



Nineteen USask researchers were awarded \$6.8 million to support 29 innovative crop-related projects through the Agriculture Development Fund. Kaylie Krys photo

USask Awarded \$14 million to support innovative crop research

The University of Saskatchewan (USask) has been awarded \$14 million through Saskatchewan's Agriculture Development Fund (ADF), with \$7.2 million of the funds allocated to operating the Crop Development Centre (CDC) for the next five years.

Nineteen USask researchers were awarded \$6.8 million to support 29 innovative crop-related projects, ranging from using plant-derived ethanol and biodiesel to reduce plastic waste, to developing nutritionally balanced milk using pulse and oilseed protein, to tackling a root rot problem in lentils, a key export for Saskatchewan.

"I am grateful for the investment in crop research at USask by the provincial and federal governments, and industry partners that recognizes the tremendous economic and social contributions of our researchers," said USask Vice-President Research Baljit Singh.

"Their innovations help deliver on USask's commitment to addressing global food security and creating value-added products that make Saskatchewan a world leader in agriculture."

The ADF is supported through the Canadian Agricultural Partnership, a five-year, \$3 billion investment by federal, provincial, and territorial governments to strengthen Canada's agriculture and agri-food sector. This includes a \$2-billion commitment that is cost-shared 60 percent federally and 40 percent provincially/territorially, with a \$388-million investment in strategic initiatives for Saskatchewan agriculture.

CDC a world leader in plant breeding

Plant geneticist and wheat breeder Dr. Curtis Pozniak (PhD), a professor in USask's College of Agriculture and Bioresources and CDC director since 2020, stressed the importance of support from the Ministry of Agriculture since CDC's inception 52 years ago.

"We are grateful for this significant ADF



Christina Weese photo

Dr. Curtis Pozniak (PhD), a professor in USask's College of Agriculture and Bioresources and Crop Development Centre director.

Dr. Pozniak said CDC has developed more than 500 crop varieties across 40 different crop types over the past five decades, noting that high-yielding productive varieties are fundamental to a sustainable agriculture production system. Thanks to CDC's innovations, Saskatchewan is now the world leader in exporting peas, lentils, and chickpeas to fast growing markets such as India, Bangladesh, and northern Africa.

The operating funds support the work of eight CDC scientists, grain quality testing, and field operations.

"This support is invaluable to achieving our vision of being global leaders in the area of plant breeding, pathology, and quality of the grain crops that we grow in Western Canada."

An economic assessment of the CDC showed that for every dollar invested in the CDC, there was a \$12 return to growers, he said. If one considers just pulse crops alone, such as lentils and peas, that return is a substantial \$44 for each dollar invested.

"Over the next five years, we will continue our work to be globally recognized for research and crop development and build our capacity in terms of people and infrastructure so that we can expand the important work that we do at CDC," said Pozniak.

Developing MAGIC lentils to fight root rot

Dr. Sabine Banniza (PhD), professor in USask's College of Agriculture and Bioresources, was awarded \$421,000 in ADF funding as well as additional support from the Saskatchewan Pulse Growers Association to develop a multi-parent advanced generation intercross (MAGIC) lentil population to explore resistance to two soil-borne pathogens that researchers believe are the main problems for root rot.

Root rot affects the below-ground portion of the developing plant, leading to poor performing pulse crops. Once root rot has set in, nothing can be done to reverse it.

Surveys between 2015 and 2017 indicate that 48 to 99 per cent of lentil and pea fields had moderate to severe root rot in Saskatchewan, and complete yield losses were reported in heavily infested fields in Saskatchewan and Alberta.

Banniza's team will use four "elite" lines of lentils that are close to being varieties that could be commercially grown and intercross them with four close wild relatives that have known resistance to the two pathogens, called *Fusarium avenaceum* and *Aphanomyces euteiches*.

"We will do an intensive crossing pro-



Christina Weese photo

Dr. Sabine Banniza (PhD), professor in USask's College of Agriculture and Bioresources.

gram to generate loads and loads of crosses—resulting in about 400 lines—that combine the genes of those two lentil groups as much as possible," said Banniza. "Then we will evaluate them in the phytotron (controlled environment facility) for resistance to these two pathogens."

Banniza is hopeful that her four-year project will identify resistant lines that can be developed right away into commercial varieties or are just a few steps away from that.

Using Saskatchewan ethanol and biodiesel to reduce plastic waste

In a world confronting a steadily growing mound of plastic waste that is polluting land and water alike, Dr. Martin Reaney (PhD), professor in USask's College of Agriculture and Bioresources, has been awarded \$360,000 to develop technology to degrade plastics to reusable forms by using Saskatchewan-produced biodiesel and ethanol.

Continued on page C2

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USask Awarded \$14 million to support innovative crop research

Continued from front

Biodiesel is a diesel fuel substitute made from plant oil or other renewable material.

Reaney said his team some years ago developed an "incredibly efficient" and very inexpensive catalyst using vegetable oil and salt water to make biodiesel, with glycerol as a byproduct. Researchers learned that they could add hydroxides of sodium, potassium or even lithium to the glyceride, with the resulting glycerol alkoxide crystallizing into a cheap catalyst.

When a catalyst is combined with ethanol and added to plastic materials, such as PET (polyethylene terephthalate, used to make water bottles etc.), or PLA (polylactic acid, used to make plastic film, etc.) plastics, or plastic powders from drinking water bottles, it reacts quickly to release monomers, which are the original materials used to create the plastic.

Another common source of non-biodegradable plastic waste is polystyrene, which is often used as an expanding foam in appliances or for moulding. This type of plastic can easily be dissolved in biodiesel, which is a fuel created from oils. The resulting mixture can then be utilized in various products, like concrete additives and sealants.

"I think if you combine this technology with some other innovations, such as laws requiring plastics be designed to be re-gregated back into pure plastics, this could be revolutionary," said Reaney.

Nutritionally balanced milk from pulse-oilseed proteins

The non-dairy milk market is growing rapidly, with a predicted global worth of more than \$3.7 billion US by 2026. Dr. Mike Nickerson (PhD), professor and acting head of food and bioproduct sciences at USask's College of Agriculture and Bioreources, has been awarded \$305,000 to develop a more nutritionally balanced milk alternative.

"We want to mimic more of the three-and-a-half, four per cent protein level of milk whereas some of the other plant-based milks tend to be lower in that amount," said Nickerson.

He also noted that many alternative milk products, especially legume-based products



Dr. Martin Reaney (PhD), professor in USask's College of Agriculture and Bioreources.

such as soya milk, have a "beanie" flavour. "We want to develop a gluten-free, plant-based milk with that complete healthy fatty acid profile, and also pay attention to flavour and try to improve the flavour profiles of these milk products," he said.

The key technology his team is developing is the blending of proteins, Nickerson said, making expansion into other products such as ice cream and yogurt attractive.

The technology brings several advantages to Saskatchewan agriculture producers, he said, with value-added opportunities for more plant proteins and expanded market segments for those ingredients, as well as higher demand for crops.

Other ADF funding recipients at USask are:

- Bishnu Acharya (Engineering), \$201,333 for valorization of canola meal by developing canola meal extract as a microbial media for fermentation; and \$175,000 for investigating the feasibility of agricultural biomass power generation in Saskatchewan.

- Yongfeng Ai (Agriculture and Bioreources), \$208,500 for investigating the use of infrared heating to improve functional and nutritional attributes of pea flours in prototype food products; and \$359,400 for the development, characterization, and food use of novel whole-cell flours from Canadian pulses.

- Sabine Banniza (Agriculture and Bioreources), \$262,500 for investigating commercially ready vegan protein-based entrapment systems for probiotics for inclusion in plant-based foods.



Dr. Mike Nickerson (PhD), professor and acting head of food and bioproduct sciences at USask's College of Agriculture and Bioreources.

- Jonathan Bennett (Agriculture and Bioreources), \$411,699 for identifying microbial inocula to increase salt tolerance in barley.

- Kirstin Bett (Agriculture and Bioreources), \$129,361 for identifying genetic tools to ensure Saskatchewan dry beans are protected from anthracnose.

- Maryse Bourgault (Agriculture and Bioreources), \$433,964 for investigating livestock re-integration in cropping systems for soil health improvement.

- Won Jae Chang (Engineering), \$550,853 for development of economical salinity remediation strategies for agriculture water using innovative desalination minerals.

- Anas El-Aneed (Pharmacy and Nutrition), \$153,625 for commercializing green extraction technology of phytosterols from canola oil waste stream.

- Supratim Ghosh (Agriculture and Bioreources), \$210,000 for developing pulse protein-based whipped cream with healthy vegetable fat as a high-value dairy alternative.

- Pierre Hucl (Agriculture and Bioreources), \$96,527 for increasing the efficiency of canary seed breeding and enhancing herbicide tolerance; and \$99,983 for combining higher anthocyanin levels, enhanced quality, and improved disease resistance in the purple wheat.

- Darren Korber (Agriculture and Bioreources), \$226,500 for examining potential threats from pea seed-borne mosaic virus and developing PSBMV-based tools to study legume seed development.

- Randy Kutcher (Agriculture and Bioreources), \$173,823 for developing an accelerated disease phenotyping system to select wheat germplasm resistant to FHB and stripe rust; and \$208,150 for evaluating flax-chickpea intercropping for disease management - fungicide regime and variety selection.

- Curtis Pozniak (Agriculture and Bioreources), \$195,001 for marker-assisted pre-breeding for alternative semi-dwarfing genes and anther extrusion in durum and bread wheat.

- Sean Prager (Agriculture and Bioreources), \$226,500 for examining potential threats from pea seed-borne mosaic virus and developing PSBMV-based tools to study legume seed development.

- Martin Reaney (Agriculture and Bioreources), \$260,000 for investigating vegan soft cheese and yogurt replacement products from pulses.

- Jeff Schoenau (Agriculture and Bioreources), \$102,789, for straw harvesting strategies to provide feedstock while maintaining soil and environmental quality.

- Jafar Soltan (Engineering), \$45,000 for investigating potential and feasibility of ozone treatment processes for the reduction of off-flavours and improvement of colour of plant proteins.

- Takuji Tanaka (Agriculture and Bioreources), \$218,000 for development of applications of legume protein enriched fraction derivatives: combinations of proteolysis and conjugation.

- Tom Warkentin (Agriculture and Bioreources), \$270,250 for developing soybean cultivars for profitable, sustainable prairie cropping systems; and \$278,875 for increasing protein-yield in pea using nested association mapping; and \$155,747 for the development of SNP markers for marker-assisted selection of pea for water use efficiency and micronutrients.

- Albert Vandenberg (Agriculture and Bioreources), \$225,000 for breeding high value lentils for future consumer trends; and \$250,000 for 3F2B - fast forward faba bean breeding.

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There has been some beautiful hoar frost in Southeast Saskatchewan and Southwest Manitoba this winter, sometimes for weeks on end. Diane Jamieson from Moosomin submitted this photo of a frosty farm scene recently.

Crown land grazing rates adjusted for 2023

The Government of Saskatchewan is freezing the 2023 rate charged to producers who lease Crown grazing land. Additionally, for 2023, lessees who must reduce their stocking rates on Crown land due to ongoing dry conditions will be eligible for a rent reduction to a maximum of 50 per cent.

"Saskatchewan's livestock sector is facing increasing costs of production in addition to successive years of low precipitation in many areas of the

province," Saskatchewan Agriculture Minister David Marit said. "Keeping this year's grazing rate at 2022 levels and implementing reductions for Crown grazing lands hardest hit by drought, will assist producers through the current challenges while supporting the continued stewardship and productivity of the land."

Saskatchewan's Crown grazing rates are established annually using a formula based on fall cattle prices and the long-term


stocking rate of each parcel of land. This year's rate freeze will apply to all grazing leases across the province.

A 2023 rent reduction will apply in situations where an individual lessee or pasture association must reduce the number of animals grazing Crown leases by 20 per cent or more, compared to the approved long-term carrying capacity of that land. The 2023 rate reduction will match the reduction in carrying capacity, ranging from a 20 per cent


rate reduction up to a maximum of 50 per cent.

"We are pleased with today's announcement, as it is something many of our ranchers have been calling for," Saskatchewan Cattleman's Association Chair Arnold Balicki said. "We appreciate the responsiveness of this government, and the pragmatic approach taken with today's announcement shows a real interest in supporting our livestock industry in the face of ongoing challenges."

Saskatchewan has about six million acres of Crown land under grazing leases.



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\$6 million invested into livestock and forage research

A total of \$6 million in funding was announced in January by Canada's Minister of Agriculture and Agri-Food Marie-Claude Bibeau and Saskatchewan Agriculture Minister David Marit for livestock and forage research activities.

Provided through the Agriculture Development Fund (ADF), funded under the Canadian Agricultural Partnership, this will support a total of 34 new scientific projects for 2023.

"The work of Canadian scientists is helping to make our agricultural sector the leader it is, both in terms of productivity and sustainable development," said Bibeau. "Our government will continue to invest in this vital research to support the success of our producers."

"Scientific research is the engine that drives innovation and competitiveness, and helps keep Saskatchewan's world-class agriculture producers doing what they do best," Marit said. "These investments enable researchers and institutions to do the work that helps position our producers to meet the global market needs of tomorrow. Research drives sustainability in the livestock sector."

This year's projects, which are submitted annually and awarded funding on a competitive basis, focus on topics such as developing water quality test kits for agricultural ponds in Saskatchewan, developing economic thresholds

and sampling plans for lesser clover leaf weevil in red clover, and development of an effective, multivalent vaccine to control foot rot in cattle.

In addition to the federal-provincial ADF funding, a total of \$288,530 for 12 livestock and forage projects was contributed by seven industry co-funders:

- Saskatchewan Alfalfa Seed Producers Development Commission
- Saskatchewan Canola Development Commission
- Saskatchewan Cattlemen's Association
- Saskatchewan Forage Seed Development Commission
- Sask Milk
- Alberta Milk
- Results driven agriculture research

"Investment in research is a cornerstone for the growth of our industry," Saskatchewan Cattlemen's Association Chair Arnold Balicki said. "Saskatchewan beef producers value projects that focus on priorities such as increasing the nutritional value of forage or better managing their herd's health, which leads to more profitability on their operations. We are pleased to see both the federal and provincial governments partnering with us and ensuring this essential research is adequately funded."

"A sustainable forage seed production system helps

Canadian livestock producers have a consistent, reliable and affordable supply of high-quality feed, and Saskatchewan's production of red clover seed used for sowing supports Canada's position as the number two exporter of this seed to the European Union and the number one exporter to the United States," Saskatchewan Forage Seed Development Commission Executive Director Jo-Anne Relf-Eckstein said. "Determining economic thresholds for timely control of the lesser clover leaf weevil—the first research done on this pest—is a crucial project. Our growers are grateful to the ADF for this support to help ensure sustainable red clover seed production in Saskatchewan and its use for planting as a good component in livestock grazing mixtures, or as a cover crop to improve soil health and fix nitrogen."

The ADF is supported through the Canadian Agricultural Partnership, a five-year, \$3 billion investment by federal, provincial and territorial governments to strengthen and grow Canada's agriculture, agri-food and agri-products sectors. This includes a \$2 billion commitment that is cost-shared 60 per cent federally and 40 per cent provincially/territorially for programs that are designed and delivered by provinces and territories, including a \$388 million investment in strategic initiatives for Saskatchewan agriculture. The CAP ends on March 31, 2023.

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Government of Canada and Saskatchewan invest \$17.6 million in crop research

Canada's Minister of Agriculture and Agri-Food Marie-Claude Bibeau and Saskatchewan Agriculture Minister David Marit recently announced total funding of \$17.6 million for crop-related research in 2023.

Invested through Saskatchewan's Agriculture Development Fund (ADF), the announcement includes \$10.3 million for 49 research projects, as well as \$7.2 million in operational support over the next five years for the Crop Development Centre (CDC) in Saskatoon.

Since being established in 1971, the CDC—a research organization with the Department of Plant Sciences at the University of Saskatchewan—has released over 500 commercial crop varieties in over 40 different crop types.

"Climate change and severe weather conditions threaten farmers' livelihoods," Bibeau said. "We continue to invest in research and innovation so that producers have the tools they need to maintain and increase productivity despite the changing climate."

"Saskatchewan is a consistent and reliable supplier of agriculture products to today's growing and constantly changing global market, and investments like these enable us to be ready for the market of tomorrow," Marit said. "Encouraging this kind of research and innovation is the first step to staying competitive. Staying competitive means Saskatchewan producers can and will remain the best there is at what they do—sustainably feeding the world."

Examples of the individual research projects being

funded include exploring the diversity of Fusarium root to species infecting pulse crops, insect response to climate change and ag inputs across the prairies, economic salinity remediation strategies for agriculture water using innovative desalinization minerals and a nutritionally balanced pulse-oilseed protein-based beverage.

An additional \$4.6 million was contributed in support of this year's research projects by the following industry partners:

- Alberta Wheat Commission
- Alberta Barley Commission
- Alberta Canola Producers Commission
- Manitoba Crop Alliance
- Manitoba Canola Growers
- Saskatchewan Barley Development Commission
- Saskatchewan Canola Development Commission
- Saskatchewan Forage Seed Development Commission
- Prairie Oat Growers Association
- Saskatchewan Cattlemen's Association
- Saskatchewan Pulse Growers
- Saskatchewan Wheat Development Commission
- Western Grains Research Foundation

"The continued support of the ADF is greatly appreciated," Saskatchewan Pulse Growers Board Chair Trent Richards said. "The funding supports SPG's new research investments that work to address top concerns and improve profitability and competitiveness of Saskatchewan pulse producers."

Each year, on a competitive basis, the ADF awards sup-

port to projects focusing on research with the potential to create growth opportunities for provincial agriculture producers and enhance the sustainability and competitiveness of the industry in Saskatchewan. This annual investment helps generate new knowledge, information and technologies for producers and food processors, such as feed and nutrition information for ranchers and new crop cultivars and production information for farmers.

"For over 50 years, the Saskatchewan Ministry of Agriculture has been a strong supporter of the Crop Development Centre," Director at the University of Saskatchewan's Crop Development Centre Dr. Curtis Pozniak said. "We're grateful for the renewed funding that supports our operations, and for the continued investment to support research and innovation in the province. The renewed investment announced today reaffirms the provinces' commitment to the CDC's mission to improve the profitability of western Canadian producers and to our continued vision of being a world-class crop improvement organization."

The ADF is supported through the Canadian Agricultural Partnership, a five-year, \$3 billion investment by federal, provincial and territorial governments to strengthen the national agriculture and agri-food sector. This includes a \$2-billion commitment that is cost-shared 60 per cent federally and 40 per cent provincially/territorially for programs that are designed and delivered by provinces and territories, with a \$388-million investment in strategic initiatives for Saskatchewan agriculture.

Manitoba Government announces agricultural crown land lease auctions to be held online

The Manitoba government's agricultural Crown land lease and permit auctions will be held online Feb. 6 to 11, Agriculture Minister Derek Johnson announced in January.

"Manitoba's agricultural Crown lands play a vital role in supporting a vibrant and sustainable agricultural sector. The online approach ensures Manitoba producers have equal opportunity to rent lands that will support their farming operations," said Johnson. "In addition to ensuring equal access to rental opportunities, a temporary rent reduction for

forage leases on agricultural Crown lands has been implemented as part of our government's commitment to supporting producers after a difficult season last year."

Leases and permits are available to farmers and ranchers to provide additional land base for agricultural activities. The Agricultural Crown Lands Leasing Program supports the sustainable expansion of livestock in Manitoba, contributes to ecological goods and services, and supports mitigation and adaptation to climate change.

A number of agricultural Crown land parcels will be available to rent for haying, grazing or cropping. The official listing of agricultural Crown lands available for rent can be found at: http://resd.ca/leases_and_permits/LPproperties.aspx#agLeasePermit.

The online auctions will be hosted by Garton's Auction Service with further information to follow at <https://gartonsauction.com/>.

Last fall, the Manitoba government introduced a temporary rent reduction for forage leases on agricultural Crown lands. The

reductions will be in place for the next three years with a 50 per cent reduction in 2023, a 33 per cent reduction in 2024, and a 15 per cent reduction in 2025.

The temporary rent reduction will allow land productivity to recover from multiple years of extreme moisture. The Manitoba government continues to

explore policy, program and service improvements to enhance sustainability and productivity of agricultural Crown lands, the minister noted.



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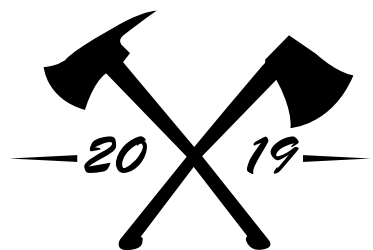
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AI and machine learning for better farm management decisions

BY PETER GREDIG

Non-ag sectors like real estate and financial services are experiencing a revolution thanks to artificial intelligence (AI) and machine learning. Agriculture has a similar data-rich environment, but there are differences that make it harder to hand off farm management decisions to a computer.

As a digital product manager for a major agricultural input company, Ontario-based Tony Meekes is entrenched in the pursuit and development of better management tools for farmers. In recent years there's been plenty of hype surrounding the use of AI to turn reams of agronomic data into meaningful decision aids.

"We're on the cusp of making significant strides in certain areas. I believe that some of the compelling advances and uses of machine learning in other sectors will find their way into agriculture," says Meekes. He also points out that AI is a broad term and that machine learning is a better term to describe how good data can be used to generate credible and trustworthy decision-making tools.

What is machine learning?

Machine learning is a form of AI whereby a programmer develops algorithms that teaches the technology how to solve problems rather than having the programmer do it themselves. It's a major distinction and it's powerful—in the right setting.

For example, machine learning is used to detect credit fraud by spotting unusual patterns and to provide customer service via chatbots that answer questions. Machine learning completes these tasks quickly and accurately.

Machine learning in real estate

Real estate investors are using AI and machine learning software to predict how properties will perform in the rental market, and future property values. There are also tools that accurately predict property maintenance costs in the near and long term. Machine learning can pull all the available data relating to real estate and take into account other economic information that is peripheral but still impactful. AI software makes these calculations instantly—faster and better than a human.

So what about agriculture?

Machine learning is based on thousands of iterations with good data. High quality data and high numbers of iterations speed up the machine learning process. The algorithm spots patterns and generates a more useful and accurate output.

But in agriculture, data that is relevant for one region,



crop or niche may not be valid or helpful in another. The variables at play are greater and less predictable, even though farmers have been collecting yield and soil fertility data for more than two decades.

Weather remains a challenging wildcard for machine learning in field crop production, so controlled environments in livestock and greenhouse production are better suited to its benefits. Many manufacturers are using machine learning tools to predict which mechanical components in industrial equipment will fail and when. This could be a fit for agriculture too.

Meekes sees a few obstacles that need to be addressed before machine learning is optimized for agriculture. "We saw a number of major players aggressively building crop production and equipment use databases in the past few years, but there is a huge opportunity to use AI and machine learning for financial management," Meekes says.

"Farmers have been more protective of their financial data so that needs to be addressed, but the success this tech has had in other sectors suggests layering aggregated financial data with production and agronomic data can be extremely powerful," he says.

What's next

Going forward, Meekes says farmer acceptance of the technology might be the biggest challenge. "Farmers are experienced in using data to validate their experience and gut instincts, but they may be reluctant to hand off major decisions to these tools."

It's more likely that they will trust AI to guide them on smaller, day-to-day, real-time decisions, and maybe to get a better handle on how things like inflation, carbon market policies and interest rates may affect financial management decisions.



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USask awarded \$5.2 million for innovative research projects

Early detection of infectious diseases in chickens and developing regional influenza vaccines for pigs are among 28 innovative livestock and forage research projects at the University of Saskatchewan (USask) to be awarded a total of \$5.2 million in new funding Wednesday.

The money comes from Saskatchewan's Agriculture Development Fund (ADF), a program jointly funded by the provincial and federal governments.

In all, 25 USask researchers were awarded funding for projects that range from using artificial intelligence to monitor the well-being of pigs to developing vaccines to control diseases such as foot rot in cattle, to controlling microbial diseases in bees and maximizing the use of wheat straw in the diet of beef cattle. Five of these projects, totalling \$863,000, are at the USask-owned Prairie Swine Centre.

"This major investment by our federal and provincial governments and industry partners ensures the continued advancement of leading-edge research by USask scientists in the areas of livestock well-being and health, production efficiency, and agricultural technology," said USask Vice-President Research Baljit Singh.

"We greatly appreciate this support for research that is contributing to global food security, and to enhancing the economy of Saskatchewan and Canada by developing value-added products, increasing exports, and training of highly skilled professionals."

Industry co-funders of the USask projects are: SaskMilk; Alberta Milk; Saskatchewan Cattlemen's Association; Saskatchewan Forage Seed Development Commission; Saskatchewan Alfalfa Seed Producers Development Commission; Results Driven Agriculture Research; and the Saskatchewan Canola Development Commission.

Getting the poop on broiler chicken health

Dr. Susantha Gomis (PhD), professor



Twenty-five USask researchers were awarded funding for projects.



Dr. Susantha Gomis (PhD), professor and head of the Department of Veterinary Pathology in USask's Western College of Veterinary Medicine (WCVM).

and head of the Department of Veterinary Pathology in USask's Western College of Veterinary Medicine (WCVM), was awarded \$170,000 to develop a biomarker-based fecal test for the early detection and control of diseases and performance improvement in commercial broiler chickens.

"The key element of this project is the rapid diagnostics focus," said Gomis.

With concern about antibiotic-resistant superbugs and consumer demands leading to

eliminating antibiotics from broiler feed meant to prevent diseases and improve bird welfare, infection rates of pathogens such as E. coli and Clostridium perfringens are increasing in chickens.

But as Gomis explains, with broilers headed to slaughter at around six weeks, conventional lab testing to diagnose a bacterial or viral infection (or both) and treat it take too long, as regulations require a 21-day withdrawal period for certain antibiotics to clear a bird. The industry currently lacks the ability to detect pathogens within one to two days of onset of an infection.

Gomis already had been analyzing metabolites in the blood serum of broilers to identify biomarkers that signal an infection even before lesions are detectable under a microscope. He is now investigating if chicken feces provide a non-invasive method of detecting the biomarkers of infections.

Such early detection of subclinical infections would be a boon for the industry, not only by providing early warnings of infection, but also in terms of savings for expensive feed whose calories are being diverted to activate the immune system of sick birds instead of being used as fuel for growth.

"The technology to detect diseases early before clinical signs appear can help improve poultry health, food safety, and animal welfare, and ultimately enhance the competitiveness of Canada's broiler production," he said.

Developing a regional influenza vaccine for pigs

Dr. Susan Detmer (DVM, PhD), associate professor of veterinary pathology at the WCVM, was awarded \$150,000 over three years to develop vaccines for pigs that are more effective against current strains of the influenza A virus than commercial products that have become out of date.

Continued on page C11

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Seventeen pulse research projects receive funding support



On January 11 Saskatchewan Pulse Growers (SPG) announced funding for 17 pulse-specific research projects, co-funded through Saskatchewan's Agriculture Development Fund (ADF). SPG's total investment of over \$3 million was leveraged through the ADF process for a total investment in pulse research and development of over \$6.7 million. These research projects are over two to five years in duration and will involve pea, chickpea, soybean, lentil, dry bean, and faba bean, and address disease, root rots, herbicide resistance, insect control, fungicide use, soil fertility management, and processing. A complete list of projects, including researchers, and SPG's investment can be seen below.

- The Prairie Crop Disease Monitoring Network: Fostering further network development, Dr. Thomas Turkington, Ag-

riculture and Agri-Food Canada – \$37,982

- The effect of liming on soil phosphorus use efficiency and cycling, Dr. Barbara Cade-Menun, Agriculture and Agri-Food Canada – \$49,610

- Examining potential threats from Pea Seed-borne Mosaic Virus and developing Pea Seed-borne Mosaic Virus (PsbMV) based tools to study legume seed development, Dr. Sean Prager, University of Saskatchewan – \$86,825

- RO CET – Rapid, on-farm, cost-efficient electrochemical testing for contaminants in grain, Dr. Sabine Kuss, University of Manitoba – \$52,095

- Insect response to climate change and ag-inputs across the Prairies, Dr. Meghan Vankosky, Agriculture and Agri-Food Canada – \$88,000

- Flax-chickpea intercropping for disease management – fungicide regime and variety selection, Randy Kutcher, University of Saskatchewan – \$129,950

- Exploring the diversity of Fusarium solani and F. oxysporum infecting pulse crops, Dr. Sabine Banniza, University of Saskatchewan – \$155,906

- Development of molecular tools for Fusarium avenaceum root rot resistance in lentil with different seed coat pigmentation, Dr. Sabine Banniza, University of Saskatchewan – \$484,168

- Developing soybean cultivars for profitable, sustainable prairie cropping systems, Dr. Tom Warkentin, University of Saskatchewan – \$310,788

- Increasing protein-yield in pea using nested association mapping, Dr. Tom Warkentin, University of Saskatchewan – \$160,354

- Development of SNP markers for marker-assisted selection of pea for water

use efficiency and micronutrients, Dr. Tom Warkentin, University of Saskatchewan – \$66,555

- Genetic tools to ensure Saskatchewan dry beans are protected from anthracnose, Dr. Kirstin Bett, University of Saskatchewan – \$148,765

- Reduction of off-flavors and improvement of color of plant proteins: Potential and feasibility of ozone treatment processes, Jafar Soltan, University of Saskatchewan – \$51,750

- Commercially-ready vegan protein-based entrapment systems for probiotics for inclusion in plant-based foods, Dar-

ren Korber, University of Saskatchewan – \$34,500

- Expanding herbicide tolerance options in lentil through gene-editing, Dr. Jodi Souter, J4 Agri-Sciences Ltd. – \$557,001

- Develop a novel tribo-electrostatic (TES) technique for dry separation of protein and starch from pulses/cereals, Venkatesh Meda, University of Saskatchewan – \$343,850

- Improving flavor of pea protein using clean-label structural modifications and different pilot-scale processing techniques, Dr. Thushan Withana-Gamage, KeyLeaf – \$251,419




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USask awarded \$5.2 million for innovative research projects

Continued from page C7

"We have been working towards a regional vaccine because we have dominant viruses within a region," said Detmer, who has been doing influenza virus surveillance in pigs across Western Canada since 2011.

"So, within Alberta and Saskatchewan, we have five viruses that are dominant. We can put those five viruses in a vaccine, and it will protect most of the pigs in our region. The same can be done for the five viruses that are dominant in the Manitoba region.

She is also developing a vaccine for flu strains in the Quebec region, on a fee-for-service basis.

"So, we can have three different vaccines or five different vaccines that will cover all of Canada because there's enough consistency and cross-reactivity between these virus that we should be able to get to most of the pigs," she said.

Of special concern is a novel strain of the flu, Alpha H1N2, that first appeared in Manitoba in 2013, and in Saskatchewan two years later, and subsequently has become a dominant strain. It has increased the mortality rate of nursery pigs by five per cent to 10 per cent, and has a high zoonosis potential, meaning it can infect humans and then reinfect pigs through human contact. This pig-origin influenza A viruses infected a swine worker in Minnesota in 2016 and in Manitoba in 2021.

In developing the vaccine, Detmer is also testing its efficacy for having antibodies in immunized pregnant sows show up in their colostrum to protect piglets during their first six to eight weeks of life when they are most at risk of severe complications from influenza.

USask funding recipients also include

- Jonathan Bennett (Agriculture and Bioresources), \$207,010 to determine combined herbicide and fertilizer application for absinth control
- Bill Biliget (Agriculture and Bioresources), \$25,025 for developing alfalfa cultivar blends for forage production based on sub-species, fall dormancy and root type; and \$219,525 for accelerating the development of forage wheat varieties for improved forage quality and biomass yield
- Jennifer Brown (Prairie Swine Centre, and Agriculture and Bioresources), \$215,500 for improving the feed efficiency of pork production through the use of thermal profiles
- Scout Butler-Siemens (Arts and Science), \$25,600 to investigate the decomposition of manure in aquatic ecosystems
- Jeffrey Chen (Vaccine and Infectious Disease Organization (VIDO), and Medicine), \$204,310 for harnessing trained immunity-inducing biomolecules to protect pigs against multiple viral and bacterial infections
- Daniel Columbus (Prairie Swine Centre, and Agriculture and Bioresources), \$90,000 for evaluating and optimizing peri-weaning management to improve perfor-



Dr. Susan Detmer (DVM, PhD), associate professor of veterinary pathology at the WCVN.

mance, welfare, and resilience of piglets; and \$30,000 for mitigating effects of deoxynivalenol (DON) intake with increased dietary nutrient content in pigs

- Matheus Costa (WCVN), \$200,000 for a pipeline for testing and validating non-antibiotic tools to mitigate diarrhea in grower-finisher pigs; and \$150,000 to investigate non-antibiotic treatment for swine dysentery
- Antonio Facciolo (VIDO, WCVN), \$327,750 for the development of injectable and oral vaccines for John's disease in cattle
- Philip Griebel (VIDO, WCVN), \$31,790 for an analysis of antibody concentration in beef calves born to dams administered inactivated or modified-live viral vaccines
- Eric Lamb (Agriculture and Bioresources), \$43,600 to investigate litter accumulation and productivity in Saskatchewan native rangelands
- Bart Lardner (Agriculture and Bioresources), \$175,200 to investigate growth-promoting implant strategies to enhance neonatal to wean-calf health, performance and profit
- Qiang Liu (VIDO, WCVN), \$369,000 for a bivalent subunit vaccine for porcine epidemic diarrhea (PED)
- Rex Newkirk (Agriculture and Bioresources), \$91,500 for determination of micronutrient availability resulting in improved precision formulation with canola meal in animal feeds
- Gregory Penner (Agriculture and Bioresources), \$190,833 for post-weaning management for beef-dairy cross calves in Western Canada: Phase 2 of 2

- Jose Perez-Casal (VIDO, WCVN), \$243,017 for the development of an effective multivalent vaccine to control foot rot in cattle
- Sean Prager (Agriculture and Bioresources), \$180,600 for developing economic thresholds and sequential sampling plans for lesser clover leaf weevil in red clover
- Bernardo Predicala (Prairie Swine Centre, and Engineering), \$210,000 for optimizing temperature requirements of pigs to reduce energy use in swine production; and \$317,500 for precision detection of real-time health and welfare conditions of pigs using advanced artificial intelligence (AI) technologies
- Gabriel Ribeiro (Agriculture and Bioresources), \$735,866 for maximizing wheat straw use in the diet of beef cattle with canola or flax screenings supplementation
- Elemir Simko (WCVN), \$269,900 to investigate cost-effective and evidence-based antibiotic control of AFB and spread of AMR in beekeeping industry in Saskatchewan
- Emily Snyder (WCVN), \$112,198 to investigate the role of serotonin in acute interstitial pneumonia in feedlot cattle
- Fabienne Uehlinger (WCVN), \$102,911 for establishing evidence-based vaccination schedules for sheep producers
- Peiqiang Yu (Agriculture and Bioresources), \$135,600 to investigate the use of a newly developed blend protein pellet on rumen parameters and milk fat in dairy cows

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Farm pride, from one generation to the next

With a healthy ground cover of snow in our area and a whole lot of days of hoar frost (how beautiful was that?), we have our fingers crossed for good moisture levels come spring seeding. In the meantime, all this snow means all sorts of fun for outdoor enthusiasts. My favourite is sledding. While I personally leave the 'going down the hill' to the kids in an effort to keep the new hip in tip-top shape, I love when the grands get out with their sleds and calf sleighs to ride the hill.

Such was the case a week or two ago when I took my youngest grandson (eight) to a hill in Regina. What an incredibly beautiful day it was—blue skies,

trees hanging heavy with hoar frost and temperatures just perfect for an afternoon of outdoor fun.

"Did you toboggan when you were little?" Hayden asked as we walked home. "Absolutely, I did," I told him. And the young man of many questions continued on. "Did you like to wake up early in the morning like I do?" he asked. "Oh yes, very early," I said. "In fact, I would make four snowmen some mornings before the school bus came to take me to school," I continued.

And that's when he asked why I didn't just watch YouTube when I got up in the morning. He totally got that I didn't have YouTube when I was his age but

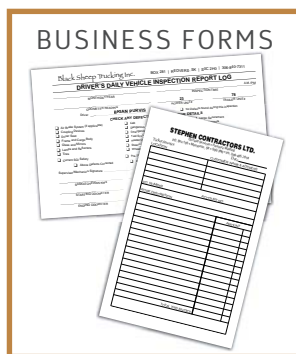
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what really brought a quizzical look across his face was when I told him we had one channel on

our black and white TV. Now there was a concept that seemed almost impossible to imagine.



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And so as time goes marching by, technology expands almost at a rate that's hard to comprehend.

When it comes to farming and all the advances that have been made in the production and operation of equipment, it can be mind-boggling. For those closing in on retirement (like moi), there are some things I will leave to the next generations to tackle, but one thing will never change no matter our age and that's our love and respect for the land and the livestock.

I was road-tripping across Kansas last week, down secondary highways and through lots of smaller communities and it almost felt like I was home on the Saskatchewan prairies instead of the flat southern plains of Kansas. Everywhere I looked, there were bins, augers, tractors, combines (parked of course at this time of year) and machinery dealerships with their lots full of balers and sprayers and equipment of every kind.

With the exception of the corn headers on the combines, the acres of corn stubble and the large number of feed lots in the area I was traveling through, so much of it felt the same. I felt a deep familiarity with the folks of Kansas because I understand the efforts of their jobs. I also understand the reward and I have to tell you, I felt a deep sense of pride in the agri-industry that is so much a part of who I am and what I do.

While I wasn't particularly people-watching (okay, maybe I was), one day during a quick Walmart stop to stretch my legs and walk around during my Kansas trip, I noticed an elderly gentleman walking towards his wife who was at the til next to the one I was at. He was dressed in well-worn work overalls and walked slowly along, holding onto his cane for support. His old tan-colored cap surely had been through the washing machine a time or two, so softened and out of shape it was. It was obvious he was dealing with pain but as he approached the counter, his leathery, line-ridden face lit up as he talked to his wife and the lady at the til. I don't know what he was saying but his smile just warmed my heart and I watched as he and his wife walked slowly away. She offered him a portion of the cart to hang on to while the other remained on his cane and together they walked outdoors. My guess—he is or was a farmer but whatever this gentleman in rural Kansas had done in his life, it was obviously something that was still dear to his heart for he dressed the part.

And this is what always speaks to me about farmers. There's a genuineness to them that goes above and beyond the call of duty—whether for their family, their land, their livestock or their neighbour. And that totally warms my heart!

And speaking of warming my heart, I love when I see the twins on the farm, currently busy with calving, so in love with all things farm. Yes, they intersperse their way of life with curling and hockey and snowmobiling and sledding and so much more, but these two are part of the next generation of farmers. And it won't be many years before they are talking about a new piece of machinery or technology and how it works and I'll be wondering what the heck they are talking about.

So here's to the young generation of farmers—I know our farmers are passing along their skills and their knowledge to the up and comings in the ag industry, and that is something we can all be proud of!

Manitoba announces \$10 million to support new Prairie Innovation Centre at Assiniboine Community College

The Manitoba government will invest up to \$10 million to support the development of the Prairie Innovation Centre at Assiniboine Community College (ACC) in Brandon, Premier Heather Stefanson announced here today as part of her address at the 46th annual Manitoba Ag Days.

"As our economy emerges into a new era of growth, our government is working collaboratively with industry, the business sector and our post-secondary institutions to ensure we attract our youth to the jobs of the future, and provide the training and skills necessary to be successful," said Stefanson. "I want to commend ACC and their leadership for spearheading this

expansion project, along with their donors and community members who are keen to see this centre come to life which will provide innovative programming and support the growth of the local community and economy."

As part of ongoing collaborative efforts to align education and training to meet evolving labour market needs and foster competitiveness and growth, ACC aims to significantly expand its programming to address labour shortages and high-demand jobs, specifically in the agriculture sector, the premier noted.

"This investment represents a significant step forward for Assiniboine Com-

munity College to help support new programs for labour market development, applied research and industry engagement in the agriculture, environment and processing sectors," said Mark Frison, president, ACC. "We have seen great enthusiasm from the community, industry and donors for the project. It's great to see Premier Stefanson and the Manitoba government respond in such a significant way by providing up to \$10 million to assist the college in moving this project forward to the next stage of development."

ACC has proposed 16 new or expanded educational programs and supporting infrastructure on its North Hill Campus.

The college projects the new centre would increase enrolment by approximately 600 students, to nearly 900 from the current 300, in such high-demand fields as agriculture, agriculture extension, environment and technology programs, the premier noted.

The \$10-million commitment will support the initial planning phases, including exploration of facilities and land development needed to support the design and development of the new centre. Assessment of the proposed educational programs and associated supporting infrastructure is slated to begin early this year, the premier said.

Manitoba launches fertilizer efficiency calculator

As part of its ongoing commitment to support the agricultural industry and help farm producers develop climate change resiliency, the Manitoba government is launching a new fertilizer efficiency calculator tool, Agriculture Minister Derek Johnson announced.

"Manitoba farm producers are great stewards of the land in the use of sustainable agricultural practices and work tirelessly every day to produce high-quality, affordable food while protecting the environment," said Johnson. "Our government recognizes producers face historically high fertilizer prices, highly variable grain prices, increased focus on environmental impacts of fertilizer use and the need to integrate, recalibrate and optimize all these variables in order to maintain farm profitability. We created this calculator so that producers, agronomists and industry partners can quickly and easily assess the financial benefits to improving fertilizer management practices."

The calculator uses field-specific soil test results and science-based analysis to provide application recommendations, to optimize fertilizer application on-farm. The calculator compares a producer's fertilizer plans to the most- and least-

efficient fertilizer application cost per acre and net profit per acre. It also provides a user friendly dashboard score for cost efficiency, greenhouse gas efficiency, maximum profitability and maximum yield.

The new fertilizer efficiency calculator demonstrates the value of adopting 4R Nutrient Stewardship, noted the minister, adding that the Manitoba government recently signed a fourth memorandum of understanding with Keystone Agricultural Producers (KAP) and Fertilizer Canada to reaffirm its commitment to the science-based nutrient management framework.

"Manitoba has been a longstanding champion of the 4R Nutrient Stewardship program as a key driver for increased production and reduced environmental impact," says Karen Proud, president and CEO, Fertilizer Canada. "This calculator helps address barriers to adoption of the 4R program by helping farmers understand the value these practices can provide to their bottom line and the environment. Farmers need tools and data to better inform their decisions and we look forward to working with government and industry to build on this important work. Using the calculator is a great start-

point and if growers are interested in learning more about 4Rs they should speak with their trusted adviser."

The 4R approach considers the:

- right source, which matches fertilizer type to crop needs;
- right rate, which matches the amount of fertilizer to crop needs;
- right time, which makes nutrients available when crops need them; and
- right place, which keeps nutrients where crops can use them.

"One of KAP's main goals is to ensure the perspectives of producers are included in the development of any initiatives or tools focused on supporting sustainable agricultural practices, to ensure they result in practical strategies that can be applied on-farm," said Bill Campbell,

president, Keystone Agricultural Producers. "Agriculture has the solutions to many of the challenges we face, and KAP is pleased to see the fertilizer efficiency calculator come to fruition as a result of direct consultation with Manitoba farmers. This new tool will allow for farmers to better measure their fertilizer use for improved sustainability outcomes, reduced input costs, and encourage broader adoption of nutrient management strategies like 4R Nutrient Stewardship."

The Excel-based version of the calculator is now available at: www.gov.mb.ca/agriculture/farm-management/production-economics/fertilizer-cost.html

A mobile-friendly, web-based version is in development and will be available in the coming months, said Johnson.



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Manitoba government collaborates on agricultural issues at North Americas Summit

From Jan. 6 to 8, Agriculture Minister Derek Johnson represented the Manitoba government at the Legislative Agriculture Chairs Summit, hosted by the State Agriculture and Rural Leaders group in Charleston, S.C., and collaborated with other state and provincial leaders on agricultural issues and trends experienced by other jurisdictions.

"I am pleased and energized by these discussions with my colleagues from across North America on issues facing the world of agriculture and to represent Manitoba's agricultural sector internationally," said Johnson. "Manitoba has many commonalities with other jurisdictions in

the issues faced in modern agriculture, including food security and climate change. I am proud to have represented our province in these discussions and look forward to bringing solutions back to Manitoba."

The Legislative Agriculture Chairs Summit is a non-partisan meeting for elected officials held to discuss agriculture and hear from speakers who share expertise in identifying problems and solutions. The annual event, first held in 2002, has been providing educational opportunities for state and provincial elected representatives with a focus on agriculture and rural communities, and how different jurisdictions can connect and collaborate on solu-

tions to shared issues.

"Our government continues to advocate for Manitoba agricultural producers and industries, and has positioned our province as a world agriculture leader. Manitoba is always developing creative solutions to agricultural issues, which I was happy to showcase at the summit to my colleagues," said Johnson.

Initiatives such as the Manitoba Protein

Advantage Strategy, the Water Management Strategy and the review of the Agricultural Crown Lands Program demonstrate the Manitoba government's focus on driving agricultural innovation and research forward, the minister noted.

"I look forward to bringing the results of our discussions at the summit home and using what we learned to drive new developments in the sector," said Johnson.

WGRF commits \$2.7 million to 22 new research projects

Through a continuing co-funding partnership with the Saskatchewan Ministry of Agriculture - Agriculture Development Fund (ADF), the Canadian Agricultural Partnership, and other producer commodity groups, WGRF has announced up to \$2.7 Million of new funding for 22 crop-related research projects.

"Producers remain committed to investing in agricultural research," says WGRF Board Chair, Dr. Keith Degenhardt. "Since we began this funding partnership with ADF in 2012, WGRF has invested almost \$30 million dollars to more than 220 research projects that have undoubtedly improved agricultural systems, technology and agronomic practices for western Canadian farmers."

WGRF is co-funding 15 projects with ADF and other producer groups. WGRF is also co-funding an additional seven projects exclusively with producer commodity groups. The projects include research into improved varietal resiliency to environmental stresses and disease for wheat, canola, canary seed, pea and barley varieties, as well as research into key agronomic challenges including surveillance and mitigation strategies for diseases such as Fusarium and club root, research into insect population dynamics, and new strategies and inputs to improve crop production.

"WGRF is excited to be supporting these 22 new promising research projects," says WGRF Executive Director, Wayne Thompson. "These projects are being led by some



remarkable researchers, not only here in Saskatchewan but across western Canada. ADF provides a great forum for producer groups to collaborate and co-fund in agricultural research."

A full listing of projects will be posted on the WGRF website once research contracts are in place.



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