

branchlines

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In this issue of BranchLines, we celebrate the 10th anniversary of the “2+2” and “3+2” programs conducted in partnership with a number of forestry universities in China. When we first explored this possibility, it was based on the presence of a number of transfer programs already in existence with educational institutions in British Columbia. The basic idea was that a student would do their first 2 years at one institution and then transfer to UBC Forestry to complete their degree. This is permitted as long as the student takes at least half the credits required by UBC, and provided that we have approved the courses taken by the student in the first years, something that we do through the process of articulation. A few years ago the Chinese government changed the rules, requiring students to spend additional time at the Chinese university, hence the shift to “3+2” programs.

Has this worked? Many universities have tried to undertake this type of arrangement, with mixed success. Early students found the transition challenging, as they had to work within a different education environment and in English. The English-language ability of some of the students was limited, despite having passed the requisite exams. Over time, the ability of the transfer students to excel at UBC Forestry has increased. This is because we have placed a lot of emphasis on sending people from UBC Forestry to

provide intensive courses at our partner universities, and have also invested a lot of time in training faculty members at those universities in some of the pedagogic techniques used at UBC.

What happens to the students? Interestingly, preliminary research indicates that about a third return to China, where many are accepting jobs in the Chinese forest sector. Their knowledge of BC and its timbers is a huge asset for Chinese companies seeking trade partnerships with Canadian companies. Of the two thirds that remain in Canada, about half are going into further education, such as Master's or PhD degrees, and about a third are getting jobs in BC. Given the massive shortfall between the expected vacancies in the BC and Canadian forest sectors and the numbers of graduates being produced by the 8 Canadian universities with accredited forestry programs, this increase in numbers should be welcome to the sector.

The presence of significant numbers of international students has a number of other benefits. We have seen a marked increase in the internationalization of our students, and there is today much greater interest in learning about and understanding global forestry issues. This is evident in the interest in our international field courses (which have been taking place in India and China), in the growth of a very active chapter of the International Forestry Students Association, and the increasing number of international internships and co-op positions taken up by our students. These students return to Canada with a much greater understanding of the British Columbian and Canadian context.

While the increased numbers of students has created some challenges, these have generally been handled well by our excellent Student Services team. By undertaking their first 2 years in China, the students avoid the difficulties associated with finding places for first-year courses, a growing problem

at UBC. The students are filling extra capacity within the Faculty, and an important point to make is that no domestic students have ever been displaced in favour of an international student (contrary to some allegations in the media). Some problems remain, such as with our field courses, and these are being addressed. More importantly, the numbers of students have enabled us to continue teaching in areas where demand from domestic students is relatively limited, such as forest operations. With the University of New Brunswick having closed its forest operations program, only Laval University and UBC still have programs in this important area. Rather than closing our program, we have this year renewed it with the appointment of a new associate professor who is tasked with looking at ways to build up the forest operations area.

Where do we go from here? Our ‘pipeline’ of students from China is healthy, and many other universities would like to join. However, we are limiting the numbers of partners, partially for practical reasons and partly so that we can add greater depth to existing partnerships. We are looking at other areas where we might establish similar partnerships, thereby continuing to diversify our student body. However, this will be done carefully, and with an eye to ensuring that we continue to have a good mix of students from both Canada and the rest of the world.

John L Innes
Professor and Dean



Cover photo – *Morinda citrifolia* or Noni fruit, in Vietnam. A staple food among some cultures and also used in traditional medicine.

forestrynews



Dr Tara Martin has joined the department of Forest and Conservation Sciences as a professor in conservation decision science. Previously, she was a principal research scientist with Australia's National Science Agency, CSIRO. Tara is a pioneer in conservation decision making - combining ecological data with decision science to bridge the gap between research and on-ground conservation action and policy. Her research interests include prioritizing threat management for biodiversity conservation; climate adaptation and mitigation under global change; understanding shifting baselines and informing eco-cultural restoration; and decision-making under uncertainty. Tara was recently awarded The Nature Conservancy Professor in Practice Award, Thomson Reuters Citation & Innovation Award for her work in climate change decision making and a Wilburforce Conservation Fellowship. Tara will be developing a graduate course in conservation policy and decision making. She can be reached at tara.martin@ubc.ca.



Dr Fernanda Tomaselli has joined the department of Forest Resources Management as a lecturer and coordinator in the new Land One program - a joint initiative between the Faculties of Forestry and Land and Food Systems. Fernanda will be teaching an integrated seminar course within this program as well as teaching 2 second year conservation courses. Fernanda has an interdisciplinary background, with experience in various conservation and environmental projects in the Amazon Rainforest and in the Galapagos Islands, and in community forestry in The Gambia. Fernanda has a BSc in environmental communication from Universidad San Francisco in Ecuador and a PhD in Forestry from UBC. She is very passionate about teaching and hopes to inspire students to become more engaged in sustainability issues. Fernanda can be reached at fernanda.tomaselli@ubc.ca.



Dr Ryan Frazier has joined the department of Forest Resources Management as a lecturer responsible for developing and teaching courses for the Master of Geomatics for Environmental Management (MGEM) program. Ryan completed a PhD in Forestry at UBC in 2016. His research is focused on applying time series of Landsat data to gain a greater understanding of environmental change over long time periods. Previously, Ryan was lecturing in geomatics at Arizona State University, and also has done extensive environmental consulting work in the United States. In his new role, Ryan is most excited to help MGEM students harness the power of geomatics to better understand the issues facing the environment today and to find innovative environmental management solutions. He can be reached at ryan.frazier@ubc.ca.



Dr Cole Burton (assistant professor in the department of Forest Resources Management) has been appointed as a Canada Research Chair (Tier 2) in Terrestrial Mammal Conservation. Cole's Wildlife Coexistence research group is studying human-wildlife coexistence across multiple species and scales, with particular emphasis on large-bodied terrestrial mammals. You can read about one of his current research projects on page 14 of this newsletter. Congratulations Cole.

International Urban Forestry Congress 2018

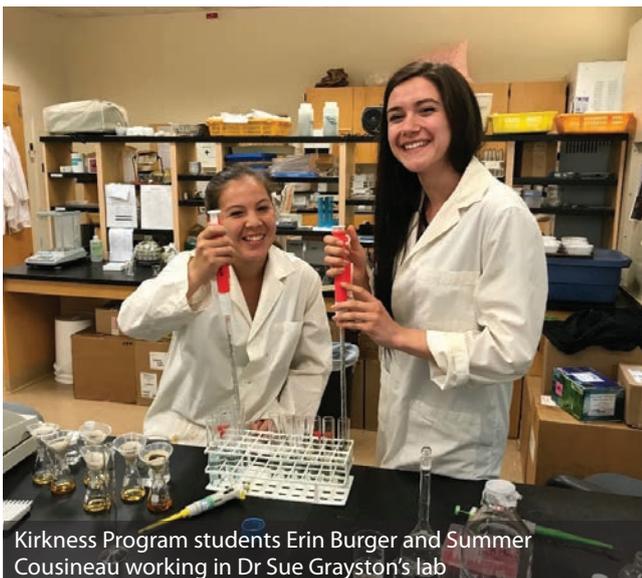
September 30 – October 3, UBC Forestry is co-hosting the International Urban Forestry Congress 2018. The event, organised jointly with the Vancouver Board of Parks & Recreation and City of Surrey, is themed 'The Urban Forest – Diverse in Nature' and will offer delegates, from a wide range of backgrounds, an opportunity to discuss planning, design and management of diverse urban forests for diverse urban communities. The Congress is a unique partnership between Tree Canada's Canadian Urban Forest Conference, the Annual Training Conference of the Pacific Northwest Chapter of the International Society of Arboriculture and the International Urban Tree Diversity Conference. The 3-day event will provide a forum for practicing arborists and urban foresters, green space planners and designers, and policy makers to share their unique insights and allow for dialogue between community groups on innovative strategies, policies, technologies, research and best management practices.

The geographical focus of the event will be regional (BC, Pacific), national (Canada) and international (including US-Canada). Subthemes will include:

- People & City Diversity – how people and communities of different backgrounds perceive and use urban forests
- Urban Forest Diversity – the different parts of the urban forest, and promoting diverse and resilient urban forests
- Diversity in Urban Forest Management – the many different ways in which we manage our urban forests
- Diversity in Governance and Partnerships – exploring different governance approaches and partnerships for successful urban forestry
- Natural Diversity – the role of nature, and approaches for rewilding our cities
- Diversity in Education and Communication – training the arborists and urban foresters of the future, and telling about urban forestry and its benefits

For more details, visit <http://iufcvancouver2018.com/>

Activating a passion for forestry among Indigenous youth



Kirkness Program students Erin Burger and Summer Cousineau working in Dr Sue Grayston's lab

From May 14 to May 18, 2018, UBC hosted 31 Indigenous high school students from across Western Canada for the Verna J Kirkness Science and Engineering Education Program at UBC. The Kirkness Program provides these students the opportunity to live on campus for the week and conduct research alongside professors and graduate students in their labs.

Twelve Kirkness Program students were paired with

Forestry faculty members Drs Lori Daniels, Phil Evans, Sue Grayston, Rob Guy, and Shawn Mansfield. Mayenda Jones, a Grade 11 student from Hazelton, BC worked in Dr Mansfield's lab to analyze the stomata of different cottonwood leaves. This project provides a comparison of the differences between trees that grow in the northern and southern parts of the province. When speaking about her experience at the program's celebration supper, Mayenda said, "I can never look at a tree the same way again." On the final day of the program, the students delivered in-depth presentations on what they had accomplished during the week, and how this experience broadened their ideas of what it means to work in Forestry.

A part of the Faculty's strategic vision is to support the recruitment and retention of Indigenous students in Forestry, which is part of a larger commitment to be an institution that respectfully partners with Indigenous peoples, communities and institutions to provide meaningful natural resources education. Dr Faride Unda, a postdoctoral fellow with Dr Shawn Mansfield, hopes that the students "feel inspired by all their experience," and that they return to UBC to pursue a post-secondary education in Forestry.

For more information about the Kirkness Program, visit www.vernajkirkness.org/ or contact Alison Krahn at alison.krahn@ubc.ca.

Celebration of the UBC-China Forestry Transfer Programs



The undergraduate transfer programs (also referred to as “2+2”/“3+2” programs) have been one of the most successful collaborations between UBC and the Chinese forestry universities. These transfer programs involve 2 or 3 years of post-secondary education in China followed by program completion at UBC. Successful graduates receive a UBC degree. Since the first Chinese transfer student were accepted in 2008, a total of 319 students have successfully transferred to UBC from one of the partner universities to continue their undergraduate studies.

In commemoration of the 10th anniversary of these transfer programs, an Anniversary Celebration of the UBC-China Forestry Transfer Programs was held on May 31st, 2018. It was the first time that Chinese partner universities had been represented at the UBC Vancouver graduation ceremony. Following the graduation ceremony, a special reception was hosted by Dean John Innes in the Forest Sciences Centre. Over 50 people

attended the event, including representatives from UBC’s Office of the Vice President, the Consulate General of China, Chinese partner universities and UBC’s Admission Office. UBC Forestry faculty members and staff, alumni and Class of 2018 graduates also joined in the celebration. Prof Murali Chandrashekar (UBC Vice-Provost), Mr Changxue Yu (Counsellor, the Education Office of Consulate General of China), and Dean Innes delivered opening remarks. Each partner university expressed their sincere gratitude, congratulations, and best wishes for the successful cooperation. Dr Guangyu Wang (Associate Dean, UBC Faculty of Forestry) presented a review of the UBC-China forestry transfer programs, including the development history, enrollment status, challenges and achievements, faculty level exchange, alumni network, and lessons learned. Representatives of the 2+2/3+2 alumni (Mr Ye Huang) and the Class of 2018 (Ms Xi Liu) also spoke at the event.

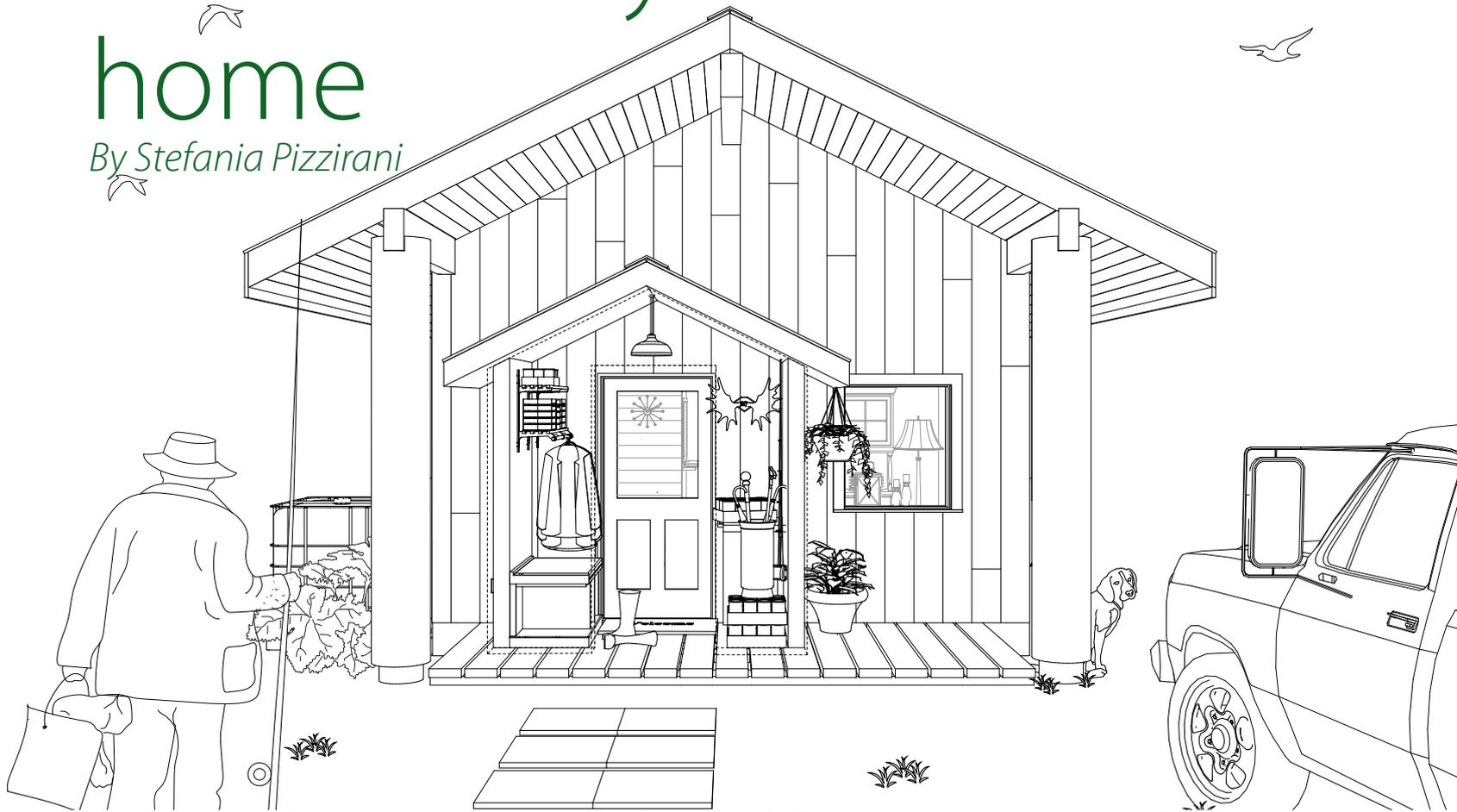
In the past decade, the transfer programs have produced qualified research and management professionals who are proficient in both Chinese and English and familiar with a broad range of disciplines, including forestry and management, advanced wood products processing technology, conservation and urban forestry. These programs have helped UBC Forestry obtain a reputation of being diverse and international. In 2008, international students represented only 12% of the undergraduate student body; this proportion increased to 40% by 2017.

The UBC-China Forestry Transfer Programs’ cooperative educational platform fully embodies the principles of keeping teacher-level cooperation as priority. Young faculty members from partner universities come to UBC as visiting scholars, to work with Forestry professors, conduct research, and learn interactive teaching skills through auditing UBC courses. Faculty members from UBC also deliver lectures or research seminars in China. Many cross-border research projects have developed as a result of these communication and learning opportunities. These cooperative efforts have also helped UBC faculty to initiate or deepen cooperation with organizations such as the Asia-Pacific Network for Sustainable Forest Management, the International Center for Bamboo and Rattan, and the Chinese Academy of Forestry.

The 10th Anniversary Celebration of UBC-China Forestry Transfer Programs has marked a milestone in the history of UBC Forestry’s international cooperation in higher forestry education. The Faculty will continue to support these joint programs with Chinese forestry universities and hopes to apply this excellent model to other universities in the Asia Pacific region.

Creating the Heiltsuk 'tiny' home

By Stefania Pizzirani



Originally from California, I have always had a passion for sustainability and have pursued degrees related to environmental conservation and life cycle management. With a predominant focus on forestry, I have lived and worked in several countries: Italy, Wales, Scotland, New Zealand, and – since 2016 – Canada. I have had the honor of working with and for Indigenous communities for the past 7 years. My current role as a postdoctoral research fellow in UBC's Faculty of Forestry is dedicated to working with and for the Heiltsuk Nation.

The Heiltsuk people have, since time immemorial, resided throughout the inlets, numerous islands and coastal mountain ranges that together comprise 35,553 km² of Traditional Heiltsuk territory. Over 55 permanent settlements as well as hundreds of seasonal harvesting camps once permeated throughout this highly biodiverse, coastal temperate rainforest region on what is now commonly referred to as the Central Coast of British Columbia.

Throughout the mid-19th century, the Heiltsuk experienced severe hardship as approximately 80% of their population perished between the years 1835 and 1889, primarily to pandemic diseases. Several other changes throughout the late 19th century had devastating effects on the Heiltsuk population, including the development of a commercial salmon canning industry, ubiquitous logging operations, shifting settlements and the implementation of the Indian Act

in 1876. Throughout the early 20th century the Department of Indian Affairs began building pre-planned reserve houses which were, unsurprisingly, insufficient for Heiltsuk lifestyles. There has also been a clear deficit in the number of houses built in Bella Bella (or Waglisla in the Heiltsuk language) where the majority of the Heiltsuk Nation now resides.

With over 2,400 members, the Heiltsuk population has grown steadily over the past 20 years but, due to the lack of available housing, the population of Bella Bella has remained relatively constant at about 1,500 people. Many of the Heiltsuk people who live outside Heiltsuk territory are interested in returning home to the main village of Bella Bella as the local economy continues to grow, but in order to meet housing demand over the next 10 years, the community will need 150 mold remediations, 160 home renovations, 100 new homes, and 120 new lots. In particular, there are no culturally- and environmentally-suitable home designs available to the Heiltsuk community.

To address the urgent housing shortage issue, leadership from the Heiltsuk Nation tasked me with exploring timber-framed housing options for their newly created 46-lot subdivision in Bella Bella. With funding from Mitacs Elevate and FPIInnovations (my industry partner and Canada's largest non-profit forest research institution), I began to engage with the Heiltsuk community. I used semi-structured interviews as

a way for me to understand and articulate Heiltsuk aspirations, and to develop associated indicators with which to measure the impacts of various housing options.

These aspirations helped to refine potential housing solutions. One viable housing solution was the 'tiny' home (ie < 500 sq feet). Although the concept has been around since the 1970s, the inherent design of these homes has rarely been developed with, for, and by Indigenous communities. At this stage, Heiltsuk leadership asked me to focus my postdoctoral research entirely on the development and implementation of a Heiltsuk 'tiny' home. Therefore, a pilot project was created with the aim to develop a long-term, culturally-focused 'tiny' home to provide an independent living style to individuals, couples, and even young families within the Heiltsuk community.

With this mandate, the project quickly became more interdisciplinary. UBC's School of Architecture and Landscape Architecture got involved by utilizing Ryder Thalheimer, a Masters student, to help develop a community-led 'tiny' home design. Together with Heiltsuk leadership, Ryder and I organized a housing survey/questionnaire and a focus group, and presented at a Heiltsuk housing policy workshop. We also had valuable help from a former Forest Resources Management student, Kristin Smart, who assisted with the engagement and documentation process. This engagement helped create a housing design that was reflective of communities' social and cultural preferences while accounting for the temperate rainforest conditions of Bella Bella. Furthermore, the resulting 384-sq foot home design is small enough to allow for 2 homes to be placed on 1 lot thus optimizing space in the subdivision.

With the housing design in place, implementation strategies – and additional partners – were explored. Funding was secured from Indigenous and Northern Affairs Canada and the Heiltsuk Haałcistut (reconciliation) Steering Committee to support the construction of 8 'tiny' homes. Additional funding was attained from UBC's Community-University Engagement Support fund to help pay for Heiltsuk members to work on and gain further construction training during the housing build process. Processed timber for the homes was delivered to Bella Bella and was organized between the Heiltsuk Integrated Resource Management Department and Interfor. A licensed architect, Scott Kemp, was invited to the project to refine and approve Ryder's architectural blueprints, and to advise on the construction process. UBC's Indigenous Research Support Initiative (IRSI) worked with me early on to connect with key individuals from

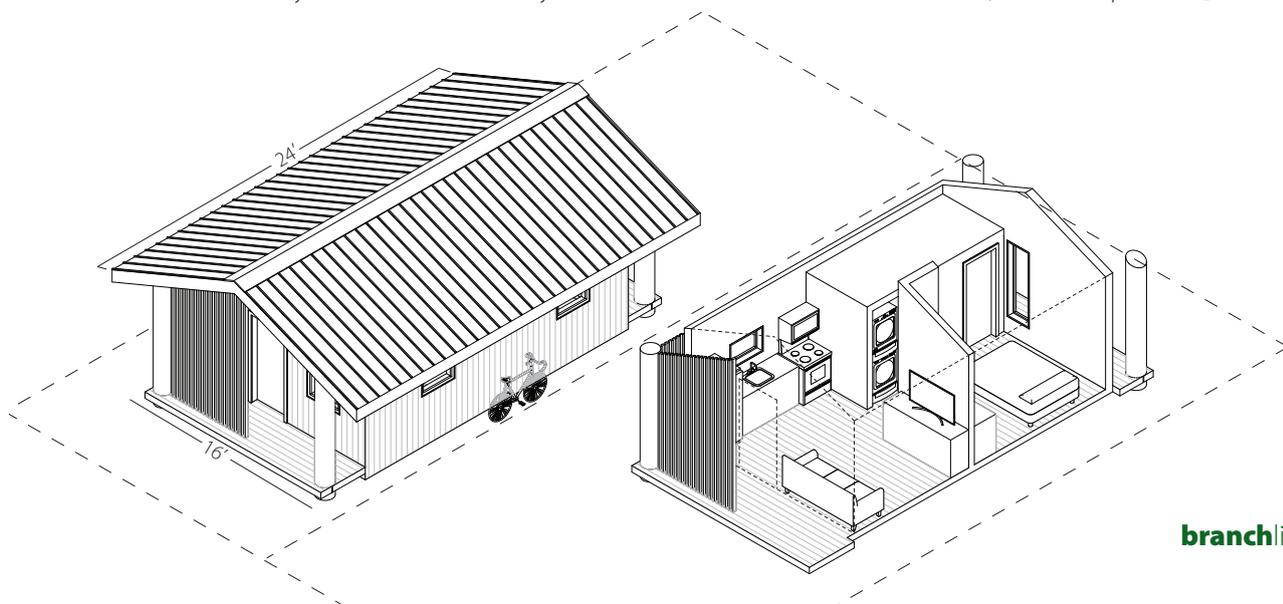
the coastal First Nations, including the Heiltsuk Nation and its Chief Councillor, Marilyn Slett. As the project developed IRSI advised on the creation of project charters and co-developed a Memorandum of Understanding between the Heiltsuk Nation and UBC. Recently, Builders Without Borders, a registered Canadian charity, joined the team to assist with the build, provide onsite training, and to help document the build process.

On May 31st 2018, a ceremony was held in Bella Bella to bless the land of the new subdivision and to recognize the collaborative journey of the housing project. During the ceremony, Heiltsuk youth performed a traditional dance and song to bless the site. Hereditary chiefs recalled the continued growth and resiliency of the Heiltsuk Nation. Chief Marilyn Slett recognized the strength and commitment of the housing project team. She made a call for continued collaboration between all partners and the Heiltsuk community during the subsequent design and innovation of larger homes for the subdivision.

Construction of the 8 Heiltsuk 'tiny' homes was due to begin in June 2018. The construction team will be comprised almost entirely of Heiltsuk members who will have skills development opportunities throughout the build. Youth from the wood-working class in the Heiltsuk school will build benches for the front decks of the homes. Architectural workshops will be held with Heiltsuk youth to increase their knowledge of design and construction principles. Youth will also be involved in helping to design the outside space between the homes; this may include communal seating areas with sheltered space for processing seasonal foods. Additional home maintenance-tenant wellness training will be provided to community members – a need that was reaffirmed in the housing survey/questionnaire. Finally, my postdoctoral research will include a post-occupancy assessment of the homes and also interviews with home occupants to understand if and where improvements can be made.

The lessons learned throughout this project exemplify the importance of community-led projects which emphasize community aspirations and values, collaborative partnerships, and intergenerational planning and involvement. Together, this project provides more than just homes – it strengthens the housing and construction autonomy of the Heiltsuk Nation. Walas gaisixa to all involved partners, collaborators, and Heiltsuk leadership and community members for their support, guidance, and determination!

For further information contact Stefania Pizzirani, postdoctoral research fellow, at stefania.pizzirani@ubc.ca.



Diagrams by Ryder Thalheimer

Forests for people and food – why trees are good for you

By Terry Sunderland

On a visit to Cat Ba Island in northern Vietnam some years back, I was invited to a communal lunch organized by local party officials. We were seated on a long table located on an outside terrace overlooking meticulously maintained gardens and an extensive orchard and grazing area which adjoined the bamboo forests of the Cat Ba National Park. On the table were 25-30 plates of a wide variety of food stuffs including vast quantities of stewed water cress, along with plates of prawns from the nearby stream. Fiddlehead ferns, yam tubers, and nutritious fruit from the nearby forest were arranged decoratively on old US army plates – an artifact of previous times. Goat meat from local animals was cooking aromatically on a nearby grill and a jug of potent mead, made from forest honey, was being passed round, our host insisting we drink and refill our glasses with head spinning frequency. Every single item on that table had originated from the farm and forest in the immediate vicinity – and the afternoon repast was truly marvellous.

But why should I have been so surprised by our forest fare? For the majority of our history we humans sustained ourselves by foraging edible plants and hunting animals encountered in grasslands, forests and other wild habitats. Indeed, our evolutionary development is almost entirely based on a complex system of hunting and gathering that was able to provide a varied and nutritious diet. All that changed around 10,000 years ago when agriculture simultaneously emerged in various parts of the world, providing a food system that is very much dominant today.

The “agricultural revolution” resulted in the settlement

of former forager communities to focus on the production of a small variety of crops and livestock. This increased the overall volume of food, yet ultimately led to a more simplified diet. It also resulted in large swathes of wild habitats being permanently transformed into agricultural landscapes, unprecedented population growth and the emergence of cities. Some have argued that humankind itself was equally domesticated by a few key food species that themselves were capable of being bred for ever-increasing yields – wheat, maize, rice and others.

Agriculture now dominates the global landscape. Over 30% of the global land area is under some sort of cultivation. However, this expansion has come at the expense of our forests. Over half the world’s freshwater is appropriated to nourish our crops, soil erosion now exceeds soil formation, the need for chemical herbicides and pesticides results in extensive and pervasive pollution and agriculture now accounts for around one third of GHG emissions. Some might argue that these environmental costs are worth paying in order to feed an ever-growing population, yet our food system has not necessarily resulted in better nutritional outcomes.

The dietary basis of our global food system is characterized by a reliance on a narrow range of crops and livestock resulting in a dietary shift towards a high consumption of fats and oils, meat and refined carbohydrates. As a result, over 1 billion of our global population is overweight or obese yet around the same number remains under-nourished. The proportion of the world’s population that goes to bed hungry has increased in recent years, despite almost a third of all food produced being



Communal freshwater fishing in Burkina Faso

wasted, either post-harvest or post-purchase. In short, our global food system has been found wanting. Despite this, there are repeated calls for food production to increase by between 50-100% in order to feed an ever-growing human population. This would suggest we need more of the same in terms of our agricultural production systems. Or do we?

Many landscapes, particularly in the tropics, continue to maintain a mosaic of forests and agriculture. These landscapes are often characterized by a diversity in production systems, a diversity in ecological systems and, as we now know, a diversity of diets. Piqued by the Vietnam experience and long-standing research in the non-timber forest product sector in Africa and Asia, a few years ago I started to work on the relative contributions of forest foods to rural diets. There is a fair amount of anecdotal evidence out there that highlights the importance of forest foods to local diets, but on presenting this to both colleagues in the forestry community and, with dramatic push back from those in the agricultural community, it was clear we needed some hard data to provide a more convincing argument that forests were indeed important for local food security.

With a team at the Centre for International Forestry Research (CIFOR) we linked a large demographic health data set with information on diets – with data on more than 90,000 children under 5 – from 21 African countries with data on tree cover. We found that children who lived in communities where there was greater tree cover had a higher dietary diversity, and ate from more food groups than children living in areas without forests. We also found that children ate more fruits and vegetables in forest-covered areas. Dietary diversity is often recognized by nutritionists as an important indicator of healthy diets and so this relationship shows that forests do indeed contribute to better diets and overall nutrition. We also undertook the same analysis for the Indonesian archipelago and found exactly the same pattern – dietary diversity was somehow correlated to tree cover.

It is important to note that this level of dietary diversity is independent of wealth. The natural biodiversity of forests leads to more variation in diets, which ultimately results in better nutrition. In addition, these landscape mosaics of forests, trees and agricultural production systems provide a considerable proportion of the world's food and are intrinsically more resilient to economic, climate-induced and environmental shocks – an issue of increasing concern in a fast-changing world.

In addition to the direct foods they provide, we have also found that forests have immense effects on the sustenance of agriculture in their proximity. Forests and trees on farms host the pollinators that help many of our agricultural crops reproduce. They also help purify water, support grazing livestock, provide traditional forms of medicine and healthcare and supply wood energy – the primary source of fuel for one-third of the world's population. Without energy for cooking, food would be far less palatable and water would remain un-sterilized.

An emerging body of research has also found that wheat yields in Ethiopia and the DR Congo actually increase in proximity to forests primarily due to climate regulation effects. And in the oil palm plantations of Indonesia yields often reduce



Fruits of forest species *Dacryodes edulis* and *Garcinia kola* being sold in the Limbe market in Cameroon

further away from natural vegetation because of pollinator inhibition – this can have an immense impact on landscape configuration with the need for more remnant natural vegetation to be maintained to sustain yields. Forests also play a critical role in nutrient provision; in Ethiopia livestock herders closest to the forest have communal access to fodder crops and are able to fertilize their fields with dung from their animals so nutrients are transferred from the forest to the field. This leads to higher agricultural productivity and greater household incomes. Similar examples of the importance of broader agro-ecological systems are emerging and this positions forests at the heart of the global food security debate, potentially breaking down traditional sectorial silos.

Of course, forests alone won't solve the critical issues surrounding global food security, but clearly they can play a role. Research has shown that forestry and agriculture are more intrinsically linked than previously thought and a more focused and integrated "systems approach" to both forest management and agricultural production would seem to be an emerging, and increasingly attractive, option for more sustainable landscape management.

This now represents a recognized research theme, and potential paradigm shift, that has been adopted through the forestry, agriculture and nutrition communities. Perhaps to reflect the integrated nature of the Sustainable Development Goals the dialogue has changed to better reflect the need to achieve more sustainable agricultural production while recognizing the importance of landscape as well as dietary diversity. It is an agenda that UBC Forestry is well placed to pursue.

For further information contact Terry Sunderland (department of Forest and Conservation Sciences) at terry.sunderland@ubc.ca.

An exploration of urban green equity in North America

By Lorien Nesbitt



The High Line, New York City



The Coronado Neighbourhood, Phoenix



The Pearl District, Portland

I first became interested in urban green equity while living in the tropical port city of Guayaquil, Ecuador's vibrant, humid and aggressive economic centre. While most of the city is dominated by concrete and cars, one of Guayaquil's most popular places is the Malecón 2000, a recently built, 2 km walkway along the Guayas River. It is one of the greenest areas in the city with an impressive collection of mature shade trees and gardens.

In Guayaquil, I went often to the Malecón, where I could escape the heat and noise of the city... and I was not alone. People of different ages, incomes and cultures travel from all over the city to spend time here when they can: it is a safe, public area, and with its diversity of greenspaces and activities, urban dwellers forge a connection with the place.

The Malecón is not without its problems, however. It is one of very few greenspaces in a city with low tree canopy cover and limited park land. It is located far from low-income neighbourhoods, guarded by high gates that are locked at midnight, and patrolled by guards. The Malecón is also becoming increasingly commercialized: once public spaces are privatizing. These realities restrict the public's access to some of the most impressive treed areas along the walkway, and gradually, local people are being excluded from the decisions that direct its management.

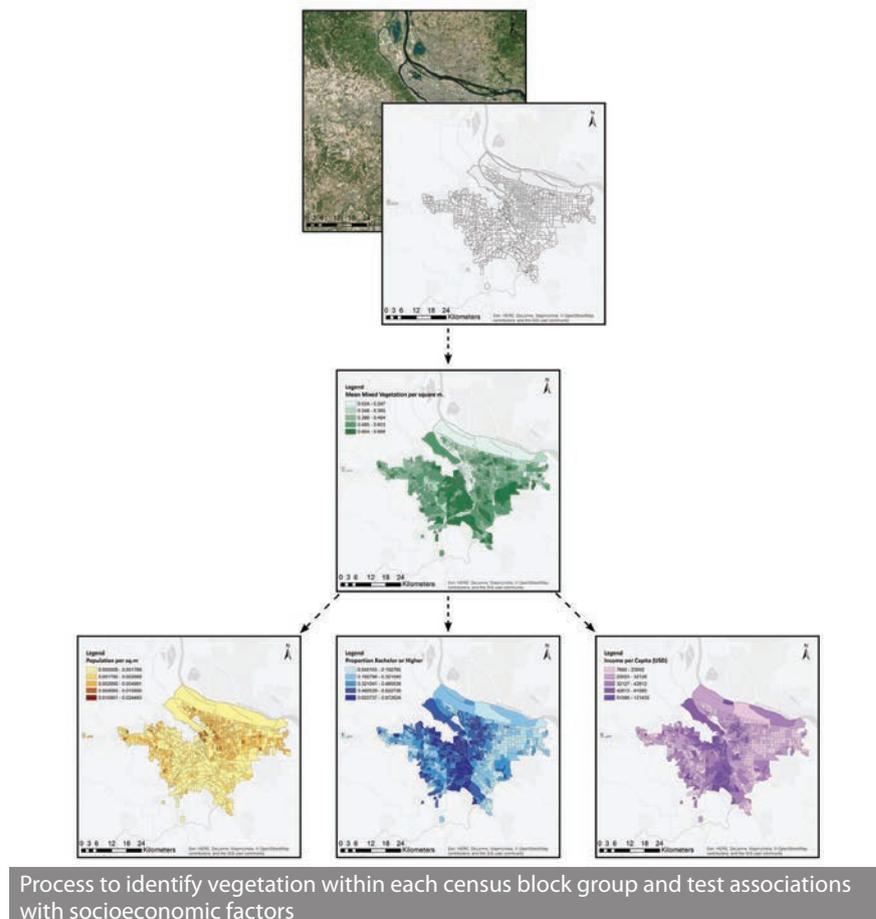
What is happening to the Malecón is not unique. Urban green equity in North America was the central focus of my recently completed doctoral research at UBC, and with the guidance of professors Mike Meitner, Cynthia Girling and Stephen Sheppard, I uncovered and explored similar patterns and themes in cities in the United States. Urban green equity is broadly defined as the fair distribution and governance of urban forests, regardless of the factors that differentiate urban dwellers, such as socio-economic or racialized status. I approached this topic using a mixed methods approach, combining large-scale spatial analysis with grounded inquiry and theoretical exploration.

I began the research with a theoretical analysis of the dimensions of urban green equity across multiple academic disciplines. Two principal dimensions emerged from this analysis, the spatial distribution of urban forests (distributional equity), and the decision making processes that direct their planning and management (recognitional equity). Sub-dimensions of spatial distribution included temporal distribution, condition and preference, and ownership, and sub-dimensions of recognition included representation and procedure, and the desire and ability to participate in decision making processes. These dimensions provide a framework for future urban green equity analyses and can help inform public conversations on urban green equity. The analysis also clarified that the con-

cept of urban green equity obtains its meaning through its application. Thus, I investigated its practice on the ground, by conducting a case study analysis of urban green equity in 3 cities: New York, NY, Phoenix, AZ, and Portland, OR.

The case-based research was focused around interviews with 12 to 13 practitioners in each city – those urban foresters, landscape architects, urban planners and allied actors such as academics and community organizers, who are involved in planning, designing and managing our urban forests. Such practitioners understand the real-world issues of applying the principles in practice. The practitioners described the 2 dimensions of urban green equity presented above, and unpacked the sub-dimensions, barriers, and strategies related to each dimension. Interestingly, 2 key insights that emerged from the interviews reflected my initial musings on urban green equity on the Malecón 2000. The principal barrier to distributional green equity described by practitioners was the perception of urban forests as amenities, with sub-barriers including limited funding, income inequality, property ownership, disconnection from nature, lack of information, and infrastructure conflict. If urban forests are perceived as amenities rather than as essential goods that should be accessible to all citizens, it opens the door to privatizing urban forest spaces and to excluding local people, particularly if they hold less economic or social power in society. The principal barrier to recognition equity was described as the sheer number of widely diverse populations within the city, each with differing priorities and competing views about how urban forests should be designed, planned, managed and accessed. Sub-barriers included limited funding, income inequality, culture, sense of ownership, hiring practices, and language. When the views of those with more power are given precedence, those with less power may be excluded from decision making processes and ultimately from the urban forest spaces themselves, which become increasingly commodified.

The final piece of my doctoral research examined the accessibility of urban trees, vegetation, and park lands via an analysis of how urban



Process to identify vegetation within each census block group and test associations with socioeconomic factors

forests are spatially distributed across 10 US cities, including the 3 case cities described above. The analysis uncovered widespread patterns of inequity. Urban dwellers with less education and lower incomes experienced lower levels of access to urban trees and other vegetation across almost all the cities studied. Racialized communities also experienced higher levels of green inequity in some cases, with African American and Hispanic populations in particular facing lower levels of access to urban forests in some of the larger cities. Interestingly, parks were more equitably distributed, suggesting that green inequity is perpetuated via the distribution of trees and other vegetation on streets and private land, especially with respect to socioeconomically depressed communities and racialized communities in larger cities.

There is strong evidence that urban green inequity exists, but practitioners and communities are starting to employ multiple strategies to overcome the barriers. They are targeting tree planting and park establishment in low-canopy neighbourhoods, designing low-barrier public engagement processes such as setting up community advisory bodies and partnerships, and conducting outreach in multiple languages and in alliance with local

community organizations. They are promoting urban forest stewardship activities focused on low-income and racialized neighbourhoods, implementing inclusive hiring practices within green professions, and redesigning parks to make them more physically welcoming to all potential users.

While these strategies alone won't solve the problem, they are important first steps in connecting people to urban nature and giving them real and perceived ownership over their local urban forests. Underlying all of this is the importance of our commitment to equity as a society and as urban green practitioners. It is time for all of us to bring a commitment to urban green equity to the centre of our personal lives and professional practice.

Dr Lorien Nesbitt completed her PhD in the fall of 2017, and is now a post-doctoral research fellow in the Faculty of Forestry, UFORIA Lab, and the Faculty of Medicine, OEH Division, at UBC. Her research focuses on socio-ecological interactions in urban environments, including the relationship between urban greenness exposure and public health and urban governance systems to support climate resilience. She is also a researcher and documentary filmmaker with EcoPlan International. Lorien can be reached at lorien.nesbitt@ubc.ca.

Cherries, climate change and microbes



When, in 1862, the French catholic missionary Father Pandosy planted the first fruit trees in the Okanagan valley, he never thought that many years later cherries would become a major economic activity for the region. The Pandosy Mission established the first orchard in the area using nursery stock brought by canoe on the Columbia River from the city of Olympia, in Washington State, to the Okanagan valley. After Father Pandosy's passing in 1891, Lord and Lady Aberdeen acquired land near the Okanagan Mission and established 2 100 acre orchards, starting the business of fruit farming in the region. After the Aberdeen family's success, new farmers planted small and large fruit orchards. By 1900 there were close to 1 million fruit trees growing in the Okanagan.

Now, just over 100 years later, the extent of the area suitable for cherry production has increased as a result of climate change . New orchards have been established in more northern parts of the Okanagan valley and

at higher elevations – where it was impossible to cultivate cherries just a few decades ago. This expansion has also been incentivized by a growing demand for British Columbia cherries, especially for export to China.

Nowadays, cherry production in British Columbia represents 96.5% of the total cherry production in Canada, with a farm gate value of \$55 million. However, the increase in the number of cherry orchards has brought new challenges for the region. Farmers are now dealing with problems such as maintaining pathogen-free, healthy soils and finding a way to meet the water demands of the new plantations.

Planting new cherry trees where there was previously a related crop (such as apples) can lead to a disease known as replant disease or sick soil syndrome. Replant disease is caused when soil microbial communities living close to plant roots, in the rhizosphere, become deleterious with increases in populations of plant parasitic nematodes and pathogenic

fungi. Poor root growth, stunting, and failed establishment of new trees are the consequence.

Nematodes are managed most effectively before planting of the cherry trees. Fumigation of the soils with pesticides such as Vapam or Basamid have been used to reduce nematode population levels. However, due to the high toxicity of some pesticides, new restrictions on the use of chemicals came into effect in September 2014. Once the trees are planted, pest control is more difficult as there are no chemical treatments for nematodes allowed on fruit bearing trees in Canada. Farmers have applied compost and mulch to boost the soil's beneficial microbial communities, but environmentally friendly alternatives to pesticides are urgently needed in order to decrease pathogen populations and improve tree growth and productivity.

The second big challenge for cherry farmers is that of managing water



demands for the orchards. The Okanagan valley is a very dry region. So much so that, In 2015, the valley was included in the group of “extremely dry areas of the BC province” and its drought rating was increased to level 4 (the highest category). Trees respond to water stress through different physiological mechanisms, such as: decreasing their turgor pressure, reducing their growth and photosynthetic rate, and consequently reducing their size and yield. With cherry trees in particular, drought may affect morpho-physiological traits by decreasing the number of leaves, leaf area, leaf dry weight, and root volume. Drought will also affect the fruit yield. Although farmers have been increasing the efficiency of their water use through the use of mulching and other practices such as micro-sprinkler irrigation, other management practices are still needed.

Marieta Marin Bruzos is a PhD student working under the supervision of Dr Sue Grayston (department of Forest and Conservation Sciences) in the Belowground Ecosystem Group. Marieta was trained as a soil microbiologist in Cuba, a leading country in the use of microbial inoculants for improving crop health. With this background, and with the collaboration of Dr Louise Nelson, from UBC Okanagan, and Dr Tom Forge, from Agriculture and AgriFood Summerland Research Station, Marieta is searching for soil beneficial bacteria which will be able to improve the establishment and health of the cherry trees.

In the same way that we humans have beneficial gut bacteria that help us to remain healthy, plants live in close association with microorganisms that inhabit the rhizosphere. These bacteria are called plant growth promoting bacteria and they can help with both healthy tree growth and with resisting biotic stresses (soil borne pathogens) and abiotic stresses such as drought. These growth promoting bacteria do this through different mechanisms of action such as producing lytic enzymes or antimicrobial compounds that inhibit the

growth of the pathogenic microorganisms, and by producing plant hormones that increase plant growth.

Marieta has isolated beneficial bacteria from the soil surrounding healthy cherry tree roots. She tested these bacteria in the lab against the plant parasitic nematode *Pratylenchus penetrans* and against pathogenic fungi isolated from cherry tree roots affected by replant disease. She has found some bacterial strains that could kill or paralyze the plant parasitic nematodes. Some of the bacteria were also able to inhibit the growth of fungal pathogens that typically attack cherry trees.

As cherry trees are very difficult to grow from seed, Marieta has used onions as model plants to test the effectiveness of the strains selected against the parasitic nematodes. She grew onion seedlings in soil infested with nematode worms and then treated the plants with the bacterial cultures. After 2 weeks, she found 8 bacterial strains were able to protect the onion's roots from the nematode attack at a similar level to Basamid, a chemical pesticide used in the experiment as a positive control. Marieta is now testing the more effective bacterial strains on apple seedlings, a fruit tree species closely related to cherry.

Marieta is also investigating the mode of action of these biocontrol bacteria against the parasitic nematodes with the ultimate aim of developing a green alternative to chemical pesticides to be used in the successful expansion of cherry production in the Okanagan. These and other interesting questions are also being studied by Marieta and the research team in the Faculty of Forestry's Belowground Ecosystem Group. They are using a combination of microbiological, molecular biology techniques and in-plant assays to address these questions.

For further information on this research project, please contact Marieta Marin Bruzos at mmarinb@mail.ubc.ca or Dr Sue Grayston at sue.grayston@ubc.ca.



Energy development and caribou conservation

A dense array of seismic lines in northern Alberta's oil sands region

Photo: Cole Burton

Recent controversies over oil and gas pipelines in western Canada have sparked societal debates about energy development: environmental protection vs job security, Indigenous land rights vs resource-dependent communities, climate commitments vs struggling economies. In the Lower Mainland, First Nations, environmental groups, and other citizens are voicing concerns about climate change and the potential dangers of oil spills to coastal ecosystems. Further north, however, a terrestrial ecosystem is already shifting in response to development decisions within Alberta's oil sands region.

For many Canadians, the term "oil sands" conjures images of expansive open pit mines and tailings ponds, yet the most extensive industrial "footprint" in this boreal forest landscape comes from a network of narrow, linear disturbances called seismic lines. These cut lines are paths cleared for exploring underground oil reserves, creating vast trail networks that stretch across much of Alberta and northeastern BC. While the land area directly disturbed by a given seismic line is small, collectively these long corridors divide the forest into smaller habitat patches and create thousands of kilometres of forest edges. When seismic lines are considered alongside other industrial features – including well pads, roads, forestry cutblocks, and other infrastructure – the cumulative effects of these disturbances produce an unfamiliar landscape that boreal wildlife must

navigate.

While environmental concerns about the oil sands are not new, alarm bells are now sounding loudly for woodland caribou, an iconic species facing dramatic declines across the boreal forests of Alberta, BC, and much of Canada (leading to its designation as a threatened species under the federal Species at Risk Act). Industrial land transformation has fragmented caribou habitat while facilitating the northward expansion of white-tailed deer, which in turn provide food for growing populations of grey wolves – caribou's chief predator. Seismic lines further exacerbate this effect by providing "highways" for wolves to move more quickly, and hunt more effectively, in caribou habitat. Many biologists predict that these intense pressures will wipe out woodland caribou in coming decades, unless urgent conservation measures are implemented. Indeed, governments, industry, Indigenous communities and others are taking action to protect caribou, but the effectiveness of these actions is not yet known. Furthermore, changes on the landscape that affect caribou – both the industrial impacts and their mitigation – are also likely to affect a wide range of boreal wildlife that interact with caribou and their habitats, including not only wolves and deer, but many other iconic Canadian species such as moose, lynx, bears, and beavers. Understanding how caribou conservation fits within this broader tapestry of boreal forest ecosystems is

a key challenge for wildlife ecologists and managers.

This challenge is being taken up in UBC Forestry's Wildlife Coexistence Lab ("WildCo") by Dr Cole Burton, postdoctoral researcher Dr Joanna Bugar, and MSc student Erin Tattersall, who are using networks of camera traps to explore these complex wildlife community dynamics. A first step in assessing community relationships and conservation status is the development of accurate population counts. For nearly all boreal mammal species, documenting the number of individuals in a population remains a difficult task. The WildCo team has been combining camera trap data with new statistical models to simultaneously estimate abundance for a whole suite of interacting species, rather than following the typical, narrow focus on only 1 or 2 species of concern. Though caribou have been the primary focus for conservation efforts, providing a broader view allows us to understand which other species are sensitive to industrial impacts in the boreal, or which adapt well to disturbance.

Recent studies by Dr Burton and colleagues have shown that a wide-range of mammal species respond to industrial disturbances in northern Alberta, to the point that these anthropogenic effects are meeting or exceeding the effects of natural habitat variation. Documented responses have been highly variable across species, providing signals of wildlife "winners"

and “losers” in these changing landscapes. For instance, wolves, coyotes, lynx, white-tailed deer, snowshoe hares, and red squirrels were all positively associated with higher levels of human disturbance in one oil sands study area. Conversely, moose, black bears, red foxes and fishers were detected less often in more disturbed habitats. Many of these responses stem from changes in the forest structure: industrial disturbances convert mature forests into early seral vegetation, to the benefit of some species and the detriment of others. Similarly, linear disturbances like seismic lines may be preferred for movement or foraging by some species, while being avoided as risky by others. Improved understanding of these different responses, and of their consequences for species interactions, will be important in anticipating the community-level effects of continued industrial development.

Another key challenge is to understand how the boreal mammal community will respond when government and industry attempt to mitigate the impacts of development. For example, in response to concerns over caribou declines, several energy companies have initiated programs designed to restore seismic lines within caribou habitat. The goal is to reduce use of these lines by caribou predators and competitors, and thus return them to their natural state, through active replanting and protection of natural regeneration. One such effort is the Algar Caribou Habitat Restoration Program, situated with the range of the Algar caribou herd, about

70 km southwest of Fort McMurray along the Athabasca River. Led by members of Canada’s Oil Sands Innovation Alliance, this initiative involved hundreds of kilometres of mounding and tree planting to create movement barriers for predators and promote regeneration of vegetation to entice caribou and discourage their competitors (eg, deer and moose). Simply carrying out such restoration in this remote, boggy landscape is quite an accomplishment, but the critical question is whether it has the desired effect on caribou and other members of the boreal mammal community.

The WildCo team is studying the effectiveness of this project by monitoring wildlife responses to restoration across the Algar landscape. They are comparing the frequency of animal activity – as measured by camera trap photographs – on the restored seismic lines relative to unrestored lines, naturally regenerating lines, and off-line forest habitats. Three years after the restoration treatments were undertaken, and 2.5 years into monitoring, the camera trap data suggest that the restoration efforts are having some, but not all, of the expected effects. For example, wolves are using the most open (unrestored) seismic lines much more frequently than other line types, yet they don’t appear to be strongly deterred by the movement barriers created by active restoration. White-tailed deer, on the other hand, are using the restored lines much less frequently, perhaps because they provide less of the attractive early seral forage. So far, the team has seen

some evidence that caribou are using the restored lines more frequently, but the effect is small at this stage of the recovery process. The key question is whether these emerging effects will be strong and fast enough to reduce predation rates sufficiently to allow caribou populations to recover. A rigorous monitoring program, such as the one being developed by WildCo and its partners, is critical to evaluating the success of conservation efforts and informing management attempts to maintain healthy boreal forest ecosystems.

The current attention devoted to conserving woodland caribou is well warranted, both by federal and provincial policies, and by the species’ iconic status in Canadian culture. Nevertheless, a myopic focus on one species, without adequate consideration of the dynamics of other interacting species, could not only cause caribou conservation efforts to fall short, but could also leave our boreal forest ecosystems in disarray. A more holistic view should also extend to society’s conversations about energy development and forest resource management. Decision makers need to acknowledge the diversity of stakeholders, and consider the consequences of the interconnectivity we create and the relationships we alter. To truly debate the outcomes of resource development requires an understanding of all players on the landscape, including those without voices.

For further information, contact Erin Tattersall (ertattersall@gmail.com), Dr Joanna Burgar (joanna.burgar@ubc.ca) or Dr Cole Burton (cole.burton@ubc.ca).



Woodland caribou (camera trap photo)



Wolf (camera trap photo)

Art, conservation and science

By Agni Klintuni Boedhihartono



Prior to joining UBC's department of Forest and Conservation Sciences earlier this year, I worked in tropical countries where biodiversity values are high, natural resources are rich, but the people are still very poor. People come from different backgrounds and cultures and the use of art can provide a very easy way to engage with this diversity.

I am part of a team with a local foundation in Indonesia (where I was born) who work with partners to help them achieve sustainable and productive landscapes. I use visual arts (drawings, videos and paintings) to connect practitioners, scientists and communities. Our multidisciplinary team use drawings to help people share their visions and understanding and to explore future scenarios in forested landscapes in the tropics. Visual techniques allow sharing experiences between different actors and stakeholders in landscapes and seascapes. Participants can communicate different ideas and expectations of how landscapes fit into the bigger development picture. We have had success in a set of sentinel landscapes in remote, biodiverse tropical areas where we have developed close engagement with local inhabitants. We have used drawing to help clarify trade-offs between conservation and development goals.

We use **landscape approaches** to try to understand the benefits that people obtain from their landscape. We use the principles of **appreciative inquiry** when we arrive in a new landscape and try to engage local people in a discussion of what their desired landscapes would look like. Drawings can then help to provide a platform for negotiating better future scenarios.

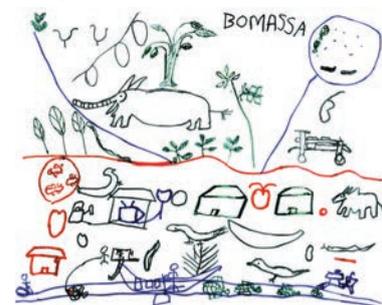


Visualization consists of making drawings and exchanging ideas about possible future landscapes with different stakeholders. Visualization allows us to use images, drawings, or animations to communicate a message or idea. Visualization is also used to present information, scenarios or perceptions. In a world of continuous changes and growing economic development, understanding trade-offs in conservation and development is needed in order that local minority groups can assert their interests and achieve more equitable outcomes. Visualization allows people from different back-

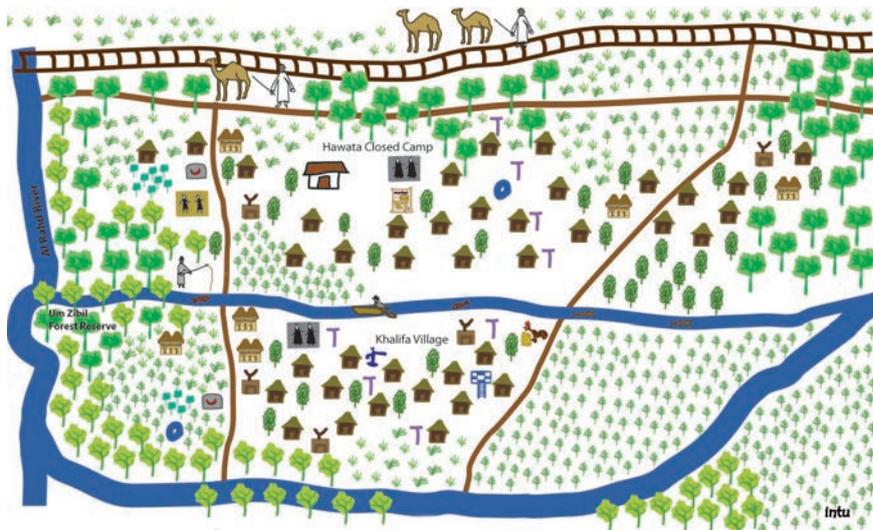
grounds to engage in debate on a more equal footing and lessens the influence of educational background, cultural differences, languages and different motivations.

Drawings and paintings can be used as a tool for transformative understanding. In using art, we use paintings and drawings as "boundary tools" – there are no cultural boundaries in art. "A picture speaks a thousand words" – we use art for collective exploration of scenarios, visualizing the future, learning together, and as a vehicle for developing "collaborative intelligence".

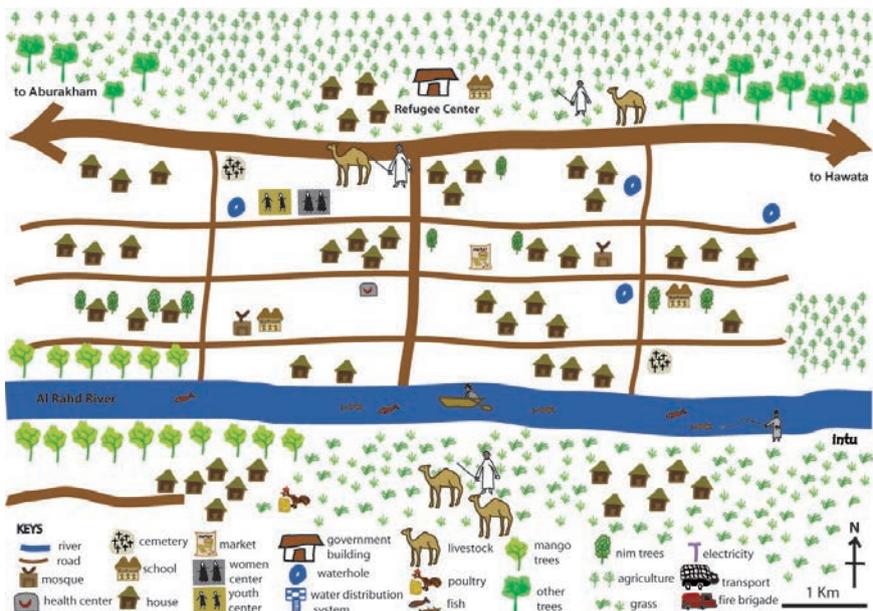
We often challenge development practitioners to tell us for whom development is intended? How sustainable is the future? What kind of landscape is wanted? Why do we need to conserve forests? Why is biodiversity important? What do we want to conserve and for whom? What is the real value of biodiversity for local people? What kind of conflict resolution is needed? People value forests for the goods and services that they provide. For example timber, non-timber forest products, and for the possibility of clearing the forest to provide more productive land. Some communities in Kalimantan and the Congo Basin were asked to draw how they understand the forest. They rarely see a vast uniform forest, instead they see a diversity of elements: mushrooms, roots, fruits, traditional medicines, honey, etc.



Livelihoods seen by a pygmy group in Bomassa, Congo. – Full of a diversity of non-timber products, wildlife, and objects they use in their daily lives



Hawata Future Landscape – women’s vision Sudan



MAFASA Present Landscape

In the Rif mountains in Morocco we used drawings to enliven discussions about trade-offs between cork oaks, olive trees and marijuana. These drawings allowed people to visualize a bigger picture in the region for example when the landscape becomes homogenous, income would be limited to a single activity. More livestock will cause people to encroach on forests. Bigger towns also will put pressure on people who work on the land as job opportunities will change. The police force sat together with farmers to discuss how marijuana will have an impact on tourists who come to the region. Cork trees are declining as vineyards are becoming less dependent on the use of cork for their bottles. We have found it useful to use our drawings to track changes in the landscape. Repeat visits after a few years enable us to enter into discussions

of the changes that are occurring in the landscape and to understand the causes of these changes.

Another way of working in a landscape uses computer animated drawings made together with stakeholders. Such **smart-mapping** consists of making icons that relate to the specific landscape using drawing software and then using these icons to build best case and worst case scenarios.

Visual techniques can be used at any scale. I have had a lot of success in getting people to create mural paintings. I have encouraged people from different backgrounds, cultures, ethnic groups, institutions, ages and genders to sit together and discuss the complexities of the issues confronting them, to tolerate others’ ideas in order to produce a mural painting. Painting a mural with numerous participants is

“Rich pictures are used primarily as a means for a group to express its preliminary vision concerning a matter of common concern. By understanding the group mind as represented in a picture – we gain a deeper understanding of the group’s potential to use and exploit information of all kinds. We are able to move towards a deeper ‘Sustainable Group Mind’ in using collaborative and collective intelligence and a more focused means to solve problems.”

like “jazz” – jazz requires individual skills but also empathy for the other players if we are to get an attractive product.

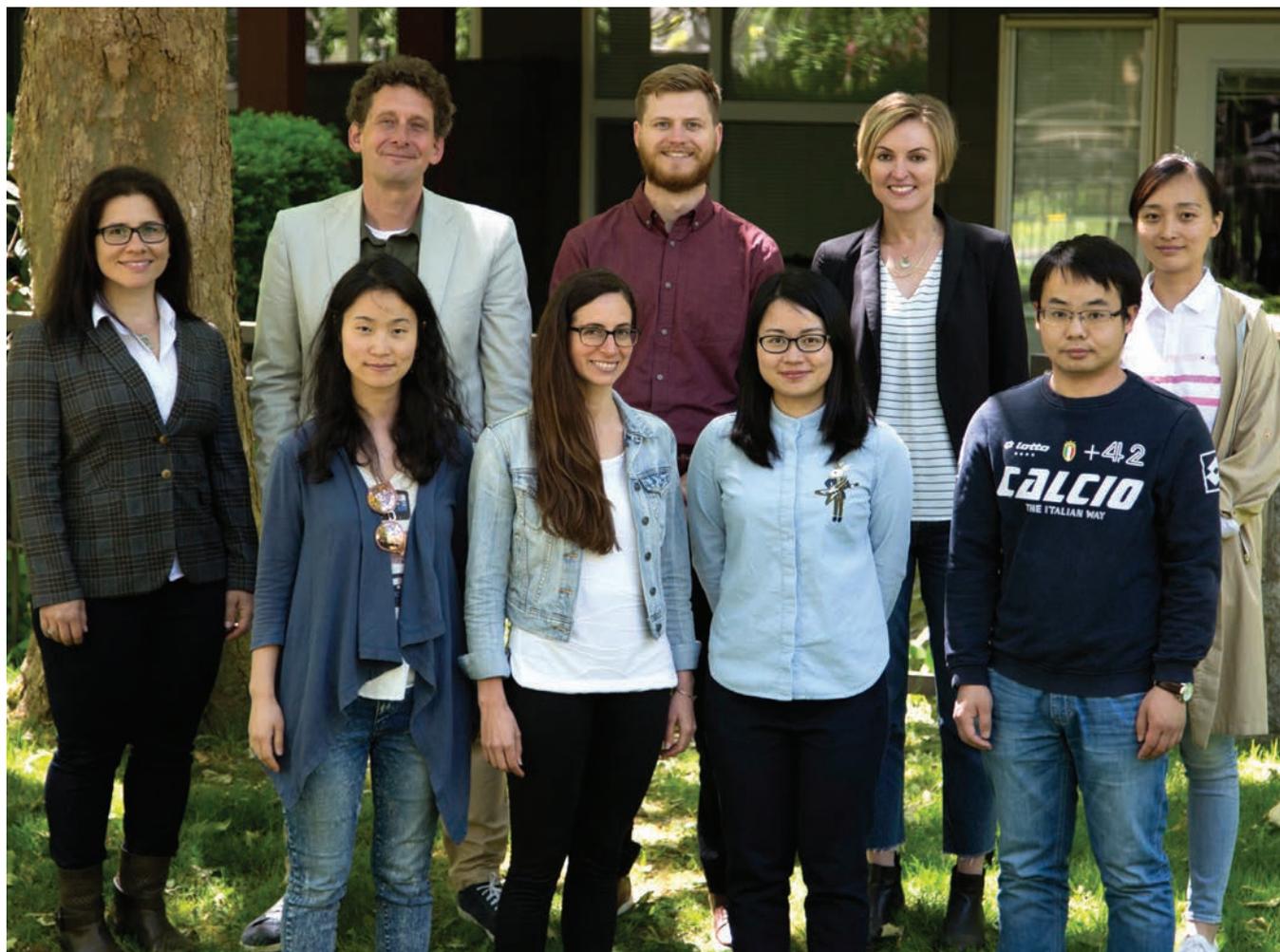
In recent years I have facilitated and organized mural paintings to link **Art, Conservation and Science**. I have worked on the margins of big conferences to link up different groups of people with different goals and visions, different institutions – government officials, Indigenous groups, NGOs, different genders, age and ethnic groups. Participants do not need to be good painters, but they have to express ideas of what they want to contribute to a work of art produced in collaboration with numerous other artists. A theme is given in advance and usually depends on the theme of the conference. As a facilitator, I usually make an outline of the landscape or seascape and give background colours, then each participant adds their contribution to the big mural. As facilitator I contribute a harmony and coherence to the ensemble. The facilitator needs to link up all the ideas and ambitions of the participants and makes a “story” that links everyone’s vision.

The use of visual methods allows us to learn from “others” and understand from other people’s experience. Each landscape is different. There are complexities in landscapes and visual techniques can be used to engage and share experience and knowledge.

For further information contact Dr Agni Klintuni Boedhihartono (department of Forest and Conservation Sciences) at agni.boedhihartono@ubc.ca.

research lab profiles

UFORIA – Urban Forestry Research in Action



The Urban Forestry Research In Action lab, UFORIA in short, aims to contribute to more resilient and healthy urban communities by enhancing the way people understand, plan and manage urban vegetation, and urban trees and woodlands in particular. Since its formal establishment about 1 year ago, UFORIA is carrying out cutting-edge research on these urban forests from the local to the international level. The interdisciplinary group has specific expertise in urban forest governance and planning, community involvement, urban ecosystem service assessment, and the links between urban forestry and climate change mitigation and adaptation.

UFORIA is led by professor Cecil

Konijnendijk, a Dutch national who has previous affiliations in several of the Nordic countries and Hong Kong. Cecil has been an active contributor to the development of urban forestry research worldwide, for example as founding editor of the journal *Urban Forestry & Urban Greening*. His research focuses on urban forest governance, the socio-cultural importance of forests and nature in cities, and wider contributions of urban forestry to urban development and resilience. Cecil has advised municipalities and governments across the globe, as well as international organizations such as the European Commission and the Food and Agriculture Organization of the United Nations.

Who works in UFORIA?

The UFORIA team represents a wide range of nationalities and disciplinary backgrounds, including (urban) forestry, ecology, landscape architecture, environmental sciences, arts, and social sciences. Many of the lab members have worked in urban forestry or urban planning practice previously, which helps keep the group's research activities relevant and applicable.

Adrina C Bardekjian (PDF) studies the role of women in arboriculture and urban forestry in North America. Adrina also works with Tree Canada where she manages urban forestry programs and research.

Tahia Devisscher (PDF) was recently awarded a prestigious Banting

postdoctoral fellowship. Her research studies whether urban forestry can assist cities with adapting to climate change, applying the concept of ecosystem-based adaptation.

Weicong Fu (PDF) assesses the various benefits provided by urban green spaces, and models relationships between urban green space characteristics and ecosystem services. Most of his fieldwork is done in China.

Lorien Nesbitt (PDF) is studying urban forest governance in Canadian cities, with emphasis on factors that contribute to successful urban forestry programs and resilience in times of calamities, such as forest fires and pest outbreaks.

Zhaohua (Cindy) Cheng (PhD student) has been assisting with managing the Bachelor of Urban Forestry program. As of September 2018, she will start a PhD-study comparing urban forest governance in Canada, China and Europe.

Shuping Huang (PhD student) is a visiting student from Fujian Agriculture and Forestry University (FAFU) who studies landscape perceptions and people's attachment to urbanising rural landscapes.

Qunyue (Corner) Liu (PhD student) is also a visiting student from FAFU. He is studying the relations between urban landscape design, place attachment and human health.

Sophie Nitoslawski (PhD student) starts her research in September 2018. She will study the extent to which urban forest benefits and services may be lost due to urban densification efforts, and how these losses may be effectively prevented and/or mitigated.

Hyeone Park (PhD Student), who is co-supervised by Jeanine Rhemtulla, studies the concept of urban food forestry and its current application in Vancouver.

Na (Alice) Yao (PhD student) is a visiting student from Beijing Forestry University. She studies the implementation and impact of the large-scale urban afforestation project in the Beijing plain areas.

Leila Todd (PhD student, currently on leave) has a background as a municipal landscape architect. Her research looks at the interface between urban forestry and landscape design in Canadian municipalities.

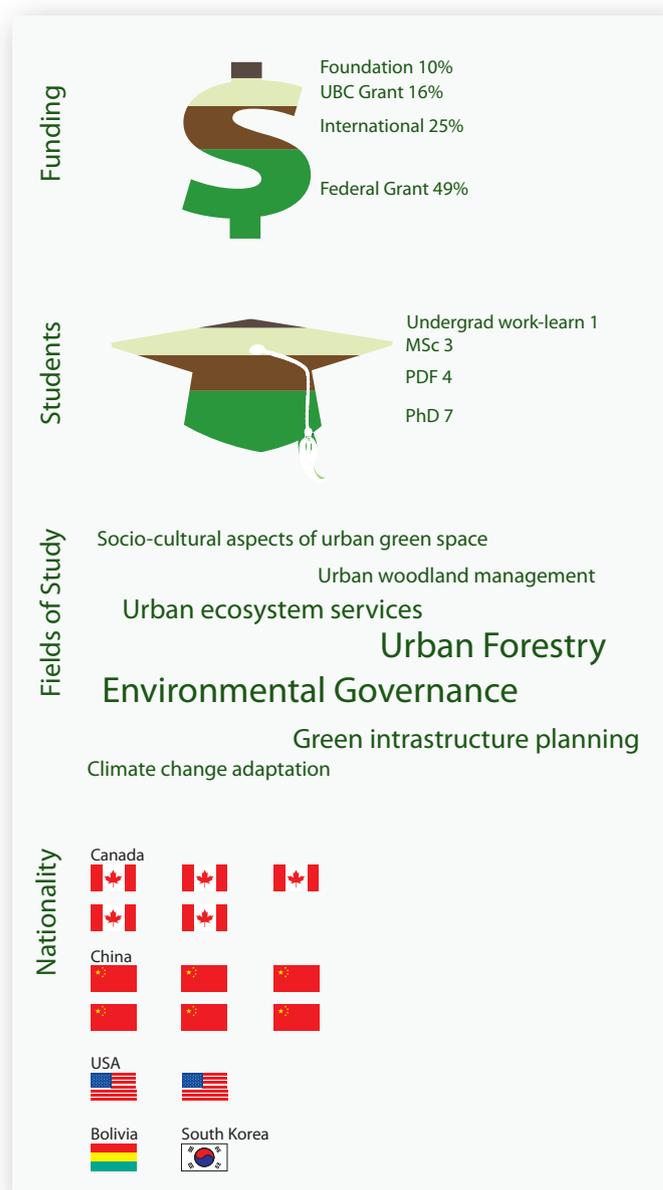
Alice Miao (MSc student) starts her research on the adaptation of forest management and inventory to urban conditions in September 2018.

Jehane Samaha (MSc student) investigates what criteria are used by different types of professionals when selecting tree species for urban areas, for example when facing climate change. Her work will include a case study of urban forestry in Philadelphia.

Zach Wirtz (MSc student) studies urban forest governance in North America and aims to identify ways in which the success of governance models and programs can be assessed.

Reg Eddy is an undergraduate work-learn student in UFORIA. Reg assists Tahia Devisscher in her research on ecosystem services provided by urban forests, and helps with organising the new Urban Forest Design Challenge involving urban forestry students from UBC and the University of Wisconsin.

UFORIA works both regionally, nationally and internationally, striving to enhance knowledge on urban forests and urban forestry, and assisting with the promotion of good practices. Lab



members actively contribute to the Bachelor of Urban Forestry program at UBC. They work with other research groups both within and outside the Faculty, including the Collaborative for Advanced Landscape Planning led by Professor Stephen Sheppard. Dr Matilda van den Bosch is a key collaborator on the relations between urban forests and human health.

Who funds UFORIA's work?

UFORIA receives its funding from multiple sources. Some larger grants have been secured from SSHRC and NSERC, for example for a Canadian project on urban forest governance, while members have also secured prestigious fellowships such as the Banting postdoctoral fellowship (Devisscher), the Tim and Ann O'Riordan Fellowship in Sustainability (Nitoslawski), and the Paul Heller Memorial Fellowship (Miao). Extensive collaboration with China has resulted in co-funding of several research students. Other funding has included project money from Environment Canada, internal Faculty of Forestry grants and funding from the Peter Wall Institute for Advanced Studies.

How can you contact the group?

UFORIA can be contacted through Cecil Konijnendijk at cecil.konijnendijk@ubc.ca.

Forestry field day for Aboriginal youth



On May 8, the Faculty's Indigenous Initiatives program hosted a field day for Aboriginal youth at Malcolm Knapp Research Forest. The field day was designed to give Aboriginal high school students the opportunity to learn about forestry-related work and research, as well as the different degree programs offered by Faculty of Forestry. Students in grades 10-12 travelled from Abbotsford, Coquitlam, and Sea to Sky school districts to participate in the day. Research forest staff, UBC staff and students, and members of the ABCFP assisted with the activities, and were on hand to answer questions students had about studying at UBC, or career opportunities in forestry.

Coleen Pierre from Katzie First Nation started the day with a cultural welcome, and encouraged the students to open their minds and take away at least 1 lesson from what they would be learning. MKRF education coordinator Victoria Farahbakhchian planned a day of activities designed to educate students on basic ecological knowledge and technical field skills. Students were divided into groups, and rotated through activity stations; participating in a forest ecology hike, forest mensuration course, and an orienteering exercise. The forest ecology hike involved students embarking

on a 1.5 km forest loop. Along the way, the instructor summarized the local disturbance regime, characterized native and non-native plants, acknowledged previous and current research projects, and allowed students the time to make observations about the surrounding environment.

During the mensuration course, students geared up with a hard hat and high-vis vest and then hiked over to their forest plot. Students learned about common forest mensuration instruments and practiced their tree identification skills to differentiate between Douglas-fir, western red cedar, and western hemlock. For many students, the orienteering course was the first time they had used a compass. Students were divided into small groups and sent on 1 or 2 orienteering courses. At the end of their orienteering journey, they came across a question that pertained to the local ecology and the field of forestry.

Just before lunch, students attended a short presentation given by Seraphine Munroe. Seraphine is a masters student in the Faculty of Forestry and is of Dakelh and Sto:lo First Nations heritage. Dakelh are peoples of the forest, and as such, Seraphine sees her culture as being strongly tied to the land. Her research focuses on how Indigenous

legal systems can influence better forest practices to enhance forestland and culture. Seraphine explained her research project to the visiting students, and also gave them a brief history of her path to university and how she came to study forestry. Seraphine encouraged the students to think of how they might benefit from pursuing post-secondary education, and how post-secondary institutions can benefit from having more Indigenous students and perspectives in the classroom.

Michele Schroeder, a teacher from WJ Mouat Secondary in Abbotsford, said that she was so impressed with the field day that she hopes it will be run as an annual event. Michele told us, "My students really enjoyed themselves. I would also like to be able to incorporate some infrastructure in my program that could assist students in further exposure, interest, opportunity and preparation for the career field of forestry. What I saw that day really does dovetail with so many of our principles and desired outcomes."

The Faculty's Indigenous Initiatives program would like to extend thanks to all of the people who made this day possible, including the MKRF staff, Loon Lake staff, UBC Forestry staff and volunteer students, ABCFP members Christine Gelowitz, Cliff Roberts and Tim Ryan, and to Canfor for providing funds for the event.



development & alumni news

Former dean expands scholarship opportunities



Thanks to the generosity of **Clark Binkley**, former dean of the Faculty of Forestry, graduate students in course-based professional masters programs have another potential means of supporting their studies.

With a gift of \$380,000, Clark has established the **Binkley Family Graduate Scholarship**, which made its first awards to 3 students in professional masters degree programs in the 2017-18 academic year.

Recently retired from his position as Chief Investment Officer and Managing Director of Greenwood Resources, Clark also stepped down from the Board of Directors of West Fraser Timber. "I had some deferred stock units that allowed me to make this gift to UBC," he says.

The first 3 recipients of the Binkley Family Graduate Scholarship are grateful for the support.

Renata Moura da Vega came to UBC the long way. Originally from Brazil, she completed her undergraduate degree in forest engineering in Brasilia. In her final year she did a student exchange at the Australian National University in Canberra.

This experience focused her career goals on sustainability and environmental conservation. "I looked at UBC for my graduate education because it's known for excellence," she says. "The Master of International Forestry program is exciting because we are trying to solve complex environmental, social and economic problems through a forestry lens."

Renata appreciates the recognition that comes with this scholarship. "It tells me that I am on the right path, that I should continue doing what I love and keep going," she says.

Tyler McDivitt-Vandermolen is completing his Master of Sustainable Forest Management and starting a new job with BC Timber Sales. "I was studying forestry at the University of Toronto when I got a job opportunity with Silverwood Consulting in Terrace", he says. "I learned a lot about how thoughtful forestry is out here, how developed it is. I was intrigued by the depth of knowledge and complexity of the practice."

With his masters degree completed, Tyler will spend the next year under the guidance of practices foresters at BC Timber Sales, and hopes to obtain his RPF the following year.

"I am honored to accept the scholarship," he says. "It renews my focus and intent to make an impact on the industry."

Anne Hervieux completed an undergraduate degree at the University of Alberta, but felt uncertain about pursuing graduate studies. "It felt out of reach; I just didn't feel capable," she says. Instead, she took a seasonal job as a wildlife management technician and field biologist in Vancouver, where she learned a lot about biology in practice but felt underemployed.

"I felt there was potential for geospatial analysis to help us understand conservation ecology issues," she says. I was very lucky to find the



Renata Moura da Vega and Anne Hervieux

Master of Geomatics for Environmental Management program at UBC." The MGEM program is a relatively recent addition to the Faculty's suite of 9-month intensive professional masters programs, and aims to equip students with remote sensing and GIS skills.

Anne says that receiving the scholarship improved her confidence. "It removed any of those lingering fears that I wasn't capable of the work I want to do," she says.

Clark Binkley wanted to create some equity between scholarships for profes-

sional graduate programs and those for thesis-based ones. "These professional masters programs are extremely important," he says. "The world is more complicated now."

Clark's belief in equity also underpins the **Emily and Francis Binkley Scholarship**, which he established in 1996 to support under-represented students such as Indigenous students, refugees, transfer students and those from rural communities. He recently enhanced this award with a further gift of \$120,000.



Tyler McDivitt-Vandermolen

"I feel a moral obligation, as someone who has made money in British Columbia, to support important BC institutions, and UBC is one of them," he says. "There's no better way to secure the future than to have really strong and well-educated young people."

The Faculty of Forestry is grateful to Dr Clark Binkley and all other donors who help enrich students' lives through scholarships and bursaries. To find out more about establishing a student award, please contact Emma Tully at 604.822.8716 or emma.tully@ubc.ca.

BLUE & GOLD CAMPAIGN FOR STUDENTS

The Faculty of Forestry is experiencing unprecedented growth. Our undergraduate student enrolment has almost doubled in the past 7 years. Our graduate student body has increased 30% in the same period.

The Faculty, along with our donors, has long been proud to support students with a variety of scholarships and bursaries that help alleviate some of the financial stress of attending UBC. But the growth of student awards hasn't kept pace with enrolment gains, and that's worrying.

In order to attract and retain great

students – the ones who will make a significant difference in the future of our forests and our environment – we need your help.

Donor-funded student awards are quite literally life-changing. They help remove financial stress, the constant back-of-the-mind worry about money that affects where students live, what they eat, and if they can participate in important programs such as field school.

"Thanks to donors, our capacity to be a magnet for excellent students, a centre for interdisciplinary research, and

a worldwide leader in forestry has been strengthened and enhanced. Please join us in creating new opportunities for our students." John Innes, Dean, Faculty of Forestry.

We can help you create the award that best reflects your intentions, whether it's a bursary, scholarship or graduate fellowship, either endowed or funded annually. Matching funds may be available for your award, doubling the impact of your generosity. To find out more please contact: Emma Tully, Assistant Dean, Development and Alumni Engagement at emma.tully@ubc.ca or 604.822.8716.

Alum's career on the ocean began in the forest



For a Forestry grad, **Aaron Lawton (BSF '07)** spends an awful lot of time where there are no trees at all. As operations director of One Ocean Expeditions for the past 10 years, Aaron runs a company specializing in tours of Antarctica, the Canadian Arctic, and Greenland. So how did he get here, and why?

"It started at Trent University in Ontario, where I was studying physical geography and was also on the varsity rowing team," Aaron says. "I loved rowing and being outdoors, and eventually my professors said they could only give me so much leeway. I dropped out and got a job running canoe trips near Sudbury."

Through a friend Aaron discovered that he could get hired on ships touring the Amazon and Antarctica. He later came back to Trent to coach rowing and met his wife, Catherine. Together they planted trees, fought forest fires, and worked in the Arctic and Antarctic.

"Then one day it wasn't enough anymore," he says. "I wanted to learn more; exercise my brain. As a tree planting crew boss I would walk the cut block with the forester, and have a lot of time to talk. I realized that forestry is a fascinating field of study."

Aaron enrolled at UBC when he was 28, with about a decade of work experience. "I felt I had more in common with my professors than with some of the students," he said. While in school he was also using his tour leader expertise working with Peregrine Adventures, led in Vancouver by Andrew Prossin.

Just before Aaron graduated in 2007, Peregrine was purchased by a larger corporation and Aaron, his wife Catherine, and Andrew were out of jobs. They decided to form a company, and One Ocean Expeditions (OOE) was born.

"At that time the forest industry was in a bit of crisis and I had few good job opportunities in forestry," he says. "I thought about it a lot, then I took the leap."

Aaron has brought many of the concepts he learned in forest resources management into the way OOE operates. "I learned from Professor Gary Bull that you can do things that are better ecologically and also better for your bottom line," he says. "I'm always looking for ways to enrich the experience we give our passengers and decrease our footprint in the areas we travel through."

Today OOE operates 3 vessels and

takes passengers through the Canadian Arctic, Antarctica, Greenland, Scotland, the Faroe Islands and Iceland, among other destinations.

OOE also supports a number of scientific projects, always free of charge to the scientists. "We enlist our passengers to help in data gathering, whether it's observing and recording wildlife numbers and behaviour or noting the number and types of garbage objects. People sign up to do this willingly, even if it means a shift in the middle of the night," he says.

OOE played a significant role in the 2014 discovery of HMS Erebus, one of Sir John Franklin's 2 ships in his search for a route through the Northwest Passage in 1845. One Ocean Voyager carried Parks Canada's remote operated and autonomous underwater vehicles, which finally located Erebus on the ocean floor in Victoria Strait.

"Those were pretty exciting times. When the ship was found, it was like winning game 7 of the Stanley Cup," he says. "Now, Franklin scholars come on board our trips regularly to share what they are learning from the Erebus."

Aaron encourages forestry students to pursue their degrees, "because you will be respected around the world for it. If you are fortunate enough to find a niche that works for you, then great. But if not, this degree provides an excellent foundation. You learn how to think analytically, question your own opinions, do research and modeling," he says. "I still use the economic analysis of establishing a sawmill in a small community as the basis for building a business case or cost-benefit scenario."

One Ocean Expeditions is part of the Alumni UBC Travel Club, which offers enriching and immersive travel experiences in a wide variety of locations around the world. For more information, visit www.alumni.ubc.ca/travel.



Faculty of Forestry's Alumni BBQ at Homecoming 2018

We're looking forward to welcoming you to the Vancouver campus this fall for the Faculty of Forestry's Alumni BBQ at Homecoming. Spend the rest of the day on campus with complimentary admission to UBC attractions, a festival at the Alumni Centre, the 101st UBC Alumni Association AGM, faculty showcases, an exclusive alumni

game experience at the football game, and the Awesome '80s Party, **Saturday, September 22, 2018, 12:00 am-1:30 pm**
UBC Forest Sciences Centre, 2424 Main Mall
For more information and to register please visit - www.getinvolved.forestry.ubc.ca/alumni/events

Alumni and friends social in Nelson

Join the Faculty of Forestry for a social in Nelson. Meet and mingle with students, fellow alumni and members of the Nelson forestry community.

Before the reception, join the students from the Master of Sustainable Forest Management program as they present their observations from field camp and discuss sustainable forest management in the Kootenay area.

Friday, August 31st, 2018
Student Presentations: 3:00pm – 4:45pm
Best Western Baker Street Inn – Osprey Room, 153 Baker Street, Nelson
Alumni and Friends Social: 5:00pm – 7:30pm
Relish Bistro, 301 Baker St, Nelson
For more information and to register please visit - www.getinvolved.forestry.ubc.ca/alumni/events

Questions? Contact Michelle Lindsay at michelle.lindsay@ubc.ca or 604.827.0297.

Newsletter production

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