

REACHOUT



**Leading
Animal Welfare Experts**
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DEAN'S MESSAGE

WHAT DOES THE FUTURE LOOK LIKE TO YOU?

In the Faculty of Land and Food Systems, we are tackling some of the most critical issues of our time – issues that have already had a profound effect on the state of our world, like climate change, access to a healthy, safe and abundant food supply, and human and animal wellbeing. These are issues that need to be addressed now, so that we can ensure that future generations can enjoy a stronger, more sustainable planet.

Our research touches every person in the world, without exception. We are working on finding practical solutions for critical global problems, but we are not working alone – by actively engaging our local and global communities, we can better pinpoint the on-the-ground challenges they are facing. As you'll read about in these pages, internationally-recognized scientists like Dan Weary and Nina von Keyserlingk, for example, maintain close ties with the dairy industry in order to identify research projects that best meet the needs of that industry.

Community also plays a strong role in our teaching philosophy. We use community-engaged learning to give students the opportunity to apply what they're learning to real world problems. We have found that this type of learning is the best way to engage our



students, to help them better understand what they've learned in the classroom and to prepare them for their future careers.

Our researchers, our students and our communities are all connected by the desire to make a difference and it's truly inspiring to see the impact we can have on the planet and the future by working together.

RICKEY YADA

DEAN, FACULTY OF LAND AND FOOD SYSTEMS

UBC FARM Celebrates The Naming Ceremony of xwc'ic'usum Gardens

THE INDIGENOUS Health and Research Education Gardens at the UBC Farm received a new Musqueam name on October 3rd: xwc'ic'usum. The ceremony included the raising of a totem pole, Thunder Child, by Algonquin artist David Robinson and a marking stone was dressed with ochre and eagle down.

“We are honoured and grateful to the Musqueam to live, work and learn in their traditional territories,” said Eduardo Jovel, Director of Indigenous Research Partnerships. “For me, the significance of the ceremony is a reflection of the good intentions, purpose and relations between UBC and Musqueam people. It’s about learning to be respectful of the land and the place, and the ways we develop meaningful relationships to the land and enhance land-based teaching and pedagogies.”

The Indigenous Health Research & Education Garden (IHREG) has been based at UBC Farm since 2007. This special garden aims to serve educational and research needs related to Indigenous food sovereignty while increasing participants’ knowledge and access to traditional and non-traditional plants, including more than 40 varieties of medicinal plants. The garden is cared for by the Medicine Collective, a group of Indigenous Elders and Knowledge-keepers who lead medicine-making workshops with the community. It’s also used by the Culturally Relevant Urban Wellness program, a partnership led by the Vancouver Aboriginal Child and Family Services Society, that promotes green space as a source of wellness and concrete skill development for vulnerable youth. ☺



APBI Grad Taps into Maple Syrup Market

IN THE SPRING of 2015, Jason Lion was working on a community gardening project on Hupacasath

First Nation Reserve near Port Alberni, BC when he noticed the land had an abundance of Bigleaf maples. Lion, a graduate of our Applied Biology program who majored in plant and soil science, knew that these particular maples could be tapped for syrup, and he began to wonder about the potential for sap production.

After a year of research and testing – not to mention earning his degree – he is now working with the Hupacasath on Kleekhoot Gold maple syrup. “Kleekhoot” is Nuu-Chah-Nulth for “where the fish swim up the river”.

“While bigleaf maple syrup has been produced for many years on a hobbyist scale, we are the first to use professional grade equipment,” said Lion, adding that the Hupacasath hope to achieve a business model that combines environmental sustainability with innovation and economic opportunity for the community.

Bigleaf maples are only found on the West Coast, in limited patches in lowland areas. What sets this maple syrup apart from the syrup produced from sugar maple trees is its familiar yet distinct flavor. It also has a much higher content of calcium and magnesium than sugar maple syrup.

The sap is collected via a tubing system that connects the tree to a vacuum pump. Once the sap is harvested, the tank is taken to a sugar shack where the sap is put into a reverse osmosis machine that begins the process of concentrating it into syrup. Once the sap is fully reduced, it’s run through a filter press to remove impurities, then hot-packed into glass bottles. A new batch of syrup is created every day.

Maple syrup production occurs during winter and requires a freeze-thaw cycle to generate sap flow within the tissues of the tree.

“Winter in coastal BC can be very unpredictable – in some areas, freezing doesn’t happen very often,” he said. “Climate change could prove challenging for us as freezing temperatures become less frequent in the Port Alberni region, and may eventually necessitate moving the project to higher elevations.”

Lion is currently gearing up for the commercial launch of Kleekhoot Gold in early 2017. The syrup will be targeted to tourists and sold in BC souvenir and gift shops. ☺

hitting the sweet spot

FOR SOME PEOPLE, their morning coffee or tea just isn't complete without a few sugar cubes, a packet of artificial sweetener or spoonful of honey. But which choice really hits the sweet spot for your health?

Azita Madadi-Noei, a food science lecturer, explains the differences between sugars and sweeteners and why fears about artificial sweeteners like aspartame are unfounded.

Is there one sugar that's better than the rest?

Nutritionally speaking, we want to reduce the amount of sugar we consume, mostly the purified form, altogether. With that said, when we talk about sugars – honey, molasses, brown sugar, white sugar – all of them will be converted to glucose in our blood system, raising insulin levels. Calorie-wise, they have slight differences but they're inconsequential. For example, brown sugar and honey may contain healthy compounds, but you wouldn't get enough in a spoonful to see the benefits. If you're concerned about the amount of sugar or the amount of calories you're consuming, it doesn't really matter which sugar you use to sweeten your drink.

Are artificial sweeteners, like Splenda, a better alternative?

Splenda is made from sucralose, a synthetic sweetener, which the human body doesn't recognize as sugar. It triggers the taste buds the same way as sugar and we

perceive it as sweet. The body doesn't metabolize sucralose, so it just passes through our system. For people with diabetes, using sucralose as a substitute for sugar has value as it has no effect on glucose or insulin levels. Technically, artificial sweeteners are unnecessary in our diets, but if you want your tea or coffee to be sweetened without adding sugar, they are safe to consume in moderation, like all foods. One misconception people have about artificial sweeteners is that it will help with weight control, but there are better nutritional methods to manage your weight.

What about aspartame? A quick search on the Internet brings up all sorts of pages about alleged dangers or harms.

So far, any claims about aspartame having ill effects are not substantiated. My advice to anyone is to consult with Health Canada and Canadian Food Inspection Agency. The approval process for any sweetener to make it to market is rigorous and thorough. Aspartame is a combination of two amino acids: aspartic acid and phenylalanine. The body recognizes it as a dipeptide and it will metabolize like any other food that contains peptides, like milk. The downside of aspartame is for people with a genetic malfunction called phenylketonuria, an inherited disorder diagnosed at birth. Those with the disorder can't digest aspartame. That's why it needs to be mentioned on the label as "Aspartame contains phenylalanine." ☺



JUN-HYUNG TAK
POSTDOCTORAL RESEARCH FELLOW,
APPLIED BIOLOGY



IT'S NO SECRET that insecticides can be harmful, not only for the environment but also for human health.

"Although there are good synthetic insecticides out there, many of those synthetic chemicals have negative effects," said Jun-Hyung Tak, a Postdoctoral Research Fellow in Applied Biology. "Botanical insecticides can provide a better, more natural –and just as effective alternative."

Botanical insecticides use naturally occurring chemicals extracted or derived from plants or minerals. Tak's research involves studying the toxicological effects that botanical insecticides have on insects and why certain combinations of essential oils kill or repel them.



JULI CARRILLO

ASSISTANT PROFESSOR, APPLIED BIOLOGY

JULI CARRILLO'S FASCINATION with bugs began during her childhood in Houston, Texas. "I opened an insect field guide and there were these beautiful pictures of insects in the kind of crazy colours you really only see in a jewelry box," she said. "I just got very excited about bugs."

That excitement, combined with her love of nature, eventually led Carrillo to pursue her graduate and PhD degrees in Ecology & Evolutionary Biology at Rice University in Texas. Her postdoctoral research at Purdue University in Indiana focused on how the evolutionary history of plants has changed how plants interact with organisms in the environment, research that she will continue as part of the Centre for Sustainable Food Systems at UBC Farm.

Carrillo uses the tomato plant as a case study. Tomatoes send out a chemical signal when they are being attacked by an herbivorous insect, like the tobacco hornworm.

"Wild tomato plants are really good at crying for help and attracting wasps, which are an enemy of the tobacco



hornworm," she said. "Domesticated tomatoes, on the other hand, perhaps due to cultivation or breeding practices, have become less resistant to insects and have reduced ability to call their wasp bodyguards in."

Carrillo's research will help to identify which wild and land race varieties of tomatoes are good at asking for help. Plant breeders can use this information to screen plants for particular traits which can then be bred into domesticated tomato plant to enable them to become more resistant to pests.

Carrillo is also interested in how soil affects a plant's ability to defend itself against insects. "Soil conditions can influence how well a plant can communicate. Rather than using pesticides, growers can use soil to defend the plant against different types of damage."

The UBC Farm is the perfect place for Carrillo to conduct this research. "We'll be using the Farm to look at some of the different ways that soil can improve plant resilience," she said. "There's a lot of really interesting work being done at the Farm to try and improve the way food is produced and I'm happy to be part of that." ☺

After completing his Masters in Entomology at Seoul National University in South Korea, Tak worked in industry for a number of years before coming to LFS to do his PhD in Plant Science (2015). What primarily drew him to the program was the chance to work alongside Professor Murray Isman, former Dean of the Faculty of Land and Food Systems, and "one of the best scientists in botanical insecticides in the world."

Botanical insecticides are typically used to get rid of common household pests – in fact, Isman helped to develop Eco Smart, a line of organic pesticides derived from plant oils sold in the U.S. – however Tak and Isman have now turned their attention to how botanical insecticides can be effectively used in agriculture.

Tak, who is planning for a career in academia, believes the way to get the most of a PhD program and become an independent researcher is to "ask the right questions. Work closely with your supervisor, but take responsibility and think of the project as your own."

He also credits the Faculty's welcoming environment with helping him to adjust to life in BC when he was an international student. "I've had the best experience in this Faculty," he said. "The staff members are exceptional and always go the extra mile for students." ☺





*NSERC Industrial Research Chair in Animal Welfare
Professors Dan Weary and Nina von Keyserlingk at the
UBC Dairy Education and Research Centre.*





Leading Animal Welfare Experts

Find Practical Solutions to Modern Day Problems

“We live in a changing world,” said Professor Dan Weary. “The general public is increasingly interested in where their food comes from and in giving animals a reasonable life. Our job as animal welfare researchers is to find ways to keep dairy cows healthy and functioning well, while meeting the concerns of dairy farmers and the public.”





>> For more than fifteen years, Professors Dan Weary and Marina (Nina) von Keyserlingk have worked closely with the Canadian Dairy Industry to identify some of the critical issues dairy farmers are facing, such as cow lameness and disease.

“We’re focused on finding practical solutions that farmers can incorporate that won’t have a negative effect on their livelihood and that the public can accept,” said von Keyserlingk. “These aren’t issues we’re just facing in BC, these are global issues. What we’re discovering here can be applied on dairy farms all over the world.”

Weary and von Keyserlingk’s research is frequently published in leading industry journals and often makes international headlines. Last year, their study on social housing, which showed that dairy calves who are reared according to conventional practice (i.e. housed by themselves for the first 6 to 8 weeks of life) have a harder time learning compared to calves who are socially housed, led to media coverage in *Scientific American*, *The LA Times* and *The Economist*. They have also received many awards for their work; Weary received the Killam Research Prize in 2015, von Keyserlingk received the American Dairy Science Association Award for Excellence in Dairy Science in 2013 (sponsored by Elanco), and they were jointly awarded the Ruminant Well-Being Award earlier this year (see sidebar).

Part of what makes their research partnership so successful – and highly productive – is a mutual respect and their different but complementary research strengths. “We can do more together than we could ever do individually,” von Keyserlingk said, adding that their weekly two-and-a-half hour commute from UBC’s Vancouver campus to the UBC Dairy Education and Research Centre in Agassiz affords them regular time to problem solve and brainstorm ideas.

While much of their research is conducted at the UBC Dairy Education and Research Centre, a world-class facility supporting the development and adaptation of new technologies for the dairy industry, Weary and von Keyserlingk also do research on commercial farms in BC and elsewhere in North America. The results of this on-farm research is also helpful for the farmers who participate in the work, as they are able to benchmark their performance against that of their peers, and use the data to develop tailored solutions for their own dairy farms.

As busy as their research keeps them, it’s only part of the job. They are also in heavy demand as lecturers for professional and academic audiences around the world; last year alone the pair gave more than 30 invited lectures in over a dozen countries. Weary and von Keyserlingk are also enthusiastic and popular teachers in the Faculty, and supervise more than a dozen graduate students. Both have received the Killam Teaching Prize for outstanding teaching at the undergraduate and graduate levels.

“It’s always an adventure when a new graduate student comes along,” said Weary. “The dynamics of working with that student and hearing their ideas, figuring out how to manage those ideas into a workable project – it’s like mixing a recipe.” Their students, in fact, are what they are the most proud of and what they consider their greatest contribution.

“It’s the research that gets the limelight, but we wouldn’t have any of that without the students,” said von Keyserlingk. “They’re incredibly passionate, and they are going to create positive change for animal welfare in the future.” ☺



Professors Marina von Keyserlingk and Daniel Weary received the inaugural Ruminant Well-being Award at the 2016 World Buiatrics Congress (WBC) in Ireland in July 2016. The award is in recognition of their contribution to cattle welfare. Their work has helped transform practices on dairy farms including the treatment of pain for dehorning and other procedures, changes in milk feeding and group housing practices for calves, and improvements in barn design and management that improve cow comfort and reduce the risk of lameness and injuries in mature cattle. The Ruminant Well-being Award is sponsored by Boehringer Ingelheim Animal Health and awarded by the World Association for Buiatrics (WAB).

KILLAM POSTDOCTORAL FELLOW RESEARCH PRIZE, BECCA FRANKS

BECCA FRANKS received a Killam Postdoctoral Fellow Research Prize in 2016. The Killam PDF Prizes are awarded to full-time postdoctoral fellows in recognition of their outstanding research and scholarly contributions. Franks began her postdoctoral fellowship in the UBC Animal Welfare Program in 2014 under the supervision of Professor Daniel Weary. In addition to receiving the Killam PDF Research Prize, Franks is also a recipient of the Killam Postdoctoral Research Fellowship.

Can you describe your research?

I'm interested in fundamental patterns of motivation and well-being across species. Beyond the drive to acquire food, water, and shelter, species across the animal kingdom show the desire to have control over and learn about their world. I am currently working to determine whether fish, like mammals and birds, are driven to use their sophisticated cognitive skills—e.g. learning and problem-solving—and whether engaging in such activities might improve their well-being and social relationships.

Why did you decide to pursue postgraduate work at UBC?

UBC is home to the world-famous Animal Welfare Program, led by three exceptional professors: Dan Weary, Nina von Keyserlingk, and David Fraser. They have each made unique and lasting contributions to the field, but beyond this, they are ideal mentors, providing unwavering

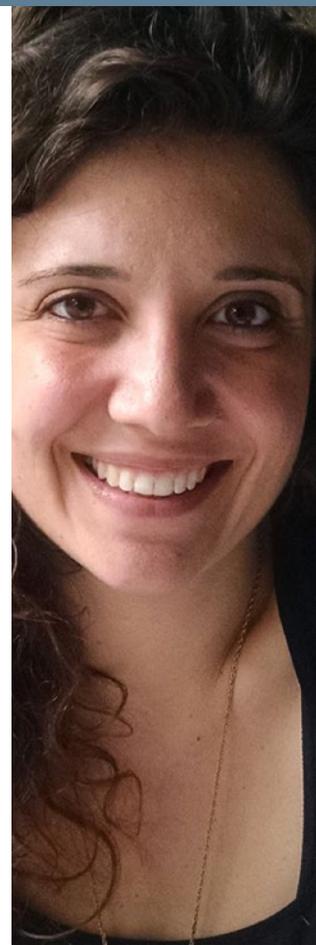
support and expert guidance to their students. I was also attracted to the beautiful UBC campus and its international reputation for being a place of outstanding scholarship and research.

What do you hope to accomplish with your current work?

I hope to promote our understanding and appreciation of fish and the fascinating lives that they lead. I think that by carefully researching the behavioral and social dynamics of fish held in semi-natural environments, we can gain insights into a vastly different way of being an animal on this planet. At the same time, we can also uncover fundamental similarities that exist across species. For example, until now, we had relatively little information about the cognitive sophistication and complex lives of fish, which, through scientific study, we now know to be comparable to that of land animals. I hope that my research will contribute to this growing body of literature and thereby enrich our appreciation for all animal life.

What has winning a Killam award meant to you?

Winning the Killam award is a great honor. The Killam name is synonymous with exceptional scholarship and research for the greater good. It has validated the importance of my scientific approach. I'm passionate about the work that I do and hope that it contributes to our ability to maximize our relationship with other animals while also minimizing human-animal conflicts. ☺



CULTURE CLUB: NOT ALL PROBIOTICS CREATED EQUAL

PROBIOTICS ARE FLYING OFF THE SHELVES in grocery stores, as research continues to confirm the important role that gut microbes play in our overall health. But not all sources of probiotics are created equal. Assistant Professor Siyun Wang explains what these helpful little organisms are – and how to get them working for you.

What kind of health benefits do probiotics provide?

They help to maintain the health of your gut. Your gut microflora actually plays a very important role in health. When your gut microflora isn't healthy, you are more susceptible to infectious diseases, obesity and irritable bowel syndrome.

Probiotic bacteria can help maintaining healthy microflora in the gut. They also produce a more acidic environment, which is less favourable to pathogenic, or disease-causing bacteria.

What exactly are probiotics?

Probiotics are actually living microorganisms. The majority of them are lactic acid bacteria and Bifidobacteria. You often find these listed on yogurt labels. Researchers are finding that an increased proportion of these two bacteria present a healthier microbial population in the gut.

What are sources of probiotics?

In general, yogurt and kefir are considered to be the top probiotic food products. Fermented foods like miso, kimchi and pickles are also sources. But to get a benefit from probiotics you have to consume them regularly. One shot of yogurt every two weeks is not going to be beneficial. These are living organisms, and enough of them have to survive the journey through your digestive system to get to your intestinal tract. They have to be consumed in adequate amounts, and they must be constantly supplemented.

Are probiotic supplements a good option?

That depends on whether the supplement contains enough probiotics, and if they are designed in a way that enough of them will reach your gut. Another important thing to consider is whether there is a food source for these probiotic organisms to multiply. If you want to establish healthy microflora you have to provide what they want to eat as well – what we refer to as prebiotics. These are non-digestible carbohydrates, or fibre.

Many probiotic supplements also contain fructo-oligosaccharides, which is a common prebiotic. Check the label to make sure you have both the living probiotic organisms and their food source. ☺

2015/16 KILLAM GRADUATE TEACHING AWARD

Human Nutrition PhD student Theresa Schroder received a 2015/16 Killam Graduate Teaching Award. UBC annually awards the Killam Graduate Teaching Award to sixteen Teaching Assistants in recognition of the valuable role that they play in our undergraduate programs. The prize includes both a certificate and \$1,000 and is given to TAs who have achieved a high level of respect from both undergraduate students and academic or course supervisors.

ASSISTANT PROFESSOR XIAONAN LU RECEIVES GRANT FROM CENTER FOR PRODUCE SAFETY

Xiaonan Lu, Assistant Professor, Food Safety, received a \$200,000 US award from the Center for Produce Safety (CPS) for his project on Detection, validation, and assessment of risks implied by the viable but non-culturable (VBNC) state of enteric bacterial pathogens in fresh produce. The CPS awards are for research projects directed at answering critical questions in specific areas of food safety practices for fruits and vegetables; pre-harvest, harvest and post-harvest handling; and food safety and the environment. The objective is to provide the produce industry with practical, translatable research data that can be used at all levels of the supply chain.

LFS RESEARCHERS RECEIVE CFI JOHN R EVANS LEADERS FUND

Assistant Professor Yvonne Lamers and Assistant Professor Xiaonan Lu received funding from the John R. Evans Leaders Fund, which helps universities attract and retain researchers by providing funding for tools and laboratory equipment, infrastructure and operating costs. Lamers, Canada Research Chair in Human Nutrition and Vitamin Metabolism, was awarded \$200,000 for the UBC Nutritional Biomarker Laboratory, while Lu received \$260,000 for his project on Single Cell-Level Platform for Detection and Characterization of Foodborne Pathogens.

Fulbright scholar joins Integrated Studies in Land and Food Systems program



FULBRIGHT SCHOLAR VICTORIA OSTENSO joined the Integrated Studies in Land and Food Systems program in September. The Fulbright Program offers competitive, merit-based grants for international educational exchange for students, scholars, teachers, professionals, scientists and artists. The award celebrates and supports individuals who have demonstrated excellence in scholarship, and service to their communities, while, at the same time, reflecting diverse perspectives.

Osteno plans to study how immigrant and ethno-cultural communities in the Metro Vancouver area form informal food redistribution networks to combat food insecurity and the ways in which formal food access programs can best facilitate these networks.



FOOD SCIENCE STUDENT RECEIVES MITACS AWARD FOR INNOVATION

FOOD SCIENCE PHD STUDENT YAXI HU won a 2016 Mitacs Award for Innovation. This award is given to a PhD student who has made a significant achievement in research and development innovation during his/her Mitacs-funded research. Hu received the award at the 2016 Mitacs Awards on November 14th in Ottawa.



**JOHN
FROSTAD**

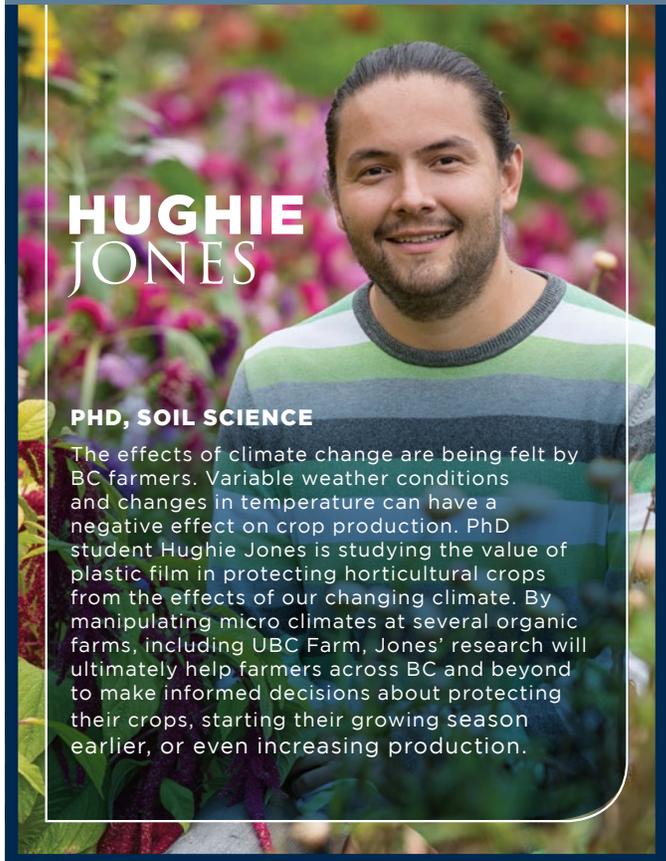
ASSISTANT PROFESSOR,
FACULTY OF LAND AND FOOD SYSTEMS
AND UBC CHEMICAL AND BIOLOGICAL ENGINEERING
(JOINT APPOINTMENT)

IMAGINE EATING a great-tasting, nutritious meal, and then not feeling hungry again for 48-72 hours. It may sound like something from a science fiction movie, but if John Frostad has his way, a controlled release food product could eventually become a reality.

“A meal like this wouldn’t be intended to replace the way we normally eat or to change anyone’s lifestyle,” Frostad said. “It would be short-term assistance for people who have a difficult time getting the proper nutrition, such as the elderly or those in disaster situations.”

As a chemical engineer, Frostad is interested in knowing more about how things work in order to make them better, more efficient or more cost effective.

“I study the physics of foams and emulsions in food products, and how they can be understood to make better food products,” he said. A recent project involved studying the physics of beer foam and making correlations between the properties of the bubble interfaces with the density of the entire foam. “The idea being that if you understand the connection, you can make the foam just the way you like it.”



**HUGHIE
JONES**

PHD, SOIL SCIENCE

The effects of climate change are being felt by BC farmers. Variable weather conditions and changes in temperature can have a negative effect on crop production. PhD student Hughie Jones is studying the value of plastic film in protecting horticultural crops from the effects of our changing climate. By manipulating micro climates at several organic farms, including UBC Farm, Jones’ research will ultimately help farmers across BC and beyond to make informed decisions about protecting their crops, starting their growing season earlier, or even increasing production.

Originally from Spokane, Washington, Frostad might not have become a chemical engineer at all – in fact, he was considering not going to college – if it hadn’t been for his high school guidance counsellor.

“My counsellor was adamant that I go to college and she helped me get a full ride scholarship to Eastern Washington University,” he said. A year later, he transferred to the University of Washington, where he earned a BS (with honors) and then a PhD from the University of California, Santa Barbara, both in chemical engineering. Before joining UBC in July, Frostad was a research chemical engineer at Bend Research (a division of Capsugel) and a postdoctoral fellow at Stanford University.

Frostad would like to branch into functional foods, which are foods that have been enhanced in order to make them more nutritious, such as omega-3 fatty acids enriched eggs.

“I’ve long been interested in food and food systems, and I’m looking forward to applying chemical engineering to food related research,” he said. ©



NICOLE FETTERLY

REGISTERED DIETITIAN

Nicole Fetterly has taken the nutrition world by storm. After graduating from the Dietetics program in the Faculty of Land and Food Systems in 2007, Fetterly worked for Vancouver Coastal Health in clinical dietetics and then as Nutrition Operations Manager at Choices Markets. She was named Star Woman in Grocery for 2015 by Canadian Grocer magazine.

Fetterly returned to UBC in October 2015 as the Nutrition & Wellness Manager in Student Housing and Hospitality Services on the Vancouver campus. She has been a large part of education outreach to students in residence and partly responsible for the increase of healthy food options on campus.

“Students are entering an amazing new phase of their lives and really establishing their independent relationship with food for the first time,” she said. “I felt I could have the most impact in a university environment.” And when it comes to UBC’s food choices on campus she believes it is “improving day by day.”

Thanks in part to Fetterly, the food choices have improved since the days when she

herself was a student in the Dietetics Major, a program that uses an integrated, province-wide approach to prepare students for safe, effective and ethical entry-level dietetic practice. “The integrated dietetics program opened a lot of opportunities for me both within the Faculty and outside of UBC.”

One of Fetterly’s favourite parts of working with UBC is the Joy of Feeding event, an annual fundraiser in support of UBC Farm with a goal of raising awareness about the importance of cooking at home. She has been part of the steering committee for five years, bringing Choices Markets on board as a sponsor, and credits working on Joy of Feeding with helping her land her position at UBC.

So, what does the future hold? Nicole recently accepted a role as Coordinator for the Nutrition Programming & Services with the University of Victoria where she’ll be continuing the work she started at UBC. “I look forward to this new chapter with my family and the University of Victoria where I’ll continue to advocate for more sustainable food systems on campus.” ☺

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