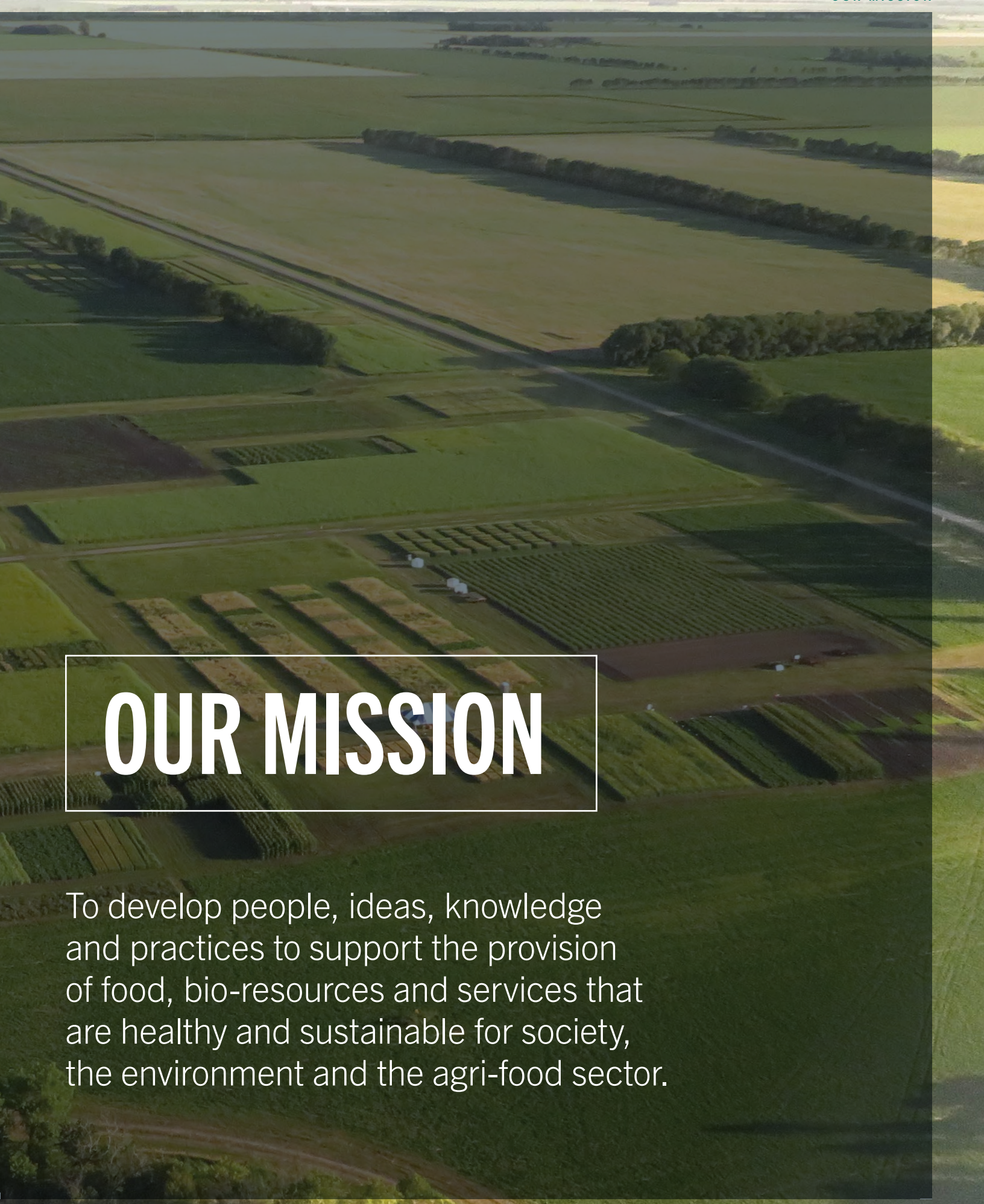
STRATEGIC RESEARCH PLAN

2022-2027

Faculty of Agricultural and Food Sciences | University of Manitoba



OUR MISSION

To develop people, ideas, knowledge and practices to support the provision of food, bio-resources and services that are healthy and sustainable for society, the environment and the agri-food sector.

OUR VISION

Promoting sustainable, resilient, fair, diverse and healthy, and technologically advanced agri-food systems

The University of Manitoba (UM)'s Faculty of Agricultural and Food Sciences (FAFS) is a national leader in agri-food research and training excellence, recognized for our research innovations and extension contributions that offer solutions to grand challenges facing society including climate change, food security, food safety, and nutritional well-being. We develop highly qualified people and ideas in support of providing food, bio-resources and services that benefit our society, the environment and the agri-food sector. For over a century, we have been a trusted source of independent information, providing recommendations and arm's length validation of technologies and best practice guidelines, supporting a thriving, profitable and sustainable Canadian agriculture and agri-food sector.

We envision a future where all have access to safe, nutritious, and healthy food and services from sustainable crop and livestock production systems and thriving managed and natural ecosystems.

Over the next six years, we will advance FAFS research around core values representing our strategic research plan's four pillars of focus:

SUSTAINABLE	RESILIENT	FAIR, DIVERSE & HEALTHY	TECHNOLOGICALLY ADVANCED
A Sustainable Agri-food System that is whole systems-based, climate-smart, human health-oriented, nature-positive, resource-efficient, culturally and socially acceptable, and economically viable.	**A Resilient Agri-food System** that responds to climate variability and extremes, supply chain disruptions, plant and animal diseases and pests, production challenges, societal trends, and evolving policies.	**A Fair, Diverse and Healthy Agri-food System** that promotes Indigenous, urban & northern food systems, supports local and new producers, addresses nutritional and food security, is inclusive & just, and promotes health and well-being.	**A Technologically Advanced Agri-food System** that drives innovation and facilitates real-time complex decision making, through precision agriculture and food processing, machine learning, data analysis, multi-scale sensing and modelling.

OUR APPROACH

Apply systems-based and multi-scale thinking to agricultural and agri-food sustainability

Beyond a path of deep specialization, the Faculty of Agricultural and Food Sciences orients the focus of its main research programs on integrated whole-systems approaches to food and nutritional security and environmental sustainability. We are differentiated by our track record of building diverse teams of experts to tackle challenges and seize opportunities using a whole-systems approach. Interdisciplinary research and training approaches, that draw on insights from disciplines beyond the capabilities of a particular sector or individual researcher, are essential to catalyzing the transition from data into knowledge and action. This integration of skills and expertise, representing the whole agricultural value chain, is critical to training future generations of highly qualified personnel who will help lead the next agri-food revolution.

The Faculty of Agricultural and Food Sciences offers collective research capacity spanning many scales:

Gate to Gut

FAFS brings together agricultural, microbiological, food, and human nutritional scientists with biosystems engineers and economists to address issues of local and global relevance at the nexus of food security, human nutrition, and the sustainable use of resources. FAFS research spans the natural, social, and health sciences, from the lab to the field/farm, through storage/processing, to innovative foods, and ultimately to the gut/bloodstream.

DNA to Satellite

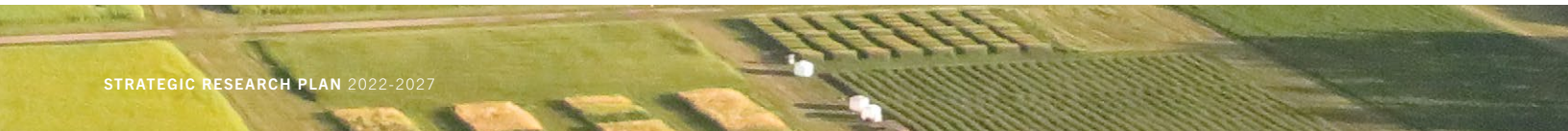
The Faculty maintains a balance between applied and basic research. Industry-funded applied research allows integrated application of existing science and technologies to address emerging complex challenges facing society. This is sustained by the creative insights and innovative tools generated from discovery-driven programs. Our research spans an enormous spatial scale from human, animal and plant cell genetics, to bench and lab-based investigations, to plot and farm-based trials, and finally to landscape and regional studies making use of satellite imagery and remote/aerial sensing.

30 to 30

Our research time-scales are unique, with long-standing field studies providing continuous data going back 30 years (e.g, our world-renowned organic production plots and long-term greenhouse gas monitoring sites), and modeling and field work extending well into the future (30 years out). We also operate within shorter time-frames as needs of the industry and consumers shift, which can be drastic and require quick adaptation. Through our ongoing close interactions with all stakeholders, our researchers are able to respond to partner and stakeholder priorities, whether they are very near-term, or far into the future.

Individuals to Society

FAFS researchers develop solutions that benefit individuals to whole communities, be it humans, animals, plants, insects, or microorganisms. Our researchers use approaches specifically tailored to benefit individuals (e.g., nutrigenomics, metabolomics) to understand the relationship between nutrition and health, as well as enhance animal productivity through genetics, nutrition, and diagnostic/precision tools. We develop and test best management strategies benefitting specific populations, enhancing biodiversity, and contributing to resilient communities. Our stakeholder engagement is broad and includes local, regional, national and international scale interactions with diverse communities and cultures.



OUR CORE PRINCIPLES

Driving research excellence

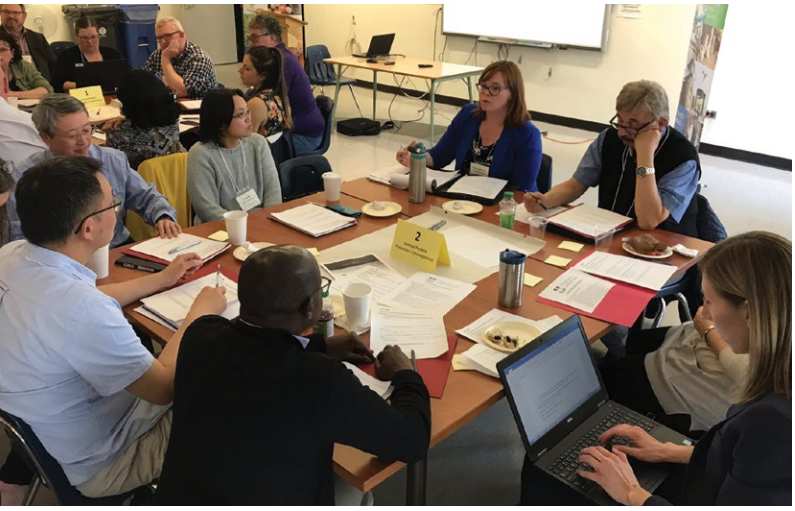
The UM's Faculty of Agricultural and Food Sciences has provided world-class education, research, innovation and training to the benefit of the agriculture and agri-food sector for over 100 years. We are adapting our research capacity in line with a rapidly changing agri-food climate by investing heavily in efforts to grow and modernize our food, nutrition and agricultural research and training capacity. Examples of our recent capacity-building efforts are interspersed throughout this strategic research plan. We are committed to recruiting and retaining outstanding researchers and ensuring they have the tools and resources to establish nationally and internationally competitive research programs. The Faculty invests in research facilitation services to provide assistance with exploring new funding opportunities, fostering new research partnerships, and enhancing the development of cohesive and compelling proposals through grantsmanship support and training. The Faculty supports research excellence through mentorship and peer review programs, knowledge translation and mobilization networks and platforms, and nominations for institutional and external research awards, and by facilitating ways to leverage funding for research. We aim to foster an inclusive culture of excellence that engages early career researchers, ignites their passion for research, sparks curiosity and innovation, and paves the way to meaningful impacts.

Fostering collaboration

While recognizing the importance of contributions made by individual academics, the Faculty encourages and facilitates the development of multi-disciplinary and interdisciplinary research initiatives with collaborators at the UM, government research organizations and other universities at provincial, national and international level, and with industry and community partners. In doing so, our researchers and partners are able to address complex issues that challenge individuals, communities and industries across Western Canada, and contribute to the development of value-added innovations that promote health and grow our economy. For example, the Faculty regularly hosts sessions to further enhance interactions amongst our academics and with external stakeholders including Manitoba Agriculture, Agriculture and Agri-Food Canada (AAFC), and industry, around topics such as climate smart agriculture and agri-food systems and Digital Agriculture, to spark ideas that will result in mutually beneficial research outcomes. Establishing and strengthening connections between the University community and external partners is top of mind when targeting infrastructural upgrades. Planned facilities are designed to conduct research, not only of academic interest for driving fundamental science and new discoveries, but that is also relevant to solving challenges facing individuals, communities and producers today. The Faculty further supports collaboration through more formal networks, such as the UM's National Centre for Livestock and the Environment (NCLE), a research community that engages in multi-disciplinary, multi-agency research partnerships, aiming to foster livestock production systems as an integral component of an adaptive and enduring food system in Canada.

Aligning our efforts with stakeholder priorities

Our vision and capacity building efforts align closely with institutional, provincial and federal priorities to maximize the impact of our research discoveries. Our pillars of focus and established areas of strength align within the overarching strategic research themes and goals outlined in the UM's Strategic Research Plan. Our researchers work with industry, community partners, and government to build and execute on shared research visions that address priorities within Canada's agriculture and agri-food sector, and advance complementary goals within Manitoba Agriculture's priority focus areas, including the Province's Protein Advantage Strategy. FAFS research initiatives are supporting the Advancing Sustainable Agriculture and Agri-food and Climate Change and Environment priorities within the Federal, Provincial and Territorial Ministers of Agriculture's Guelph Statement, a vision that will guide the 2023-2028 Sustainable Canadian Agricultural Partnership Program. Interdisciplinary research initiatives within the Faculty will help meet federal Science, Technology and Innovation priorities including a *Clean and Resource-Rich Canada, Sustainable Food Systems*, and a *Technologically Advanced Canada*, through advanced technologies including artificial intelligence and big data analytics-enabled precision farming practices. By building and supporting safe, healthy, and sustainable food systems, the Faculty is furthermore supporting federal areas of focus including *Food Sovereignty* and *Healthy and Resilient Communities*, enhancing the health and well-being of all Canadians. On a global scale, our vision is framed more broadly around United Nations Sustainable Development Goals and the Food and Agriculture Organization's *OneHealth* and *Sustainable Food Systems* priority areas, as whole systems research approaches provide more benefits than single practices for climate change adaptation and mitigation, which impact global food and nutritional security.



Fostering greater equity, diversity and inclusion in agriculture

Principles of equity, diversity, and inclusion (EDI) are and will continue to be at the forefront of everything we do. The Faculty is currently developing an EDI plan that will guide us in offering a culturally rich, safe and supportive learning and work environment, to prepare graduates to become adaptable employers and employees in Canada's agri-food and health (e.g. dietitians) sectors with the mindset of celebrating diversity and building respectful, inclusive work environments for all. Our researchers engage with various marginalized and under-represented communities (e.g. new immigrants, inner-city populations, and racialized communities) to include their voices in food and nutrition studies. We are at the forefront of a new paradigm – where we listen to Indigenous knowledge (particularly residing with Indigenous knowledge holders and elders), where we empower and support Indigenous perspectives, and where we enter into a new knowledge-sharing relationship with Indigenous peoples. This will provide not only scientific, social and economic benefits, but also recognize and embrace the fact that we, here at home, are all treaty people. Our Faculty's researchers and scholars link Indigenous communities at home with others around the world (Africa, South and Central America, and US), bringing voices and perspectives from similar but geographically disparate places in the world together in one place. Canada's Truth and Reconciliation process focused us further and increased our engagement with Indigenous communities in our region (e.g., Swan Lake First Nation through AAFC's Living Labs initiative, Brokenhead Ojibway Nation through the Kitigay Indigenous Food Initiatives, Opaskwayak Cree Nation through the community smart vertical farming initiative & CIHR Healthy Cities Research Initiative platform). Collaborations between Canada's first Indigenous agricultural scholar at FAFS and other Indigenous Scholars at UM and across the globe will allow us to emerge as global leaders and solidify the UM's reputation in Indigenous Achievement.

Facilitating knowledge mobilization and partner engagement

Our researchers frequently interact with producers and community members to learn about their challenges and to design and execute research studies that help alleviate real-world concerns. FAFS faculty help translate new and current knowledge into action by farmers, food innovators, policy makers, health care professionals, and consumers to transform our agri-food systems. They accomplish this by making use of established, highly regarded and well-attended hands-on knowledge mobilization activities to offer the latest research advancements and accelerate direct adoption of scientifically validated discoveries. These include the Manitoba Agronomists Conference, two-week annual Crop Diagnostic School, grower organization-hosted field tours/events at multiple sites in agro-Manitoba, the Sustainability of Canadian Agriculture Conference, the Manitoba Nutrition and Dietetics Research Day, and the Manitoba Sustainable Protein Research Symposium. Other researchers engage in 'Food as Medicine' community events to facilitate the implementation of evidence-based food and nutritional security solutions at the heart of where it is most needed.

To enhance public trust in Canadian farming practices, our livestock facilities include dedicated learning/knowledge translation spaces with viewing windows into livestock production environments in bio-secure settings, which is not possible at commercial farms. FAFS recently established an online Faculty Conversation Series featuring researchers, collaborators and community/industry partners on a range of topics, and the Manitoba Agriculture and Food Knowledge Exchange (MAKEManitoba.ca) knowledge translation platform to share evidence-based research in lay and social media formats with producers, consumers, and policymakers. These platforms are designed to increase consumer awareness about how food is produced and processed, the role of food and beverages beyond nutrition, and the pivotal role technology plays in the quantity and quality of ingredients.

OUR STRENGTHS

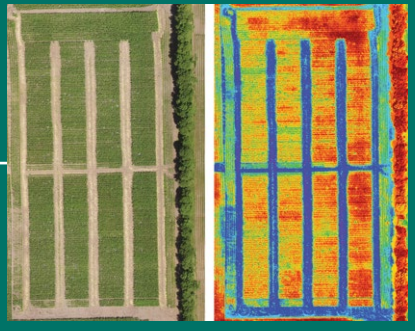
This plan identifies 16 established areas of Faculty research strength, organized into four broad categories, as well as the key initiatives, programs, and infrastructure that support these endeavours:

CROPS & CROPPING SYSTEMS OF THE FUTURE

CANADA'S PREMIER LIVESTOCK RESEARCH & OUTREACH CAMPUS

FOOD INNOVATIONS FOR NUTRITION & HEALTH

DECISION-MAKING THROUGH DATA & TECHNOLOGY



CROPS & CROPPING SYSTEMS OF THE FUTURE

Building on our legacy of innovation and extensive crop research infrastructure, we have made important investments in an effort to grow and modernize our agronomic research and training capacity.

With producer and industry support, we established the NSERC/WGRF/Fertilizer Canada Industrial Research Chair in 4R Nutrient Management and the Integrated Crop Protection Chair. We have renewed our crop and soil research teams by adding eleven new tenure-track faculty positions (2020-22), including two new members in soil fertility. We have numerous initiatives underway to support the sustainable development of agricultural resources and foster an expanded knowledge-driven agricultural economy. For example, through a $2.5M investment by Prairies Economic Development Canada and a $2.84M investment by the Western Grains Research Foundation, we are integrating digital agriculture suites and monitoring systems into our long-term field sites and research farms, and validating the latest agricultural technologies for multiscale decision-making and precision farming in a variety of Western Canadian crop production systems. Key to our success is to provide new state-of-the-art, faculty-wide facilities to meet future needs of Western Canadian farmers and industry. To this aim, we are completing a major capital campaign, the Prairie Crops & Soils Research Facilities (PCSRF) initiative, which will enable an unprecedented increase in research productivity by improving the quantity, quality, and efficiency of seed, soil, and plant sample processing, analysis and archiving, and facilitate the integration of soil, crop, entomology, livestock and engineering research. The faculty is also home to the Ian N. Morrison Research Farm, a 406-acre facility located in Carman, MB, the Glenlea Research Station, which includes plot lands for the Long-Term Manure & Crop Management Field Laboratory and the Trace Gas Manitoba Greenhouse Gas Field Emission Site, and greenhouse and growth facilities to carry out molecular, physiological, agronomic, pathology and genetic research.

Specific strength areas

CROP CULTIVARS RESILIENT TO CLIMATE CHANGE & DISEASES, AND FOR SPECIFIC USES

- *Canada's only perennial grains breeding program*
- *long-standing wheat breeding program with strong relationships to programs at AAFC*
- *world-leading programs in canola and wheat diseases*

AGRONOMIC SYSTEMS FOR BEST PERFORMANCE & LONG-TERM SUSTAINABILITY

- *world's longest continuous running (est. 2005) field-scale greenhouse gas monitoring facility*
- *Canada's oldest organic versus conventional farming systems experiment (est. 1992)*
- *Research Chair in Natural Systems Agriculture for Climate Solutions*
- *Rockefeller Foundation Food Systems Vision Prize*

TECHNOLOGIES TO ENHANCE CROP PRODUCTION & CROP HEALTH

- *Crop Protection Research Chair supported by four commodity groups*
- *establishment of an Agronomist-in-Residence*
- *long-standing on-farm water management projects that have influenced policy and industry*
- *planned Research Chair in Potato Health and Sustainability*

LAND & WATER RESOURCES MANAGEMENT

- *Academic Impact Hub for the United Nations' Sustainable Development Goal 6 (Clean Water and Sanitation)*
- *FAFS researchers represent Canada on international intergovernmental policy panels*
- *strong interactions with the International Institute for Sustainable Development and Experimental Lakes Area*
- *new high-throughput analytical capacity for environmental samples*

CROP PROTECTION ENTOMOLOGY & POLLINATION

- *insect museum houses one of the largest collections of insects in Western Canada*
- *world-renowned and Canada-leading pollinator and bee program*
- *FAFS entomologists participate in extensive public outreach, extension and stakeholder engagement activities*

CANADA'S PREMIER LIVESTOCK RESEARCH & OUTREACH CAMPUS

The University of Manitoba is home to Canada's most highly cited and active innovators in livestock research with over 20 academic research programs centered on sustainable livestock production, crop-livestock integration, animal protein, and animal welfare.

Our contributions relating to the circular bioeconomy (how livestock plays a key role in improving overall efficiency and sustainability of food production), as well as the environmental footprint of Canadian livestock production, are highly sought after by the agriculture and agri-food sector and the scientific community. We bring together diverse fields of expertise through the National Centre for Livestock and the Environment (NCLE), a unique community that focuses on environmentally sustainable livestock and poultry production systems to inform producers, government, and the public on strategies for improved sustainability. Our goal is to further solidify Manitoba as the Canadian leader in livestock research, education and extension through continuous investments and enhancements in the Faculty's livestock and poultry research, training, and public outreach capacities. We have renewed our animal science and crop-livestock integration research teams with the addition of six tenure-track faculty positions (2019-22). We are strengthening and building new industry partnerships through collaborative research and training programs. On the heels of a $3.4M investment in the Dairy Farmers of Manitoba Discovery and Learning Complex, we are expanding our poultry capacity through a $4.5M investment for the Manitoba Egg Farmers Learning and Research Centre. This adds to the existing swine unit (comprised of a 130-sow farrow-to-finish swine barn), beef feedlot, and 400 hectares of forage lands at the Glenlea Research Station, located 20 km south of the University of Manitoba's Fort Garry Campus. The station also includes a feed processing facility, bioproducts processing and manure composting facilities, and the state-of-the-art Bruce D. Campbell Farm and Food Discovery Centre, which provide hands-on interpretive learning to the general public of all ages to explore the ways food is grown, raised, and made in Canada.

Specific strength areas

ANIMAL NUTRITION & GUT HEALTH

- *UM is Canada's most highly cited and 2nd most prolific innovator in livestock research (13th in the world), leading the country in swine and poultry nutrition and feed ingredient research (i.e. antibiotic alternatives)*
- *new hires in applied animal microbiology (gut microbiome) and precision livestock agriculture*

CROP-LIVESTOCK INTEGRATION

- *key focus of NCLE*
- *two large NSERC partnership grants supporting crop-livestock integration projects*
- *incorporates Canada's only perennial grains breeding program (i.e. intermediate wheatgrass as a dual-purpose cash crop and animal feed)*

SUSTAINABLE & RESILIENT LIVESTOCK PRODUCTION SYSTEMS

- *NCLE researchers are exploring the role of livestock in the circular bioeconomy (alternative feeding strategies using by-products and food waste) as well as the environmental footprint of livestock production*
- *new hires in animal welfare and public trust and supply chain disruption in livestock production*

FOOD INNOVATIONS FOR NUTRITION & HEALTH

Building on our long history in food and nutrition innovations, the Faculty of Agricultural and Food Sciences is investing heavily in the research and development of new foods, with a particular interest in cereal grains, oilseeds, and plant protein.

The UM is a key participant in the Protein Industries Canada Supercluster, which in conjunction with the US-Canada Protein Highway Initiative aims to accelerate protein innovation and increase Canadian and North American protein production to meet expanding global demand. Major investments made in FAFS research and training initiatives in these areas include: (i) three Canada Research Chairs (Tier 1 CRC in Grain-Based Functional Foods, Tier 1 CRC in Bioactive Peptides, and Tier 2 CRC in Food Protein Processing and Bioproducts), (ii) multiple CFI investments in the internationally recognized Grains Storage Research Laboratory, which now extends its works to pulses and oilseed crops, (iii) the NSERC CREATE funded Canadian Agri-food Protein Training, Utilization, and Research Enhancement (CAPTURE) training program that ensures graduates are well-prepared for the fast-growing food protein processing and bioproducts sector, and (iv) leading the Manitoba Protein Research Strategy, which provides a comprehensive research plan for the province's ultimate success in this burgeoning market segment.

Planned initiatives to further accelerate food innovations include the establishment of a Manitoba Strategic Research Chair in Sustainable Protein and a new Protein Foods Innovation Centre, which will provide a food research and training environment unique in Western Canada. Scientists across disciplines will work together to make Manitoba a global leader in producing and marketing protein-rich foods that can feed the world. The modern research facilities and improvements in value-added processing technologies within the Richardson Centre for Food Technology and Research (now HACCP-certified and supporting diverse research groups) as well as the world-leading nutrition research at the Canadian Centre for Agri-Food Research in Health and Medicine (CCARM), will allow small and medium-sized enterprises to scale-up and bring innovative and nutrition-focused food products to market, integrate into global value chains, and build a sustainable and diversified food industry.

Specific strength areas

GRAIN & FOOD QUALITY, PROCESSING, AND HEALTHY FOODS

- *internationally recognized expertise in grain and oilseed quality and processing, including three Canada Research Chairs*
- *four new hires in grain quality and processing into innovative, nutritious and human health-oriented foods*

SUSTAINABLE FOOD & FEED PROTEIN SYSTEMS

- *lead for the Manitoba Protein Advantage Strategy*
- *new Manitoba Strategic Research Chair in Sustainable Protein*
- *strong and highly collaborative protein foods innovation team*
- *new CFI, Manitoba Agriculture, and Prairies Canada investments*

APPLIED NUTRITION & FOOD SECURITY

- *accredited dietetics program*
- *research focused on food and nutrition security, food and health equity for vulnerable populations*
- *strong linkages with Indigenous communities. e.g., Opaskwayak Cree Nation vertical smart farm initiative*
- *new hire in food, culture and health*

HUMAN NUTRITION & HEALTH

- *FAFS researchers represent Canada on international intergovernmental policy panels*
- *lead innovative nutrition research in close partnership with CCARM with the goal of alleviating many chronic diseases through improved diet and food preparation*

GRAIN STORAGE ECOSYSTEMS

- *major CFI investments in the Grain Storage Research Laboratory*
- *strong international collaborations with similar stored-grain ecosystem research centres in China and India*
- *international leadership recognized through awards, patents, publications*
- *largest UM Internship program through Mitacs*
- *industry incubation and job creation through 151 Research (acquired by AGCO)*

DECISION-MAKING THROUGH DATA & TECHNOLOGY

A fourth agricultural revolution - one focused on data - is underway. Many farmers are utilizing more artificial intelligence and machine learning-powered farming apps, sensors, automated agricultural machines, and market models to make smarter on-farm decisions aimed at improving crop management and yield while reducing cost, environmental impact, and effort.

The massive amounts of data generated within the agri-food system at the farm, food, and consumer level have the potential to improve management decisions broadly and inform public policy. Enhancing productivity, sustainability, and resilience of agri-food systems will increasingly rely on real-time data gathering and interpretation, development and adoption of advanced decision making, digitization, machine learning, and automation, which cuts across the production-food-health continuum.

We understand how artificial intelligence and innovative digital applications can streamline industry efforts to meet sustainability goals and ensure the success of Canadian agriculture for generations to come. We believe our leadership in agricultural and biosystems engineering, precision farming, life-cycle analysis, econometrics and market data analysis, risk management, and policy analysis will deliver a progressive and sustainable future for agricultural communities in Canada and globally. Our research, training, and knowledge transfer activities provide the latest evidence-based information and recommendations to agri-food industry leaders to accelerate innovation, support producers, and advance the business of agriculture.

Specific strength areas

BIOSYSTEMS & AGRICULTURAL ENGINEERING

- *researchers collaborate broadly across FAFS and the Price Faculty of Engineering on digital agriculture, precision farming, sensor development, and data interpretation*
- *large graduate program engaged extensively with agri-food industry*
- *unique interdisciplinary bioproducts and biomaterials program with strong focus on technology development and commercialization*

AGRICULTURAL & AGRI-FOOD POLICY AND ECONOMICS

- *significant strengths in risk management, marketing, resource and environmental economics, and policy analysis*
- *extensive stakeholder engagement and policy influence*
- *new hires in supply chain disruptions in crop and livestock production, and econometrics*

OMICS APPLICATIONS TO AGRI-FOOD & HEALTH

- *application of omics technologies, particularly NMR and mass spectrometry-based platforms for rapid screening and for exploring key bioactive compounds in plants, foods and physiological samples*
- *research in personalized nutrition and precision health*
- *new hires in gut microbiomes and plant bioinformatics*

Building on our strengths and focusing on strategic pillars

By continuing to support and invest in areas of established strengths, as well as by strategically investing in people and infrastructure to bolster areas of focus, FAFS will be ideally positioned to lead initiatives that contribute towards building Sustainable, Resilient, Healthy, Fair & Diverse, and Technologically Advanced Agri-Food Systems. **Many of our ongoing research efforts are helping to move us towards this vision, as denoted below:**

ESTABLISHED AREAS OF STRENGTH	SUSTAINABLE	RESILIENT	HEALTHY, FAIR & DIVERSE	TECHNOLOGICALLY ADVANCED
Crop cultivars resilient to climate change & diseases, and for specific uses	✓	✓		✓
Agronomic systems for best performance & long-term sustainability	✓	✓		
Technologies to enhance crop production & protection	✓	✓		✓
Land & water resources management	✓	✓	✓	
Crop protection entomology & pollination	✓	✓	✓	✓
Animal nutrition & gut health	✓			
Crop-livestock integration	✓	✓		
Sustainable & resilient livestock production systems	✓	✓		
Grain & food quality, processing, and healthy foods	✓		✓	
Sustainable food & feed protein systems	✓		✓	✓
Applied nutrition & food security			✓	✓
Human nutrition & health		✓	✓	✓
Grain storage ecosystems		✓		✓
Biosystems & agricultural engineering	✓	✓	✓	✓
Agricultural & agri-food policy and economics	✓	✓	✓	✓
Omics applications to agri-food & health			✓	✓

METRICS & TARGETS

FAFS – By The Numbers:

7
DEPARTMENTS

3
RESEARCH CENTRES

2
RESEARCH STATIONS

1
SCHOOL OF AGRICULTURE

82
RESEARCH ACADEMICS (6-YEAR AVERAGE)

135
SUPPORT STAFF

1,157
STUDENTS

$102M
IN EXTERNAL RESEARCH FUNDING (2016-2021)

$205k
AVERAGE ANNUAL RESEARCH FUNDING PER ACADEMIC

We are proud of the many contributions made by our researchers over the past six years. By collectively working towards our vision and by tracking and reporting on these Faculty-wide metrics on an annual basis, we aim to extend the impact of our research as follows:

METRIC (UNIT)	2016-2021	2022-2027 KEY TARGETS	2022-2027 GOALS
Research Funding, Total ($)	**102M**	**125M**	**Strengthen research capacity & supports** • Add to number of research chairs • Increase partnership funding • Enhance Tri-council success • Continue capital upgrades and new investments
Tri-Council ($)	23.4M		
Other (industry/government/producer groups) ($)	57.7M		
AAFC & Manitoba Agriculture ($)	10.1M		
Mitacs ($)	4.6M		
Sub-contracts from other academic institutions ($)	3.6M		
UM Internal grants ($)	2.6M		
Researchers with Tri-Council funding (% current holders)	59	70	
Total research funding per academic ($)	1.2M	1.5M	
Externally funded research chairs (active, #)	5	8	
Grad Student Training (completed grad students, #)	**419**	**540**	**Provide an exceptional training environment** • Increase MSc, PhD and PDF training • Continue to attract high quality trainees • Enhance diversity and inclusivity of training
PhD	105	140	
MSc & MEng	314	400	
% Female (of all grad students)	54		
% Domestic (of all grad students)	48		
Post-Doctoral Fellows (avg #/yr)	49	60	
Research Associates (avg #/yr)	31		
Scholarly Output (#)	**1,864**	**2,300**	**Extend the reach of our achievements** • Increase peer-reviewed publications and scholarly output • Focus on high quality and open access journals • Target journals with large readership and distribution • Perform well on field-weighted citation and viewing measurements • Expand and enhance intradisciplinary and international collaborations • Broaden social media presence to further highlight research, expertise, and impact
% open access	41.4	50	
Avg # Scholarly Output/researcher/yr	3.8		
% Publications in Top Journal Percentiles	32.2	35	
% Publications involving International Collaborations	43.3	50	
Citations (#)	**24,437**	**30,000**	
Field Weighted Citation Impact (FWCI)	1.3		
Citations per publication	13.1		
Avg # Citations/researcher/yr	49.6		
% Publications in the top 10% most cited journals	13.7		
Views (#)	**60,433**	**75,000**	
Field Weighted Views Impact (FWVI)	1.27		
Views per publication	32.4		
Industry & producer/commodity group partnerships (#)	**137**	**160**	**Further partnerships & innovation** • Build and strengthen partnerships • Increase industry internships for HQP • Encourage commercialization activities
Mitacs Internships (# of student interns)	69	100	
Inventions (#)	11	15	
Royalties ($)	1.2M	1.5M	
Events/Promotions hosted by our Faculty	**298**	**350**	**Facilitate the adoption of scientific discoveries** • Increase knowledge translation efforts • Emphasize outreach and stakeholder engagement
Conferences (#)	22	25	
Seminars (#)	258	300	
Field Days (#)	18	25	

This Strategic Research Plan emerged from a broad, reflective and engaged consultation process across all departments within the University of Manitoba's Faculty of Agricultural and Food Sciences. It communicates our vision, approach, core values, strengths, priorities, and targets to our community and external stakeholders. It delineates broader strategic directions for our Faculty and provides a framework for aligning future investments with Faculty priorities.

For research & partnership inquiries, please contact:

agresearch@umanitoba.ca
umanitoba.ca/agricultural-food-sciences/research

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