



**UNIVERSITY
OF ALBERTA**

Agricultural, Food and Nutritional Science

ANNUAL REPORT 2024-25



The University of Alberta respectfully acknowledges that we are located on Treaty 6 territory, a traditional gathering place for diverse Indigenous peoples including the Cree, Blackfoot, Métis, Nakota Sioux, Iroquois, Dene, Ojibway/Saulteaux/Anishinaabe, Inuit, and many others whose histories, languages and cultures continue to influence our vibrant community.

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Pictured on the cover [L to R]:
Rudolph Fredua-Agyeman,
Sheau-Fang Hwang and Stephen
Strelkov pose at a canola
research trial in the Agriculture/
Forestry Building greenhouse on
U of A North Campus.
Photo: Bluefish Studios



Photo: U of A



**UNIVERSITY
OF ALBERTA**

Department of Agricultural, Food and Nutritional Science
Faculty of Agricultural, Life & Environmental Sciences

30
years

1994-2024



Keith Blythe
Professor
Plant Science (1994-2024)



John Kennedy
Professor
Plant Science (1994-2024)



Peter Spence
Professor
Plant Science (1994-2024)



Russell Ziehe
Professor
Plant Science (1994-2024)



Heather Bruce
Professor
Plant Science (1994-2024)



Stephen Proctor
Professor
Plant Science (1994-2024)

Message from the Chair

Welcome to the 2024/25 Annual Report for the Department of AFNS! Over the last 12 months we have seen significant transition, including an outgoing chair, interim chair and now a new permanent chair fixture. For those of you whom I have not met, I started in AFNS as an assistant professor +20 years ago as a member of the Division of Human Nutrition and have been the interim chair of AFNS now on three separate occasions. This is my first annual report as the permanent chair and wish to take the opportunity to recognize our outgoing Chair, Heather Bruce, now Dean of Agriculture and Campus Principal at Dalhousie University. We are fortunate that we still see Heather in our hallways in Ag/For on regular occurrences throughout the year!

The last year was also significant for our department in that it marks the beginning of a 30-year milestone for the current structure of AFNS. If you have not already done so, please take a moment to reflect on the Chair's Wall of AFNS over this period and to those who have contributed to its maintenance and success.

The last 12 months have also been marked by a new dean of the Faculty of ALES, Rickey Yada, and with him, a new chapter and strategic plan. This new page in the strategic direction for the Faculty of ALES offers an opportunity for AFNS to reflect and reset its own path. With much transition experienced at the U of A over the last five (or more) years, we welcome opportunities to be able to rebuild and renew in various ways. This optimism will be part of my own personal mandate for AFNS, to find ways to strive for success and reveal new initiatives that can exploit our excellence.

This report offers a place to showcase the many broad levels of celebration across the gamut of our department — both in and out of the classroom and beyond. There is no shortage of highlights and high calibre stories to share, and these are but a snapshot of what some of our colleagues have been able to achieve and have been recognized for.

We also say goodbye to retiring colleagues Judd Aiken, Heather Bruce, Catherine Field, Lynn McMullen and Frank Robinson, as well as welcome new faces to AFNS; Rudolph Fredua-Agyeman (Brassica/Genetics), Ning Xiang (Cellular Agriculture), Hiwot Haisleslassie (Academic Teaching Staff in Human Nutrition), Brasathe Jeganathan (Academic Teaching Staff in Food Science).

Finally, I wish to congratulate those who graduated from their first degree; left with a higher degree, published papers, won awards or accolades, made tenure and/or promotion. Thank you to everyone who makes this department what it is.

Regards,



Spencer Proctor
Professor and Department Chair





ANIMAL SCIENCE

Photo: Getty Images

FACULTY

JUDD AIKEN | Prion Disease

BURIM AMETAJ | Ruminant Nutritional Immunology

DAN BARREDA | Immunology

JOHN BASARAB | CEO, Livestock Gentec

URMILA BASU | Manager, Lab and Genomics
and Proteomics Unit

CLOVER BENCH | Applied Ethology/Animal Behaviour

HEATHER BRUCE | Carcass and Meat Science

MICHAEL DYCK | Reproductive Physiology/
Biotechnology

CAROLYN FITZSIMMONS | Beef Genomics

CHRISTINA OSBORNE | Director Animal Care

DOUG KORVER | Poultry Nutrition

ANNE LAARMAN | NSERC Industrial Research Chair
in Dairy Nutrition

CHANGXI LI | Bovine Genomics

MASAHITO OBA | Dairy Nutrition and Physiology

GLEISE M. SILVA | Ruminant Nutrition

PAUL STOTHARD | Bioinformatics

RICHARD UWIERA | Veterinary Pathology

CRAIG WILKINSON | University Veterinarian

BENJAMIN WILLING | Epigenomics/Nutrigenomics

RUURD ZIJLSTRA | Ingredient Evaluation and
Carbohydrate Nutrition

MARTIN ZUIDHOF | Poultry Science/
Bioeconomic Modeling

New theory on dairy cow disease could revolutionize animal health – and maybe human medicine

BY BEV BETKOWSKI

Milk fever, a serious condition that strikes dairy cows around the time they give birth, has long been blamed on a drop in blood calcium. That dip can lead to muscle weakness, inability to stand and, in severe cases, death. Despite the standard treatment – administering extra calcium to the animal – milk fever remains a costly and common problem on farms around the world.

Professor Burim Ametaj offers a breakthrough perspective called the Calci-Inflammatory Network, a concept that reimagines milk fever not as a simple calcium deficiency, but as a complex biological response to inflammation.

“This is a paradigm shift that challenges decades of thinking,” says Ametaj, a nutritional immunobiologist. “Instead of seeing low blood calcium as a malfunction, we now believe it could be part of the body’s intelligent strategy to control inflammation after calving.”

Inflammation naturally rises after calving, and Ametaj’s research suggests that reducing calcium may help to dampen harmful immune overreactions, like excessive activation of immune cells and the spread of bacterial toxins. His findings recommend more targeted treatments that adjust calcium not just to “refill the tank,” but to align with the cow’s immune state, genetic profile and stage of recovery. That could mean fewer sick cows, less antibiotic use, and better outcomes for dairy producers and animal welfare, he notes.

Because calcium and inflammation are core processes in all mammals, Ametaj believes the network could help explain a wide range of diseases in both animals and people after further research. He notes that low blood calcium, known as hypocalcemia, is a strikingly common finding in many serious human illnesses.

“The Calci-Inflammatory Network may offer a new biological framework for tackling diseases where inflammation is central – not only in livestock, but across human medicine.”

Alberta researchers aim to revolutionize animal feed

BY BEV BETKOWSKI

Innovative research to get an edible coal-derived protein into the marketplace, replacing less eco-friendly ingredients in animal feed, is now powered in part by a US\$1.7-million grant from the Bill & Melinda Gates Foundation.

AFNS researchers David Bressler and Ruurd Zijlstra are working with C̄victus, a company that brought the project to the U of A for modernization, Bressler’s Biorefining Conversions and Fermentation Laboratory to improve the technology needed to make single cell protein (SCP).

David Bressler. Photo: U of A



"It's an opportunity to produce a much more sustainable ingredient that is less expensive to make, has a much smaller carbon footprint and is scalable to production."

SCP is a nutrient-rich, low-cost substitute for fish meal and soybean meal, the standard protein sources used in animal feed, and could be a "game changer" in several ways, says Bressler. "It's an opportunity to produce a much more sustainable ingredient that is less expensive to make, has a much smaller carbon footprint and is scalable to production."

Using a patented process, C̈victus is focused on extracting hydrogen from deep coal seams without mining, converting it to produce clean methanol and then from there, making SCP for use in livestock feed. The leftover carbon is then captured and sequestered back underground.

Production is being scaled up at the U of A's Agri-Food Discovery Place to make hundreds of kilograms of the powdered SCP, which will then be blended into feed given to pigs and poultry. Over the next two years, Zijlstra will assess the C̈victus product for key qualities, including nutrient digestibility and growth performance. These feed trials are vital to earning certification from the Canadian Food Inspection Agency for commercializing the SCP in Canada.

"If SCP is found to be a valuable and safe ingredient to include in feed, particularly for animals with high nutritional demands, that will be a win," he notes, adding that the innovation could help other countries provide protein-rich feed to their livestock.

Research support has been provided by C̈victus, MITACS, a Natural Sciences and Engineering Research Council Alliance Grant and Alberta Innovates.



New research will help beef producers use genetics to reduce methane emissions in cattle

BY BEV BETKOWSKI

A new five-year project is the first to test a large-scale way to measure the methane produced by beef cattle in Canada, to help producers genetically identify which animals in their herds produce less of the potent greenhouse gas. The project is also creating a carbon offset protocol that, if approved by governments, would give beef producers a financial return on using genetic selection in their herds.

“Removing those kinds of existing barriers can help the Canadian beef industry stay resilient and along with that, help ease environmental impact,” says project lead John Basarab, an associate professor of livestock genetics and RDAR Research Professor in Beef Cattle Genetics and Genomics.

Using more than 2,300 beef cattle in the field, including from the Roy Berg Kinsella Research Ranch, the researchers are using an emissions monitoring system to measure methane breathed or burped out by the animals as they feed on treat pellets. The measurements from the feeding experiments along with fecal analysis will provide the large amounts of data needed to calculate accurate breeding values “and allow producers to pick cattle that have, by inheritance, lower methane emission rates,” Basarab says.

The trait would then be added to existing DNA-based multi-trait selection indexes commercialized by Livestock Gentec, a research centre co-founded by the U of A, Alberta Agriculture and Agriculture and Agri-Food Canada, which is led by Basarab as the CEO. The addition would help round out indexes that already include desirable traits for superior growth, feed efficiency, carcass quality and female fertility.

The project is also looking at ways to increase adoption of genetic selection on commercial farms. To make it a more worthwhile tool to producers, a carbon offset protocol will be developed in partnership with Viresco Solutions, an environmental consulting firm. Used to quantify greenhouse gas emission reductions, an offset protocol means producers with lower-GHG cattle could register and sell their carbon credits to large final emitters, such as utility companies.

“Our work will help the beef industry become more resilient and profitable, and it helps agriculture last for future generations.”

The project is funded by the Natural Sciences and Engineering Research Council of Canada-Social Sciences and Humanities Research Council of Canada Sustainable Agriculture Research Initiative. Co-investigators include U of A professors Graham Plastow and Xiaoli Fan, Ghader Manafiazar of Dalhousie University, Obioha Durunna of Lakeland College and Sean Thompson of Olds College.

FOOD SCIENCE AND BIORESOURCE TECHNOLOGY

FACULTY

MARLENY ARANDA-SALDAÑA | Bio/Food Engineering Processing

DAVID BRESSLER | Fermentation and Bio/Food Engineering

HEATHER BRUCE | Carcass and Meat Science

LINGYUN CHEN | Canada Research Chair, Plant Protein Chemistry and Technology

MICHAEL GÄNZLE | Canada Research Chair, Microbiology and Probiotics

BRASANTHE JEGANATHAN | Academic Teaching Staff

ROOPESH MOHANDAS SYAMALADEVI | Food Safety and Engineering

AMAN ULLAH | Utilization of Lipids and Polymer/Material Chemistry

THAVA VASANTHAN | Grain Science and Technology

WENDY WISMER | Sensory and Consumer Science

JIANPING WU | Food Protein Chemistry

NING XIANG | Cellular Agriculture



The cricket ick factor: sustainability not a selling point for bug-based snacks

BY BEV BETKOWSKI

Insect-based protein is a low-cost, eco-friendly alternative for supplying a nutrient the world needs — but research suggests even that's not enough to make people reach for it.

Claims about health and sustainability were only marginally effective in persuading a test group of 548 Albertans to try or like a packaged cricket-based snack. The finding provides food for thought on the challenges of convincing people to consider eating insects, says associate professor Wendy Wismer who co-authored the study.

"It's a common perception that consumers want sustainable food products, but even though we provided that information, it didn't turn out to be important or attractive to them.

"You would think it would be good news to the consumer, but in actual fact, it's a real turnoff," adds Wismer, a food scientist. "That's really challenging for selling sustainable food products made with insects, or coffee grounds or other upcycled food."

For the study, researchers surveyed people about their preferences for the types of snack offered, consisting of cricket chips and whole roasted crickets, as well as qualities like taste and texture. Participants were also asked about various photos of the food and about beneficial claims printed on the packaging, such as "certified organic," "sustainable food source" and "tasty snack."

The cricket chips proved to be the most preferred product type for the participants, and though the product benefit claims didn't effectively boost the overall liking or willingness

"If sustainable food initiatives are going to be successful, we need to move away from consuming just the products we know and love, and really try different things."

CRICKET
CHIPS

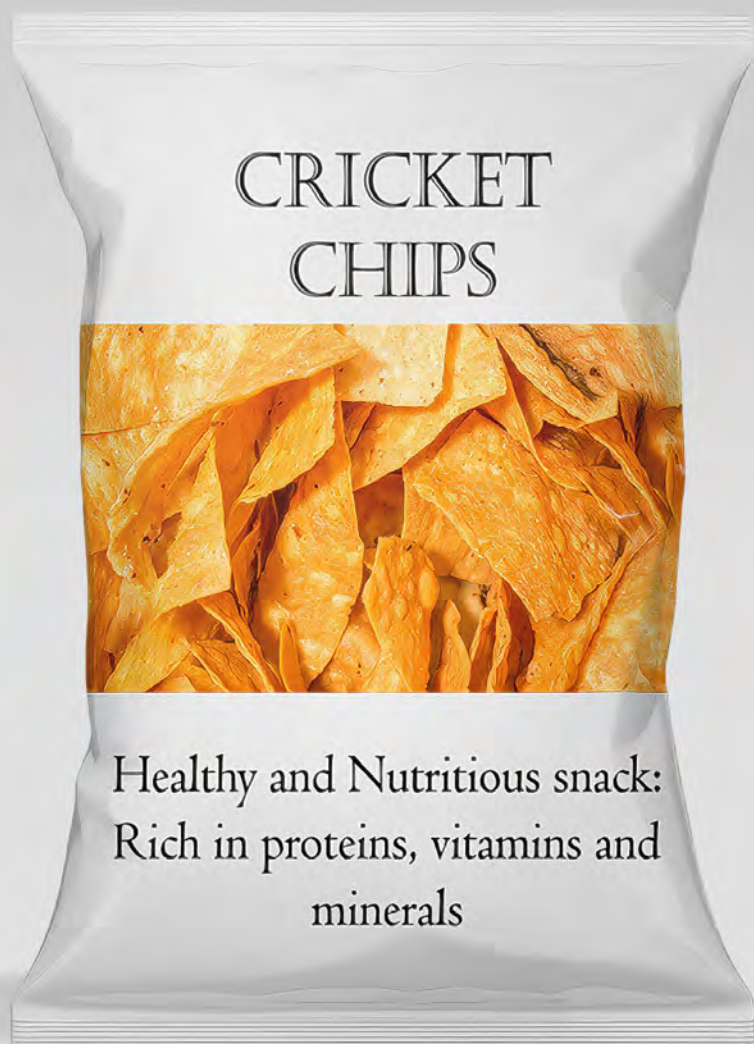
Healthy and Nutritious snack:
Rich in proteins, vitamins and
minerals

Photo: Supplied

to try the snacks, the kinds of photos shown on the bags turned out to be an important deciding factor. Participants were more willing to try the snack if it had a picture of the chips on the bag, but the ick factor was much higher when the bag instead showed a roasted cricket.

"If sustainable food initiatives are going to be successful, we need to move away from consuming just the products we know and love, and really try different things."

The study's co-authors include adjunct professor John Wolodko, master of food science and technology graduate Susana De Leon Siller and postdoctoral researcher Temitope Awobusuyi.





Cultivating New Possibilities in Food Science

BY JOYCE YU

Assistant professor
Ning Xiang works in the field
of cellular agriculture, with an
emphasis on cultivated meat.

If you've seen headlines about "lab-grown meat" in recent years, you've already encountered the research focus of assistant professor Ning Xiang. Xiang works in the field of cellular agriculture, with a particular emphasis on cultivated meat.

Xiang's path to this work began at Purdue University, where her research focused on plant-based proteins and peptides. That interest continued into industry through an internship at Eat Just, followed by a role at Nestlé, where she worked as an ice cream product developer specializing in plant-based alternatives.

At its core, cultivated meat is produced by growing animal cells in a controlled environment rather than raising and slaughtering livestock. The process begins with a small sample of cells taken from an animal — such as cattle, pigs or chickens. Scientists then help those cells become stable enough to grow and multiply on their own under carefully monitored conditions.

The cells are grown in bioreactors — systems similar to the fermenters used to make beer or yogurt. Fed with nutrients like amino acids and sugars, the cells proliferate and form the building blocks of meat. Xiang explains that if you're familiar with fermentation, the idea isn't that different.

"Instead of yeast making beer, we're growing animal cells to make meat," Xiang says.

The goal is to produce meat with the same nutritional value, flavour and texture people expect, while using fewer resources and avoiding animal slaughter.

"We don't have to slaughter animals — we only need a small sample of cells," Xiang explains.

"That means using less land and water, reducing greenhouse gas emissions, and avoiding many of the antibiotics and pathogens associated with conventional meat production."

Ultimately, however, Xiang says the strongest motivation behind cultivated meat is food security.

"There is an increasing population over the years. We need new ways to feed people with a good protein source," she says.

After completing her doctorate, Xiang joined Tufts University as a postdoctoral researcher, where she worked directly on cultivated meat under the supervision of professor David Kaplan, a leader in the field. She later co-founded CellX, a cultivated meat startup based in Shanghai, gaining first-hand experience with the challenges of scaling the technology beyond the lab.

Cultivated meat has drawn attention for its potential to reduce land and water use, lower greenhouse gas emissions and limit exposure to foodborne pathogens and antibiotics. For Xiang, though, food security remains the central driver.

Importantly, she emphasizes that cultivated meat is not intended to replace traditional animal agriculture. Instead, it offers an additional option — one that can exist alongside conventional meat production, particularly in regions like Alberta where livestock farming remains central to the economy and culture.

Since arriving at the U of A, Xiang has been building a research group focused on addressing the field's most pressing challenges. Some projects explore ways to reduce production costs, while others examine consumer perception — how people understand cultivated meat and what kinds of products they may be most willing to try.

"Instead of yeast making beer, we're growing animal cells to make meat."

Like many emerging technologies, cultivated meat still faces hurdles. Production costs remain high, scaling up is complex and public understanding continues to evolve. In Canada, a limited industry presence can also make funding and partnerships more difficult.

For Xiang, those challenges are part of what makes the work exciting.

"We know where the problems are," she says. "And that means we can start working toward solutions. This research has the potential to make a real impact — on the future of food, on the climate crisis and on food security."



HUMAN NUTRITION



Photo: Curtis Comeau Photography.

FACULTY

HEIDI BATES | Director, Integrated Dietetic Internship

JEAN BUTEAU | Human Nutrition

CATHY CHAN | Human Nutrition

CATHERINE FIELD | Canada Research Chair, Nutrition and Metabolism

HIWOT HAILESLASSIE | Academic Teaching Staff

RENÉ JACOBS | Human Nutrition

DIANA MAGER | Clinical Nutrition

VERA MAZURAK | Nutrition and Metabolism

CARLA PRADO | Canada Research Chair in Integrative Nutrition, Body Composition, and Energy Metabolism

SPENCER PROCTOR | Metabolic and Cardiovascular Diseases

CAROLINE RICHARD | Canada Research Chair, Nutritional Immunology

SABINA VALENTINE | Academic Teaching Staff

DONNA VINE | Human Nutrition

NOREEN WILLOWS | Community Nutrition

Traditional diet shows promise for modern gut health

BY BEV BETKOWSKI

Refined foods and antibiotics help keep people in the industrialized world fed and well – but they’ve also taken a toll on the human gut, wiping out microbes that may influence good health. By mimicking a traditional, non-industrialized diet, an international study involving researchers in AFNS shows it’s possible to restore damage to the gut.

“We’ve been able to come up with a dietary intervention that makes significant improvements to the gut microbiome and lessens the risk of diabetes and heart disease,” says Anissa Armet, who co-led the study to earn a PhD in nutrition and metabolism.

The researchers focused on re-establishing *Limosilactobacillus reuteri*, a beneficial bacterium, by creating the Non-Industrialized Microbiome Restore (NiMe™) diet based on what non-industrialized populations eat regularly.

“Our previous research has shown that they have a much more diverse microbiome, enriched in bacteria that thrive from dietary fibre, and with lower levels of pro-inflammatory bacteria linked to the western diet,” notes Jens Walter, a principal investigator on the study, professor at University College Cork and adjunct professor in ALES.

To test its effects, 30 healthy Canadian adults were put on the NiMe diet over three weeks through a randomized controlled trial at the U of A’s Human Nutrition Research Unit. The diet included fibre-rich foods including beans, sweet potatoes, rice, cucumbers and cabbage, as well as peas and onions, which aid *L. reuteri* growth in the gut. It contained one small daily portion of chicken, salmon or pork, and no wheat, dairy or beef.

U of A collaborators on the study included co-lead author Fuyong Li, co-principal investigator Carla Prado and Catherine Field from ALES, Liang Li and Russ Greiner from the Faculty of Science and Jeffrey Bakal, Laurie Mereu and Andrea Haqq from the Faculty of Medicine & Dentistry. The study was funded by the Weston Family Microbiome Initiative.

Breakthrough research helps young liver transplant patients preserve muscle

BY ADRIANNA MACPHERSON

In a recent pilot study, researchers tested the feasibility and effects of a 12-week home-based resistance training program. Their target patient population was children who have had a liver transplant and subsequently suffered with sarcopenia, a condition wherein there is loss of muscle mass and function. The researchers wanted to know whether the approach would be as successful for combatting sarcopenia in children as it has been in adults, according to earlier studies.

“Traditionally sarcopenia is associated with aging,” says Diana Mager, AFNS professor, adjunct professor in the Department of Pediatrics and member of the Women and Children’s Health Research Institute. But it has been shown to be increasingly prevalent among children who’ve had chronic, severe diseases and transplants, and it is associated with several adverse outcomes including prolonged and repeated hospital stays, increased ICU stays, and high levels of fatigue that affect the kids’ quality of life.

Mager worked with pediatrics professor Susan M. Gilmour and the Stollery Children’s Hospital pediatric liver transplant multidisciplinary health-care team for the pilot study. And, she collaborated with Norm Boule, professor in the Faculty of Kinesiology, Sport, and Recreation, to design a resistance training program that participants were able to complete at home with minimal equipment.

Over the 12 weeks of the study, participants completed resistance exercise sessions three times per week, reported their activity using an exercise journal workbook, and took part in weekly phone check-ins as well as monthly Zoom check-ins to review technique and ask questions. About 75 per cent of participants successfully completed the program, and researchers measured increases in skeletal muscle mass as well as decreases in visceral fat content, indicating the accumulation of more lean body mass, which broadly speaking is a marker of improved health.

“We were happy to see that using a very low level of technology and an inexpensive intervention, we were able to get pretty good adherence and could show some favourable outcomes,” Mager says.



Photo: Getty Images

A global journey in nutrition brings Hiwot Hailelassie to the U of A

The newest member of the Human Nutrition Division, associate lecturer Hiwot Hailelassie, has a diverse background, and an even broader range of expertise. Her academic journey reflects a global commitment to understanding how food shapes health, education and well-being across cultures and communities. Hailing from Ethiopia, where she first studied and taught public health and applied human nutrition, Hailelassie continued to earn her PhD in Nutrition from the University of Saskatchewan before serving as an assistant professor of Foods and Nutrition at the University of Prince Edward Island. She also pursued a postdoctoral fellowship at the University of Saskatchewan focused on promoting pulse consumption at an early age in school settings.

Hailelassie sees educating the next generation of nutrition experts as a core component of health promotion, encouraging university students to pursue nutrition as an “exciting, ever-evolving field full of opportunities to make real-world impact.” She currently teaches courses including The Cultural Ecology of Food and Health, Applied Food Theory, Current Topics and Controversies in Nutrition, Introduction to the Principles of Nutrition and seminar courses, where she shares her scholarly interests in food literacy and health promotion through sustainable foods. Her students never have to wonder whether these topics matter beyond the classroom, as she draws on both professional and lived experience, including her own experience of dietary acculturation since moving to Canada.

Hailelassie is not just a role model for students for her passion, but also an exemplary educator for her strong commitment to the scholarship of teaching and learning. During class, she engages students as partners in meaningful, real-world learning. She is particularly motivated by opportunities to connect course content to students’ lived experiences and to foster curiosity, critical thinking and collaboration in the classroom. In recognition of her outstanding dedication to teaching, Hailelassie received the AFNS Teacher of the Year Award in 2025. She also serves as a U of A faculty supervisor for Let’s Talk Science, a national organization dedicated to providing education in science, technology, engineering and mathematics (STEM) to students and educators. She has quickly had a positive impact in the department, faculty and broader university community since taking this role, and is sure to achieve more during her tenure.





Photo: Dawn Graves.

Researcher creates key resources for PCOS diagnosis and care

Donna Vine, professor and founder of the PCOS Together research program, and her clinical research team were awarded the 'Cooperation, Collaboration and Teamwork Award' from the Faculty of Medicine and Dentistry in recognition of the launch of their Patient and Clinical Care Pathways.

With funding from the Women and Children's Health Research Institute and the University of Alberta Hospital, Vine and co-investigator Mahua Ghosh, an endocrinologist, worked with the Alberta Health Services Pathway Unit, clinicians and patient partners to create guides for both doctors and patients. Also known as pathways, the guide for doctors helps with diagnosis and management, and the one for patients helps explain the disease and treatment process, and offers support and resources including access to mental health and nutrition-dietetic care supports. The pathways are being used across Canada and in more than 30 countries.

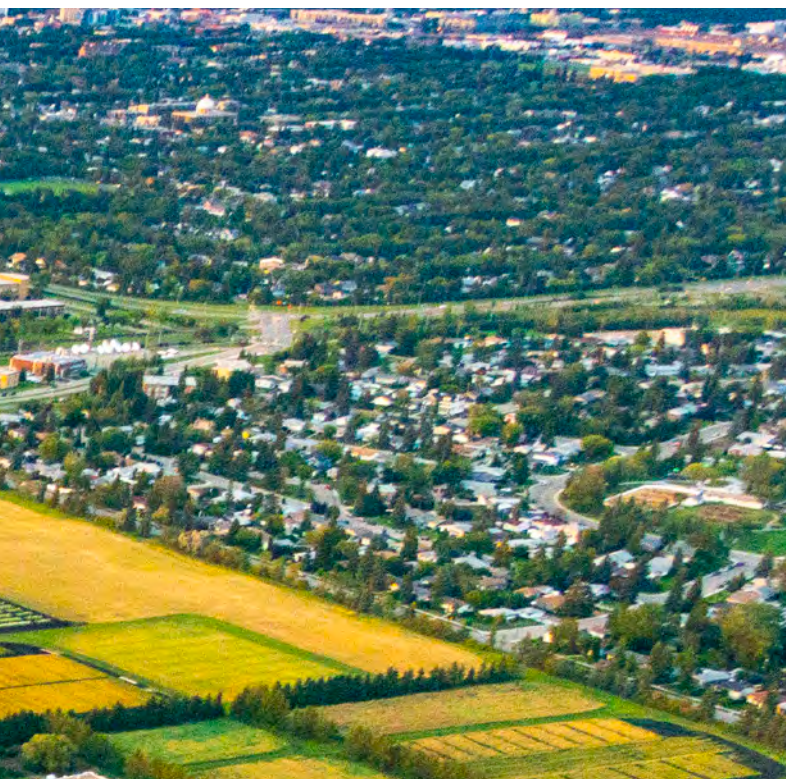
<https://ar.wchri.org/researcher-creates-key-resources-for-pcos-diagnosis-and-patient-care>



PLANT BIOSYSTEMS



Photo: U of A



FACULTY

EDWARD BORK | Mattheis Chair in Rangeland Ecology and Management

GURCHARN SINGH BRAR | Wheat Breeding, Cereal Genetics & Genomics

CAMERON CARLYLE | Rangeland Ecology

GUANQUN (GAVIN) CHEN | Canada Research Chair, Plant Lipid Biotechnology

LINDA GORIM | Western Grains Research Foundation Chair in Cropping Systems

SHEAU-FANG HWANG | Canola Breeding and Research

NAT KAV | Biochemistry and Biotechnology

BOYD MORI | NSERC Industrial Research Chair in Agricultural Entomology

JOCELYN OZGA | Plant Physiology and Horticultural Science

HABIBUR RAHMAN | Canola Breeding and Research

ERICK SANTOS | Agronomy, Forages and Grasslands

STEPHEN STRELKOV | Plant Pathology

MALINDA THILAKARATHNA | Plant-Microbial Interactions

No fences: research shows high-tech collars keep cattle from straying

BY BEV BETKOWSKI

In a study that tracked the movement of beef cattle over two grazing seasons using virtual fencing, cattle wearing the specialized GPS collars stayed within set boundaries more than 99 per cent of the time. That could potentially help cattle ranchers graze their herds and pastures more efficiently, says rangeland ecologist Edward Bork, a professor of rangeland ecology and management and co-author of the study.

“Virtual fencing allows the rancher to control where, when and how often the animals graze, which gives tremendous flexibility to improve pasture and forage management.”

The collars continuously track animal location and use auditory cues to warn livestock when they approach a programmed digital fence boundary. The collars deliver a mild electrical pulse if the cattle stray beyond the designated area.

The technology, which is just starting to emerge in Canada, is controlled through a cellphone app and can sharply reduce the need for costly fencing and labour needed to move herds to different grazing areas, Bork says. It also provides constant information on the location and status of individual animals.

For the two-year study, conducted at the U of A's Roy Berg Kinsella Research Ranch, the researchers measured the ability of cattle to initially learn and adapt to virtual fence technology, to see whether they'd then stay inside their unfenced pastures.

The training appeared to stick with the animals, the findings showed. Heifers that had never experienced the collar quickly caught on to its signals, learning within a week to respect the collar and stay inside their virtual pasture boundaries. The same cows remembered the signals the following year.

Though the use of virtual fencing does rely on having adequate cellular connectivity in remote rural areas and still comes with relatively high costs for the collars, the fact that cattle can easily learn and be contained by the system adds to its potential for improving grazing management, Bork believes.

"Ultimately, this is the kind of innovative tool that could be revolutionary for the cattle industry."

The study's co-authors include U of A researchers Carolyn Fitzsimmons, Gleise Medeiros da Silva, master of science graduate Alexandra Harland, postdoctoral fellow Francisco Novais, research associate Maria Londono-Mendez, and John Church from Thompson Rivers University.

The research was funded by grants from the Alberta Beef Producers, Sustainable Canadian Agricultural Partnership, Smart Agriculture and Food Digitization and Automation Challenge Program from Alberta Innovates and Results Driven Agricultural Research.

**"Ultimately,
this is the kind
of innovative
tool that
could be
revolutionary
for the cattle
industry."**



Cows with GPS collars. Photo: Sydney Lopes

Researchers genetically engineer yeast to produce healthy fatty acid

BY BEV BETKOWSKI

AFNS researchers developed a new strain of baker's yeast containing high levels of punctic acid, a healthy fatty acid found mainly in pomegranates, offering a sustainable way to produce both the value-added fatty acid and yeast biomass — a supplemental protein source used in food and animal feed industries — with additional health benefits.

"This means we could produce this high-value lipid much more quickly and economically in the future, and it also shows how we can develop and nutritionally enhance sustainable sources of specialty oil," says study co-author Guanqun (Gavin) Chen, associate professor and Canada Research Chair in Plant Lipid Biotechnology.

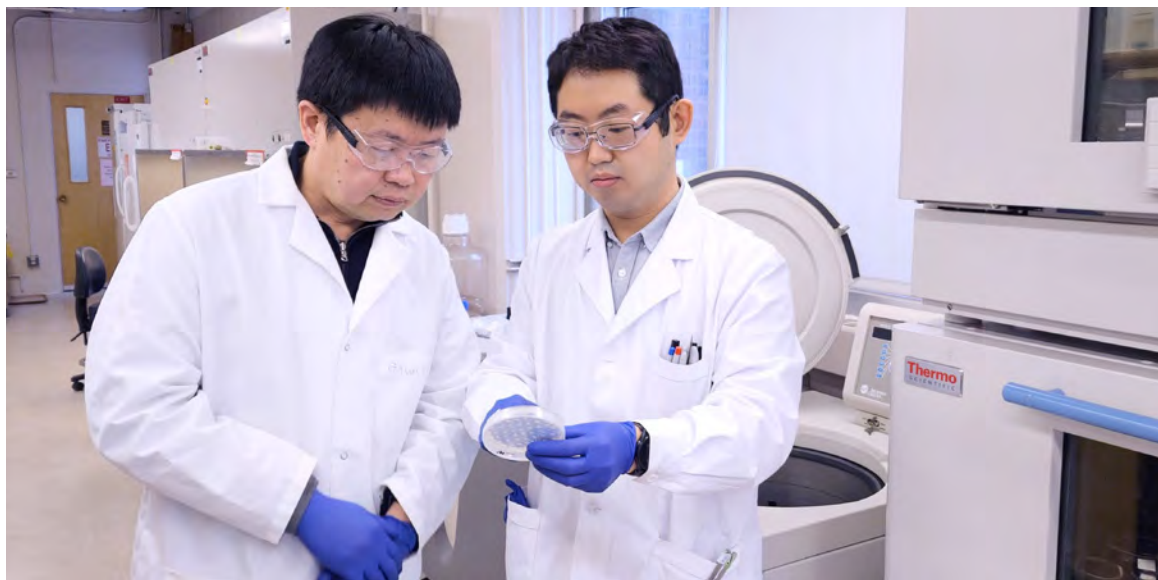
Using a gene-editing approach called CRISPR-based gene shuffling, Chen and study co-author Juli Wang, who conducted the experiments to earn a PhD in plant science, randomly integrated certain genes potentially involved in punctic acid synthesis and accumulation directly into the genome — the complete set of DNA — of baker's yeast. Their experiments mark the first time CRISPR-based gene shuffling has been used in engineering yeast to produce plant-derived, unusual fatty acids, and the work has resulted in a faster, more efficient way to find out which of the genes work well together.

The experiments boosted the punctic acid content by 80-fold, to 26.7 per cent, the highest level achieved and reported by scientists in engineered micro-organisms or plants so far.

The discoveries have resulted in a provisional patent application, and they plan to grow their high-yield strain in lab-scale fermenters, a step toward scaling up for potential commercial production.

The study was funded by Natural Sciences and Engineering Research Council of Canada Discovery and Alliance grants, the Canada Research Chairs Program, Alberta Innovates, Canadian Poultry Research Council, Cargill/Diamond V, Results Driven Agriculture Research, Canada Foundation for Innovation-John R. Evans Leaders Fund and Research Capacity Program of Alberta. Wang was supported in his work by an Alberta Innovates Graduate Student Scholarship.

Pictured L to R: Guanqun Chen and Juli Wang. Photo: Supplied.



U of A researchers help solve the mystery of the global rise of wheat and bread through genetics research

A collaborative study by the Open Wild Wheat Consortium sheds light on how bread wheat became one of the most successful crops on the planet, while many others have disappeared or can only be grown in particular areas.

Bread wheat, as we know it, appeared in the Fertile Crescent between eight and eleven thousand years ago, thanks to interbreeding between durum (pasta) wheat and a wild grass, *Aegilops tauschii*; revolutionizing agriculture and the human diet. As this interbreeding was originally believed to only have happened once and no wild bread wheats exist, it was puzzling to conceptualize the prolific spread of bread wheat across the globe instead of remaining local to the Fertile Crescent.

To understand where the genetic diversity that allows wheat to be so adaptable as a crop came from, international researchers worked together to map the genome of *Aegilops tauschii* and analyze the 80,000 bread wheat landraces — locally adapted varieties — from around the world. The Cereal Breeding Lab played a critical role by providing and analyzing data from different plant tissues (root, leaf, shoot and head) that made it possible to accurately identify the 40,000+ genes in the different *Aegilops tauschii* genomes and compare them with wheat.

The resulting data showed that only around 75 per cent of the bread wheat D-genome is derived from the lineage (L2) of *Aegilops tauschii*, which originates from the southern Caspian Sea. The remaining 25 per cent of its genetic make-up is derived from other lineages across its range. This genetic diversity allowed the global expansion of bread wheat, and indicates that there was much more interbreeding between ancestral wheat than previously thought.

“In addition to better understanding history, this data can help wheat breeders research new climate resilient genes, or disease resistance genes, that protect against traditional diseases like wheat rusts,” says wheat breeder expert Gurcharn Brar.



Pictured L to R: Valar Gurusamy from the Western Grains Research Foundation and Gurcharn Brar. Photo: Supplied.



Protecting a Prairie Staple: How AFNS Researchers Are Protecting Canada's Canola

BY DONNA MCKINNON

If you grew up in Alberta — or have driven through it in the summer — you've seen the prairies open up into vast golden canola fields stretching toward the horizon. What's far less visible are the diseases that threaten those crops, the scientific work required to keep them healthy and what's at stake if that work doesn't happen.

At the U of A, three AFNS researchers, Stephen Strelkov, Sheau-Fang Hwang and Rudolph Fredua-Agyeman, are at the forefront of protecting canola from one of its most serious threats: clubroot disease. Their work has helped position the U of A as a global leader in managing a disease that could otherwise make canola production unviable.

Strelkov's arrival at the faculty coincided with the first detection of clubroot in Alberta canola fields. Previously, the disease was primarily associated with vegetables related to canola like cabbage and broccoli and wasn't considered a major threat to canola plants itself. That changed quickly.

Clubroot is caused by a microscopic, soil-borne organism that infects plant roots, causing them to swell into tumour-like growths. Once infected, plants struggle to absorb water and nutrients, leading to stunted growth and major yield losses. Even more concerning, the pathogen produces long-living resting spores that can survive in soil for many years, making infected fields extremely difficult to reclaim.

Canola is one of Canada's most important crops, contributing billions of dollars annually to the national economy. It's also a staple ingredient in countless products, from cooking oil to animal feed.

"Losing such an important crop would certainly have very important implications in terms of the economy," Strelkov says. "If a disease like clubroot went uncontrolled, it would really change what we can cultivate in Canada—and people wouldn't see those golden yellow fields in summer anymore."

Clubroot itself isn't new. The disease has been documented in Europe for more than 400 years. What made it a crisis in Canada is that it began infecting canola — the crop Canada produces more of than any other country in the world.



Pictured top to bottom: Sheau-Fang Hwang, Rudolph Fredua-Agyeman and Stephen Strelkov (opposite page)
Photos: Bluefish Studios.



"If a disease like clubroot went uncontrolled, it would really change what we can cultivate in Canada—and people wouldn't see those golden yellow fields in summer anymore."

"It wasn't high profile until clubroot became an issue because it happened to canola," Hwang explains. "The U of A is on the world map in terms of clubroot."

Each member of the team plays a distinct but interconnected role. Strelkov leads surveillance and pathology work, identifying how the disease spreads and evolves. Hwang focuses on disease management strategies in the field. Fredua-Agyeman's work centers on resistance breeding — identifying genetic traits that allow canola plants to withstand infection.

That foundational pathology work influences breeding programs across Canada and around the world. Many companies breeding against clubroot rely on materials from the team in AFNS.

The team's research also focuses on understanding resistance to clubroot disease through genetic crosses. Their work involves developing genetic markers that plant breeding companies can use to track resistance genes and determine whether the offspring of plants will be susceptible to the disease.

Fredua-Agyeman notes that the pathology research behind this work spans across Canada and forms

the foundation of many clubroot-resistance breeding programs.

"Breeding companies that are breeding against clubroot are getting their information and pathogen materials from the U of A and from our team," he says, emphasizing that this would not be possible without the foundational research led by Strelkov. "Without the foundational work from Dr. Strelkov, that work cannot be done by anyone breeding against clubroot."

The impact is global. International breeding companies — from Australia, New Zealand, and Europe — send plant material to the U of A for testing. The team maintains one of the most extensive collections of clubroot-resistant germplasm anywhere, even exceeding that of Canada's national seed bank.

Within the group, the trio jokingly share their nicknames: the "King," "Queen" and "Prince" of clubroot research. But jokes aside, their work has established the U of A as a leading research institution in the fight against clubroot and helping safeguard a crop that is central to Canada's landscape, economy and food system.



IN THE AFNS COMMUNITY

The Ag Club's annual Bar None, the longest running event on campus, reaches fund-raising milestone

BY DONNA MCKINNON

On March 13, 1948, the U of A Agriculture Club, also known as the Ag Club, or more affectionately, Aggies, organized the first Bar None social to connect the entire campus community. Everyone was welcome — they would bar none — a nod to the small, closely-knit rural communities that had shaped the lives of many of the club's members.



Photo: U of A Agriculture Club.

It's the university's longest-running student-organized event, and in addition to being an anticipated annual tradition, it's also a community fundraiser for STARS air ambulance. At the November 2024 Bar None, \$23,224 dollars was raised, pushing the cumulative donations to \$259,000, surpassing the \$250,000 milestone and earning the privilege of displaying the club's logo on the STARS helicopter.

"It has been a dream for the last few years, and a pretty big honour for our club," says Emily Parker, one of three Bar None directors that season, along with Logan Snow and Kai Watrin. "To see the event grow in the last three years, especially coming out of the COVID shutdown, was incredible. At one point this milestone seemed really far off, so to reach this goal has truly been an exciting feat."

The choice of STARS — whose corporate motto is 'critical care, anywhere' — as the recipient of the annual donation highlights the unexpectedly common and personal impact the organization has had on Ag Club members over the years, including Emily, who grew up on a cattle farm close to the Saskatchewan border.

"Coming from a rural area, I have seen STARS in many different circumstances provide life-saving care to individuals who would otherwise have not received the care they needed in a timely fashion," she says. "We also have alumni who have taken a ride in the helicopter and are now STARS VIPs (very important patients). STARS has a special place in our club and will continue to do so."



Photo: Supplied.

Coming together at the University Club in support of the Campus Food Bank

March 2025 saw the inaugural gala in support of the U of A Campus Food Bank (CFB), thanks largely to the entrepreneurial initiative of undergraduate students in the Dietetics Specialization, including Ashley Blackwood and her colleagues. AFNS was a proud supporter of the event that took place at the University Club and raised \$4,000 for the CFB. It was a fantastic event supported by different groups from campus and beyond. It was so successful that it has become an annual fundraiser. Keep an eye out for the next event in March 2026!

APRIL 2024 - MARCH 2025

Awards

AFNS Faculty Award Highlights



**MARLENY ARANDA
SALDANA, PHD**

- ALES Graduate Mentor Award for 2024-25
- Top Scholar (ScholarGPS) (0.5% of all scholars in the last 5 years) and 1st ranked in the field of Supercritical Fluid Technology in Canada
- Gold Medal Award from the Research Centre of Natural Resources from the National University of Peru
- Outstanding volunteer award from Institute of Food Technologists

Faculty + Staff Awards

AFNS Graduate Student Mentor Award:
Michael Gaenzle

AFNS Teacher of the Year Award:
Daniel Barreda, Lingyun Chen, Boyd Mori,
Carla Prado, Habibur Rahman, Erick
Santos, Stephen Strelkov, Wendy Wismer,
Ruurd Zijlstra, Martin Zuidhof

ALES Graduate Mentorship Award:
Marleny Aranda Saldana

ALES International Engagement Award:
Roopesh Syamaladevi

ALES Research and Innovation Award:
Linda Gorim

**American Oil Chemist Society
Fellow Award:** Jianping Wu

**American Society for Parenteral and
Enteral Nutrition (ASPEN) Fellow:**
Diana Mager

Canola Award of Excellence:
Stephen Strelkov

Distinguished Professor (U of A):
Carla Prado

**Fellow of the International Union of
Food Science and Technology (IUFoST):**
Jianping Wu

Le Studium Research Fellowship Award:
Vera Mazurak

**Patient Partner Innovation and Research
Award (Androgen Excess and PCOS
Society and Verity PCOS International):**
Donna Vine

**Stanley J. Dudrick Research
Scholar Award:** Carla Prado

U of A Innovation - Spin-Off Award:
Aman Ullah

U of A Retirement Recognition:
Judd Aiken, Heather Bruce,
Lynn McMullen



CARLA PRADO, PHD

- International recognition: Clarivate™ (Web of Science) Highly Cited Researcher
- Stanley J Dudrick Research Scholar Award (American Society for Parenteral and Enteral Nutrition)
- Recognized as a Distinguished University Professor by the U of A
- U of A convocation speaker



AMAN ULLAH, PHD

- U of A Innovation Award 2024 (Spinoff Company)
- The Advanced Materials Innovation Award 2025 (Advanced Materials Society, Sweden)
- ASTech Award Finalist for the 36th Annual ASTech Innovation Awards (in Alberta) 2025
- Nomination for the 2024 ENI Award (Ente Nazionale Idrocarburi - National Hydrocarbons Board) - under the category of Protection of the Environment



THIS YEAR IN PHOTOS





Graduate Student Awards

AFNS graduate students received \$940,867 in awards in 2024/25!

AFNS Graduate Thesis Award:

Sumedha Nallanthighal (MSc),
Pamela Klassen (PhD)

Alberta Canola Producers Graduate Award in Canola Production Research:

Aayushi Rambia

Alberta Graduate Excellence Scholarship:

Jo Ann Chew, Carina Lopez,
Thiago Noetzold, Danna Rotariu,
Sabina Schreiber, Usha Nandini
Sivakumar Sharma, Emilee Storfie,
Jacey Toerper, Prithviraj V,
Maria Wong Xian

Alberta Innovates Graduate Student Scholarship:

Amir Behrouzi

Alberta Innovates Postdoctoral Enhancement Fellowship:

Bruna Ramos Da Silva

Alberta Soil Science Workshop:

Chathuranga De Silva (1st Place-Oral),
Dayani Patuwatha Withanage (3rd Place-Poster)

ALES Centennial Dutch

Endowment Award: Jo Ann Chew

ALES Graduate Student Distinguished

Thesis Award: Amber Hager (MSc),
Juli Wang (PhD)

Ali Navabi Graduate Student

Travel Award (CSA): Jedida Chirchir,
Chathuranga De Silva

AltaLink Master's Scholarship in Rangeland Disturbance Ecology:

Shubhashis Bhattarai

Anthony Fellowship in Human Nutrition:

Jaqueline De Lima Munhoz

Banting Postdoctoral Fellowship (CIHR):

Bruna Ramos Da Silva

Bentley Lecture in Sustainable

Agriculture – Best Poster: Oshadhi
Athukorala Arachchige, Dayani Patuwatha
Withanage, Caroline Wade

Bern & Donna Kotelko Travel Award:

Miguel Franco Londono

Canada Graduate Scholarship -

Master's (NSERC): Mackenzie Gorman,
Sierra Sayles

Canadian Society of Agronomy - Best Poster:

Oshadhi Athukorala Arachchige

CIHR - Canada Graduate Scholarship – PhD:

Pamela Klassen

CIHR - Health System Impact Fellowship

- Postdoctoral: Pamela Klassen

Donald A Shaw Memorial Graduate

Scholarship: Jiayi Hang

Dr Bruce Jeffery Canola Travel Award:

Keshav Bhattarai (MSc),
Emilee Storfie (PhD)

Dr Catherine Field Graduate Scholarship in Agricultural, Life & Environmental Sciences:

Sarah Parsons

Dr Elizabeth A Donald MSc Fellowship in Human Nutrition:

Yiqi Wang

Dr Nick Hussar Graduate Scholarship in Animal Science or Human Nutrition:

Jo Ann Chew

Egg Farmers of Canada Student Innovation Challenge – Finalist:

Jo Ann Chew

Elizabeth Russell MacEachran

Scholarship: Yifu Chu, Julia Montenegro

Entomological Society of Canada Ed Becker JAM Participation Award:

Carina Lopez

GPS Special Award:

Imtiaz Ahmad, Bilal Asghar, Kiran Khurshid,
Zohaib Saleem, Umair Zahid

Graduate Course-Based Master's Community Engagement Award:

Shenin Mehnaj

Graduate Students' Association

Rising Star Award: Maria Camila
Londono Mendez

Harry J Hargrave Memorial Graduate Scholarship in Animal Science:

Amir Behrouzi, Sergio Lasso Ramirez

Hazel McIntyre Summer Research**Award:** Yelyzaveta Mamula**Helen & Fred Bentley Forage Crops
Graduate Scholarship in ALES:**

Chathuranga De Silva

**Howard and Caroline Malm Graduate
Award in Climate Change:** Amir Behrouzi**Izaak Walton Killam Memorial
Postdoctoral Fellowship Award:**

Arturo Macias Franco

**Izaak Walton Killam Memorial
Scholarship:** Camila Estefani Orsso**J Gordin Kaplan Graduate Student Award:**Sameena Alam, Xiaoyu Bao, Rahul Chetry,
Sandhya Gautam, Zihan Wang, Qiong
Xiao, Zhaohui Xu,**J Macgregor Smith Graduate
Scholarship:** Haley Wolgien-Lowe**John Prentice Graduate Scholarship
in Beef Genomics:** Amir Behrouzi**Mary Louise Imrie Graduate Student****Award:** Christy Marie Alsado,
Maanasa Mudoor Soorash**Michael R Bevan Graduate Scholarship:**
John Hubensky**NSERC Postgraduate Scholarship and
President's Doctoral Prize of Distinction:**
Lingxiao Zhang**Poultry Science Association Certificate
of Excellence:** Jo Ann Chew**Poultry Service Industry Workshop
Student Scholarship:** Jo Ann Chew**President's Doctoral Prize of Distinction:**
Pamela Klassen**Professor JB McQuitty Graduate
Scholarship:** Umair Zahid**Robert Simonet Graduate Scholarship &
Travel Award – PhD:** Emilee Storfie**Ruminant Animal Digestive and
Metabolism Graduate Scholarship:**

Anna Widenmann

**Ruminant Animal Digestive Physiology
and Metabolism Travel Award:**

Amir Behrouzi

**São Paulo School of Advanced Science
on Precision Livestock Farming Student
Scholarship:** Jo Ann Chew**SaskBarley Graduate Scholarship:**
Suman Bagale**Shirley E Redmond Graduate Scholarship
in Human Nutrition:** Sarah Parsons**Simone Demers-Collins Graduate
Travel Scholarship in Agriculture:**
Chunxiao Yang**SM Blair Scholarship:** Valentine Udeh**Syngenta Graduate Scholarship in
Sustainable Agriculture:** Caroline Wade**TD Insurance Meloche Monnex Award
for Outstanding Graduate Student
Community Service:** Pauline Chan**The U of A Opportunities MBA Award:**
Azam Nikzad**U of A Graduate Recruitment
Scholarship:** Shaqayeq Asefi,
Damon Bectell, Shubhashis Bhattarai,
Nkechinyere Chukwuemeka,
Mackenzie Gorman, Sergio Lasso
Ramirez, Yasaman Mojibi Eslami,
Dayani Patuwatha Withanage,
Aayushi Rambia, Luis Salas Chia,
Sierra Sayles, Preston Tran, Anubhav
Tripathi, Ana Xochitl Vidrio Sahagun**Walter H Johns Graduate Fellowship:**
Mackenzie Gorman, Sierra Sayles**Wayne Borden Graduate Travel Award:**
Jedida Chirchir**Western Grains Research Foundation
Graduate Scholarship:** MSc - Keshav
Bhattarai, John Hubensky; PhD - Aldo Rios
Martinez, Kanishka Senevirathna**Women and Children's Health Research
Institute Graduate Studentship Award:**
Ren Wang**Women in STEM Scholarship:**
Carina Lopez**Zenia Hawrysh Scholarship in
Food Science:** MSc - Pauline Chan;
PhD - Maanasa Mudoor Soorash,
Amir Vahedifar

Partners + Funders

Acadian Seaplants Limited

ADISSEO

Agriculture and Agri-Food Canada

Agriculture Funding Consortium:

- Alberta Canola
- Alberta Chicken Producers
- Alberta Crop Industry Development Fund
- Alberta Grains
- Alberta Innovates-Bio Solutions
- Alberta Milk
- Alberta Pulse Growers Commission
- Egg Farmers of Alberta
- Western Grains Research Foundation

Alberta Agriculture and Forestry

Alberta Beef Producers

Alberta Hatching Egg Producers

Alberta Health Services

Alberta Innovates

Alberta Pork

Alberta Turkey Producers

Alltech Canada Inc

Almased Wellness GmbH

Barley Council of Canada

BC Dairy Association

BC Peace River Grain Industry Development Council

Beef Cattle Research Council

Biena Inc.

Bioindustrial Innovation Canada

Burnbrae Farms Ltd.

Canada Foundation for Innovation

Canada Malting Company Limited

Canada Research Chairs

Canadian Beef Breed Council

Canadian Celiac Association

Canadian Field Crop Research Alliance

Canadian Foundation for Dietetic Research

Canadian Institutes of Health Research

Canadian Poultry Research Council

Canadian Swine Research and Development Cluster

Canola Council of Canada

Canterra Seeds

Ceapro Inc.

Climate Change and Emissions Management Corporation

Dairy Farmers of Canada

Dairy Farmers of Manitoba

Edmonton International Airport

Egg Farmers of Alberta

Egg Farmers of Canada

Elmira Pet Products Ltd.

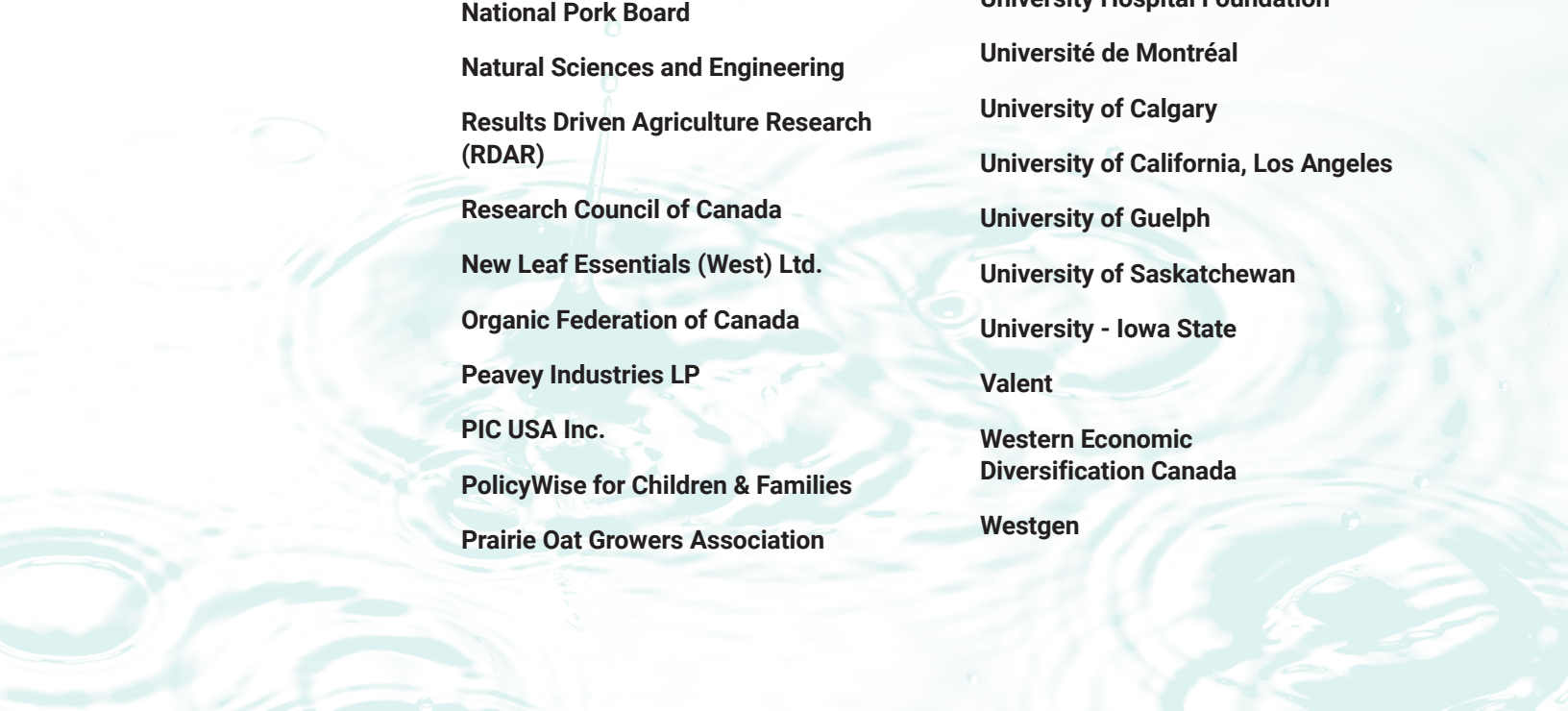
Engage Agro Corporation

FMC Corporation

Forge Hydrocarbons Corporation

FP Genetics

Genesis Inc.



Genome Alberta	Red Bow Ranching Ltd.
Genome Canada	Sacco Systems Srl
Genome Prairie	Saskatchewan Milk Marketing Board
Heart & Stroke Foundation of Canada	Saskatchewan Pulse Growers
Hypor LP	Saskatchewan Stockgrowers Foundation
Ingredion Inc.	Saskatchewan Wheat Development
Kaslo Sourdough	Commission
Kellogg Company	Saskatchewan Barley
Kaiser Foundation Research Institute	Development Commission
Kidney Foundation of Canada	SeCan Association
Lallemand Animal Nutrition	Social Sciences and Humanities
Lilydale Inc. – A Sofina Foods Company	Research Council
Maple Leaf Foods Inc.	South of the Divide Conservation
Mitacs Inc.	Action Program
Monsanto Fund	Sunterra Farms Ltd.
Networks of Centres of Excellence -	The Hanor Company of Wisconsin, LLC
GlycoNet	The W. Garfield Weston Foundation
National Pork Board	Trojan Technologies Inc.
Natural Sciences and Engineering	University Hospital Foundation
Results Driven Agriculture Research	Université de Montréal
(RDAR)	University of Calgary
Research Council of Canada	University of California, Los Angeles
New Leaf Essentials (West) Ltd.	University of Guelph
Organic Federation of Canada	University of Saskatchewan
Peavey Industries LP	University - Iowa State
PIC USA Inc.	Valent
PolicyWise for Children & Families	Western Economic
Prairie Oat Growers Association	Diversification Canada
	Westgen

Facts + Figures

ENROLMENT

Undergraduate Students

PROGRAM OR MAJOR	NUMBER OF STUDENTS
Bachelor of Science in Agriculture	168
Agricultural and Resource Economics Major	15
Animal Science Major	87
Crop Science Major	45
Sustainable Agricultural Systems Major	21
Bachelor of Science in Agricultural/Food Business Management	36
Agriculture Business Management	26
Food Business Management	10
Bachelor of Science in Animal Health	304
Companion and Performance Animals Major	265
Food Animals Major	39
Bachelor of Science in Nutrition and Food Science - General Program	302
Food Marketing Minor	12
Food Safety and Quality Minor	49
Global Health Minor	12
Human Ecology Minor	13
Nutrition Communication & Education Minor	39
Physical Activity Minor	36
Bachelor of Science in Nutrition and Food Science - Dietetics Specialization	133
Bachelor of Science in Nutrition and Food Science - Food Science and Technology Specialization	50
Bachelor of Science Honors Honors in Food Science	3
Bachelor of Science Honors Nutrition	9
TOTAL	1011

NOTE: EXCLUDES BRIDGING PROGRAM STUDENTS

CONVOCATION

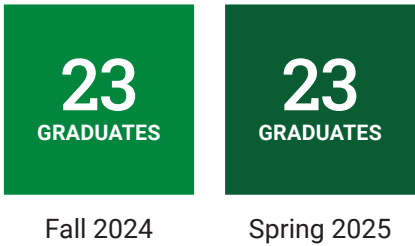
Bachelor of Science Graduates

PROGRAM	GRADUATES IN FALL 2023	GRADUATES IN SPRING 2024
BSc in Agricultural/Food Business Management	0	7
Bachelor of Science in Agriculture	1	36
Bachelor of Science in Animal Health	2	35
Bachelor of Science in Nutrition and Food Science	7	78

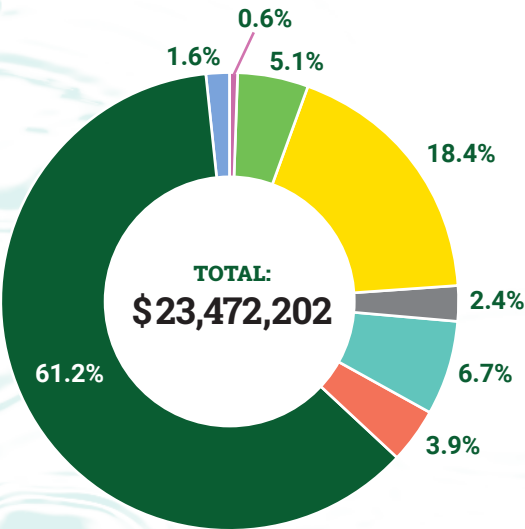
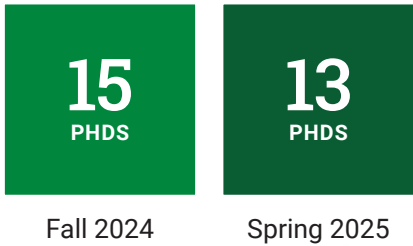
Graduate Students

PROGRAM	NUMBER OF STUDENTS
Animal Science	38
Bioresource & Food Engineering	5
Bioresource Technology	15
Course Based MAg	2
Course Based MSc	3
Food Safety & Quality	12
Food Science & Technology	47
Nutrition & Metabolism	21
Plant Science	58
Rangeland & Wildlife Resources	8
Visiting Graduate Students	1
TOTAL	210

Masters of Science Graduates



Doctorate Graduates



RESEARCH AFNS Research Funding

Government of Alberta	\$151,346
Government of Canada (not Tri-agency)	\$1,189,876
NSERC	\$4,328,971
CIHR	\$570,389
Municipal, Provincial and Foreign	\$1,577,814
Business	\$912,771
Not for profit and Individuals	\$14,368,073
Endowments	\$372,962







Leading with Purpose.

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