



RETURN ON RESEARCH

ANNUAL REPORT 2013-2014



research

Since 1980, Canada has experienced a 100-per-cent increase in overweight or obese children. Obesity is difficult to reverse, which is why Jess Haines is interested in preventing it in children and adolescents. Haines, a professor of family relations and applied nutrition and pictured here with her children, Oscar, 8, and Eleanor, 5, is exploring community and family-based interventions to promote healthy behaviour among preschool children. Haines is one of three recipients of the Early Researcher Award, given by the Ministry of Research and Innovation to young researchers who are emerging as leaders in their field.

WELCOME



J. Livernois

John Livernois
Vice-President (Interim)
Research

The 50th anniversary of the University of Guelph (1964-2014) calls for some reflection on how far we have come and how far we are destined to go.

We proudly continue to embrace our roots in the fields of agriculture and veterinary medicine, but our research has flourished in a variety of other disciplines as well. New initiatives range from bioconversion and nanomaterials to improvisation, Shakespeare and Guelph East Africa.

The University's research efforts reflect the creativity and expertise of our dedicated faculty and staff, who have a long tradition of engaging with colleagues and students in cross-disciplinary work.

Research partnerships are central to our mission of creating new knowledge of value to society, both domestically and internationally. We have branched out and continue to grow as a community with a profound sense of social responsibility and obligation to address global issues.

I hope you enjoy reading this Return On Research report, and I welcome your comments.

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r In times of socio-economic change, society can respond to its most pressing challenges with a careful reading of their historical context. Prof. Kris Inwood (pictured at right) is a researcher in economics and history who is cross-appointed to the College of Management and Economics and the College of Arts. Inwood is examining past and long-term change with an eye to understanding how it can inform the social, economic and physical well-being of our population. Inwood is seen here poring over an historical census collection with post-doctoral researcher Andrew Ross (left) and research associate Luiza Antonie.

LEADING THE WAY

A broad range of diverse research is under way at Guelph

More than 600 researchers and 2,100 graduate students engage in a broad range of studies at the University of Guelph. Among their ranks are 34 Canada Research Chair holders who are at the top of their fields.

The partnership agreement with the Ontario Ministry of Agriculture, Food and Rural Affairs provides a significant source of research revenue for the University of Guelph. Other important sources include the Tri-Councils (Natural Sciences and Engineering Research Council, Canadian Institutes of Health Research, and Social Sciences and Humanities Research Council); other federal and provincial departments and ministries; business and industry; and non-profits and charitable organizations.

In 2014, the Royal Society of Canada created the College of New Scholars, Artists and Scientists to recognize the emerging generation of Canadian intellectual leadership. The University of Guelph was proud that Profs. Evan Fraser and Ryan Norris were among the inaugural cohort. Fraser, a geographer, joined the University in 2010 as the Canada Research Chair in Global Human Security. Norris, a Guelph faculty member since 2006, is an ecologist and University Research Chair who studies the behaviour, population dynamics, conservation and evolution of migratory animals.

\$142 MILLION
640 RESEARCHERS
2,000 PROJECTS



research Physics professor John Dutcher and his team have discovered a new type of polysaccharide nanoparticle derived from Ontario corn. The discovery, trade-named PHYTOSPHERIX™, could serve as a non-toxic and biodegradable replacement for petroleum-based compounds and engineered nanoparticles, making consumer products and pharmaceuticals more environmentally friendly. Dutcher and his team received support from the University of Guelph — OMAFRA Partnership to help bring PHYTOSPHERIX™ technology to the marketplace.

A VITAL PARTNERSHIP

Supporting investment in a key economic driver

The partnership between the Ontario Ministry of Agriculture, Food and Rural Affairs and the University of Guelph continues to support investment in agri-food and rural research. The partnership agreement, which spans 2013-2018, is entering its second phase and ensures the continued delivery of a suite of programs. These programs are aimed at increasing capacity in the key priority areas of competitiveness and innovation in the agri-food industry, food safety and quality, environmental protection, and human health.

This research funding program represents an investment of \$264 million over the five years of the Agreement (and includes the programs described to the right). The funding is invested in seven theme areas: agricultural policy and rural development; bioeconomy; emergency management; environmental sustainability; food for health; product development and enhancement through value chains and collaboration; and sustainable production systems.

\$2.5
MILLION


The *Knowledge Translation and Transfer (KTT)* program is aimed at the synthesis, exchange and application of knowledge and involves the dissemination of the results of research and other activities occurring pursuant to the Agreement. Over the next five years, \$2.5 million will be invested in ensuring research knowledge reaches the people and organizations that need it.

\$2.5
MILLION

The *Highly Qualified Personnel (HQP)* program is designed to enhance graduates' "market readiness" by providing training and development opportunities to future generations of researchers, policy-makers and innovators in agri-food. Over the next five years, \$2.5 million will be dedicated to supporting the innovators of the future.

\$2.0
MILLION

A new investment in *Commercialization* was made as part of the Agreement, with \$2 million per year in support aimed at moving research innovations to market. The first funding competition saw eight researchers receive financial support from the Gryphons' "Leading to Accelerated Adoption of Innovative Research" program to commercialize their inventions and discoveries.

A portrait of Nigel Raine, a man with a beard and short hair, wearing a grey zip-up jacket over a light blue shirt. He is standing outdoors with his arms crossed, looking directly at the camera. The background is a blurred natural setting with trees and foliage.

r Global pollinator declines are of urgent concern for maintaining food production and wild plant diversity. Understanding the range of environmental challenges faced by bees, butterflies and other insects is the focus of pollination conservation expert Nigel Raine. He joined the University of Guelph as the Rebanks Family Chair in Pollinator Conservation in May 2014. Canada's first research chair in pollinator conservation was endowed by The W. Garfield Weston Foundation in the name of Wendy Rebanks. As well as leading cutting-edge research programs, Raine takes on the pivotal role of informing public policy and training highly qualified conservationists and agriculturalists, both locally and globally.

GLOBAL OUTREACH

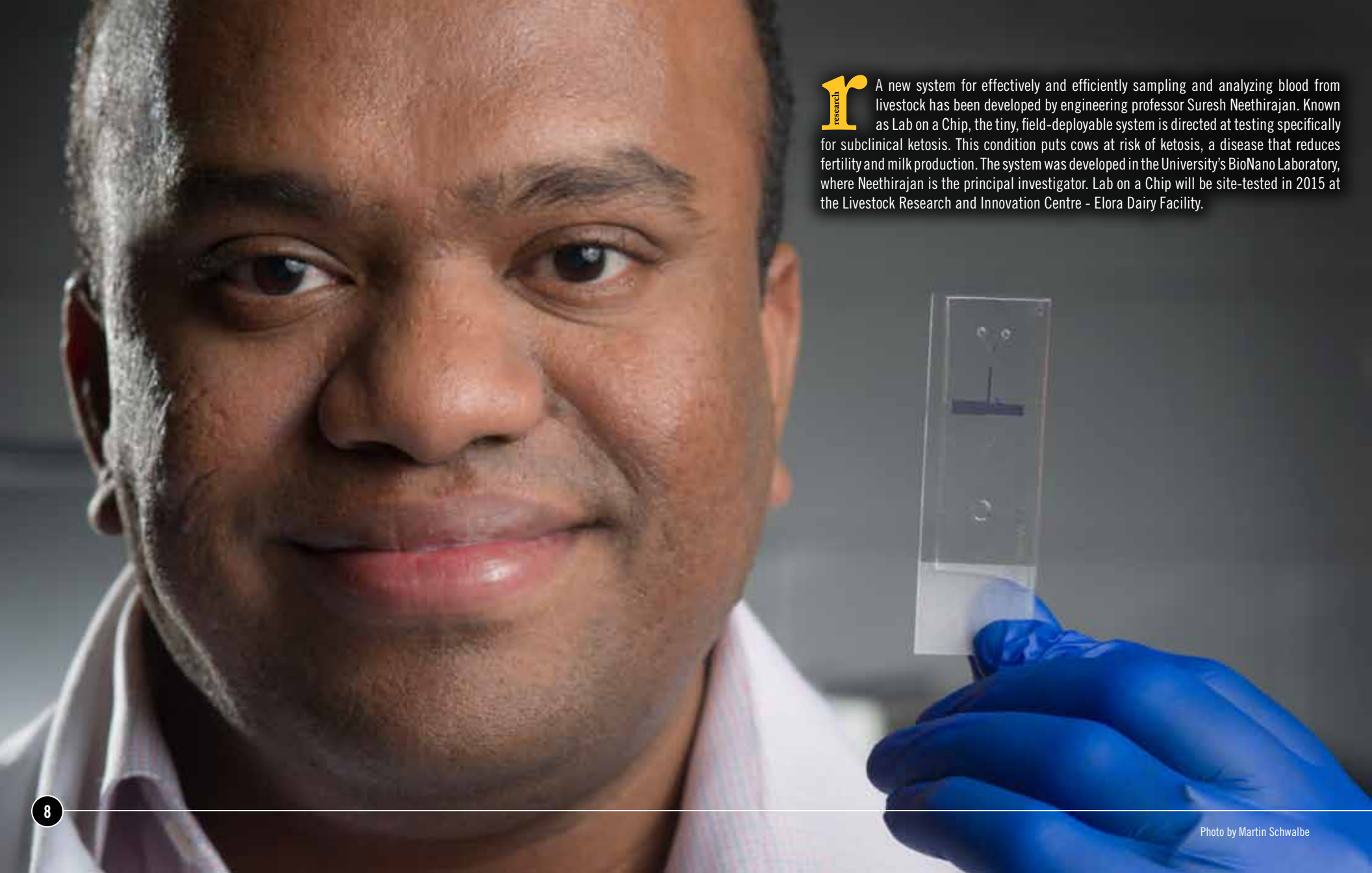
Impressive record of international research activity

University of Guelph researchers have a strong tradition of international outreach and partnerships. In 2013-14, Guelph researchers were engaged in 237 research studies in 77 countries. That's an increase of 25 per cent in funded international research since 2012-13.

For example, the Guelph East Africa (GEA) initiative and the Agroforestry Practices to Enhance Rural Livelihoods (APERL) made significant efforts to develop international collaboration further. GEA continues to form partnerships between academia, business, government and NGOs in East Africa to create sustainable research and teaching programs there. APERL, which recently wrapped up, helped small-holder farms from six African countries escape poverty through agroforestry.

On another frontier, the Centre for Biodiversity Genomics and the International Barcode of Life project made further inroads into international collaboration. The centre is dedicated to applying DNA barcoding to real-world problems, such as forensics, conservation, disease control and ecosystem monitoring. It will host a global DNA barcoding conference in the summer of 2015.

\$25 MILLION
237 PROJECTS
77 COUNTRIES



r A new system for effectively and efficiently sampling and analyzing blood from livestock has been developed by engineering professor Suresh Neethirajan. Known as Lab on a Chip, the tiny, field-deployable system is directed at testing specifically for subclinical ketosis. This condition puts cows at risk of ketosis, a disease that reduces fertility and milk production. The system was developed in the University's BioNano Laboratory, where Neethirajan is the principal investigator. Lab on a Chip will be site-tested in 2015 at the Livestock Research and Innovation Centre - Elora Dairy Facility.

THE BEST IN RESEARCH

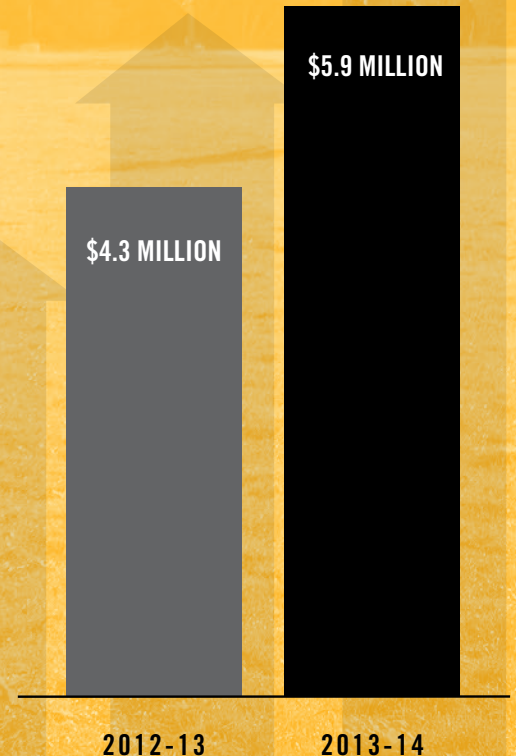
Ontario investment in Guelph research rises significantly

In addition to the extensive support provided by the Ontario Ministry of Agriculture, Food and Rural Affairs, significant provincial research sponsorship comes from the Ministry of the Environment through its “Best in Science” program. This initiative helps graduate students conduct research studies into a wide range of environmental issues.

Among other notable sources of provincial support are the Early Researcher Awards from the Ministry of Research and Innovation. Awardees this year were Prof. Jess Haines (see inside front cover), Prof. Suresh Neethirajan (see page 8) and Prof. Alex Smith. The Early Researcher Awards are an important investment by Ontario in advancing the work of some of our most promising young faculty, who have already taken steps to prove themselves as leaders in their fields.

The provincial ministries of natural resources and transportation are also major research sponsors. Collectively, their contributions account for the 37-per-cent increase in Ontario government funding for 2013-14.

UP 
37%
\$5.9 MILLION





r After an extensive international poll by vaccination.org and the World Vaccine Congress Europe, chemistry professor Mario Monteiro was named one of the world's key influencers in vaccine development. Monteiro has developed vaccines against diarrhea, including one to protect against *Campylobacter jejuni* (traveller's diarrhea) that is now being evaluated in human clinical trials. Monteiro was the only Canadian researcher in the top-50 listing and the first Guelph researcher to have technology reach human clinical testing.


BUSINESS AND INDUSTRY

Guelph discoveries made readily available to society

University of Guelph researchers disclose more than four times the national average in innovations each year. This pipeline of new technologies leads to commercial opportunities and products that improve life in Ontario and beyond.

Such discoveries are made readily available to businesses, industries and society partly through the Catalyst Centre, which oversees all aspects of the University's intellectual property management and technology commercialization. Proceeds are returned to inventors, industry and government partners, and the University of Guelph for reinvestment in future innovations.

Through the Catalyst Centre's Industrial Liaison Program, Guelph's research expertise and resources are matched with the research and development needs of companies and entrepreneurs. In 2013-14, these efforts contributed to an increase of 43 per cent in business and industry funding at the University. Industry-academic research partnerships enable companies to conduct innovative research, build competitive advantages, introduce new products to market and access future highly qualified employees.

UP 
43%
\$14 MILLION





r
research

The Canada Research Chairs program helps universities across the country attract some of the world's most accomplished and promising researchers. At Guelph, international development professor Sharada Srinivasan holds the Canada Research Chair in Gender, Justice and Development. Her research on gender-based discrimination and violence is an integral part of a three-country study examining the social transformation of East and South Asia by the "daughter deficit." Millions of girls in those societies have been lost due to sex-selective abortion, infanticide and neglect in their early years.

COMMITTED TO SOCIETY

Researchers find creative solutions to complex problems

University of Guelph researchers are increasingly working with a sector of society that is showing new commitment to evidence-based solutions: non-profit and charitable organizations. Funding from this sector is up 86 per cent since 2012-13, to \$8.4 million.

Guelph researchers are engaged in studies ranging from the arts to the physical sciences. Funding support includes, for example, a Tier 2 Canada Research Chair in Gender, Justice and Development held by Prof. Sharada Srinivasan (overleaf). The Gosling Foundation is providing support to Prof. Praveen Saxena to create the Gosling Research Institute for Plant Preservation, where scientists can preserve and restore threatened plants. As well, Prof. Moira Ferguson's studies into developing late-maturing and salinity-tolerant strains of Arctic char have received funding from the Coastal Zones Research Institute.

The University of Guelph engages in more medical research than any Canadian university without a medical school. The University received funding in 2013-14 for research into mental health, heart and stroke problems, diabetes, cancer and multiple sclerosis.

As well, support from other governments and U.S. universities has increased more than 90 per cent since last year, now totalling more than \$670,000.

UP 
86%
\$8.4 MILLION





The Natural Sciences and Engineering Research Council (NSERC) promotes discovery and innovation by funding exceptional Canadian post-secondary research. Ontario Veterinary College clinical studies professor Adronie Verbrugghe is a recent recipient of an NSERC Discovery Grant. She was recognized for her creative and innovative long-term research on companion animal nutrition. Verbrugghe's specific interest is feline nutrition. In her most recent work, she investigates ways to stimulate cats' metabolisms to help them burn fat and also scrutinizes the link between obesity and the gut microbiome. Verbrugghe is building a nutritional science program at the college to ensure cats and dogs receive the best nutritional care possible.



GREAT BEGINNINGS

Sweeping support for early career researchers

The success rate of University of Guelph research applications has improved tremendously, thanks in part to a new focus on best practices for crafting and highlighting excellent research proposals.

The success has been felt throughout the research community, including among young researchers just starting to advance their careers. The awards received help ensure the University will continue to lead in vital research and innovation that advances the well-being of the citizens, ecosystems and environment not only in Ontario but around the world.

In 2013-14, the University of Guelph had a success rate of 100 per cent among early career researchers who applied to the Natural Sciences and Engineering Research Council Discovery Grant Program. The national average is 66 per cent.

The discovery grant recipients will immerse themselves in a broad range of research. Among the 11 recipients, Prof. Amy Newman in the Department of Integrative Biology will investigate the influence of early-life stress on behaviour, physiology and fitness in the wild. In the Department of Biomedical Sciences, Prof. Thomas Koch will study domestic animal stem cell biology to understand tissue development, maintenance and therapeutic interventions.

100% SUCCESS

**UNIVERSITY
OF GUELPH**

100%

**NATIONAL
AVERAGE**

66%

LEADERSHIP

Researchers at the forefront of their academic fields

Endowed and externally funded research chairs

Jason Coe, Nestlé Purina PetCare Canada Chair in Communications

Ian Duncan, Emeritus Chair of Animal Welfare

George Greene, Chair in Environmental Governance
Kinross Gold Corp.

Alexandra Harlander, The Burnbrae Farms Professorship in Poultry Welfare

A. Max Jones, Professorship in Integrated Plant Production Systems for
Vegetatively Propagated Horticulture Species

David Kelton, Chair in Dairy Cattle Health
Dairy Farmers of Ontario

Donna Lero, Jarislowsky Chair in Families and Work

Ralph Martin, Loblaw Chair in Sustainable Food Production

Ali Navabi, Grain Farmers of Ontario Professorship in Wheat Breeding

Lee Niel, Col. K. L. Campbell Chair in Companion Animal Welfare

Nigel Raine, Rebanks Family Chair in Pollinator Conservation
W. Garfield Weston Foundation

Praveen Saxena, Gosling Chair in Plant Preservation
The Gosling Foundation

Adronie Verbrugghe, Royal Canin Veterinary Diet Endowed Chair in
Canine and Feline Clinical Nutrition

Tina Widowski, Col. K. L. Campbell University Chair in Animal Welfare; Egg
Farmers of Canada Chair in Poultry Welfare

Catharine Wilson, Francis and Ruth Redelmeier Professorship in Rural History

Premier's Research Chair

Amar Mohanty, Biomaterials and Transportation
Ontario Ministry of Agriculture, Food and Rural Affairs

Pierre Elliott Trudeau Foundation

Evan Fraser, Fellow

Canada Research Chairs

Aaron Berg
Dorothee Bienzle
Milena Corredig
Myrna Dawson
Monique Deveaux
Kari Dunfield
John Dutcher
Hermann Eberl
James France
Evan Fraser
Amy Greer
Chris Hall
George Harauz
Paul Hebert
Nina Jones
Allan King
René Kirkegaard

Vladimir Ladizhansky
Joseph Lam
Jacek Lipkowski
Alejandro Marangoni
Georgia Mason
Ed McBean
Barbara Morrongiello
Linda Parker
Kathryn Preuss
Carla Rice
Sharada Srinivasan
Carl Svensson
Merritt Turetsky
Scott Weese
Chris Whitfield
David Wright
Rickey Yada

University Research Chairs

Madhur Anand
Dionne Brand
John Cranfield
Robert Enright

Elizabeth Ewan
Daniel Fischlin
Sky Gilbert
Spencer Henson

Towhidul Islam
Paul McNicholas
Robert Mullen
Ryan Norris

Theo Noseworthy
Steven Rothstein
Thanasis Stengos

NSERC Industrial Research Chairs

Milena Corredig, Dairy Technology
Ontario Dairy Council

Mansel Griffiths, Dairy Microbiology
Dairy Farmers of Ontario

Beth Parker, Groundwater Contamination in Fractured Media
Boeing, Syngenta

Hongde Zhou, Advanced Wastewater Technologies
Zenon Environmental Inc.

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Ric Knowles
John Leslie
Elizabeth Waterston

Academy of Science
Derek Bewley
Arend Bonen
Chris Gray

Paul Hebert
Gabriel Karl
Ken Kasha
Peter Kevan

Jacek Lipkowski
John McMurtry
Larry Milligan
Bernhard Nickel

Larry Peterson
Bruce Sells
John Simpson
Chris Whitfield

College of New Scholars,
Artists and Scientists
Evan Fraser
Ryan Norris

CHANGING LIVES IMPROVING LIFE

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