WATCHING THE WATCHERS
Dr. David Lyon and the Surveillance Studies Centre
Dear Colleagues and Friends,

It’s hard to believe that a year has passed since we released the inaugural issue of (e)AFFECT. Over the past 12 months, we’ve been delighted to receive your positive feedback on the diverse representation of research across disciplines covered in our publication – research that is solving real-world problems and making a difference to the lives of people everywhere. Many of you also appreciate our efforts to highlight student research experiences and opportunities – work that very often sits at the heart of the research enterprise. We thank you for your continued support.

In this issue, our focus is on “Securing Safe and Successful Societies” – one of the four themes of the Strategic Research Plan. As citizens of the 21st century, we are aware of the web of social, physical, and technological forces that exist that influence our safety and well-being. When catastrophic natural events occur, like tsunamis and earthquakes, and the dynamics of human dimensions associated with political and social change shift, our security at times can feel threatened. Information and communication developments also bring risks and opportunities.

Scholars, from a range of disciplines at Queen’s, are actively studying the security and stability of our financial institutions, political systems, physical assets and infrastructure, as well as of the natural world.

In our feature article on David Lyon (Sociology) and the Surveillance Studies Centre, we look at how the state of surveillance is constantly changing, and how the challenges of surveillance in society go well beyond the traditional tensions of police, state, and the privacy of citizens. Focusing on the work of Betsy Donald (Geography and School of Urban and Regional Planning), we explore North America’s industrial food system and examine why in two of the world’s richest countries (Canada and the U.S.) people are fed so poorly.

Our photo essay captures the efforts of the International Centre for the Advancement of Community Based Rehabilitation (ICACBR) and local partners in Bangladesh to change negative attitudes towards the disabled to ensure the safety and success of these populations. The question of how to safely dispose of nuclear waste is examined in our article on Mark Diederichs (Geological Sciences and Geological Engineering) who is an expert on the infrastructure needed to safely store this waste long term.

In our Q&A, we talk to film and media professor, Sidneyeve Matrix, about key issues in the development of information technology, and how new technologies are changing the way we teach and learn.

I hope that you enjoy reading this issue and, as always, I welcome your comments and encourage you to explore, discover, and engage in the research enterprise at Queen’s.

Dr. Steven N. Liss
Vice-Principal (Research)
Across faculties and departments, Queen's researchers are capturing headlines in Canada and around the world. Here are a few highlights from the past few months:

“RePOOPulating” targets *C. difficile*

An expert in infectious diseases at the Gastrointestinal Diseases Research Unit (GIDRU) at Kingston General Hospital, [Dr. Elaine Petrof](#) teamed up with biochemist Dr. Gregor Gloor (Western University) and microbiologist Emma Allen-Vercoe (University of Guelph) on a new study showing that “rePOOPulating” the gut bacterial flora with a synthetic stool substitute may cure antibiotic-resistant *Clostridium difficile* infection.

It is not uncommon for *C. difficile* patients to undergo a stool transplant when antibiotic therapies are not working for stubborn recurrent cases. The donor stool helps the patient’s gastrointestinal tract re-establish “good” bacterial levels. However, there are concerns about patient resistance and about donor transmission of infection.

The researchers showed that rePOOPulate, made from 33 different types of intestinal bacteria, can be an effective treatment without the “ick factor” of transplanting donor stool. This study was published in the journal, *Microbiome*.

**Excellence in Research Lectures**

On March 7th, 2013, the recipients of the 2012 Queen’s Prizes for Excellence in Research, [Drs. Praveen Jain](#) (Electrical and Computer Engineering) and [Rena Upitis](#) (Faculty of Education) presented public lectures on their research to an engaged audience. Dr. Jain’s lecture, entitled “Power Electronics for a Sustainable Society,” looked at the wide application of power electronics in fields such as space, telecommunications, and computers. Dr. Upitis presented the view that music can influence us in life-changing ways in her presentation entitled “Why Music Matters.”

**For Contributions to their Country**

Created to commemorate the 60th anniversary of the accession of Queen Elizabeth II to the throne, the [Queen Elizabeth II Diamond Jubilee Medal](#) is a tangible way for Canada to honour Her Majesty for her service to Canada and at the same time, honour significant achievements and contributions by Canadians to their country. Queen’s researchers were recognized for their leadership in areas such as mental health initiatives and bullying prevention, and for their seminal research contributions to critical issues such as cancer treatment, climate change, and multiculturalism. Queen’s researchers who received the esteemed honour, include:

- Daniel Woolf
- Jeanette Holden
- John Smol
- Sue Cole
- T. Geoffrey Flynn
- Will Kymlicka
- Wendy Craig
- Elizabeth Eisenhauer
- R. Kerry Rowe
- John McGarry
- Steven Liss

These recipients join other members of the Queen’s community who have received this medal through various governmental and non-governmental organizations.
A “Smoking Gun” in the Oil Sands Debate

In a paper published in the January 2013 issue of Proceedings of the National Academy of Sciences (PNAS), Dr. John Smol (Biology, School of Environmental Studies) and co-authors revealed that lakes in the Athabasca oil sands region are becoming increasingly contaminated due to oil sands development. Using sophisticated sediment analysis techniques, the researchers found that levels of toxic hydrocarbons – groups of chemicals associated with oil production – in six lakes in the oil sands region are between 2.5 to 23 times greater than what they were before the development began. These findings all but end the argument that the lake pollution is caused by bitumen that seeps naturally into the watershed. Smol predicts much more serious consequences in the future and recommends that the oil sands development be monitored more carefully. This study made waves in the national and international media including interviews in The New York Times, The Globe and Mail, The Vancouver Sun, and appearances on CBC’s The National and Quirks and Quarks.

DID YOU KNOW…?

Dr. Elizabeth Eisenhauer, Head of the Department of Oncology, is credited with discovering a method for administering a commonly used cancer treatment drug, Taxol®, that has reduced toxic side effects in chemotherapy patients. Her 1990 discovery, which shortened the delivery time of the drug from 24 hours to three hours, became the global standard of care for Taxol® use in the treatment of breast cancer, ovarian cancer, non-small cell lung cancer and AIDS-related Kaposi’s sarcoma.

“DID YOU KNOW...?” is a recurring feature in (e)AFFECT.
If you know of a Queen’s research discovery you would like to see in an issue of the magazine, contact research@queensu.ca.
The last decade has seen massive changes in the way industry, governments and individuals act to improve physical and information security. From the proliferation of biometric security, software intrusion protection systems and even miniaturized environmental sensors, safety and security is growing into a trillion-dollar economic engine internationally with Canadian companies alone counting $13.6 billion in revenue in 2011. Demand for technologies to improve security is likewise driving important collaborations at Innovation Park – a Queen’s University-hosted research and innovation centre facilitating university-industry interaction.

Thales Canada Defence & Security
Thales’ Kingston office has been providing the Canadian Army with command-and-control software and communications solutions since 2003. In September, Thales brought its training demonstration business to Innovation Park with a mission to accelerate its command-and-control work by attracting prospective clients and capitalizing on university expertise. This work includes design and delivery of intense, battle-training classrooms where officers are pressed to control simulated formations of soldiers operating in difficult terrain under unpredictable circumstances. These environments are fast-paced, high-tech hothouses of decision-making expertise and, occasionally, information overload. With the support of NSERC, Thales is partnering with Queen’s computing professor, Dr. Nick Graham, to try and understand if touch-sensitive software architecture could make it easier for large teams of people distributed over large distances to collaborate more efficiently and effectively.

ENDETEC
ENDETEC, a Queen’s spin-off company now owned by Veolia Water Solutions and Technologies, is deploying its TECTA platform in the race to secure drinking water supplies against deadly E. Coli outbreaks. Working with Queen’s professor of chemistry, Dr. Stephen Brown, the company has developed TECTA into a self-contained testing unit allowing operators to rapidly process water samples in even the most remote locations. Dr. Brown’s research in applying fibre-optics and chemically-sensitive polymer probes for bacteria was motivated by the Walkerton contaminated water tragedy of 2000. What began as a lab effort to identify E. Coli from water samples with portable and easy-to-use equipment became the basis for a new company with the assistance of Queen’s technology transfer office, PARTEQ Innovations. After validating the concept in several prototypes and one change in ownership, the company continues to develop the testing platform at Innovation Park’s satellite premises in the Queen’s Biosciences Complex. The company is collaborating in related materials-development work with another Innovation Park partner, GreenCentre Canada.
**Medizone International**

In a small, sealed room that is part of a Biosafety (level 2) certified lab at Innovation Park, Medizone is using its portable AsepticSure system to thwart outbreaks of *C. difficile*, Strep A and other dangerous infections threatening thousands of hospital patients and visitors every day. The portable machines use ozone and peroxide generating technology in a unique patented formulation to sterilize the demonstration room. The “outbreaks” are contained to Petri dishes, but early work directed by Medizone’s Dr. Michael Shannon has shown that the ozone-generating machine, coupled with vapourized peroxide in a proprietary fashion, can completely eliminate these threats in hospital rooms with minimal time and labour costs for hospital staff. Working with Queen’s researcher Dr. Dick Zoutman, the company’s successful technology demonstration has expanded into a collaboration with Kingston manufacturer Transformix Inc., which will produce the first commercial AsepticSure units for delivery.

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**FCRC**

Directed by Queen’s professor, Dr. Brant Peppley, the Queen’s-RMC Fuel Cell Research Centre (FCRC) evolved from hydrogen-powered propulsion research done in the late 1980s for the Department of National Defence. As fuel-cell and related technologies emerge from expensive lab novelties to commercially viable solutions, early adoption is heavily focused on powering mission-critical systems, where efficient, reliable performance is needed to make sure major data, control and local electrical systems stay “on” during brownouts and blackouts. FCRC is engaged in research partnerships with Hydrogenics, makers of hydrogen fuelled uninterruptible power supplies (UPS) for critical data systems, and Ballard Power Systems, which is demonstrating peak-power neighbourhood electricity generating systems. Some of these systems have already surpassed the price-performance of competing systems using traditional lead-acid batteries.
Dr. David Lyon, Professor in the Department of Sociology and Director of the Surveillance Studies Centre, leans in to make his point: “You know, we need to talk about surveillance and privacy. We need to talk about it in our schools, in our organizations, on campus. We need to say, ‘Do you know what happens to personal data here? Do you care?’ People’s life chances and the choices they can make in life are affected by surveillance.”

Lyon has been talking with me for a good hour or so, unveiling a world that most of us ignore in our day-to-day lives, but which is present and persistent in nearly everything we do. We live in a surveilled society where personal information is routinely collected, sorted and classified, often without our knowledge.

I reflect on my own habits. I tend to think of my own personal data as something I keep in my wallet, or type at the top of a private tax form. But listening to Dr. Lyon, a much richer landscape of personal information emerges. I begin to realize that every day I scatter little bits of myself around a digital world. As I walk to my office, my cell phone is not only broadcasting my location, but the trail is being logged. I browse the web, send email, and post to a social media site. All these data can be retrieved, sorted and classified in ways about which I am completely ignorant.

Dr. Lyon had this same kind of revelation over two decades ago while writing a book about the myths and realities of an emerging information society. As a professor and scholar in sociology and history, he was intensely curious about how the modern society came about, and its key moments of transformation. Looking at the interplay between cultural beliefs and the technologies that develop in that culture led him to look critically at the so-called “information society.” While writing his first book on the subject (The Information Society: Issues and Illusions, 1988), Lyon saw a developing interplay between organizations and institutions that collect personal data and emerging digital technologies.

“When I was writing the chapter on government collection of personal data, I thought to myself, ‘Oh my goodness, this chapter speaks to me about a whole world of things that I don’t really understand all that well.’ And that really set me on a course that I’ve been on ever since.”

Lyon’s course initially led to the creation of the Surveillance Project at Queen’s with his colleague Dr. Elia Zureik (emeritus). The Project received provisional centre status as the Surveillance Studies Centre in 2009 (official status in 2012). The Centre works across disciplines, with involvement from the School of Business, the Faculty of Law, the School of Computing plus other departments in the Social Sciences and Humanities, such as Film and Media.

The complexity of the field under study can’t be understated, particularly as surveillance is a continually developing target. It is a dynamic system, where society responds to, and drives, the use of new technologies in the field of surveillance.

The main interest of the Centre is to study the trends in surveillance – the context in which new technologies will arise, in addition to the details of this-or-that technology or internet platform. By understanding the trends, the Centre hopes to inform policy and legislation. For the last five years, the group has been working on a major project, called The New Transparency, including a report, Transparent Lives: Surveillance in Canada, which is nearing completion.

“It’s a great network of scholars around the country and around the world,” Lyon beams. “It’s wonderful to be with people who are both totally intellectually engaged with really difficult problems that are also politically contentious, and where there’s a demand that one thinks ethically about these kinds of issues.”

A case in point is the recent abandonment of Bill C-30 where the government sought to change how police and other law enforcement officials could gain access to personal online data from telecom and internet service...
provider (ISP) companies without a warrant. Lyon shakes his head and remarks, “The degree of unaccountability and lack of oversight in that process was astonishing.”

So in response, at a New Transparency workshop, the implications of the legislation were discussed, and out of that came a public campaign – led by OpenMedia.ca, but informed, among others, by the academic research of Lyon and his colleagues. “I think I’m correct in thinking that one of the reasons that the government pulled right back on Bill C-30 was because of the extent of interest raised on the issue by the campaign.”

**Social Sorting**

The challenges of surveillance in society go well beyond the traditional tensions of police, state and the privacy of citizens. “We’re all involved in this,” Lyon remarks. “We’re part of an increasingly surveillant context.”

The Internet gives us an amazing amount of information about one another. Every time you check up on a new acquaintance or job applicant through social media, you are conducting surveillance of a sort. We associate ourselves with some people, but not with others, and thus sort ourselves in very powerful ways. But when our self-sorting is exploited through the algorithms and in the databases of huge organizations, the sorting machine thus created affects us in ways we are not aware of.

Social sorting has been around for ages – we size people up, judge their clothing, their neighbourhood, their accents, where they fit into our conception of society. But the sheer power of databases, and the algorithms created to sort people into groups based on those data, puts modern social sorting on a completely different plane.

“The search engine of Facebook is becoming the kind of model of how to do this because, unlike Google, Facebook is relationship based. And so the clustering is being done by us as we choose friends. So, in a sense, we are “friending” those who will betray us to the world.”

How data are sorted and categorized have very real implications as people are socially sorted in profiles and groups. This is done on you without your knowledge, and without any way to change it. A simple example is how companies choose to locate retail services near more affluent communities and avoid poorer ones. A more poignant situation is how one ends up on a no-fly list and one’s powerlessness to do anything about it.

Social sorting is often done with the best intentions. When certain books or albums are recommended to you on Amazon, it is often quite useful and welcome. But the consequences can also be as negative as they are unintentional. Krystle Maki is a PhD student doing pioneering work on how the use of sorting by Ontario’s welfare system is leading to discrimination against women on welfare as a group.

Lyon is visibly impressed by the students and colleagues who work in this field: “I don’t think anyone that we know in our Centre or in our larger national and international networks is interested in surveillance in a dispassionate way. I mean, it is intellectually fascinating, but most people who are engaged in it are concerned about issues of privacy or civil liberties or human rights.”

Another PhD student at the Centre, Özgün Topak, is studying the effects of surveillance along the Greek and Turkish borders, and the experiences of migrants dealing
with frankly inhumane policy. “Law is far, far behind what’s happening in the field. There are crucial issues to do with just basic social justice that are raised by surveillance today.”

The issues surrounding social sorting involve a move from the acts of the individual to the perceived risks of the profiled group. Moreover, you may not know how you got into a group, or why you are now under suspicion, or how to disassociate yourself from a particular group. A Kafka understanding of this world is in some ways better than the Orwellian metaphors because it gives that sense of the experience of surveillance. You don’t know why you’re being called. You don’t know how you got on a list. You don’t know what the criteria were that classified you in a particular way. You don’t know how to get out of it. You don’t know what the consequences are for you or your family. It’s very Kafkaesque in that sense."

And this is perhaps the crux of the work being done at the Surveillance Studies Centre: there is an emerging surveilled context that certainly affects, and perhaps even distorts society, and democracy, and freedoms. And it isn’t a conspiracy, or the result of bad intentions, nor always a negative thing, but it is a context and a dynamic that demands our full attention if we are to maintain the type of society we enjoy today.

The Risk of Risk Assessment

Lyon makes an insightful contrast to the risk mitigation associated with climate change policy. Climate research is based on analyzing and modeling data in order to predict likely outcomes. Those outcomes are risk, and it makes perfect sense to act early on that, before all the data are in, whether it is reducing greenhouse gas emissions, or redesigning infrastructure to deal with new frequencies of extreme weather.

This is something most people accept as a reasonable course of action, and to not act at all in the face of the risks would be negligent. But when the same thinking is applied to the analysis of human data, and the profiling of groups based on potential social risks, then problems arise. Acting early, with incomplete data, means compromising due process and the presumption of innocence, things in the current security-surveillance climate that, Lyon says, we can no longer take for granted in Canada.

Lyon questions the underlying assumptions about how we evaluate risks from the data: “Our risk analysis is based upon very sophisticated analysis of statistics combined with very sophisticated software. But the belief in them and their power and efficacy also have to be considered. The algorithms themselves have to be calibrated in some way.
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How are they calibrated? Who makes them in the first place? Who constructs them and how does that effect the way that they are calibrated?”

In climate change, the data surveilled are physical things like water, heat and geography, but in surveillance, the data are about people – about one another.

To assess risk and act on that understanding has very different consequences. Our conversation turns to the Steven Spielberg film, Minority Report (2002). “In some ways, Minority Report was a very important movie because it came out simultaneously with the after effects of 9/11. The notion of ‘pre-crime’ in the movie is so close to pre-emptive surveillance. And that’s precisely where the civil liberties and human rights potential violations become most likely.”

The extraordinary rendition of Maher Arar, whose personal data were mishandled, and whose personal associations had flagged him as a risk, is a case in point.

The New Transparency Project

Lyon points out that in Canada, we are much better off than many other countries in that we have a Privacy Commission, something that is the envy of other states. Even while the laws it works under struggle to keep up with the changing state of surveillance, nonetheless it offers citizens a direct method to address privacy concerns and violations. To its credit, the Commission has won privacy cases against Facebook and Google.

The New Transparency Project hopes to build on these positive trends through rigorous research and assessment of surveillance. The report is nearing completion of its first draft. “It is a gargantuan task,” Lyon remarks. But the Project is also far more than a report. The Centre, conscious of its identity as a publicly supported institution, plans to launch broad public outreach alongside the publication so that citizens can begin to think critically about these issues and help determine appropriate responses.

As Lyon concludes our talk, I recall his mention of his early academic focus on the development of modern society and how it is connected to cultural beliefs, and I realize that through this research he is engaged directly in that dynamic, at this precise moment in history. “I feel that it’s a moral obligation to bring the intellectual content of my work in line with my deepest commitments and the things that I really believe about human beings and about the world, and what is truly important about a life worth living. And I discovered that among my students and colleagues, there are many people who are asking the same questions.”

DR. DAVID SKILLCORN

FINDING BAD GUYS IN THE DATA

We live in two interconnected worlds. One is the everyday world of homes, streets, sidewalks and restaurants where we interact physically with one another. In this world, if a crime is committed, there are witnesses, physical clues and law enforcement officers. The second world is the digital landscape, where we text a message, locate ourselves with GPS, and generally “log in. In this world, our actions leave digital traces captured as data at a rate of billions of bits every day. There are criminals who operate in this world too and, in many ways, finding them is a greater challenge.

Finding ways to detect bad guys in the data of the cyber landscape is a major part of Dr. David Skillcorn’s (School of Computing) research. This landscape arises from data, and the sheer volume of online activity means it is rapidly changing. It is also a landscape with no real national borders, where personal identities are difficult to nail down, and where it is difficult to know if an action is being done by a person, an organization, or a country.

While the field of cyber security is vast, Skillcorn summarizes a key strategy in his research with the phrase: “humans are terrible actors. That is, when performing any action, the fact that someone is trying to conceal something can be detected in the data. The intention to try to evade detection, or to cover one’s trail, leaves a signature in the data that reveals itself against a background of normal human activity. Skillcorn develops and tests strategies and algorithms that pull such patterns out of the vast sea of internet data.

Originally from Australia, Skillcorn points to the Bali bombings of 2002 as an influence on his research, part of which is to detect adversarial intentions before a crime or act of aggression is committed. He does not believe that digital networks can be designed to keep people out, so searches instead for ways to preempt criminal activity before it happens.
“The CFI grant is really the culmination of all our work.”

Dr. Amir Fam is talking about the $1.4 million grant the Canada Foundation for Innovation (CFI) awarded him and his colleagues this January. Together with other funding that he is waiting to hear about, the CFI money will go a long way towards his goal of building what he calls a “moving load facility” for testing bridges, a $3.5 million system, likely unique in the world. Having such a facility will help Fam, a professor of civil engineering and the Canada Research Chair in Innovative and Retrofitted Structures, realize what has long been one of the central goals of his research: finding new and better ways both to build concrete structures and to make sure that they last longer.

Conventionally, concrete is poured around rebar (i.e. reinforcing rods) and steel cages and shaped using wooden forms that hold the liquid concrete in place while it hardens. Removing the forms is time-consuming, potentially dangerous and disruptive – pulling them off a bridge can require blocking traffic for considerable amounts of time. Conventionally constructed concrete bridges have other problems as well. Heavy use and Canada’s harsh winter climate, with its repeated freezes and thaws, combined with water and road salt, damage them in the long run. Concrete cracks and breaks; far more seriously, the heart of all concrete structures, the steel rebar, corrodes, severely weakening it. Take a look at the crumbling and pitted older bridges passing over Ontario’s Highway 401 or Toronto’s deteriorating Gardiner Expressway, and it’s apparent that concrete can be surprisingly fragile.
Fam’s solution has been to create a new, different type of form, made from composites such as fibre-reinforced polymers. Designed to be left in place after the concrete hardens, speeding up and simplifying construction, they also act to reinforce the concrete, taking the place of corrosion-prone steel rebar.

Fam’s earliest work with fibreglass and other polymers relied largely on pre-made pipe developed for use in the oil and gas industry and suitable for what are called “closed forms,” those used for example in the pouring of bridge uprights. As well as speeding up construction and reinforcing the concrete, these fibre-reinforced polymer tubes protect the concrete against water and the damaging effects of salt and other chemicals. The first-ever bridge constructed using this technique was erected in Virginia in 2000. Such tubes have proven amazingly resilient. Fam has been working recently with colleagues at the Royal Military College to see whether similar columns might prove more blast-resistant than conventional concrete reinforced with rebar.

Tests carried out with high explosives at the Canadian Forces base at Petawawa have demonstrated that they are.

In the last six years or so, financed by Ontario’s Ministry of Transportation, Fam has turned his attention to developing fibre-reinforced polymer versions of the conventional wooden “open forms” currently used in bridge construction to shape and hold concrete in place when it is poured. Fam has used large flat plates that will form the underside of bridge decks, and corrugated fibreglass panels specially designed so that concrete will bond to them to serve as part of the roadbed.

What Fam has developed will revolutionize bridge construction. Yet it may well be years before we drive over bridges built using Dr. Fam’s latest techniques. Civil engineering, Fam will be the first to tell you, is a “very conservative profession.” With good reason – people’s lives depend on it, so nothing changes abruptly or before it has been carefully tested.
And that is where his new moving load facility for testing bridges comes in. Fam envisions building a sort of miniature railway in his lab at Queen’s. “It was inspired,” he says, “by the automatic car wash.” Models of future bridge deck components would travel on flat cars under a constantly pounding 200 ton hydraulic press, simulating the effect of heavy vehicles moving over them. The same track will then run them into a chamber where they will be sprayed with salt and other corrosive chemicals, and subjected to extremes of temperature before being hauled under the press again. The relentless pounding combined with extremes of temperature and constant exposure to corrosive chemicals would mirror the constantly changing real-life conditions a bridge endures over several decades, letting Fam test – and improve – his technology in the closest to real-world conditions possible. “It will be,” says Fam, “a structural engineering researcher’s dream come true.”

The end result will be bridges that are stronger, easier to build, longer-lasting – and safer than what we have today.
Everyone eats food, some of us enjoy cooking, and careful consumers check food labels in the interests of healthier eating. But unless you’re a professional chef, you probably don’t spend as much time thinking about food, and probably not in the same way, as Dr. Betsy Donald.

For the last few years, Donald, a professor of geography and urban planning at Queen’s, has been exploring the origins of North America’s industrial food system. That system feeds millions of people – but it has also destroyed countless family farms, engendered the growth of thousands of fast-food restaurants and mass-marketed foods that, while inexpensive, have scant nutritional value and are partly responsible for an obesity epidemic in the United States and Canada. Too, in many cities the system has also created “food deserts” – typically lower-income sections of town whose residents have no convenient access to a grocery store.

How is it that, in two of the world’s richest countries, so many people are fed so poorly? One reason, says Donald, has been corporate restructuring in the retail food sector, which has failed to produce the across-the-board consumer benefits that some economists say is the natural result of marketplace competition.

“The food system has become incredibly industrialized and margins are very slim,” says Donald, who is spending a sabbatical year at the University of Cambridge to study the historic evolution of that system in the U.S. “Big retailers have had to build bigger and bigger stores, which has had an impact on small towns and poor communities because it’s not as profitable for these large retailers to locate in poorer areas. It means people have to have access to cars.”

The food desert phenomenon reflects both a food system and urban-sprawl city planning that is ultimately based on cheap oil, says Donald. Big-box food stores stock huge inventories, which are often trucked over long distances and are highly processed so they can be stored longer. Much of it is made using products derived from corn, which relies on government subsidies and oil-derived chemicals to grow on an industrial scale. As well, since
big-box outlets tend to be located in suburban areas, shoppers must drive there. If the price of oil soars to unsustainable levels, which many economists predict is only a matter of time, the current food system could break down for food growers, distributors, retailers and consumers.

That’s a dire scenario, but Donald is encouraged by grassroots food activism in recent years that has led a growing population of consumers to think – and care – about where their food comes from. By taking small steps to sidestep the industrial food system, she says, more people and communities are seeing how they can become physically and economically healthier.

Such steps include the establishment and promotion of traditional farmer’s markets, local food co-ops and small-scale organic farms and community gardens. Too, regions such as Prince Edward County in eastern Ontario – which revived its declining rural economy by fostering the growth of wineries and restaurants serving food made from locally-grown ingredients – are showing that agriculture on a smaller scale can provide productive employment, healthy food and a sense of community identity and pride.

But Donald acknowledges that organic fruits and vegetables are too expensive for many people and that healthy, affordable food will only become a reality for everyone after major shifts in public attitudes and government policy. For instance, governments will have to re-think subsidies for industrial corn and beef farming that depletes soil and pollutes water, and support more sustainable growing methods. Food manufacturing and processing, which often takes place in massive factories whose output might be distributed to half a continent, will need to be done in more, and smaller, facilities to reduce the risk of widespread transmission of food-borne illnesses. Urban planners will need to promote human-scale development that makes it easier for people to walk or cycle to get food instead of drive.

Policy-makers are already considering moves in this direction, says Donald, because the costs of treating heart disease, obesity, diabetes and other medical conditions associated with poor nutrition and a sedentary lifestyle are making them an economic necessity.

While previous generations built the mainstream food system, Donald says it will be the coming generation’s job to reform it.

“Younger students have really grabbed onto food as a way forward, a way to find solutions,” she says. “I’m optimistic that it’s the students who are going to change the system.”
If you own a computer, you’ve experienced the frustration when your email service fails or you can’t access your Facebook account because of a service disruption. Dr. Ahmed Hassan feels your pain – and he’s doing something about it.
Hassan, the NSERC/RIM Industrial Research Chair in Software Engineering at Queen’s School of Computing, is a co-inventor of the Blackberry communication platform and a world leader in a field known as Ultra-Large-Scale (ULS) computing. He also heads the Software Analysis and Intelligence Lab (SAIL), an innovative, multidisciplinary research group of software engineers at Queen’s School of Computing that is working to increase the reliability of global-scale computing services.

Hassan and his colleagues are engaged in critical work. Every second of every day, millions of computer and smartphone users surf, chat, search, bank, buy, email, game, and upload. The services that enable this computing whirlwind – Google, Amazon, eBay, Blackberry, Xbox Live, PayPal, Interac, Facebook, and wireless networks such as those operated by Bell and Rogers – are based on massive, complex and global ULS computing infrastructures. With so much economic and social activity depending on such services, they must operate flawlessly all the time.

Usually these services work the way they’re supposed to, with billions of daily online transactions zipping back and forth without incident. But even a minor glitch in a ULS service affects countless users and exacts an enormous financial toll – such as a recent four-hour PayPal outage estimated to have cost as much as $32 million in lost customer transactions. Similarly, periodic outages of messaging, email and internet services cause productivity losses and impact financial markets worldwide.

When such downtimes occur, ULS software engineers must identify the problem and fix it, quickly and effectively. However, solutions are often devised on the fly and rely more on the experience, guesswork and intuition of engineers rather than on evidence derived from hard data. Hassan and the SAIL team are devising unique data-mining processes – Hassan describes it as digital archeology – that allow software engineers to sift through billions of lines of code and real-time operating data generated by ULS services and to quickly spot the anomalies, leading them to the source of a current or potential software problem – and a solution.

Data mining – the analysis of extremely large and complex data sets – is not new. Banks and large retailers use it all the time to analyze sales, identify consumer usage trends and make business decisions based on trends that are gleaned from terabytes of corporate data. This analytical process is often referred to as “Business Intelligence.”

The sort of data mining that Hassan’s team performs is different. The mining is applied to data from both the historical software development and the real-time field usage of computing systems instead of business-level data like customer purchases. Hassan coined the term “Software Intelligence” to differentiate it from traditional data mining.

Software Intelligence is quickly becoming a cornerstone of ULS computing. Unlike traditional consumer software, whose updates are methodically written, tested and rolled out every year or two, ULS services may be updated monthly, or even more frequently, while the service itself is running. To help ensure this near-continuous development and operation, accurate and actionable information is needed from both the software development world and the real-life operational world. Hassan’s team is creating the protocols, algorithms and techniques to make this happen.

“Software Intelligence offers up-to-date, pertinent information to support daily decision-making processes,” says Hassan. “Owners, operators, maintainers and developers of ULS services can use it to inform their long- and short-term strategic planning.”

The SAIL team is a diverse group whose 20-odd members have expertise in data mining, grid computing, distributed systems and database management. They have research partners all over the world, and at any given time about a quarter of the group is stationed at Blackberry offices in Waterloo or Toronto to collaborate with the company’s software engineers.

Hassan is a key figure in Queen’s thriving software engineering ecosystem, whose researchers in the past few years have produced the highest return on investment for NSERC funding in Canada. SAIL has also become a success story for two key supporters, the Ontario Centres of Excellence and the Ontario Ministry of Research and Innovation.

“Canada has already established itself as a world leader in ULS systems thanks to innovations like Blackberry and the Bell wireless networks,” says Hassan. “Our goal is to ensure that Queen’s plays a key role in future research innovations and in student training so we maintain our leadership in ULS computing – the backbone of all future services.”
Swinging between Euphoria and Despair:

Frank Milne

BY ALEC ROSS
The 2008 global financial crisis was the worst economic and financial calamity since the Great Depression, and countries and financial institutions everywhere are still struggling with its consequences. Meanwhile, academics, analysts and pundits are studying the roots of the crisis in the hopes of averting another meltdown in the future.

Dr. Frank Milne is one of Canada’s leading experts in this regard. As the BMO Professor of Economics and Finance in Queen’s Department of Economics, Milne was one of the financial professionals around the world who warned that some of the financial and regulatory practices of the 1990s and early 2000s would lead to catastrophe. His research and graduate training on risk management and financial stability is influencing banking policy in Canada and in his native Australia.

In a 2008 analysis of the international debt crisis for the C.D. Howe Institute, for example, Milne argued that the crisis was caused by two different types of debt funding and risk management systems operating simultaneously within the banking and financial world. One model assumed that securitization—the packaging of mortgages, credit-card debt, auto loans and other interest-bearing debt into bonds and various other asset-backed securities that could be bought and sold on the market—was a market-based system that reduced the need for standard risk-management approaches regarding the transparency of information available to buyers and sellers, uncertainty and market liquidity. The second model was the traditional one, which assumed that securitization merited the same rigorous risk-management strategies as any other investment.

Between the early 2000s and 2008, the former model, now referred to as a “shadow banking system,” operated outside of standard bank regulations and supervision. It was successful while it lasted: the housing market, fuelled by millions of home buyers lured by low-interest mortgages and tax-deductible mortgage payments, boomed. Across the U.S., new housing subdivisions expanded rapidly. Traders, banks, insurers and investors enjoyed huge returns from the real-estate backed securities. The stock market soared. But the bonanza was founded on an illusion. Asset-backed securities earn long-run returns only if the debt they are built around is relatively sound. Unfortunately, millions of sub-prime mortgages had been sold to people who could not pay them back because of subsequent job losses, or because they should not have been approved in the first place. Inevitably, defaults and foreclosures began to mount by the hundreds of thousands, rendering the once-valuable bond securities worthless: the institutional investors who had sunk money into them collectively lost trillions of dollars. Major investment banks and mortgage companies, such as Lehman Brothers and Countrywide Financial, went bankrupt, were sold to other banks at fire-sale prices or were taken over by government. Worst of all, millions of American investors, whose savings had been used by the banks to purchase the junk securities, lost everything while the banks that caused the crisis received large bailouts from the U.S. government.

As we now know, and as Milne observed, inadequate risk management within banks, lax regulatory oversight, widespread corruption and conflict of interest were root causes of the crisis in the U.S. and in a number of European Union (E.U.) countries. In too many cases banks and mortgage companies facilitated, or even promoted, the reckless lending to people who were obvious credit risks. Credit rating agencies gave AAA ratings to bonds they knew to be junk. Traders knew they were junk, too, but sold them to net massive profits and bonuses. People everywhere are outraged that none of the banking executives and traders who caused the crisis have gone to jail.

While the financial crisis affected Canada, tighter regulation of its banking system helped it avoid the sort of melt-downs that occurred elsewhere. But Milne says Canadians should not be complacent. The dramatic increases in sovereign debt in the U.S. and the E.U. caused by huge fiscal stimuli, combined with looming fiscal challenges posed by the aging baby boom generation, pose a serious threat to national economies everywhere.

At the same time, Milne says a long view of economic history suggests that while things may get rough, there is cause for hope.

“The road to the future is never smooth: it is littered with booms, busts, surprises, disappointments and failures,” he says. “We should adapt, looking for opportunities and encouraging our fellow citizens through thoughtful policy implementation. It is foolish to be myopic, swinging between euphoria and despair.”
In Bangladesh, one of the most densely-populated countries in the world, it is difficult enough to walk down the street without being pushed and shoved in all directions. But imagine trying to make that same journey in a wheelchair, on crutches, or with any physical disability. What about trying to work and go to school and live a “normal” existence where there is little to no accessibility in any public or private facilities?

However challenging these physical barriers may seem, they are often not the most difficult ones to overcome: attitudes to, and perceptions of, disability are often the biggest obstacles. In Bangladesh, where an estimated 10-14% of the population is disabled, there is little awareness of disability, its causes or consequences. As a result, many “traditional” and superstitious ideas on the subject still prevail, especially in rural settings. Disability is often seen as a curse from God – inflicted as retribution for the sins of the disabled person’s parents. Many believe that disability is infectious and will spread through physical contact. Access to education and employment for persons with disability is almost non-existent.

“Because of these negative attitudes, the physically disabled in a country like Bangladesh are very disadvantaged and extremely vulnerable,” says Dr. Malcolm Peat, Executive Director of the Queen’s International Centre for the Advancement of Community Based Rehabilitation (ICACBR). This is especially true for girls who, as Peat explains, are victims of “double disability,” as the status of women in the country remains poor.

Since 2011, Peat and the core ICACBR team of Djenana Jalovcic (Director), Beth Richan (Project Manager), and Darko Krznaric (Project Manager, Interprofessional Project on Disability, Maternal and Child Health [IPODMCH]), have worked directly with health care professionals, persons with disabilities and communities in Bangladesh to educate them on the nature and causes of disability, raise awareness, and challenge prevailing attitudes through the establishment of what is known as “Community Based Rehabilitation” (CBR). CBR is a multi-sectoral strategy achieved through the transfer of skills, the building of local expertise, and the creation of an environment that...
empowers persons with disabilities to access and benefit from education, employment, health care and social services. Established in 1991 as a Centre of Excellence funded by the Canadian International Development Agency (CIDA), the ICACBR’s mandate is to advance the development of CBR worldwide.

The ICACBR has spearheaded international CBR initiatives with vulnerable populations in Canada and in over 15 countries in the Asia Pacific Region, Central and South America, Central and Eastern Europe and Africa, including those in conflict, post-conflict and democratic transition. To carry out their work, the ICACBR team works with networks of clinicians, disability advocates, researchers, educators, and students. Essential to the success of CBR initiatives are the partnerships with local governments, education/research institutions, and NGOs. The ICACBR works with these groups to develop curricula, educate and train rehabilitation practitioners, and design sustainable CBR services that will continue to thrive once the team returns to Kingston. In all of his work, mutual respect, cultural understanding and creativity are key.

Currently, the ICACBR is in Bangladesh leading the CIDA-funded IPODMCH initiative. In developing countries like Bangladesh, almost 500,000 women die and 1.5 million are disabled annually of childbearing-related causes. Eleven million children die annually, the majority of preventable causes; the mortality rate for children with disabilities is 80%. Bangladesh has among the highest infant and maternal mortality rates in the world.

Working with a local partner, the Centre for the Rehabilitation of the Paralysed (CRP), their goal is to educate and train over 1000 health professionals, students in health studies and 12,000 community members, including children, in five regions in Bangladesh. The training stresses the benefits of seeking skilled health care providers during pregnancy, labour and post-birth, to improve birth practices, nutrition, hygiene, and growth and development to reduce risk of death and disability. It also provides strategies to positively influence attitudes towards disability, support development and the inclusion of women and children with disabilities from birth.

The ICACBR hopes to again join forces with the CRP to break down the barriers, superstitions, and stigmas within communities, which prevent disabled children from enjoying equal rights and opportunities. Dr. Peat is quick to stress how important it is to involve children in these projects. They are the future of Bangladesh and the ones that can make a real difference. Getting the children involved in these projects is a wonderful thing – they can change attitudes and do so much positive work with their energy and excitement.”
A weekly basketball game is played by spinal cord injury patients from CRP. Founded in 1979 in response to the desperate need for services for spinal injured patients, the CRP is the only organization of its kind in Bangladesh. In addition to raising awareness and acceptance, the CRP focuses on a holistic approach to rehabilitation, recognizing that all aspects of the rehabilitation processes, from physical and psychological to economic, are vital to the success of Bangladesh’s disabled population.

The ICACBR team works directly with school teachers to develop strategies to promote positive attitudes towards disability at school and to promote equal opportunities for children with disabilities. Students with disabilities often do not attend school because they face a number of barriers, including poverty, social exclusion, and physical inaccessibility. Therefore, children rarely mix with disabled friends. Integration of disabled children, especially at an early age, will encourage acceptance and positive attitudes.

Public awareness seminar for pregnant women on disability and maternal and child health delivered by the ICACBR teaching team in Savar, Bangladesh.
To eliminate stigma and develop positive attitudes towards disability, school children engage in games where everyone is accepted and included.

A young girl hurries to an open house hosted by the CRP vocational institute to learn about jobs in the garment industry, and how to acquire marketable skills such as sewing. Often disabled individuals cannot work in Bangladesh because of attitudes against hiring the disabled, but also because workplaces cannot accommodate them. For example, narrow doorways and staircases prevent those in wheelchairs from even entering the building.

A young mother holds her newborn baby in Bangladesh. Disability in newborns is often a consequence of complications of adolescent maternity (girls aged 12-13), poor prenatal care and screening, or prolonged labour without effective management.
People can argue endlessly about whether nuclear power is desirable. But they can’t dispute the fact that, like it or not, it’s a part of society – and that society needs to find a safe way to dispose of nuclear waste.

Hundreds of scientists around the world are grappling with this issue, and Dr. Mark Diederichs is in the thick of it. Diederichs, a professor of geological engineering at Queen’s and a member of the GeoEngineering Centre at Queen’s – RMC (see sidebar), is part of a Canadian research group that’s designing massive underground chambers where nuclear waste can be stored safely long term. Diederichs’ expertise is in figuring out how the geology and characteristics of the surrounding rock interact with shafts or tunnels excavated within it. Does the rock fracture or disintegrate? How does the tunnelling affect water flow? Will a major geological event in the distant future compromise the stability of the excavation?

There are different types of nuclear waste. The kind that captures the most public attention consists of bundled uranium fuel rods from the cores of nuclear reactors. Spent fuel, known as high-level waste, remains radioactive and is toxic to humans. It takes thousands of years to degrade to a harmless state. Used nuclear fuel destined for long-term storage is typically encased in thick jackets of copper or lead and concrete and stored in secure facilities at the site of the nuclear reactor that produced them.

Though it’s less hazardous, low- and intermediate-level nuclear waste – such as nuclear plant maintenance tools and equipment, machine parts and some types of medical waste – must also be safely stored. In Ontario, contaminated material from the Darlington, Pickering and Bruce nuclear generating stations is currently stored in secure canisters at the Western Waste Management Facility near the Bruce generating station near Kincardine.

With Diederichs’ assistance, the Nuclear Waste Management Organization (NWMO), a government mandated, industry supported organization for which Diederichs is a technical adviser, has designed a Deep Geologic Repository, or DGR, to be built under the Bruce site. The mine-like facility, now in the licensing phase, will be bored out of limestone 680 metres underground and below a 200-metre thick shale deposit, and be large enough to contain all the low- and intermediate-level waste produced by Ontario’s 20 nuclear reactors through the rest of their life cycle.
To determine the geological suitability of a potential excavation site, other geologists and engineers like Diederichs study the chemistry and physics of underground water to estimate how long it’s been since it experienced a major geological transformation. In the case of the Bruce site, for instance, it’s been hundreds of millions of years. While this is no guarantee that the rock will remain stable forever, it does provide a comforting outlook from a human safety perspective. Diederichs, himself, studies the physical response characteristics of the various geological units and simulates the mechanical behavior of the rock around the facility during construction and for up to a million years after closure. The point of the testing is to ensure that no radioactivity will reach the layers of water above it if the underground site is somehow compromised. All indications are that the geology at the Bruce site provides this safety barrier.

Diederichs is also involved with NWMO’s other big research project: a deep-storage facility for Canada’s high-level nuclear waste. Because the stakes are so high, it will take at least a decade to choose a location for the facility and another 20 to 30 years before it’s actually built. The public must be satisfied that it will be safe – the exhaustive consultation process is called Adaptive Phase Management – and accomplishing this can be even tougher than the engineering and construction of the site. In fact, in the 1990s, the Canadian government was considering a deep-storage facility dug out of the Canadian Shield. The project was shelved not because of complex technical issues but, as one scientist observed, “because of public dread.”

“Nuclear waste is all about communication,” says Diederichs. “We can work on the technical issues as geologists and engineers, but at the end of the day our work in that area has to be communicated to the public. That’s hard to do, because the time scales we’re dealing with are very challenging. How do you persuade someone that something will be safe for basically forever? This is where geology and geological engineering become as much about the future as it is about the past.”
INTERNATIONAL ADOPTION:
AID OR ABDUCTION?

BY NANCY CORRIGAN
When you see images of Angelina Jolie or Madonna with their adopted children, what is your reaction? Perhaps you see two women giving children born in poverty a better life? Or perhaps you view their actions as rich North Americans promoting their own self-interests, rather than those of the child? Dr. Karen Dubinsky (History and Global Development Studies) studies how perception and politics play into the adoption process – and how that affects not only the child, but also the culture and well-being of a country.

Originally an historian focused on Canadian history, Dubinsky became fascinated by the issues surrounding transnational adoption when she adopted her son from Guatemala. As she went through the process, she discovered both real problems within the system, but also perceptions about international adoption that weren’t necessarily true.

“Some view international adoption as a rescue operation for the child, while others consider it to be the worst kind of colonialization,” she says. “Each case is different, but I’ve learned that there is often much more going on than a simple adoption focused on the child’s best interests.”

Dubinsky has observed adoption practices from a number of perspectives – and notes that there are many factors and issues surrounding international adoption. “The pain of relinquishing a baby can be as acute for a community or a nation as it is for an individual mother,” she notes. “The impact, especially of large-scale adoptions, can reverberate for generations.”

Often, political or financial concerns can take precedence over the welfare of the child. In 1960, the CIA arranged for over 14,000 Cuban children to be sent to Miami in an operation dubbed “Peter Pan,” claiming that the Cuban government was planning to take the children from their families and send them to military schools and Soviet work camps. Russia recently implemented a ban on U.S. adoptions, citing child welfare concerns, although critics suggest the move is in retaliation against a new U.S. law that bans Russians charged with human rights offences from entering the country.

In Guatemala, a lack of formal processes led to children being kidnapped by attorneys who charged significant “fees” to adoptive parents, who in turn believed these were abandoned children at risk during civil strife. The country eventually closed to adoption in 2008, after having sent over 4,700 children to the U.S. in 2007, a significant number given the country’s size.

Dubinsky’s book, Babies Without Borders (2010) examines the political aspects of international adoption in Cuba, Guatemala and North America, looking at “projects” such as Operation Peter Pan, but also at adoption practices closer to home, including the relocation of native and black children in North America during the 1960s. Her work delves beyond the “kidnap vs. humanitarian aid” debate to observe the political symbolism of children and its impact on them.

Dubinsky’s current research is focused on examining how children’s images are used for a variety of messages that may or may not result in a positive outcome for them. She’s found evocative images from a broad range of countries and causes over decades – from children saluting in a Nazi party poster to a mother posing with a baby and a gun in a revolutionary image. “Sometimes these images portray children as empowered political actors, other times as a vulnerable population in need of rescue,” she says. “It’s not uncommon even today – think of politicians kissing babies, or the use of young children to elicit emotion in television advertising. It’s not necessarily bad – but it’s not necessarily in the child’s best interests.”

Dubinsky believes we need to better understand how our actions are motivated by our perception of children in various situations. “Our human love for children shouldn’t overshadow their rights,” she says. “Children are much more astute than we generally acknowledge. It’s time to consider how they represent themselves, rather than always speaking in their name.”

**SETTING CUBAN HISTORY TO MUSIC**

Along with introducing students to Cuban culture through her third-year Cuban Society and Culture course (which includes a two-week study program at the University of Havana), Dubinsky is actively giving a voice to the complicated history of Cuba through a project to promote the work of musician Carlos Varela, considered by many to be the “Bob Dylan of Cuba.” Varela, an outspoken critic of the Cuban government, writes politically-motivated songs featuring the history of Cuba, including topics such as Operation Peter Pan. Dubinsky is collaborating with international colleagues, including U.S. musician Jackson Browne, to prepare a translated anthology of his lyrics to further raise awareness of these issues.
“Contributing to peace, even in a small or indirect way, is an immense honour; knowing that lives are being saved, because of a process in which you participated, brings the greatest pleasure imaginable.”

Growing up in Northern Ireland, Dr. John McGarry got an early introduction to his future career, living through what’s often been referred to as “The Troubles” – an ethno-political conflict that divided a country and escalated into three decades of violent unrest. Today, as a Queen’s researcher, professor and senior advisor to the United Nations (UN), McGarry is once again on the front lines – but this time as a global advisor, mentor and active participant, collaborating with governments around the world in the quest for peaceful conflict resolution.

As a Catholic living in a primarily Protestant town, McGarry was close enough to the action to be both frightened and intrigued by the causes of conflict – and how it might be defused. Those childhood experiences motivated him to study conflict and conflict resolution at both Trinity College in Dublin and the University of Western Ontario. “I wanted to know more about why these kinds of conflict occur,” he says. “Learning how to ‘diagnose’ these situations was essential to proper prescription.”

Breaking down barriers

McGarry’s studies led to the development of a number of articles and books centred around different aspects of Northern Ireland’s conflict, many of them written with his close colleague, Brendan O’Leary. One of these was *Policing Northern Ireland* (1999), a book that proposed a number of recommendations for making progress around probably the most divisive issue in peace negotiations.

“Divisions around policing reform created a major barrier to an agreement,” he says. “Our book presented clear recommendations and proposals designed to find a respectful way for all parties to move forward.” *Policing Northern Ireland* was later cited as a critical influence on the commission tasked with reforming the police, a major milestone in the peace process. Policing reform in Northern Ireland has been a dramatic success story, and is now seen as “a,” if not “the,” model for other divided societies.
GLOBAL REACH

McGarry stands at the Nicosia Airport in Cyprus, which was abandoned in the 1974 Turkish invasion and now lies in the UN controlled “buffer zone.”

Bringing the world to the classroom
McGarry joined Queen’s in 2002 and is an active researcher, as well as the Canada Research Chair in Nationalism and Democracy in the Department of Political Studies. His expertise in the design of political institutions in divided societies has been internationally recognized and has won him major accolades including Fellowship in the Royal Society of Canada, a prestigious Trudeau Fellowship and a 2013 Killam Prize. McGarry is also a much sought after professor – his undergraduate class in Comparative Politics has over 200 students and consistently runs a waiting list. He also works with a number of graduate students, using his background and experiences to deliver powerful and relevant lessons for students hoping to pursue a career in academics or conflict resolution.

McGarry is not just a popular professor and prolific researcher – he’s also a highly respected global advisor on conflict, power-sharing and public policy, appearing as an expert witness before the U.S. Congress and working alongside other experts as part of a UN team that has advised on some of the most chaotic areas of unrest in the world, including the Philippines, Kosovo, Iraq, and the Western Sahara.

Solutions for Cyprus
McGarry was appointed the first Senior Advisor on Power-Sharing to the UN (Mediation Support Unit) in 2008-09, and was most recently tasked with advising on the UN-led negotiations in Cyprus, a small Mediterranean island that achieved independence from British colonial rule in 1960 and is inhabited by both Greek and Turkish Cypriots. After just three years, Cyprus collapsed into inter-community violence, and UN peacekeepers have been there ever since. The island was forcibly partitioned by Turkey in 1974. The current peace negotiations are aimed at reunifying the island in a way that both of its communities can accept. It has been a difficult task, with the Cyprus problem seen as one of the three most intractable conflicts in the world, alongside Israel/Palestine and Kashmir.

As part of the UN team, McGarry’s role includes working with all parties to discuss issues of governance, particularly the specific issues of power-sharing institutions and federalism. The task requires careful and painstaking work. “Leaders need to be strong enough to take on the challenges that come with negotiations,” he says. “They can often be risk-averse, especially if groups in their constituency deem compromise as treachery.” He relies on his research as well as his background to help parties understand options and negotiate for mutual benefit.

“Both sides have to believe that settling is better than the status quo,” he says.

Knowledge for action
McGarry says that it has been a huge privilege to be involved in these types of negotiations, especially when they lead to peaceful resolutions. “Contributing to peace, even in a small or indirect way, is an immense honour; knowing that more lives are being saved, because of a process in which you participated, brings the greatest pleasure imaginable.”

He cautions, however, that the real heroes are not advisors, but the politicians who can compromise skilfully without losing their followers. “They’re the ones who risk their futures, and even put their lives on the line.”
Although not much changed during the one hour I spent with Sylvia Bawa, I left her office feeling empowered. It was empowerment from knowledge, which is something that Bawa knows a lot about: she researches women’s rights in Sub-Saharan Africa. In her eyes, knowledge is a powerful tool. “My research examines discourses around women and women’s empowerment in Sub-Saharan Africa,” says Bawa, a recent PhD graduate in the Department of Sociology. “African women are often constructed only as helpless victims of oppressive local cultures. I didn’t find this depiction to be accurate, given my experiences.”

Bawa lived in Ghana most of her life. When she moved to Canada in 2005 she noticed a discrepancy between her memories of Africa and Canadian perceptions of Africa. “The most difficult thing for me was seeing images of Africa on the television that I didn’t recognize,” Bawa says. “Of all the things that I had prepped for mentally, that was the one thing I wasn’t prepared for.” That is, the depiction of the continent as a place that needs to be “saved” by the West; or the depiction of its problems as peculiar to the continent – without any recourse to a violent history of colonialism and its lingering legacies.

With a new external perspective, Bawa began her PhD dissertation at Queen’s focused on deconstructing the notion of women in African post-colonial societies. She undertook a six-month field study in Ghana and organized 16 interviews and eight focus groups. Other than a few men, the participants were all women with a post-tertiary education that were actively negotiating or defending women’s rights in Ghana. In her thesis, Bawa includes direct quotations from these meetings; she says she did this to use the women’s voices and experiences as the basis for analyzing women’s rights. “The women know the reasons why they find themselves in particular situations,” Bawa says. “I didn’t want to speak for African women, I wanted them to speak.”

Bawa unearthed many issues regarding women’s lives in Africa. However, she noticed some recurring themes. Education was a big one. Human rights, post-colonial feminism, identity construction, the use of religion, and what it meant to be empowered were all topics that her participants wanted to discuss.

“There is a campaign slogan that says, ‘If you educate a man, you educate an individual. If you educate a woman, you educate a whole nation.’ It’s one that is very popular in Ghana. It’s not the same discussion for men’s education. It’s okay for them to be an individual.”
"I didn’t want to speak for African women, I wanted them to speak.”
SYLVIA BAWA

This idea is reinforced around the world. There is a global emphasis on putting African girls in school, and although this is very positive, there are neoliberal economic and cultural expectations that contradict this goal: once girls reach a certain age they are expected to take on primary reproductive responsibilities, including childbirth, care and mothering.

She emphasizes that Africa’s colonial history must be kept in mind in discussing women’s marginalization on the continent.

Bawa says African culture was shaped by colonization. Ghana gained independence not too long ago, in 1957, and as a result, it is very much a post-colonial society. In other words, the legacies of colonialism are still very present. Among other things, British colonists imposed Victorian notions of womanhood onto the country; women were expected to be fully domestic and out of public view.

“There’s an idea that African women just stay at home, but that’s not the case,” Bawa says. “They are very much in the public eye, but they’re not in the formal places … If you look at the informal sector, women are going to the farm, they trade, and they travel for trade.”

In her research, Bawa finds that domestication, or perceived domestication, is magnified by global trade policies. Current trade policies focus on growing the formal macro-economy in Africa, which is an economy that has historically marginalized women. Bawa concludes that these things together – colonial legacies and a focus on the macro-economy in global economic relations and trade – are contributing to the impoverishment of African women.

However, there is a silver lining to Bawa’s findings. Bawa believes that the evolution of knowledge will allow us to examine issues regarding African culture more critically. And this will lead to change.

Her thesis defence, which occurred in December 2012, was a success and she is now turning her research into a book.

Catherine Owsik

In August 2012, Catherine Owsik, a fourth-year undergraduate biology student, launched the inaugural issue of Nerve, a monthly, online science, engineering and technology magazine. It was a project that she initiated out of her own interest, but Nerve has flourished with support from the Queen’s and scientific communities.

Owsik’s writing career began in her second year at Queen’s, when she accepted a job working for the Queen’s Journal. The next two years were busy, but she loved the chase of a story and a strong work ethic grew out of the many late nights. It was also at this time that Owsik discovered she enjoyed working with layout and design.

The idea for Nerve came to Owsik suddenly one night when she realized she wanted to write about science, but there wasn’t a science publication on campus. Almost immediately, Owsik started jotting down notes about creating a science magazine and taped them to the wall above her desk. During the following months Owsik refined her wall of ideas, and worked hard to make the magazine a reality. Owsik advertised Nerve on campus, found a base of contributors, and soon was busy managing and designing.

Owsik and Nerve caught the eye of a Scientific American blogs editor on Twitter. He was impressed with Owsik’s initiative and he interviewed her for the Scientific American Incubator blog. He also reviewed Nerve, and invited Owsik to present the magazine at the Science Online 2013 conference in Raleigh, North Carolina.

Already in its seventh issue, Nerve will continue to grow. Owsik is unsure of her post-undergraduate plans, but she will keep following her instincts towards new learning opportunities, whether they are from a job or graduate program.

You can access Nerve magazine at:
issuu.com/nervemag/docs
The university experience is changing. The days of lecture halls and blackboards are slowly disappearing, and new ways of thinking, learning and creating are advancing. When so much information is readily available at our fingertips, how do we inspire passion and curiosity, encourage critical thought and problem-solving, and foster initiative to effectively prepare students for real-life success?

The Queen's Summer Innovation Initiative (QSII) was developed to bring together students in the Faculty of Engineering and Applied Science with students in the Queen's School of Business to encourage entrepreneurship and innovation. In its first summer pilot program in 2012, twenty students joined forces to propose, develop, and translate innovative ideas to the marketplace with the help of faculty members, mentors in industry, and each other.

Greg Bavington was recruited as the first Executive Director to manage the program. In Bavington – with both a Queen's engineering background and extensive business experience in massive-capital, high-technical risk projects in manufacturing and process industries – Queen's found the perfect combination of skill and expertise to nurture this fledgling program into a soaring success, even after its first summer pilot run. QSII has achieved success that surprised even Bavington: “The sparks can really fly when you get bright people thinking about things without a lot of distractions.”

The program started with some traditional academic underpinnings – two weeks of lectures from faculty and business experts that taught the students some of the hard skills of entrepreneurship, including decision-making from a practical standpoint. For example, is a new idea an engineering possibility? Will it cost more to develop than it could possibly profit? Is there a market? Does it have value to society?

The students were also exposed to MBA-style personality testing, so each participant could understand more about themselves, and about the role they might play as a member of a team. “Not everyone has the right personality to be a CEO, but all members of the team have
value,” says Bavington. “Everyone in the entrepreneurial space knows that the three most important aspects of success are: the team, the team, and the team. A fully-functional team with all the skill sets covered, who work together honestly, constructively, and passionately will make the most mediocre idea successful. A dysfunctional team will ruin the world’s best idea in a heartbeat.”

At the end of the two week period, including a 2-3 day “lockdown” at the Donald Gordon Centre, students had coalesced into logical groups, and they presented their innovative ideas to each other as well as successful entrepreneurial alumni. Ideas fell broadly into one of three main categories: for profit; corporate innovation or “intrapreneurship;” and social innovation.

Over the course of the summer, junior and senior mentors, mostly alumni, helped the groups develop their ideas. According to Bavington, “The strength of the alumni spirit has been a great resource for this endeavor. Most are eager to participate and assist.” At the end of the summer, the teams pitched their ideas to a distinguished group of venture capitalists.

Two of those teams are now in the public sphere. Moja Labs developed a smart phone app, In Sir John As Footsteps, to guide Kingston residents and visitors through the historic downtown, stopping at key locations in Canada’s first Prime Minister’s life. Another team developed Listn – an iPhone app that lets people share and connect through music. “It started out as a small idea, allowing two people in close vicinity to share their music,” says Bavington, “but they pushed it up into the cloud, so that two people on opposite sides of the world can listen to each other’s music. They have really run forward with this.”

While there are other innovation programs around North America and Europe, most reside entirely within business schools as a concentration in MBA programs, or within engineering schools as a concentration in Master’s programs. Queen’s is unique in offering a program that bridges these two disciplines.

While many entrepreneurs would agree that there is a natural fit between engineering and business, these disciplines do not have a “lock” on innovation. Therefore, for 2013, the program has opened up to accept 40 students from across the University. Says Bavington, “When people work in teams, there is a role for all types of people – presenters, communicators, creative and aesthetic forces. These people could be from psychology, history, or anywhere.” In addition, technical expertise and innovation can be found all over campus, including in computer sciences and the health sciences.

Bavington says, “This entrepreneurial training for the 21st century is giving our students a leg-up in the real world. I’m looking forward to the excitement that will unfold this year.”
Q&A WITH SIDNEYEVE MATRIX

Dr. Sidneyeve Matrix is a professor in the Department of Film and Media who also teaches at the Queen's School of Business Executive Development Centre and for Rutgers University’s Center for Management Development. She specializes in mass communications and marketing, and digital and social media. She teaches many of her classes online – she is a leader at the University in this respect – and is a sought-after public speaker and analyst on radio and TV. Sidneyeve spoke recently with Alec Ross about her work and key issues around the ever-growing use of digital technologies. This is an abridged version of that conversation.
How do you research digital culture?

I read the news and my networks. That’s where I find trend stories, research reports, academic studies, and cultural conversations. Right now there is heightened interest in privacy issues online. And a lot of people are very interested in mobile technology. There is a lot of coverage of teaching with technology.

What does the “digital divide” refer to?

There are actually two divides: the first refers to unequal access to digital tools and services. Perhaps someone can’t afford to have a computer or smartphone. Someone in a rural area with dial-up internet would have reduced access relative to someone with high-speed web connectivity in the city. A second digital divide concerns digital knowledge or fluency. When you don’t understand how to configure your profile settings on Facebook, you’re at risk for privacy violations. If you need a job and it requires digital skills you don’t have, you’re obviously at a disadvantage vis-a-vis more digitally literate candidates.

Some of your research is about teaching using digital methods. Tell me about that.

That’s been my main focus for the last few years. I want to use tools that students may bring to the classroom and use outside the classroom. I try to leverage their technical skills to meet educational ends. That means teaching with Facebook and Twitter, smartphones and online discussions.

You’re a prolific Tweeter and blogger. Do you read everything you post?

I spend hours every day reading online. I probably didn’t worry as much about vetting all the links I shared when I was only connected with close friends, but you feel a sense of responsibility to provide quality content when it’s posted publicly and people know you teach about digital communications.

Should internet access be considered an essential service, like electricity and the telephone?

The question is really important and yes, I do think it should be. For a few years we’ve been having conversations about how Canada really lacks a digital economy strategy, and trying to fund an infrastructure that’s really expensive. To have high-speed connectivity all across this large country really is becoming more essential because people use the web for health care, for news, and so on. A lot of essential services, including government services, are moving online and people need to have access to them.
How well is the federal government keeping pace with digital culture? Is it even possible to keep pace?

It’s probably not possible to keep pace, in terms of regulation and legislation. Those are slow moving organizations and digital culture changes quickly. But I think if we look at the different initiatives that have responded to Canadians’ concerns about broadcast law, spectrum allocation, mobile phone use, and privacy, they really are trying to address all the hot issues. It’s just that not everybody agrees on the best way to go forward.

What’s digital culture doing to literacy?

I really thought I’d see students using a lot of acronyms and emoticons online, but I don’t. The people I see using those the most are usually my generation, Gen X. It seems generationally specific. Young people, whether they’re 12 or 25, they “get” that they’re communicating with a doctor or professor or their parents. They are connecting digitally to their employers, places where they volunteer, and family and friends, so I think the diversity of those networks inspires them to think about audience.

Are you Mac or PC?

I have to be both. I do most of my creative work on a Mac, but many of the digital tools I use in the classroom are designed for the corporate world and I have to co-opt them for educational use. Those are PC only. My students use both Mac and PC, iOS, BlackBerry, and Droid, and that’s why I do too. I want to see what students see when I’m designing digital and mobile resources for them to use on their laptops, tablets and phones.