USASK COLLEGE OF AGRICULTURE AND BIORESOURCES MAGAZINE 2019

# AGKNOWLEDGE


## Making it work:

### Innovation and collaboration play an important role for Linden Lane Farms.

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## AGKNOWLEDGE


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# DEAN'S REPORT

I consider myself the luckiest person ever, to have become part of this amazing place known as the College of Agriculture and Bioresources.

We Agros have the most amazing attitude, the coolest faculty, and the best students, anywhere, ever.

My first Agknowledge message was as a very new dean, and ten years later I write my last message as your outgoing dean, who has been made a proud Honourary Lifetime Member of our Saskatchewan Agriculture Grads Association and, bestowed by our students, an Honourary Lifetime Agro. I am honoured, humbled and so blessed to be a part of this amazing Agro family! Together we have accomplished so much.

Since 2009, we've moved from impacts of the global recession of 2008 through Saskatchewan's boom years to the current period of shrinking budgets and reduced government spending on universities—although provincial support of agriculture has been and remains strong.

AgBio undergraduate student numbers have gone from 622 in 2009 to 1337 in 2019, contributing to our total growth of diploma, undergraduate and graduate numbers from 939 in 2009 to 1671 in 2019.

We have added the popular new Bachelor of Animal Bioscience and the joint PhD in Applied Economics (with three other colleges/schools), revised the Kanawayihetaytan Askiy certificate to create a diploma that allows graduates to ladder into degrees (as do all our diplomas), and we are now proposing a new collaborative degree in Food Sciences. We are also working on reviewing all our undergraduate programs to update them, and considering developing new professional programs to upgrade and enhance professional qualifications for those in, or entering, industry.

We always insist on hands-on learning and practical focus in our teaching and training, and this carries through into our discovery and outreach. This insistence on multi-faceted excellence mirrors the exceptional efforts, talent and determination of all AgBio faculty, staff, students, alumni, partners and donors. Together over the last 10 years we have created the Canadian Feed Research Centre , the Rayner Research and Teaching Facility, the Livestock and Forage Centre of Excellence and the rooftop garden. We have added solar panels, a multi-million upgrade of the Phytotron, purchased thousands of new hectares of land for crop, soil, climate, animal and agroeconomic research and teaching—and the list goes on.

The Agro students raise tens of thousands of dollars for charities and continue to be the bane of the Engineers' existence.

We have created or renewed over 25 government and industry-funded research chairs—and those professors are teaching, discovering and informing our students, clients and the world in production, policy, science and social awareness.

We have greatly increased our connectivity to, and collaboration with, our Indigenous peoples in First Nations around Saskatchewan, the Arctic and other provinces.

Our faculty has grown from 75 to 82. With that bare 10 per cent increase in numbers of faculty, we have in 2019 brought in 50 per cent more new grants (151 in 2009, 222 in 2019—and that does not include ongoing grants) and tripled our research dollars (value of new grants was $15 million in 2009 and $45 million in 2019). I ask you to put these statistics beside the enormous increase in students and let's all say together: AGROS ROCK!

And the world is becoming much more

aware of us. Our international profile is increasing because of all we do and our impact globally is growing. We are active in India, Brazil, Japan, China, Israel, Ethiopia, Ghana, Australia, the international Arctic, Scandinavia, Ukraine, EU, Mongolia and many more.

As great as all this is, the challenges we face mean we must do more. The sky-rocketing rate of changes in our climate, environment and population are, quite frankly, terrifying. Global economic and social unrest are growing because of these and other pressures. Our northern great plains must lead truly sustainable, regenerative agriculture capable of feeding an unthinkable number of people AND provide bio-based products to replace almost all products currently coming from non-renewable resources—in an environment whose temperature, moisture, wind and water currents, pests, diseases, and social fads cannot be predicted. We need practices, policies and novel (likely, weird and unexpected) approaches to help us cope.

The youngest generation see these issues with crystal clarity—it's their future at stake. The world faces an enormous, and unstoppable, challenge. Our amazing, understated AgBio college, including current and future Agros who are so firmly rooted in our love of this land and planet, must create a world that, seven generations from ours, will be a better place. Our history says if anyone can do this, it is us. We must work together to be the change the world needs, so Agros, as always, let's roll up our sleeves and get 'er done.

# AGBIO AT A GLANCE

**1,671** students — **1,337** undergraduate, **334** graduate

**82** faculty — **317** staff

**$45.3 M** New awarded research funding — **$1,571,002** Scholarships, bursaries, awards

## Undergraduate students by program

675 — Bachelor of Science, Agriculture
249 — Bachelor of Science, Agribusiness
224 — Bachelor of Science, Animal Bioscience
49 — Bachelor of Science, Renewable Resource Management
50 — Diploma in Agribusiness
52 — Diploma in Agronomy
38 — Kanawayihetaytan Askiy (KA) Program

## Bachelor student breakdown

24 — Agriculture Biology
6 — Agriculture Economics
187 — Agronomy
140 — Animal Science
9 — Applied Plant Ecology
34 — Crop Science
60 — Environmental Science
47 — Food and Bioproduct Sciences
33 — Horticulture
17 — Soil Science
118 — Undeclared

# Making it work

**Matthew Carr finds the passion and drive to grow his farm year by year.**

ASHLEIGH MATTERN

*Photography provided by Linden Lane Farms*

Linden Lane Farms grows around 150 types of horticultural crops with at least two cultivars of each. This year, they have 30 types of onions—it's a trial to see which ones they want to keep growing into the future. They're looking into planting kiwis, grapes and haskaps, and they grow things you won't typically find in other farms in their region, like okra, ginger and sweet potatoes.

"If we're not trying to innovate every single year, we're not going to keep growing the farm," said owner Matthew Carr, who graduated from the College of Agriculture and Bioresources this past spring. "If people tell me we can't do it, I like to prove them wrong."

Carr's interest in farming was first sparked in his Grade 11 biology class. He built a backyard nursery at his house and kept expanding it until he had thousands of plants. Eventually, he moved the operation to his grandparents' farm and started working in the family's 100 by 100-foot garden.



Linden Lane Farms supplies their organic produce to weekly farmer's markets, to their CSA subscribers and into wholesale outlets.

Running his nursery and the garden part-time and not knowing much about commercial farming, he was left with 1,000 pounds of tomatoes that first year. That's when he and his father sat down to talk about what he would need to do to start a business.

**Hands-on experience**

For the first few years, he was only at the farm part-time. After high school, Carr played junior hockey with the Fernie Ghostriders, the Langley Rivermen, the Trail Smoke Eaters, and the Melville Millionaires from 2011-15.

And in those early days, it wasn't clear to him that getting a post-secondary education would be necessary for operating a small-scale farm. "I was already running the farm," he said. "Was school worth my time?"

Attending university would take Carr away from the farm again, but his parents encouraged him to go.

"They did everything in their power to make it work here at the farm. Without their time, effort and sacrifices, it wouldn't have been possible to keep the farm business running."

That hands-on experience did help him better understand the academic work but he said going to university also taught him applied research, how to understand the literature, how to access funding, and opportunities to expand his network.

"It's going to accelerate our farm past everyone else in our region."

He worked hard at university, completing a BSc in agriculture with a major in horticulture science and a minor in soil science with great distinction, and ended up receiving the Sask. Horticultural Association Graduation Award.

**Bootstrapping the business**

Carr didn't want to juggle armloads of debt. From the beginning, he's only expanded each year as much as the business can afford.

The land was a high school graduation gift from his grandparents. He pays them a stipend to cover power and water costs. The original gift was an acre and has since expanded almost every year on his grandparents' 150-acre farm.

"Every year, I asked, 'Can I cut down a few more trees and expand this field?' It's been, 'Can I afford another roll of fencing?'"

His farm is run as a community-supported agriculture (CSA) operation where community members buy upfront subscriptions for the season's production. This helps him manage finances because he doesn't have to max out his credit cards at the start of

Carr runs Linden Lane Farms as a family operation with the help of his four grandparents, parents, sister and girlfriend.

the season, which was immensely valuable for a student after two semesters of full class loads.

The CSA also gives him a sense of connection to the community.

"We've been running a CSA for the last four seasons, and there are a couple of members who have been buying for the last few years," he said. "I meet them and their kids every single week and I like knowing the food is feeding them for the entire season. They're more like family now…. I see these children growing up on stuff I grew."

Linden Lane Farms is also a tool guardian for the Kootenay Local Agricultural Society (KLAS)—they store and rent out tools on behalf of KLAS, which gives them the ability to use the tools for free, including BCS tractors, chippers, mowers and pressure washers.

Being tool guardians is a volunteer position, one of several community outreach efforts Carr supports. The farm donates produce to the women's shelter and food banks, giving away items that have a blemish but are still of nutritional value. And every year they grow special pink and blue pumpkins as a fundraiser for B.C. children and their families battling through cancer in memory of a close childhood friend who passed away from an extremely rare cancer just after high school. They've donated about $7,000 to date.

**Looking to the future**

Today, Linden Lane Farms supplies about 50 different fruiting plants in their nursery and grows four acres of vegetables with an additional half-acre experimental orchard for small fruits and berries. They're certified organic, and they supply their organic produce to weekly farmer's markets, to their CSA subscribers and into wholesale outlets. It's a family operation—his grandparents, parents, and even his sister and girlfriend are involved—but they also have three full-time employees plus part-time employees during the peak of the season.

Building Linden Lane Farms to what it is today hasn't been easy, Carr said.

"The first couple of years, I paid myself pennies per hour, and I still pay myself dollars per hour, but I love what I do and at the end of the day, I push through it."

He has the passion and the drive to grow the business. His goal is to have 10 acres for vegetables—five in production, five in cover crop—and he has plans for a tools, tech and consulting company that focuses on small-scale horticulture clients as well as being a professional agrologist.

His university degree opened up new possibilities for him, and now that he's at the farm full-time, the sky's the limit.

DONOR PROFILE: JOHN HICKIE

# Perseverance Farm

## The legacy of a grateful alumnus

COLLEEN MACPHERSON

In 2009, John Hickie mounted a bronze plaque on a large boulder at the entrance to the home quarter on his section of land near Melville, Sask.

The plaque pays tribute to pioneering farmers, including his parents, and to the attributes they required to make a life on the land—courage, vision, a strong work ethic, determination, effective management and perseverance.

It is that last trait—perseverance—that resonates strongly with Hickie. In fact, "it's the story of my life," he said, particularly when he was a student at the University of Saskatchewan. It is fitting, then, that Hickie has donated Perseverance Farm to his alma mater in recognition of his belief that the acquisition of knowledge results in the ability to do good in the world.


Born on his parents' homestead in 1935 in the Loon Lake area, Hickie and his family moved to the Waldron area, near Melville, when he was nine years old. After finishing high school in Waldron, the young man set out for Saskatoon, intent on getting a degree from what was then the College of Agriculture. But he found the adjustment to life at university overwhelming.

"I was so uncertain about everything," he said, adding that he decided instead to enrol in a two-year diploma program with the intent of "taking what I learned home to help people on the farm to make their lives better."

Hickie returned to the farm in the summer between first and second year, "but I knew I had too many new ideas for my father. They were hard-working people and education was not valued very highly." He changed his plans and after completing the diploma program, Hickie went on to earn a BSc in agriculture with great distinction in 1959. He spent an additional year at the University of Guelph doing a master's degree but was disappointed the additional education was not particularly applicable to the realities of prairie farming.

Returning to his home province, Hickie spent the next 27 years with the Saskatchewan Department of Agriculture. Over those years, he acquired land near where he grew up and got back into hands-on farming "in my spare time and on holidays." He retired from the civil service in 1987 and returned to his roots, farming almost 1,700 acres of crop land. In 1990, he bought what is now Perseverance Farm.

Also during this period he married the love of his life, Bernadette, in 1968. She was a school teacher and shared John's work ethic, sense of service and generous nature. She was a source of inspiration and encouragement to many, including John. Bernadette passed away in 2015 and is dearly missed. They raised two daughters, Jennifer and Angela, and have four grandchildren.

Speaking from his home in Regina, Hickie said his decision to donate the land to the university stems from his years as a student there.

"I received a lot of benefit from my education that I would never have had if I hadn't attended the college. I feel a great deal of gratitude for the success I've achieved in life, and that increased my feelings of giving back so others have the chance to have a successful career.

The section of land is currently leased, and that arrangement will continue with the proceeds going to fund a student scholarship at USask in Hickie's name. He would like to see the scholarship used to support students who have "a sense of responsibility to use their training to improve the world but also so others can have the opportunity to have a successful career."

The donation is generous but it is not Hickie's first. While working for the provincial government, Hickie assumed responsibility for administering the Major Alfred Frank Mantle Memorial Scholarship, which had been set up by the province for the college but was later discontinued.

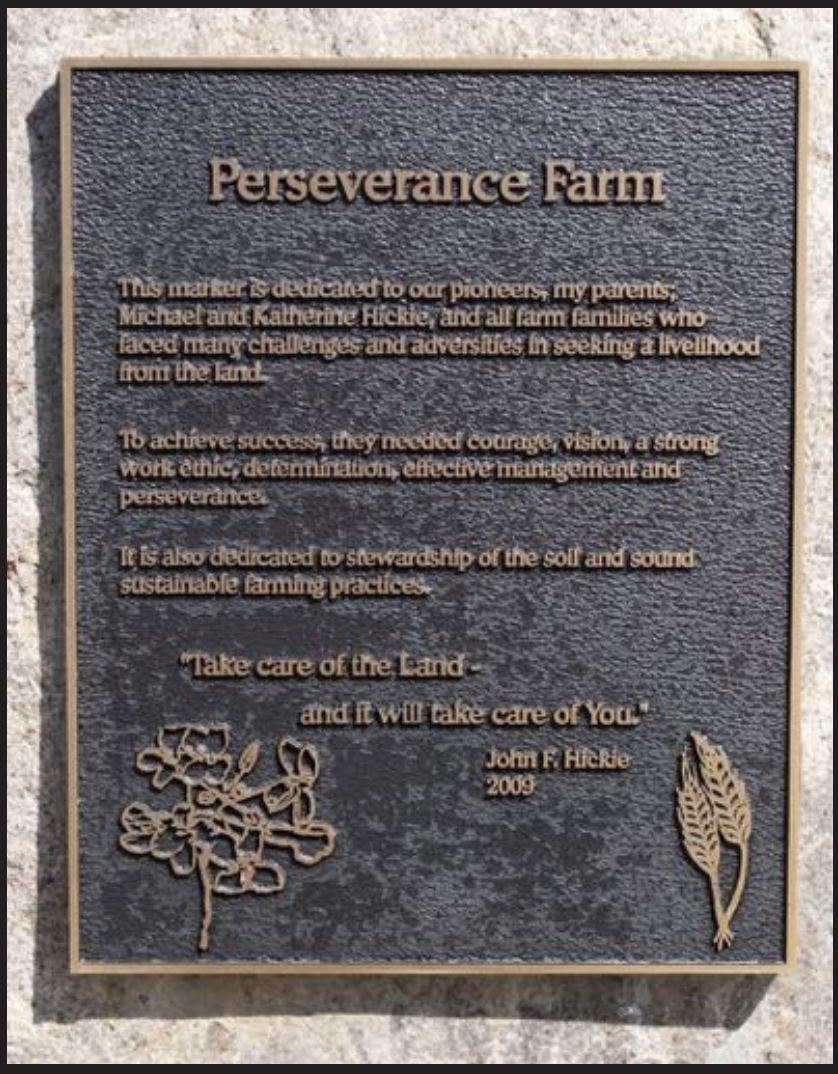
Mantle was the deputy minister of agriculture when, at age 33, he enlisted in the army in August 1915. He was killed in action in the First World War almost exactly a year later.

"The more I learned about Major Mantle, the more I became a great admirer of the type of person he was, of his value system, his sense of service. I felt I should do something (to renew the scholarship) in the hope the major would serve as an inspiration for students' lives."

Hickie was so inspired by Mantle's example that he established a new Major Alfred Frank Mantle Memorial Scholarship at the college. It too will be supported over the long term by this land gift.

Hickie was also a member of the Sodbusters Club, a group that contributed financially to the original feasibility study for a new agriculture building on the USask campus and whose generosity kick started the fundraising campaign that led to its establishment.

Although no longer actively farming, Hickie still makes the trek from Regina to Perseverance Farm. "I go out regularly to cut the grass to keep the yard looking good," he said. And often when he drives into the yard, he glances at the words on the boulder. "I'm proud of that marker, and especially the plaque. I hope it will be there for a very long time."




**It is that last trait—perseverance—that resonates strongly with Hickie. In fact, "it's the story of my life," he said, particularly when he was a student at the University of Saskatchewan.**

# Unearthing agriculture land use on First Nations

## Researcher to study land use and soil quality change in order to develop a 'roadmap' for First Nations agricultural lands going forward.

✎ JEFF MELCHIOR

To what extent can soil tell a story to fill in gaps in history? This is what a researcher in USask's College of Agriculture and Bioresources intends to find out.

Dr. Melissa Arcand (PHD) is launching a three-year research project with hopes of finding missing pieces of land use history on two First Nations reserves in Saskatchewan.

Using conventional soil sampling, remote sensing techniques, oral history and recorded data, the transdisciplinary research team she is leading is aiming for a more comprehensive idea of how reserve land was managed in an era when government policy—while never explicitly prohibiting Indigenous people from farming reserve land—used numerous methods to discourage them from doing so.

The ultimate goal of the miyo mâmawi atoskewin ("All working together in a good way") project is to develop a "roadmap" for reserves facing land use decisions today, co-developing the tools to protect their historically based rights in the event of disagreements over how their land should be managed and by who.

"We are going to combine the use of historical soil survey data as well as soil sampling to look at some of the historical and contemporary effects of agricultural land use on agricultural capability and soil quality," said Arcand, a soil biogeochemist with the Department of Soil Science.

She is also hoping to extend the notion of capability to include Indigenous values of the land, which go beyond strictly economic outcomes of agricultural production.

"But in order to do that we are going to have to talk to community members and access and use oral history methodologies to get the really refined detail required to make sense of the biophysical information we collect."

Arcand is one of five USask early career researchers who have each been awarded $250,000 over two years through a new federal fund. The New Frontiers in Research Fund has been designed to promote exploratory research that crosses disciplinary boundaries and enables researchers to take risks and be innovative.

Conflicting values between First Nations residents and non-Indigenous leaseholders have led to disagreements over land use in some communities in recent years, said Arcand.

"There have been concerns about the extent farmers are enacting best practices where it comes to preventing herbicide and pesticide drift, their use of tillage and approach to crop rotations, for example.

"We're kind of shifting towards agriculture that may not necessarily be farmed by First Nations but is still impacting the sustainability of their land and their ability to ensure they are gaining the full economic benefits of that land."

One challenge is historical land use arrangements that may have been made between individuals but were not necessarily

*Photography by Gord Waldner*

sanctioned by the band.

"Those historical arrangements can really impact the present-day conflict within a community or identify people in decision-making power. There is a lot of nuance to this and it's very complex. There is a lot of history there so it's very important to not ignore that history," she said.

The research, which will take place on a First Nation in Treaty 4 and another in Treaty 6, will start with talking to the Chief and Council of both reserves. Both First Nations have a long and dynamic history of agriculture on their reserve lands, said Arcand.

"Our main contacts for both communities are through the lands and resources departments; the on-the-ground people who are doing the day-in and day-out implementation of land management policy.

"Through our contact with those folks we'll get in touch with anyone who has knowledge of local agricultural land use history. Examples may include any farmers who have a good living memory of the history of the area or elders who may have stories of the time when land may have been broken for agriculture."

Arcand would like to take the historical research as far back as she can—to the treaty signings if possible.

"Obviously there's no one with us who would have been there but there certainly would be some elders who would have stories passed down from their predecessors. If we can start linking some of those older stories to what we see in the present day I think that would be really interesting."

She also has access to audio interviews which could provide insight into land use in both communities. "I'm working with Winona Wheeler with the Department of Indigenous Studies. She has a wealth of old audio transcripts of elders from various locations across the Prairies.

"It's very likely we will find little snippets of information that relate to when land was cleared or the important areas for food harvesting, hunting, and berry and root picking. All of that will be very interesting information to compute together to reconstruct that historical land use piece."

This is a subject close to Arcand's heart. Despite government efforts otherwise, handfuls of Indigenous people have consistently farmed using European techniques ever since settlers introduced them to North America. Arcand's family was among them.

"My parents farmed for 37 years on a conventional grain farm an hour north of Saskatoon on the Muskeg Lake Cree Nation," said Arcand.

"Throughout my whole life I have been aware of some of the challenges that First Nations farmers face that are distinct from what the general farm population generally has to contend with."

First Nations hold as much as four million acres of reserve land under conventional agricultural production in Saskatchewan alone, said Arcand. However, most of this land is farmed by non-Indigenous producers.

"That has been the case since the Indian Act in the late 1800s," she said. "First Nations people took up agriculture quite quickly, quite readily and quite easily. Thinking back to the late 1800s, there were many Indigenous farmers who competed quite successfully among the broader community."

However, a strain of policies—such as the pass and permit systems which required an Indian agent or farm instructor to sign off on transactions before Indigenous farmers could sell their produce—hampered their progress. Barriers to market entry remain today, said Arcand. Perhaps the biggest hurdle is lack of access to loans.

"Because we don't own our own land we just don't have the capital to use as collateral. That has been a perennial problem."

RESEARCH SPOTLIGHT: LFCE

# From the ground up

RIGEL SMITH

After a successful first year, USask's Livestock and Forage Centre of Excellence (LFCE) continues to provide unique research opportunities for livestock and forage studies.

The $38 million centre, which held its grand opening on Oct. 9, 2018, is a partnership between USask, the livestock and forage industries, and the Saskatchewan and federal governments. The largest and most comprehensive centre of its kind in Canada, the LFCE provides researchers from a variety of backgrounds the unique opportunity to work together within one organizational "roof."

Dr. Kris Ringwall (PhD), director of the LFCE, said the first year is characterized by hard work.

"I think it's coming along very well," said Ringwall. "Each part takes time, and we're looking at probably another good year of unboxing boxes, but we're happy with the development so far."

Ringwall breaks down the development of the LFCE into three phases: development, growth, and operation. The team is currently working on phase two, growth, which Ringwall estimates will take another year to complete.

Ringwall said the goal of the centre is to provide a new approach to forage and livestock research in Canada.

"We're really trying to bring together all aspects of beef cattle research into one entity from the ground up," said Ringwall, who moved from North Dakota to work at the LFCE. "It's really quite unique."

The centre is composed of three units. The Beef Cattle Research and Teaching Unit, which includes an environmentally monitored 1,500 head capacity feedlot, along with the Forage and Cow-Calf Research and Teaching Unit including more than 400 breeding cows, are located south of Clavet, Sask. The Goodale Farm which includes bulls and horses as well as specialized livestock such as bison, is near the community of Floral, southeast of Saskatoon.

From soil science, agriculture studies, veterinary medicine, and animal science, there are a wide variety of fields involved in research at the LFCE. The centre prides itself on being a leader in developing research, teaching, and technology transfer programs that help enhance the health and sustainability of the lifestock and forage industries in Western Canada.

The LFCE is able to provide new research that will benefit producers from providing consumer feedback, exploring new environmental practices and cost-effective herd management research.

Ringwall said the response of faculty has been positive, though the change required some adjustment.

"It's just like road construction. You've driven this road for 20 years, and then all of a sudden they decide to build it new and you have to detour ten miles," said Ringwall. "When you approach a detour, it can be frustrating, but once you sit down and say, 'at the end I'm going to have a better road,' it's easier to manage."

Like staff, the centre also provides a new learning opportunity for students. Many of the projects carried out at the LFCE involve graduate and undergraduate researchers who now have easy access to state-of-the-art equipment and facilities.

"We're looking at expanded opportunities for students through the use of our facilities," said Ringwall. "It's certainly likely to draw students as we continue to enhance the opportunities available out there."

With a blend of both science and field laboratories, Ringwall said the LFCE provides everyone a better learning environment.

"There's no question that the capacity to do research in livestock and forage has been enhanced."

**"You really need to consider all of the different components [of research] and how they fit together, so the interdisciplinary and collaborative effort is very, very important."**

**JEFF SCHOENAU**

## DR. JEFF SCHOENAU
## PRECISION MANURE SPREADING

**Professor, Soil Science**
**College of Agriculture and Bioresources**

**Soil Nutrient Management Chair**
**Ministry of Agriculture Strategic Research Program**

Dr. Jeff Schoenau (PhD) is leading a research project evaluating the effects of precisely managed manure spreading to traditional constant rate spreading and commercial fertilizers. The five-year project is multidisciplinary and involves researchers from soil science, the College of Engineering, animal science, the Global Institute of Water Security, and the National Water Research Institute.

"We've come to recognize that we can't really work in isolation," said Schoenau. "You really need to consider all of the different components [of research] and how they fit together, so the interdisciplinary and collaborative effort is very, very important."

Schoenau said the LFCE has allowed him to conduct research he couldn't before. The short 20-minute drive from the University of Saskatchewan to the LFCE, provides Schoenau and his team the ability to increase their measurement frequencies. Schoenau said this is more convenient than working exclusively from the Western Beef Development Centre in Lanigan, Sask., approximately 90 minutes from Saskatoon.

"[The] facility really resembles very much what producers and the livestock industry are doing, at a close distance [to USask] and with a lot of support," said Schoenau.

The LFCE's state-of-the-art facility also benefits students. "The LFCE gives [the students] exposure to people working in lots of different fields" said Schoenau. "It brings everything together in one place."

## KATHY LARSON
## AGRICULTURAL ECONOMICS

**Research Associate, Agricultural and Resource Economics**
**College of Agriculture and Bioresources**

Kathy Larson is trained in agricultural economics. Her work at the LFCE is based on collaboration with researchers from the College of Agriculture and Bioresources and Western College of Veterinary Medicine (WCVM). Larson also served as the interim director of the LFCE from February to October 2018. She also worked at the Western Beef Development Centre before it was rolled into the the LFCE in 2018.

Larson brings economic expertise to the centre. "Researchers often want to have an economic component to their projects so I'm in a unique position where I get tagged onto a lot of different projects." Larson's contributions have a practical focus. "What a new practice or technology is going to cost, save, or do for a producer is generally where my interest lies," she explained.

Some of her current research includes working with Dr. Bart Lardner (PhD), a professor of animal and poultry science at the College of Agriculture and Bioresources, comparing annual and perennial forages and how they fit into a grazing system. Larson also works alongside WCVM researchers Drs. John Campbell and Cheryl Waldner. Her research with WCVM faculty includes providing economic analysis to Campbell's Canadian Cow-Calf Surveillance Network project and Waldner's project focused on developing an assessment tool for Johne's disease.

Larson believes collaboration is front and centre to this research. "[The research] is required to be multidisciplinary and multi-researcher, so you need to be able to pull everyone together," Larson said. "The LFCE is where we get to all interconnect to make sure we're looking at research questions from all relevant angles."

# Talking to trees

## Researchers date caribou fence by reading the history told in its wood.

✎ COLLEEN MACPHERSON

To the untrained eye, the Moose Horn Pass caribou fence doesn't look like much, just low jumbled piles of wood stretching across the Mackenzie Mountain landscape high in the Northwest Territories. What Dr. Colin Laroque (PhD) sees, however, is clear evidence of ancient and masterful First Nations use of the land and its resources.

Laroque, a professor in the Department of Soil Science and a faculty member in the School of Environment and Sustainability, is part of a team working to document the fence built and used by the Shútagot'ine (Mountain Dené) who occupy an area south and west of Norman Wells bordered by the Mackenzie River and Yukon. An expert in dendrochronology—the science of using annual tree growth rings to date events, environmental change and archaeological artifacts—Laroque believes the tale of the fence will be told by the wood.

"It's like a reverse storybook. We weren't there, but the trees were so we ask them."

The fence is "a crude assemblage of wood—pieces of forest and downed lumber—stacked in any way, shape or form," he explained. It is very low because caribou will not jump anything higher than about two feet, a fact "the First Nations

*Photography by Colin Laroque*

have known forever and used to their advantage." The wood piles run in a line about 800 metres across the slope and down into a draw, the location of a kill zone, a configuration Laroque likened to a prairie buffalo jump.

The effort to gather as much information as possible about the fence arose in response to climate change, he said. "They never used to have forest fires up there but the North is drying up and heating up like crazy," creating a risk the fence could be lost. Shútagot'ine Elders and experts from the Prince of Wales Northern Heritage Centre in Yellowknife began the project by carbon dating two pieces of wood from the fence.

The results, however, did not match the traditional knowledge of the First Nation, said Laroque. Carbon dating put the age of the fence at the late 1800s or early 1900s, suggesting a connection with the Hudson Bay Company's meat trade in the area, "but the First Nations people say they've been using it much longer than that. It was then they realized they needed a different way to date the fence because the time period is of number one importance in knowing who was there, when they were there and when they were building the fence."

Laroque and his graduate students joined the effort in 2016 and 2017. A one-hour helicopter flight out of the small community of Tulita, formerly Fort Norman, got them to the site where they took core samples from living trees and standing deadwood as well as disk-shaped samples from fence wood.

Back in the lab, a timeline was created. Laroque said tree rings reflect everything that has gone on in the environment—wind storms, snow events, soil chemistry, fire—so by matching up known marker rings in the samples, a picture emerged that told a much longer story than the carbon dating. From about 80 samples came a timeline a millennium in length "which is almost unheard of. Of the samples we tested, we found quite a number dating from the 1400s and 1700s which says the fence was built in sections, and that fits with what the First Nations people were saying," said Laroque.

Asked if there could be wood in the fence that dates back further than the 1400s, he had a one-word answer: "Absolutely."

The Shútagot'ine Elders were happy with the results, he said. "It's their project and it validates that they've been using that environment for a long time. Caribou are still king on the food chain … and the fence shows the First Nation has been using that resource at a very sophisticated level for a long time. What they had was a good and smart system."

**" … the fence shows the First Nation has been using that resource at a very sophisticated level for a long time. What they had was a good and smart system."**

**COLIN LAROQUE**

While at the site, Laroque also used a specially equipped drone to capture images for a 3D model of the fence and its landscape. An additional drone sensor mapped soil compaction by caribou.

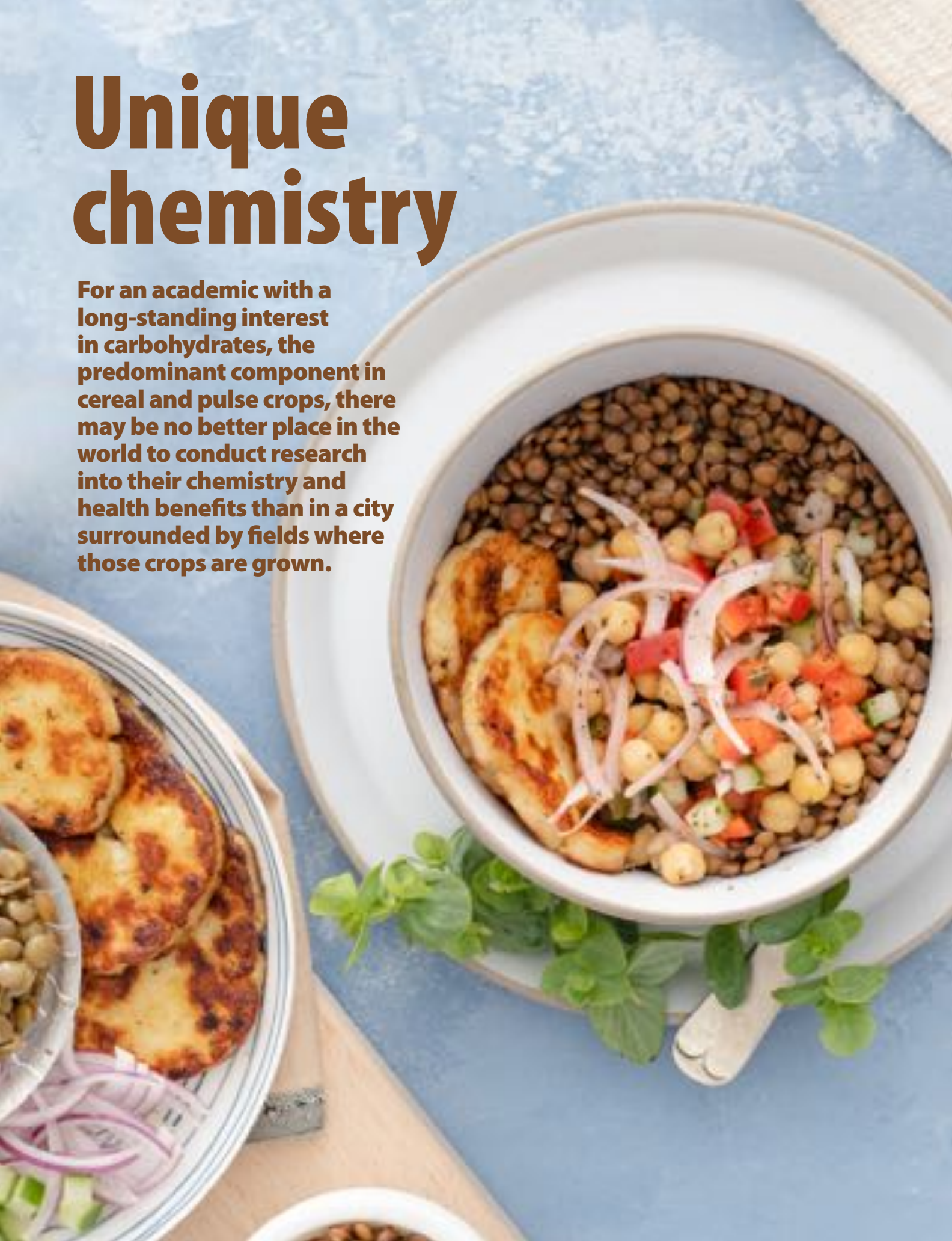
Laroque tries to return to the area annually, taking with him educational materials for the Shútagot'ine community that explain his work and findings. The Elders want these materials for their children "so they can know their culture, heritage and environment." He has also repatriated all of the wood samples. With funding from the Canadian Mountain Network, he hopes to continue his research, seeking archaeological evidence to confirm the locations of campsites near the fence and the kill zone.

The whole project is what he described as a proof of concept that research can take many forms and involve many players.

"We've got cultural knowledge, wood and drone technology, and it works. Now we want to do more."

# Unique chemistry

**For an academic with a long-standing interest in carbohydrates, the predominant component in cereal and pulse crops, there may be no better place in the world to conduct research into their chemistry and health benefits than in a city surrounded by fields where those crops are grown.**



*Photography by Bob Deutscher*

**COLLEEN MACPHERSON**

## Dr. Yongfeng Ai (PhD) arrived at the College of Agriculture and Bioresources almost four years ago, to a new position, a blank slate and an empty lab.

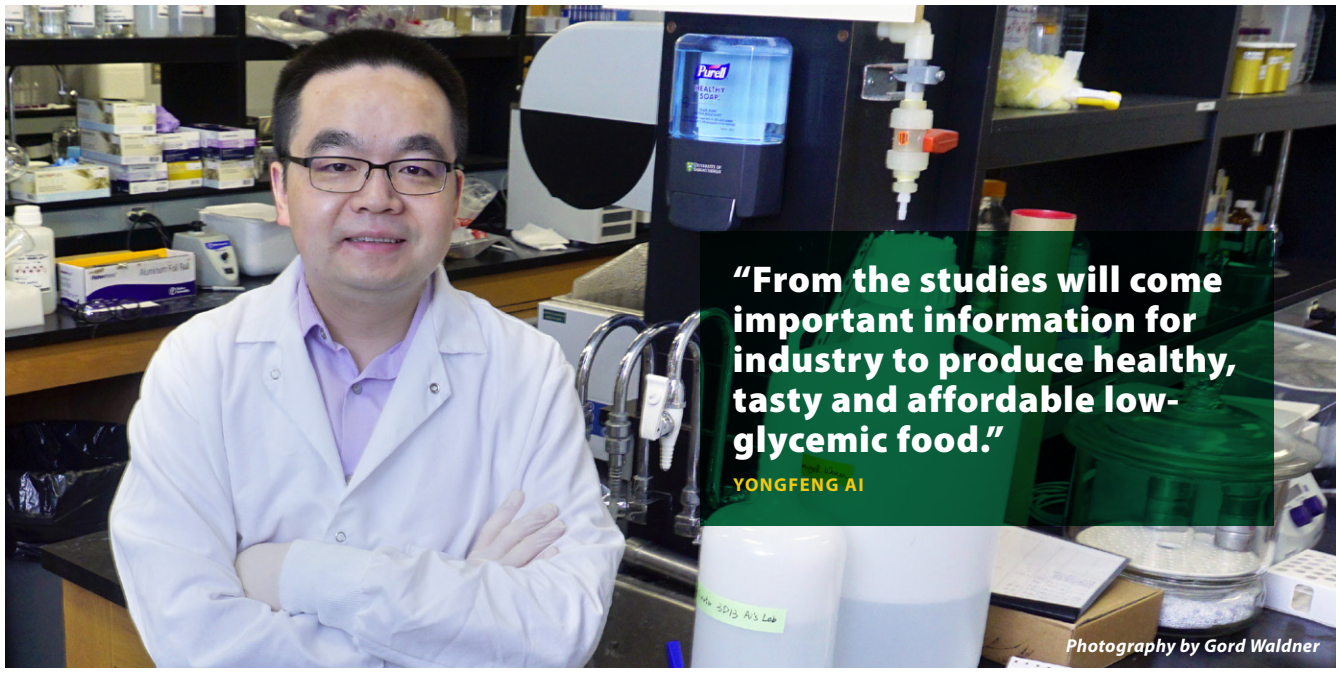
He has gone on to build a diverse and robust research program focused on producing healthy complex carbohydrates from Saskatchewan-grown crops like peas and lentils, but also on broadening the potential of carbohydrates as ingredients in human and pet foods.

"Food is a universal language with strong ties to our daily life and health," said Ai. "What we eat and how the food we eat affects our health have always intrigued me."

His interest in biology and chemistry came together naturally in the area of food science, and Ai developed a particular interest in starch as an undergraduate student in China. An internship with a global starch company there exposed him to the world of possibilities for what is most commonly known as a food ingredient but also has important industrial applications in paper and textile production.

Ai earned a PhD in carbohydrate chemistry at Iowa State University, then held a post-doctoral position at Michigan State University doing cereal grain science. When a friend sent him the posting for an assistant professorship and the Saskatchewan Ministry of Agriculture Endowed Research Chair in Carbohydrate Quality and Utilization in the Department of Food and Bioproduct Sciences at the University of Saskatchewan, it seemed almost too good to be true. "It allowed me to carry all of my passion and knowledge into the position."

His research program falls into three main areas that intersect with the food chain from one end to the other, from collaborating with plant breeders in the college to sharing knowledge and techniques with ingredient producers and food processors. One of Ai's main research areas is carbohydrate modification and utilization.




**"From the studies will come important information for industry to produce healthy, tasty and affordable low-glycemic food."**

**YONGFENG AI**

*Photography by Gord Waldner*

He explained there is an increased use of Saskatchewan-grown crops like peas, lentils and faba beans to produce high-quality protein but a co-product of that process is starch. "Our goal is to find ways to use that starch to generate new value, and to improve both its food and industrial applications."

Maize and tapioca starch currently hold a significant share of the global market, he said, "but I think there's room for pulse starch, and starch from oats, quinoa and other Saskatchewan crops, as a new source of food ingredients."

Working with the Saskatchewan Agri-Food Innovation Centre and other industry partners, Ai and his research colleagues are evaluating the performance of pulse starch, looking in particular at how they function as a food ingredient as well as their glycemic response, the effect a food has on blood sugar level after consumption.

"We want to collect more solid data that we can use to convince the industry that pulse starch is a good alternative to maize and other starch. There's a lot of work to do, but we've made good progress."

In conjunction with this work is an effort to address a new trend—clean-label ingredients. "When starch is modified using a chemical method, it must be listed on food labels as 'modified starch,'" said Ai. He is investigating non-chemical modification methods which would allow the ingredients to be listed simply as 'starch', the new preference.

"Processors don't want ingredients that sound like a chemical. We're using new physical and enzymatic methods to generate clean-label starch to meet this new demand."

Ai's research also zeros in on carbohydrate nutrition, work driven by the demand for low-glycemic foods in the face of rising rates of diabetes and obesity around the world. "People are looking for food that is low glycemic and the exciting part is that in our province, we have all the low-glycemic pulses."

With his expertise in producing healthy complex carbohydrates, Ai has partnered with other researchers to conduct three feeding studies to explore the glycemic response and digestibility of Saskatchewan-grown crops in food. One human trial will involve peas, lentils and oats; a second one will diverse varieties of peas.

In the third study, he has teamed up with Dr. Lynn Weber of the Western College of Veterinary Medicine and her pack of research beagles to assess the nutritional benefits of low-glycemic pet food developed by his program. According to Ai, more than 50 per cent of dogs and cats in North America are overweight or obese, so the need to more fully understand the nutritional value of low-glycemic food is as real for them as it is for their human owners.

"These studies are an opportunity to work closely with pulse breeders and nutritionists to tell the whole story of low-glycemic food ingredients and products," he said. "From the studies will come important information for industry to produce healthy, tasty and affordable low-glycemic food."

The third side of Ai's research triangle is exploring value-added processing of both pulses and cereals. By studying different processing methods like extrusion, infrared heating and germination, and the resulting functional attributes and nutritional value of the products, Ai hopes to present food processors with more ingredient options.

Ai's research is diverse, complex and potentially hugely beneficial to food producers, processors and consumers. But he's quick to acknowledge it could not happen anywhere but at an agriculture-based university "because food science has its roots in agriculture."

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# USask team cracks cadmium code in durum wheat

## 'Complementary expertise' key to reducing toxic heavy metal.

✎ JEFF MELCHIOR

A team of Prairie scientists led by a USask researcher has discovered how to significantly reduce the presence of a toxic heavy metal in durum wheat.

The team identified the gene responsible for the accumulation of cadmium in durum, through genome sequencing. The project was part of an international consortium dedicated to sequencing the durum genome, said Dr. Curtis Pozniak (PhD), a USask durum breeder and project leader. Durum is the wheat variety most commonly used as the source of semolina in pasta.

Pozniak credits the depth of expertise within the team for the project's success. The team included University of Alberta scientists Dr. Gregory Taylor (PhD) and Dr. Neil Harris (PhD), Dr. Ron Knox (PhD) from Agriculture and Agri-Food Canada and Dr. Andrew Sharpe (PhD) from the USask Global Institute for Food Security.

"Andrew and I have complementary expertise in the area of genomics, plant genetics and durum wheat breeding," said Pozniak. "Our colleagues at the University of Alberta are global experts in heavy metal accumulation in a range of different species. Their contribution to the project was critical to understanding how the gene impacts cadmium movement from the roots to the developing grain.

"It was the perfect marriage of complementary expertise and a proven track record in those particular disciplines."

The durum wheat genome is quite large and complicated, which meant a collaboration on a global scale was necessary, said Pozniak.

"Our team at USask co-led the project with a number of partners, most notably scientists from Italy's Council for Agricultural Research and Economics and the University of Bologna," he said. "Working as part of a team meant we could sequence the durum wheat genome in very short order, given our vast experience in other wheat species."

So why tackle cadmium? A major reason is because it can have an adverse effect on human health if consumed in sufficient amounts, said Pozniak.

"Cadmium is readily absorbed and retained in the human body, so it can accumulate throughout life," he said. "It generally accumulates in our kidneys, impacting renal function."

The Codex Alimentarius—or Food Code—is a collection of standards established by the United Nations and the World Health

*Photography by Christina Weese*

Organization to protect consumer health. It has set a limit of 200 parts per billion of cadmium in cereal grains. The durum wheat sequence was pivotal to identifying the gene that reduces cadmium levels to 100 or less parts per billion.

"It reduces the levels of cadmium to levels well below international standards, ensuring a safe food supply," said Pozniak.

Key to the research was cross-referencing the DNA sequences of cadmium-heavy durum against durum varieties with little cadmium accumulation.

"This comparison was critical to identify precisely the genetic differences between high and low cadmium accumulators. This allowed us to very quickly pinpoint a gene that we thought would be the right gene," said Pozniak.

The gene identified was a heavy metal transporter that locks cadmium in the roots of durum wheat plants, preventing it from moving to the grain where it can cause harm.

"When we first saw the DNA sequence, it made sense that this might be the actual gene," said Pozniak. "We conducted very meticulous experiments and were able to confirm that the heavily metal transporter was in fact the gene causing cadmium accumulation."

The team's research is already making waves in the crop research community.

"Other crop species can also accumulate cadmium and researchers of these crops have also identified the heavily metal transporter gene that can cause cadmium accumulation in those crops," said Pozniak.

The sequencing of the durum genome—and genome sequencing in general—has opened up a treasure trove of possibilities where it comes to identifying traits of interest to crop producers, said Pozniak.

"The sequence on its own isn't all that useful. It's really a blueprint which allows us to understand which genes are important for those traits that we select for. We are then able to develop DNA tests in a much more effective way to improve varieties for commercial production."

Pozniak and his partners' efforts to sequence the durum genome are far from over. There is a focused effort right now to improve resistance to fusarium head blight (FHB) in durum, using much the same process employed in the cadmium project.

"FHB is quite a devastating disease and durum wheat has very little resistance to it," he said.

That's not the only sequencing project Pozniak is working on.

"In fact. we have already sequenced 10 additional durum wheat varieties carrying various traits of interest to us in terms of breeding," he said. "As plant breeders we are trying to simultaneously improve a number of traits, like yield, disease resistance, end-use quality and marketability simultaneously.

"Much like we did with the first sequence, we are deciphering the genetic makeup of those particular individuals, which were carefully selected from our breeding program to represent those traits of interest to western Canadian producers."

**"Cadmium is readily absorbed and retained in the human body, so it can accumulate throughout life. It generally accumulates in our kidneys, impacting renal function."**

**CURTIS POZNIAK**

# Striking a balance between the costs and benefits of wetlands

**A new research project will look at how to compensate farmers for the costs of keeping wetlands on their properties.**

✎ JEFF MELCHIOR

There is almost no question that wetlands provide a great deal of good to society. They help with flood control, carbon storage, ecosystem services and a host of other benefits. In fact, if you've drunk clean water or breathed clean air lately, you can thank wetlands for playing a role in that sometime along the line.

But there's another side of wetlands not often reported in the media. Although everyone benefits from wetlands in some way, it's farmers who bear the brunt of the costs of keeping them on their properties. And because not all wetlands are created equal, the private costs of retaining them can sometimes outweigh the benefits—at least from an economic perspective.

Striking a balance between the social and environmental benefits of wetlands with producers' business costs is the focus of a research project by Dr. Patrick Lloyd-Smith (PhD), an assistant professor with the college's Department of Agricultural and Resource Economics.

The basic idea behind the project is that there is a mismatch between who benefits and who bears the costs of wetland conservation. This suggests a role for compensation to agricultural producers. "One aspect of the research is taking the cost of wetlands to landowners seriously," said Lloyd-Smith.

**"There are going to be some wetlands on very productive agricultural land that do not provide substantial benefits to society and keeping those wetlands may not be worth it. Of course, the reverse is true as well."**

**PATRICK LLOYD-SMITH**

In addition to the opportunity cost of land, there are other, less tangible costs as well.

"There's a nuisance cost to having a wetland on your landscape. Farmers have to maneuver their farm equipment around them, duplicating their input costs depending on the piece of equipment. They can also be home to different kinds of wildlife which interfere with farming practices," said Lloyd-Smith.

The costs and benefits of wetlands tend to vary across the landscape, he adds. "There are going to be some wetlands on very productive agricultural land that do not provide substantial benefits to society and keeping those wetlands may not be worth it. Of course, the reverse is true as well."

Lloyd-Smith's research will combine surveys of producers with economic modeling to understand the compensation required for wetland conservation. There has been a lot of research into compensation models internationally but in Canada it's just getting off the ground. By far the simplest means of compensating landowners is to pay them a fixed fee, a method exemplified by the Alternative Land Use Services (ALUS) program. Lloyd-Smith said this program has seen a lot of successful uptake by landowners, particularly in Alberta and Manitoba.

"It's nice and simple and everybody understands the rules of the game," he said.

"The ALUS program is interesting because they really work at a local scale—that's one of the keys to their success. They work with watershed and producer groups—it's a really collaborative effort. I think they've had some success in getting landholders engaged in the process and thinking about stewardship on the land as well as rewarding landowners that are good stewards of the land."

Another way of transferring payments is to run a reverse auction, said Lloyd-Smith. Rather than bid to buy a good as in a traditional auction, this model sees landowners submit bids to receive compensation for restoring a wetland on their land. These bids are based on how much they think it will cost to keep a wetland on their properties.

"One of the nice things about reverse auctions is we find out how much it costs farmers to actually restore a wetland on the landscape. Farmers—because they are the landowners—usually have the best information on that. It's also a way that we can keep the costs of the program down."

The time and effort required to submit a bid can be an obstacle to farmers, he said. One of the challenges of reverse auctions is increasing the amount of participation.

"There was one reverse auction for wetlands that was run around Calgary over the last couple of years. There is a general sense that participation in the program was quite low. They didn't get as many landowners putting in bids as they had hoped. I think as they become more popular they will have better success with participation."

On the flipside, Lloyd-Smith's research will also look at the environmental and economic benefits of retaining wetlands. For this he is working with his colleagues at the University of Saskatchewan's (USask) Global Institute for Water Security. A team of hydrologists, biologists and other scientists will trace the linkages of wetlands throughout the ecosystem to understand their impact on human well-being. Lloyd-Smith's role will involve placing an economic value on the benefits society receives from wetlands.

"I'm primarily an economist, so on that part of the research I imagine that you wouldn't want an economist trying to figure out all those scientific linkages," he said.

The second component of Lloyd-Smith's research is the role of technology in farmers' decisions to retain or decommission a wetland. "On the one hand, technology has been increasing yields, which increases the opportunity cost of having wetlands on your landscape. So in a sense technology is sort of hurting wetland conservation," he said.

"On the other hand you have the potential for technology to reduce nuisance costs. If you have auto steering and automatic shut-off of inputs, you might be able to reduce the costs of maneuvering big equipment around wetlands. Technology plays a role in both exasperating and helping reduce the costs of wetlands on the landscape."

# In the right light

Photography by Gord Waldner

## Graduate student aims to improve housing conditions for laying hens.

KATHY FITZPATRICK

As egg farmers of Canada switch from conventional cages to alternative housing systems for laying hens, Jo Ann Chew is working to help pinpoint optimal conditions.

A graduate student in the Department of Animal and Poultry Science at the University of Saskatchewan's (USask) College of Agriculture and Bioresources, Chew is trying to determine the most appropriate light levels inside chicken barns.

Low light levels keep chickens calm but they may not be able to see well enough to navigate successfully through their complex living space. Brighter light makes them more fearful, aggressive and flighty.

**Low light levels keep chickens calm but they may not be able to see well enough to navigate successfully through their complex living space. Brighter light makes them more fearful, aggressive and flighty.**

"My project is to find what the right balance is," Chew said of the research for her master's thesis.

The right balance is especially important in alternative housing, such as free run systems or enriched cages with perches and nest boxes. Grouping chickens together in larger numbers tends to increase feather pecking which can lead to cannibalism, Chew says. And, with more space to fly around, there is more chance of the birds crashing and breaking bones.

The current industry standard for minimum light levels is five lux (a measurement of illuminance) in conventional housing, 10 lux in alternative housing.

To put that into perspective, zero lux is total darkness while 500-800 lux would be typical office or classroom lighting, Chew explains.

However, she says more study on the current standard of five and 10 lux is needed.

To that end, she is testing the effects of 10 lux, 30 lux and 50 lux on behaviour, stress and fear levels, and bone health. Her subjects are two strains of laying hens, Lohmann LSL-Lite and Lohmann Brown-Lite, from the time they're hatched to 16 weeks of age. They're housed in floor pens equipped with perches, ramps, feeders and drinkers.

Chew has ceiling-mounted infrared cameras taking 24-hour footage four times throughout her research trial. During play back, she pauses every 20 minutes and notes what each bird is doing at that exact time, a technique called instantaneous scan sampling. She also watches an entire 24-hour period and counts the birds' successes and failures in navigating their environment (behaviour sampling).

To check stress levels, Chew takes blood samples from the wing vein to measure heterophil-lymphocyte ratios "which is a measure used to determine stress levels in birds."

And to gauge fear levels, she places a novel object in the pen and times how long it takes for up to three different birds to peck at it.

To assess bone health, Chew palpates keel bones searching for deviations or fractures, and will dissect some birds at the end of the trial. She will put their tibias through a machine to measure the bone breaking strength.

In all, Chew is conducting two trials over a two-year period. Sometime later this year, she expects to have all of her data and will begin to analyze it.

Her work is part of a larger project on the transition to alternative housing, involving researchers at the University of Guelph and McGill University.

"It's going to benefit possibly the (whole) of Canada, and maybe even worldwide too … It's very exciting," Chew said.

Poultry science may seem an unlikely career choice for a Malaysian-born city kid. But looking back, it's clear how it fell into place.

Growing up, Chew had always loved animals. While in high school she and her family emigrated to Canada, arriving in Edmonton.

Her mother, an IT trainer, observed how popular pets are in Canada, and suggested Chew go into veterinary medicine. Her father, a project manager in hotel construction, saw opportunities in farming.

"He said one day the world will go hungry … and they're going to need someone to feed them," she recalled.

So she steered a middle path, entering the University of Alberta to study Animal Health, majoring in Food Animals.

Chew also remembers seeing news reports of abused farm animals, and thinking "If I get into that industry I can change the game."

She said she has since learned from her professors that farmers love their animals and treat them well, and so her approach has shifted from reformer to facilitator in the humane care of livestock.

Two professors in particular inspired her to pursue poultry science and research in that field. Independent studies under the supervision of Drs. Martin Zuidhof and Frank Robinson from the University of Alberta gave her the first glimpse of what it's like to engage in research.

"I just think it's so cool finding out the way science plays a role in bird management" by bridging a knowledge gap, Chew said.

She also enjoys the teamwork.

As she neared the end of her undergrad studies, Robinson urged her to pursue a Master's degree. He recommended she work with Dr. Karen Schwean-Lardner (PhD) at USask. Schwean-Lardner secured funding for the research project Chew is now completing and became her thesis supervisor.

Chew said one of the main things Schwean-Lardner has taught her is to "think like a scientist," critically evaluating whatever she sees or hears.

After this, Chew remains open to either working in industry or staying in research. Either way, she looks forward to learning more about production and management—for the benefit of animals, producers and consumers alike.

# From idea to reality

## Alumnus grows idea into thriving business.

✎ KATHY FITZPATRICK

If you've ever tasted Dare's popular Vinta cracker, here's an interesting tidbit. Its distinctive flavour comes largely from one ingredient, malted red wheat, supplied by a processor in Saskatoon. That's what Mark Pickard, founder and president of InfraReady Products, will tell you.

*Photography by Gord Waldner*

Despite a non-descript head office in Saskatoon, Infraready Products is a major player in the global food industry. InfraReady and Pickard both exude quiet confidence, that prairie "get 'er done" attitude.

Raised on a mixed farm in southern Saskatchewan, pursuing a degree in agriculture in his home province seemed like a natural choice to Pickard. He studied applied microbiology and food science (BSA '78) at USask's College of Agriculture and Bioresources, with a particular interest in industrial fermentation. "It might have been my interest in beer," he quips. In 1990,

**"Our business success really comes from helping other companies innovate—and that's either by solving a problem they have or creating an opportunity."**

**MARK PICKARD (BSA'78)**

Pickard added an MBA to his credentials.

It was actually his search for efficient cooking technology that led to InfraReady's creation. At the time, Pickard was head of processing research at the Saskatchewan Wheat Pool (SWP). The SWP was looking for ways to add value to crops. Pickard's team investigated infrared processing methods, and then he wrote InfraReady's business plan and presented it to SWP's CEO Milt Fair. "He only had one question, and that was who's going to run it? And I said I would. And he says okay I'll give you the money."

So in 1994, at the age of 38, Pickard started InfraReady with "three employees, no products and no customers." Three years later, as the SWP went public, InfraReady faced either sale or closure. Then-CEO Don Loewen told Pickard he could buy InfraReady if he could raise the money. Pickard found a couple of partners: fellow alumnus Bill Hetland, a supplier of high-quality grain to InfraReady; and Ken Davis, owner of a food ingredient distribution business headquartered in Singapore.

Central to InfraReady's strategy was to remain a secondary processor, providing modified ingredients for such famous brands as Kellogg's, Post, Nestlé, and Nature's Path. In addition to breakfast cereals and bakery items, InfraReady products are also used in baby food, meat and beverages. Even cat litter.

Pickard saw a gap between raw commodities and what many food companies seek, ingredients that will yield improved appearance, texture, taste and nutrition. "Our business success really comes from helping other companies innovate," Pickard said. "And that's either by solving a problem they have or creating an opportunity." InfraReady's success is also due to the multiple accreditation it has attained, establishing itself as a reliable, responsible and secure global supplier. Last year it won the ABEX Innovation award. (The award celebrates Saskatchewan business excellence.)

In striving to innovate, InfraReady engages in a constant search for new commodities such as purple wheat. In this case, value creation is huge. By the time one tonne of purple wheat is baked into bread, its value has multiplied 57 times, Pickard said.

InfraReady also supports research at the College of Agriculture and Bioresources' Crop Development Centre, on purple wheat and other raw commodities. A recent success story is NutraReady, a powder that preserves the colour and freshness of red meat. Made from precooked lentils, it was developed in co-operation with Dr. Phyllis Shand (PhD) in the college's Department of Food and Bioproduct Sciences and Dr. Janitha Wanasundara (PhD) at Agriculture and Agri-Food Canada.

At the same protein level of ground beef and a quarter the price, Pickard said NutraReady is an appealing alternative to toasted wheat crumb or soy as a meat binder and extender. "It's sold locally by Prairie Meats. They have put it into a premium burger and they actually label it 'made with Saskatchewan lentils,'" he said.

He expresses "extreme gratitude for the education, for the relationships, for the university, for the college. If they weren't here none of this would have happened . . . The ripple effects are huge." Meanwhile, InfraReady contributes to the AgBio Discovery Camps, looking to develop potential new employees.

Today the company employs 25 people, processing 60 different raw materials into 6 million kilograms of food ingredients per year—in all 300 different ingredients for about 100 customers worldwide. Half of InfraReady's production is exported (35 per cent to the U.S., 15 per cent off shore.)

To stay on top, Pickard said InfraReady must keep improving operational efficiencies so that it can continue offering good value to its customers. As well, it is always looking to expand its global market. Vietnam may be next on the horizon.

Fortunately, the food ingredient business is "a big space to play in," Pickard said. With a growing world population, and ever-evolving food industry, Pickard doesn't worry about limits to InfraReady's growth.

**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.**

SAGA
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## Honorary life members for 2019

**Blair Cummins ('77 S)** has been tilling the same patch of soil in the RM of Blucher since he was old enough to walk, and resides on the family farm with his wife, Marina. Blair and his brother operate a 5,500-acre grain farm, and he and Marina have a Saskatoon berry and sour cherry orchard.

Blair is active in community activities including Blucher ag boards, and Allan and Clavet sports. He is a third generation RM councillor, as well as an APAS rep and Municipal Hail board director. Blair has been involved with SAGA since graduation, and became the first ag grad to serve two terms as president. Currently, he serves as an MAL and organizes the Cheers with Peers events at three agriculture shows.

**Jim Halford ('63 C)** grew up on the family farm south of Indian Head, but was never satisfied being just a farmer. He obtained his MSc under Dr. H. Van Vliet (PhD), went to the United Kingdom as a Nuffield Scholar, and furthered his knowledge through the 80's at the Ag Institute of Canada, Sask Ag, and Sask. Indian Agriculture program, plus a multitude of other agriculture fields.

In '79, Jim decided "Vale Farm" (which his grandfather homesteaded in 1890) needed to be farmed differently. Jim's design of the Conserva Pak™ seeder led to a business of ongoing design, testing, manufacturing and marketing. Over the years, Jim has been recognized nationally and internationally for his innovations, and contributions to zero till seeding and the agriculture industry.

## 2019 highlights

The first awards of the SAGA Undergraduate Award/Scholarship will be presented in the 2019-20 academic year.

The scholarship is funded by ag alumni, and is open to any undergraduate degree or diploma student currently enrolled in the College of Agriculture and Bioresources. Two awards of $3000 will be presented based on both academic achievement and involvement in community, college and university activities.

Our key event, the SAGA Reunion Banquet, enjoyed another great crowd with over 400 in attendance.

For the first time that anyone can recall, we hosted two centenarian graduates, Thomas Drever ('39 C) and Harold Chapman ('43 C).

## 85th Annual Reunion Weekend

**Register at saskaggrads.com**

**Friday, January 10, 2020**
**4 – 7 pm**
A come-and-go social will be cohosted by SAGA and the College of Agriculture and Bioresources in the Agriculture Building student lounge.

Refreshments and tours provided.

**Saturday, January 11, 2020**
**8 am – 6 pm**
Hockey Tournament, Waldheim, SK

**4:15 pm – 1 am**
Reunion Banquet and Mixer
TCU Place, Saskatoon, SK

- Honorary Life Membership Presentations and AGM
- Recognition of Years – 1940, 1945, 1950, 1955, 1960, 1970, 1980, 1990, 2000, 2010, 2015

**Return undeliverable Canadian addresses to:**

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**University of Saskatchewan**
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