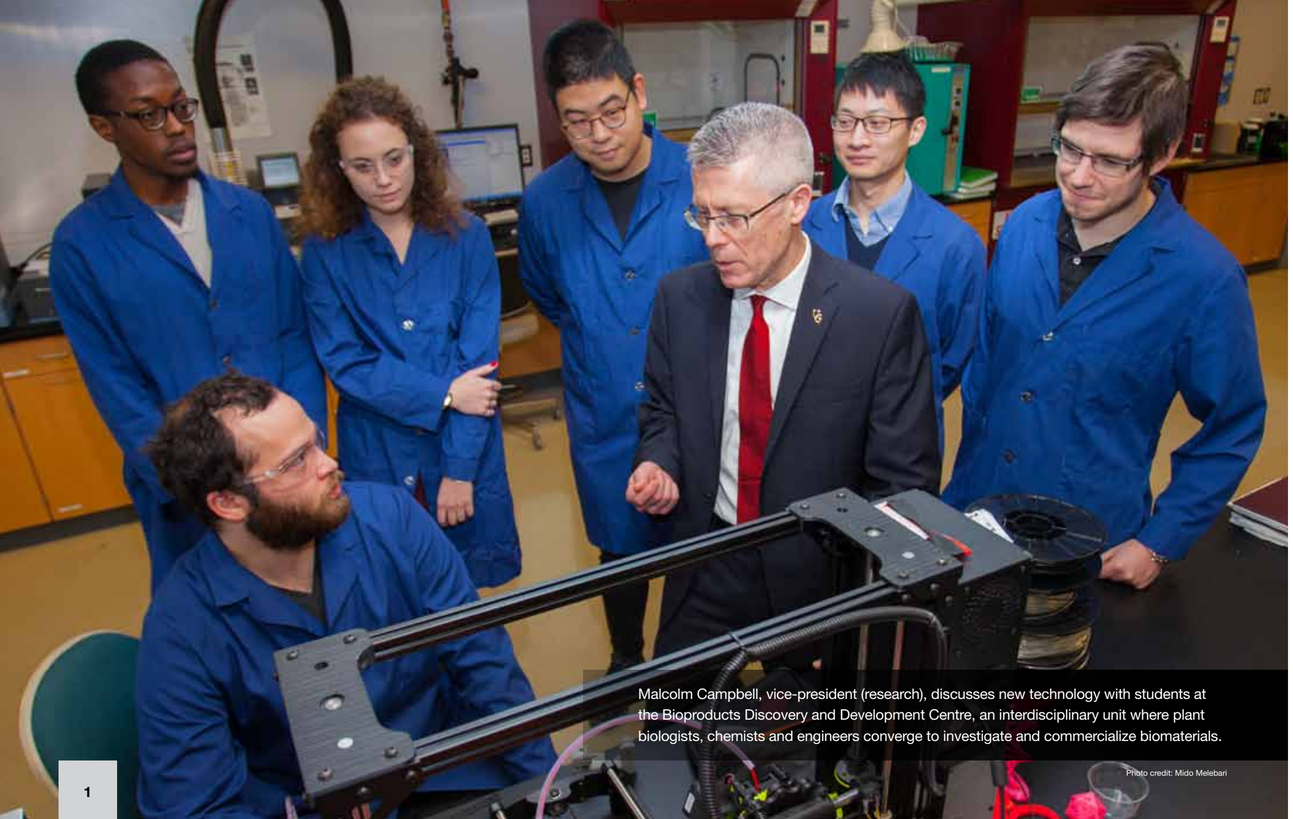
RETURN ON RESEARCH

UNIVERSITY of GUELPH

IMPROVE LIFE.

ANNUAL REPORT 2016-2017



Malcolm Campbell, vice-president (research), discusses new technology with students at the Bioproducts Discovery and Development Centre, an interdisciplinary unit where plant biologists, chemists and engineers converge to investigate and commercialize biomaterials.

Photo credit: Mido Melebari

A BANNER YEAR FOR RESEARCH

In the University of Guelph's storied history, 2016-17 has been a banner year for research.

On the pages that follow, you'll see we received the largest single research award in the institution's history: $76.7 million from the federal government for a project called Food From Thought.

It's designed to start a "digital revolution" in food and agriculture focused on not just how much food we produce in the next century but also the way we produce it.

As well, the University of Guelph received its single largest-ever gift, a $20-million donation from the Arrell Family Foundation, for the Arrell Food Institute. Its mission is to transform the global food economy and further strengthen U of G and Canada as agri-food leaders.

Also this year, we gave our first Innovation of the Year award to pathobiology professor Bonnie Mallard for her High Immune Response technology for improving the health of dairy cattle. This annual award recognizes creative strategies or products that make a difference in people's lives.

And we started two new awards for researchers (see pp. 17-18) to recognize leadership and excellence.

We celebrate many remarkable research achievements at the University of Guelph every year. Here, 600-plus faculty members lead research that covers a huge range of expertise, united in their mission to improve life.

We're proud of their accomplishments across the board and take special pride in a year such as this.

Malcolm Campbell
Vice-President, Research

613
researchers

292
funding sponsors

1,862
projects

2,100
graduate students

$141,956,403
research revenue

Geography professor Evan Fraser (pictured here), scientific director of Food From Thought and director of the University of Guelph Arrell Food Institute: “Food From Thought is bringing a digital revolution to agriculture through collaborations with industry and government, leveraging interdisciplinary research to tackle key challenges. These include food fraud, food safety, increasing profitability and yield, and improving livestock health and welfare, while enhancing biodiversity and ecosystems.”

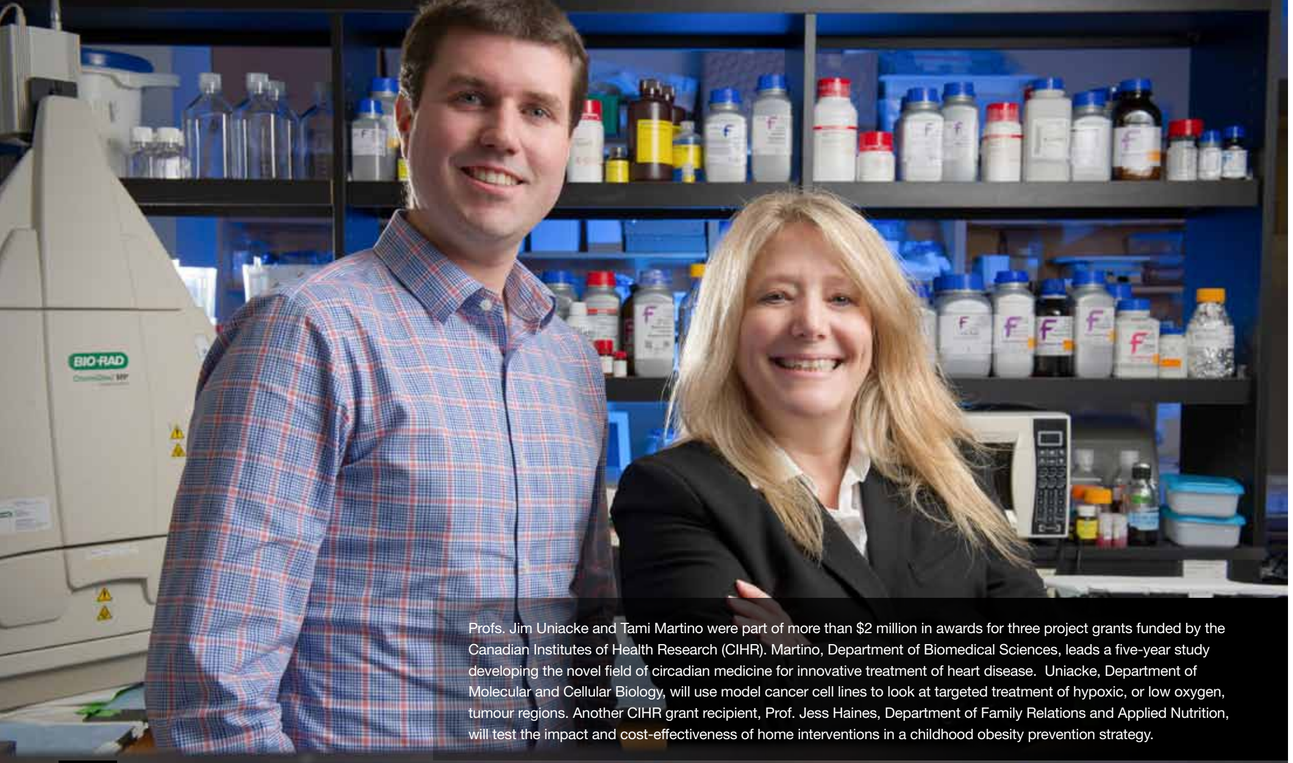
FOOD FROM THOUGHT

Food From Thought: Agricultural Systems for a Healthy Planet, focuses on research to improve the sustainability and productivity of global food production by leveraging the power of leading-edge data science, agri-food research, and biodiversity science. The seven-year program is positioning Canada as a global leader in the development of innovative solutions that improve both the sustainability and productivity of food systems.

Food From Thought research spans a broad range of priority areas within the sector, including:

- Reducing food fraud and outbreaks of food-borne illnesses by expanding the use of DNA barcoding technology developed at U of G
- Increasing on-farm yields and profitability by using big data to reduce pesticide and fertilizer use and to monitor soil and water health
- Improving livestock health and welfare and food safety by applying advanced computing such as artificial intelligence and predictive analytics

Food From Thought is the largest single federal research investment in U of G history, with $76.7 million invested over seven years from the Canada First Research Excellence Fund.



Profs. Jim Uniacke and Tami Martino were part of more than $2 million in awards for three project grants funded by the Canadian Institutes of Health Research (CIHR). Martino, Department of Biomedical Sciences, leads a five-year study developing the novel field of circadian medicine for innovative treatment of heart disease. Uniacke, Department of Molecular and Cellular Biology, will use model cancer cell lines to look at targeted treatment of hypoxic, or low oxygen, tumour regions. Another CIHR grant recipient, Prof. Jess Haines, Department of Family Relations and Applied Nutrition, will test the impact and cost-effectiveness of home interventions in a childhood obesity prevention strategy.

Photo credit: Martin Schwalbe

FEDERAL GRANTING COUNCILS

Natural Sciences and Engineering Research Council

Five new Discovery Accelerator Supplements program recipients

Two new Industrial Research Chairs

Discovery Grants – 77% success rate for early career researchers (vs. 69% national average)

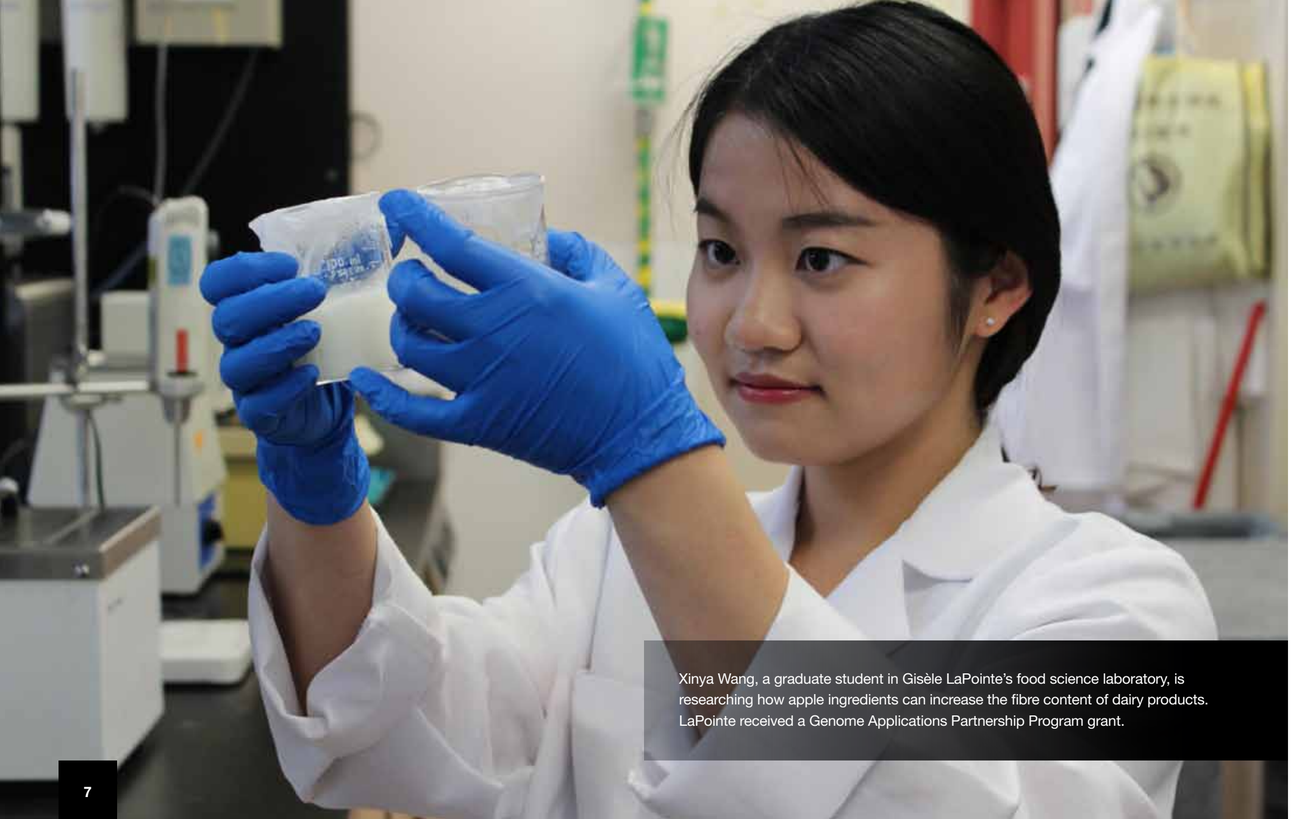
Social Sciences and Humanities Research Council

Insight Grants – 44% success rate, up 16% from 2015-2016

Insight Development Grants – 35% success rate, up 27% from 2015-2016

Canadian Institutes of Health Research

Project Grants – three new initiatives worth $2 million



Xinya Wang, a graduate student in Gisèle LaPointe's food science laboratory, is researching how apple ingredients can increase the fibre content of dairy products. LaPointe received a Genome Applications Partnership Program grant.

FEDERAL GOVERNMENT

Three cutting-edge University of Guelph research projects in genomics – one of today's most rapidly developing and powerful areas of science and technology – received $10.7 million in support to improve animal health and welfare, crop yields and food production. The investment came from Genome Canada's Genomic Applications Partnership Program, which supports university-industry R&D collaborations with social and economic benefits.

$6 MILLION
to improve turkey health and welfare

$3.4 MILLION
to improve canola yields

$1.3 MILLION
to increase production of aged cheddar cheese

U of G received more than $2 million from the Agricultural Greenhouse Gases Program for three projects to study riparian buffer plantings (vegetation planted between streams and farms to help prevent surface runoff), to investigate aerial sensors used to assess soil organic carbon levels and to study nitrous oxide emissions.

The research agreement between the University of Guelph and the Ontario Ministry of Agriculture, Food and Rural Affairs supports studies of targeted probiotics such as those being investigated by Prof. Cezar Khursigara, Department of Molecular and Cellular Biology, that could help fight diabetic conditions and obesity.

Photo credit: Cezar Khursigara

OMAFRA-U of G AGREEMENT

The University of Guelph has a unique and long-standing agreement with the Ontario Ministry of Agriculture, Food and Rural Affairs to conduct innovative research that is fundamental to sustaining and enhancing the agri-food sector – provincially, nationally and globally.

283 OMAFRA-U of G-funded research projects active in 2016-17

215 faculty engaged in research supporting OMAFRA priorities

OMAFRA's $51.5-million investment in research leveraged $48.6 million of external funds for research projects to support shared OMAFRA-U of G priorities.

OMAFRA's $7.4 million of research operating funding leveraged $10.8 million of third-party research funding, a ratio of 1.46:1.

Early researcher awards from the Ontario Ministry of Research and Innovation support novel research projects at U of G. Food science professor Paul Spagnuolo (pictured here) studies nutraceuticals and cancer treatment. Other recipients are Prof. Leah Levac, Department of Political Science, who is investigating well-being among women in Canada's North, and physics professor Alex Gezerlis, who uses high-performance computers in nuclear physics.

Photo credit: Martin Schwalbe

ONTARIO GOVERNMENT

A breadth of research is supported with almost $5.4 million at the University of Guelph by various provincial ministries, including projects in these departments:

Chemistry
High-temperature aqueous chemistry

Integrative Biology
Evaluation of woodland caribou ranges

Human Health and Nutritional Sciences
Cardiovascular response to physical exercise

Physics
Building atomic gases, stars and nuclei from scratch

Political Science
Well-being and political engagement of Northern women and girls

Population Medicine
Assessing models of community-based learning

School of Computer Science
Data mining for early detection of mastitis

School of Engineering
Great Lakes basin streams and the changing climate

School of English and Theatre Studies
Arts and the digital humanities

School of Environmental Sciences
Growth and climate relationships in hardwood forests

Josie Wittmer (centre), a PhD candidate in collaborative geography and international development studies, works with women waste pickers in India to understand the health and livelihood challenges involved in recycling work.

Photo credit: Josie Wittmer

INTERNATIONAL

The University of Guelph has a long-standing commitment to international development in dozens of disciplines. International research grew significantly in 2016-17, including support to engineering professor Graham Taylor to get computers to “think” like humans. Taylor has been named to a prestigious new network created by the Canadian Institute for Advanced Research for researchers “pursuing answers to the most difficult challenges facing the world today.”

67 COUNTRIES

294 PROJECTS

$55 MILLION

in research funding

Exploring consumers' relationship with food is the focus of two new food laboratories at the University of Guelph, including a state-of-the-art grocery store lab. The Longo's Food Retail Lab (pictured here) and the Schneider's Research Lab are designed to help U of G researchers better understand consumer decision-making, consumption habits and reactions to food advertising.

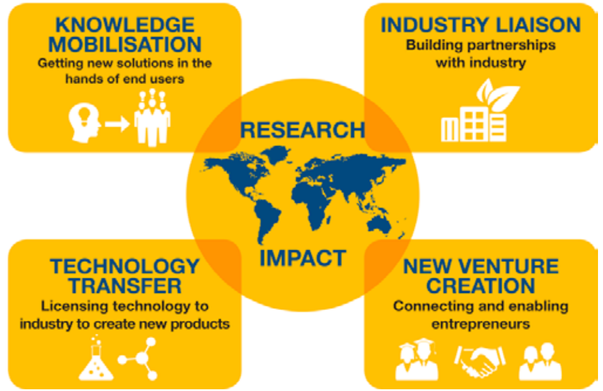
INNOVATION

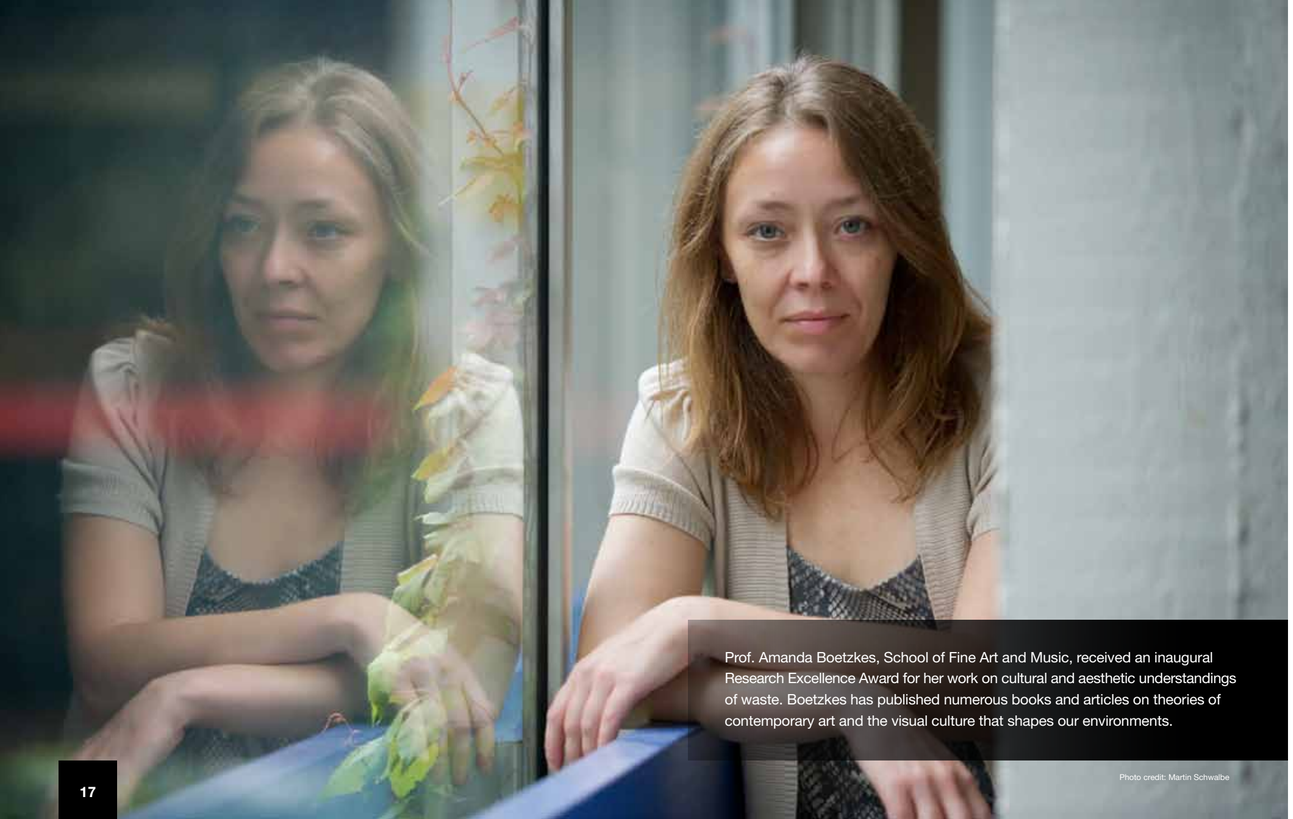
The Research Innovation Office helps transform world-class University of Guelph research into innovations that improve life. Staff provide expertise in managing intellectual property generated through all sources of funding, including the research agreement between the University and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

In 2016-17, the office reported 177 intellectual property disclosures and 33 licences and options signed. Fifteen patents and plant breeders' rights certificates were issued related to OMAFRA-funded technologies.

Total royalties from OMAFRA-funded technologies increased 12 per cent over the previous year.

A new Research Innovation Office was created in 2016-17. It brought in the former Catalyst Centre and has created new portfolios (new venture creation and knowledge mobilisation), launched the new Accelerator Guelph program and continued the successful Gryphon's LAAIR program.





Prof. Amanda Boetzkes, School of Fine Art and Music, received an inaugural Research Excellence Award for her work on cultural and aesthetic understandings of waste. Boetzkes has published numerous books and articles on theories of contemporary art and the visual culture that shapes our environments.

Photo credit: Martin Schwalbe

NEW AWARDS

In 2016-17, the University of Guelph instituted two new internal award programs to support and enhance research.

Research Excellence Awards

Research Excellence Awards highlight research achievements of recently tenured faculty members to raise the profile of individuals who would be considered for future external recognition.

Sarah Adamowicz, Integrative Biology
Amanda Boetzkes, Art History
Alexandros Gezerlis, Physics
Thomas Koch, Biomedical Sciences
Meghan McMurtry, Psychology
Paul Spagnuolo, Food Science

Research Leadership Chairs

Research Leadership Chairs recognize research excellence of mid- to late career faculty who have proven records of distinguished and sustained scholarly work. Chairholders are prominent researchers who have received significant national and international recognition.

Emma Allen-Vercoe, Molecular and Cellular Biology
Stephen Henighan, School of Languages and Literatures
René Kirkegaard, Economics and Finance
David Ma, Human Health and Nutritional Sciences
David MacDonald, Political Science
Ed McBean, Engineering
Amar Mohanty, Plant Agriculture
Shayan Sharif, Pathobiology
Alfons Weersink, Food, Agricultural and Resource Economics

LEADERSHIP

Endowed and externally funded research chairs

Endowed and externally funded research chairs are established through the generosity of individual and/or corporate donors. Chairholders focus on topics of interest to the donor and University – and bring distinction to both.

Christine Baes
The Semex – Canadian Dairy Network – Holstein Canada Professorship in Dairy Genomics

Theresa Bernardo
IDEXX Chair in Emerging Technologies and Bond-Centered Animal Healthcare

Nicolas Brunet
Latornell Professorship in Environmental Stewardship

Steve Crawford
Professorship in the Department of Integrative Biology Saugeen Ojibway Nation

Brady Deaton
Michael McCain Family Chair in Food Security

James Fraser
Scottish Studies Foundation Chair

Ryan Gibson
Libro Professorship in Regional Economic Development for Southwestern Ontario

Ernesto Guzman
Pinchin Family Chair in Bee Health

Alexandra Harlander
The Burnbrae Farms Professorship in Poultry Welfare

Max Jones
Professorship in Horticulture and Plant Preservation

David Kelton
Dairy Farmers of Ontario Chair in Dairy Cattle Health

Elijah Kiarie
McIntosh Family Professorship in Poultry Nutrition

Gisèle LaPointe
Dairy Farmers of Ontario Professorship in Dairy Microbiology

Donna Lero
Jarislowsky Chair in Families and Work

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

Neil Rooney
Professorship in the School of Environmental Sciences Saugeen Ojibway Nation

Praveen Saxena
Gosling Chair in Plant Preservation – The Gosling Foundation

Cynthia Scott-Dupree
Bayer CropScience Chair in Sustainable Pest Management

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

Tina Widowski
Egg Farmers of Canada Chair in Poultry Welfare

Catharine Wilson
Francis and Ruth Redelmeier Professorship in Rural History

TBD
Chair in Environmental Governance Kinross Gold Corp.

TBD
Loblaw Chair in Sustainable Food Production

TBD
Arrell Chair in Food Quality

TBD
Arrell Chair in Food, Policy and Society

TBD
Arrell Chair in the Business of Food

TBD
The Barrett Family Chair in Sustainable Food Production

Canada Research Chairs

The Canada Research Chairs program helps universities attract and retain some of the world's most accomplished and promising minds. Chairholders aim to achieve research excellence in engineering and the natural sciences, health sciences, humanities and social sciences.

Aaron Berg
Hydrology and Remote Sensing

Susan Brown
Collaborative Digital Scholarship

Myrna Dawson
Violence Prevention

Monique Deveaux
Ethics and Global Social Change

Trevor DeVries
Dairy Cattle Behaviour and Welfare

Kari Dunfield
Environmental Microbiology of Agro-ecosystems

John Dutcher
Soft Matter and Biological Physics

James France
Biomathematics in Animal Nutrition

Evan Fraser
Global Food Security

Amy Greer
Population Disease Modelling

George Harauz
Myelin Biology

Paul Hebert
Molecular Biodiversity

Nina Jones
Eukaryotic Cellular Signalling

Allan King
Animal Reproductive Biotechnology

René Kirkegaard
Risk Management and Regulation

Joseph Lam
Cystic Fibrosis and Microbial Glycobiology

Alejandro Marangoni
Food, Health and Aging

Ed McBean
Water Supply Security

Barbara Morrongiello
Child and Youth Injury Prevention

Linda Parker
Behavioural Neuroscience

Kathryn Preuss
Chemistry of Molecular Materials

Carla Rice
Care, Gender and Relationships

Michael Rogers
Food Nanotechnology

Sharada Srinivasan
Gender, Justice and Development

Carl Svensson
Gamma-Ray Spectroscopy and Rare Isotope Physics

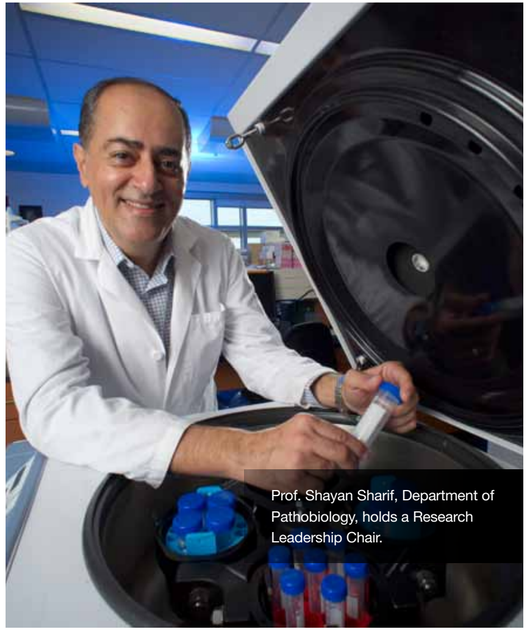
Merritt Turetsky
Integrative Ecology

Scott Weese
Zoonotic Diseases

Chris Whitfield
Molecular Microbiology

David Wright
Lipids, Metabolism and Health

Prof. Nina Jones, Department of Molecular and Cellular Biology, holds a Canada Research Chair in Eukaryotic Cellular Signalling.



Prof. Shayan Sharif, Department of Pathobiology, holds a Research Leadership Chair.

Photo credit: Martin Schwalbe

Ontario Premier's Research Chair

Ontario Premier's Research Chairs are prestigious Ontario university research professorships created to drive provincial research and develop excellence, to create world-class centres of research and to enhance Ontario's competitiveness in Canada's knowledge-based economy.

Amar Mohanty, Biomaterials and Transportation

SSHRC Impact Award

SSHRC Impact Awards build on and sustain Canada's research-based knowledge culture in all research areas of the social sciences and humanities. The awards recognize outstanding researchers and celebrate their research achievements, research training, knowledge mobilisation and outreach activities funded partially or entirely by SSHRC.

Ajay Heble, Partnership Award

NSERC Industrial Research Chair

The Natural Sciences and Engineering Research Council Industrial Research Chairs program helps universities pursue new directions or build on existing strengths to achieve the critical mass required for a major research endeavour in science and engineering of interest to industry.

Gisèle LaPointe, Dairy Microbiology
Sponsors: Dairy Farmers of Ontario, Parmalat Canada, Lallemand Inc.

Beth Parker, Groundwater Contamination in Fractured Media
Sponsors: Boeing, Syngenta

Peter Tremaine, High-Temperature Aqueous Chemistry
Sponsors: University Network of Excellence in Nuclear Engineering, CANDU Owners Group, Nuclear Waste Management Organization, Electric Power Research Institute

CIFAR Azrieli Global Scholar

The CIFAR Azrieli Global Scholar program provides funding and support to help scholars build their network and develop essential skills to become the next generation of research leaders.

Graham Taylor

Pierre Elliott Trudeau Fellow

Pierre Elliott Trudeau Fellows agree to conduct a three-year research project in cooperation with other members of the community on an issue of major relevance to Canadians and the world.

Evan Fraser

Fellows of the Royal Society of Canada

The Royal Society of Canada recognizes leaders and their work in order to help them build a better future in Canada and around the world.

Academy of the Arts and Humanities

Ric Knowles
John Leslie
John McMurtry
Barry Smit
Judith Thompson
Elizabeth Waterston

Academy of Science

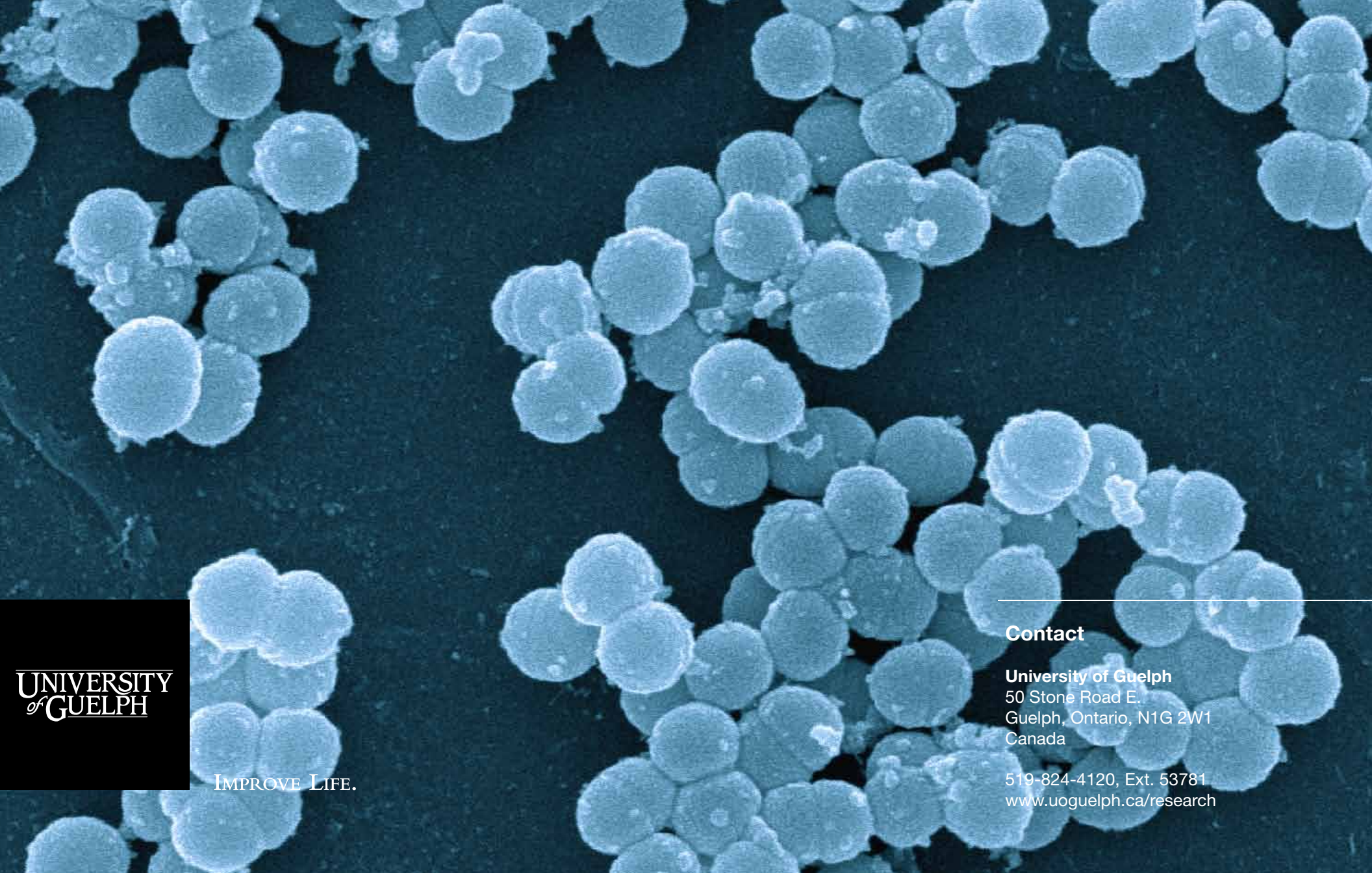
Derek Bewley
Arend Bonen
Chris Gray
Paul Hebert
Gabriel Karl
Ken Kasha
Peter Kevan
Jacek Lipkowski
Larry Milligan
Bernhard Nickel
Larry Peterson
Bruce Sells
John Simpson
Chris Whitfield

College of New Scholars, Artists and Scientists

Evan Fraser **Nina Jones** **Ryan Norris** **Merritt Turetsky**

Photo credit: Rob O'Flanagan

Avid cyclist and engineering professor Graham Taylor is a CIFAR Azrieli Global Scholar.



UNIVERSITY of GUELPH

IMPROVE LIFE.

Contact

University of Guelph
50 Stone Road E.
Guelph, Ontario, N1G 2W1
Canada

519-824-4120, Ext. 53781
www.uoguelph.ca/research