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FALL 2018

CHANGES ARE BLOWING IN

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ONWARDS AND UPWARDS

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Women in Agriculture

DIGITAL SOIL MAPPING

Key to our survival on a threatened planet

UNIVERSITY OF SASKATCHEWAN
College of Agriculture and Bioresources
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DEAN'S REPORT

DEE HOBSBAWN-SMITH

"Similar to last year, we are firing on all cylinders in our college, with consistency of excellence in a whole bunch of different areas," reported the Dean of the College, Mary Buhr.

One major success is far afield. It's a long way from the Saskatchewan prairies to Africa's sub-Saharan Ethiopian highlands, where, according to Canada's International Development Research Centre, population increase and climate change have led to alterations in land use, with resulting deforestation, overgrazing, soil erosion and desertification. Despite the differences and distance, the College of Agriculture and Bioresources has maintained an educational presence in Ethiopia for twenty years. Forty thousand farmers partner with the College and the College of Pharmacy and Nutrition, testing different ways of managing and modifying crops that have been developed.

Buhr was recently in Ethiopia to participate in the local celebration of the partnership's twentieth anniversary. Of particular note, said Buhr, is the work of Dr. Carol Henry, studying the resulting impact of related dietary change on family nutrition.

"Most touching was meeting some of our collaborating small farmers," said the Dean. "One shy woman stood up and said she started participating because she could get free seed, but continues because they now have more crop to sell and their land is better. [She said that] one of her neighbours came over and asked if she could work with the partners too. 'Why, what makes you say this?' the farm woman asked. 'Because your children are taller and so healthy,' the second woman replied."

The Dean added, "We are making the local economy and individual lives better. It really makes a difference in every way – and in many ways we did not anticipate."

The College's research in Ethiopia includes crops, animal nutrition improvements, and what Buhr described as "cool work using mealworms." The worms are fed a diet of mouldy grain. "Not food grade, it would otherwise get tossed. But the worms love it, and somehow detoxify the grain." Those mealworms are ground up and fed to chicken and fish. The project has the added benefit of creating what might become a valuable product. "Otherwise," the Dean asked, "do you bury or burn that mouldy grain?" She added that research dollars are very strong this year, offering increased "evidence of the significance of the College's work that makes an enormous difference."

PHOTO BY CHRISTINA WEESE

Closer to home, Buhr remarked that "we don't stand still. The new Livestock and Forage Centre of Excellence in Clavet is up and running, and was substantially compete last March." The plan was to move some animals to the new Centre during July, with the cow herd from the university farm following in the fall. The herd on the Goodale research farm will relocate after calving next year.

However, she added, "Dairy cows will continue to graze along College Avenue." As part of the urge to stay visible and relevant, the College rebuilt its on-campus dairy barn in 2015 – "the only university in North America that rebuilt a dairy facility and kept it in the city," commented Buhr. Its state-of-the-art dairy production provides three ways to milk, including robotics, with an interpretive centre that is open to the public. "Kids and adults take the walkway the entire length of the barn above all our cows. It's a unique opportunity to play and learn, not just about dairy, but about the whole agricultural cycle and maintenance of land." She paused and added, "That includes the management of animal poop." In a city, animal waste is an issue, as any dog owner knows.

"We are making the local economy and individual lives better. It really makes a difference in every way – and in many ways we did not anticipate."

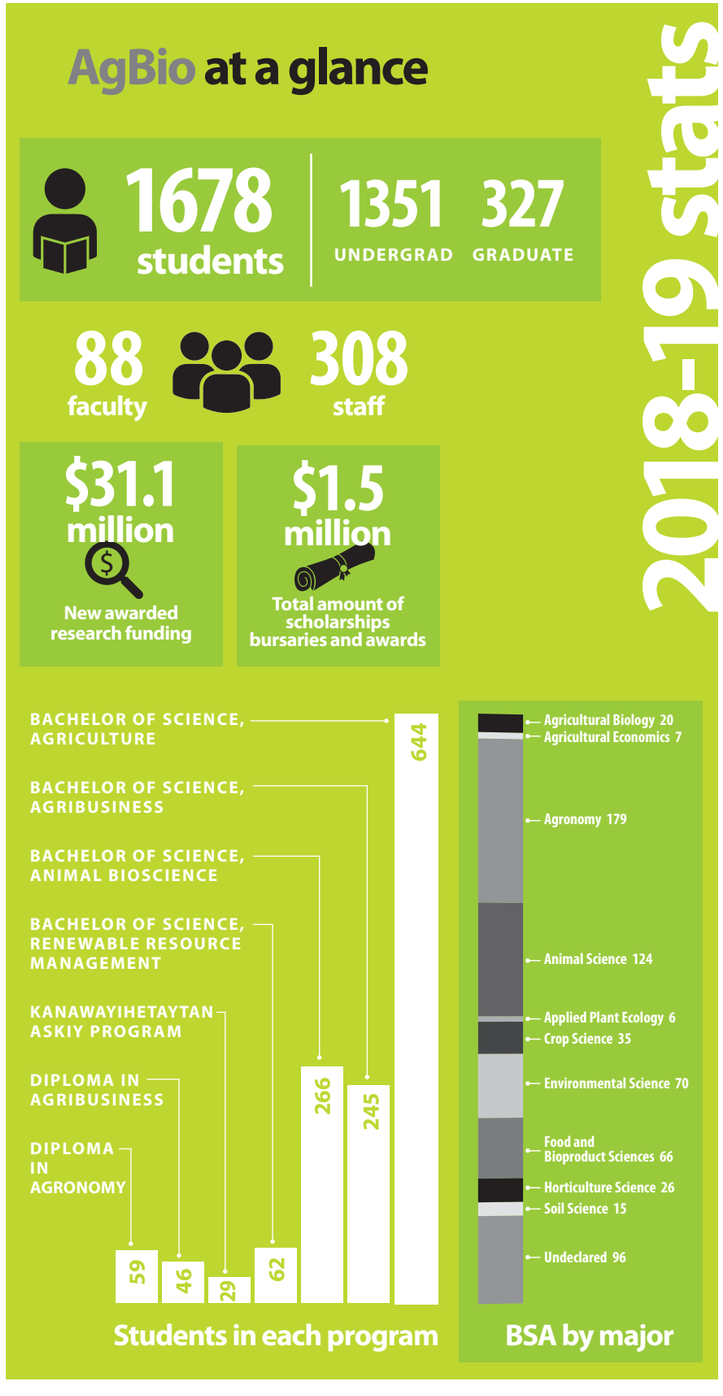
MARY BUHR, DEAN

The College had four new faculty members start this year, in water economics, rangeland and forage management, agricultural risk, and beef cattle nutrition and pasture management. "Even though we remain under budgetary constraints, we are finding ways to renew and expand," Buhr said.

Ag students received a variety of travel opportunities in the past year. "We take students to Crop Life Canada meetings, and our Ag marketing student team went to the North American meeting of major US and Canadian schools, where they got into the semi-finals, among the top fifteen." For this competition, a multi-disciplinary team of students coached by Dr. Eric Michaels imagine a new product and write a case study as if presenting a prospective product to a board of directors.

"They figure out all the business pieces, so it must be an exciting product with saleability and an economic plan," Buhr said. "They've done very well the last three years, and this year, they were considered one of the teams to beat. As a result of all these successes, on-campus job fairs regularly see prospective employers queuing up to recruit our students as their future employees."

"We want to be relevant," the Dean concluded. To meet that goal, the College has a presence at Ag in Motion, Agribition and Ag in the City, and offers AgBio Discovery Camps – day camps for kids during the summer, doing agricultural things. "Most are urban kids who might not have that ag background," Buhr said. "We listen to people's issues and concerns. This is all about the people. The attitude of people in this college and university and province keeps us strong. They are the ones who keep on giving and make this place the excellent spot it is." ■



GIFTS THAT KEEP ON GIVING

Scholarships and other academic awards aren't just about money. They're really about opportunity.

PHOTO BY AMY MACTAGGART

The recognition reminds you that all of the time spent studying, doing homework, and meeting with groups pays off, and positive results will come as a consequence.
ZACHARY PERSON

PHOTO BY COLIN LAROQUE

DEE HOBSBAWN-SMITH

For two accomplished students in the College of Agriculture and Bioresources – Zachary Person and David MacTaggart – winning scholarships has been "a game-changer."

Person, just starting his pursuit of a Master's degree, considers himself a hopeful man. His ambitious goals are in keeping with that hopeful stance: studying ways to mitigate the impact of humanity's growing population on the planet's natural resources; and repairing harm caused to the natural world by past human activities such as mining. Just as *Star Trek* heroes "boldly go where no one has gone before," Person is drawn, as he says, "to explore new things that nobody knows." In 2018, he completed the fourth year of his Bachelor of Science in Agriculture, majoring in environmental sciences. Next is his Master of Environment and Sustainability, also at the U of S.

He recently received the Edwin Wells and Walter and Jean (Wells) Curry Scholarship to further his education. Candidates must be Saskatchewan-educated leaders committed to community-focused endeavours.

Person was raised in Shellbrook, SK, on the edge of the boreal forest, where his childhood was a happy blend of agricultural and parkland life, with many hours spent outdoors, sledding, swimming, camping, and boating. "The forest was always a peaceful sanctuary," he said, "and to do work and research within the forest is exactly where I wanted to end up." In grade eleven, he toured three Saskatchewan mines – coal, potash, and uranium. The huge holes the mines left in the ground sparked the high schooler's interest in land reclamation: how would the holes, tailings, and the ecosystems surrounding them be cleaned up afterward?

His interest in mining and its effects is sending Person north for his postgraduate studies. He expects to spend two years studying the effects of arsenic on the surrounding environment of Giant Mine north of Yellowknife in the Northwest Territories. He will use an increment borer to drill a small hole into trees in the region and gather samples of tree rings (one grows each year). Then he plans to work with the Canadian Light Source (the Synchrotron) to scan the tree core samples. This will aid in putting arsenic pollution on a timeline to determine when it entered the environment and how it can influence berries, soil and trees, Person explained, and added, "The world is changing in ways it shouldn't, and quicker than it should, due to an increase in both population and resource use." He believes that counter-changes are needed: encouraging reusing and recycling; learning about the lifecycle of disposable items and their impact on the planet; understanding the finer points of food production and food waste. "Every small action impacts the larger issue," he said.

"This award means the ability to continue my education," he said. "Alternatively, I would not be going back to school, but working. The recognition reminds you that all of the time spent studying, doing homework, and meeting with groups pays off, and positive results will come as a consequence." He added, "Recognition shows that you are capable of achieving great things. You just have to keep your mind focussed on your goals."

This fall, another goal-focussed student, David MacTaggart, began his third year of his Bachelor of Science in Agriculture, majoring in Crop Sciences. MacTaggart was recently awarded The Torvald and Margaret Tollefson Scholarship in Agriculture and Bioresources.

He has been interested in agriculture since grade five. "I was a 4H member and community leader in and around Lacombe," he said of his early years. In 2017, as a Saskatoon resident, he started the Grow 4H gardening project with other 4H leaders, helping others learn about food production and gardening by working in a community garden for the food bank. "Traditionally 4H is a rural organization," he commented, "but I wanted to show that food production is not just for farmers. Everyone can grow a plant – urban youth and new arrivals, for instance."

MacTaggart's goals are as ambitious – and as hopeful – as Person's. He wants to rebuild public trust in agriculture, and as a dedicated home cook, he believes in the pleasure of cooking – and in its intrinsic link to agriculture. "I love cooking myself, and I believe in fresh, natural, quality ingredients," he said, "and I hope that everyone comes to value the holistic path of food, from farm to fork." But even if an urban diner doesn't get excited about the idea of farming or the act of gardening, he believes that the appearance of a beloved ingredient in a favourite dish can be cause for celebration.

His interest in crop sciences was triggered by reading a National Geographic article about GMOs – genetically modified organisms – and what such science could accomplish. *I could help feed the world*, he thought. That type of job seemed fascinating. Then, at university, he learned just how diverse science is on the crop side. "That's fascinating too," he said.

His eye is firmly set on a Master's after completing his undergrad studies, focussing on how plants respond to stresses in the environment, translated into breeding programs for farmers in western Canada. In keeping with MacTaggart's interest in food, his goals embrace a plateful of "big" crops. "I'd like ultimately to be directing research programs relating to crop breeding of the big staples – corn, wheat, rice, canola – toward making sure they produce better and grow more sustainably."

Winning the scholarship affirms that he is on the right path, he said. "The award really takes the load off my mind when I am at school. It gives me time to focus on studies and achieve grades. And branch out – it's not just marks but the connections you make. If you are willing to branch out and get to know people there will always be people willing to help. It's a good life lesson." That life lesson extends to the food production chain as well, he maintains, and points at the divide between conventional and organic farming. "It's critical to maintain connections and dialogues. Once things are polarized, it prevents dialogue," he said. "It's imperative we come together and talk."

MacTaggart is grateful for the dedicated scholarship sponsors and the opportunities to go to conferences outside of classes. "Thank you," he said. "Once I graduate I can chip in too – I have seen it make a huge difference in my learning." He added that scholarships "recognize that the academic path is a good one, and being recognized for going the extra mile is important." ■

AGENTS OF CHANGE

Women are stepping up, seeing greater presence in agriculture's business boardrooms and fields.

✎ DEE HOBSBAWN-SMITH

Katelyn Duncan

PHOTO BY MARK TAYLOR

In Saskatchewan, women have always played a vital role in farming. For some immigrant women, this meant pulling the plow alongside their husbands and children. For others, it meant a secondary role tending gardens, raising animals, cooking and feeding the male field workers and threshing crews.

However, the past is just that: the past. Today looks a lot different from the days of hand plows and horse-drawn machinery. Women are stepping up, seeing greater presence in agriculture's business boardrooms and fields.

According to the World Bank, women make up almost half of the world's farmers. Those numbers vary in the western world. On Saskatchewan farms, the number of women working solo on farms rose marginally between 2011 and 2016, from 1,385 to 1,965. As of 2016, 11,275 women farmed provincially. But, as several U of S alumni have proven, the extended world of agriculture and bioresources is vaster even than the farms of the prairies.

Susan Blair (BSA'88) currently works in southern Ontario in the field of animal health pharmaceuticals. As Boehringer Ingelheim's Executive Director of Animal Health, she leads a team that brings preventative and specialty therapeutic pharmaceutical products for livestock and companion animals to market.

"I landed in a very different part of life and in a different part of the country than I would have planned," she commented wryly. "I spend my workdays thinking about three things: the industry itself – the Canadian animal health business; people, both customers and the internal talent we are building; and strategy – where we are going and how we will get there."

Raised on her family's grain and cattle farm near Lanigan, SK, Blair recalls writing a paper for school in grade four detailing how she was going to get a degree and farm – just like her father and grandfather. But she also recalls her father telling her unequivocally, "You can't just farm, you need an education first. No one can take that from you in tough times."

His words proved prophetic. Blair, who went on to both earn her degree and buy land near the family holdings, lost her land in the economic downturn of the late 1980s, when high land prices and interest rates combined with drought and global trade wars drove commodity prices through the floor. Blair moved laterally into pharmaceutical sales with Pfizer, hoping to eventually return to farming. She never did. Instead, curious and ambitious, she shifted her focus from livestock to companion animals, and took on marketing, leadership, and global assignments.

She parlayed her farm background into a corporate leadership role that eventually landed her with Boehringer Ingelheim, a global, research-driven pharmaceutical company. In doing so, Blair received a lot of support but initially her mentors were mostly male. In her turn, Blair has grown into a role as a respected champion of women, notably speaking in 2015 at the annual Advancing Women in Agriculture conference.

Blair's gratitude for her wide-ranging cultural and business experiences has accrued interest. "I would not be where I am now without that diversified background," she said, laughing. "It's a complicated life," she conceded. "You need to be agile, accountable, adaptive, entrepreneurial, a risk-taker. I aspire to making a positive difference to my people and to the animal health industry."

By all standards, she has achieved just that.

Fran Walley (PhD'93) serves as the U of S Agriculture College's Associate Dean (Academic). Deeply involved in farm-related research, like current AgBio Dean, Mary Buhr, Walley's field is literally the ground that farming is built on: soil science.

"I've always been interested in biology," she explained. "Agriculture is in many ways applied biology. That aspect of applied science fascinates me. I'd love to farm, but it's not my path." As a scholar, she has investigated what teems underground – the life in soil – that underlies all of agriculture. But she also has a pulse on the lives of women who enter the field.

"Agriculture continues to evolve and programs within the College of Agriculture and Bioresources have also evolved from a single undergraduate Bachelor of Science in Agriculture," she said.

"Nowadays, along with the many majors within the BSA, we also offer Bachelor of Science degrees in renewable resource management, agribusiness, and animal bioscience. All of our programs, including the BSA, attract a lot of women. More than 50 per cent of our undergrads are female. In addition to training future farmers,

Fran Walley

we train scientists and agronomists, researchers, people who go into sales, consulting, environmental consulting, finance, government, and academia. The diversity of jobs and careers reflects just how closely our provincial economy is tied to agriculture. This college touches the entire world."

"There has been tremendous evolution since I started, from a single program in the Bachelor of Science in Agriculture," she said. "Nowadays, we also explore renewable resource management, agribusiness, and animal bioscience. These all attract a lot of women, more than 50 per cent of our registrants. Women can go forth and do good in many diverse areas. We train scientists and agronomists, researchers, people who go into sales, consulting, environmental consulting, finance, government, even academia. It reflects just how closely our provincial economy is tied to agriculture. This college touches the entire world."

Walley admits that even as societal customs toward child-rearing evolve, women who carry the freight professionally oftentimes still have to balance their home lives and careers. "The same issues face any woman, and it can be more challenging in terms of progressing professionally."

Women are pursuing careers in all aspects of agriculture and contribute meaningfully, she asserts. "Farming is a very complex business, with many complex considerations – science, agronomy, marketing, food processing for value added. To capture that diversity, education provides a really solid background."

Finding those skilled farmers, male or female, is part of the role played by Debra Hauer (BSA'79), currently manager of Agri LMI (Labour Market Information) in Ottawa. In her youth, Hauer was actively involved on the family farm near Lloydminster, SK. She earned her masters in education in 2008 in Ottawa, and taught agriculture courses at the college level in Regina, where she served as executive director of the Saskatchewan 4-H Council before serving with an aboriginal women's organization in the north.

"This college touches the entire world."

FRAN WALLEY

In her current role, Hauer returns to her farming education background. She describes her job as finding and indentifying people in agriculture, having the right number of people with the right skills, encouraging family businesses, ensuring that there are sufficient well-trained people in the agricultural workforce. To clarify the difficulty, she suggests thinking about kids aged 5 to 14 who will be taking over farms in the coming decades. "There are not a lot of kids in rural areas," she said. "Where will [farm] people come from in the future?"

Hauer was never tempted to farm herself. "At the time when I might have, there was a lot of consolidation, changes that resulted in fewer, but bigger, farms. My roots are in farming, though, and I enjoy working in a farm-related industry."

For women looking to make their names in the corporate side of agriculture, she has some succinct advice. "Women need to grab the opportunities. Find an individual or a group to serve as your personal board of directors. You need a champion to advocate for you if you aspire to a board position."

Katelyn Duncan (BSA'14) bears witness to this need for supportive mentors in farming. "At age 12, I knew I wanted to be a farmer," Katelyn recounted. "I told my uncle. He said 'Awesome! You will do well.' That's the best kind of support you can get from an older farmer."

She and her sister, Mary Jane Duncan-Eger (BSA'13) manage the family farm south of Regina, where the women and their brother were raised. Duncan-Eger and her husband live and work on their own farm near Coronach, two hours from Regina, but she also puts in long hours on the family farm with Duncan, their brother and father.

The path to putting "family" on the farm has not been easy. Duncan's sister had originally planned on a medical career, but changed course and studied agricultural economics. As well, the almost-inevitable conflict arose. "Dad wasn't ready to let go when I wanted more responsibility, and I thought I knew it all after I finished university," Duncan said.

As a result, Duncan worked on other farms and as an agronomist in Saskatoon for several years. At age 25, sitting in a National Young Farmers conference in Ottawa, Duncan had an "Aha!" moment of clarity: she needed to quit, go travelling for the winter, and then move closer to the farm. "All I ever wanted to do was farm," she said simply. That winter, she utilized her network to land a job running a combine during harvest in Australia.

"First this guy offered me a job in the kitchen [by long-distance phonecall]," she said. "The next day, when he realized I had real experience, he asked if I'd be comfy with the boys in camper vans for two months. I told him I didn't expect any special arrangements, but I did expect a respectful work environment. My tone convinced him, that and my unwillingness to settle for the kitchen job. I ended up being the first girl he ever hired to drive combine."

After Australia came a month in Zambia, where Duncan worked long hours on an 18-hectare farm owned by an orphanage. "It was humbling, on top of culture shock," she said. "Here, maybe 12 per cent of people work in farming and related fields, so the North American disconnect from agriculture is staggering. In Africa, over 60 per cent of people work in food production. And it was all manual labour. We fertilized maize, dug mounds of dirt for sweet potatoes, worked with pigs and mucked out their stalls."

While in Zambia, Duncan made time to visit Ndola University's farm to investigate banana research and make a presentation on agriculture in Canada. She came home inspired. "Farmers in Africa are passionate about the soil and what they do," she said. "The work ethic is incredible. I am a different person because of it."

As a young alumna, Duncan has already racked up some impressive credentials. During her final year of her BSA, she completed her Agriculture Technician Certificate through Sask Polytechnic. She worked as general manager of SK Ag Young Entrepreneurs, an organization that provides networking and training to young farmers. She currently serves as a director for the Canadian Young Farmer Forum and the local Conservation and Development Association. After a governmental job in Regina, working with farmers to rebuild trust in modern agriculture and later, in agriculture policy, Duncan and her family arrived at a compromise.

"In university, I was full of pith and vinegar," she admitted. But the situation has changed since: the women's father has started to pass the torch. "We are partners, with different strengths and weaknesses," Duncan said proudly. "MJ is stronger at finance and marketing, and I am stronger on operations and equipment. Succession plans are something every farm has to deal with. We have to make compromises to be happy and to keep the people in our lives happy."

At 18, Duncan wanted to be a landowner and fulltime farmer by age 23. At 28, she is a fulltime farmer and partway through a Master's degree in policy ("to give me a better big picture understanding of our industry.") More importantly, she has grown up. She realized that other experiences could help her before she committed to being a business owner. Along the way, she tapped the shoulders of other farmers and previous bosses – mostly men, all older.

Susan Blair

"Those men are the farmers right now, and they are my tribe. But the difference between baby boomer farmers and the young farmers of today is that the new farmers want a life outside of the farm. We chase this thing called work-life balance, and try to leave room in our lives for off-farm priorities, whether that's family, kids or sitting on boards. There's not just one definition of farmer. You have to find the one that makes you happy."

Speaking for her cohort, Duncan asked, "When is the next generation ready to take over?" Her answer: "When they show up with a long-term vision for the farm. When they show leadership and are conscientious and take the initiative. When you are willing to trust them." ■

DIGITAL SOIL MAPPING ISN'T JUST COOL, IT'S KEY TO PROTECTING OUR PLANET

GLENN CHEATER

Zoom in with Google Earth and you can count the roof vents on Angela Bedard-Haughn's office in the Agriculture Building at the U of S.

But the view over her hometown of St. Brieux, 150 kilometres northeast, starts getting fuzzy at a height of three kilometres above the land.

That digital disparity is even greater below ground — something that Bedard-Haughn and other Canadian soil scientists are trying to change. Their efforts include the Saskatchewan Soil Information System (sksis.usask.ca), a newly launched soil database and digital mapping initiative.

This is precisely the sort of tool that humanity will need as the population heads to 10 billion on a planet undergoing climate change, says Bedard-Haughn.

"We're increasingly hearing about folks talking not just about food security and water security, but about soil security," says the 43-year-old associate dean of research and graduate studies. "Because of the role that soil plays in producing food, because of the role that soil plays in filtering and controlling the flow of water, it is critical for both of those things. Healthy, high-functioning soil is really key to the longevity of the human species."

Students of history know that — soil degradation played a big role in the collapse of ancient civilizations. Early Prairie residents knew it, too. Teams of soil surveyors spent decades methodically categorizing soil types across Western Canada. But their old maps are as lacking in detail as the fuzzy Google Earth view over St. Brieux. A 1940s-era soil survey of that area used catch-all terms (covering three or more different soil categories) to describe entire quarter sections (which cover one-quarter of a square mile).

"The limitations of mapping of that time were based on how much detail you could meaningfully show on a printed map," says Bedard-Haughn. "A lot were done at a rural municipality scale and there were all these rules of thumb in terms of how much detail you could put on there."

Detail matters. A lot.

Instead of making up names to describe different mixes of different soil types, it's now possible to pinpoint the precise location of every different type of soil in a field.

"You can then link that spatial information to hydrology, detailed information on land management, and even bring it into the precision agriculture realm," she says. "Then you can bring together GIS (geographic information system) layers to inform management decisions, do predictive modelling of change, or figure out how water might be distributed based on soil texture."

Such a database would be valuable to prospective buyers of land, priceless to those responding to a chemical spill threatening a water supply, and also help efforts to reduce greenhouse gas emissions.

"For example, you can look at wetter areas that don't produce the best yields," says Bedard-Haughn. "Rather than continue to apply nitrogen fertilizer that gets blown off as greenhouse gases or leaches into groundwater, we could look at alternative uses for those areas, such as for water retention that mitigates downstream flooding risk."

Digital mapping is also a way to leverage the data revolution taking place on today's farms.

GPS-guided tractors and combines equipped with devices such as yield monitors are collecting all sorts of information on a sub-metre scale. But each farm tends to be an island of data unto itself.

"Healthy, high-functioning soil is really key to the longevity of the human species."

ANGELA BEDARD-HAUGHN

"We're increasingly hearing about folks talking not just about food security and water security, but about soil security."

ANGELA BEDARD-HAUGHN

"You could take all that information the farmer is collecting — what inputs they applied where, their yields, any soil sampling they've done — and combine it with the soil information, and you can really tweak it," says Bedard-Haughn.

In this case, think of Google Maps. They don't just show you locations of businesses or community facilities, they act as portals to all sorts of information contributed by a host of collaborators.

A digital soil database works the same way. Some contributors might tie in the spread of crop diseases or pests while others craft ways to boost carbon sequestration, mitigate flooding from major storms, or boost yields on the most productive land.

"Even if you don't understand all the information that's there, there are parts that folks can put into use right away," says Bedard-Haughn. "In that sense, it's transformative. You can start from that foundation and begin to understand how the pieces fit together by playing around with that information."

The technology is there. It's people who are in short supply.

The federal government once had dozens of soil surveyors but almost all are retired. And there's no coordinated national effort as in countries like the Netherlands and Australia, world leaders in digital soil mapping. So it has fallen to scientists who volunteer for a working group set up under the auspices of the Canadian Society of Soil Science "to keep things moving forward."

"It seems a little Wild West sometimes, but we have a loosely affiliated group of soil enthusiasts doing what they can."

The Saskatchewan Soil Information System was created by U of S researchers who started by digitizing old soil survey maps and overlaying them with satellite photos. Data collected with modern digital mapping techniques (which provide 100 times better resolution than old paper maps) and from LiDAR (light detecting and ranging) flights will be added as they become available.

As contributors upload additional data — soil profiles, photos, drone video, and documents — to the searchable database, the tool will become more and more useful. And that will only spur more people to help expand it further.

"There's been a lot more recognition in recent years of the essential role of soils," says Bedard-Haughn. "I'm also seeing a lot more interdisciplinary collaboration. There's the obvious ones, such as plant or rangeland scientists, but there's also a lot more environmental and economic collaborations."

Given the challenges ahead, that sort of information will be in high demand.

"We need soil to be in a high-functioning state," she says. "We need to be looking at innovations. We need to manage our soils to build them up or at least maintain them." ■

KEEPING IT REAL

FOOD FRAUD IS BIG BUSINESS, BUT JAMIE WILLEMS IS FINDING WAYS TO ENSURE CONSUMERS GET WHAT THEY PAY FOR

GLENN CHEATER

PHOTO BY CHRISTINA WEESE

People are fascinated when they learn Jamie Willems is an expert in oligosaccharide profiling of high-carbohydrate foods such as agave syrup and fruit juice.

Although few know what oligosaccharides are (they're a type of carbohydrate), they figure out Willems is a food scientist. And then they start grilling the U of S researcher.

"I get a lot of questions when people learn what I do," says Willems. "A lot of them are nutrition-based: 'Oh, I read this on the label. Is that safe?' or 'Do you still eat x or y?' People are becoming more aware and more concerned about what they put in their bodies."

Although not a nutritionist, Willems can talk about the scrutiny and safeguards protecting our food supply.

"We have one of the safest food systems in the world. Ingredients aren't just put into food. Any food additive — especially these days — undergoes very extensive safety testing beforehand and there are very strict controls."

Despite her relative youth, the 27-year-old from the small Saskatchewan town of Waldheim is already a recognized expert in the area of food adulteration.

Her PhD thesis on detecting substitution of cheap juices in higher-end ones (such as pear juice) earned her a Governor General's Gold Medal in 2017 (the most prestigious academic award available to Canadian graduate students), and generated no fewer than five published papers. That work has led to a patent application (she's under strict orders to stay mum on that one) and a method for detecting the doctoring of agave syrup (a natural and expensive sweetener) that is now the government standard in Mexico.

Those are just two examples of a much wider problem — food fraud is estimated to cost the global food industry upwards of $15 billion annually. But Willems' work is an example of how scientists are delving deep into the chemistry of food to reassure consumers increasingly worried about what's in the products they buy.

She began that work as an undergraduate after getting a summer job in the lab of Dr. Nicholas Low, a professor in the Department of Food and Bioproduct Sciences and an expert in food adulteration.

"The association of agave growers had reached out because they were concerned some less-than-honest sellers were adulterating their product with something much less expensive, such as high-fructose corn syrup, and selling it as pure," she says.

The challenge from the chemistry point of view is that pricey agave syrup and cheap sweeteners are similar carbohydrates, and there's no simple test to distinguish one from another.

"So we went looking for more minor components, compounds that would be present in high-fructose corn syrup but not in agave syrup," says Willems.

That's where oligosaccharides come in. Low had already done similar work on maple syrup — another gourmet product that attracts fraudsters. Willems' job was to find which types of these short-chain carbohydrates were present in agave syrup and which ones weren't, and therefore could be used to authenticate the pure product.

"Food adulteration is surprisingly common and a world-wide problem. Fortunately, the vast majority of it does not pose health issues."

JAMIE WILLEMS

KEEPING IT REAL

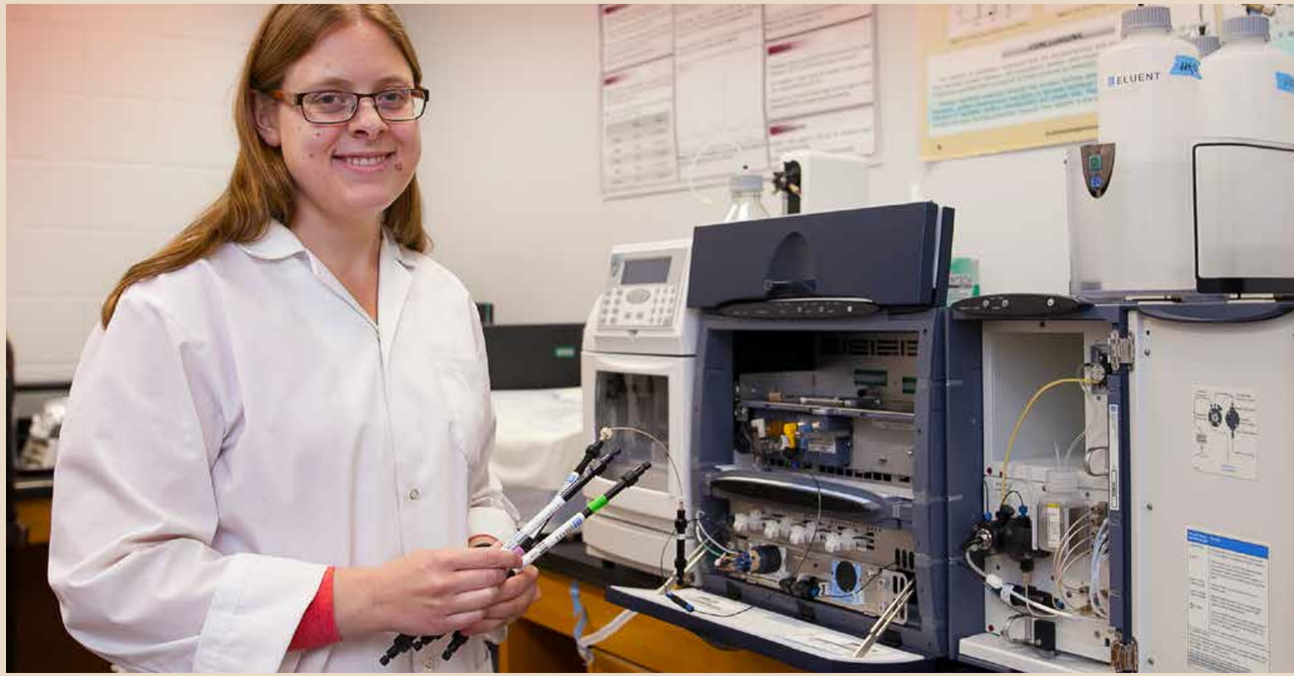


PHOTO BY CHRISTINA WEESE

It's painstakingly complex work and, in the end, you need a test that can be reliably done in a basic food-testing lab. Willems, who had just finished her second undergraduate year and never before worked in a lab, succeeded and in the process, became hooked on this branch of science.

"I not only had some idea of how to do research, but whether this is something for me," she says. "Some people start grad studies only to discover, 'Hey wait a minute, I don't actually like this.' But I got a chance to really learn what it's all about."

That experience led to her becoming the first student in the college to be accepted as a direct-entry PhD candidate. She chose to study adulteration in pear and apple juices, two of many products afflicted by food fraud.

"Food adulteration is surprisingly common and a world-wide problem," she notes. "Fortunately, the vast majority of it does not pose health issues, although that has occurred — such as melamine (an industrial compound) in infant formula in China. But it's a big financial concern."

The detective work needed to unmask it is fascinating, says Willems, who has always marvelled at how simple compounds can create wondrously complex systems. Studying a single food closely not only reveals added intricacies stemming from where something was grown and how, but also patterns.

"During my PhD research, I got samples from around the world. So a sample from China tends to have a certain profile while those from Argentina have slightly different ones.

"It sounds kind of funny to say, but you get to know your samples. After a while I could look at a profile and say, 'Oh, this is one of my Chinese samples and this one is from Brazil.'"

Her deep dive into the chemistry of food is also providing insights into other areas, such as does terroir (the flavour and character attributed to climate and geography) have a chemical basis?

She can also see how processing changes a food product.

"For example, when juices are produced, enzymes are added to break down the cell walls of the apple or pear so more juice is released. All processors do this, but there are some types of enzymes that enhance this process. It's called total liquefaction. These enzymes are illegal in North America and Europe because you get a lower quality juice. There's also concern about the fibre in the juice. Little kids drink a lot of juice and you don't necessarily want young children having excess fibre."

Food fraud has opened doors Willems, now doing a post-doc in Low's lab, says she never knew existed.

And it will, unfortunately, mean she will never be short of research topics.

"It's hard to say what the next big concern will be, but there's always going to be someone trying to sneak by and make a quick dollar," she says. "Our goal is to use technology to keep our food supply safe and fair." ■

CHICKS IN THE CLASSROOM

A HANDS-ON HATCHING EXPERIENCE

PHOTO BY DEANNA CONSTANTINOFF

DEE HOBSBAWN-SMITH

"Chick Week is always the best week of the grade one year," wrote a Saskatoon elementary school teacher in May, 2018.

Her comment was part of a follow-up report she filed after her students had spent a week observing and caring for a dozen chicks after they had hatched in the classroom. Her class was part of a fertilized egg hatching program for some of Saskatoon's youngest elementary school students.The program has been operating in partnership with the College of Agriculture and Bioresources' Poultry Research and Teaching Unit for 21 years.

"Seeing life happen, watching a chick hatch, is one of those magical moments you don't get to witness very often," observed Deanna Constantinoff, a first-grade teacher at Willowgrove School in Saskatoon and the program's current school coordinator.

"The program really began by accident," the program's originator, Donna Nazar, now a retired teacher, explained. "Teachers used to get incubated eggs from Anstey's Hatchery in Saskatoon. When that ended, I called the university's poultry centre and asked [animal technician and poultry specialist] Robert Gonda for fertilized eggs." Gonda replied that running his big incubator for one teacher's eggs was prohibitively expensive but eggs for 10 teachers was feasible. And so the Saskatoon Public Schools Chick Hatching Program began.

Each teacher's eggs are candled (held up to a bright light to confirm the presence of a living chick inside the shell) before collection to ensure the highest possible hatching rate. Eggs hatch 21 days after being laid, so the poultry centre manages timing closely for the school program, which lasts for one week in May. (If the program ran any longer, the chicks would quickly become unruly teenagers and might leap out of the school's containers.) The eggs incubate on campus for 19 days, then they are collected by teachers on a Monday, and begin hatching the next day or two, closely observed and cared for by younger elementary students. The chicks graduate to a farm flock the following Friday.

"Kids learn better when they experience things," Constantinoff said. "Hatching chicks is a real-life experience." There's a lot to learn, she admitted. For the children, lessons include responsibility for animals, being accountable, hygiene when handling animals, and the necessity of being careful with fragile creatures.

"In grade one, living and nonliving things is one of our learning objectives," Constantinoff said. She explained that some teachers purchase toy chicks to give the children advance practice in how to hold the fragile creatures they'll be caring for – including lessons in calm response, such as not dropping the chick if it does anything unexpected. She believes that the program's most valuable facet is re-connecting urban children with the world of agriculture.

Participating teachers have even more to learn. "It's like being a farmer – all of a sudden you are responsible for these animals!" Constantinoff said.

Before the time of the university's support, teachers were on their own, Nazar explained, often without knowing important facts. For instance, once they hatch, chicks need to be on a non-slippery surface or their legs won't develop properly. With support from the university, the Chick Hatching Program began to educate teachers about chicks. "Most important for us was accountability of the program and promoting animal care." Nowadays, Constantinoff continues to hold sessions to share information (and sometimes equipment) and train her surrogate human "hens." Topics include how to safely transport the eggs from the university to class, ideal incubator temperatures, using two thermometers in the incubator in case one doesn't work (temperatures, either too hot or too cold, will affect hatching), where to buy a heat lamp and chick food, what to use for a brooder, and practical teaching ideas on how to make the most of the hatching experience within the curriculum.

"We share ideas and help teachers do the most they can," Constantinoff explained. "For teacher and kids alike, it's an exciting time, and often our own family and friends find it exciting too. Once you have hatched chicks, often grade eight kids will be excited and asking about it. Sometimes we have the whole school in our room before school and at recess and after to relive the experience." Such interest comes at a cost, she added. "We have learned to keep doors locked to protect chicks and keep them safe – you need to be constantly watching that week."

Some schools set up live cameras so parents can watch the hatching too. "Oh yes, video and apps, we aren't just teaching the kids in the classroom, we're teaching the families too," Constantinoff said. "When teachers hatch chicks, they often can't sleep at home and run back to school to check. I come every night to the school during hatching week. But you come happily."

From the 17 teachers who signed on in the program's first year, numbers have grown to 40 participating teachers with a waiting list. Each teacher receives a dozen eggs. Most hatch.

PHOTO BY DEANNA CONSTANTINOFF

Constantinoff knows it would be far easier to provide a lesson from a book so having all the kinks worked out is critical. Participating teachers are comfortable in knowing they have all the support necessary to offer a successful learning experience.

However, the effect on the students is where the magic really happens - a magic that Constantinoff has repeatedly witnessed when the chicks begin to hatch or are cradled in the hands of a child. The students' expressions tell the real story. "These are profound life lessons," she asserted; "ones that are best taught by doing."

At the end of Chick Week teachers bring their chicks to one school. All of the chicks are then picked up by a farmer who transports them to his farm where they begin their new life in his flock. Nazar said that one of the biggest issues has been finding a farmer who would take all of the chicks. Over the years, the program worked with several different farmers until they found Farmer Ken. Ken Fehr, who farms near Hepburn, SK, has been collecting the program's hatched chicks for 10 years now. The nearly 500 extra birds from the teachers' program fit comfortably into his egg-selling business.

Constantinoff is happy to lay the program's long-running success at the feet of the college's poultry unit. "It was Robert who got permission from his superior. Robert saying yes all those years ago. As long as Donna or I managed the teachers all he had to do was manage the agriculture end. It's a good partnership." Gonda retired this year but his replacement, Jocelyn Fournier, has enthusiastically taken on the program.

"For teachers, it's always good to see genuine learning," Constantinoff observed. "Many older students say, 'Remember that year we had the chicks,' and stop by the classroom with their parents. Hands-on science is often what students remember, looking at and connecting with the world." ■

CLASSROOM SCIENCE:

Chicks Hatching + Kids = Memories That Last

Take one dedicated animal technician and one U of S incubator, one detail-oriented school co-ordinator, and over 500 fertilized eggs. Stir in about 40 classrooms full of curious young students and their teachers, add one week of hatching and hands-on care, and you have a surefire recipe for a memorable childhood experience.

The 21-year-old chick hatching program that is a partnership between the College of Agriculture and Bioresources' Poultry Research and Teaching Unit and some of Saskatoon's elementary schools has charmed and educated an average of 1,200 students per year.

Who knew classroom science could be so rewarding – and so cute?

ONWARD AND UPWARDS

In a warming world, carbon taxation policy is more than hot air

GLENN CHEATER

In both his professional and leisure pursuits, Tristan Skolrud seems to favour the hard, gruelling route. One 'highlight' of the U of S ag economist's days on his college bike racing team was a week-long, European-style stage race.

"The last day, we raced 100 miles and then the finish was 12 miles straight up," recalls the 31-year-old assistant professor in the Department of Agricultural and Resource Economics. "It was extremely hot outside, well above 30, and we'd raced all week. It's hard to describe what it feels like when you've hit that wall — and you've still got 12 miles left to climb."

Skolrud has an even tougher grind ahead: He's trying to find a way to harness free-market forces to reduce greenhouse gas emissions from agriculture.

Although scorned by many, carbon taxes make sense from an economist's point of view because they encourage "polluters to reduce their pollution in the least-cost way."

"Carbon is something we call a negative externality that comes from producing things that we need," says Skolrud. "By putting a tax on it, we encourage marketplace efficiency to reduce it."

But the theory isn't a good fit with farming.

First, you can't hook up a seeding rig to a Prius. Farmers need big diesel-gulping machines and even when fuel is exempted (as it is in Canada) carbon taxes increase equipment prices, and also the cost of inputs like fertilizer. That puts farmers here at a disadvantage to their competitors in countries with no such taxes.

Then there's the challenge of something economists call 'asymmetric information' — it's impossible for farmers to know the amount of emissions they're generating.

For example, nitrogen fertilizer is a major source of nitrous oxide, which has substantially more heat-trapping potential than carbon dioxide. But those emissions can be greatly reduced if you apply just the right amount in the right place (the soil close to the seed) at just the right time (when plants need it). Some farmers do a great job of this, others don't.

"Think how difficult it would be to observe everyone's fertilizer practices," says Skolrud. "It's almost impossible. And the last thing people would want would be a sea of government agents going out to everyone's farm to check if everyone is doing what they say they're doing."

Some suggest taking an approach similar to water pollution, measuring contaminant levels in a watershed's rivers and lakes, and encouraging reductions either through levies on polluters or subsidies for better stewardship. But while you can measure greenhouse gases in the atmosphere, you can't determine where they come from, notes Skolrud.

"Let's be honest, I don't think that one is going to make it too far," he says.

So what's the way forward?

For Skolrud, it's like those crazy hill climbs — just keep moving.

"If a farmer isn't profitable, there's absolutely no way we can ask them — or expect them — to make changes that would improve the environment."

TRISTAN SKOLRUD

PHOTO BY CHRISTINA WEESE

...while carbon taxes are a hard sell, doing nothing to reduce emissions is not an option

It's important to remember, he says, that agriculture is a big greenhouse gas emitter, accounting for 10% of emissions in Canada.

Second, while carbon taxes are a hard sell, doing nothing to reduce emissions is not an option. Developing nations are most vulnerable (because they lack the wealth to take protective measures or deal with the aftermath of catastrophic weather). But wealthier nations are starting to see the effects of climate change in terms of more droughts, wildfires, superstorms, and floods.

"As more and more disasters pile up, I think public sentiment will catch up," he says.

Those are two things that drive Skolrud's quest. But he also sees "an opportunity" for the agriculture sector to craft its own solution.

It starts by acknowledging farmers' concerns.

"When I meet with farm groups, the question that comes up most often is 'Why is Canada voluntarily hurting its economy to achieve an environmental goal beyond its control?'" he says. "It's a tough question and I'm not sure it has a real answer right now."

So he responds by first pointing out that a revenue-neutral carbon tax is a powerful thing when used properly — although politicians and the public often don't get this.

"The ramifications are enormous," says Skolrud. "Some argue, 'Why collect a tax when you're just going to give it back?' But that's completely the wrong way to look at it."

The "two best things" you can do with carbon tax revenue is to use some to reduce other taxes (blunting the charge it's just a tax grab) while subsidizing emission-reducing technology.

And offering financial incentives for innovation (which both well-crafted subsidies and taxes can do) is better than the alternative: over-regulation.

"There are corporate entities that are actually calling for a carbon tax because they view that as better than a patchwork of regulations."

Companies are also realizing that burnishing their green credentials resonates with more and more customers, offering them a way to gain market share.

Finally, he can point to the power of "learning by doing."

"The best example, by far, is acid rain reduction. Regulatory measures were put in place and it brought down acid rain in a very short amount of time."

Yes, that was an easier nut to crack because "the negative externalities were localized" (and specific emissions from specific smokestacks could be pinpointed). But it was also a case where taking action against what seemed an intractable problem led to innovation that made pollution-reduction measures cheaper.

One thing Skolrud doesn't mention is his continuing love of cycling (mostly commuting to work these days) out of concern some will view him as an anti-car, hardcore environmentalist.

But that's far from the case.

"I think there are some on the environmental side that are really dismissive of the industrial sectors they are criticizing. But if a farmer isn't profitable, there's absolutely no way we can ask them — or expect them — to make changes that would improve the environment."

Unlike racing, the road to the summit isn't laid out. But Skolrud also draws motivation from that.

"I want to help come up with policy that recognizes the huge role that agriculture has to play — but balances it with the environment, too." ■

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We also acknowledge and celebrate those who have established planned gifts for the College of Agriculture and Bioresources. These arrangements help shape and secure our college's future.

CHANGES ARE BLOWING IN

Climate change will affect insects too—and that spells trouble for all of us

High magnification image of an aster leafhopper

GLENN CHEATER

PHOTO BY TYLER WIST

Sean Prager was never going to be lonely after becoming the College of Agriculture and Bioresources' first entomologist.

"I get lots of calls and emails," says the insect ecologist. "I'd say weekly I get a picture from someone asking, 'What is this?'"

Prager arrived from the University of California Riverside two years ago, but thanks to climate change, he's not the only one moving north.

Take, for example, one of the bugs he's studied extensively. Psyllids have long been a major pest in the southern U.S. where they attack a wide range of crops. A decade ago, the version that feeds on potato plants started overwintering in California after winter temperatures increased by a couple of degrees Fahrenheit.

Then they started showing up in more northerly states, and recently in insect traps in Saskatchewan and Alberta. Those provinces aren't California-warm, so what gives?

"Climate change doesn't just change temperature, it changes many things," says Prager. "If you have insects that blow in on the wind, climate change may mean you get winds coming from a different direction or stronger winds more frequently. That will change the number of insects that arrive that way."

The New Jersey native wasn't hired because of climate change. An entomologist has long been on the college's wish list, and the need has increased due to crop diversification (which means more types of pests) and a decline in the number of federal bug specialists.

But a changing climate has increased the need for his expertise, particularly in his specialty of insect ecology, which looks at the complex relationships between bugs, the plants they feed on, and the pathogens they spread.

This is a different approach from the past, when researchers focused on individual pests or their relationship with a particular crop they attack.

Even in a field of wheat or canola, you have an intricate food web, says Prager.

"People used to assume that insect A and host plant A interacted, and B and B interacted — and even if insects A and B were in the same field, it probably didn't matter," he says. "But we've started to realize what should have been obvious — that one thing can modify another and everything in a field is in some way interacting with everything else."

"Climate change can upset the apple cart in many different ways."

SEAN PRAGER

This is why the threat to crops from climate change goes beyond the pests expanding their range northwards. Species adapted to current conditions may decline in numbers or get elbowed aside if it gets warmer or drier, or if winds bring in new competitors, he says.

"So it gets a couple of degrees warmer and the psyllids are suddenly here because they like it warmer. But the things that eat them may no longer be around because they don't like it warmer. So suddenly you get all these new pests, but none of the beneficials."

It's not just insects but also pathogens.

For example, psyllids carry a bacterium that causes discolouration in potatoes, rendering them unsaleable for both the fresh market and processing into potato chips. Virtually all psyllids found north of the border so far have been free of the pathogen, but the fear is that will change if more of that type of bacteria overwinter on weeds, creating larger 'reservoirs' and increasing its spread.

None of this is good news, and conjures up visions of climate change causing catastrophic crop losses.

But a deeper understanding of these complex communities of bugs, pathogens, and plants will generate new ways to respond to a changing world. Prager likens it to human demographics: You may know that most people in Montreal speak French, but that doesn't tell you much about how the community functions.

"It's when you start digging in, that you find all these differences."

Since moving to Saskatchewan, he's been studying aster leafhoppers, a psyllid relative that also carries a crop-attacking pathogen. In a bad year, a severe outbreak of aster yellows in a crop like canola can cause yield losses of upwards of 80 per cent.

"But it's infrequent," notes Prager. "You can go six, seven, or eight years in between outbreaks. Part of the problem is we simply don't know why."

The answer to that riddle will be complicated, and likely involve factors such as the size of pathogen reservoirs, things that influence their uptake by leafhoppers, populations of other insects, and weather.

But just knowing the tipping point could have a big payoff.

"We're hoping to find a way to predict when they are coming so we can tell growers, 'You're going to have a big problem, so spray before your numbers get too big,'" says Prager. "It would also mean that the other six or seven years, we could say, 'Don't worry about it. You don't need to spray this year.'"

Better yet, early targeting of hot spots could curtail a wider outbreak while further reducing insecticide use.

Prager's duties include the traditional one of identifying the most effective pesticides for dealing with either new arrivals (pests and pathogens) or old ones that have suddenly started causing more serious crop losses. But having a better understanding of plants and their defences; pathogens and how they operate; and the different insect populations and their interactions will generate new tactics for enhancing crop production.

For example, knowing more about 'beneficials' — good bugs that eat or attack bad ones — could help in protecting or increasing their presence.

"Beneficials play a very large role," says Prager. "In experiments, when you remove beneficials, you get much more damage from the pests."

And humanity will need all the friends it can get as the changing climate affects a host of things all at once.

"Climate change can upset the apple cart in many different ways," Prager points out.

No one can say precisely how that will play out or which crops will be threatened by what pests in the years ahead. But the college's lone entomologist is preparing for a day when the 'what is it' queries turn into 'please help us' ones. ■

"We've started to realize what should have been obvious … everything in a field is in some way interacting with everything else."

SEAN PRAGER

SAGA highlights

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 Honorary Life Members for 2018:

Before **Art Delahey** '52 C began college life, he was doing his part for agriculture as one of the crew that introduced 2-4D to the prairies. At the U of S, Art fully participated in the culture, active in many sports, and equipment manager for Huskies hockey. His career took him through Robin Hood and Federated Co-operatives Limited, where he developed the new Crop Supplies Department. As if that didn't keep him busy enough, he established Riverside Gardens, which was world renowned for continuing Dr. Patterson's hybrid lily breeding work.

Lorence Peterson '65 C, graduated with Distinction, and was a provincial Ag Rep for his first 10 years. Then he moved onto the Royal Bank and developed their provincial Agriculture and Farm Loans Department. Lorence retired from that industry and became the Executive Director of the Western Grains Foundation. All along he was involved with Saskatchewan 4-H, and any other community associations that needed assistance. He still volunteers with the Saskatchewan Institute of Agrologists in one capacity or another.

2018 Highlights

The Sask Ag Grad Association Undergraduate Award was announced for the 2019-20 academic year. This unique Award is available to all undergrads who demonstrate both academic ability and community mindedness.

The Association's renewed sense of connection with the college was evident in the Telemiracle Bed Push fundraiser. Whether it was painting the old bedframe, assisting in the actual pushing, or raising 'highway' dollars, SAGA worked closely with the college to generate an impressive total.

Our key event, the SAGA Reunion Banquet, enjoyed one of the largest crowds in many years. Over 400 graduates and friends attended. A high point of the evening was an address by **Harold Chapman, a 1943 C graduate.**

Mason Simmons '46 S and **Ted Turner '48 S** also attended the Reunion. In what had to be a record of some sort of U of S Alumni, we had three grads who graduated 70 or more years ago. Five gentlemen from the 1953 school class came for their 65th. **'51 S grad Bill Cooper**, who always comes for the fun, was recently honoured by both SaskCanola and Saskatchewan Pulse Growers.

Several SAGA alumni were welcomed into the Saskatchewan Agricultural Hall of Fame this past April. They included **Vern Racz '68 C, Henry (Hank) Classen '71 C,** and **Brian Fowler '64 C.**

For regular updates follow SAGA @saskaggrads
For more information and to become a member, visit saskaggrads.com

84th SAGA REUNION WEEKEND

FRIDAY, JAN. 11, 2019

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 various tours will be provided, including some of the former college buildings.
4:00pm–7:00pm

SATURDAY, JAN. 12, 2019

SAGA HOCKEY TOURNAMENT
held in Waldheim. Begins:

REUNION BANQUET
Cocktails @ 4:30pm
Banquet @ 5:30pm
TCU Place

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Banquet tickets are sold only through our webpage beginning Nov. 1, 2018.

REGISTER AT SASKAGGRADS.COM

Always Ready for a Challenge

FROM A BOLD DECISION, A MIGHTY AGRICULTURAL EMPIRE GREW

GLENN CHEATER

Curt Vosen

He was a young arts grad headed for an exciting career in journalism when his brother showed up with an outlandish proposal.

Curt Vossen would say 'yes' to the crazy scheme and not only change his life, but western Canadian agriculture.

It's been more than four decades since Vossen found his brother Glen waiting for him one day after work at his last summer job before heading to journalism school.

"He said, 'Guess what, Curt? I found some farmland for us to take a look at.'"

Vossen was 20, his brother a couple of years older, and they had never grown a crop of any sort.

"We started farming two weeks later," recalls Vossen. "It was spring and we had to buy the equipment and figure out how to use it because we had never really done any farming. But away we went.

"At the time, it all seemed like a logical thing to do — although, of course, I wouldn't necessarily say that today."

Flash forward two decades and Vossen is about to agree to do something even more radical — go toe to toe in a cage match with the giants dominating Canada's grain industry. And under his stewardship, Richardson International would not only survive but become the country's largest grain company, as well as a major player in food processing.

The two events are connected by another decision — to earn a second degree at what was then the college of agriculture.

"I thought I should really learn something about farming on a technical basis, so I enrolled in the college of agriculture," says Vossen. "I had a lot of catching up to do."

Prior to that, his only ag experience came after his father, a civil engineer with the highways department, acquired a small herd of purebred polled Hereford cattle. His sons became "the labour source of convenience" and while doing their chores, often chatted about maybe trying grain farming one day.

"We had never really done any farming. But away we went. At the time, it all seemed like a logical thing to do."

CURT VOSSEN

Richardson Pioneer Crooked River, Saskatchewan location

"At university, I discovered this culture and I found I was very comfortable in it."

CURT VOSSEN

But while his farming career proved short-lived, the experience at the college was transformative. Although he eventually majored in economics, he was always keen to tap into both professors and classmates (most came from farms) for practical farming information.

"I'd ask them, 'What was your experience with this? And how did you handle that? And what would you have done about this?"

Vossen got more than agronomic advice — he found himself in what he calls "a culture."

"There's a connectivity between farmers and within farming communities. And I liked it. I liked the people, I liked their openness and their willingness to share. If you're sincerely interested in learning what they knew, they were willing to take whatever time was required to answer your questions and help you understand."

Working with farmers became his new passion and after graduation, Vossen left farming to work for Cargill, rising through the ranks to increasingly senior positions. But while Cargill was a global giant, it played second fiddle in Canada to the three provincial farmer-owned co-operatives that dominated the Prairie grain trade.

However, winds of change were starting to blow and everyone knew transformation was coming to a system created when horse-drawn wagons moved the crop and small wooden elevators went up every 10 miles along the rail lines. The future was massive concrete elevators able to load 50, or even 100, rail cars at a time.

The transformation would not only cost a mind-boggling amount of money, but spark a Darwinian survival of the fittest.

"It was either invest and modernize or cede the field of battle," says Vossen. "You either needed to get into the game or get out."

Hartley Richardson was up for that challenge.

In 1993, the 38-year-old great-great-grandson of the founder of James Richardson & Sons became its president. The family-owned company had diversified into finance, real estate, and other lucrative businesses, and some family members wondered if maybe now was the time to leave grain altogether.

Richardson thought otherwise, but needed the right field general, someone with vigour, vision, and nerve. He offered the job to Vossen.

"We thought we had a good idea of how this was going to play out and what we had to do was be very patient, execute very well, and make as few errors as possible," says Vossen. "If we stayed up there with the very best, then when the inevitable consolidation came, we would have a chance to prosper."

That's just what happened. Along the way were many nerve-wracking times, particularly when a massive drought cut revenues by nearly half and stretched the balance sheet to near breaking.

But today the company is the country's largest grain company, with revenues of more than $9 billion annually and nearly 3,000 employees.

Nothing in university, of course, prepares you for this sort of high-stakes affair. But Vossen can still trace a line from his CEO suite at Winnipeg's famous corner of Portage and Main to his old campus.

While the classroom learning was valuable, it was the culture and connections that drew him to his new career path. Those were also the things that guided him when Richardson's survival depended on 'executing very well.'

"My business since graduating from university has largely been dealing with farmers as customers, learning what their needs are, and their approach to things," says Vossen. "At university, I discovered this culture and I found I was very comfortable in it."

It's a culture the 64-year-old now strives to instil in the company's workforce, many of whom hail from small communities across the Prairies.

"What really makes me smile as a good old Saskatchewan boy and a graduate of U of S is that the people who will succeed us — not entirely, but for the most part — are going to be people who grew up in Western Canada. And they're going to get to carry this on and make it an even better company." ■

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