

REACHOUT



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a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

DEAN'S MESSAGE

ACCORDING TO A REPORT by the United Nations, by 2050 there will be more than 9 billion people on the planet – that's two *billion* more people in just 35 years. Finding ways to feed a population of that size is a challenge that scientists all over the world are focusing on – including researchers here in the Faculty of Land and Food Systems.

We are in the unique and lucky position of having a working farm on which we can conduct food security and food sustainability research. Through the UBC Farm, we can model how food can be produced intensively and sustainably in an urban environment. The research and teaching we're doing at the UBC Farm is some of the most innovative in the country and has the potential to transform our world.

In this issue of Reach Out, you'll learn more about what's happening at the UBC Farm, as well as some of the exciting research that's already having an impact on our communities. Gladys Oka, a Masters student in our Soil Science program, for example, found elevated levels of toxic metals at Vancouver community garden sites. Her research was covered by several media outlets and, as a result of that exposure, the Vancouver Park Board is mandating that community gardens and local agricultural projects be planted in soil free of urban contaminants – a great example of how science can affect policy.



Our Faculty is also in the midst of working on a new strategic plan, a roadmap that will guide us through the next 5 years. Creating this plan involves taking a close look at where we're currently at and establishing a clear focus for where we want to be. We are calling on our staff, faculty and students, as well as alumni and our industry and community partners to help us build a solid plan of action. If you are interested in providing your feedback, I welcome you to contact me at rickey.yada@ubc.ca.

RICKEY YADA
DEAN, FACULTY OF LAND AND FOOD SYSTEMS





UBC FARM RECEIVES \$1M GRANT from Real Estate Foundation of BC

LOCAL FARMING has been given a boost thanks to a \$1 million investment from the Real Estate Foundation of British Columbia (REFBC) in support of the Centre for Sustainable Food Systems (CSFS) at the UBC Farm.

The grant, part of UBC's *start an evolution* campaign, signifies the largest ever made by REFBC and marks a joint 10-year partnership between REFBC and CSFS.

"REFBC's support of the Centre for Sustainable Food Systems at the UBC Farm helps to ensure a more secure and sustainable future for farming in B.C.," said Rickey Yada, Dean of the Faculty of Land and Food Systems. "This partnership offers an opportunity to change land use attitudes and practices through innovation, stewardship and learning."

The funding will support land policy research and experiments to improve yields and test new crops at the farm. It will also expand both Aboriginal and children's programming, and invest in a proposed new eco-friendly facility that will increase the number of courses and students taught on-site. The new facility will make it possible for the number of students trained in the UBC Farm Practicum in Sustainable Agriculture to grow from 12 to 24 each year.

Faced with an aging farming population and costly acreage, the hands-on 8-month long program is a way for young or inexperienced people to engage in small-scale farming and learn about the farm-to-table business.

"This program made me realize that farming is a viable career choice, and I can actually do this," said Dave Semmelink, a UBC conservation student who recently completed the training program and has now launched his own organic mixed-live stock business, Lentelus Organics.

Semmelink credits the program for helping him to make business connections to find land to farm on, leasing 6 acres of a 25-acre property in Comox Valley.

Jack Wong, REFBC's CEO, said the foundation is committed to local, sustainable food systems with

a focus to advance progressive agricultural land use policies and practices.

"This grant will expand UBC Farm's unique capacity as a demonstration site for community-based research and education – work that aligns with the Foundation's goal to build healthier, more resilient communities." ☺



**HANNAH WITTMAN
NAMED ACADEMIC
DIRECTOR, UBC
CENTRE FOR
SUSTAINABLE FOOD
SYSTEMS**

ASSOCIATE PROFESSOR HANNAH WITTMAN has been appointed Academic Director, Centre for Sustainable Food Systems (CSFS) for a three year term beginning in July. The mission of the CSFS, building on a strong foundation of research and community engagement at the UBC Farm, is to conduct globally significant, multi-disciplinary research on sustainable food systems. The CSFS is a living laboratory for transformative learning through innovative cross-faculty and interdisciplinary collaboration, socially responsible community engagement, and international dialogue and knowledge-dissemination.

Wittman holds a PhD in Development Sociology from Cornell University (2005). She grew up on a farm in Idaho and has built her career on research related to the social organization of small scale and diversified farming systems in Canada and Latin America. Her current work focuses on community farms and agricultural land trusts, land access challenges and opportunities for new farmers, peri-urban and urban farming systems, and community mobilization for food sovereignty and socially just food systems.

She is jointly appointed in the Institute for Resources, Environment and Sustainability at UBC's Faculty of Science. ☺

ELEVATED TOXIC METALS

AT COMMUNITY GARDEN SITE RAISE CONCERNS

Elevated levels of toxic metals at a Vancouver community garden site raise questions about the city's approach to promoting urban agriculture.

In research outlined in the *Journal of Soil Science and Plant Nutrition*, lead author Gladys Oka, an MSc candidate in our soil science program, detected elevated levels of zinc and lead in soil from a community garden site at 16th Avenue and Oak Street.

"My intention is not to say don't plant, don't do community gardens," says Oka. "But I don't think it's necessarily in the best interest of Vancouver to push something without informing people of all the considerations they need to make."

Native soil sampled from the garden site was found to have concentrations of 456 parts per million (ppm) of zinc, and 219 ppm of lead—exceeding background soil levels in the Lower Mainland of 200 ppm and 60 ppm respectively. Kentucky bluegrass, used as an indicator plant, was found to absorb the metals: the shoots of those grown on the garden site contained 1,330 ppm of zinc and 387 ppm of lead. The European Scientific Commission on Food recommends no more than 25 mg per day of zinc and no more than 0.03 mg per day of lead be ingested by a 60 kg person.

While the use of raised beds could mitigate contamination from the soil, Oka says readings of metals in the air are also a concern. Compared to the UBC Farm site, which the researchers also tested, there was eight times as much zinc and twice as much lead and copper in the air around the community garden.



"You can fix the problem of what's happening in your surface soils by using compost, but if you're growing in that for five years, you might be accumulating a lot of metals," she notes.

Co-author Les Lavkulich, program director of the UBC Master of Land and Water Systems, calls for a measured approach to urban gardening. "Our research has shown that the potential for metal contamination is a concern. Before we start promoting things, we should make sure we have a relatively good idea of what we're promoting."

Oka's research has led to a change in Vancouver Park Board policy. In February 2015, the Vancouver Parks Board announced that it will mandate that communicate gardens and local agriculture projects be planted in soil free of urban contaminants. ●

UBC Grad Student Brings an Innovative

AS GLOBAL ISSUES SUCH AS CLIMATE CHANGE and food security continue to place increasing demands on our soil, bringing attention to this important resource is becoming more and more critical. Providing effective education in soil science will increase awareness of the key role that soil plays in environmental sustainability and social issues. UBC masters student Darrell Hoffman is taking on the task of making soil science education more accessible and engaging for students, researchers and educators everywhere.

The Forest Floor Tool will complement campus-based learning by helping students learn to complete basic descriptions and classifications of the forest floor. This tool is part of the Virtual Soil Science Learning Resources website led by Associate Professor Maja Krzic, that produced a larger body of learning resources designed to enhance soil science education in Canada.

According to Hoffman, an effective way to engage people in soil science is to take advantage of today's digital media technology. "If we can make soil science



ONE DROP WILL DO

LFS RESEARCHERS DEVELOP A SIMPLE TEST FOR VITAMIN B12 DEFICIENCY

RESEARCHERS in the Faculty of Land and Food Systems have developed a novel method to test for vitamin B12 deficiency that is sensitive enough to work on anyone, including newborn babies and large swaths of the general population.

Vitamin B12 deficiency can be tested with a single drop of blood collected from a finger prick, then blotted and dried overnight on a card consisting of filter paper. The LFS study made dried blood spot card analysis sensitive enough to measure the amount of methylmalonic acid (MMA), an indicator of a person's B12 level.

"This minimally invasive approach helps us measure deficiency in an easier and more convenient way, especially in large samples of people," says study author Yvonne Lamers, an assistant professor in LFS and Canada Research Chair in Human Nutrition and Vitamin Metabolism. "Our method is the first to make dried blood spot analysis sensitive enough to test healthy people for B12 deficiency."

The method simplifies blood sample collection for researchers in rural or remote areas where sophisticated

lab equipment is unavailable. It's currently being used in a research project in rural Indonesia.

The method could also have a significant clinical application. It has the potential to be added to the BC Newborn Screening Program. The program tests for treatable disorders in all infants born in the province. B12 deficiency, if not detected and treated early, can cause delayed brain development, slow learning and digestion problems in babies.

"We are interested in Dr. Lamers' method, which may be sensitive enough to detect and confirm B12 deficiency using the blood spot cards currently collected on B.C. newborns," says Hilary Vallance, director of the BC Newborn Screening Program. ☺



Approach to Soil Science Education

visible by putting it online and making it more attractive I think it's likely that more students will give soil science more consideration," says Hoffman.

This push for innovations in soil science education coincides with the recent declaration by the UN and the Intergovernmental Panel on Climate Change of 2015 as the International Year of Soils. This declaration reinforces the key role of healthy soil in a sustainable future and the far-reaching impacts of soil science to various environmental and social issues. ☺







THE CASE FOR EATING INSECTS



LFS RESEARCHER YASMIN AKHTAR says bugs are nutritious, sustainable and delicious.

WHY SHOULD WE EAT INSECTS?

There are so many advantages to eating bugs, one of them being they are so plentiful. They can thrive in different types of environments and extreme conditions. Approximately 1,500 species of insects are considered edible (0.15 per cent of known species), but far more must be edible. They can provide food to everyone.

Insects are also highly nutritious. They are higher in protein, iron, and other nutrients than beef. Their food conversion efficiencies are also much higher than animals, and they require less feed and space. Crickets, for example, require 12 times less feed and 13 times less water than cattle to produce the same amount of edible protein. They can be farmed on a larger scale without damaging the environment. Compared to mealworms, a pig produces between 10 and 100 times as much greenhouse gas per kilogram.

WHAT REGIONS OF THE WORLD EAT INSECTS?

Insects have been a food source for people for tens of thousands of years, all over the planet. Although popular in many developing regions of the world, including Central and South America, Africa, and Asia, using insects as food is still very rare in the developed world.

An aversion to eating insects is strictly cultural in origin. There's a negative perception toward bugs; they are considered pests, vectors of diseases, annoying and creepy. But in blind tastings, most people enjoy the flavour and texture of insects, if properly prepared.

In fact, people don't realize that they eat bugs unknowingly all the time. Fruits and vegetables contain insect parts or whole insects. Fig paste can harbour up to 13 insect heads in 100 grams; canned fruit juices can contain a maggot for every 250 millilitres; 10 grams of hops can be the home for 2,500 aphid; and frozen broccoli can contain 60 or more aphids or thrips per 100 grams—and these

numbers are permissible by the U.S. Food and Drug Administration.

HOW DO THEY TASTE?

They have a bit of a nutty flavour, especially when they are roasted. Ants are crunchy, and they have a lemony sourness, which could be because of the formic acid they contain. Crickets taste like nutty shrimp. Some stinkbugs have an apple flavour, and some worms are spicy. Bee larvae sautéed with butter and honey taste like bacon. I have also heard that fried silkworms taste like eggs.

HOW CAN PEOPLE GET OVER THEIR SQUEAMISHNESS ABOUT EATING BUGS?

They need to be aware of their benefits. People have to understand that there will be a time later on when there will be a shortage of food, so they will have to rely on other sources. They should know that insects could contribute to a more sustainable source of protein and serve as an alternative to meat. Insects hold promise as a sustainable food source, and they may be a solution to world hunger in an economically sound and environmentally friendly manner.

Besides entomophagy research, Akhtar also works with botanical insecticides and antifeedants. She's currently conducting research on how to control bed bugs using natural products. ☺



KIDS EAT BETTER IF THEIR PARENTS WENT TO COLLEGE

CHILDREN OF COLLEGE-EDUCATED PARENTS eat more vegetables and drink less sugar, according to a recent study co-authored by LFS researcher Jennifer Black. But according to Black, an assistant professor in our food, nutrition and health program, it's still not enough as all kids are falling short when it comes to eating healthier at school.

The research suggests a parent's educational attainment, an indicator of socioeconomic status, may inform a child's diet.

The study found Vancouver school children whose parents completed some post-secondary education were 85 per cent more likely to eat vegetables during the school week than those with parents who completed high school or less. Children whose parents graduated from college or university were 33 per cent less likely to consume sugary drinks, like soda pop.

"We can only speculate on the reasons for the disparities," says Black. "Higher priced products, like vegetables, may not be the food that gets packed first for vulnerable families that need to make tough choices about school lunches."



The study revealed, however, that the majority of children, regardless of socioeconomic status, do not consume enough low-fat milk or whole grains on school days, opting instead for packaged snack foods like potato chips or fast-food style items, like french fries, high in sodium and saturated fat.

"While there are still barriers that exist for low-income children, families from across the socioeconomic spectrum are struggling to get their kids to eat healthy food at school," says Black. "Our findings challenge this common notion that only low-income families feed their kids junk food because it appears wealthy families are not always making healthier choices either." ☉

Researchers Evaluating Impact of Food Hub Programs

A RESEARCH TEAM led by LFS Assistant Professor Jennifer Black was recently awarded \$200,000 by the Canadian Institutes of Health Research to evaluate the impact of the Greater Vancouver Food Bank Society's Food Hub Programs on dietary intake and food security.

Black, along with UBC researchers Nathan Lauster and Gail Hammond, and Simon Fraser University researchers Scott Lear, Nadine Schuurman and Charles Goldsmith, will work with the GVFBS as they transform their delivery model.

The GVFBS provides assistance to over 28,000 people weekly through 15 food depots and over 100 community agencies in Vancouver, Burnaby, New

Westminster and North Vancouver. The non-profit is developing a food philosophy that will set nutritional standards for food banks. Through its 'food hub' program, members can select from a healthier array of food offerings, as well as engage with agencies that provide health promotion, nutrition education, and social service referrals. They will also be able to purchase fresh local fruits and vegetables at subsidized prices.

The evaluation of this program will inform the transformation of the food bank system in Vancouver. In the long-term, findings will provide valuable insight about how food banks across Canada could better meet health equity and community food security goals. ☉



Heart problems Triggered by Climate Change Could Devastate Chinook Salmon Stocks

WILDLIFE BIOLOGISTS are trying to predict how animal populations all over the world will respond to climate change.

There are many examples of how projected future temperatures will dramatically affect the performance of a wide range of animal species whose body temperature is at the same as the environment in which they live. Some species will acclimate to warmer temperatures; their bodies will adjust. Other species that are able may simply move to cooler habitats.

But it's unknown what species of animals can adapt and survive over the long term to global rising temperatures.

Determining the future of animals in aquatic environments is a challenge an LFS researcher took part in.

The research team investigated the potential for juvenile Chinook salmon to adapt to warming water temperatures. They examined the capacity for evolutionary change using a genetic breeding program.

The salmon's response to warmer than normal water acclimation temperature was measured across all the genetic variations of the fish created for this research project.

It was discovered that Chinook from the Quinsam River can acclimate to a warmer environment with subtle changes to cardiac functions, but only up to a point.

At 24.5°C and regardless of the acclimation temperature, the Chinook developed serious cardiac problems.

Professor Anthony Farrell, a UBC zoologist and member of the international research team describes what happens to the fish.

"Its heart beats faster and faster with warming until at 24.5°C it can beat no faster, then it either slows or goes arrhythmic," says Professor Anthony Farrell, Chair, Sustainable Aquaculture. Farrell goes on to explain that if climate change continues unchecked, Chinook salmon from the Quinsam River would be one animal species facing dire consequences because they discovered there's a five per cent chance of catastrophic loss of this population of Chinook salmon by 2075 and upwards of a 98 per cent of the fish would be gone by 2100. ☺



SOILX PROJECT LED BY MAJA KRZIC RECEIVES THE PLATINUM MARCOM AWARD

The SOILx project, *From the Earth to the Cloud*, led by Associate Professor Maja Krzic received the Platinum MARCOM Award (mobile/web-based technology category) from the International Festival of the Marketing & Communication Industry (MARCOM).

SOILx enables users to search spatially its database of soil sites and view detailed information on each one.

Dr. Krzic was the SOILx project's PI; her team included Saeed Dyanatkar (UBC IT), Julie Wilson (LFS), Chris Crowley (CTLT), UBC undergraduate student Nathan Sidles (Computer Sciences), Dr. Angela Bedard-Haughn (University of Saskatchewan), Dr. Nathan Basiliko (Laurentian University), Dr. Paul Sanborn (UNBC) and Kent Watson (Thompson Rivers University).

PROFESSOR DAVID FRASER RECEIVES AWARD FROM DETROIT ZOO

Professor David Fraser was one of two recipients of the Bärle Award from the Center for Zoo Animal Welfare (CZAW) at the Detroit Zoo, recognizing outstanding contributions to the field of animal welfare through leadership, service, education, research or advocacy. The other winner was Andrew Rowan, president/CEO of Humane Society International.

"Dr. Fraser and Dr. Rowan embody the letter and spirit of this award with their career-long commitment to improving the welfare of animals," said Ron Kagan, Detroit Zoological Society executive director and CEO.

The awards were presented during CZAW's international animal welfare symposium, held November 21-22.

UBC ANIMAL WELFARE TEAM PLACES 4TH AT INTERCOLLEGIATE COMPETITION

UBC's Animal Welfare Judging Team (Tanjot Gill, Eugenia Kwok, Katie Mills, Elena Pakalnis and Laura Rounding) finished fourth at the 14th Intercollegiate Animal Welfare Judging Competition on November 22 at Michigan State.

Teams were given hypothetical animal welfare scenarios involving specific species, and had to determine which situation had a superior quality of welfare, and present their findings to a group of expert judges. Winners were chosen based on decision accuracy, argument strength and presentation style.



ZAIRA PETRUF joined the Wine Research Centre in February 2015, taking over the role of Research Communications Coordinator from Samantha Turner, who has moved on to a position at Harvard Medical School. Petruf brings many years of experience in administration,

project and events management, and communication outreach from positions at UILO's Genomics Research Entrepreneurship to Accelerate Translation (GREAT) Program, Culturally Relevant Urban Wellness Program at Vancouver Aboriginal Child and Family Services Society, the PuSh International Performing Arts Festival, Vogue Theatre and Bard on the Beach Theatre Festival. Petruf holds a B.A. in Anthropology (UBC) and an M.A. International Studies, Complex Emergencies (SFU) with a focus on Transitional Justice processes in Sub-Saharan Africa. ☺

PROFESSOR DAN WEARY AWARDED UBC KILLAM RESEARCH PRIZE

Professor Dan Weary, UBC Animal Welfare program, recently received the UBC Killam Research Prize in recognition of his outstanding research and scholarly contributions.



Each spring, the Office of the Vice President Research & International hosts an awards reception to recognize outstanding UBC researchers. Faculty researchers are nominated by their peers. Winners are selected by UBC's Faculty Research Award Committee, which spans arts and humanities, business, education, applied science, science, and medicine.

Weary, who last year received the Killam Teaching Prize, works with students and colleagues in the Animal Welfare Program using behavioural and other non-invasive measures to objectively assess aspects of animal well-being and uses this knowledge to improve the care and housing of animals used in research and agriculture. A special focus of Dan's work is on dairy cattle, and he works closely with dairy farmers in BC, and with the staff and students at the UBC Dairy Education and Research Centre, to develop innovative methods of improving the lives of dairy cows and calves. ☺

CLARE CULLEN, OPERATIONS DIRECTOR, THE CENTRE FOR SUSTAINABLE FOOD SYSTEMS AT THE UBC FARM



CLARE CULLEN joined the Centre for Sustainable Food Systems at the UBC Farm in March. With a rich background in arts, environmental education, finance, entrepreneurship and non-profit organizations, Cullen brings a diversity of skills and a wealth of experience. She holds a B.A. honours in Film and Communication from Queens University and an M.Ed in Art and Environment from Simon Fraser University.

She is particularly passionate about local and self-sufficient food production. Her commitment to local

and sustainable food production led her to launch *Growing Food in Your Own Front Yard*, a grassroots program in Vancouver, which aims to engage school children in small scale urban farming.

As Operations Director for CSFS, Cullen will play a key leadership role in the Centre's daily operations, business development, and financial and human resources management. Prior to joining CSFS, she was Administrative Manager for UBC's Beaty Biodiversity Museum. ☺

CENTENNIAL DIALOGUES ON CRITICAL ISSUES IN LAND AND FOOD SYSTEMS

ON OCTOBER 17, 2014 the Faculty of Land and Food Systems, with support from the UBC First Nations House of Learning, the UBC Department of History, Kloshe Tillicum (Network Environments for Aboriginal Health Research), Irving K. Barber Learning Centre, alumniUBC and the Aboriginal Feast Bowl, hosted the first in a series of *Centennial Dialogues on Critical Issues in Land and Food Systems*, in recognition of UBC's centennial (May 2015 – May 2016).

This dialogue, entitled, *First Nations' perspective on history, food, and health (Continuing the Dialogue on Truth and Reconciliation)*, featured a panel discussion on the aftermath of the Indian Residential School

(IRS) System, and specifically, the effect government-sanctioned nutrition experiments performed on children under state care has had on the relationship with food, nutrition, and health for both survivors, and inter-generational survivors of the IRS System.

The event was moderated by Dean Rickey Yada and panelists included Ian Mosby, Postdoctoral Fellow, L.R. Wilson Institute for Canadian History, McMaster University, Eduardo Jovel Director, Indigenous Research Partnerships; Associate Professor, Faculty of Land and Food Systems, Dawn Morrison — Research Associate, Indigenous Community Engagement, Jessie Newman — B.Sc. Student, UBC Dietetics Major, Food, Nutrition and Health Program. ☺



ANIMAL WELFARE ALUMNA HELPING TO SET STANDARDS FOR WHOLE FOODS MARKET

FRANCES FLOWER never dreamed a career in animal welfare would one day lead her to Texas and a job in a natural and organic foods supermarket. But shortly after completing her PhD in our Animal Welfare program in 2006, the British-born Flower was recruited by Whole Foods Market. She moved to Austin, where the grocery chain's global office is located, and has spent the past nine years managing the day-to-day operations of their animal welfare program.

It all started with a love for animals.

"I loved studying animal behaviour, why animals do what they do," Flower said. While working on a Masters in Applied Animal Behaviour and Animal Welfare at the University of Edinburgh in the 1990s, she came across an ad for a research project led by UBC Animal Welfare Professor Dan Weary. Flower jumped on the opportunity to be part of a project looking at the maternal bond between cow and calf, which was conducted at the UBC Dairy Education and Research Centre, a decision that led her to pursue her PhD in our Animal Welfare program.

"The UBC Animal Welfare program was a great experience," she said. "The researchers are very well respected in the animal welfare world and we were exposed to a whole spectrum of animal welfare related issues."

Flower's experience working with dairy cows at the UBC Dairy Education and Research Centre prepared her well for her current role at Whole Foods; as a Livestock Associate, she works with 2,700 farmers and ranchers in the US, Canada and Australia to ensure that they meet the company's strict animal welfare standards. Whole Foods Market requires that all the farms and ranches that supply meat to the stores (including beef cattle, pigs, chicken and turkey) must be third-party inspected and certified to Global Animal Partnership's (GAP) 5-Step® Animal Welfare Rating Program. The 5-Step program is a multi-tiered set of standards that recognises producers for their welfare practices.

"Consumers want to know how animals are raised," she said, adding that the rating system has impacted the welfare of 290 million farm animals in the U.S., Canada and Australia. "We're dedicated to helping our customers make informed choices about the food they eat." ☺

FOR MORE INFORMATION GO TO WHOLEFOODSMARKET.COM/PERSON/FRANCES-FLOWER

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