

AGKNOWLEDGE

Exploring the economics of genetic resources in agriculture



UNIVERSITY OF SASKATCHEWAN

College of Agriculture
and Bioresources

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A man and a woman are kneeling in a field of young green plants. The man, on the left, is wearing a brown jacket and a dark cap, and is pointing at a tablet held by the woman. The woman, on the right, is wearing a grey sweatshirt and a dark cap. In the background, there are three large blue and white silos under a blue sky with scattered white clouds.

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◀ Cover photo: Exploring the economics
of genetic resources in agriculture.
See page 23 for story.
Photography by Gloria Gingera

Dean's report



Dr. Angela Bedard-Haughn (PhD)

Photography by Christina Weese

Over the past 110 years, the College of Agriculture and Bioresources (AgBio) has seen many changes, reflecting the world around us.

This includes opportunities but also challenges brought on by pandemics, wars and the economy. Throughout all of this, AgBio has been here – training the next generation of experts to responsibly care for the environment while feeding a hungry and growing world.

Indeed, the world needs AgBio to find solutions to pressing global issues, including food insecurity and environmental sustainability. Our cutting-edge research has led to new crop varieties, advances in animal nutrition, healthier soils, novel bioproducts, agricultural policy insights, and many more innovations. Our perseverance was put to the test by the last couple of years, but our faculty and staff

remain committed to our mission and are excited to continue growing the future!

The college has three new academic programs that will be rolling out over the next year. This includes two new undergraduate degrees, the Bachelor of Science in Food and Nutrition (launching this fall, a joint offering between our Department of Food and Bioproduct Sciences {FABS} and the College of Pharmacy and Nutrition) and a Bachelor of Science in Food Industry Management (a joint offering between FABS and the Department of Agricultural and Resource Economics; slated to launch in fall 2023).

We also have a new Certificate in Precision Agriculture which will bring together University of Saskatchewan (USask) students from AgBio, Engineering and Computer Science to prepare them to be leaders in the rapidly evolving area of ag tech.

We work hard to ensure that our students will graduate with what they need to grow their future: excellent industry-endorsed scientific training and a foundation of professional career skills. As always, we strive to respond to student and community needs: providing hands-

on training that combines both the “how” and the “why”, learning directly from industry-leading researchers, exposure to a wide swath of the agriculture industry, and the critical thinking skills to separate the wheat from the chaff!

Through these new educational opportunities, we continue to strengthen and diversify our student community, and that community is what makes AgBio rise to the top. Emma Cross, our top AgBio graduate this year and winner of both the Governor General’s Silver Medal (the highest academic honour for an undergraduate student at USask), and the Saskatchewan Institute of Agrologists’ Gold Medal, put it best:

“In my opinion, the greatest strength of the College of AgBio is its close-knit community. Students have an opportunity to develop deep friendships that will last a lifetime while pursuing important causes that benefit the broader community.”

As you read this issue of Agknowledge, we hope you enjoy learning more about our community - the faculty, staff, students, alumni and donors that make us the college the world needs! ♥

2021-22 Year in Review

Rooted in history since 1912, the College of Agriculture and Bioresources is growing the future. 🌱



1,738
Students

1,400
Undergrad

338
Graduate

\$27.1
million



New awarded
research funding

3
New academic
programs



Bachelor of Science in
Food and Nutrition



Bachelor of Science in
Food Industry Management



Certificate in
Precision Agriculture

The first cohort of the BSc in Food and Nutrition will begin classes in Fall 2022. The other two new programs will welcome their first cohorts in Fall 2023.



316
Staff

80
Faculty

\$1.8
million



Scholarships, bursaries,
awards

Undergraduate students by program

Bachelor of Science, Agriculture **690**

Bachelor of Science, Agribusiness **233**

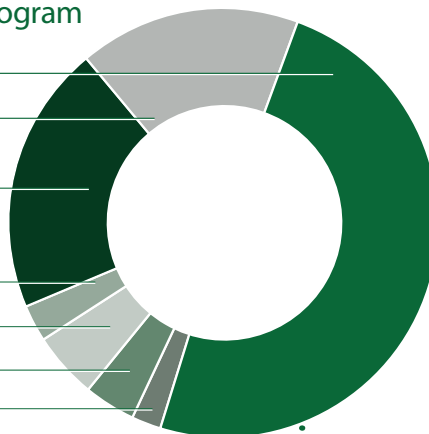
Bachelor of Science,
Animal Bioscience **284**

Bachelor of Science,
Renewable Resource
Management **41**

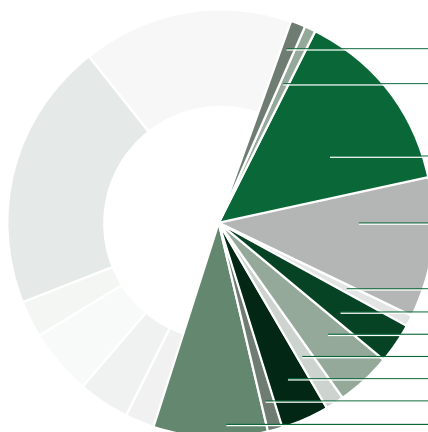
Diploma in Agribusiness **67**

Diploma in Agronomy **54**

Kanawayihetaytan Askiy Program **31**



Bachelor of Science, Agriculture students by major



Agricultural Biology **14**

Agricultural Economics **12**

Agronomy **198**

Animal Science **150**

Applied Plant Ecology **9**

Crop Science **43**

Environmental Science **59**

Food and Bioproduct Sciences **20**

Horticulture Science **51**

Soil Science **14**

Undeclared **120**

1
Rooftop garden



Led by the USask
Horticulture Student Club

Embracing culture and

 **ASHLEIGH MATTERN**

Cree Autumn Sunrise Longjohn (wâhyaw kê-itâpit | ᑕᑭᑦ ᐱᑦᑭᑦᑭᑦ ᐱᑦᑭᑦᑭᑦ "forward seeing") says her Indigenous heritage has always guided her throughout her work. "I can't think of any other way to do my work than having that incorporated," she said.

Longjohn spent most of her childhood on Sturgeon Lake First Nation, and it was there that she was first introduced to the idea of studying the sciences at the postsecondary level. While she was in high school, she had an opportunity to participate in the Junior Forest Rangers program, which introduces Indigenous youth to natural resources science. She took part in an introductory summer program on soils, forestry and wildlife identification, and she was hooked.

"It got me interested in the natural resources side of science — that's what set me on this path," she said.

Her path included enrolling in the Bachelor of Science in Renewable Resource Management degree through the College of Agriculture and Bioresources at the University of Saskatchewan (USask).

She has since graduated from the program, majoring in Resource Science, which provides skills in applied sciences and resource management for sustainable development projects like rejuvenating disturbed land or reducing greenhouse gas emissions from landscapes.

"One of the biggest motivators for me was being able to understand natural resources for my community so I can give back," she said. "If I understood different resources, how they're used, and how they're taken care of, it's something I can take back to my community."

"One of the biggest motivators for me was being able to understand natural resources for my community so I can give back."

CREE AUTUMN SUNRISE LONGJOHN

She said her favourite aspects of the Renewable Resource Management program were learning about natural resources and working with Indigenous communities.

"That whole connection to working with Indigenous folks ... how to be that link between a stakeholder and Indigenous communities — those skills are important to learn."

Longjohn also appreciated the collaborative nature of the program, saying she enjoyed working with a team of classmates on a capstone project for Mistawasis First Nation. The first nation had ideas for their land that they wanted Longjohn and her classmates to investigate. Longjohn and her classmates crafted a land use report using traditional

How alumna Cree Autumn Sunrise Longjohn incorporates her heritage into her scientific work.

Cree Autumn Sunrise Longjohn

Photography by Heywood Yu

science



knowledge to identify resources and locations that have been of traditional use and cultural significance to the Mistawasis First Nation on reserve lands, traditional territories and Treaty 6 territory.

"I really liked that aspect of being able to actually work with the folks at Mistawasis," she said.

She found the professors and department heads at the College of AgBio to be personable, friendly, and easy to work with, and she encourages other students interested in taking a path similar to hers to get involved with the Environmental and Bioresources Students Association.

"I found studying with somebody else to be helpful in forming a sense of community," she said. "Having a community ... really helps the student experience overall."

Longjohn is now coordinating science outreach to communities much like her own through the Science Outreach Office with the College of Arts & Science at USask.

In 2016, she started off as a science ambassador, spending time in northern Indigenous communities doing science activities with students. Then last year, she had the opportunity to be a student coordinator, coordinating programs with the communities that would be receiving students, and now she's working as the interim science outreach manager, overseeing the coordinators and ambassadors by training them and providing support.

'Other ways of teaching language'

Revitalizing Indigenous languages is another cause close to her heart, and something she tries to incorporate into her science outreach work.

One outreach program she has participated in is Kamskénow, which provides hands-on science and mathematics activities to Saskatoon classrooms with a high number of Indigenous students.

When helping to develop the cryptography

session for the Kamskénow program, she incorporated the Cree language using the Cree star chart. The star chart is arranged in a non-linear star shape that displays the 44 syllabics and 14 consonants.

"The Cree star chart with the symbols that correlated with Roman orthology can be seen as a key," she said. "The star chart is the way you can translate one to another, and the idea of cryptography is encrypting and decrypting."

The similarities between cryptography and language translation stood out to her, and she saw how combining the two could be a unique way to incorporate the Cree language into the session.

Longjohn is in the process of completing an Indigenous language certificate out of the College of Education, which is aimed at giving students the tools and resources to teach the Cree language, going beyond the textbook.

"The textbook way is the western way," she said. "There are other ways of teaching language that I've been learning the past two years."

She is also close to completing a Bachelor of Science in biology with a minor in math.

Bringing two worlds together

Longjohn says she expects she'll stay with science outreach for several more years, but she has big plans for her future, including starting her own culture camp, weaving together her scientific background with her Indigenous knowledge.

"It would be really great to harness those two worlds, and together to create something that's different but relevant to Indigenous youth," she said.

A culture camp is a place where you go to learn about different traditional skills or ways of knowing. She participated in a culture camp herself at Ministikwan Lake in northwest Saskatchewan called kâniyâsihk Culture Camps.

"It could look like hide tanning, learning how to identify medicinal plants or traditional medicines, learning about canoeing — land-based learning."

She would also like to see elements of reclaiming language involved, incorporating language learning into the culture camps just as she did with the science outreach cryptography session.

"I'd like to see a culture camp like that in every Indigenous community." ■



Cree Autumn Sunrise Longjohn at her Convocation ceremony for the University of Saskatchewan.

Photography: Submitted

A photograph of three people standing in a brewery. On the left is a man with a beard and dark hair, wearing a dark shirt. In the center is a man with glasses and a dark shirt, holding a glass of beer. On the right is a woman with red hair, wearing a dark sleeveless top, with a tattoo on her left arm. They are standing in front of several large, shiny metal brewing tanks. The number '6' is visible on one tank, and the number '7' is visible on another tank to the right. The lighting is warm and focused on the people.

Can you influence genetics for a better beer?

Dr. Christopher Eskiw (PhD) believes the yeast genome could be the key to your favourite brew.

Casey Murray, Head Brewer of 21st Street Brewery;
Dr. Christopher Eskiw (PhD) and Fina Nelson, PhD Student.

Photography: Submitted

 **MATT OLSON**

Eskiw specializes in nutritional genomics — how nutrients and the environment can affect genes — with the goal of answering the eternal question of increasing the human lifespan.

He never would have imagined his research would lead him down a path to answer a slightly different question: can genomics determine why my beer tastes the way it does?

“What are the differences in yeast genomes and their genetics that creates such different and diverse beers with essentially the same starting materials?” said Eskiw.

Eskiw received \$120,000 in funding from Saskatchewan's Agriculture Development Fund for his project *Connecting Craft Brewing Quality with Yeast Genomics*. The research focuses on how



Dr. Christopher Eskiwi (PhD)

the genome of the yeast used in brewing affects the outcomes of the beer being brewed.

"We started asking ourselves: how and why are these yeasts essentially different? And the thing that makes every organism different is their complement of genetic material, that collective entity known as the genome," said Eskiwi.

So Eskiwi asked one of his grad students who worked for 21st Street Brewery to introduce him to head brewer Casey Murray, who walked Eskiwi through their process of brewing beer.

But Eskiwi — an associate professor of nutrigenomics with the University of Saskatchewan's (USask) College of Agriculture and Bioresources — wanted to dig deeper. Of the basic ingredients of malt, hops, water and yeast, Eskiwi was convinced that yeast was the key.

"A lot of these beers use different yeast strains. So you start with very similar starting materials, and the yeast converts them into very different final products," he said. "Whether it be a fruity citrus flavour or a dry lager flavour, that is dependent on the yeast strain."

Nutrients, the environment, and the human genome

Eskiwi studied at the University of Alberta and USask before earning his PhD in Cell Biology from the University of Toronto. His specialty is nutritional genomics — or put more simply, the study of how genes respond to and are influenced by different nutrients.

"This is the study of gene-nutrient interactions, which is an equally cryptic term," said Eskiwi with a laugh. "Nutritional genomics is identifying the necessary compounds that help promote the healthy genes to turn on and the detrimental genes to turn off."

As Eskiwi puts it, most people don't quite understand the details of how genes work when they refer to their own genetics.

"Most people don't realize the environment plays a huge role in how your genes are regulated. Diet and nutrition are the number one environmental factors controlling when your genes turn on or turn off."

"Diet and nutrition are the number one environmental factors controlling when your genes turn on or turn off."

DR. CHRIS ESQUIW (PHD)

Eskiwi's current project is based on the concept that the way different genes express themselves can be influenced by their environment. An example Eskiwi used involved drinking coffee: one specific gene controls caffeine metabolism. If the gene is "activated," you metabolize caffeine more quickly. Alternatively, if the gene is expressed differently, you metabolize caffeine more slowly and its effects are longer-lasting.

But Eskiwi said it's possible to "activate" that caffeine-metabolizing gene by ingesting caffeine with enough regularity — changing the "environment" of the gene.

"Saying 'oh, it's my genetics, I just have the gene for it' — that's a misconception. What you do and where you are helps define how those genes are expressed."

It's this theory that Eskiwi is applying to his research into yeast genomics. Eskiwi believes it's the yeast in beer that has the greatest control over the final product — from colour, to smell, to taste.

So if genes can be influenced by the environment, and the taste of beer is influenced by yeast, Eskiwi's theory is that they can look for and influence the parts of the yeast genome that correlate to particular flavours and colours of beer.

"If you ask me any biological question, I'm going to come back to the genome ... When you add different software, it does different things. With that yeast, we're maybe adding different pieces of software, but we're turning them off and on at the right time."

Beer, genetics, and you

The process for brewing craft beer is, at least on paper, fairly straightforward. There are only four basic ingredients: malt (or malted grain, typically barley, to be specific), hops, water, and yeast.

The brewing process starts by adding malt to hot water to begin turning the starches in the grains into fermentable sugars. Hops are later added to the newly created sugar water - also called "wort." Once the hot combination of wort and hops is rapidly cooled, yeast is added to ferment the brew — converting the sugar into alcohol and carbon dioxide.

First, Eskiwi's team will examine and record the genetic profile of yeast samples. Next, the team will match those profiles to flavours of beer they create.

And finally, they will attempt to activate or deactivate specific genes to determine how the final flavour profile is altered by the yeast genomics.

The goal is to create a roadmap for craft brewers — a "handbook" for breweries to know exactly what kind of beer they're making. It would also provide a scientific method to determine what smaller-scale brewers can do to get different, and very specific, flavours of beer.

"(Brewing) is more of a traditional observation science. We started with this and we got that, so we're going to keep doing this and hopefully we'll keep getting that product. But if something goes wrong and you're not sure about the mechanisms behind it, it's hard to correct," said Eskiwi.

A growing Saskatchewan industry

The importance of yeast in brewing isn't a brand-new concept. Many large-scale brewing companies keep a firm proprietary hold on the yeast and the methods they use to produce their types of beer.

"Not many people have actually looked at this," said Eskiwi. "Those that have looked at it, work for major breweries. And they're not telling anybody anything ... we want to kick the lid off the can here."

Eskiwi's research could take the guesswork out of the process when it comes to yeast. A more targeted recipe using yeast with the exact right genetic markers activated would lead to less waste, lower costs and a greater diversity of product for home-grown brewers.

Eskiwi lauded the craft brewing community in Saskatchewan for their passion for the craft, as well as their support of his research. Calling it a "very Saskatchewan industry," Eskiwi said he hoped he'd be able to give local brewers an advantage with his research.

"Knowledge is power. I think this would give craft brewers more variety because they could take that same yeast, change the growth conditions a little bit, and generate a different beer. So everything's the same starting material, but now you can make more products with it."

"Knowledge is power. I think this would give craft brewers more variety because they could take that same yeast, change the growth conditions a little bit, and generate a different beer."

DR. CHRIS ESQUIW (PHD)

Craft brewers throughout Saskatchewan have given Eskiwi and his research their support. 21st Street Brewery has become an integral partner in the brewing part of the project, and Eskiwi said Maker's Malt in Rosthern has been providing the malt for their experiments. Meetings with Nokomis Craft Ales (another craft brewery) and JGL Shepherd Farms (a local producer of hops) were on the horizon at the time of the interview, and he's hoping to add more collaborators going forward.

As Eskiwi put it, his health sciences research doesn't always pique local interest. This time, the community is very interested — and Eskiwi is happy to share a pint with them.

"I've lived in Alberta, Ontario, I lived in the UK for 10 years. Saskatchewan has a different feel in its communities. It's very much a tight-knit province, and the craft brewers exemplify that ... I'm super excited to be involved with this." ♥

Bedpush 2022 a show of Agro pride on fundraiser's 40th anniversary

Bi-annual event for TeleMiracle smashes fundraising goal.

 JENN SHARP



Josie Huber and Kate Sauser leading the BedPush crew.

Photography: Submitted

The ability of a small yet committed group of people to effect change is always encouraging. When it comes to the Agricultural Students' Association's (ASA) bi-annual Bedpush fundraiser, when two dedicated women were at the helm, the results were nothing short of inspiring. In 2022, the Bedpush organizers smashed their goals and raised the most in the fundraiser's 40-year history: \$88,142.69.

Bedpush helps raise support and awareness for TeleMiracle, a telethon fundraiser for the Kinsmen Foundation. The Kinsmen Foundation is a volunteer organization that provides resources for medical assistance and equipment for residents of Saskatchewan. Bedpush volunteers spend three days pushing a metal bedframe from Saskatoon to Regina in early March.

Two ASA members from the College of Agriculture and Bioresources at the University of Saskatchewan played pivotal roles in the event's success. Kate Sauser, who will graduate next year with a Bachelor of Science in Agribusiness, was the ASA Public Relations Officer and leader of the 2022 Bedpush. Fellow organizer, Josie Huber, was the ASA President and Treasurer for 2021/2022. Huber graduated with a Bachelor of Science in Agribusiness in spring 2022.

How Bedpush began

Back in 1982, a few Agros were out socializing and came up with the bizarre idea to push a metal bed frame from Saskatoon to Regina – on foot. Bedpush began that year with an old hospital bed frame. It has continued bi-annually ever since, albeit the original frame has been replaced with a smaller (and lighter) version, complete with its own steering system.

A group of students, alumni, family and members of the ag industry join to spend a few wintry days pushing the bed down Highway 11 to Regina. A bus and pilot vehicles travel the route to ensure safety for everyone and provide a place for the runners to take breaks. People can drive their own vehicle to join the Bedpush convoy (the group takes donations along the route from intrigued passers-by).

"Bedpush has always been about TeleMiracle and bringing our college and ag community together to rally for such a great cause," said Sauser. "The ASA supports TeleMiracle's goal and mission."

While the fundraiser is primarily about giving back to TeleMiracle, Bedpush also

provides networking opportunities with alumni from the ag industry who come to help push. Current students get to discuss their future careers and experiences in the industry.

Strength in community

This year marked the second time Sauser and Huber participated in Bedpush and both say it wouldn't be possible without generous support from the ag industry, the volunteers and donors. Sponsors provide snacks, water and lunch for the volunteers and some even come out to help push.

"These people are always a great help to us," said Sauser.

Alumni also volunteer their time, some since the event's inception, despite the weather. And during 2022's event, the weather would have made most think twice about volunteering.

"We dealt with a lot of blowing snow, wind, icy roads, and cold weather," said Sauser. "The wind was often blowing straight at us too, which made it extremely difficult to keep pushing."

While runners on Thursday and Friday weren't as numerous, Saturday boasted the best turnout with 50 students. Several alumni came out each day, which Sauser appreciated, including three multi-generational Agro families.

"They are such a key part to our success as they have many connections through the province and are able to get us more exposure within the ag industry."

For Huber, 2022 marked her final Bedpush as a student. She was proud the group overcame the challenges of pushing the bedframe through blowing, drifting snow.

"One of the best memories for me was just sitting in a truck taking it all in: the great cause and doing it with my friends. It felt surreal to just embrace it," said Huber.

Sauser was honoured to be part of Bedpush's 40th anniversary event. While it was challenging to raise funds during the COVID-19 pandemic, Sauser said they were lucky that the pandemic's height held off during February, their main fundraising month. She's proud of leading the college to a successful event and outcome.

"Watching my Bedpush committee work so hard for four months to prepare for such a large event, as well as watching all of my hard work come together to donate that \$88,142.69 cheque to TeleMiracle was one of

the best feelings I have ever felt," said Sauser.

Philanthropy at the heart

Sauser said the 2022 Bedpush smashed their fundraising goal thanks to generous support from online donations. The ASA also held in-person fundraisers such as auctions, a raffle, a bingo and athletic events. Bedpush isn't the only recipient of the ASA's fundraising efforts, however.

In 2021, the ASA received two Youth in Philanthropy awards recognizing the extensive work the organization does to give back to the community.

As Sauser explained, "The ASA finds it rewarding and fulfilling to be able to help those in need within our city, province, and industry. It's how we create a strong sense of Agro pride and pull the community together. We are only a small student association, but any positive impact we can make is a step in the right direction."

The ASA holds other fundraisers throughout the year, like Saskatoon Food Bank drives. The group also collaborates with and donates money to various mental health initiatives. And on non-Bedpush years, they hold a "March for Stars" fundraiser in support of STARS Air Ambulance.

Lifelong AgBio memories

In the end, Huber, who comes from a long line of AgBio alumni, remembers her last year as an AgBio student fondly.

"This year's Bedpush has been one of my greatest memories. It was an amazing opportunity to be a part of something greater than myself and do it along with all my friends; truly an unforgettable moment," said Huber.

Sauser's farming background and passion for the agriculture industry and its opportunities led her to choose the College of Agriculture and Bioresources for her studies. Leading the Bedpush 2022 fundraiser stands out as her favourite memory thus far.

"To watch the whole college, ag community, and alumni rally together to reach such an amazing goal was a truly unforgettable moment for me. That moment when I passed over the cheque and revealed how much we fundraised, which was over \$30,000 more than our 2020 Bedpush, was a surreal feeling," said Sauser. ■

Speaking up for agriculture

Fundamentally, says alumnus Clinton Monchuk, the agriculture industry must advocate for itself because people need to eat.

 **JOANNE PAULSON**

Monchuk, the executive director of Farm & Food Care Saskatchewan, has deep agricultural roots that sprouted on the family farm at Lanigan, Sask. and were nurtured in the College of Agriculture and Bioresources (BSA'00) at the University of Saskatchewan (USask).

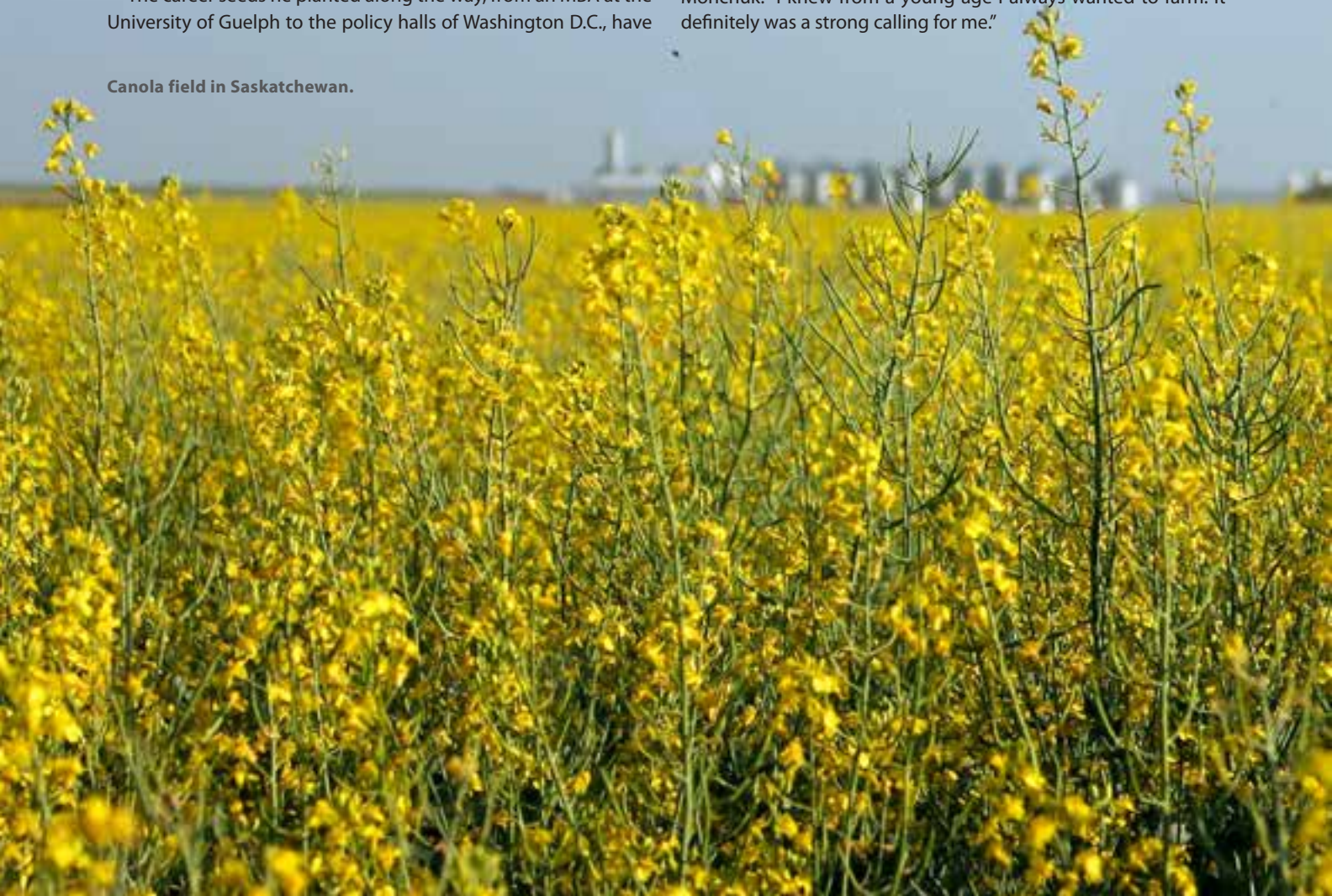
The career seeds he planted along the way, from an MBA at the University of Guelph to the policy halls of Washington D.C., have

grown into a profound knowledge of his industry and its unique importance to human beings.

It seems inevitable, looking back, that Monchuk would today be a leading advocate for agriculture.

"Growing up, I did a lot of work with cattle and on the land," said Monchuk. "I knew from a young age I always wanted to farm. It definitely was a strong calling for me."

Canola field in Saskatchewan.



Once at university, he decided to focus on agricultural economics. He was, and is, fascinated by how the markets function and the global agriculture industry.

"It really was great. It resulted in many great friends that I still have today and a lot of great contacts at the university I deal with weekly. Plus, I have the opportunity to lecture at the university."

He planned to return to the farm post-degree, but money was tight in farming and his father advised him to get a different job. Monchuk ended up in banking, "which was extremely boring for me," and ultimately decided to take his MBA at the U of Guelph, specializing in agri-business.

He then taught and conducted research at the Universidad de Guadalajara in Mexico before returning to Saskatchewan as a beef economist with the Western Beef Development Centre (now part of the USask Livestock and Forage Centre of Excellence.)

Then a government-supported opportunity came up to serve as a lobbyist in Washington, D.C., where he worked for the American National Farmers Union and met both American and Canadian policy makers.

"It really did jumpstart my career."

He subsequently became a lobbyist in Ottawa with the Canadian Federation of Agriculture as director of trade policy and spent a lot of time in Geneva. But his life had taken a personal turn while in D.C.

"My biggest benefit from my experience down in Washington, D.C. was that I met my wife," Monchuk said. "She's a cowgirl from southern Oklahoma and I convinced her to move up to Canada."

They had decided to start a family and live in either Saskatchewan or Oklahoma when he lined up a job with the Chicken Farmers of Saskatchewan. Saskatchewan became their choice, although the job came with spending a lot of time in Ottawa.

A change in plan

After many years in the job, Monchuk, who was very involved coaching his son's baseball team, had a revelation.

"I was going to have to leave him for a tournament or a few games that I was going to miss. I said, 'I'm sorry I'm going to have to leave you, buddy.' As I was leaving, he said, 'That's okay, Dad. I'm used to you being gone.'"

Monchuk takes a breath before continuing.

"I'm not that emotional of a man, but I started tearing up on the flight to Ottawa."

And so, when the Farm & Food Care Saskatchewan directorship came up, he applied and landed the position, which allows him to stay mainly in Saskatchewan. Meanwhile, he continues to farm with his brother, who lives on the farm full-time. The family has gone out of cattle and dairy but continues to grow grain and run an egg layer business.

"I always say, they were going to pay me to talk about farming, and I was doing it for free for the last 30 or 40 years, so I figured why not? If I could possibly have designed my own job . . . this would be it. It's the perfect job for me."

Monchuk is definitely a multi-tasker; the job has many arms and legs to it. For example, he speaks and lectures frequently at USask. He was recently a guest speaker on public trust in agriculture for

Photography by Farm & Food Care SK





Clinton Monchuk, Director of Farm & Food Care SK

Dr. Stuart Smyth's (PhD) Agricultural Economics 459 class, as well as several other ag science and ag econ classes and a nutrition class in the College of Pharmacy and Nutrition.

"We are the most trusted sources, we being those in the agriculture industry. The College of Agriculture and Bioresources puts out some great students. We have world leaders from the College of Agriculture and Bioresources. Farm & Food Care's goal is making sure advocacy is part of their lives."

Working with current and future industry advocates is about 20 per cent of Farm & Food Care's efforts. Its main focus is on consumers, who are inundated with mistruths on social media that the organization is trying to dispel with facts.

"We have a lot of social media that occurs through our main brand, CanadianFoodFocus.org," he said.

"We did an analysis of what consumers are searching for. It turns out they don't search for farming or ranching. They search for food nutrition or food safety. We built this whole brand around

what consumers are actually searching for and then we filled it with the undercurrent of how that food is being produced."

He gives the example of someone searching for the nutritional qualities of beer, who will also see recipes using barley, and information on maltsters and microbreweries.

"It will lead you down the path to how is that barley originally grown on a farm in Saskatchewan," he explains. "You bring people in on the food side, and they're interested enough that they want to keep going."

Canadian Food Focus was initiated in the second quarter of 2019 and has reached 7.5 million engagements. Every month brings another half-million, which he considers quite amazing coming from a province of 1.2 million souls.

"We're really hitting those key audiences."

Farm & Food Care also organizes farm tours. A tour of 20 people with their own social media followings could result in 340,000 connections through their own messaging.

All of these efforts are working, he feels, but it will take time.

"I feel like we are moving the bar forward, but it's a slow-moving bar. One thing we don't have is celebrity superpower. As soon as we talk about, say, the benefits of dairy products, Joaquin Phoenix can go to the Oscars and tell you not to drink milk."

Influencing public trust

Monchuk notes that less than three percent of the Canadian population has a direct tie to a farm. As more generations are removed from farming, the understanding of how food is produced becomes more distant.

"And when it becomes more distant, you have policy makers come in to change the rules because they think what they're doing is right," he said.

That may result in seeding distrust in farming from people who don't understand that producers are trying to ensure "that we have enough food, food security and safety of food, in our country and beyond to make sure people can eat. Failure to do so will hurt us in the future."

Individuals can help by talking about their places in the food system and giving people a better understanding of food production.

"And you can do it in a variety of ways. You can volunteer to speak in the classrooms with Agriculture in the Classroom's Agriculture Literacy Month. You can post on social media."

"One of them would be to take our workshop called SpeakUp training. It's an online workshop (and) those individuals who do that just feel more confident going forth and talking to a community group or speaking to that individual you're sitting beside on the plane ride to Puerto Vallarta or wherever."

Agriculture, he notes, touches everyone. Not only does everyone have to eat, "one in eight jobs are affected by food and farming, and some of those people don't even realize they're affected by it."

"It all relates and trickles back to the farm. We owe everything we have today to agriculture." 🍷



New AgBio class teaches valuable communications skills

AGRC 110 class offers lectures covering several different topics ranging from data visualization to writing and editing.

 JANE CAULFIELD

Dr. Sirajum Munira (PhD)

Photography by Carey Shaw

Researchers and agricultural professionals spend hours toiling over experiments or developing products and services that can lead to meaningful solutions to real world problems, such as food insecurity and climate change. But being able to communicate the work being done, in academia and beyond, is the key to seeing those solutions put into action through applied practice – and communication is a skill that can be cultivated. That’s why the College of Agriculture and Bioresources at the University of Saskatchewan (USask) developed the 100-level class, *Scientific Literacy and Communication for the Agricultural Sciences*.

“It provides a really important foundation for several aspects of their student life and future professional agrology careers,” said Dr. Sirajum Munira (PhD), who was the first lecturer to teach the course in the 2021/22 academic year. “Students are provided with an opportunity to enhance their scientific literacy and learn how to better communicate their work with the lay public.”

While students major in several areas of agricultural expertise and science, this class specifically aims to help them develop soft skills such as presentation styles and writing for various audiences. It provides students with a chance to build the confidence they need to establish a voice for themselves in academic and practical conversations in a meaningful way and help them build a foundation for a successful career in agriculture.

“We put a lot of emphasis on our specialized courses, such as chemistry and biology, but less emphasis on effective communication skills. That’s another reason to introduce this course at the early stages of their university life. As instructors, we have the scope to prepare our students on how to communicate with scientists as well as non-scientists, and knowing how to talk to both is important.”

A good mix of classroom learning and knowledge application

The class itself consists of lectures and supplemental tutorial hours each week, providing students opportunities to learn new concepts and theories while simultaneously practice their application in a safe environment. Weekly topics include, but are not limited to, scientific communication methods in agriculture,

critical thinking, data management and visualization.

“I have a module on professional development and agrology practices in Canada. Students liked that module and their professional development assignment,” said Munira. “It helps them to think critically about their future career option and pathways.”

Over the course of one term, students develop several skills that will enhance their careers and professional ethics, learning directly from their instructor, and in upcoming course offerings, as well as leading industry experts as guest speakers. Assignments throughout the course include writing mini-scientific papers, a data management and visualization exercise, an oral presentation on a current agricultural topic of their choice, and a final scientific poster group project.

“By providing students with the opportunity to choose the topics they are interested in, they can be more engaged in the activities. We’ve gotten some good feedback from the first cohort. The choice was one thing they said they appreciated.”

Munira adds that students also appreciated how the class provides opportunities to ask questions and learn about issues that may not come up in other classes.

“We talk a lot about what is happening in global agricultural communications and what that means for the future of our industry, such as sustainable agriculture and enhancing inclusivity into the industry. The result is that students learn how to be compassionate and generous to their classmates and future colleagues, which can lead to better experiences for everyone involved.”

A personal interest in communication

Working out of both the Departments of Soil Science and Plant Sciences, Munira said she’s always recognized that good communications skills are part of good research.

“Since my childhood, I had a special interest in developing communication skills. It takes time to develop them and with practice it gets more comfortable. I am so excited about teaching this course. I hope my passion and work experience in agriculture will help students increase their knowledge and improve their scientific



communication skills in agriculture, in academia, and beyond academia.”

Munira earned her bachelors in agrotechnology from Khulna University and masters in horticulture from Bangabandhu Sheikh Mujibur Rahman Agricultural University, both located in Bangladesh. She then moved to Canada to attend the University of Manitoba where she earned her PhD in Environmental Soil Science.

Munira highlights the issue of misinformation spread through social media and says that classes like this help



Dr. Sirajum Munira (PhD) was the first lecturer to teach the new AGRC 110 course in the 2021/22 academic year.

students understand how it happens, why it happens, and how they can help create positive change.

"In my classroom they have an opportunity to talk through several issues that impact them now and will impact their future careers. They learn how to tell the stories of new science-based knowledge so that lay people can understand it."

Moving forward

While the class was first taught in the 2021/22 academic year, it is now required

for incoming AgBio undergraduate students. After the first term, students were asked to participate in an in-depth evaluation to ensure the course continues to cover topics that are responsive to both industry and student needs.

"We had fourteen students in the first year, ranging from first year to fourth," said Munira. "They provided really helpful feedback regarding what they liked as well as areas they recognize as in need of improvement."

This kind of evaluation will be relevant each year to ensure the class

remains relevant, ensuring the maximum learning potential.

"I look forward to teaching AGRC 110 to prepare my students as great global ag communicators, especially since the definition of a community is changing away from local-only perspectives. I hope to help develop lifelong learners, bridge the gap between society and science, and also mitigate the risks and challenges the ag community of our province, our country, and the planet is facing right now, and help build healthy communities for future generations."■

A proud Agro for nearly 70 years



**Professor Emeritus
Bob McKercher's
lifelong connection
to the College of
Agriculture and
Bioresources.**

Norma and Bob McKercher wear Agro blue with pride!

Photography by Hamish Tulloch

 **ASHLEIGH MATTERN**

For Professor Emeritus Dr. Robert (Bob) McKercher (PhD), travelling to Aberdeen, Scotland, in 1963 for his PhD research studies at the Macaulay Institute for Soil Research in Soil Fertility Department would end up changing the course of his life.

While studying there, a “lively Scottish lass” caught his attention – Norma Mellis, the departmental secretary. Part of Norma’s work involved reporting to mostly farmers on the hundreds of soil sample test results. Bob enjoyed her warm personality, Scottish sense of humour, and love of adventure.

Bob wanted to delve into his Scottish family history and Norma was his well-versed Scottish guide. They married in 1965, Bob defended his thesis (typed by Norma) in May 1966, and they toured Italy and Switzerland before sailing to Canada in July 1966.

"I was ready for another adventure, and this was the biggest one of my life!" said Norma.

Their new Volvo came on the ship, and they spent a month driving from Montreal to Rosetown, ending their trip in the area where Bob was raised.

Studying abroad had a huge impact on Bob's life, and he has encouraged students to take advantage of the same opportunity ever since. Bob invited interested summer students from Aberdeen University in Scotland to work in the Department of Soil Science at the University of Saskatchewan (USask). The McKerchers hosted five international students for short terms at their own home over the years.

"They really benefited from this opportunity," said Bob. "They had a different work experience as well as culture and went home with a broadened outlook."

The McKerchers are avid travellers, too — Norma's Scottish roots are important to her and she has travelled "home" to Scotland 34 times. They have used the opportunity to travel extensively in Europe.

Their appreciation for broadening one's horizons through travel is why they are establishing a graduate scholarship for international study; they'd both like to see more students taking the opportunity to study abroad.

50 years on campus

Raised on a farm south of Rosetown, Bob's father James McKercher died in 1941 when Bob was only 10 years old, leaving his mother, Zelma, to run the farm and care for three young sons.

For university, Bob chose the science track at the USask College of Arts and Science, staying in "Pres Res" on Spadina Crescent for \$45 per month. In his second year, he transferred to the USask College of Agriculture, preferring the more heavily science-based courses.

In 1955, the head of the USask Soil

Science Department, Dr. John Mitchell (PhD) offered Bob the position of first departmental assistant.

"I jumped at this offer as it took me all over the province doing field strip fertilizer tests and valuable extension work," said Bob. He also worked on soil survey for two summers.

When Bob returned to Saskatoon in 1966 after his sojourn to Scotland, he was appointed as an assistant professor in the Department of Soil Science, researching soil organic phosphates and soil applied pesticides. Bob excelled in his career at the university, working his way up to full professor, and was recognized as an innovative agriculture teacher.

"The College offered me so many opportunities as a teacher, mentor, researcher, administrator, and, most of all, my relationships working with the students," said Bob. "Some students still keep in touch, and I appreciate hearing about their career successes."

He also played an integral role in the planning and construction of the Agriculture Building, which opened in 1991. Bob and Ted Turner later wrote a book called *The Sodbusters Vision: An Agriculture Building for the University of Saskatchewan*, which tells the history of the building. He says seeing that building take shape from the ground up is one of the highlights of his career.

"I worked closely with the architect, Obert Friggstad, and what a rewarding learning experience that was. The official opening in 1991 was a dream come true. Even after 31 years, the building looks new, well maintained and is an important landmark on campus. I am proud to have been involved in this project."

Following a sabbatical in New Zealand in 1992 where he studied phosphorus cycling in forest soils, he took on the position of associate dean, College of Graduate Studies and Research, assisting graduate students as needed from 42 departments on campus.

"The graduate college had connections

in all departments; I really enjoyed that experience."

In 1997, he returned to the College of Agriculture as assistant dean (planning), applying his experience by assisting with the 6th floor addition. Bob retired in 1998 after almost 50 years on campus.



Norma and Bob McKercher's home garden. They have both taken numerous Gardening classes at USask.

Photography: Submitted

Supporting continued learning

Norma settled into life in Saskatoon well, getting to know Bob's colleagues and students and participating in departmental social gatherings.

"Soil science was such a friendly department," said Norma. "Your colleagues were your friends. ... We had some of the best times there."

Norma worked casually on campus in various departments, spent 24 years with the Saskatoon Public Board of Education, and worked six years as a staging consultant with In Fine Order: Real Estate Staging Services.



Professor Emeritus and alumnus Dr. Bob McKercher (PhD)

Norma is an enthusiastic gardener and coming to Canada was a big learning experience — her hometown of Aberdeen has a Zone 9 hardiness rating while Saskatoon falls in Zone 3. Over the years she turned to USask's Hort Week and Gardenline for valuable information. Now through Gardening at USask, she continues learning through their many online programs.

"During COVID, those classes have been a godsend," said Norma. "We both took many classes the last couple of years. ... Since the program has gone online it has just blossomed — they provide a wonderful service there."

Norma wants to see Gardening at USask continue to thrive, so the McKerchers are supporting the program to expand its online gardening classes and to provide website enhancements.

Deep ties to USask

Today, the McKerchers have multi-generational ties to the university. Both their son Grant and their daughter Morag are USask graduates — Morag received her Bachelor of Arts with Distinction from the College of Arts and Science in 1991 and Grant received his MBA from the Edwards School of Business in 2015 and is a member of the Senate. Bob and Norma's granddaughters are also now attending the university. Ella is a fourth-year physics student and presently starting a three-month internship in Darmstadt, Germany. Phoebe finished her second year at the Edwards School of Business and is planning to take advantage of the study abroad program.

Bob's university connections went beyond his official titles as well, serving the Saskatchewan Agricultural Graduates Association (SAGA), chairing his class's reunion committee for many years, and sitting on the board of the Saskatchewan Agricultural Hall of Fame (which he himself was inducted into in 2017).

"I have been a proud and involved Agro since graduating 68 years ago," said Bob. "The college has been an important part

of my life in so many ways, and I have learned and appreciated working at all levels.”

“I have been a proud and involved Agro since graduating 68 years ago.”

DR. BOB MCKERCHER (PHD)

With these deep ties to the university and the College of Agriculture and Bioresources, the McKerchers wanted to give back.

In addition to establishing a graduate scholarship for international study and supporting the Gardening at USask program, the McKerchers are also establishing an undergraduate scholarship in Soil Science, supporting a SAGA undergraduate scholarship, donating to the Dean’s Fund supporting AgBio students’ outdoor practical experiences, and supporting the construction of a new soil science field facility.

“What better way to show one’s appreciation to the college for all the student and career support, opportunities and personal advancement than to give back so this valuable trend can continue,” said Bob. “In these tough financial times, the college is so appreciative of donations from alumni.”

Although retired for 23 years, you may still spot Bob on campus with Norma at his side — perhaps visiting the new soil science field facility when it opens, or at their granddaughters’ convocations, or on one of their Sunday walks through the Bowl.

“Norma and I often walk on campus and viewing the grand old limestone buildings brings back memories of so many productive and fun-filled years as a student and faculty. Little did I know back in 1949 what my career path would be. I just hoped to pass all the exams!” 🍀

AgBio reaps support from far and wide

✍️ NIYA HURLEY

A world-class agricultural education from the University of Saskatchewan (USask) is universally valued. Over the years, the USask College of Agriculture and Bioresources has been fortunate to garner support from many donors outside our local community. This year was no exception with a significant gift to the Harvey Scholarship fund from Yvonne Jorgensen of Portland, Oregon. The Harvey awards were established by her brother, alumnus Dr. Ross B. Harvey (PhD), through a gift from his estate in 1998 in memory of their parents, who homesteaded at Elbow and later farmed in the Moose Jaw area of Saskatchewan. In addition to earning his academic degrees, Ross also served as a Major in the Canadian Army during WWII.



Dr. Ross B. Harvey (PhD)

Photography: Submitted

Yvonne has been based in the United States for years, but upon receiving a copy of the annual scholarship report from her sister (Marion Baller of Regina, Sask.) she felt compelled to support as well. Her very generous gift will ensure that more undergraduate and graduate students will be recognized for their achievements in their agricultural education.

Thank you, Yvonne! 🍀

Generous donation paves way for innovation

Donated equipment provides opportunity for research and product development.



 **JANE CAULFIELD**

Väderstad has made a generous equipment donation to the College of Agriculture and Bioresources at the University of Saskatchewan.

International farm machinery manufacturer Väderstad Industries Inc. believes in the work done by the College of Agriculture and Bioresources at the University of Saskatchewan (USask) – the knowledge gained will lead to a better future for the world. And in effort to show its support, gifted the college with a 2022 Seed Hawk Väderstad Model 660 Air Cart and SeedHawk Väderstad Model 45-XL Toolbar on a three-year term.

“One of the main purposes of the commercial farming operation is to manage the land in such a manner to maintain or improve the condition of the soil, thereby providing optimal field conditions for researchers,” said Kirk Blomquist, Superintendent, Field Operations at USask. “This air drill will assist in minimizing soil disturbance and reducing fertilizer and planting overlap which will improve the uniformity of the field.”

The two pieces of equipment are designed to enhance the seeding process and will be used by both a research centre and a department with the College of Agriculture and Bioresources. The equipment will support field operations done by the Crop Development Centre (CDC), which focuses on plant breeding and pathology. It also provides the opportunity for the Department of Plant Sciences to grow and examine new seed and plant varieties.



Photography: Väderstad Industries Inc.

"It is gratifying to know that companies such as Väderstad see value in donating equipment to the College of Agriculture and Bioresources," said Blomquist. "Donations such as this allow us to use the latest in agricultural equipment technology while allowing us to divert funds that would be used to purchase an air drill to other pressing needs."

A partnership of shared knowledge

Väderstad has spent decades developing machinery that helps farmers be more efficient in how they work. They develop tillage methods and produce seed drills, cultivators, harrows and rollers suitable for several different climate zones around the world.

"Väderstad itself is a very innovative company, and our focus is on simplifying the work and improving results for farmers," said Nigel Jones, CEO Väderstad Canada. "Research is what drives our business. Whether that's the agronomic research that informs what we are going to do with our machine designs, or that's product research and development that will inform agronomic outputs."

With the college using Väderstad's equipment, the Swedish-based company will gain insights into product success in real-world practice, such as testing a particular feature or increased speeds, providing opportunity for product innovations that will benefit producers around the world.

"It's less about the machine solutions sometimes and more about the agronomic solutions that we can provide by way of the machinery, so the work that's being done by the Plant Sciences department fits perfectly with these ambitions," said Jones. "It's a two-way street and without research we're not providing the best solutions possible."

For researchers at the CDC, the ability to put the latest technology to the test in the field provides opportunities to make discoveries that have positive outcomes for the future.

"Donations such as this are a win-win for all parties."

KIRK BLOMQUIST

"Donations such as this are a win-win for all parties. Ongoing dialogue between the company and University creates opportunities for both parties to improve," said Blomquist. "We are extremely grateful and appreciative of our partnership with Väderstad and look forward to strengthening this relationship in the years to come." ♥

Van Vliet Professorship explores the economics of genetic resources in agriculture

Dr. Nicholas Tyack (PhD) brings new perspectives to understanding the value of crop diversity in the face of climate change.

 JANE CAULFIELD

Dr. Nicholas Tyack (PhD)

Photography by Carey Shaw



In the face of complex global trade agreements and scientific innovation to manage climate change, policymakers continuously work to develop meaningful responses that will sustain Canada's economy. Policies that once primarily focused on domestic need, now must address broader international issues as well. This shift from local to global is most evident in Canada's agricultural industry and is felt at every step of the ladder.

"As global climates and growing conditions continue to change, it's important to understand how we can enhance food supplies around the world, while also ensuring that producers can prosper," said Tyack, assistant professor and current holder of the Van Vliet Professorship in the College of Agriculture and Bioresources at the University of Saskatchewan (USask). "The potential negative impacts of climate change on agriculture will have economic impacts as well. Understanding how to mitigate these risks is essential."

Examining the role and influence of genetic diversity in agriculture is a complex task – there are many sectors, stakeholders, and consumer perspectives to consider. Tyack focuses on the economic value of genetic resources and biodiversity, and specifically investigates how farmers and members of the public value crop diversity.

"I am fascinated by the economics of innovation in agriculture. And in particular by the question: how can innovations, such as new crop varieties, be successfully diffused from one setting to another?"

The value of genetic diversity

Plant genetic diversity, including that found in both cultivated crop species and their wild relatives (CWRs), is a rich source of valuable traits that include disease resistance, drought tolerance, quality, and genes for higher yield, that can lead to greater success for producers year-over-year. The economic value of these resources – typically conserved in genebanks – is however difficult to estimate.

Much of the existing research explores how demonstrated and predicted values of genetic diversity on a large scale, or how selecting for specific traits, can lead

to increased revenue or profits. While the commercial value of plant genetic resources is important, it is only one part of a much larger picture.

"It really only represents a small part of its total economic value to society," said Tyack. "Conserved genetic resources provide a number of values not captured by direct use for breeding in any given year, such as option value – maintaining the ability to use a crop variety for breeding in the future – and cultural values provided by heirloom varieties and landraces."

Understanding willingness to adapt can lead to improved food security

Working alongside organizations around the world, including those helping manage genebanks located in Africa, the Arctic, and in the Czech Republic, Tyack has published several papers that examine and expand on the relationship between genetic resources, crop conservation, and agricultural innovation.

"The connection between genebanks and farmer experimentation with novel crop varieties supported by genebank activities is essential to better understand the economic values provided by these collections," said Tyack.

Understanding how innovative approaches to agriculture flow from research and development activities to practice is an important step to help address some of the effects of climate change in agriculture.

"We've found that farmers value the services provided by genebanks – not only in terms of providing genetic inputs to improved varieties but also for their conservation of agricultural heritage. Understanding the challenges and successes of past and current agricultural technological diffusion can provide insights of value for the coming years."

This economic lens to agricultural bioscience marries research that enhances crop production and resiliency to social values provided to the producer as well as the broader general public. As a result, policymakers are provided with insight about what kinds of investments are required to support producers in their efforts to adapt to new technology that



Wheat at the USask Crop Development Centre.

Photography by Gloria Gingera

is relevant for and adapted to their own personal settings and circumstances.

USask offers unique opportunity

The Van Vliet Visiting Professorship in Agricultural Economics was established in 1985 in honour of the contributions of Dr. Hadley Van Vliet (PhD) made to the agricultural industry in Saskatchewan and Canada through his teaching, research, and community outreach.

Tyack is the 11th person to hold the Van Vliet Professorship. His education took him around the globe before moving to Saskatchewan to accept the position.

Tyack earned his bachelor's degree in biology from Pomona College in California before heading to Europe for his graduate studies. In Prague, he got his master's degree in economics from Charles University, then headed to Switzerland to earn his PhD in development economics from the Geneva Graduate Institute.

"This position offers an invaluable opportunity for collaboration with several groups both locally and internationally," said Tyack.

Because agriculture is the dominant industry in Saskatchewan, understanding how it impacts or is impacted by global

trade patterns is key to ensuring the province's economic success. The Van Vliet Professorship provides space for recognized expertise in agricultural and international economics to explore the issues faced by producers, distributors, and other industry experts.

"This position offers an invaluable opportunity for collaboration with several groups both locally and internationally."

DR. NICHOLAS TYACK (PHD)

Tyack says one of the advantages provided by USask is its strength in crop breeding at the Crop Development Centre as well as its collaborative relationship with GenomePrairie, a non-profit organization that works to capture and maximize the benefits of research in genomics and related biosciences. This focus on crop breeding and genetics provides him with the opportunity to learn more about the natural science underlying the value of crop wild relatives and genetic resources.

"In a period of global food insecurity, it is necessary to understand how specific crops, such as the protein-rich lentil or chickpea, can provide value both as a food source and as a contributor to soil health and conservation agriculture."

Tyack is looking forward to working with researchers and students on projects managed by GenomePrairie, including the 4D Wheat project, which examines the role played by genetic resources in enhancing yield and helping to manage producer risk. One area he highlights is the potential use of crop insurance data to better quantify how new crop varieties can lead to yield gain in different cultivation zones.

"There's a lot of economics to consider in these processes, including the promotion of good innovations into everyday practice. I am also looking forward to working with Indigenous groups and producer groups to better understand their perspectives on agriculture in Saskatchewan." ▀

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Yvon A. Martel

UP TO \$100

Alan R. Hammond
Albertus W. de Gooijer
Dawn S. Brennan
Donald P. Wilkins
Elwin G. Smith
Gwendolyn N. Papov
Harold J. Popoff
Herbert S. Brinkhurst
Jacob L. Hamm
Keith E. Akins
Lyle M. Ballard
Margaret A. Ames
Michael J. Volk
Michael P. Schellenberg
Orrin M. Clayton
Orville G. Myrvang

Orville L. Thompson
Peter A. Ignatiuk
Rhonda L. Farley
Robert M. Gordon
Sharon L. Faye
Vanessa M. Headford
Wesley F. Nuttall
William E. Nussbaumer
William R. Nell

GIFTS OF EQUIPMENT

New Holland Agriculture and Robertson Implements

Contribution: Three tractors

Vaderstad Industries Inc.

Contribution: Precision air cart and drill

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We also celebrate those who have planned a bequest to the College of Agriculture and Bioresources. These arrangements help shape and secure our college's future.

Research Centre Spotlight: Livestock and Forage Centre of Excellence



The Livestock and Forage Centre of Excellence (LFCE) is the connection between research, industry and the consumer, from the microbes in the soil to the steak on your plate.

Aerial image of the LFCE Clavet site.

Photography by Tess Mills

 **JOANNE PAULSON**

Founded in 2018, the LFCE at the University of Saskatchewan (USask) is a world-class complex of field and science laboratories advancing all aspects of raising livestock on the Canadian Prairies. It's the first "research smart farm" in Canada, with a mission to advance efficient livestock operations.

The LFCE is comprised of the Goodale Site, the Native Hoofstock Centre (a bison facility), the Clavet-area forage cow-calf research and teaching unit (FCCRTU), and

the beef cattle research and teaching unit (BCRTU, including an intensive feedlot and metabolism barn), and four quarters of land owned and leased between Clavet and Goodale areas, the Termuende Ranch and Pathlow pasture.

And, of course, there are the stars of the show.

"The LFCE herd includes 300 cows and 100 replacements every year or 400 in total; and we are moving to 80 bison in two independent herds, one of pure

Woods and one of pure Plains bison," said Dr. Scott Wright (PhD), LFCE director. There are also horses.

All of this is managed by 13 animal technicians, and five staff in administration and supervision. The researchers come primarily from USask and its cooperators.

"Researchers are a deep partnership with us, international leaders in their fields," said Wright. "Key researchers like Drs. Gregg Adams, Jaswant Singh, Bart Lardner and Greg Penner, on the



Dr. Scott Wright (PhD), LFCE Director

Photography by Christina Weese

The path to LFCE

Wright's education and long career, which began in beef and forage research, laid down a winding but clear path to the LFCE. His master's degree is in animal science and his PhD in plant breeding, both from USask, following his bachelor's in animal science from the University of British Columbia.

After attaining his PhD, he worked for Agriculture Canada as a forage breeder and agronomist and then managed the forage-based Melfort Research Station, with heightened activity through to the mid-90's. In 1995, the government downsized the station by two-thirds, and he was manager through that process.

"From there, I went on to co-chair the Western Forage Beef Group out of Lacombe, Alta. Ironically, that's where we moved the forage program from Melfort."

He has held many leadership positions in the agriculture industry, including executive director of the USask Feeds Innovation Institute and director positions with Agriculture and Agri-Food Canada.

Most recently, he worked for StarGroup, a boutique fresh produce organization, for which he ultimately served as senior vice-president Food Safety and

Government Relations, and head grower of the technologically advanced 10-acre WholeLeaf Greenhouse in Coaldale, Alta.

Wright sees a broader need for "intensive research capacity" for the parent and partner institutions of LFCE, such as the Goodale Farm and Western College of Veterinary Medicine.

"Picture inoculations, vaccines, painkilling drugs, those kinds of things," said Wright. "That really requires a different setup and approach than what we have taken thus far."

To achieve the intensive approach, Wright has three things on his priority list as he moves into his second year of leadership. The first is developing capacity on the intensive livestock research side including a dedicated funding stream for this work.

"The second is to rationalize and understand the need for additional land base."

"The third is around the industry, partner and stakeholder relationships. We have room to develop strong relationships with the Ministry of Agriculture and their extensionist specialists; with industry like Saskatchewan Forage Council, Saskatchewan Stock Growers, and Saskatchewan Cattlemen's Association."

environmental side Drs. Phil Harder, Terry Fonstad and Jeff Schoenau, and Bill Bilegetu in forage breeding, are our research core; our job is to make them more successful."

"Working with them to better their work, and supporting new and emerging research programs with veterinary, animal and forage, and ag engineering and economics, the list goes on... they are our key clients, and that's the backbone of what we provide."



Cattle at the LFCE.

Photography by Gord Waldner

"I believe this will ultimately see industry sponsors and donors more directly supporting operational costs that allow us to be the glue, connecting funded projects into more integrated approaches and taking advantage of the technologies made available by managing our own herds. That was seen as part of the vision initially."

"We also have an area of Indigenous stakeholders that we are just beginning to explore — what we can learn from them. That's very exciting at the livestock end, the cattle end and the bison end."

Growing capacity

LFCE recently received a grant from the Canada Foundation for Innovation for a project called IntegrOmes, which involves a genomic-level understanding of the animal in its environment.

Wright sees being able to "take a hair sample of the cow and have it tell you how efficient she is going to be in forage conditions, or a manure sample to evaluate how she's going to respond to an antibiotic for a disease she's carrying."

"That's the future. And we expect to break ground on it this year. There is new equipment and lab capacity happening at

the university itself and a new facility at the LFCE-Goodale site."

Wright is always looking for more funding to "fit in between the research projects" and create operational connections. The LFCE runs on a \$7 million budget, but Wright thinks \$9 million would be more appropriate for the kind of fully integrated systems work possible at the LFCE.

"We'll continue to look for those donors who want to showcase or demonstrate their technologies, be it new tractors, new feed processing equipment. We're open for business to those organizations now, to showcase, use and demonstrate what they have. They can donate equipment, or lease equipment, as well as funding."

"We can do the same things with fencing technologies and showcase the manufacturer as part of this process of livestock and farming technologies."

In its third year of full operation, the LFCE is making the connections all the way from soil to the dinner plate, including environmental impacts and social credibility.

"The uniqueness of this facility allows us to begin to build integrated systems

research approaches, so that instead of just looking at how a forage might influence a feeding opportunity, we look at the implications of growing that forage, of land and the activity and the economics," said Wright.

"When you look at feeding the animal, it's not just how does that affect production, but how does it affect quality, and we're trying to get to the point of looking how that affects the environmental, the economic and the social sustainability of that operation."

"It's about sustaining livestock and forages in Saskatchewan and the Prairies."

DR. SCOTT WRIGHT (PHD)

"The uniqueness is about trying to put the pieces together. It's about sustaining livestock and forages in Saskatchewan and the Prairies." ♥

The corner where science, technology, and genomics meet

**Dr. Matthew Links
(PhD) refuses to see
barriers between
disciplines.**

✍ MATT OLSON

Dr. Matthew Links (PhD)

Photography by Carey Shaw



Dr. Links looking at the MinKnow software for the nanopore sequencer. The screen shown is about the health of the sequencer.

The research Links does as an Assistant Professor at the University of Saskatchewan's (USask) College of Agriculture and Bioresources is hard to categorize.

To say Links' work is on the cutting edge would be accurate, but it doesn't tell the full story. His research is at a nexus point — a space where computer science and biology meet to fulfill goals that neither field can accomplish on its own.

Such is the nature of the field of bioinformatics. Links uses his highly specialized expertise to answer challenging questions in agricultural sciences.

"I don't believe that the problems are solvable by either (computer science or biology) in isolation," said Links. "To solve the questions we want to answer, we necessarily need both."

Bioinformatics is an interdisciplinary science, using computer technology to analyze data drawn from life sciences that would otherwise be too complex to manage. Many elements of genomics, such as DNA sequences, contain so many individual pieces of data that it would be nearly impossible to work with them without the help of computers.

"You've got data sets that are so big, you need both a computational understanding and ... some kind of life science to understand all of the problem. You can look at that as one side supporting the primary idea in the other, or that both of them have primary ideas and things to gain from each other."

Where science and technology meet

Links parents' paths most certainly influenced his own. His father was versed in computers, mathematics and commerce, and his mother taught anatomy and other medical technology fields.

"Sitting around a kitchen table, it was never weird for me that you might talk about computer science at the same time you talk about

something like human health," said Links.

But when he was choosing his own academic pursuits, Links ended up going with both. Even as a student, Links was able to see the possibilities coming at the intersection of health sciences and computer technology.

"This was around the time the human genome was getting sequenced, so there was a realization that these disciplines around computer science and life science were colliding. And that really interested me."

Links ended up studying both computer science and biochemistry simultaneously at USask, something he said wasn't commonly done at the time. After that, he pursued a Master of Science in Biological Sciences from the University of Windsor, and a doctorate in veterinary microbiology at USask.


For Links, interdisciplinary training is not only helpful for exploring genomics — it's a necessity.

"If you look at the number of characters that make up those genomes — we're talking about things that are, in some cases, hundreds of millions of characters, and in others, billions of characters — that's easily for me getting into the 'wait a minute, that isn't tractable by a human.'"

"It is tractable by a human working with a computer. So, it seemed like a space where there was going to be new types of opportunity ... these interdisciplinary fields are going to be the ones that come together for this kind of thing."

Bringing "Star Trek devices" to the farm

Links' current areas of research seem just as diverse as his education. One of his projects involves microbiome studies in connection with swine, which is currently being funded by the national research body Swine Innovation Porc.



Inside Dr. Links' Lab: Charlie (an OpenTrons OT-2 liquid handling device) and Rosita (an OpenTrons OT-1 liquid handling device) are running simple example protocols (moving water and food coloring to create art in a microtitre plate).

The microbiome is a term for the collection of microscopic organisms living on or in the bodies of living things. The swine project examines the "gut microbiome" of pigs through the use of fecal swabs and next generation sequencing.

The goal of the swine project is to find a correlation between strong, healthy swine and the presence — or lack thereof — of certain organisms in swine microbiomes. That correlation could lead to improvements in the health of herds for animal producers.

DNA sequencing has been accelerating at a phenomenal pace in recent years and Links' group is focused on turning these data into actionable knowledge. Of the newest generation of sequencing technologies is the use of nanopores — a protein through which a strand of DNA could pass and be analyzed — to enable portable sequencing, which Links' team has been using in studies of chicken and cattle.

"The reality of this 'Star Trek tricorder' is, this is real," said Links. "It may be too expensive to sequence every animal, but the impact this will make to a producer, to have this in their hands, literally, is revolutionary."

Links sees a future where producers are using this technology as being not far off.

"The technology and science has leaped so far that we can be excessive in what we generate, and then triage the information to make the very simple, applied decision we need to make."

The cast of characters in a cross-disciplinary classroom

Scattered across a desk in Links' office are various LEGO figurines, each with their own colourful accessories.

They were each assembled by one of Links' team members as

an introductory exercise. It highlights an important part of his bioinformatics field: the number of diversely talented people who are working together to break boundaries in science.

"I forget that this is work. It's more like I'm running around with the Big Bang Theory cast of characters and we're talking about all these things, and we don't know any better to stop or to not try to do this thing where everyone else says 'that doesn't make sense,'" said Links. "We say, 'Why?'"

Links is also helping others reach that nexus as an assistant professor for the university, teaching the next generation and providing the same kinds of opportunities that made the difference early in his academic career.

Already, Links said he's seeing students cross disciplines before they've finished their studies.

"We've taken some of the animal science undergrad students and had them do some of this DNA sequencing. And that's crazy, because at least three of them now are about to go into their final year of veterinary medicine. "They're going to come out as trained veterinarians who don't see a limit as to why they couldn't do DNA sequencing in their practice."

It's a far cry from the dual-degree path Links had to make for himself when he was beginning his own academic career. And it's continuing to grow as science continues to push the boundaries of what humans and technology are capable of.

"We do some things that, on the surface, make no sense to anyone else. But it's legitimately part of not seeing that barrier between things." ♥

The Saskatchewan Agriculture Graduates Association (SAGA) proudly represents the interests and accomplishments of graduates from the college and school. This past year was another year of notable accomplishments and contributions.



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Honorary life members for 2022

Grant D. Wood '79 C retired as a University of Saskatchewan (USask) AgBio faculty member in 2020. With a BSA in Agronomy and Horticulture, he completed his master's degree in Ag Extension in '96. Over the years, Grant has been recognized for his teaching and extension work by the SIA, USask and across Canada. He was also the SAGA President for 2013. One of Grant's initiatives for USask was growing ceremonial tobacco for use in Indigenous ceremonies held on campus. His favourite course to teach was Urban Agriculture, a component of Urban Greening. Both focus on producing locally grown food, and led to the AgBio Rooftop Garden being created. Grant continues to share his passion for urban greening and agriculture, and food security through his volunteer work with inner city communities and Canadian newcomers.

Wilf Keller '69 C earned his PhD in Crop Science at USask, then completed his postdoctoral studies in Germany. He was first employed at Agriculture and Agri-Food Canada in Ottawa, then moved back to Saskatoon in 1990 to work at the Plant Biotechnology Institute, which is part of the National Research Council Canada. In his supposed retirement, Wilf decided to use his acumen at Genome Prairie, then Ag-West Bio. Throughout his science career, Wilf led many research initiatives, with a major focus on canola. He was also part of the team that successfully established the Protein Industries Canada Supercluster. Wilf is a member of both the Saskatchewan and Canadian Agricultural Hall of Fame. His retirement remains on hold as Wilf is now the Vice President of Outreach with the Ag Institute of Canada.

2022 highlights

We have some excellent must-read stories in our Dec. 2021 and June 2022 issues of *The SAGA*. This includes stories featuring graduates: Allen Hingston '69 C, Chong Sheau Ching '82 C, and Irene Ahner '65 C. All those and more are available at www.saskaggrads.com.

SAGA Undergraduate Award Scholarships

We are pleased to announce our third annual scholarship recipients. Maeve Balmer is studying Animal Bioscience and hails from Calgary, Alta. Courtney Taylor is studying Agribusiness and is from Warner, Alta. SAGA Undergraduate Award Scholarships are funded by fellow Ag grads donations.

Summer 2022 reunion

This past summer we were presented with a novel opportunity to serve our SAGA members in a new way! With pandemic restrictions affecting our last two winter reunions, we decided to explore a Summer 2022 Reunion.

Our plans fell into place when the Crop Development Centre (CDC) offered to share their facilities at the Kernen Crop Research Farm with us. We began the day at the Agriculture Building. The atrium quickly filled with Ag grads eager to (re)connect with each other. Guests were treated to tours of the old Crop Science building, presented by Bryan Harvey '60 C; the recently upgraded Controlled Environment Facility (Phytotron) courtesy of manager Adam Harrison, and the amazing College of AgBio art collection, showcased by AgBio Director of Development, Hamish Tulloch, '91 C. Several of the classes posed for their official 'Class Photo'.

We then headed to Kernen Farm to recognize Honorary Life Member (HLM) recipients of the last two years including: 2022 HLM's Grant D. Wood '79 C & Wilf Keller '69 C; and

2021 HLM's John Hickie '56 S & '59 C & Dave Christensen '58 C. AgBio Associate Dean Academic, Fran Walley, formally recognized these four HLM recipients who hadn't yet had a ceremony due to pandemic restrictions.

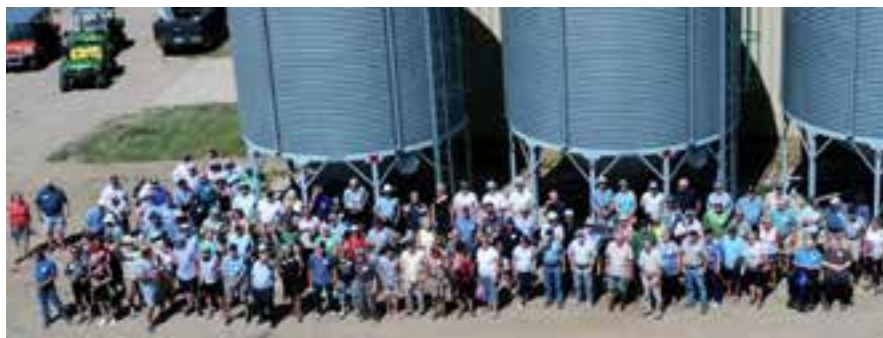
In his thank you speech, Dave Christensen intrigued us by recounting the ways the College has changed during his last 65 years. He asked if anyone remembered the 'Snake Dance' and quite a few hands were raised! The oldest member attending was Ross Reynolds, a '53 C grad. He shared with us how in 1951, he and the ladies of Home Ec. organized the first ever Ag Bag Drag.

Barb Stefanyshen-Cote '87 C and Raelene Petracek '86 C operated the refreshment stand, while Lorne McConaghey and Richard Bellamy, '66 School classmates, organized the air-conditioned bus rides.

Students from the Agricultural Students' Association (ASA) and the CDC also attended to sell ASA merchandise, direct traffic and lend a helping hand. Our future Ag grads are an impressive bunch, and we look forward to welcoming them to the SAGA alumni family!

The summer reunion was attended by over 140 members and guests who networked until the gates closed. We had a great time and look forward to the 88th reunion on **January 6-7, 2023**.

For more photos and updates, follow us on Facebook, twitter and our website at saskaggrads.com



All 44 honour year school and college classes ('41 and '42 all the way to '16 and '17) at the Summer 2022 reunion.

Photography by Kaylie Krys



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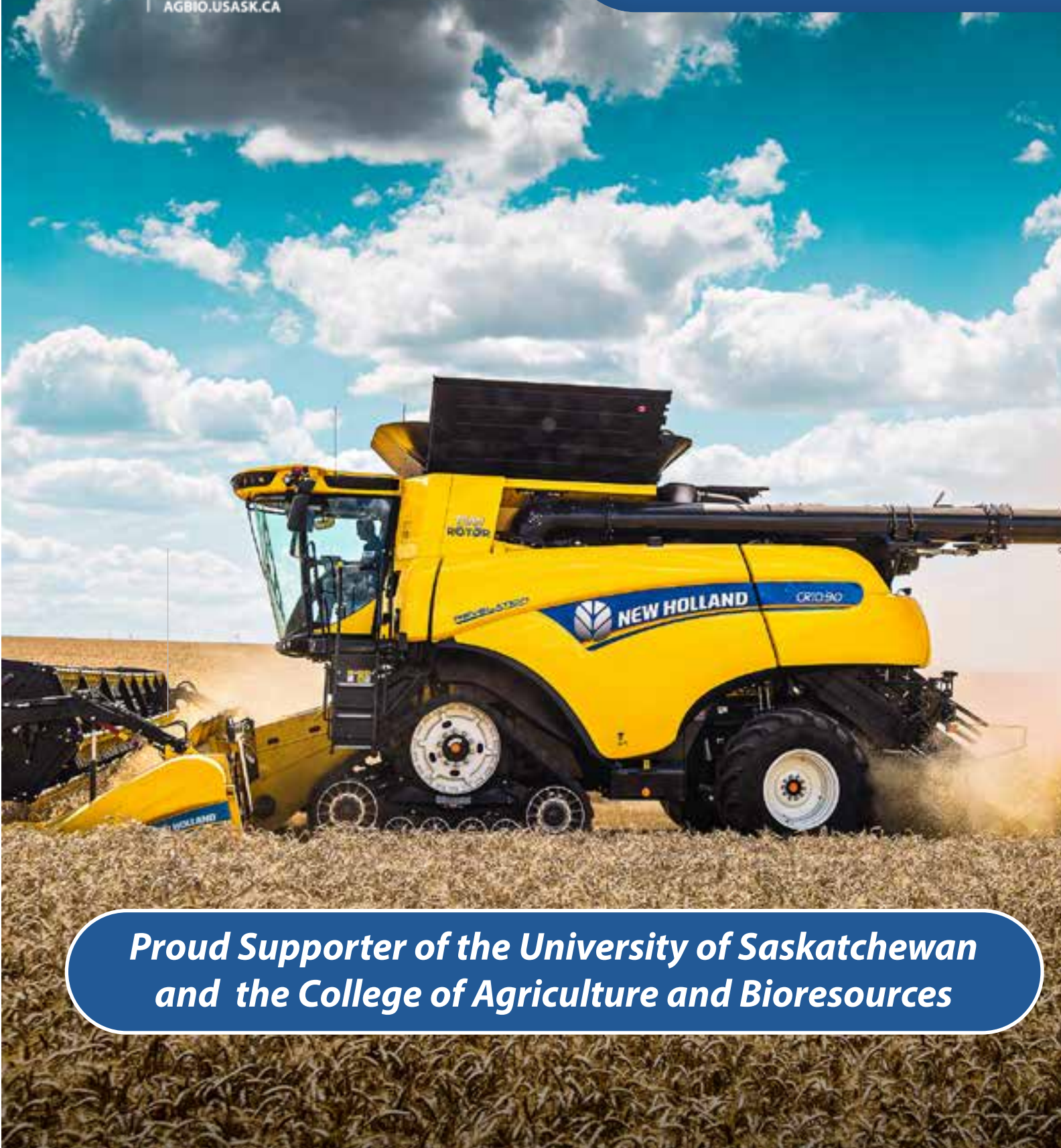
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