

Ontario Agri-Food Innovation Alliance 2018/19 Funded Projects

IMPROVE LIFE.

research



Prof. Amar Mohanty (pictured here) is the director of the interdisciplinary Bioproducts Discovery and Development Centre, where plant biologists, chemists and engineers converge to investigate and commercialize biomaterials. Some of this group's major projects are sponsored by the Ontario Agri-Food Innovation Alliance. PHOTO: MARTIN LIPMAN/NSERC

Improving life through research and innovation

The Ontario Agri-Food Innovation Alliance funds studies that help build the economy, promote strong rural communities and support a prosperous, safe, environmentally sustainable agri-food sector in Ontario – now and for the future.

This research funding supports U of G's critical mass of faculty, technical staff and graduate students engaged in high-quality research and training opportunities focused on the agri-food needs of Ontarians.

Funding priorities address the most significant challenges and opportunities for research in Ontario's agricultural, food and rural sectors, in seven research theme areas:

- **Agri-Food and Rural Policy**
- **Bioeconomy**
- **Emergency Management**
- **Environmental Sustainability**
- **Food for Health**
- **Products and Value Chains**
- **Production Systems (Plant and Animal).**

Research funding for individual projects is awarded through an annual, competitive program. Applications are rigorously reviewed based on scientific merit, innovation, contributing partners, potential benefits and best fit with established priorities in each theme area.

In 2018/19, the Agreement funded 55 research projects across the seven theme areas. All projects are listed inside this publication.



Agricultural and Rural Policy

Getu Hailu

Trade, competitiveness and blockchain: Productivity, innovation and product differentiation.

Assessing if blockchain can enhance the competitiveness of the food supply chain.

Glenn Fox

Spatial stochastic bioeconomic modelling of crop climate resilience in Ontario.

Combatting climate change hardships with crop resilience models utilizing novel irrigation and drainage strategies.

John Smithers

Linking farm and school in new regional agri-food value chains: Practices and prospects.

New perspectives on farm-to-school food programs may show economic growth for Ontario farmers.

Ken McEwan

The impact of business risk management programs on swine farm investment tendencies.

Evaluating the impact of government-funded risk management programs on investment confidence among Ontario swine producers.

Richard Vyn

An economic evaluation of cover crops and ecosystem services.

Quantifying impact of medium-term cover cropping in a vegetable-grain system.

Ryan Gibson

Building for the future: Rural infrastructure and regional economic development.

Economic development of rural Ontario communities may depend on their response to infrastructure opportunities.

Wayne Caldwell

Aggregate and agriculture: Understanding the impacts of aggregate production on agriculture and identifying mitigating strategies.

Understanding the impact of aggregate extraction on nearby farms and identifying mitigating solutions.

Measuring farmland loss: Quantifying the conversion of designated farmland to non-farm land uses across Ontario and assessing the relevance of farm severance policies.

Measuring farmland loss, availability and urban conversion using official land plan amendments.



Bioeconomy — Industrial Uses

Amar Mohanty

High biomass-filled affordable and cost-competitive green composites for compostable food packaging applications.

Creating cost-effective, biodegradable food containers by transforming food production byproducts into biocomposites.

Exposing circular economy in advanced biocarbon manufacturing from chicken feather wastes for lightweight auto-parts uses.

Converting chicken feather waste into high-value biocarbon for biocomposite uses in lightweight automotive parts.

Animesh Dutta

Hybrid hydrothermal carbonization and slow pyrolysis of agricultural biomass to produce biocarbon for Canadian iron and steel industry.

Incorporating novel agricultural biocarbon processing into steel production to reduce emissions.

Manjusri Misra

Highly graphitized biocarbon from biomass for automotive and smart material applications.

Generating eco-friendly graphitized biocarbon from biomass for advanced automotive applications.

Rene Van Acker

Assessing the tolerance of *Euphorbia lagascae* to select herbicides and fungicides.

Assessing herbicide and fungicide resistance of *Euphorbia lagascae*, a crop that can replace artificial plasticizers.



Bioeconomy — Industrial Uses, Emergency Management

Katerina Jordan

Assessment and integrated management of switchgrass (*Panicum virgatum*) head smut in Ontario.

Determining switchgrass best practices to lower head smut disease incidence and increase yield.



Emergency Management

John Lumsden

Detection of a B-proteobacteria associated with epitheliocystis in farmed Ontario rainbow trout.

Novel detection technique proven to identify an emerging disease affecting rainbow trout in Ontario aquaculture.



Environmental Sustainability

Asim Biswas

Ontario soil information system: Digital soil mapping of Ontario soils at 100-m resolution (SoilGrid100).

Digital soil mapping will address the urgent need to update Ontario soil information.

Claudia Wagner-Riddle

Net carbon balance dynamics of diverse and non-diverse crop rotations at the farm scale.

Calculating net carbon balance in cover crop fields to understand long-term soil carbon gain.

Erica Pensini

Natural, cost-effective and reusable adsorbents for the removal of phosphorus from drainage water.

Attempting to decrease phosphorus levels in drainage water into Great Lakes using calcium-rich rocks.

Jana Levison

Groundwater-surface water interactions and agricultural nutrient transport in a Great Lakes Basin clay plain system.

Investigating water and agricultural nutrient transport interactions in the Great Lakes Basin clay plain system.

Jon Warland

Process-based crop modelling for managing climate change impacts on agroecosystems.

New crop modelling technology to help understand how climate change impacts Ontario's agroecosystems.

Laura Van Eerd

Soil organic carbon and total nitrogen storage due to long-term tillage system, crop rotation, cover crop and fertilizer nitrogen.

Understanding relationships between agricultural management, soil quality and crop resiliency.

Prasad Daggupati

A decision support tool for evaluating BMPs that reduce greenhouse gas (N₂O) emission and improve water quality under changing climate.

New best management practices could reduce greenhouse gas emissions and improve Great Lakes water quality.



Food for Health

Al Lauzon

Food insecurity and rural seniors living independently: An exploratory study in Huron, Perth, Bruce and Grey counties.

Exploring multiple perspectives to help improve understanding of food security for rural senior Ontarians.

Andreas Boecker

Facilitation and economic impact of local/Ontario food purchasing in long-term care homes.

Economic analysis aims to help long-term care facilities buy local food more efficiently.

Michael Von Massow

Evaluating the potential to change behaviour in restaurants through menu labelling.

Using behavioural measures to evaluate how caloric information has changed menu labelling.

Yu Na Lee

Experimental evidence on the effectiveness of front-of-package labelling for healthy food choices.

Effective front-of-package food labelling could help guide healthier consumer behaviours.



Product Development and Enhancement through Value Chain Collaborations

George van der Merwe

Building capacity through innovation in the Ontario craft cider sector.

Ontario's craft cider market is looking to innovate by analyzing consumer perception, production cost and product diversification.

Leonardo Susta

Prevalence and early detection of wooden breast syndrome and white striation in Canadian broilers.

Poultry farmers are detecting breast myopathies more effectively to combat economic loss and improve animal welfare.

Mostafa Elsharqawy

Sustainable refrigeration and defrost system for frozen food industry.

Developing sustainable refrigeration can reduce energy demand and improve food storage.



Production Systems – Animal

Brandon Gilroyed

Effect of methane-mitigating additives utilized in dairy manure lagoons on microbial ecology.

Understanding the interconnections among additives, bacteria, dairy and methane may promote lower carbon emissions.

Brandon Lillie

Equine Herpes Virus (EHV) and EHV-associated disease in the Ontario equine industry: Disease prevalence and prevention.

Determining the role of genetic variation in prevalence and severity of equine herpes virus-associated diseases.

David Kelton

Evaluating precision agriculture technologies for disease risk characterization of calves entering veal production.

Evaluation of novel on-farm precision technologies to improve welfare and disease detection in veal calves.

Eduardo Ribeiro

Using basic science to improve fertility in dairy cattle: Development of an endometrial receptivity test for genetic selection.

Identifying responses to new fertility trait that could predict reproductive success in heifer breeding stock.

John Barta

In-barn metagenomics: Development and application of a rapid molecular assay for identifying parasite diversity and numbers in mixed *Eimeria* species infections in commercial poultry.

Using novel molecular techniques to identify the parasites that cause coccidiosis in chickens.

John Cant

Using a computer model of nutrient flow for precision feeding of individual cows in a dairy herd.

Developing a nutrient flow model to increase profitability and metabolic health.

Katie Wood

Alternative trace mineral supplementation strategies for improved beef cow performance.

Analyzing injectable trace mineral supplementation to address deficiencies and improve reproductive success in pasture-raised cattle.

Nutritional strategies to improve transition dairy goat production and health.

Testing nutritional strategies to improve transition dairy goat productivity and reduce metabolic disease incidence.

Lee-Anne Huber

Insect products: Providing novel proteins to weanling pigs, while improving gut health and development, pig health and the sustainability of pork production.

Introducing novel insect protein into piglet diets to investigate health improvements and industry sustainability.

Robert Friendship

The relationship between iron nutrition status and immunity in weaned pigs.

Examining the effect of iron status on weaned pig immunity with experimental disease-challenge model.

Todd Duffield

Establishing evidence-based pain management protocols for disbudding neonatal dairy calves.

Establishing pain management protocols for neonatal dairy calf disbudding to improve welfare and industry sustainability.

Trevor DeVries

Validation of a dairy cow illness detection model using behaviour and production data from precision technologies.

Using precision technology data to improve early disease detection in dairy cows.

Impact of dry-off management in robotic milking systems on risk of intramammary infection.

Evaluating robotic milking system management practices at dry-off to reduce risk of intramammary infection in dairy cows.



Production Systems — Animal, Bioeconomy — Industrial Uses

Brandon Gilroyed

Reducing pathogens and greenhouse gas emissions from swine manure using anaerobic digestion.

Assessing anaerobic digestion for reducing swine manure pathogens and greenhouse gas emissions.



Production Systems — Plant

David Wolyn

Association mapping of traits and development of a freezing tolerance seedling screen in asparagus.

Developing hybrids improved for traits that increase productivity and offset farmer production cost.

Hugh Earl

Optimizing quinoa production systems for Ontario: A physiology-based approach to improved agronomics.

Developing quinoa as a viable Ontario crop to reduce imports.

Manish Raizada

Discovery of corn silk-associated probiotics to combat Fusarium disease and mycotoxins: An exciting new frontier in an old battle.

Probiotic supplementation in corn and wheat crops could reduce Fusarium head blight prevalence.

Mike Dixon

Conditioning of nursery plants using irrigation management and mycorrhizae for improving post-transplant success rates.

Creating best management practices to reduce water use in plant nurseries without affecting productivity.

Rene Van Acker

Subsurface drip irrigation for enhanced asparagus production.

Subsurface drip irrigation may reduce asparagus drought stress and improve productivity.

John Lauzon

Determining prevalence of sulfur deficiency and a soil test method that will inform sulphur fertilizer recommendations for Ontario field crops.

Novel soil test method may allow accurate sulphur fertilizer recommendations for Ontario field crops.

John Zandstra

Investigations into variables affecting tomato solids.

Determining optimal growing conditions to naturally increase tomato solid content.

Development of cropping systems for hazelnut in Ontario.

Meeting hazelnut production demands through developing a new Ontario cropping system.



Production Systems — Plant, Bioeconomy — Industrial Uses

Brandon Gilroyed

Evaluation of cup plant (*Silphium perfoliatum*) as a new perennial biomass and forage crop for Ontario.

Cup plant is a native perennial that may be a suitable on-farm substrate for anaerobic digestion.



Production Systems — Plant and Emergency Management

Cynthia Scott-Dupree

Developing sustainable pest management strategies for brown marmorated stink bug.

Identifying novel pest management strategies to protect crops from the brown marmorated stink bug.

Mary Ruth McDonald

Management of clubroot on canola and Brassica vegetables in Ontario.

Determining best practices to prevent clubroot disease in canola and Brassica vegetable crops.

Distribution and management of carrot cyst nematode in Ontario.

Quantifying the prevalence and determining effective management methods for carrot cyst nematode.

