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June 2021

A collaboration between OMAFRA and the University of Guelph

Alliance Innovations

Stories of the Alliance people, places and programs generating impact in the agri-food sector in Ontario and around the world.

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In this issue:

- Gryphon's LAAIR pitch competition winners and 2021 grant recipients
- Meet four HQP scholars
- Behind the scenes at the Ponsonby General Animal Facility and Ontario Sheep Research Centre
- Alliance people, places and programs in the media
- News, upcoming events and more

What's New?

Pathways to Commercialization webinar recording and presentations available

On May 4, we heard from four researchers and two industry partners about how Gryphon's LAAIR grants facilitated their journeys from research to product commercialization. Presentations from this event can be found in the University of Guelph's Atrium, and the webinar recording is available on YouTube.

Watch the webinar >

Obi Veterinary Education wins Gryphon's LAAIR pitch competition

Obi Veterinary Education wooed the judges with their pitch and nabbed the $10,000 prize at the Gryphon's LAAIR Pitch Competition Finale live event on May 19.

The Gryphon's LAAIR program helps U of G researchers launch innovations into the marketplace, accelerating the development of new products and technologies for the Ontario agri-food and rural sectors.

Obi Veterinary Education provides an online veterinary continuing education platform that offers "micro-learning" opportunities to veterinarians to improve their professional skills. The winning team aims to enhance veterinary health care to benefit veterinarians and to improve the health of companion animals, large animals and agri-business. **Watch the winning pitch.**

Photo caption: Obi Veterinary Education founder Dr. Ryan Appleby accepts a cheque as the grand prize winner. (Photo: Kyle Rodriguez)

DigiTrack Systems Inc., which develops cloud-based software for food and agricultural product recalls to connect manufacturers, distributors and merchants, won the $2,500 people's choice prize.

Photo caption: Mohammad Khodabakhshi (left) and Amir Namavar Jahromi of DigiTrack Systems Inc., accept the people's choice prize. (Photo: Kyle Rodriguez)

The three other pitch teams in the competition were Astra Redex Inc., which builds portable sanitation systems to disinfect everything from phones to fruit; BioFerm Functional Foods Inc., which creates nutrient-packed, dry baking mixes; and Guelph Petrographic Imaging, which provides geological data for agriculture, energy and mining.

To watch the five-minute pitches, visit the Research Innovation Office's YouTube Channel.

Introducing the 2021 Gryphon's LAAIR grant recipients

The Gryphon's LAAIR program provides a unique opportunity for academics to turn innovative research into marketable products or services that make Ontario more competitive.

Two types of grants are available to University of Guelph researchers:

- **Market Validation Grants** help recipients conduct market research to determine the size and quality of the market opportunity for a new and promising technology, product or service.
- **Product Development Grants** help researchers create prototypes, perform field trials, remove any barriers to a market launch and optimize a minimum viable product that best meets the needs of customers, all in support of the Ontario agri-food economy.

Five grants have been awarded in 2021.

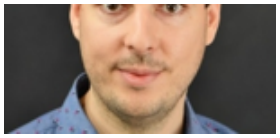
Product development grants

Dr. Gopinadhan Paliyath,
Department of Plant Agriculture

Nanopect-RNA adducts for therapeutic and vaccine delivery in animals and humans

Dr. Rafael Santos, School of Engineering

Validation and certification of engineered slow-release



carbon-sequestering fertilizers

Dr. George van der Merwe,
Department of Molecular and Cellular Biology

Developing Ontario lager yeasts

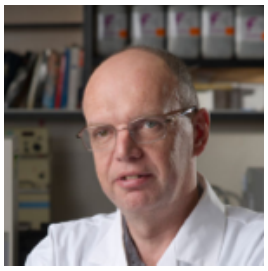
Dr. Wael Ahmed, School of Engineering

Gaslift pumps for moving heavy fluids and mixtures in food systems

Market validation grants

Dr. Lisa Duizer, Department of Food Science

Market validation through customer-focused sensory analysis of functional bakery goods



Dr. Keith Warriner, Department of Food Science

Market validation of a portable hydroxyl-radical unit for surface decontamination of food and non-food surfaces and shelf-life extension of fruit and vegetables

Highly Qualified Personnel program scholarship recipients

The Ontario Agri-Food Innovation Alliance's Highly Qualified Personnel (HQP) scholarship program, jointly funded by Food from Thought and the Alliance, supports the development of highly skilled graduates to become future researchers, policy-makers, business leaders and innovators who can meet the changing demands of the agri-food industry.

The program includes an Innovation and Entrepreneurship course, in which students become partners with external organizations to solve real-world challenges. HQP scholarship recipients also conduct graduate research projects that address Ontario

Ministry of Agriculture, Food and Rural Affairs priorities and support the mission and vision of the Food from Thought program.

Meet the scholars

Each month we will introduce several forward-thinking HQP scholarship recipients and their research projects. Each link will take you to a biography where you can learn more about scholars' research and collaborations, their motivations and the potential impacts of their research.

Anna Schwanke, Department of Animal Biosciences

"My research focusses on how individual dairy cattle personality traits may be used to develop more efficient feeding programs. This approach will help expand the potential of technologies such as automated milking systems...this strategy would support a cost-effective production system by targeting resources only where and when they are needed, thus improving resource efficiency within the animal production system." Learn more about Anna's research >

Daniel Noble, Department of Integrative Biology

Daniel is investigating nutrient and hydrological cycling in agricultural areas. Specifically, he is looking at the amount of nutrients that are transported from cropped fields into surface water, causing eutrophication of the Great Lakes. This research will provide a fundamental understanding of how we can build more resiliency in agricultural systems while also increasing productivity to feed a growing population.
Learn more about Daniel's research >

Emily Sousa, School of Environmental Design and Rural Development

In working with Dr. Wayne Caldwell and Dr. Nicolas Brunet, Emily's current research explores agri-environmental program delivery to dairy farmers in Southwestern Ontario. Emily hopes her research will help build consensus around what biodiversity conservation looks like in the agricultural sector, ultimately balancing food production and environmental conservation needs. Learn more about Emily's research >

Kurtis Sobkowich, Department of Population Medicine

Kurtis chose the University of Guelph to complete his Master's of Science degree in epidemiology because of

the unique atmosphere brought on by the veterinary college. Under the supervision of Dr. Berke, Kurtis is now researching and identifying spatial and temporal patterns of Varroa destructor (Varroa mite) infestations within apiaries of Ontario. Through mapping and spatio-temporal regression analysis, the goal of his project is to identify and explore major risk factors leading to mite infestations and in turn colony death. Learn more about Kurtis' research >

Focus ON: Ontario Agricultural Research Centres

Ponsonby General Animal Facility

The Ponsonby General Animal Facility, which opened in 1995, is a unique, flexible, multi-purpose research animal facility designed to house diverse livestock species of various ages and to facilitate livestock trials.

The multi-purpose, adaptable penning arrangements work for large and small livestock species, including dairy and beef cattle, sheep or pigs. The facility has been used for functional nutrition research, including controlling boar taint, making feed more digestible and creating nutritionally enhanced meat.

Research at the Ponsonby General Animal Facility

Researchers can bring in a wide range of animals from other research flocks or herds (including non-productive sheep from the Ontario Sheep Research Centre, featured below), private farms or other sources, for temporary housing during specific research projects.

To ensure the highest standards in humane care and treatment of animals, these projects, as well as all other U of G research projects involving animals, are approved by the Animal Care Committee before starting. As an institution, the University supports the principle that animals may be used in science only where necessary and

? Did you know...

Through the Alliance, researchers working on projects that support the public good (beyond OMAFRA funding priorities) can apply for access

where there are no alternative means that will produce the same results to benefit the health of humans and animals.

to OMAFRA-funded technicians and research centres. Learn more.

Current projects

“Our team is creating the proof of principle that allows clinical trials to begin in people,” explains Dr. Mark Hurtig, who is leading the first two projects listed below. These two in-progress “translational” projects are intended to improve human health and well-being.

1) **Arthritis**: **Using sheep to model the viability of cartilage cells in storage over time**

Cartilage on bone (osteochondral) grafts are widely used to restore shoulder, ankle, and knee joint surfaces after injury or during early to mid-stage arthritis. Cartilage grafts stored using a new long-term, room-temperature storage method will be transplanted into the knees of sheep using computer-designed, printed plastic positioning jigs. The transplanted cartilage and bone will be evaluated to determine its survival and incorporation into the recipient knee. The new storage method allows the storage period to be extended from about 10 days to months, which would greatly improve the availability of grafts.
In collaboration with Mount Sinai Hospital in Toronto.

2) **Heart Surgery: Using novel bone cements developed by Ryerson University (Towler lab) to reduce pain and infections after chest surgery**

Many heart and lung procedures involve cutting the sternum (front chest bone) from top to bottom and then wiring it together. After surgery, patients have pain and more infections because the two halves of the sternum move during coughing, sneezing and walking. Using special metal-ion-containing polyalkenoate cements and wiring reduces the motion and is anti-microbial. Applying this cement between the two halves of the sternum means that sheep are expected to recover more quickly from surgery and experience less pain and fewer complications from the cut.

3) Analysis of adeno-associated virus (AAV) vectored immunoprophylaxis for protection against emerging infectious diseases

Emerging infectious diseases that can pass from animals to humans require fast and effective countermeasures, as they can have devastating impacts on human and animal health, as well as serious economic consequences. This project will include proof of principle studies of antibody gene delivery in sheep—a new approach to protecting against emerging pathogens currently lacking effective vaccine or treatment—to improve large animal health.

? Did you know?

The large meeting room at the Ponsonby General Animal Facility has been used to hold programs such as FarmSmart and sessions of the master shepherd's course.

Ontario Sheep Research Centre

The Ontario Sheep Research Centre (formerly Ponsonby Sheep Station) is on the same property as the Ponsonby General Animal Facility.

The sheep research centre needed to be built on land that had not housed livestock for several years and could be separated from other livestock barns to prevent disease transmission (the Ponsonby facility maintains strict protocols for its sheep to ensure the health of the flocks at both locations). The first sheep came from the Ottawa Research Station, which dispersed its specific pathogen-free colony in 1988.

To ensure that sheep were useful for many types of research, the station needed to acquire a flock without many significant production diseases (maedi visna, scrapie, abortion diseases) and zoonoses (Q-fever in particular). Dorset and Rideau breeds at the station are suited for breeding year-round to provide animals for various projects and teaching. And yes — over the years there has been the occasional black sheep, a throwback to foundation breeds!

The Specific Pathogen Free (SPF) status of the sheep flock is one of the highest level of pathogen-free sheep flocks in North America. No animals may enter, and once an animal leaves, it cannot return. The flock is routinely tested to maintain this superior health status.

This centre has on average 250 ewes and replacements and 20 rams and an annual production of more than 300 lambs. The breeding flock is managed under the Cornell Star system resulting in a birth cycle that produces lambs five times throughout the year. New genetics are introduced into the flock every three to five years through artificial insemination. The sheep are bred so that a subset of the flock produces lambs every 2 ½ months, creating a predictable flow of animals and allowing for consistent station management.

The sheep research centre includes a high-perimeter security fence around the buildings and four fenced paddocks with field shelters. The main facility has five indoor pens, an isolation facility, a basic procedure room, a dormitory and a laboratory for sample processing.

At one time, the sheep research centre provided all the older lambs used by veterinary students for practical health assessment and surgical procedure training. Currently, a smaller group is brought to campus for teaching purposes. Before the COVID-19 pandemic, veterinary students visited the research centre to gain experience during lambing, or to accompany the Ruminant Field Service (U of G's mobile veterinary service) when for pregnancy-scanning or treating sheep ailments.

Research at the Ontario Sheep Research Centre

The Ontario Sheep Research Centre breeding flock is used for important research on reproductive technologies, immune response, disease resistance, animal health and production.

If research requires sheep to be moved onto campus for procedures, or an infectious element is involved, the sheep are moved to the Ponsonby General Animal Facility or the Central Animal Facility on campus. Sheep from the research centre are part of a study intended to create a portable dialysis machine.

The sheep research centre is the home of a long-term study on inherited immune response and breeding for disease- or environmental resilience:

Genetic assessment of stress resilience in dairy cattle and sheep
The objective is to develop an immune-based stress model to identify stress phenotypes of dairy calves, determine their heritability and identify genetic markers associated with stress response. Identifying stress-associated genetic markers will help mitigate biological stressors and provide an alternative to antimicrobial treatment. It could allow for the development of breeding programs that would improve animal health and reproduction.

See current research at the Ontario Sheep Research Centre.

Media

A selection of Alliance people, places and programs cited in popular and trade media

Beans grown as part of research at University of Guelph donated to local food charities (May 4, CBC Kitchener-Waterloo)

Beans grown at the Ontario Crops Research Centre – Elora by Dr. Peter Pauls have been donated to local charities.

Personal Stories May Help Influence Environmental Behaviours, U of G Researcher Finds (April 26, U of G News Service)

Dr. Tongzhe Li found that when it comes to motivating consumers to make environmentally responsible choices, a moving story might be more persuasive than scientific facts. The study's findings form the basis of Li's current Alliance-funded research on ways to encourage farmers to adopt best management practices such as the 4R nutrient stewardship (Right fertilizer source at the Right rate, at the Right time and in the Right place).

Adding Wheat to Corn/Soybean Rotations Boosts Yields, Improves Soil (No-till Farmer, May 19)

Findings from the long-term plots at the Ontario Crops Research Centres in Ridgetown and Elora were recently published. This article covers the benefits of rotating wheat with corn and soybean crops and includes an interview with researcher Ken Janovicek.

Events

Join University of Guelph researchers on Tuesday, June 8 from 1:30 to 3 p.m. for a webinar on harvesting data at Ontario's agri-food research centres. The panel will focus on the new research station data access portal at the Elora Research Station and discuss how new data resources are being used to inform and advance dairy and beef research.

The event will interest OMAFRA and U of G staff as well as sector partners. All are welcome to attend.

The panel will consist of the following U of G experts:

- Host: Dr. Beverley Hale, professor and associate vice-president research (agri-food partnership)
- Dr. Christine Baes, professor, Department of Animal Biosciences, and Canada Research Chair in Livestock Genomics
- Dr. Katie Wood, professor, Department of Animal Biosciences
- Dr. Rozita Dara, professor, School of Computer Science

To register and for more information, please visit the event page. If you have any questions, please email kttadmin@uoguelph.ca.

Learn more and register >

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