may have even surpassed, the 'oil peak.' The days of the 'easy oil' are over, and we are witnessing a huge surge of interest in unconventional resources, such as the Oil Sands.

Canada is blessed by the availability of this resource which will continue and expand its prominence in the years to come. Overall, the oil demand will increase in the next 40 years.

The 'gas peak' will eventually occur, but later than the 'oil peak.' The recent developments and spectacular expansion of tight and shale gas supplies are dramatically changing the energy directions of the United States and will shape its position for the next decades.

Overall, the gas demand will increase around the world. Coal is still the most abundant – and dirtiest – of the fossil fuels. It will lose popularity in North America, but will continue to be used in developing countries, stimulating more activities in the development of improved technologies as well as in carbon sequestration and storage, in an attempt to combat the greenhouse gas emissions.

Without any doubt, oil, gas and coal will continue to be the primary sources of energy in the world for the next 40 years. But the difference between energy demand

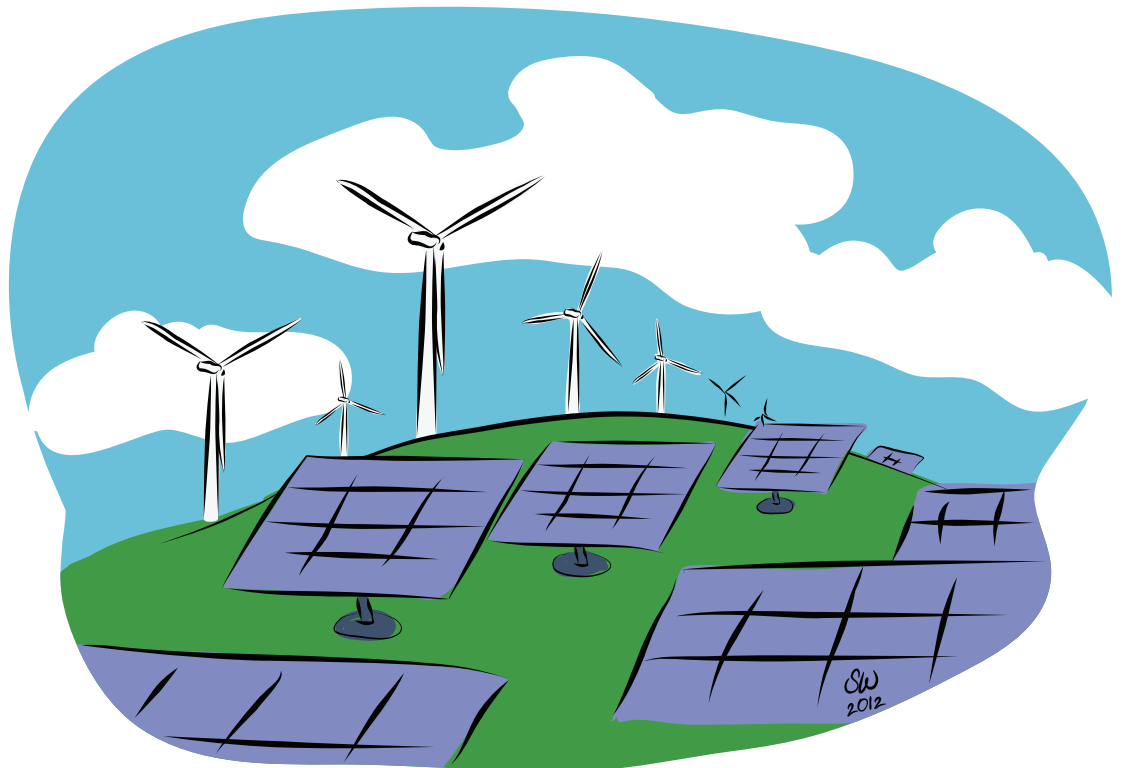


ILLUSTRATION BY SCOTT WOODS

and supply will continue to widen, thus stimulating the expansion of other energy sources.

Nuclear energy may stabilize at current levels or just increase slightly. But the greatest expansion will be with renewable energy, although the net contribution of renewable towards the global energy demand will still be minor in 40 years.

It is likely the role of biomass will increase from providing about 7 per cent of the world energy demand today, primarily through combustion, to about 15 per cent in 40 years, with more than half of this contribution derived from first generation (ethanol) and second generation (advanced) biofuels.

Other renewables, primarily solar and wind with some geothermal, will continue to expand their contribution to about 15 per cent by 2050, with their relative contribution mostly dependent upon the technology advances in the field of solar energy. In the

future, we may come across transformative technologies, such as thermonuclear fusion, but none of these is expected to become viable in the next four decades.

In summary, no single silver bullet available today will solve the predicted energy and environmental challenges. The direction is a slow integration of multiple technologies with an increasing relevance of renewables and carbon sequestration and storage, along a bumpy ride caused by significant economic instabilities, and world tensions.

This is not a pretty picture, but one in which scientists, engineers, economists, governments will need to put their heads together and work with the general public to manage the change and steer the world in the right direction.

*Franco Berruti is a Chemical Engineering professor in the Faculty of Engineering.*

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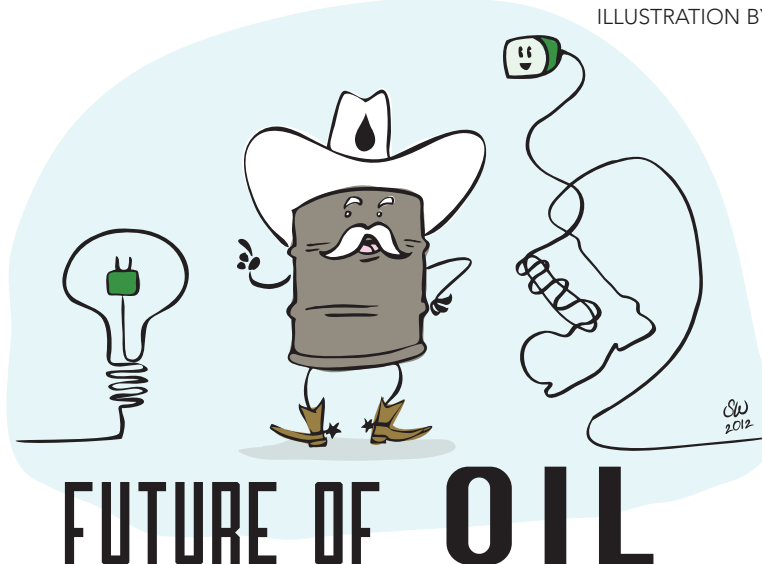
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BY BURNS A. CHEADLE

**B**y 2052, the second century of the modern oil age will be drawing to a close.

In the 200 years since the discovery of distillation of crude oil into kerosene, the production and consumption of crude oil and natural gas have irrevocably transformed the lives of virtually every living being on Earth. Despite widespread concerns about the environmental, political and economic consequences of reliance on petroleum as our primary energy source, the convenience and versatility of the fuel feeds an insatiable appetite that is not easily replaced by alternatives.

Superficially, the third century of the oil age will not be remarkably different from the preceding half-century. Beneath this familiar veneer, however, the adaptability of petroleum will be evident in our choice of fuel and the way we go about securing it. The demand for transportation fuels will grow by another 50 per cent by 2050, and the two billion vehicles in the global fleet will insist on the same combination of high energy density, scalability and accessible distribution that today's gasoline and diesel fuels offer.

Although distributed solar power systems and the next generation of storage batteries will begin to transform local transportation using electrical power trains, long-distance road travel – either in personal vehicles or, more significantly, by long-haul truckers – will continue to require liquid fuels. Food and goods will still need to move over the road.

The power and range requirements of long-haul trucks far exceed any contemplated electrical power train design, and trucking companies are loath to accept the risk of abandoning a proven combination of fueling infrastructure and engine design. Similarly, the lure of the open road will continue to capture the imagination of the traveling public who demand vehicle range, power-hungry conveniences, and trailer hauling

capabilities that are well outside of the limitations of personal electric vehicles.

The major change is that, by 2050, a significant proportion of these over-the-road liquid fuel needs will be met by compressed and liquefied natural gas (CNG and LNG), displacing today's gasoline and diesel fuels. CNG, in particular, carries three significant advantages.

First, natural gas supplies are abundant and address energy security concerns.

Second, the carbon dioxide emissions from CNG combustion are approximately 25 per cent less than gasoline.

Finally, CNG is a proven transportation fuel that is readily adaptable to current engine designs.

In short, although the outward appearance of transportation will not be radically different, the fuel will have significantly lower emissions and come from different sources than the crude oil suppliers of today.

Crude oil will remain a critical feedstock for a variety of transportation fuels and petrochemicals, but reducing its profile in the light passenger vehicle and over-the-road transport sectors will result in a fundamental shift in the global petroleum value chain. Increased broad demand, and the corresponding rise in price, will transform natural gas from a regional product to a global fungible commodity.

Depletion of conventional supplies of gas will drive exploration and development toward technologically challenging sources including shale gas, ultra-deepwater reservoirs, and the immense gas hydrate resources of the continental margins.

Managing the human and environmental safety associated with these activities will be a defining challenge of the latter half of this century.

*Burns A. Cheadle is an Earth Sciences professor in the Faculty of Science.*

## FUTURE OF DIGITAL HUMANITIES

BY JUAN LUIS SUAREZ

**THE ONLY SENSIBLE THING** to say about what the state will be in 40 years of a field of knowledge so new as digital humanities is that the humanities will be digital, that is:

```
def digital_humanities_in_forty_years():
    a = digital(2012)
    b = humanities(2012)
for time in range(2012, 2053):
    a,b = digital_humanities(a, b, time)
print digital_humanities_in_forty_years()
"100% digital, 100% humanities"
```

*Juan Luis Suarez is a professor of Modern Languages and Literatures in the Faculty of Arts & Humanities.*



# FUTURE OF DISASTERS



BY KRISTY TIAMPO

**THE PAST 30 YEARS** has seen the proliferation of vast quantities of remote-sensing data that are available on a variety of time scales, and the volume of that data will increase by orders of magnitude over the next 40 years. In addition, we are experiencing a confluence of high-performance computing (HPC) capability and breakthroughs in computational algorithms, data handling and storage, the development of services to support continuous data collection and analysis, and user interfaces for remote sensing applications in integrated solutions.

While the identification and analysis of natural hazards has been an increasingly important goal, the incredible growth in both the quantity and quality of available data has been both a boon and challenge to the scientific, engineering and hazard-response communities.

A U.S. National Academy of Sciences' report called for improved spatial and geometric resolution in technology and image processing, including improved temporal resolution. Today, this technology is delivering imagery and derived products in the fields of economic development, environmental assessment, commercial, agricultural, land-use and mineral resource mapping, water resources, and natural hazards.

Over the next 40 years, these large quantities of data will be converted into knowledge and information that individuals, hazard-response organizations and industry can use to improve decision-making and achieve their goals and objectives. The resulting applications will be uniquely capable of providing critical real-time, or near real-time, information on the progression and impact of natural hazards, information that is crucial input for both long-term planning and rapid response.

This combination of HPC and remote sensing infrastructure will not only provide society the data analytics capability to convert raw images into maps that can be used by city planners to optimize infrastructure systems such as electrical networks, but also a unique opportunity for continuous data monitoring and early warning of natural hazards with strong reliability and ready availability.

Natural hazards represent a significant risk to the people and economy of every country in the world and are often a future liability that is difficult to quantify or predict. Research points out the

exponentially increasing yearly losses due to natural hazards disasters in the United States alone escalated from, on average, approximately \$2.5 billion in 1960 to \$15 billion in 2002, and conclude human factors such as population growth are the most likely contributors to this increase.

The anticipated doubling of Earth's population in the next 50 years will result in unprecedented growth in our urban centres, and associated risk to their populations.

Again, the potential for future disasters arising from inevitable natural hazards is exacerbated by population growth and concentration. Cyclone Nargis struck Myanmar in 2008 and the resulting damages totaled more than \$10 billion, including 135,000 deaths and 800,000 homes damaged or destroyed, according to the Centre for Peace and Conflict Studies.

Other research points to the occurrence of a large earthquake in one of the world's megacities possibility resulting in as many as 12 million deaths. However, the increased hardware capacity and software techniques capable of processing large quantities of remote sensing data will provide real-time hazard mapping and emergency response capability to the emergency response and business communities.

We will see the development of a wide variety of valuable tools for global monitoring in environment and security to monitor earthquakes, hurricanes, volcanoes, forest fires, landslides, changes in permafrost and arctic ice, and the impacts of climate change. These will include mapping interfaces similar to those we see today, but with real-time or near real-time capability that allow a responder to click the map for detailed, interactive scientific, population and management information for rapid, improved response to these events.

This revolution in the quantity and quality of remote sensing data and the computational and visualization tools will allow for both the forecasting and monitoring of these catastrophic events, providing an unprecedented opportunity to reduce deaths and provide rapid relief to disaster victims.

*Kristy Tiampo is a professor in the Department of Earth Sciences in the Faculty of Science.*

# FUTURE OF MATERIALS

BY ELIZABETH GILLIES

**IN THE FIELD OF** materials, I think we need to look both forward and backward when we think about what to expect over the next 40 years.

Looking back, chemists and chemical engineers have been associated with many positive contributions to society such as the development of numerous drugs to treat disease, herbicides and pesticides to improve crop yields, and synthetic plastics for everything from cellular phones to wind-proof clothing and bullet-proof vests. While responding to the demands of consumers, it is has also increasingly been recognized that these developments have also contributed to serious societal problems such as environmental pollution and health effects from chemical processes and products, a huge demand for energy, drug resistance (particularly to antibiotics) and ever-increasing landfills of non-degradable plastics from consumer products.

I think the next 40 years in materials research will be about sorting these issues out and helping society address the challenges of the future.

For example, there will be a big push to replace traditional non-degradable plastics with biodegradable materials. However, consumers will not want to compromise on cost or properties, so there is still a lot of work to do.

Makers of materials are also major contributors to the development of alternative energy sources, such as solar cells and fuel cells. There is still a long way to go in terms of cost and efficiency, but with increasing attention on these areas, steady progress is being made.

Global fossil fuel reserves are destined to be depleted, and there will be no choice but to turn to alternative energy sources.

Finally, people are living longer than ever before, creating increasing demands for therapeutic treatments and products to improve life expectancy and quality. While the growth of traditional pharma has slowed in recent years, a materials-based approach to health and medicine is experiencing a dramatic growth.

For example, this can involve the development of drug delivery vehicles for currently known pharmaceuticals to improve their properties. It can also involve materials for the delivery of DNA- and protein-based therapeutics, which are emerging through dramatic advancements in the biological sciences. With people living longer, medical implants and joint replacements will also need to last longer. This will require the development of improved materials.

In addition, tissue engineering is a field currently experiencing dramatic growth. This means that rather than receiving an organ transplant from a donor, we could receive a new liver, pancreas, or blood vessel grown on a biodegradable polymer scaffold.

With the current rapid pace of this field, I think the production of organs by tissue engineering could become a reality over the next 40 years.

*Elizabeth Gillies is the Canada Research Chair in the Departments of Chemistry and Chemical and Biochemical Engineering in the Faculty of Science.*

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# FUTURE OF PERFORMING ARTS HEALTH

BY CHRISTINE GUPTILL

## LEON FLEISHER'S FOCAL DYSTONIA.

Pete Townshend's hearing loss and tinnitus. Julie Andrews' vocal strain and subsequent failed surgery. These world-class musicians had devastating, potentially career-ending, health problems related to their occupation abound.

These are the public cases among the 84 per cent or more of musicians who experience playing-related health problems at some point during their careers. Other researchers in occupational health find those statistics hard to believe, since occupations considered relatively 'risky' by the general public – such as assembly line workers and grocery store check-out clerks – have injury prevalence rates closer to 40 per cent.

Add to this an even higher prevalence of mental health concerns, including stage fright, depression and drug abuse, and you have a veritable epidemic of health concerns among musicians and other performing artists.

The field of Performing Arts Health has only a 30-year history – 30 years exactly in 2012, in fact. For a healthcare specialty, that is relatively young. However, it has been, and continues to be, an uphill battle.

For the uninitiated layperson or doctor, there is the perception music occupations are sedentary, and even frivolous.

I'm here to tell you this is far from true.

There is also the perception among artists themselves that one must suffer in order to produce great art. This myth, and that of 'no pain, no gain,' need to be finally debunked. It is common knowledge it's hard to make a living as an artist; I think Canadians would be shocked to see how low income levels among musicians and artists really are.

With what we know about social determinants of health, musicians truly represent a vulnerable population who

experience precarious employment – many work part-time for several employers, or are self-employed. They are one of the most highly educated sectors; yet they lack benefits for work-related injuries that many sustained before they entered post-secondary training.

And they are well below the poverty line based on StatsCan data.

What I expect from my field in the next four decades builds on what we have been working toward, and are close to achieving, in the first 30.

Firstly, that performing arts health will become a recognized specialty in healthcare. Second, that major artistic groups will employ health promotion and treatment specialists, who will be treating artists in their workplaces, just as we see in sports medicine. Third, that artistic training programs will have implemented injury prevention and treatment programs.

This has been happening in the United States and is beginning to be discussed in Canada, particularly here at Western, where we have the first university credit course in Health and Music Performance.

My bigger vision for the next 40 years, however, is this: As our economies begin to adjust to the strong message that self-regulation through competition is a dream from which we were harshly awakened in 2008, we also need to begin to look around at how we value things like health, work and the arts.

In this day of seeking human justice and planetary healing, I hope we will come to realize the live, social experience of music – which has demonstrated healing powers, and is universal among human cultures – is a resource we cannot afford to be without.

*Christine Guptill is a professor in the Don Wright Faculty of Music.*

# FUTURE OF FAMILY MEDICINE

BY DR. CAROL HERBERT AND DR. JUDITH BELLE BROWN



**IT IS ESSENTIAL WE** determine best practice for integrated care of concurrent chronic illness in primary health care, which will require the development of rigorous methods for evaluating complex systems of care for patients with multi-morbidity.

Dr. Carol Herbert is a Family Medicine professor with cross appointment to the Department of Pathology, both in the Schulich School of Medicine & Dentistry. Dr. Judith Belle Brown is a Family Medicine professor in the Schulich School of Medicine & Dentistry with cross appointment to the School of Social Work, King's University College at Western.





ILLUSTRATION BY SCOTT WOODS

# FUTURE OF VETERANS

BY RUTH LANIUS AND ANDREW PETERSON

**HOW DO WE CARE** for the growing population of young military veterans after they return from combat deployment? An answer to this question is not as simple as one might presume.

For one, the obstacles faced by this population – both social and medical – are largely heterogeneous. Some veterans of the recent conflict in Iraq and Afghanistan, for example, may incur highly complicated psychological or physical injuries that preclude their ability to seamlessly reintegrate into civilian life. For these young women and men, advancements in medical and psychological therapies are needed to mitigate the barriers preventing them from recapturing elements of health and wellbeing.

Other veterans, however, who return from deployment with a clean bill of health, may still struggle to find their new role in the civilian world. Despite being medically unaffected by their battlefield experience, these young veterans will often not be able to reintegrate successfully due to a variety of social barriers. Lack of employment or educational opportunities, as well as stark cultural differences between civilian and military worlds, are only some of the obstacles that prevent happy and fulfilling lives after military service. A feeling of isolation often results from this, and veterans are frequently left feeling alienated from their friends and families.

In brief, there are no universal causes to the struggles that veterans face. Nor are there any quick

fixes.

This complexity, though, has not stopped pioneering researchers from seeking innovative solutions to these problems. The results of this research will likely change the way we care for our veteran population now, and as they age, over the next 40 years.

A major component of this new enterprise into veterans' health involves the rapidly growing body of scientific knowledge related to the brain and its reaction to internal and external stressors. Experimental measures of these phenomena have grown exponentially since the advent of sophisticated neuroimaging techniques, like fMRI, which have benefitted the fields of psychiatry, neurology and neuroscience in variety of ways.

One recent application of these methods by researchers at San Francisco's Veterans' Health Research Institute has helped to narrow the etiology and long-term impact of combat related traumatic brain injuries. Given today's wars are largely fought with unconventional weaponry, namely improvised explosive devices, researchers have asked how blast impact and non-impact concussions compare as potential causes of mild to severe injuries to the brain.

Strikingly, findings of these investigations suggest non-impact concussions from explosions can, in fact, precipitate similar neurophysiological changes resulting from typical blast injuries. Being physically hit by explosive material, as opposed to the shockwave of a blast from 10 metres away,

makes little difference in the likelihood of developing traumatic brain injuries soon thereafter.

These brain injuries have also recently been correlated with several neurological and psychiatric conditions related to the aging brain. Of the aging veteran population of the Vietnam era, it has been shown the occurrence of mild traumatic brain injury may lead to a significantly increased risk of early onset dementia. Likewise, such injuries may also be causally related to sleeping disorders and post-traumatic stress.

As young veterans begin to age, time will tell whether or not their brains have been affected by the various experiences they have had in combat. Over the next 40 years, both new therapies for traumatic brain injury, as well as new methods of early intervention, will likely be introduced to mitigate the long-term neurophysiological effects of combat related brain trauma.

Another scientific program on the horizon, which is related to this growing interest in the brain's reaction to stressful environments, is the search for genetic, environmental, and neurodevelopmental variants that predict the onset of certain combat related psychiatric conditions. Researchers have recently been curious as to why some military personnel will develop psychiatric injuries while others do not despite identical exposure to combat stimulus. What makes the difference in these cases?

Though experimental findings are still preliminary, studies conducted at Western, University of California San Francisco and Harvard suggest a combination of genetic predispositions and developmental environments stunt the normal growth of certain cortical networks, which engenders a compounded vulnerability to psychological injury. Interestingly, this research has also been used to make reverse inferences about the ideal genetic, environmental, and neurodevelopmental conditions for mental resilience.

Research of this kind has also been conducted in populations distinct from military personnel. At Emory University, for example, neuroscientists and psychologists are closely examining familial relationships in historically violent demographics as an added variable for predicting the development of psychiatric conditions. These studies have found that a lack of strong, secure attachment relationships,

namely a disturbed emotional relationship between parent and child, in combination with early exposure to violence, may substantially increase the risk of psychiatric problems later in life.

It would be far from accurate to assume all military veterans who suffer from battlefield related psychiatric injury come from less than ideal developmental environments. Nevertheless, these new revelations about initial pre-traumatic causes of psychiatric injury highlight the importance of understanding the lives of young military personnel before their enlistment papers were signed.

These areas of research will likely offer exciting methodological advantages over the next 40 years for understanding the cause and treatment of both brain injuries and psychiatric conditions. However, there may be an added benefit to identifying the biomarkers that are unique to the current veteran population, and may be the most profound change in the enterprise of veterans' health in the near future.

For military personnel from all walks of life, the modern advances of neuroscience have offered the amazing advantage of making the invisible psychological wounds of war visible. This has, in recent years, eroded much of the stigma associated with neurological and psychiatric conditions caused by war, and has encouraged many veterans to seek medical therapy when warranted.

The women and men of the armed forces are often stoic, proud, and always "good-to-go" regardless of the stress and fatigue endured during war. The new science of the brain holds great potential to develop highly sophisticated therapies for this commendable population. Yet it also presents the very simple benefit of cutting through many of the cultural assumptions surrounding combat related brain and psychiatric injuries.

For these reasons, we anticipate the contributions of brain science will continue to change the way medical practitioners think about veterans' health, and provide effective tools for serving this community for many years to come.

*Ruth Lanius is a Psychiatry professor at Western's Schulich School of Medicine & Dentistry. Andrew Peterson is a doctoral student member of the Rotman Institute of Philosophy in the Faculty of Arts & Humanities.*



# FUTURE OF CLASSICAL STUDIES

BY AARA SUKSI

**IN MYTHS FROM ANCIENT** Greek and Roman culture, Prometheus gave the technologies of fire and writing to humans. Some ancient writers saw these gifts as a curse, others as blessings.

In Classical Athens, we have the earliest imperial democracy in Western culture. This radical new distribution of power was glorified and condemned by philosophers, politicians, artists and the first historians and dramatists in the West.

Far from being an antiquarian's refuge from contemporary complexities, an exploration of ancient Mediterranean civilizations elucidates how Greece and Rome are part of a continuum, shaping our own culture and the way we think today.

Moreover, removed from us in time as they are, ancient Greece and Rome provide perspective, and a cultural laboratory in which to test emerging theories about the major questions that will always preoccupy us – how to define justice, how to manage new technologies, how to draw the map of the human soul, how to construct meanings and identities subsequently assumed to be 'natural.'

The discipline of classics is, therefore, always relevant, and in 40 years' time will be no less valuable as a medium for thinking about whatever terrifies, intrigues or delights us, than it has been for the past 2,800 years, since the first performances of the *Iliad* and the *Odyssey*.

Aara Suksi is Classical Studies chair in the Faculty of Arts & Humanities.



# FUTURE OF ART

BY KELLY JAZVAC

**W**hen I consider where my discipline will be in 40 years, I think of a question writer Jennifer Higgie asks about the value of art in society: "How can change be manifested if it can't first be imagined?"

I predict a lot of imagination will be needed in the next 40 years to help us navigate some current and upcoming sticky situations (climate change and debt come to mind). I also think that visual arts will specifically play an important role in that imaginative process.

I foresee (and, no, I really don't think I'm delusional) a real urgency for visual arts in the next four decades; for people to make it and use it to question, propose, speculate, delight, fulfill, imagine and think in necessary, complex and sophisticated ways.

It's obvious there are lots of images and objects in the world. Yet, there are not many that aren't trying to directly sell us something. I think the exception are the kind of critically engaged images and other forms of art we make and talk about in places like universities and public museums.

In fact, such art not only discourages passive consumption and conformity, it actually encourages active responses and critical thinking. Room is made for reactions and opinions, regardless of whether or not one likes the art in question. In and around such art, the imagination has a snowball effect: it is activated through (art) making, and through engaged viewing.

Simon Brault, former vice-chair of the Canada Council for the Arts and author of the book, *No Culture, No Future*, states, "For any society or community that is facing change – of population, generation, economy – it's clear that arts and culture are a powerful tool that gives people the notion of sharing, a certain control on their own destiny."

Here, Brault refers to both making art and experiencing art as a viewer. He cites culture as a crucial tool for individuals and communities to use to both deal with the world, and to participate meaningfully in its production and change.

So there you have it: In 40 years, we will all be urgently making and experiencing art.

To me, that future doesn't sound so bad.

Kelly Jazvac is a Visual Arts professor in the Faculty of Arts & Humanities.

# FUTURE OF INCLUSIVE EDUCATION

BY JACQUELINE SPECHT

**THE FOUNDATION OF INCLUSIVE** education is a belief all students belong and are valued members of their classroom and neighbourhood school communities. By including and valuing all members of the classroom, educators provide caring communities that appreciate the unique contributions and diversity of all people.

Unfortunately, in Canada and around the world, we still seem to hold the belief that some children with learning exceptionalities don't belong in the regular classroom. We segregate them in their own classes or schools simply because of a label or identification.

This is a misguided and archaic notion. If we were to substitute this population for 'girls', 'students living in poverty' or 'Aboriginal students,' we would be appalled.

Research in teaching practices demonstrates inclusive education provides the most beneficial environment and outcomes for all students.

In the next 40 years, we will eradicate the belief that not all students belong in the regular classroom and equip and empower our educators with the competence and confidence required to teach students with exceptionalities.

Jacqueline Specht is an Educational Psychology and Special Education professor in the Faculty of Education.

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# FUTURE OF FAMILY

BY SAMANTHA BRENNAN

**AS WE ALL SAW** recently with the release of the new Canadian census data, the Canadian family is changing. For the first time fewer than 25 per cent of us live in the traditional nuclear family made up of mom, dad and kids at home. But probably we didn't need the census to tell us this.

The rise of single-parent households, singles living alone, same-sex couples and couples without children is obvious just by looking around. Around the world, and throughout time, families are often larger than the nuclear family, many taking the shape of multigenerational households. And now we see creative, intentional relationships – families of choice, some people call them – in other forms, too.

It's an exciting time to be working on academic issue related to the family.

I work in the fields of moral and political philosophy and one of my research areas is children's rights and family justice issues. Traditionally, the fields of moral and political philosophy haven't had much to say about justice and the family, instead viewing the primary relationship of political significance to be between adult individuals and the state. The family is either assumed to be just or thought of as somehow beyond the scope of justice. But two

groups of philosophers have pointed out that both assumptions about the family fall short.

Feminist philosophers, such as Susan Moller Okin, have pointed out that assuming families are already just or are beyond the scope of justice is a mistake. For example, as long as women do an unequal share of work in the home, women won't be able to participate equally in political and economic life.

Building on feminist work, egalitarian political philosophers examine the tension between egalitarian commitments and the rights we give parents to make choices for their children. For example, Adam Swift asks whether parents can send their children to private schools and still live up to their ideals. Western postdoc Angela White and I maintain a parent's right to smoke is limited by children's right to smoke-free homes (and cars) and that, ethically speaking, parents ought not to smoke in their own homes or motor vehicles.

My work is connected to both feminist political philosophy and egalitarianism. I've argued for a developmental account of rights for children, which start out protecting children's interests but end up protecting their choices, as rights do with adults. With the philosopher Robert Noggle, I've argued

parents' rights are best conceived of as 'stewardship rights,' rights shaped by obligations to promote the well-being of the child. In addition, I've looked at a variety of ways which parental rights and children's rights interact.

Often my work involves PhD students in philosophy. With Jennifer Epp, I've been exploring how children's control over their sexuality, and over their sex and gender orientation, is an important part of childhood well-being. With Bill Cameron, I've argued children can have more than two parents and the law ought to recognize multi-parent families when doing so serves the best interests of the child.

Next summer with Sarah Hannen, a postdoc at Stanford, and Western professor Richard Vernon, I'm organizing a workshop on the ethical obligations associated with the choice to parent. Titled *Permissible Progeny*, the workshop will be held in June 2013 and bring more than a dozen philosophers and political theorists working in this area to Western to share their research.

Here are some more of the many questions about the family we need to think about philosophically as face the next 40 years:

- ☛ Childlessness is becoming a growing trend in North America. Are those who chose not to reproduce just selfish? Or, from a self-interested point of view, is it ever rational to have children?
- ☛ People are exercising choice in selecting family structures that suit their lives. Along with same-sex couples, we also see a variety of multi-parent households. What kinds of multi-parent households, if any, are able to best achieve ideal parenting goals?
- ☛ Are the life stages associated with childhood changing? 'Childhood' is itself a culture and

time-specific idea and perhaps our categories are changing as more young people remain economically dependent on their parents throughout their twenties. Do we need to think differently about the categories of child, adolescent, and young adult?

- ☛ How should families balance the needs of family members at different stages of life? For the 'sandwich' generation, how ought one to balance the needs of one's parents and one's children? What's fair within the family?
- ☛ How will the changing roles of men affect justice within those families based on opposite sex marriages? The philosopher Colin Macleod says, "with any luck - the question posed almost exclusively to women of how they manage to have a successful career and a family will cease to seem sensible (either the question will make just as much sense when asked of men with children or it will seem more generally silly because professions and social norms will have developed so as to fairly and feasibly accommodate family life and career.)"
- ☛ And there are other ethically important family relationships that I, and other philosophers, have begun to address. What do I owe my siblings? Are there obligations that follow from being cousins? What makes someone a good aunt or uncle? These family relationships are nonconsensual and yet they have a moral pull on us.
- ☛ Are family structures just about choice or are the limits on the kinds of family I can choose?

*Samantha Brennan is a Philosophy professor in the Faculty of Arts & Humanities.*

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# FUTURE OF GOD

BY MARK YENSON

**'SPIRITUALITY' IS ALMOST IMPOSSIBLY** vague. Postmodernity has highlighted one cannot speak from a disembodied perspective, as if context and particularity don't matter. The context from which I speak is as a North American engaged in Roman Catholic theology.

Given that context, my comments may be more or less applicable to other faith traditions or social locations. Here is a personal - and non-exhaustive - list of some directions in religion and spirituality over the next decades:

**Spiritual vs. Religious.** In North America and Europe, at least, overt membership in organized religion, such as mainstream Christian denominations, is on the wane (immigrant groups being the exception) as more people identify themselves in the well-known terms, 'spiritual but not religious.' Individual choice and multiplicity of religious/spiritual options are here to stay. Religious groups will continue to feel an immense tension between 'relevance' and distinctive traditions.

**Religion will continue to flourish.** Contrary to the secularist prophecies of the end of religion, religion continues to attract and matter. Debate will continue on the limits of religious tolerance within pluralistic democratic societies. As Canadian philosopher Charles Taylor has asked, will religious discourses be included on conversations about ethics and public life, or excluded by a supposedly neutral secular narrative?

**Practice over doctrine.** While doctrine is not ignored, the attraction to religious traditions, and particular stances within those traditions, seems to have a great deal to do with practices,

for instance forms and styles of worship or social outreach. The French community of Taizé, with its incorporation of various languages and traditions, simple chants and contemplative prayer, reaches out beyond denominational lines and crosses the lines demarcating spiritual vs. religious. And facilitated by the ease of global travel, the ancient practice of pilgrimages still finds profound resonance with many, whether explicitly religious and not.

**Encountering the other.** Due to globalization, the explosion in global communications, travel and migration, previously insulated religious groups now live as neighbours. High-level dialogues about religion and spirituality probably matter less than the day-to-day encounters among adherents of different traditions. One hopes difference will be a cause for celebration, learning and cooperation. This reality is a good reason for the continued exploration and teaching of religious studies within academia.

**Moving south.** Those of us in the 'global north' should be wary of generalizing too much. The most significant developments in spirituality and religion will probably be in the 'global south,' where new manifestations of spiritual practices and religiosity are revitalizing and transforming traditional faiths, and democratizing movements are creating new challenges for newly enfranchised religious groups.

*Mark Yenson is a professor of Religious/Catholic Studies at King's University College at Western.*

# FUTURE OF CHILDHOOD OBESITY

BY SHAUNA BURKE

**CHILDHOOD OBESITY IS ONE** of the major health threats of the 21st century. Some researchers predict its prevalence will continue to rise in the coming decades; others have suggested the rate at which it is increasing may be slowing.

If the latter is true, it is certainly no cause for celebration given nearly one third of our youth are currently overweight or obese.

In an ideal world, the next 40 years will bring less talking and more doing. In an ideal world, we will put the 'eat less, exercise more' mantra of the past four decades behind us and we will tackle the myriad of social, economic and environmental factors contributing to this complex disease. In an ideal world, we will work collectively toward denormalizing the unhealthy, obesogenic environment in which our children live.

In an ideal world, as far as childhood obesity is concerned, the next 40 years will look nothing like the last 40.

*Shauna Burke is a Health Studies professor in the Faculty of Health Sciences.*



# FUTURE OF DEMOGRAPHICS

BY DON KERR

**ON A GLOBAL SCALE**, we currently face somewhat of a population paradox.

While global population is projected to continue growing rapidly, this increase will be highly uneven. Some countries currently face the prospect of population decline, whereas others will continue to grow rapidly. Parts of world face a continued 'population explosion' whereas others a potential 'population implosion.'

According to the medium variant projection of the United Nations (UN), the global population of about seven billion is projected to grow by an additional two billion. Most of the demographic growth over the next 40 years will occur in low income 'high-fertility countries.'

This can be placed into its proper perspective by remembering it took all of human history through to the eve of the Industrial Revolution to reach our first billion and an additional 130 years, through 1930, to add a second. Currently, global population is increasing by roughly 210,000 souls daily or approximately 80 million persons a year (comparable to the population of Germany).

While the UN forecasts a gradual slowing in growth rates and a possible stabilization by mid-century, this is far from a fait accompli. While many nations are witnessing a slowdown

in their population growth, the underlying global trend is one of extreme population growth.

While Canada's population will grow, what happens elsewhere is of far greater importance.

India, currently the world's second-most populous country, is expected to soon surpass China - up to a projected 1.7 billion by midcentury. China's population, barring an abandonment of its highly controversial one-child policy, will likely stabilize at about 1.3-1.4 billion. Northern Africa is expected to increase by roughly one half; sub-Saharan Africa is projected to more than double; whereas Latin America's population is expected to increase by about roughly a quarter.

At the same time, and somewhat paradoxically, the UN projects Europe's population will stabilize, if not shrink over the next several decades. The UN's low and medium projections suggest declines of minus-14.5 per cent and minus-2.7 per cent respectively by 2052.

Currently, there are roughly two dozen countries worldwide that were witnessing negative growth, including many countries in Eastern Europe.

Russia's population is shrinking, and is projected to decline by 10 per cent, or more, by mid-century. Several important economies, including Germany and Japan, have stabilized

and may very well experience population decline and further population aging over the next several decades.

These numbers imply all sorts of social and economic challenges, as population decline also implies various unforeseen difficulties. From a policy point of view, both low growth (and population aging) and high growth (with youthful populations and high fertility) can imply major challenges.

North Americans are not expected to experience this same sort of decline, as for example, both Canada and the United States receive large numbers of immigrants, whereas Mexico continues to have a relatively high natural increase.

Fertility in the United States is now at replacement level, whereas the fertility rate in Canada is 1.67 children per women. Working with Statistics Canada's mid-range projection, Canada's population is expected to continue growing to about 42 million by 2052, up from just under 35 million currently. While this growth will hold implications for Canadians, this increased population is a mere drop in the bucket when it comes to global population growth.

Canada's population is currently less than half of 1 per cent of the global total and this

is not likely to change much into the future. If anything, this percentage may shrink.

Again, what happens elsewhere 'demographically speaking' will swamp what happens in Canada.

The consequences on how we accommodate this growth will be global, particularly given the planets capacity for food production, our continued reliance on fossil fuels and the alarming prospects for climate change. In my own lifetime, if I am lucky enough to live to 2052 (my 92nd birthday), I will have likely experienced a tripling of the world's population, from only about three billion to potentially more than nine billion by the time of my death.

This is unprecedented, and clearly suggests that from a demographer's point of view, the next 40 years will likely turn out to be quite 'interesting.' We are not immune to the impact of this growth even though Canada's population, by world standards, continues to be relatively small with lower population densities, plenty of space and resources.

What happens elsewhere will be extremely important to Canada, and we can't ignore the basic arithmetic on this issue.

Don Kerr is a Sociology professor at King's University College.

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# FUTURE OF LIBRARIES

BY JOYCE GARNETT

## What will the academic library of the future look like, feel like?

Traditionally, the library brand has been the book, but today's libraries are focused on breaking out of that image through spin-off brands. The future of libraries is not only in the book business, but the discovery business, the learning business and the 'open-your-mind business.' Forty years in the future, libraries will remain central to education, to deep learning and critical thinking, and to stewardship of the scholarly record.

Looking ahead, the print book will remain, but become more esoteric in nature with the emphasis on the unique (limited editions and customized printings) and the esthetic (through decorative bindings and illustrations). Print books will again become coveted collector items, for the individual as well as for the library, for their rarity and their beauty.

Witness Captain Jean Luc Picard on the star ship Enterprise with his precious collection of Shakespeare in leather bindings. Of course, that is looking 400 years into the future, not 40, but it illustrates the point.

For the seeker of content - for the creators and consumers of knowledge - the book will become more and more portable and personal as technology enables greater miniaturization and customization. Physical objects will be retained in a shared storage facility of 'last copies' to be retrieved and digitally sent to the library user at point of need. Over time, and likely by 2052, all physical objects will have become 'born again' digital objects through mass digitization, with digital delivery on demand to a personal device.

Looking ahead, libraries will become centres for personalization and customization, delivering content and format on demand whenever and wherever it is required, to customers distributed around the globe (and possibly within the solar system). Libraries will move from providing resources, access and services locally and regionally to collaboration on a global scale.

We already experience digital glut in our current lives and suffer from information obesity; technology will make it so to a greater extent in the future.

Personal contact - P2P - will be reinforced in the future, as libraries nurture relationships and community in physical and digital environments. Librarians and library staff will continue to focus on customer service; we need not fear the holographic - abrupt and sarcastic - artificial intelligence projection seen in *The Time Machine* (2002).

We will start to think 'inside the box' - a personalized 'my library in a box' that provides access and services customized for individual learning styles and preferences. The 'pocket library' or 'wrist library' will become the 'pocket watch' or 'wrist watch' of the future - a multi-functional, decorative, mobile knowledge environment.

Libraries have always been early adopters and adapters of technology, be it the chisel, the pen, movable type, the mainframe computer, the microcomputer or mobile device. Forty years ago, libraries installed computer systems for collaborative cataloguing, a significant development of the time.

We don't know what the next 40 years will bring in terms of technology, but we do know libraries will embrace with enthusiasm whatever comes. Who, 40 years in the past, would have predicted the current ubiquity of the microcomputer, the mobile device, the Web, Google, Facebook, Twitter and other social media?

Regardless of the technology - holograms, virtual reality, Google glasses, knowledge implants, real time neural information feeds, 3D learning objects - looking ahead, libraries will leverage all opportunities to reach out and engage customers.

Libraries are forever - a bridge from the past to the future.

Looking forward 40 years, libraries will be the same and they will be different, in ways both obvious and subtle. Libraries have a well-established 'formula' for success: calling upon people, technology and collaboration to ensure access, resources and services to enable knowledge creation, dissemination and discovery.

Regardless of future directions in technology, academic programming and business models, libraries will remain relevant and vital because of their enduring values: accessibility, preservation of knowledge, and freedom of intellectual choice.

Joyce Garnett is the university librarian at Western Libraries.

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# FUTURE OF ENERGY

BY MATT DAVISON

**PARTICULARLY IN CANADA, WE** depend on large quantities of cheap reliable energy. So, how will we power our lives over the next 40 years? As Yogi Berra said, "It's hard to make predictions, especially about the future."

That's as true for energy as for any other field. Early 1970s planners significantly over-projected the future demand for electricity when deciding the shape of Ontario's electricity generation infrastructure. This resulting overbuilt network was a major contributor to the breakup of the Ontario Hydro electricity monopoly and Ontario's current energy system.

Poor predictions have consequences. But predictions are still fun to consider and I'm going to give you mine.

How will energy consumption patterns change over the next 40 years?

If you go back 40 years you'd find that very little was different, on the surface, about energy use in Ontario. People used electricity for many purposes and hydrocarbons to heat their houses and power their vehicles.

Many of the power plants used to generate electrical power were the same in 1972 as they are today; most of the hydroelectric plants now operating in our province were already operating then, as were several of the coal-fired power stations that have recently been retired from service.

Even on a quantitative basis little has changed. Canadians now consume about 5 per cent less energy per capita than in 1972, counter to the projections of those 1970 planners. The small size of

this change points to two important facts.

First, we aren't interested in energy, but in the services (a cool house, hot shower or moving car) that energy provides. Our homes and cars are much more efficient than their 1970s counterpart. In that case, why only a 5 per cent decrease in energy use?

The answer is termed 'energy homeostasis.' If window technology improves, build houses with bigger windows.

Our energy comes from many sources of high and low grades. Heating things is possible with low-grade sources; even a bundle of twigs can heat water to make tea. Doing mechanical or electrical work requires higher grade energy.

The supreme controllability of electricity makes it prized in homes, offices and factories. For transport, fuels that are dense in energy like oil are prized, because they can be carried by the vehicle they fuel. Electricity can itself be generated from a variety of sources including running water, wind and solar and by running a steam turbine heated by nuclear fission or by burning hydrocarbons.

The energy sources we use to power our lives change over time. Houses, once heated with fuel oil, are now heated with natural gas. Most cars are still gasoline powered, but that gasoline now contains some corn ethanol, and propane-powered vehicles and vehicles partly powered with electricity may now be found.

Decreased oil production 40 years hence need not imply energy catastrophe if some tasks currently performed by oil are replaced by other energy sources. This happened between 1972 and today.

Low value uses for oil like space heating and electrical generation are now rare. Likely 40 years from now, oil will be used mostly for its highest value uses like aviation, where its high-energy density is at the greatest premium, and less to fuel ground vehicles.

This is not to say that the price of oil will not rise over the next 40 years - such price changes force the displacement of oil to its highest value uses. The prices of various energy sources will continue to fluctuate wildly over the next 40 years, in response to uncertainties about long and short run supply and demand shocks, and in response to scientific and engineering innovations.

Environmental shocks, like the Japanese Fukushima disaster, which will result in the shuttering of nuclear reactors, will continue.

More ongoing environmental concerns - like those causing Ontario to close coal-fired power plants - will continue. Energy changes of that type are possible only if other options are open - the Japanese can shut their nuclear reactors because they can generate the missing power from new generators whose fuel arrives on tankers.

Political disasters are, unfortunately, nearly certain to occur somewhere, sometime over the next 40 years, and may result in exceptionally high oil prices that temporarily reduce our ability to, for instance, fly cheaply, until a technology shift reduces the consumption of oil for tasks which it has substitutes.

The population of the world will continue to increase, mostly in materially poor parts of the world who want energy lifestyles approaching those in the developed

world. Success in this goal, even assuming a modest decrease in per capita energy use, implies a large increase in total energy consumption. That increase will drive price increases, particularly for oil, that change fuel use patterns.

If current anti-nuclear trends continue, immensely more coal will be used, even though much research supports the contention nuclear power is less environmentally damaging than even modern coal-fired power generation technologies.

Wind and solar renewable energies will continue to improve, although their intermittent supply will require the development of storage solutions and 'smart grid'-style demand shifting.

Public transit will increase to cope with higher population densities and to allow transport to be fueled by coal, renewables, and nuclear power.

Prices will change over the next 40 years, technology will develop, and we can hope more of the world's poor will emerge from poverty, but we won't live in grass huts, nor will be living in a fusion-powered energy paradise; our consumption of the services provided by energy, if not of the current fuel mix, will remain much as today.

*Matt Davison is the Canada Research Chair in Quantitative Finance, and is jointly appointed to the Departments of Applied Mathematics and Statistical & Actuarial Science in the Faculty of Science as well as to Ivey's Management Science and Energy Policy and Management Centre.*

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# FUTURE OF CHILDREN'S MENTAL HEALTH

BY SUSAN RODGER

**COMMUNITIES SUPPORTING FAMILIES, FAMILIES** caring for children and children living in communities where they are loved, where they are safe and where they are welcomed – this is what we hope children's mental health looks like 40 years from now.

Children's mental health will be evidenced by healthy relationships with classmates, friends, family and community members, by their curiosity and interest in the people and things around them, and by their willingness to (from the safety of their secure relationships) step into new experiences.

Children and families who need help with their mental health will be able to access the needed supports quickly and without stigma in their community and in ways that recognize child, family and community strengths as well as needs.

What does children's mental health look like in the future? It looks like healthy, thriving, learning and growing children surrounded by love, support, acceptance and infinite opportunities.

*Susan Rodger is a Counselling Psychology professor in the Faculty of Education.*

# FUTURE OF THE MIDDLE AGES

BY M.J. TOSWELL

The Middle Ages are over. Well, sort of.

They encompass the years from the so-called 'Vision of Constantine' in 312, when the Roman emperor embraced Christianity, to sometime around 1500 when that pernicious invention, the printing press, infested all of Western Europe with its cheap and democratic copies of books.

Along the way developed scholastic philosophy, Gothic architecture, chivalry, courtly love, the book, the notion of kingship as something that needs controls placed upon its absolute power and many other structures of modern society.

The Middle Ages gave us some role models – Arthur, Saladin, Richard the Lionhearted, Blondel, Heloise and Abelard, Eleanor of Aquitaine, the Black Prince, William Tell, Marco Polo, El Cid, Robin Hood – and some figures and behaviours we might prefer to forget – feudalism, the Hundred Years' War with its development of the crossbow and longbow, Vlad Tepes of Romania, the Crusades, various heresies and their eradication and the Black Death.

What we know about the Middle Ages is largely established: Some materials are miscatalogued in obscure libraries or don't have full references in major ones, and much as the archaeologists believe there is more to be gleaned from digging more late medieval sites, even they would prefer to find more cool treasure-hoards.

What, then, will medievalists be doing in the next 40 years? We have a lot more questions to ask the Middle Ages.

The field is just emerging from a concentrated study of medieval texts in their manuscript contexts, so we think about why legal texts would appear beside homilies or treatises on the best farming practices. Greater attention is going into analysing the pigments used for manuscript illumination, so that we now know that rather than importing lapis lazuli at great expense to produce the shade we today call electric blue, or perhaps cobalt blue, in northern Europe some local sources, including woad, were used (this is the colour of the Virgin Mary's robes, chosen because of its rarity).

I suspect more scientists, possibly impelled by the fun of medievalist video games, will be doing DNA analyses to figure out more about migration and trade patterns in the Middle Ages. Perhaps we'll discover the medieval world was not a sedentary and small-minded one but one with at least as much travel and movement as the 18th century. After all, until the early 19th century, the fastest travel was horseback or sailing ship; a medieval nobleman could go on pilgrimage on his horse, and the serf could use shanks' mare for the same purpose.

The field of animal studies is just arriving at the Middle Ages; disability studies arrived two years ago; no doubt many other such 'studies' fields remain to be dug.

Medievalists discovered theory some years ago, but they are far more sceptical and untrusting of its tenets – neither early adopters nor part of the mainstream, they are stragglers in the field. Moreover, medievalists who enjoy theoretical approaches tend to disdain manuscript study, and vice versa. This irrelevant, small war will end in the next 20 years, though it will end slowly and painfully.

Studying the Middle Ages has always been a thoroughly cross-disciplinary and multidisciplinary endeavour. Still, along the way, the fiercely protective way in which disciplines protect themselves has on occasion resulted in areas of neglect. Thus, serious study of medieval drama began quite recently (watch Mario Longtin in French Studies), and the dense,

difficult and technical world of heraldry treatises has suffered neglect now being redressed by Western English professor Richard Moll.

In recent years, medievalists have re-discovered the 12th century and the neglected ground of the long 15th century is the subject of squabbles between Renaissance scholars (a field now renamed as early modern studies) and medievalists.

In the next 40 years, I expect medievalists, led by archaeologists and historians, to push back to Constantine's vision of a cross in the sky in the year 312 and claim large tracts of what is generally called 'late Antiquity' or sometimes (though we frown upon the term) the Dark Ages. We will be re-discovering the 5th century, the 4th, and probably the 16th as fertile medieval ground.

The Middle Ages might be over, but we rediscover them in every generation.

Medievalists have an uneasy relationship with medievalism; most of them consider working in this field to be something of a cheat, an easy option requiring insufficient 'real work' (involving manuscripts; Latin; reading large tracts of the *Patrologia Latina*, the works of the Christian fathers; and personal suffering).

However, medievalism is sweeping the world, and seems likely only to increase its hegemony over the next 40 years. Our students become interested in the Middle Ages as a result of video games, movies, TV shows, iconic figures they admire.

The generation which discovered the Middle Ages through medievalism is already in graduate school or in junior posts; the students trained by that generation will be medievalists who are also medievalism-ists.

Long may they thrive.

*M.J. Toswell is a professor in the Department of English in the Faculty of Arts & Humanities.*



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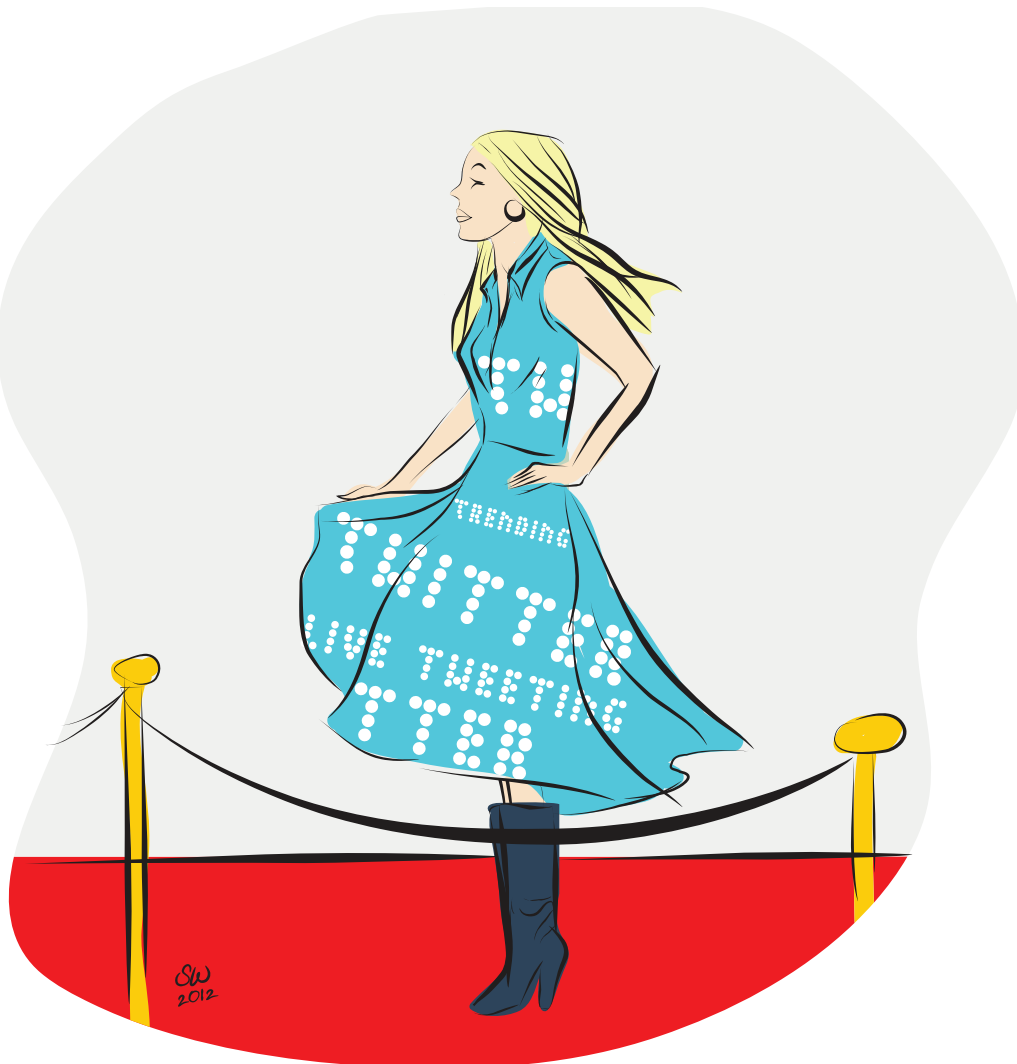
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## FUTURE OF TEXTILES

BY KIRSTY MÀIRI ROBERTSON

**EVEN CURRENTLY, INTELLIGENT TEXTILES** stretch the limits of the imagination and seem to border on science fiction – moving tattoos that crawl across the skin of the wearer, appearing and disappearing as they record stress; sensors in shirt sleeves that can register a wound and lead the fabric to tighten, forming a tourniquet; polymers that can be added to manufactured fibers, protecting the wearer from infection and disease; technologically enhanced military uniforms that can communicate with satellites.

These high-tech and often mobile structures are part of a much wider application Bradley Quinn calls ‘textile futures’ – faster, lighter, stronger textiles that can stop bullets, hoist satellites into orbit and withstand temperatures hot enough to melt steel. Tiny fibres, writes Quinn, will rebuild the world.

Truly exciting projects are currently being imagined that cross the boundaries between art, experimentation and architecture, and offer endless unfettered possibilities – in 40 years time many of these might have come to fruition.

Clothing that registers and displays emotion, changes pattern according to the wearer’s wants, creates heated or cooling microclimates, absorbs smell or communicates with other similar items of clothing are just some of the items currently in prototype that, in 40 years, may be the norm. Flexible and provisional housing proposals (imagine inflatable, multi-storey tents) that can be easily transported and quickly assembled in post-disaster scenarios may be easily available.

High-tech fabric may also, in the future, offer solutions to environmental catastrophe and questions of sustainability (for example, sophisticated, technologically enhanced awnings that provide natural shade instead of air conditioning). We might also expect to see medical textiles such as thermochromatic bedding to monitor the temperature of premature babies or the elderly, textile environments wired with ‘ambient intelligence,’ or actuators and computers that can adapt environments, manipulating devices or calling emergency services.

In all, smart textiles respond dynamically to a variety of

situations, and in these scenarios, the infinite potential of smart textiles is writ large.

But there is another, darker side here.

While in 40 years’ time, intelligent textiles might offer solutions to certain problems, currently textiles are creating problems of their own.

As Luz Claudio writes in an article on waste and the fashion industry, the demand for polyester alone doubled between 1992 and 2007 and “the manufacture of polyester and other synthetic fabrics is an energy-intensive process requiring large amounts of crude oil and releasing emissions including volatile organic compounds, particulate matter, and acid gases such as hydrogen chloride, all of which can cause or aggravate respiratory disease. Volatile monomers, solvents, and other by-products of polyester production are emitted in the wastewater from polyester manufacturing plants.”

Fast fashion, or the vast increase in the sheer amount of cheap clothing produced and available, has had significant detrimental environmental impacts, as have the chemical by-products of dyes used in the colouring of clothing. Every aspect of apparel manufacture, from pesticides used in the production of cotton, to the huge amounts of water and phosphates used in washing clothes, to vast amounts of textile garbage produced when clothing is discarded have significant accumulatory effects.

Even seemingly environmentally friendly textiles, such as polar fleece, have significant and devastating impacts – fleece, for example, sheds thousands of tiny plastic particles with each wash, eventually ending up in the ocean and other bodies of water.

Forty years from now, we will likely all be familiar with the impact of the clothing we are currently wearing, and may be looking for other solutions that will parallel the intelligent textiles described above.

*Kirsty Màiri Robertson is a professor in the Department of Visual Arts in the Faculty of Arts & Humanities.*

## FUTURE OF TECHNOLOGY IN EDUCATION

BY JOHN BARNETT

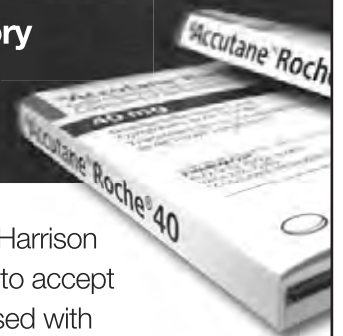
**IN 40 YEARS, EDUCATION** at all levels will be seamlessly interwoven with new technologies. These tools will be highly personalized and based in sophisticated artificial intelligence that delivers learning experiences and individual assessment exquisitely appropriate for each student’s neurophysiological development. Memory will be unvalued because information of all types will be readily available (though not necessarily free) through augmented reality machines, some physically embedded in the brain. Thus individual critical judgment and personal knowledge networks will become vital to students’ future success.

Students will not take courses as now conceived, but go to school for help, skill development and group work when needed. Massive online learning experiences created by world leading thinkers will dominate the educational landscape and be delivered by the few remaining degree granting institutions. Other universities will transform themselves from teaching institutions that generate knowledge to research and high-level skill/social institutions.

*John Barnett is a Science and Online Education professor in the Faculty of Education.*

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