IDEAS THAT COULD CHANGE THE WORLD

EXCELLENCE, INNOVATION, LEADERSHIP:
RESEARCH AT THE UNIVERSITY OF TORONTO

1827.

The frontier town of York, soon to be called Toronto (as it was known by Aboriginal groups who had lived in the region for 11,000 years), has a population of about 2,000.

John Strachan returns from England with a royal charter for the *"establishment of a college...to continue for ever, to be called 'King's College.'"*

And out of 150 acres of forest north of the city, a university is born.

TODAY.

King's College transformed into the University of Toronto. The forest is now U of T's St. George campus, one of three with U of T Mississauga and U of T Scarborough.

The University has grown with the city.

Toronto, the economic and cultural centre of Canada, now has a population of more than 2.5 million, including descendants of the original Aboriginal peoples, and is part of an urban region of more than 5.5 million.

U of T has become the home of Nobel Prize Laureates and discoveries and scholarship that have changed the world. It is an academic and research powerhouse ranked among the world's leading institutions. In the 2009 Times Higher Education-QS World University Rankings, U of T was ranked by academic peers globally as a leader in all fields:

- 8th in the world in Engineering and Information Technology
- 11th in the world in Life Sciences and Biomedicine
- 11th in the world in Arts and Humanities
- 14th in the world in Natural Sciences
- 15th in the world in Social Sciences

At the core of these achievements is our outstanding research community, made up of thousands of brilliant scholars and students who create knowledge that helps to move the world forward.

This publication showcases some of our current innovators as they explore 10 key questions that will transform the future of global society. We stand committed to continuing our pursuit of knowledge creation and research impact for the benefit of our next generations.

R. Paul Y

PROFESSOR R. PAUL YOUNG, PhD, FRSC
Vice President, Research

Are universal human rights possible?

RON DEIBERT

Information and communication rights and freedoms – such as access to information, freedom of speech and privacy – are integral to human rights. Cyberspace is the domain within which such rights are contested. There is an arms race in cyberspace today that threatens human rights online, characterized by Internet censorship, cyberwarfare, espionage and surveillance. Human rights are possible, but citizens must be vigilant against these breaches and protect and preserve cyberspace as an open, global commons.

Department of Political Science
Director, Citizen Lab, Munk Centre for International Studies

DAVID RAYSIDE

As a set of ideals to strive for? Absolutely! Is there agreement on what rights claims are legitimate? Absolutely not! Working on gender equality and sexual diversity means regularly facing claims that some rights are more important than others. Or alternatively, that western values have no universal application. Tricky territory and social context surely matters. But hiding behind cultural or religious difference is a popular cover for stark prejudice, ignorance and oppression.

Department of Political Science
Past Director, Mark S. Bonham Centre for Sexual Diversity Studies

CYNTHIA WESLEY-ESQUIMAUX

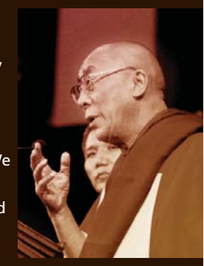
One of the most important questions I have ever responded to as an Aboriginal woman is whether or not rights are portable. Do we take them everywhere we go? I think not. Rights are a product of interpretation, generally not our own, and generally not conducive to Indigenous sensibilities. Universal rights are something to aspire to, but they are not a common feature in the world in which we presently live.

Centre for Aboriginal Initiatives
Department of Aboriginal Studies
Factor-Inwentash Faculty of Social Work

AYELET SHACHAR

It's more a question of how to secure a threshold of well-being for everyone, everywhere. My work on the rights of women within religious communities demonstrates that it is possible to achieve diversity *with* equality. Similarly, in developing legal means for mitigating the opportunity gaps perpetuated by unconditional birthright citizenship, we can explore membership entitlement in the broader context of today's urgent debates about global justice. Without tangible ideas about how we can change our world, change can never occur.

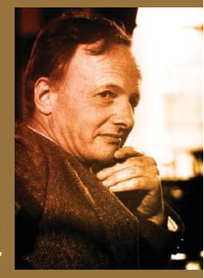
Faculty of Law
Department of Political Science
Canada Research Chair in Citizenship and Multiculturalism



The question of human rights is so fundamentally important that there should be no difference of views about it. We all have common human needs and concerns. We all seek happiness and try to avoid suffering regardless of our race, religion, sex or social status. However, mere maintenance of a diversity of traditions should never justify the violations of human rights. Thus, discrimination against persons of different races, against women and against weaker sections of society may be traditional in some regions, but if they are inconsistent with universally recognized human rights, these forms of behaviour should change. The universal principle of the equality of all human beings must take precedence.

His Holiness, the14th Dalai Lama
U of T Honorary Doctor of Laws

Is war inevitable?



If we can bring ourselves to the realization that threats of indiscriminate slaughter are no more to be tolerated than is the implementation of those threats, we shall have taken a historic step toward the outlawing of war.

Professor John Polanyi
Nobel Laureate in Chemistry (1986), nuclear disarmament proponent

THOMAS HURKA

War's an evil, but it can prevent greater evils such as the violation of a people's right to political self-determination or, in extreme cases, genocide. The question I study is: When is war morally justified, or when are the evils it can prevent sufficiently important to justify the death and destruction it will cause? Many wars are wrong, but some are worth fighting. How do we tell the two apart?

Department of Philosophy

JANICE GROSS STEIN

Evolutionary biology tells us that we are hard wired to fight or flee when we sense danger. Evolutionary psychology tells us that we naturally distinguish between our group and theirs. These two imperatives, working together, create a powerful tendency to violent conflict. Over time, however, at a painfully slow pace and at great cost, we have learned to discipline these tendencies so that today, in some parts of the world, war is inconceivable.

Director, School of Global Affairs, Munk Centre for International Studies
Department of Political Science

MICHAEL INZLICHT

While intergroup conflict is inevitable, war is more than conflict – it is violent, aggressive conflict that takes thought and deliberation. Psychologists have argued that one of the features that separate us from other animals is our ability to control our automatic impulses. So it is possible to prevent those inevitable conflicts from escalating into war. Just because it's possible, however, doesn't mean it's easy. Inhibiting predominant desires is hard work, taking motivation, ability and effort. If we want it enough, if our desire to end war is autonomously chosen and self-determined, then war is not inevitable.

U of T Scarborough Department of Psychology and Toronto Laboratory for Social Neuroscience

How will the **new economy** transform our lives?

RICHARD FLORIDA

When we hear the words 'new economy' most of us think of Google, RIM and other high tech companies, but I believe the period of transformation we're entering goes far beyond just technology. The industrial age brought with it massive changes in employment, housing, transportation and culture. The creative age will see paradigm shifts on a similar scale. Toronto, and really all of Canada, is uniquely positioned to be at the forefront of this transition.

Academic Director, The Martin Prosperity Institute
Rotman School of Management

EUGENE FIUME

To the extent the 'new' economy will be different from the 'old', it is that technology will allow the provisioning of labour, goods and services to become ever more global. The people of many nations will be able to participate and prosper, but competitive forces could push us all into a race to the bottom. Research, creativity and innovation will be essential, but the new economy, like the old, will require human wisdom to transform new ideas into global races to the top.

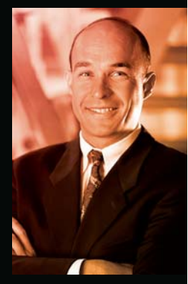
Department of Computer Science

JUDITH TEICHMAN

Economic globalization has not produced equitable nor sustained prosperity in many parts of the world. In some disadvantaged regions it has contributed to a marked rise in political and criminal violence. The way recent economic events affect us depends entirely on us both as a society and as 'citizens' of the world. We can choose to use politics, domestically and internationally, to achieve social justice at home and abroad. Doing so will help to ensure a future of social peace and prosperity.

U of T Scarborough Department of Social Sciences
Munk Centre for International Studies

The New Economy offers global society in the 21st century powerful transformative possibilities. How we communicate with each other will continue to evolve and mobility will become even more important. The digital services of the near and far future will have richer media and more powerful tools – and they will be even more personalized, contextual and inter-related. This communications transformation will apply to every part of a borderless global society – business, consumers and government.



Jim Balsillie
U of T alumnus, Co-CEO of Research In Motion Limited, founder, Balsillie School of International Affairs

Personalized medicine:

What's possible? What's right?

WAYNE SUMNER

As medical science continues to push back the frontiers of the possible, it raises ever new questions about the ethical. I believe that philosophers have an important contribution to make to the vital public debates over these questions. My own current research is addressed to one of them: What can – and should – we do to assist persons in the dying process to end their lives on their own terms?

Department of Philosophy

ALED EDWARDS

The sequencing of the human genome has provided a stark reminder of our commonality with our fellow humans, but also our individuality. To discover new medicines, these commonalities and differences must be considered, both for economic reasons, as well as to ensure that the safest and best medicines are produced. Our goals are to facilitate this process by providing scientists with research tools that have no restriction on use and to promote the concept of open access science to advance human health.

Chief Executive, Structural Genomics Consortium
Banting and Best Department of Medical Research
Department of Medical Biophysics

JOHN DICK

We are making significant advances in our understanding of the genetic makeup of cancer tumours and their response to drugs. However, we are also recognizing that the cells that make up tumours have differing abilities to sustain tumour growth and to respond to therapies. Now we need to go beyond sampling the genetics of bulk tumours and delve a layer deeper to learn more about the genetic regulators of stem cell-like cancer cells to determine patient prognosis and to create therapies to destroy these cells.

Division of Stem Cell and Developmental Biology, Ontario Cancer Institute
Division of Cellular and Molecular Biology, Toronto General Research Institute
Department of Molecular Genetics, U of T

MOLLY SHOICHET

Regenerative medicine promises to overcome diseases rather than simply treat symptoms. We're tackling the most challenging organs – the brain and spinal cord. We're delivering therapeutic molecules and stem cells to stimulate regeneration after a traumatic injury such as stroke or spinal cord injury. Working with neuroscientists and neurosurgeons, we test innovative solutions to these complex problems. Our goal is to promote healing when it does not happen on its own.

Department of Chemical Engineering and Applied Chemistry
Department of Chemistry
Terrence Donnelly Centre for Cellular and Biomolecular Research
Institute of Biomaterials and Biomedical Engineering
Institute of Medical Sciences
Canada Research Chair in Tissue Engineering

I'm excited about the potential that the move towards personalized medicine presents. Through innovative approaches to medicine, and the advancement of research, health care providers will increasingly have the opportunity to deliver customized care, based upon factors specific to an individual. This is a landmark outcome of targeted and innovative thinking that will change our approach to health care, and ultimately, benefit patients.

Rick Hansen, *C.C., O.B.C.*
U of T Honorary Doctor of Laws,
Canada's Man in Motion, President & CEO, Rick Hansen Foundation

Can vaccines save us?

This is an idea whose time has come with greater urgency than ever before, mostly because AIDS has added such a vast human population at risk. We are making tremendous progress with some vaccines. We have a vaccine to combat Hepatitis B and now to prevent the Human Papillomavirus so as to eliminate the risk of cancer. We have significant possibilities in vaccines for children, we're also testing a new vaccine for malaria and soon for tuberculosis. With HIV, prevention, treatment and care are, of course, critically important, but the only way to bring an end to the disease conclusively is through a vaccine. Nothing else will suffice.

Stephen Lewis
U of T Honorary Doctor of Laws, Senior Fellow, Massey College, Chair of the Board, Stephen Lewis Foundation, former United Nations Special Envoy for HIV/AIDS in Africa

ALLISON McGEER

Before smallpox vaccine was used to eradicate smallpox, one person in the world died every second from the illness. Vaccines can save us from many diseases – but only if we can rise to the challenge of new vaccine development against increasingly difficult target diseases, if we can build societies that ensure they are available to the most vulnerable and if we learn to better understand the human psychology that consistently leads us to underestimate their value.

Director, Infection Control, Mount Sinai Hospital
Department of Laboratory Medicine and Pathobiology, U of T
Department of Medicine, U of T
Dalla Lana School of Public Health

PETER A. NEWMAN

Vaccines have made tremendous contributions to global health. Nevertheless, many diseases, HIV/AIDS being one that I focus on, travel along the fault lines of poverty and disenfranchisement. Persistent disparities in health and access to care that stem from structural inequalities and social injustice may leave us with great vaccines but with limited accessibility and acceptability to the vulnerable populations who need them most. There is no vaccine for stigma and discrimination.

Factor-Inwentash Faculty of Social Work
Canada Research Chair in Health and Social Justice

KEVIN KAIN

Despite the remarkable contribution of vaccines to advances in public health, their potential impact on even greater challenges such as HIV, malaria and cancer are threatened by a growing tide of misinformation and anti-scientific thought. So while it is clear that vaccines alone will not save us, the more pressing question is whether we can save vaccines from *us*. Perplexing, how time after time, we can't seem to recognize a good thing when we have it.

Director, Sandra A. Rotman Laboratory, McLaughlin-Rotman Centre for Global Health, Toronto General Hospital
Director, Global Health, McLaughlin Centre for Molecular Medicine, U of T
Director, The Centre for Travel and Tropical Medicine, Toronto General Hospital
Department of Medicine, U of T
Canada Research Chair in Molecular Parasitology

Is there life elsewhere in the universe?

It is presumptuous of us to think that the third planet of an average solar system in an average galaxy, when there are several billion galaxies around us, would be the only source of life. While it's an incredible challenge to search for evidence of life elsewhere in the universe, we must continue that search. It is a fundamental question, and the day we find proof, even at the bacterial level, of life somewhere else in the universe besides Earth, will be a tremendously important event for humankind.

Julie Payette
U of T alumnus, Honorary Doctor of Science, Canadian astronaut

NORMAN MURRAY

We don't understand how life started on Earth, so it is difficult to say how common life is. This motivates the intense ongoing exploration of Mars and of Jupiter's moon Europa. Finding Earth-like planets around solar type stars, as the Kepler telescope is expected to do in the next three years, would allow us to look for signs of life, such as oxygen, in those planets' atmospheres. Astronomers may be able to answer the question empirically!

Director, Canadian Institute for Theoretical Astrophysics
Canada Research Chair in Astrophysics

GABRIELE D'ELEUTERIO

There was a time when the word 'robot' was as much a staple in science fiction as the idea of finding life elsewhere in our universe. But the global aerospace community has made important leaps forward in designing technology that will help us answer this question. Today, robots are a fact of life in space science and we are sending robotic explorers off to hunt for signs of potential life on other planets. Through this amazing technology, I expect that someday, somewhere we will indeed find those 'alien' life forms. Won't that be thrilling? Or maybe I'm just being hopeful.

University of Toronto Institute for Aerospace Studies

BARBARA SHERWOOD LOLLAR

An important component of astrobiological research actually involves the study of life on Earth. Investigations of the microbial life in extreme environments on this planet have profoundly impacted our search for life elsewhere. The discovery of microorganisms capable of surviving from the geochemical energy discharging at deep sea hydrothermal vents changed our understanding of the diversity of metabolic processes that can sustain life. This discovery and other research findings have wrought transformational change in search strategies for life on other planets and moons.

Department of Geology
Canada Research Chair in Isotope Geochemistry of the Earth and the Environment

Will we be ready when the oil runs out?

GREG SCHOLES

A number of parallel alternative energy solutions will eventually be needed. Nature's primary approach is to use energy from the sun and it is likely we will follow suit. Nature's solar cells have been improved through 3.5 billion years of evolution. Plants, algae and other photosynthetic organisms have thus developed tricks that lie behind their success that will inspire new paradigms for solar energy conversion that will benefit humankind.

Department of Chemistry

We're not going to run out of oil soon in a geological sense, but we are starting to run out of oil we can afford to burn. Our natural instincts are to find new sources of supply so we can sustain our energy-intensive lifestyle – which may, in fact, be unsustainable under any form of energy supply. Instead, we must re-organize our economy to expend less energy. How? Move from our current mode of economic organization that is energy, and particularly, oil-intensive – the Global Economy – to a much more local economy.

Jeff Rubin
U of T alumnus, former Chief Economist, CIBC World Markets, author, *Why Your World is About to Get a Whole Lot Smaller* (2009)

HEATHER MacLEAN

Society must transition to energy systems that have much lower negative impacts on the environment and public health *before* oil runs out. No fuel is without associated risks and negative consequences – I take a lifecycle approach in evaluating the full impact of alternative energy systems. In evaluating replacements for oil, it is critical to examine the associated trade offs and find the alternatives with the highest overall net benefits to society. Technological innovation is important but behavioural change is urgently needed.

Department of Civil Engineering
Department of Chemical Engineering and Applied Chemistry
School of Public Policy and Governance
Centre for Environment

JOHN KIRTON

When the oil runs out Canada will do well and the world could too. Canada is a clean energy superpower. With the world's second largest territory, it leads in producing the uranium needed for safe, climate-friendly nuclear energy. With the world's largest fresh water supply, it has enormous hydroelectricity. It has world-leading supplies of natural gas and the technology to get more. And with the world's longest coastline, it could be a wind energy superpower too. All Canada needs are the policies and infrastructure to get all these abundant, affordable off-oil alternatives to Canadians and the world.

Director, G8 Research Group, Munk Centre for International Studies
Department of Political Science
Fellow, Trinity College

Is lifestyle the greatest cure of all?

JAN ANGUS

Exercise and diet contribute to healthy aging. Yet lifestyle is not simply a product of whether we exercise and eat well. It also emerges from constraints, opportunities and resources that are differently distributed in society according to gender, ethnoracism and discrimination against people with disabilities. Before we declare lifestyle the greatest cure of all, research is needed to understand how these inequitable conditions lead to health disparities and chronic illness in an aging population.

Lawrence S. Bloomberg Faculty of Nursing
Dalla Lana School of Public Health
Toronto Rehabilitation Institute

DAVID JENKINS

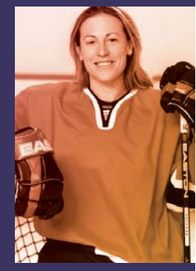
Humans are successful due to their ability to thrive on very different kinds of diets. The challenge is now to choose the diet which is both good for us and for the rest of the planet. I believe such diets must focus on plant foods. They will be constructed to maximize health and prevent those chronic diseases that are major causes of mortality and suffering and are increasingly making contemporary health care economically unsustainable.

Departments of Medicine and Nutritional Sciences, U of T
Clinical Nutrition and Risk Factor Modification Centre, St. Michael's Hospital
Canada Research Chair in Nutrition, Metabolism and Vascular Biology

GUY FAULKNER

Evidence shows that being physically active adds years to life, but more importantly, life to years. Physical inactivity is the most common risk factor for premature death in Canada. My research examines how we can help people be more active more often – through economic levers such as tax credits to subsidize physical activity, social marketing campaigns like ParticipACTION or modifying the built environment to make parents more confident in letting their kids walk to school.

Faculty of Physical Education and Health



One of the most urgent health challenges of the 21st century is the rise of diseases such as diabetes, cancer and heart disease. The incidence of these diseases has increased at an alarming rate in recent decades, in large part due to increased rates of obesity and sedentary lifestyles. The most effective way of combating these non-communicable diseases may well be through improving lifestyle choices. It is important that cultures all around the world adopt healthy lifestyles because there is very clear evidence that positive lifestyle choices can improve overall health and well-being.

Jayna Hefford
U of T alumnus, member of Canada's Olympic women's gold (2002, 2006, 2010) and silver (1998) medal-winning hockey teams

Is it too late to reverse climate change?

STEPHEN SCHARPER

Our present ecological moment calls for the emergence of a new ethical framework. Our collective challenge is to grapple honestly and humbly with the sobering indicators of climate change and at the same time remain open to a future lined with such intangible essentials as hope, societal compassion and a re-valuing of the Earth. All of these, in concert with scientific diagnostics and technological shifts, are requisite companions as we strive to confront climate change candidly and effectively.

Centre for Environment
U of T Mississauga Department of Anthropology
Centre for the Study of Religion

SPENCER C.H. BARRETT

Climate change is the most important environmental problem facing the planet today. It is influencing the distribution of plants and animals and is affecting biodiversity and ecosystem function. We are already seeing shifts in the ranges of species and in their behaviour and reproduction. Our work on introduced invasive plants shows that some species have the necessary genetic variation to adapt to changing environmental conditions. However, others inevitably face extinction, an outcome that cannot be reversed. Concrete action on climate change is a political imperative that cannot be delayed.

Department of Ecology and Evolutionary Biology
Canada Research Chair in Evolutionary Genetics

KIMBERLY STRONG

Climate change is happening, as seen in atmospheric and ocean temperatures, retreating glaciers, declining Arctic sea ice, rising sea levels and changing precipitation patterns. Greenhouse gas concentrations have increased over the past 250 years due to human activities. These gases will remain in the atmosphere for many years. Even if we froze greenhouse gases at their 2000 levels, global surface temperatures are predicted to rise at about 0.1°C per decade. Without reductions in greenhouse gas emissions, about twice as much warming is expected, with serious consequences for the planet.

Department of Physics
U of T Atmospheric Observatory
Centre for Global Change Science
Centre for Environment

The problems that lead to climate change are not practical problems – they're political and philosophical. We can have a beautiful future for Planet Earth, we only need to do two things: pay attention and pay for it. Governments and citizens need to wake up – we need to tax things that contribute to climate change and reward behaviours that mitigate it. We know what we need to do, we just need to generate the political will to get it done.

Robert Bateman
U of T alumnus, Honorary Doctor of Laws, artist, naturalist, environmental activist

Why are people still hungry?

JOSÉE JOHNSTON

Like the economic system more generally, the global food system is segmented into multiple tiers. While it produces an astonishing variety of foods for affluent consumers, it has been far less successful promoting equitable food access or sustainability. Food activists, particularly in the Global South, critique this system and demand food sovereignty – the ability to produce foods for one's own population, on one's own land and not focusing exclusively on export markets.

U of T Mississauga Department of Sociology

HERBERT KRONZUCKER

The challenge of furnishing sufficient food for the burgeoning human population represents one of the most daunting issues of our time. Current rates of population growth outpace agricultural gains more than threefold. While warfare and distribution inequities play important roles in producing hunger around the world, the issue is, at its core, one of fundamental biology: the capacity for primary productivity in the world's agricultural fields. Solutions require unprecedented research investment and human intellectual dedication.

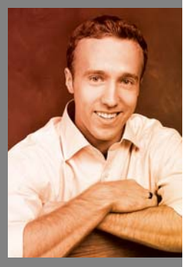
U of T Scarborough Department of Biological Sciences
Departments of Ecology and Evolutionary Biology and Cell and Systems Biology, U of T
Canada Research Chair in Metabolic Bioengineering of Crop Plants

VALERIE TARASUK

Canadians support food banks and other food assistance programs to help those in need. Although such efforts are a testament to the compassionate nature of Canadians, our research suggests that the net result of this community action is a limited, fragmented 'system' of food relief, with little capacity to respond to poverty-related problems of hunger. To address the unmet needs that underpin demands for food assistance, a more adequate and inclusive system of income assistance is required.

Department of Nutritional Sciences
Dalla Lana School of Public Health
Centre for Urban and Community Studies

World hunger is very closely connected with the abuse and exploitation of children around the world. As families struggle with extreme poverty, it's too often kids who bear the brunt of its effects. They miss out on meals, face illness that could be prevented through proper nutrition and are often denied a quality education that would empower them to break the cycle of poverty. By fighting apathy and encouraging people to take action against the injustices they see, we can put an end to world hunger.



Craig Kielburger
U of T alumnus, child rights advocate, founder, Free The Children

RESEARCHER BIOGRAPHIES

JAN ANGUS

Jan Angus is a professor in the Lawrence S. Bloomberg Faculty of Nursing, is cross-appointed to the Dalla Lana School of Public Health and is an adjunct scientist at the Toronto Rehabilitation Institute. She specializes in issues relating to gender, health and access to health care using qualitative methods to examine the contextual influences on health-related decisions and practices. In 2006 she received a New Investigator Award from the Canadian Institutes of Health Research (CIHR).

RON DEIBERT

Ron Deibert is a professor of political science, specializing in global security and the politics of cyberspace, and Director of The Citizen Lab at the Munk Centre for International Studies. He is co-founder of the OpenNet Initiative and Information Warfare Monitor projects and was one of the authors of the *Tracking GhostNet* report, which identified a major global cyber-espionage network infecting over 1,200 computers in 103 countries.

JOHN DICK

John Dick is a professor of molecular genetics at the University of Toronto and a Senior Scientist at the University Health Network. His influential contributions to the fields of molecular hematology, stem cell biology and oncology have earned him many national and international accolades, including the American Society of Hematology E. Donnall Thomas Prize in 2009.

GUY FAULKNER

Guy Faulkner is an associate professor in the Faculty of Physical Education and Health. His research focuses on interventions to promote physical activity, as well as physical activity and psychological well-being. He is a mentor with the CIHR Pan Canadian Strategic Training Program in Population Intervention Research, a member of the ParticipACTION Research Advisory Group and the founding editor of the Elsevier journal *Mental Health and Physical Activity.*

RICHARD FLORIDA

Richard Florida is Director of The Martin Prosperity Institute and Professor of Business and Creativity at U of T's Rotman School of Management. Widely recognized as one of the world's leading public intellectuals, Florida charts new trends in business and community. Ideas from his international bestseller, *The Rise of the Creative Class,* have been influential around the world in the transformation of economies in cities and regions.

MICHAEL INZLICHT

Michael Inzlicht is a professor of psychology at U of T Scarborough and Principal Investigator at U of T's Toronto Laboratory for Social Neuroscience. He conducts research that sits at the boundaries of social psychology, neuroscience and education and has published papers on the topics of prejudice, self-control and religion. He serves on editorial boards for many esteemed publications, including the Association for Psychological Science's *Psychological Science.*

KEVIN KAIN

Kevin Kain is a professor of medicine at the University of Toronto, Director of Global Health at the McLaughlin Centre for Molecular Medicine and Director of the Centre for Travel and Tropical Medicine at the Toronto General Hospital. He holds the Canada Research Chair in Molecular Parasitology and has served as chairperson on Health Canada's Committee to advise on Tropical Medicine and Travel. He has also consulted many organizations including the WHO, the Red Cross and the CDC.

HERBERT KRONZUCKER

Herbert Kronzucker is a professor in the Departments of Biological Science, Ecology and Evolutionary Biology, and Cell and Systems Biology. He holds the Canada Research Chair in Metabolic Bioengineering of Crop Plants, is ranked in the top one per cent of his research field internationally by Thomson-Reuters and was featured in the *Globe and Mail* and *Toronto Life Magazine*'s "25 World Changing Ideas from the Smartest Torontonians" in 2009.

HEATHER MacLEAN

Heather MacLean is a professor in the Departments of Civil Engineering, Chemical Engineering and Applied Chemistry, and the School of Public Policy and Governance. Internationally recognized, she provides expert advice in the field of energy systems analysis focusing on transportation and electricity generation and has served on industry and government advisory committees in Canada and the U.S.

NORMAN MURRAY

Norman Murray is a professor and the Director of the Canadian Institute for Theoretical Astrophysics at U of T and Canada Research Chair in Astrophysics. His research interests lie in planet formation and dynamics, galaxy formation and the physics of active galactic nuclei or black holes.

PETER A. NEWMAN

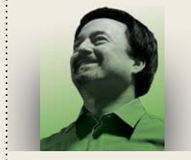
Peter A. Newman is an associate professor of social work and Canada Research Chair in Health and Social Justice. His international program of research focuses on the social, behavioural and ethical challenges of HIV vaccine and other biomedical prevention trials and future vaccine dissemination. Newman applies perspectives from social work, social psychology and public health to advance a science of community engagement in global health and HIV prevention.

ALLISON McGEER

Well-known to the Canadian public for her frequent television news appearances during the SARS outbreak and the H1N1 pandemic, Allison McGeer is a professor in the Department of Laboratory Medicine and Pathobiology and at the Dalla Lana School of Public Health at U of T, as well as Director of Infection Control at Mount Sinai Hospital. Her research focuses on the prevention of infection in hospitals and nursing homes. She currently serves on Canada's National Advisory Committee on Immunization and on the infection control subcommittee of the Ontario Provincial Infectious Diseases Advisory Committee.

SPENCER C.H. BARRETT

Spencer C.H. Barrett is University Professor (the highest honour U of T bestows on its faculty) and Canada Research Chair in Evolutionary Genetics in the Department of Ecology and Evolutionary Biology. For his pioneering work on the reproductive biology and genetics of plants, particularly invasive species, he was elected to the Royal Societies of Canada and London (U.K.) and is a Foreign Honorary Member of the American Academy of Arts and Sciences.



GABRIELE D'ELEUTERIO

Gabriele D'Eleuterio is a professor at the University of Toronto Institute for Aerospace Studies (UTIAS). He leads the UTIAS Space Robotics Group, a multidisciplinary team drawing on engineering, computer science, physics, biology and philosophy. The group is currently focusing on multiagent systems, self-organization, artificial life, genetic algorithms/ programming and the embodiment of these ideas in hardware.

ALED EDWARDS

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David Rayside is a professor of political science and past Director of the Mark S. Bonham Centre for Sexual Diversity Studies. Over the past two decades, he has published influential books and papers on lesbian/gay rights and equity more generally. His research pursuits are matched by an activist engagement with issues relating to gender and sexual orientation. In 1986, he helped secure the addition of sexual orientation in Ontario's Human Rights Code.

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Greg Scholes is a professor of chemistry. His current research focuses on interactions between molecules that are initiated by light, for example, photosynthesis in algae. His many honours include election to the Royal Society of Canada's Academy of Science in 2009 and the Royal Society of Canada Rutherford Memorial Medal in Chemistry in 2007. Scholes serves as Senior Editor for the *Journal of Physical Chemistry.*

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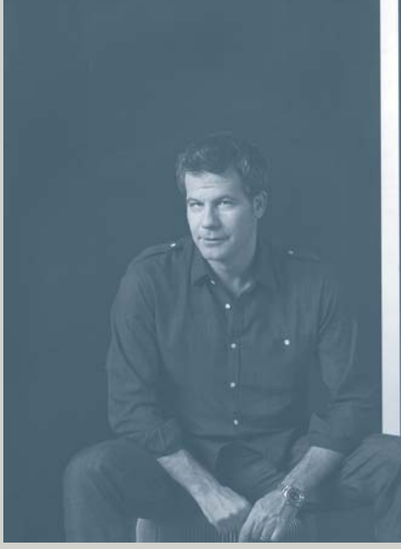

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