



UNIVERSITY
of GUELPH

IMPROVE LIFE.

RETURN ON RESEARCH

ANNUAL REPORT 2017-2018



As a Tier 1 Canada Research Chair in Electrochemistry and Nanoscience, Prof. Aicheng Chen (left) will receive \$1.4 million over the next seven years for research that includes developing practical applications for a nanomaterial called graphene. He aims to create innovative green technologies for projects like energy storage and clean drinking water. Chen leads a tour of his MacNaughton Building lab with Guelph MP Lloyd Longfield (second from left); Malcolm Campbell, vice-president (research); and Colin van der Kuur, research catalyst for Zenyatta Graphene Solutions.

Photo credit: Kenneth Armstrong/GuelphToday.com

STRENGTH THROUGH PARTNERSHIPS

University of Guelph research comfortably spans the continuum between game-changing fundamental discoveries and impactful innovations that solve real-world challenges. University of Guelph research innovations are making meaningful advances that power job creation, economic growth and trade. For example, at the end of the 2018 fiscal year, University of Guelph start-up companies employed 143 people and raised more than \$46 million.

Partnership is a key ingredient to these research and innovation successes. U of G has unique and deeply embedded relationships with both the public and the private sectors. Such partnerships are integral to generating discoveries and fuelling useful research applications, ensuring we fulfill our ambition to improve life. Our experience shows that there is immense power in working with others in an environment that promotes excellence, equity, diversity and inclusivity.

The power of partnerships is perhaps best illustrated by the University of Guelph's relationship with the Ontario Ministry of Agriculture, Food and Rural Affairs – an alliance that leverages our role as Canada's food university to benefit the agri-food industry regionally and worldwide. This alliance is a model for other U of G partnerships, that encompass both the public and the private sectors, where we create synergies with far-reaching, positive impacts that benefit many.

We're proud of our research and innovation accomplishments and applaud faculty, staff, students, and, of course, our many partners, all united in our mission to improve life. We hope you enjoy this snapshot of what we have achieved in the past year.

*Front and back cover, University of Guelph Research Excellence Award recipient Prof. Christina Smylitopoulos, School of Fine Art and Music (see page 22), featuring various works from the Bachinski/Chu Print Study Collection.
Cover photo credit: Martin Schwalbe*

Malcolm Campbell
Vice-President, Research

618

researchers

293

research sponsors

1,956

research projects

2,620

full-time graduate students

\$147,109,339

research revenue



Public procurement is an important development lever. It represents 50 to 70 per cent of imports and accounts for 15 to 20 per cent of gross domestic product. Accounting professor Philippe Lassou focuses on the role of financial governance within public procurement in Africa by comparing anglophone and francophone systems. Lassou received SSHRC funding to study the links between accounting, governance and development in developing countries and disadvantaged communities.

FEDERAL GRANTING COUNCILS

Together, the three federal granting councils – popularly called the tri-agencies – account for 18 per cent of U of G’s research funding. Success in tri-council funding is vital for a research-intensive university.

Social Sciences and Humanities
Research Council Insight Grants:
funding success rate of

48% vs. **44%**
2017-18 2016-17

National average 2017-18: 47%

Natural Sciences and Engineering
Research Council Strategic Partnership
Grants for Projects: success rate of

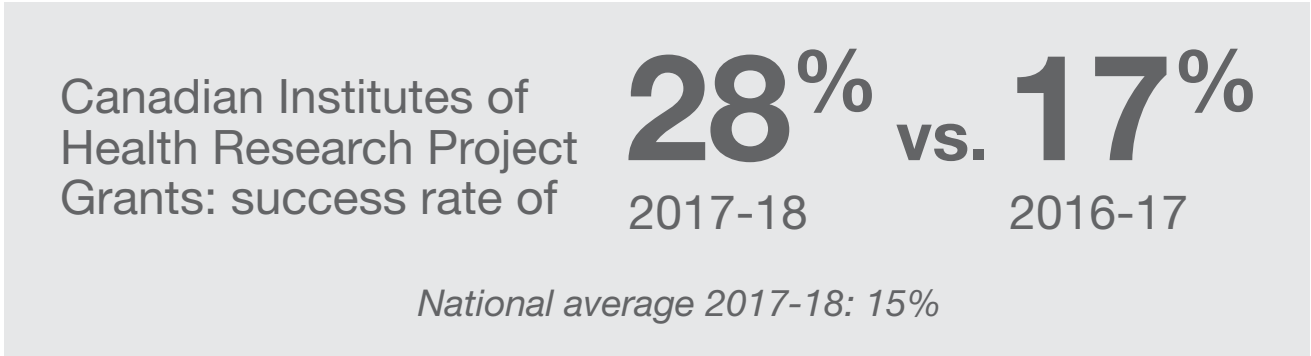
50% vs. **20%**
2017-18 2016-17

National average 2017-18: 44%

Canadian Institutes of
Health Research Project
Grants: success rate of

28% vs. **17%**
2017-18 2016-17

National average 2017-18: 15%





The University of Guelph received \$3.4 million through two new Canada Research Chairs and the renewal of three others. Engineering professor Graham Taylor received a new Tier 2 chair in Machine Learning Systems, and Prof. Kim Anderson, Department of Family Relations and Applied Nutrition (FRAN), will hold a new Tier 2 chair in Indigenous Relationships. Anderson studies strengthening of relationships through Indigenous ways of knowing. Here, she is shown on the left with FRAN professor Hannah Tait Neufeld (right) and Katie Meyer-Beck, director of research support services.

Photo credit: Martin Schwalbe

FEDERAL GOVERNMENT SUPPORT

Humanities and social sciences research at the University of Guelph received **\$3.4 million** from the Canada Foundation for Innovation’s Innovation Fund. The federal funding supports a laboratory for improvisational performance and an integrated database that gives researchers access to the historical records of 32 million Canadians. U of G received:

- **\$2.03 million** to create a global hub for community-engaged performance research and impacts on audience, youth and community
- **\$1.465 million** for The Canadian Peoples, a national infrastructure project that includes an integrated series of databases comprising the records of 32 million Canadians

University of Guelph projects ranging from converting agri-food waste into energy to improving health of young children also received more than \$1.3 million in federal funds through the Canada Foundation for Innovation John R. Evans Leaders Fund. This fund invests in leading-edge research infrastructure.



Research in digital humanities, Victorian literature and women’s writing informs Orlando: Women’s Writing in the British Isles from the Beginnings to the Present, an ongoing experiment in digital literary history. Susan Brown, a professor in the University’s School of English and Theatre Studies, as well as a Canada Research Chair in Collaborative Digital Scholarship, was awarded federal funding to expand and enhance the Canadian Writing Research Collaboratory. Brown will study the use of digital technologies for literary history and the impact of technological innovation on literature.



The Human Performance and Health Lab is directed by Prof. Jamie Burr, an exercise physiologist with expertise in elite athlete performance, fitness and applications of exercise for preventing and managing chronic disease. A member of the human cardiovascular physiology and performance research group, Burr received an Early Researcher Award for the project Understanding the Cause and Effect of Exercise-Related Vascular Alterations on Physiological Function. Burr's research comparing heart physiology of runners and swimmers has received international attention across media platforms.

Photo credit: Amber Wood

ONTARIO GOVERNMENT AWARDS

The Ontario Ministry of Research and Innovation provided six University of Guelph researchers with Early Researcher Awards in 2018, double the number of awards from a year earlier. Wide-ranging studies, including precision agriculture, electric vehicles and functional foods, received up to \$100,000 each.

The award recipients were:

Prof. Asim Biswas, School of Environmental Sciences: integrated soil sensing and digital soil mapping for precision agriculture

Prof. Jamie Burr, Department of Human Health and Nutritional Sciences: intentional blood flow restrictions to enhance physical exercise

Prof. Kirby Calvert, Department of Geography, Environment and Geomatics: mapping and managing land-use implications of renewable energy

Prof. Andrew Gadsden, School of Engineering: new approaches to monitoring the fitness of electric vehicle batteries

Prof. Iris Joye, Department of Food Science: using cereal proteins to deliver bioactive ingredients in healthful functional foods

Prof. Christina Smylitopoulos, School of Fine Art and Music: a new lab for improving visual competency and observation



The Gordon S. Lang School of Business and Economics has developed a Marketing Analytics Centre that will use insight to drive decision-making. Tanya Mark, director of the centre and a marketing and consumer studies professor, engages academic and industry communities to foster leading-edge research and improve management practice in consumer and marketing analytics.

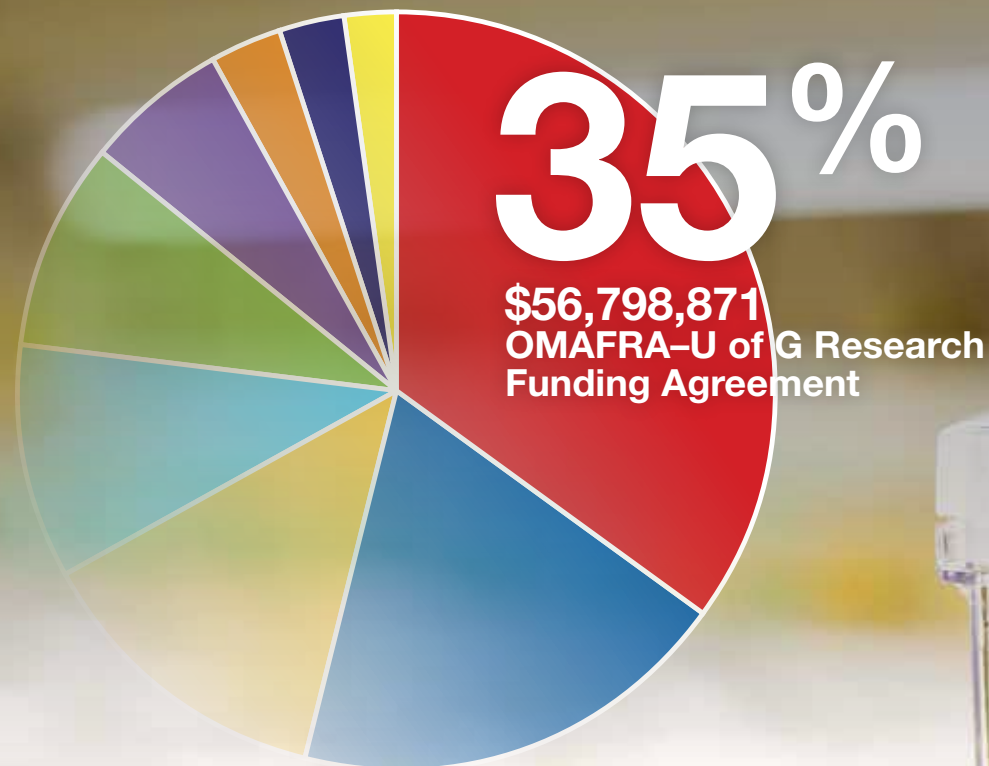


Photo credit: Hillary Rooyakkers

AN ALLIANCE FOR AGRI-FOOD RESEARCH

A unique agreement between the University of Guelph and the Ontario Ministry of Agriculture, Food and Rural Affairs brings together academia, government and industry to support and enhance Ontario's agri-food sector. Over the next 10 years, the Ontario government will invest up to \$71.3 million annually through the agreement, enabling cutting-edge research and innovation – such as advances in artificial intelligence, big data analytics and precision agriculture – that attract investment and highly skilled talent. This alliance will strengthen the economy, create jobs and sustain strong communities.



The agreement supports:

224 faculty leading and collaborating on research funded by this agreement

278 active research projects

More than **150 graduates** to date from the Highly Qualified Personnel Scholarship Program

15 research stations and centres

2 laboratory facilities: Animal Health Laboratory, Agriculture and Food Laboratory



U of G president Franco Vaccarino invited internationally recognized leaders in agri-food and community development to form the inaugural adjudication committee for the Arrell Global Food Innovation Awards. Samuel Myers won the research award for global excellence in food innovation. Sebastian Teunissen (left) and Isaac Gyamfi (right) accept the community impact award on behalf of the Solidaridad Network from Tony and Anne Arrell. The Solidaridad Network facilitates the development of socially responsible, environmentally sound and economically viable commodity supply chains to enhance rural livelihoods.

GROWING A GLOBALLY INFLUENTIAL RESEARCH INSTITUTE

In 2017-18, the University of Guelph received a \$20-million gift from the Arrell Family Foundation to transform the global food economy and further strengthen U of G as an agri-food leader. The University provided matching funds of \$20 million, for a total commitment of \$40 million to form the Arrell Food Institute at the University of Guelph.

Along with subsequent government and private funding — including a \$77-million award from the Canada First Research Excellence Fund for the Food From Thought project — the Arrell gift stimulated a total investment in agri-food research at U of G worth more than \$150 million and led to the creation of the Arrell Food Institute.



The Arrell Food Institute supports:

- 3 endowed chairs
Prof. Maria Corradini, Department of Food Science
Prof. Philip Loring, Department of Geography, Environment and Geomatics
Prof. Simon Somogyi, School of Hospitality, Food and Tourism Management

- 5 graduate scholarships, each worth \$50,000 annually

- An annual summit to engage policy-makers, academics, public and private sectors, students and farmers in agri-food discussions



International projects under way include research by Prof. David Kribs, Department of Mathematics and Statistics, who received \$90,000 from the Mitacs Accelerate program for his collaboration with the African Institute for Mathematical Sciences (AIMS) in Rwanda. Kribs, pictured here left of centre with his AIMS class, is the University Research Chair in Quantum Information.

Photo credit: David Kribs

INTERNATIONAL RESEARCH ACTIVITY

The University of Guelph has a long-standing commitment to international development across a scope of disciplines. Our research addresses local and global issues. In 2017-18, research projects relating to international development involved...



75 COUNTRIES
273 PROJECTS
\$43.2 MILLION
in research funding

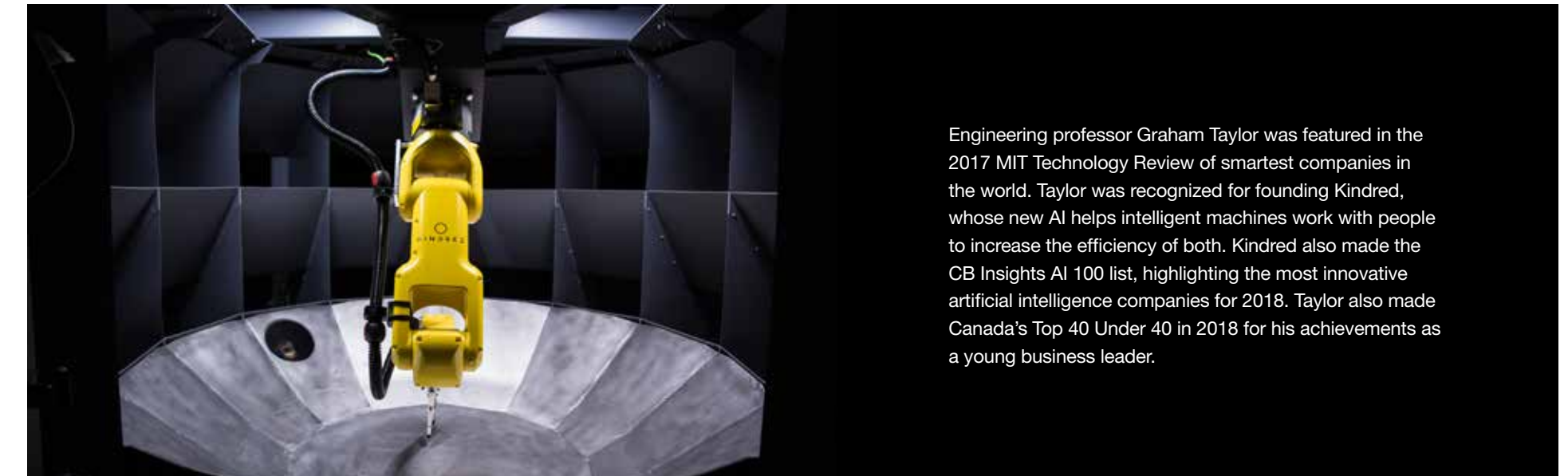


The Guelph Family Health Study is following families for 20 years to learn how childhood health behaviours are maintained or change over time. It is an example of research being conducted with community partners and will have a long-term impact on public health.

Photo credit: Jess Haines

WORKING WITH INDUSTRY

The Research Innovation Office launched an entrepreneurship support program in 2017-18 designed specifically for researchers who have developed commercially viable concepts from research at the University of Guelph. Of the six researcher-led teams that participated in the Accelerator Guelph training program, three have gone on to incorporate companies, enter the marketplace and continue in their Accelerator Guelph training program. As of the end of fiscal 2018, University of Guelph start-ups employed 143 people and raised more than \$46 million in funding, almost entirely in Ontario.



Engineering professor Graham Taylor was featured in the 2017 MIT Technology Review of smartest companies in the world. Taylor was recognized for founding Kindred, whose new AI helps intelligent machines work with people to increase the efficiency of both. Kindred also made the CB Insights AI 100 list, highlighting the most innovative artificial intelligence companies for 2018. Taylor also made Canada's Top 40 Under 40 in 2018 for his achievements as a young business leader.



Food science professor Lawrence Goodridge, recipient of the Leung Family Professorship in Food Safety (right), with food science student Vivian Ly.

Photo credit: Martin Schwalbe

LEADERSHIP

Endowed and externally funded research chairs

Endowed and externally funded research chairs are established through the generosity of individuals and corporate donors.

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
Latonnell Professorship in Environmental Stewardship

Maria Corradini
Arrell Chair in Food Quality

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
Burnbrae Farms Professorship in Poultry Welfare

A. 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 Chair in Dairy Microbiology

Donna Lero
Jarislowsky Chair in Families and Work

Philip Loring
Arrell Chair in Food, Policy and Society

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

Simon Somogyi
Arrell Chair in the Business of Food

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

Tina Widowski
Egg Farmers of Canada Chair in Poultry Welfare

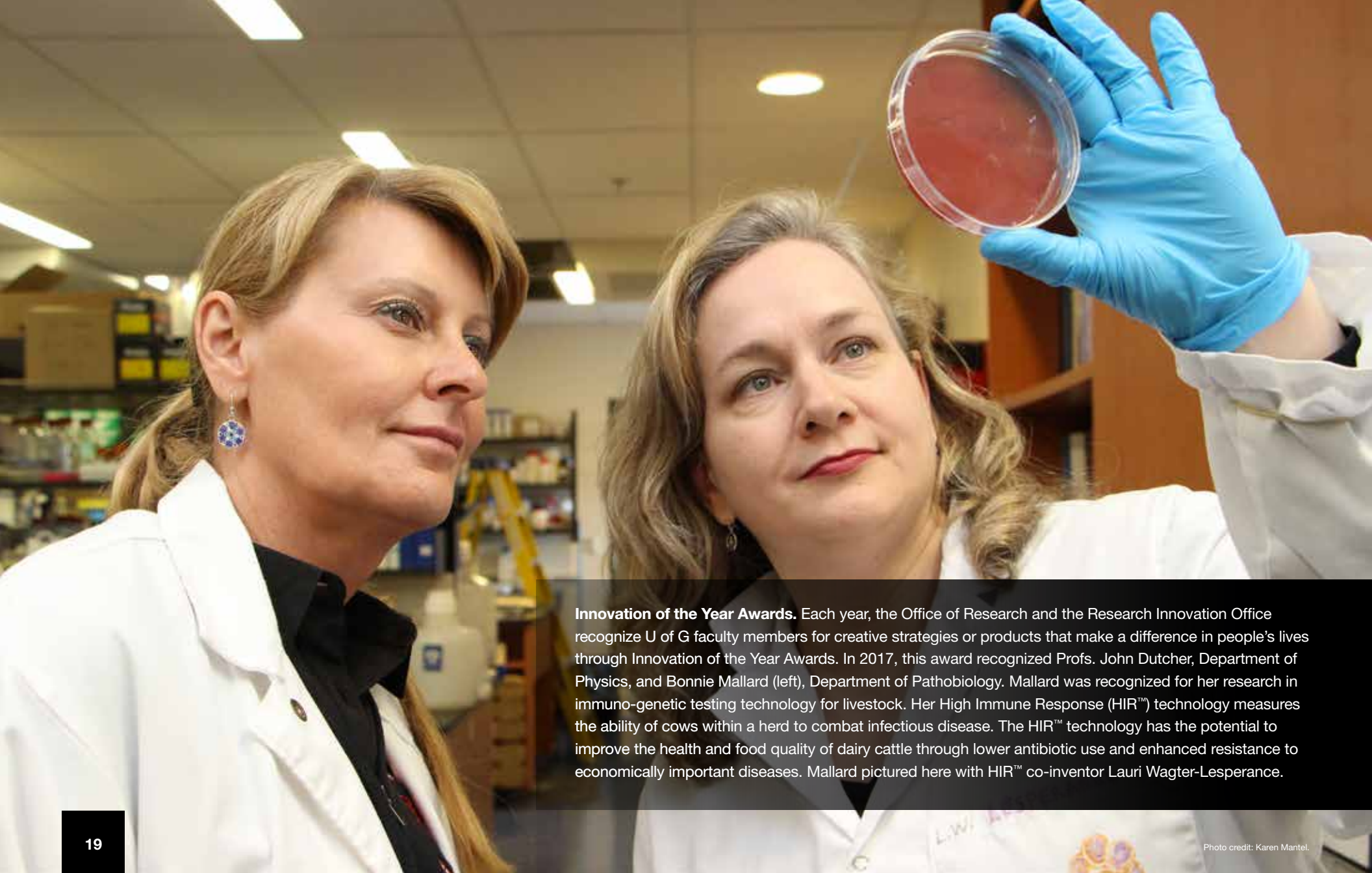
Catharine Wilson
Francis and Ruth Redelmeier Professorship in Rural History

Mary Granskou
Chair in Environmental Governance (Kinross Gold Corp.)

Lawrence Goodridge
Leung Family Professorship in Food Safety

Kevin Keener
Barrett Family Chair in Sustainable Food Engineering

Vacant
Loblaw Chair in Sustainable Food Production



Innovation of the Year Awards. Each year, the Office of Research and the Research Innovation Office recognize U of G faculty members for creative strategies or products that make a difference in people's lives through Innovation of the Year Awards. In 2017, this award recognized Profs. John Dutcher, Department of Physics, and Bonnie Mallard (left), Department of Pathobiology. Mallard was recognized for her research in immuno-genetic testing technology for livestock. Her High Immune Response (HIR™) technology measures the ability of cows within a herd to combat infectious disease. The HIR™ technology has the potential to improve the health and food quality of dairy cattle through lower antibiotic use and enhanced resistance to economically important diseases. Mallard pictured here with HIR™ co-inventor Lauri Wagter-Lesperance.

Photo credit: Karen Mantel.

Canada Research Chairs

The Canada Research Chairs program helps universities attract and retain some of the world's most accomplished and promising researchers in engineering and the natural sciences, health sciences, humanities and social sciences.

Kim Anderson
Indigenous Relationships

Aaron Berg
Hydrology and Remote Sensing

Susan Brown
Collaborative Digital Scholarship

Aicheng Chen
Electrochemistry and Nanoscience

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
Integrative Modelling of Biological Systems

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

Alejandro Marangoni
Food, Health and Aging

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 Signaling.

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

The Social Sciences and Humanities Research Council (SSHRC) Impact Awards build on and sustain Canada’s research-based knowledge culture in all research areas of the social sciences and humanities.

Ajay Heble, School of English and Theatre Studies

NSERC Industrial Research Chair

The Natural Sciences and Engineering Research Council (NSERC) 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

Graham Taylor, Learning in Machines and Brains

Pierre Elliott Trudeau Fellow

Evan Fraser, Scientific Director, Arrell Food Institute

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, and promotes learning and research in the arts, the humanities and the natural and social sciences.

Academy of the Arts and Humanities
Catharine Wilson, Department of History

Academy of Science
Jacek Lipkowski, Department of Chemistry

College of New Scholars, Artists and Scientists
Andrew MacDougall, Department of Integrative Biology
Nigel Raine, School of Environmental Sciences
Carla Rice, Department of Family Relations and Applied Nutrition

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.

Mohammad Biglarbegian, School of Engineering
Noella Gray, Department of Geography, Environment and Geomatics
Neil Rooney, School of Environmental Sciences
Christina Smylitopoulos, School of Fine Art and Music
Jim Uniacke, Department of Molecular and Cellular Biology
Adronie Verbrugghe, Department of Clinical Studies
Agnes Zdaniuk, Department of Management

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, and have received significant national and international recognition.

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

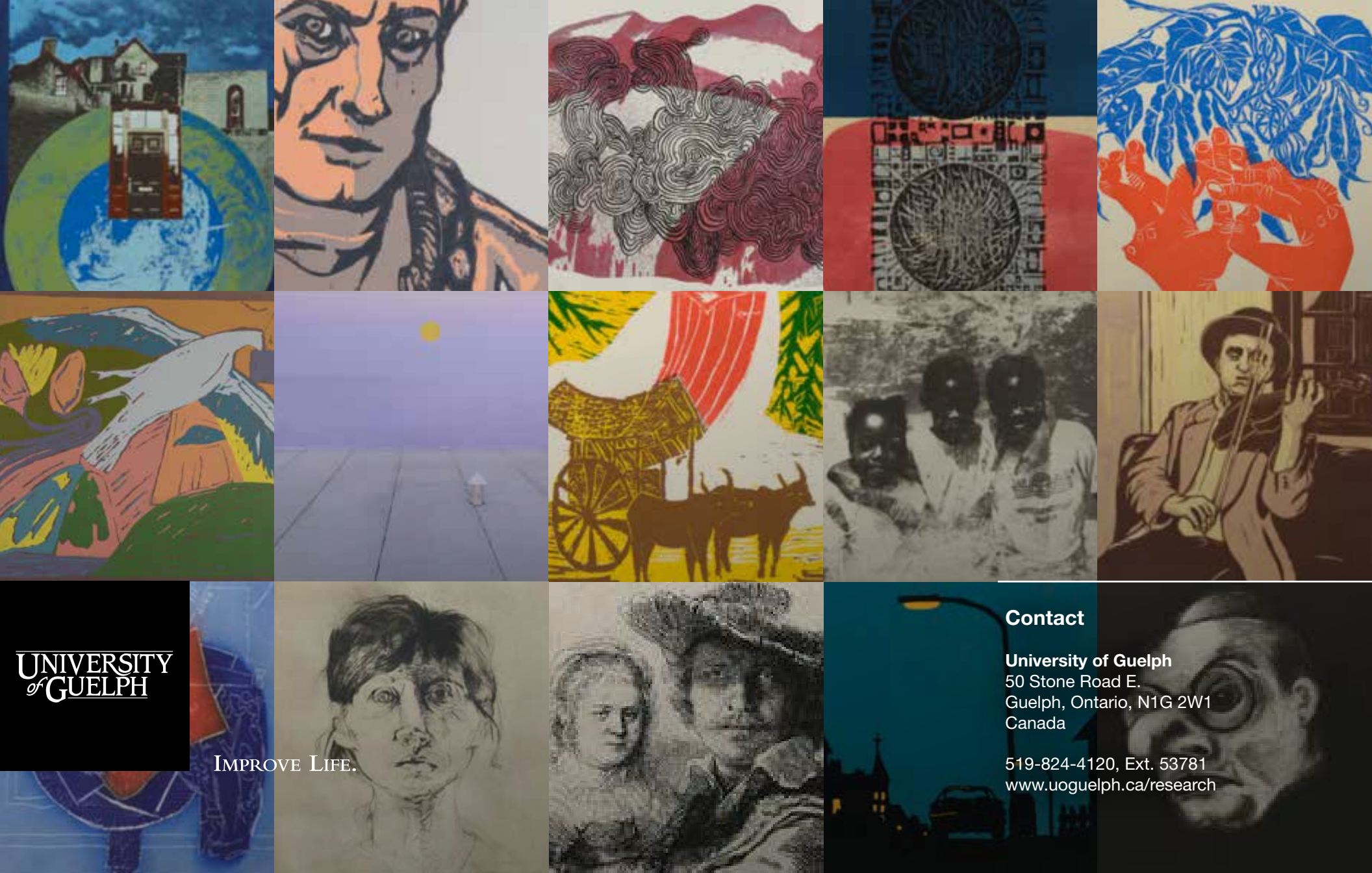
University Research Chairs

University Research Chairs are University-identified and -funded world-class researchers who work to produce impacts that demonstrate the University’s strategic development of research, and improve Canada’s ability to lead in research that has high social, cultural, scientific or technological impact.

John Cranfield, Department of Food, Agricultural and Resource Economics
Daniel Fischlin, School of English and Theatre Studies
Towhidul Islam, Department of Marketing and Consumer Studies
David Kribs, Department of Mathematics and Statistics
Robert Mullen, Department of Molecular and Cellular Biology
Thanasis Stengos, Department of Economics and Finance



Prof. Adronie Verbrugghe (right), Department of Clinical Studies, demonstrates how to check body composition score with veterinary medicine students.



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Contact

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

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