

# branchlines

Volume 30#2 Summer 2019

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# dean's message



After a record-breaking year in 2018, the British Columbian forest sector is now in turmoil. Lumber prices in the USA have halved, although following significant curtailment of supply, prices have recovered a little. Sawmills have cut production or closed altogether, with significant job losses. At the same time, the BC Government has begun to examine a number of issues, including professional reliance, tenure transfers, and the Forest and Range Practices Act, generating uncertainty for many in the forest sector.

Circumstances such as these do not encourage students to enroll in forestry programs, although some realize the cyclical nature of the sector. While domestic enrollment in some programs has remained level, others have suffered, especially our Wood Products Processing program. As potential domestic students see the huge new opportunities that are arising in the value-added sector, we expect enrollments to return to their former levels.

In contrast, our urban forestry program goes from strength to strength and will hopefully soon be accompanied by a Master's program in Urban Forestry Leadership (it is currently pending approval from the BC Government). Not surprisingly, given that most people now live in urban areas, urban forestry is of growing interest. The burgeoning research on this topic is confirming just how important the urban forest is to the health and welfare of urban populations. We all know that a walk in the park is normally a positive experience, but we can now quantify just how beneficial our exposure to green spaces is, and research is now going into more detail, identifying who benefits most, and how.

The research by Lorien Nesbitt presented in

this issue of Branchlines demonstrates that there is considerable inequity in access to urban green spaces. This work, undertaken in a number of US cities, reveals that some groups are much less able to take advantage of green spaces in cities than others. It has been known for some time that some groups take less advantage of National Parks and National Forests in the USA than others, but it is concerning that these inequities are also found in cities.

Ensuring that such green spaces are there, and that trees can grow successfully in them, is a major part of urban forestry. Urban soils present many challenges for trees and, while human interventions such as irrigation can help reduce the stress that trees face, there are many other problems to be overcome. Susan Day describes her work on this in this issue of Branchlines, and shows how academics can make a real and very significant contribution to the practice by working on standards for soil amelioration and remediation, amongst other things.

It is not just urban forestry that offers potential. Despite all the recent bad news about the forest sector in British Columbia, we believe that there are huge new opportunities opening up. As a result, we are introducing a new undergraduate program. The new Bachelor of Science in Forest Bioeconomy Sciences and Technology will train students to work in the circular bioeconomy, a quickly growing area already yielding significant results in terms of new technology and innovation for wood and other bioproducts.

There is no doubt that shifts in the forest sector are underway and that there are many exciting opportunities to be embraced within this process. With the BC Government encouraging greater use of wood in the construction of public buildings, huge interest in the use of "massive wood" in ever-larger construction projects, increasing use of wood-based products to replace not only fossil-fuel based products such as plastics but also products with environmental issues such as cotton, the time is right for a new program to train the future leaders of a more sustainable economy.

A handwritten signature in blue ink, which appears to read "John L. Innes". The signature is fluid and cursive.

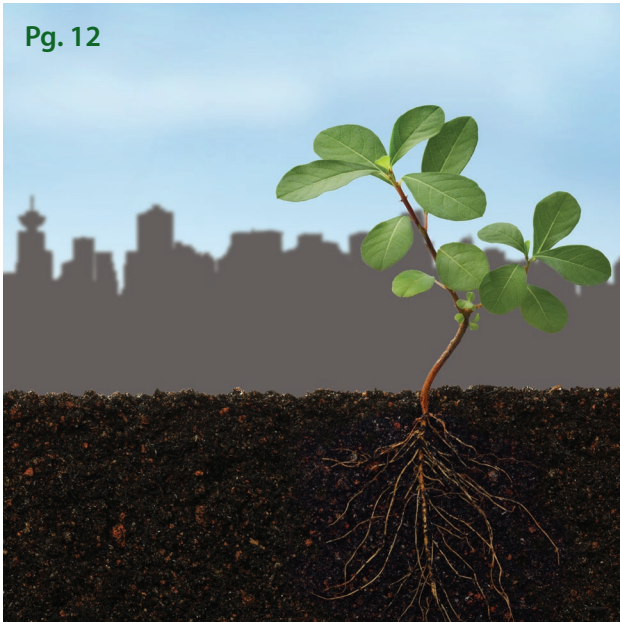
**John L Innes**  
Professor and Dean

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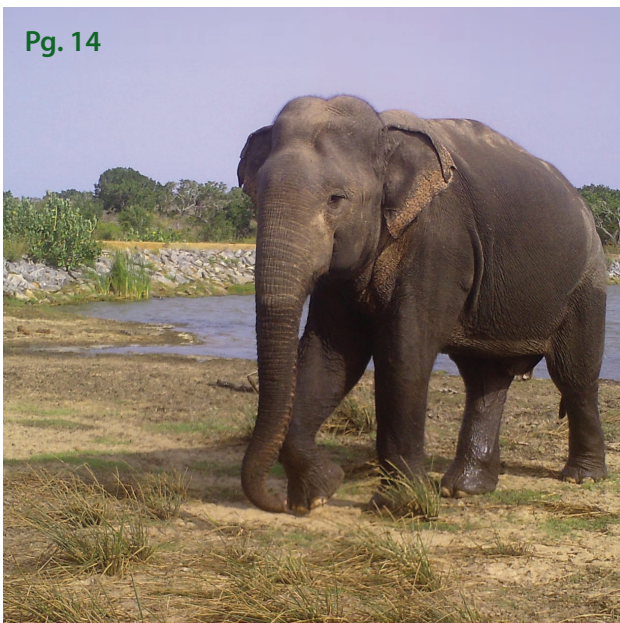
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# REMEMBERING DEAN EMERITUS ROBERT KENNEDY



It is with sadness that the Faculty of Forestry announces the passing of Dean Emeritus Robert (Bob) Kennedy, UBC alumnus and professor. Dean Kennedy passed away peacefully at age 87 in the early hours of June 17, 2019, surrounded by family.

Dean Kennedy was a distinguished wood scientist who combined a university career researching forest products together with research for industry in wood behaviour. His association with the Faculty of Forestry began following his graduation from the State University of New York where he received his Bachelor of Science degree in 1953. While at UBC, he was awarded the degree of Master of Forestry in 1955 and served as an instructor between 1955-1961.

After completing a PhD at Yale University (1962), Dean Kennedy was at the Faculty

of Forestry at the University of Toronto from 1962 until 1966. He then returned to BC to join the federal government's Western Forest Products Laboratory (now FPInnovations), on the UBC campus. There, he served as the Laboratory Director from 1975 to 1979 where he was primarily responsible for technology transfer and client relationships. His achievements were notable including laboratory developments that were translated to industrial uses and strengthened client relations from initiatives such as a series of industrial advisory committees.

Dr. Kennedy returned to UBC's Faculty of Forestry in 1979 to teach wood anatomy and properties, wood chemistry, timber mechanics and micro-technique. He was appointed Dean of the Faculty serving from 1983 until his retirement in 1991.

Dean Kennedy led a remarkable career which garnered recognition and accolades. In 1971, he was named a fellow of the International Academy of Wood Science. He was active in a wide range of national and international professional and forest-industry organizations, including the Forest Products Research Society, the International Union of Forest Research Organizations, the Canadian Forestry Association and the Canadian Institute of Forestry. Until his appointment as Dean of Forestry in 1983, he was one of only two members of the Faculty of Forestry who served on the UBC Senate. Dean Kennedy also served as Vice-Chairman of the BC Forest Resources Commission and as President of the International Academy of Wood Science.

After his retirement, he remained connected with the Faculty as Dean Emeritus, part of the Dean's Circle as an informal advisor to the Faculty, and a philanthropist. In particular, he was a passionate mentor and supporter of students and, with his wife, Averil, established the **Robert and Averil Kennedy Forestry Graduate Scholarship** to increase awareness of forestry and the forest industry in the Canadian context. Along with his three children and three grandchildren, he is survived by Averil who was also active in the UBC community. Dean Kennedy's wish is that any donations on his behalf be made to the Scholarship at [memorial.support.ubc.ca/bob-kennedy](http://memorial.support.ubc.ca/bob-kennedy).



# BEST PROGRAM GETS THE GREEN LIGHT



It may soon become more challenging to tell the difference between a single-use water bottle and sawdust. Today, any of us can clearly distinguish between the two items. However, new research is showing how to transform plant resources, such as trees, into innovative bioplastics. This means that in the near future, not only water bottles but jet fuel, running shoes, clothing textiles, car parts, and even bone repair materials, could be among the many new products originating from forests, agricultural fields, or marine food industry waste.

These efforts are a part of the burgeoning bioeconomy which sees the transformation of renewable biological resources into value-added products, enhancing sustainable natural resources and land use to generate economic value. It is a global effort to move away from fossil fuels and develop environmentally friendly solutions to consumption, economic growth, and innovation.

Given the tremendous potential of the bioeconomy, the Faculty of Forestry is pleased to announce its new Bachelor of Science in Forest

Bioeconomy Sciences & Technology (BEST), beginning in September 2020.

“The BEST program is unique in that no other Canadian university has a forest-bioeconomy program that blends both the applied and social sciences,” said Scott Rennecker, program director. “The learning outcomes will prepare students to work towards solutions for complex issues such as greenhouse gas emission reduction and development of fossil fuel alternatives, biomass conversion into innovative bioproducts, sustainable land use development, and the role of government, industry, and non-governmental organizations (NGOs) in a functioning bioeconomy.”

Countries around the world are investing in the bioeconomy. Jobs in this sector account for almost 8% of the European Union’s workforce with

Canada and the US following their lead. It is a field of growing opportunity and students who participate in the program will be well-positioned to understand the methodology and possess the practical skills for the advancement of technologies; innovative products and processes; economic forces and policy; and land use development that will advance the emergent bioeconomy paradigm.

The new degree is a four-year, 122-credit program and offers the option to complete an 18-credit Minor in Commerce and the opportunity to participate in the Faculty’s co-op program. The program includes 14 new courses including a three-credit capstone course that delivers the specialized learning objectives of the program.

*For more information contact Scott Rennecker at [scott.rennecker@ubc.ca](mailto:scott.rennecker@ubc.ca).*

“The new degree offers a comprehensive program for the scientifically minded and environmentally motivated student.”



# A COMMUNITY INTERNSHIP EXPERIENCE



Leo Peiyang Li, is a graduate student in the **Master of International Forestry** (MIF) Program 2018-19. Through his recent internship at the UBC Sustainability Collaborative for Advanced Landscape Planning (CALP), under the supervision of Stephen Sheppard and Cindy Zhaohua Cheng, he was able to work with Vancouver youth in community and elementary school settings to create awareness and engagement in sustainability.

Perhaps the most important project was the Science World Extravagant Evenings for Teens: Global Rewind 2019 public event. At this event, Leo promoted a climate change initiative using a variety of communication methods from his MIF classes, including social media, news releases, and print media. He also worked with Vancouver's Youth 4 Action Team and Science World's Teen Advisory Group. During the event, Leo also demon-

strated a video game, designed by the CALP studio to create awareness of the effects of climate change and how to address it. The teens enjoyed the format and provided valuable feedback about how to improve the game's functionality.

For Leo, the most significant aspect of his internship was the fact that he was able to gain practical skills, experience in the workplace, and was able to achieve tremendous personal growth.

## NEW APPOINTMENTS



**Dr. Suborna Ahmed** has joined the department of Forest Resources Management as a lecturer. She holds a PhD from the University of British Columbia in Forest Biometrics and is a statistician by training. Suborna's research interests include: quantitative analysis of complex forestry datasets at a large scale; methods for forecasting tree growth and yield; modelling and forecasting improved genetics; meta-analysis of tree mortality, damaging agents, and tree fertilization; and application of machine learning approaches in various sectors in forestry. Suborna is excited to advance the goal of the Spruce-Up Project to enhance socio-economic knowledge of genomics and application of big data analytics in a diverse range of forest resources. Suborna is teaching statistics and programming languages in both Bachelor and Master's programs in UBC. She can be reached at [suborna@mail.ubc.ca](mailto:suborna@mail.ubc.ca).



**Dr. Lorien Nesbitt** has joined the department of Forest Resources Management as an assistant professor of Urban Forestry. She holds a PhD in Urban Forestry from the University of British Columbia where she also worked as a postdoctoral research and teaching fellow. Lorien has had the privilege of working with communities and organizations across Canada and around the world on climate change adaptation, sustainable development, and urban greening. With a focus on urban socio-ecological systems, her research has helped to define and develop theories of urban green equity and environmental justice in urban forestry. Lorien looks forward to exploring these issues with her colleagues and students at the Faculty of Forestry. She can be reached at [lorien.nesbitt@ubc.ca](mailto:lorien.nesbitt@ubc.ca).



## CONGRATULATIONS TO OUR CANADA RESEARCH CHAIRS

In June, the Tri-agency Institutional Programs Secretariat recognized two researchers from the University of British Columbia's Faculty of Forestry as this year's recipients of Canada Research Chairs. **Dr. Nicholas Coops** and **Dr. Elizabeth Wolkovich** were among the world-class scientists and scholars recognized from across the country to receive this honour. This year's investment of \$275 million was made in support of a diverse and talented group of new and renewed chairs, all of whom are advancing discoveries and innovations aimed at improving the state of the environment as well as the health of our citizens, communities, and economy.

Dr. Nicholas Coops' Canada Research Chair in Remote Sensing was a renewed Chair after a seven-year term. The Tier 1 Chair, supported by the Natural Sciences and Engineering Research Council of Canada (NSERC) is in recognition of his research in satellite and airborne remote-sensing technology to provide cost-effective and accurate solutions for sustainable forest management and conservation. Nicholas' research centres on developing tools for forest management and biodiversity assessment in order to ensure sustainable regional and national production as well as storage and conservation of carbon.

Dr. Elizabeth Wolkovich received a new Canada Research Chair in Temporal Ecology. Also supported by NSERC, the Tier 2 Chair was provided in support of her emerging research investigating how communities assemble and disassemble as a result of global change. Drawing from the areas of population and ecosystem ecology, evolutionary biology, and climatology, much of Elizabeth's work examines the causes and consequences of plant invasions and the effects of climate change on the temporal assembly of plant communities.

The Faculty of Forestry is proud of the research conducted by Drs. Coops and Wolkovich as part of an overall drive to create a better world by being a global exemplar in supporting the health and well-being of our planet's ecosystems and all who interact with them.



## NEW STRATEGIC PLAN LAUNCHED

This spring, the Faculty of Forestry refreshed its strategic plan. After six consultation sessions and two online surveys, the new version represents the synthesis of very many points of input and opinions. Designed to guide the activities of the Faculty over the next 10 years, the Faculty of Forestry Strategic Plan 2019-2029 is an update of the 2012 plan and supports the four core strategic areas of UBC's latest strategic plan published in 2018. The new plan may be viewed on the Faculty of Forestry website.



# TRANS-ATLANTIC COLLABORATION ENRICHES STUDENTS AND THE FACULTY



Koli National Park, Finland

Each year, eight students are selected for the Faculty of Forestry's **TRANSFOR-M** program, the only dual-degree Master's program in forest and environmental management between Canada and Europe. By drawing on the resources and opportunities of 17 graduate programs across eight institutions, this is a graduate program with unparalleled opportunities and experiences, with the results being transformative for all involved.

The program started as a 2004 Canadian Government and European Union funding initiative to implement a student mobility program (TransFor 2004-2007). It provided a total of 144 students with opportunities for study exchanges and field courses between four Canadian and four European Universities. This successful collaboration led to the launch of TRANSatlantic FOREstry Master (TRANSFOR-M) in 2011.

"The aim of the program is to educate the next generation of globally-minded forest and environmental managers and scientists on the cultural differences, diverse historical contexts, and differing economic drivers that exist in Canadian and European natural resource management approaches," said Jorma Neuvonen, director of TRANSFOR-M program for UBC.

During the first two phases (2011-2014, 2015-2018) of TRANSFOR-M, over 70 students from Canada and Europe participated in the program. Recently, the agreement for a

new phase (2019-2024) was signed and included two new consortium members in Europe.

In the first year of the program, UBC students spend a year in Europe completing degree requirements at the chosen partner institution. The second year is completed at UBC fulfilling the Master of Forestry degree requirement, resulting in conferral of two separate Master's credentials. Taken separately, the degrees would take a total of three years to complete, however, the dual degree program option makes it possible to earn both degrees in two years by allowing students to apply 30 credits earned as part of the UBC Master of Forestry degree towards the European degree.

Earning two Master's degrees from two world-class forestry schools enhances the opportunities available to graduates. The program provides students with an opportunity to build a highly customized Master's program based on their interests and to work on interdisciplinary projects that incorporate knowledge from two continents. It also gives a solid international experience by living and studying in another country and culture for one year.

The Faculty of Forestry also realizes many benefits from the program. The cross-cultural aspects of TRANSFOR-M have benefited other students as visiting European students or returning UBC students share their experiences



in and out of the classroom. Participating institutions have established closer relationships, which have enhanced joint teaching, research and has led to other joint programs. For example, UBC Forestry is now an associate member in the European Forestry Masters consortium led by the University of Eastern Finland and with the Sustainable Forest and Nature Management Masters consortium – to which some of our TRANSFOR-M European partners also belong.

Building a multi-institutional collaboration such as this requires the time and efforts of numerous people due to the different policies and procedures in each institution.

#### Who should apply?

Over the years, the program has attracted highly qualified forestry graduates and diverse students from multiple backgrounds who are looking for an applied field to complement their previous degree from fields including:

- Economics
- Communications
- International relations
- Political sciences
- Sociology
- Biology
- Earth sciences
- Geography

However, the benefits realized far outweigh these challenges. The program has created a cohort of young global leaders with a broad perspective and understanding of the complex issues in forest and environmental management. Many of our graduates have ended up in good positions in industry, consulting companies, government, and NGOs.

For more information about the program and how to apply visit [www.forestry.ubc.ca/students/graduate/programs/master-of-forestry](http://www.forestry.ubc.ca/students/graduate/programs/master-of-forestry).

Contact Mr. Jorma Neuvonen at [jorma.neuvonen@ubc.ca](mailto:jorma.neuvonen@ubc.ca) or 604.822.2807.

#### The current TRANSFOR-M consortium includes the following Canadian and European universities:

- University of British Columbia
- University of Alberta
- University of New Brunswick
- Albert-Ludwigs-University, Freiburg, Germany
- Bangor University, Wales
- University of Eastern Finland, Finland
- University of Natural Resources and Life Sciences, Vienna, Austria
- University of Padova, Italy

## FORESTRY MENTORS INDIGENOUS STUDENTS

*Alison Krahn*

From May 21 to May 24, 2019, UBC hosted 24 Indigenous high school students from across western Canada for the Verna J. Kirkness Science and Engineering Education Program, which aims to increase the number of Indigenous students graduating from science and engineering programs and encourages their interest in post-secondary study.

During the week-long program, students were welcomed into the Faculty of Forestry by Drs. Cole Burton, Lori Daniels, Sue Grayston, Rob Guy, and Scott Hinch, where they conducted research alongside the professors and graduate students in their labs. Students were mentored as they worked on various projects, and then presented their findings and experiences on the final day of the program.

While at UBC, the Kirkness Program students lived in residence, met Indigenous role models, and learned about the supports that are available to UBC students.

For more information about the Kirkness Program, visit [www.vernakirkness.org](http://www.vernakirkness.org).



MSc student Taylor Wale and KP Mentee Zayne Langford



# ABORIGINAL YOUTH AT THE MALCOLM KNAPP RESEARCH FOREST

*Alison Krahn*

On May 7, the Faculty of Forestry's Indigenous Initiatives program hosted its third bi-annual field day for Aboriginal youth at the Malcolm Knapp Research Forest (MKRF). The day is designed to give Aboriginal high school students (Grades 10-12) with the opportunity to learn about forestry-related work, research, as well as the different degree programs offered by the Faculty.

To start things off, there was a cultural welcome from Mavis Pierre, a member of the Katzie First Nation, which is based in the Lower Fraser Valley Region of BC. Students then took part in a series of activities designed and led by the Faculty's Wild & Immersive program staff, Andrea McDonald and Victoria Farahbakhchian. First came the plant identification activity which involved a short hike. 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 activity to teach students about the branch of forestry that deals with the determination of dimensions (like the diameter, height, and volume of species), students focused on safety and geared up with hard hats and high-visibility vests prior to hiking over to their forest plot. Students learned about common forest mensuration instruments and practiced their tree identification skills to differentiate between Douglas-fir, western redcedar, and western hemlock. For the forestry management tour, MKRF research coordinator, Ionut Aron took the students to a cut block to talk about the detailed plans made for reforestation and growth of future forests including measures to protect

soil, water, wildlife, views, and other key values.

In the afternoon, Katzie artist, Trenton Pierre, provided a live painting demonstration to show the students his various techniques as well as his interest in incorporating culturally significant materials, like western redcedar, in his work. He also shared his career path detailing his transition from a career in civil engineering to becoming an artist and why he made such a drastic change. He uses his story in hopes of inspiring others to follow their true passions in life, and not become discouraged from engaging in activities or education that they feel is truly important. Following the workshop, students entered their names in a draw, which saw three lucky winners take home a painting Trenton made during his workshop.

Gail Stark, a teacher from the Abbotsford School of Integrated Arts, said that her students always have a wonderful time during field days, "My students really enjoyed themselves. The hands-on timber cruising activity is always the most engaging for them."

The Faculty's Indigenous Initiatives program would like to extend thanks to all the people who made this day possible, including the MKRF Wild & Immersive Program staff, Loon Lake staff, UBC student volunteers, MKRF staff Ionut Aron, and to Canfor for providing funds for the event.

*For more information about the Wild & Immersive educational programming, please visit: [loonlake.ubc.ca](http://loonlake.ubc.ca). For more information about Trenton Pierre's work, please visit his website: [www.rainawakens.com](http://www.rainawakens.com). For more information about the Field Day for Aboriginal Youth, please contact the Faculty's program manager of Indigenous initiatives Alison Krahn at [alison.krahn@ubc.ca](mailto:alison.krahn@ubc.ca).*





## ETHICAL AND SUSTAINABLE SILVICULTURE

Stephanie Ewen



Douglas-fir seedling sprayed with Tree Chalk

Amongst growing global advocacy over plastic pollution in the world's oceans, concern is also being raised locally regarding plastic pollution's impact on the forests of British Columbia. On average, 218 million seedlings are planted annually in BC, with that number expected to increase following the 2017 and 2018 wildfires. Alongside each of those seedlings is often a two- to six-inch piece of summer-weight plastic flagging tape used by planters to locate their planted trees to ensure they maintain the prescribed spacing and density.

Following planting, quality checkers and surveyors find the flagging tape helpful to expedite their survey process. However, if the wind picks up, the service time of those flags as useful identifiers of tree location can be less than one day.

If half the trees planted in the province are flagged, it adds up to over 10,000 km of flagging tape every year with a service time of less than 24 hours. The cumulative amount of plastic waste left in our forests annually is alarming given the current global rhetoric surrounding single-use plastics.

In working to eliminate this risk, I spent several years working with planters to encourage the use of biodegradable flagging tape as an alternative to plastic. However, uptake was hindered by barriers, primarily product cost and lower productivity. A major issue is the fact that biodegradable tape can cost up to three times the price of plastic tape, and it takes longer to rip when in the field. For individuals and companies paid on production rates, the additional costs and productivity impacts have been prohibitive to biodegradable tape as a viable substitute.

In addition to concerns about plastic waste, the BC Cattlemen's Association has identified the risk flagging tape poses to their cattle. Flagging tape left on the ground can persist for several years and is easily consumed by cattle while grazing in recent plantations. Anecdotally, ranchers have

found dead calves in the field that appear to have succumbed to blockages from the flagging tape in their digestive tract. Presumably, this poses a threat to wildlife as well.

Knowing the concerns of the ranchers with whom we manage our crown-land tenure areas, and committed to finding an alternative, I organized a small operational trial for a new BC-developed product, Tree Chalk. Our small operational trial aimed at expanding the manufacturer's own trial in 2018.

According to its manufacturer, Tree Chalk is a calcium carbonate (chalk)-based pigment spray that dries quickly and can be applied to seedlings while still in the box. Nursery trials were performed in 2018 to test the persistence of the product on seedlings both with and without daily misting, as well as the growth response to the product on the Douglas-fir, lodgepole pine, and hybrid spruce. Overall, the results showed the product does eventually flake off the seedlings, even without precipitation, and there was no significant difference in growth between the treated seedlings and the control over a 21-day period.

In our own operational case study, the planters still seemed to prefer the flagging tape which may have just been the result of not adjusting to the change. From a cost perspective, although the material costs were higher for the Tree Chalk than the tape, there were time savings associated with the Tree Chalk application, which will need to be further investigated to have a more fulsome understanding of a cost benefit. For example, the material costs of the Tree Chalk were 10 to 15 times higher per tree than flagging tape. At the same time, there were also productivity enhancements realized by eliminating the additional step of flagging each tree. As well, quality checkers and surveyors found that there was a time-saving benefit to their plots as the chalk persisted for at least a couple of weeks after two to three significant rain events.

Although future trials are required for additional insights, as a forest manager, knowing that this product can both contribute to maintaining good, long-term relationships with my ranching co-managers and avert some single-use plastics from the forest, I am optimistic about the future use of Tree Chalk.

*Stephanie Ewen, MF, RPF, is the Alex Fraser Research Forest manager. Prior to serving in this role, she worked as a planner and silviculture forester for AFRF for 2.5 years. She has training in forest management and analysis and more than 10 years experience as a forestry consultant in BC. She can be reached at [stephanie.ewen@ubc.ca](mailto:stephanie.ewen@ubc.ca).*

# DESIGNING AND MANAGING SOIL

*Susan Downing Day*



Walking down a shaded street, playing softball in the park, or catching the scent of flowers in the evening – for me, these have always been the simple pleasures of living in the city. When I embarked on my research career in urban forestry, it quickly became apparent that one of the greatest impediments to sharing these urban greenspace benefits with my fellow citizens was the landscape belowground.

Many city trees are stunted, short-lived, or succumb to the stress of land development. At the literal root of the problem is the soil. Urban soils are compacted, contaminated, moved around, and even manufactured out of waste products from industry. In some cases, urban soils have conflicting purposes; for example, supporting buildings and housing a complex array of pipes and infrastructure, leaving little space for tree roots. I find it fascinating to explore how we can design and



manage soils and belowground spaces to optimize the multiple benefits we get from urban forests.

In my research, I try to focus on solving a variety of belowground problems faced by urban foresters, while at the same time maximizing benefits. For example, can we manage soil so that it will support a tree and handle stormwater for the city? Can we create spaces for larger root systems that will result in more drought

initial plans, Arlington decided to trial Soil Profile Rebuilding, a soil rehabilitation technique developed by my research lab ([www.urbanforestry.frec.vt.edu/SRES](http://www.urbanforestry.frec.vt.edu/SRES)). It leaves existing soils in place but breaks up soil compaction below the zone typically affected by building construction (about 60 cm). Small amounts of compost then hold channels open in the soil allowing for root growth. The technique is relatively simple to carry out using a backhoe to

for land development and building construction. These have the potential to create healthier urban forests. For example, I participated in the soils technical committee that developed the soils sustainability standards that form a part of The Sustainable Sites Initiative, [www.sustainablesites.org](http://www.sustainablesites.org) (SITES), a voluntary certification system targeted to those professions. Now a sister program to Leadership in Energy and Environmental Design (LEED), SITES sets outcome-based standards for sustaining ecosystem services provided by urban greenspaces.

Finally, undergraduate education in urban forestry presents new challenges and opportunities in designing and managing belowground soil. Here at UBC, I am also the program director for the Bachelor of Urban Forestry degree program that has now graduated two classes. Recently I completed work on a five-year study, *Urban Forestry 2020* ([www.uf2020.frec.vt.edu](http://www.uf2020.frec.vt.edu)), on the urban forestry profession and its relation to higher education. Urban forestry is an interdisciplinary field and therefore well positioned to contribute to solving complex urban problems that require input from a wide array of experts and stakeholders. Additionally, higher education can shape public perception of what an urban natural resource professional can contribute while it also prepares students to work in this new world.

We have made significant progress in generating research, making it available and accessible in usable formats while developing curriculum and content for Urban Forestry undergraduate students at UBC. However, there is still more to do, and I am excited to work with my UBC colleagues, students, and external organizations to meet this challenge for creating a sustainable future.

*Dr. Susan Day is the new program director for the Bachelor of Urban Forestry program and is also a professor of urban forestry in the department of Forest Resources Management. She holds a PhD in Forestry from Virginia Tech and a Master's from Cornell University. She can be reached at [susan.day@ubc.ca](mailto:susan.day@ubc.ca).*

“I study both soils and roots. How they interact is a fundamental influence on the health and longevity of urban forests”

resilience, while also supporting walkways and roads? I study both soils and roots. How they interact is a fundamental influence on the health and longevity of urban forests. Further to my research, I also see effective communication, voluntary certification systems, and education as helping resolve these issues.

A few years ago, in Arlington, Virginia, new street tree plantings were being developed by creating medians in existing roads. Asphalt that had been in place for decades was removed, revealing scraped and compacted fill soil that would now be home to new street tree plantings. They explored two initial plans, in advance of adopting research developed in my lab. The first plan was to excavate the fill and import “good” soil for planting. But importing soil creates its own problems. It is expensive and likely not a sustainable practice. It’s also not sustainable to harvest soil from a greenfield (undeveloped land) to repair urbanized land.

The second plan explored using recycled or blended soils. Subsoils excavated from construction sites are screened and then re-blended with sands and composts to create a growing media. But these soils may be liable to drought and can, in some cases, result in contaminants being moved around the city with the soil.

After assessing the limits of these

break up compacted soil, allowing it to be employed in tight urban spaces. Our goal with this system was to create conditions that would allow the soil to continue its recovery both in terms of physical properties by building soil structure, and biological properties.

My lab’s research found this soil rehabilitation technique resulted in greater soil organic carbon, including aggregate-associated carbon, than conventional practices. It has also resulted in better establishment and growth in trees. Soil permeability also greatly increased, creating opportunities for urban soils to contribute to stormwater management, a significant concern for cities.

As research is only useful if it is read and used, my lab makes our findings available and accessible in order to facilitate use by a variety of users. For example, I partnered with a colleague in landscape architecture to create freely available written specifications for soil profile rebuilding, making it easy for those in professional practice to include it in contracts or request bids. As for the result, the specifications have now been used around the world for addressing compacted urban soils, especially those resulting from land development and building construction.

I have also had the opportunity to share insights from research by contributing to voluntary soil standards

# HUMAN- WILDLIFE CONFLICT IN SRI LANKA

*Aisha Uduman*



Camera trap image of a Sri Lankan elephant, fresh after a mid-afternoon bath

What comes to your mind when you hear “human-wildlife conflict”? In British Columbia, this might make you think of bears feeding on garbage, or cougars hunting sheep or other livestock. But 13,000 km away in Sri Lanka, where my research takes place, human-wildlife conflict occurs with leopards, crocodiles, and crop-raiding elephants.

While the species vary considerably between our province and Sri Lanka, the underlying challenge of the need to coexist remains the same. Human-wildlife conflict is a global phenomenon and a leading cause of large carnivore decline. Large carnivores are ecosystem regulators and influence their biological communities through predation and competition. They have large home ranges, protein-rich diets, and many prefer ungulate prey. As human operations such as farming encroach into forests and previously uninhabited environments, domesticated livestock are introduced to the landscape and are a new potential prey species for these carnivores. When livestock are lost to carnivores, conflict can ensue with farmers whose responses range from taking no action to killing these

carnivores either directly, or through poisoned carcasses and/or snares.

As the phrase suggests, human-wildlife conflict has two sides: the humans, and the wildlife. Loss of carnivores, many of which are endangered and undergoing global population declines, can be detrimental to their ecological and intrinsic value. Humans are affected as well, through loss of livelihood and security, which can elicit a range of responses in terms of their attitudes and behaviours. As such, I believe, as supported by my research in Sri Lanka, that in order to effectively address human-wildlife conflict, it is necessary to look at both ecological and social aspects.

Sri Lanka is a global biodiversity hotspot, with high rates of species endemism and a dependence on this biodiversity for tourism and economic productivity. Here, conflict occurs between cattle farmers and leopards, the terrestrial apex predator and the most adaptable of the big cats. As farmers ramp up dairy production to satisfy increased demand and domestic targets, they report increasing livestock losses and thus loss of livelihood.

There are some knowledge gaps. What is the quantity of livestock lost to leopard attacks? What factors are causing this? What are the farmers’ attitudes regarding the leopards? Do farmers support potential mitigation techniques that they can apply to their livestock? These questions form the focus of my research.

The first part of the research identifies the relative influence of ecological factors on the number of cattle lost by leopards. Specifically, these factors include native prey abundance, number and type of cattle, husbandry techniques, and distance to habitat features (roads, water, continuous and patch forest). Using remote camera traps, GIS, and structured surveys, these variables are modeled to identify the most important factors involved. These results can be used to make recommendations to cattle herders and dairy cooperatives regarding which areas to avoid cattle grazing and overnight penning, as well as to guide policies on reducing conflict and ensuring stable leopard populations, including an





Camera trap image of a mother and baby tufted grey langur, one of the leopard's favourite prey species



Setting up a camera trap

increase in patrols to restrict farming in certain buffer zone habitats.

The second part of the research addresses the social aspect of leopard-livestock conflict, using surveys to measure farmers' attitudes towards leopards and potential mitigation techniques against factors like socio-demographics, cattle demographics, limitations, costs, knowledge, and experience. What we may hypothesize as being an intuitive relationship (e.g. those that bear more direct costs from losing livestock will have negative attitudes towards leopards) may not be true in this local context, illustrating the need to include this aspect into more human-wildlife conflict research and let the results speak for themselves.

There are many potential coexistence strategies to consider, including compensation programs, awareness programs, and testing out mitigations that are affordable and easy to maintain. These can include trained guard dogs, foxlights, and PVC fences to reduce the visibility of livestock to predators. The feasibility of these options requires this baseline work to be done, and an understanding of the affected community's level of support which would be integral to the success of the options selected for implementation.

Compensation programs for consideration include a levy on luxury hotel chains near Yala National Park. The area is a popular tourist destination particularly due to the leopards. They would provide an opportunity for the hotels, and their patrons, to contribute towards a fund that cattle farmers could draw upon if and when they endure livestock losses from leopard attacks. Funds could also be used

to help farmers reinforce their pens if they get damaged by elephants (a frequent occurrence), or to vaccinate cattle against common diseases.

We must also consider alternative ways to facilitate coexistence. For example, if livestock losses from disease can be reduced through a less expensive vaccination program, then farmers may tolerate losing a limited amount of livestock to leopard attacks. After conducting numerous surveys, 80% of cattle herders surveyed believe that leopards are their biggest issue, yet 84% of them believe leopards conservation is important and appreciate the economic value leopards provide. To me, this indicates a promise of coexistence, but we must act now to prevent negative attitudes from becoming ingrained in the community, which would be a very complex issue to reverse.

Sri Lanka must consider how to balance their rich biodiversity with activities that threaten it such as agriculture and logging. For successful coexistence, we cannot prioritise humans over wildlife or vice versa; instead we must examine practical ways to accommodate them both. Promoting coexistence and protect-

ing this endangered, endemic leopard subspecies, and therefore preserving large swaths of their habitat, will also protect a wide range of species that exist within their range, from amphibians (90% of which are endemic), to mammals, to flowering plants.

After my research in Sri Lanka, my advice is to appreciate the uniqueness of each site, and lean on local participants and those with expertise for help navigating complex nuances and attitudes. It takes years, even decades, to fully understand a system's human and wildlife communities, so local insights are key to implementing resolutions. Time is of the essence as many large carnivores are endangered and undergoing global population declines.

I am returning to Sri Lanka this summer and will meet with farmers to share the results of my research and solicit their input on proposed mitigations that can be field tested as possible opportunities to mitigate human-wildlife conflict.

*Aisha Uduman is an MSc student under the supervision of Dr. Cole Burton, of the Wildlife Coexistence Research Lab. She can be reached at: [aisha.uduman@gmail.com](mailto:aisha.uduman@gmail.com).*



A Sri Lankan leopard glancing at me before crossing the road in Yala National Park



# URBAN FORESTRY: AN EQUITY PERSPECTIVE

*Lorien Nesbitt*



Imagine there was a simple, inexpensive way to address some of the key challenges facing humanity today. What if we could help improve the health and wellbeing of people of all ages around the world, from children to the elderly, while mitigating and adapting to climate change? What if we could help increase the birth weights of newborn babies, promote pro-environmental behaviour and stewardship, and encourage feelings of social connection and attachment to our local neighbourhoods? If we could buffer extreme heat events and prevent flooding during periods of high rainfall? The good news is, multi-disciplinary research provides evidence that trees and associated vegetation can provide many of these important benefits.

An urban forest is a collection of trees and vegetation that grow within a city. It provides critical benefits to help address many of the well-documented challenges of city living. These challenges include the urban heat-island effect, flooding-prone infrastructure, and the documented struggles of urban populations with feelings of social detachment and poor psychological health.

Although urban forests are a key component of healthy and livable cities, in advance of creating these green spaces it is important to ensure that they are developed to meet the needs of all inhabitants equitably. In examining how urban forests can improve the well-being of our societies, we need to consider issues such as who is involved in designing, creating and managing them; whose preferences, cultures and identities they represent; and how they are distributed in our cities. Our recent research, conducted at UBC in collaboration with Mike Meitner, Cecil Konijnendijk, Cynthia

Girling, and Stephen Sheppard, has started to shed some light on the environmental justice and green equity issues related to urban forestry.

In order to establish a baseline understanding of who has access to urban forests in different kinds of neighbourhoods, we examined the spatial distribution of urban forests in 10 metro areas in the US. We used high-resolution aerial imagery and census data to examine the relationships between different socio-economic and built environment factors and the distribution of urban trees, mixed vegetation, and parks. Our findings point to several challenges faced by US cities in providing fair access to urban forests. First, high-density neighbourhoods generally have lower access to urban trees and vegetation. The implication of this finding is that the neighbourhoods where most people live are also the most underserved by urban forests. However, we also found that these high-density neighbourhoods sometimes have higher levels of park accessibility, suggesting a possible approach to providing high-density neighbourhoods with access to urban forests.

A second key finding was that neighbourhoods with more educated and wealthier residents were more likely to have more trees and vegetation in almost all the cities we studied. This suggests that those with greater economic and social power are better able to access urban forests in their neighbourhoods. It might also suggest that more educated residents are choosing to live in greener neighbourhoods.

The third key finding was that racialized residents, and in particular Black and Hispanic populations, had lower access to urban forests in their neighbourhoods, especially in larger,





The Heidelberg Project, Detroit, MI, USA



Yarn-bombed trees, AZ, USA

denser cities. This finding requires further study but likely expresses historical and current patterns of marginalization due to race.

Unfortunately, these findings make it clear that in a wide range of US cities, particularly those that are larger and denser, residents who are poorer, less educated, and in some cases

equity in theory and in practice. This research has highlighted the key elements of fair urban forest governance and stewardship, including representation of diverse identities, perspectives, and points-of-view; and governance and stewardship procedures that allow diverse participants to be heard, valued, and have influence on

interact with the urban forest with which we live.

Our research has begun to highlight the many ways in which Vancouver residents express and share their biocultural relationships. These include Vancouver's Greenest City and urban forestry policies and plans; traditional farming practices at the UBC Farm; and recreation and intercultural exchange in iconic parks and gardens such as Stanley Park and the Dr. Sun Yat-Sen Garden. There are also examples of biocultural tensions in the region, for example in the conflict over the Trans Mountain Pipeline expansion and the use of urban park spaces by homeless and housing insecure populations.

If a city's biocultural diversity is to be enjoyed by its diverse residents equitably, we need to design urban forest governance and stewardship processes that recognize and supports this goal. We still have a long road to travel before we can achieve truly just urban forests and urban forestry, and our lab hopes to contribute to this conversation, both locally and around the world.

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“ Urban forests are a key component of healthy, liveable, vibrant cities. So, what are we waiting for? ”

racialized, are less likely to be able to access all of the benefits of urban forests. As a result, cities are less likely to be healthy, livable places for these residents. While this research and other studies are starting to uncover inequitable patterns of urban forest access, we still don't know if these patterns are widespread in other US cities, in Canadian cities, or others around the world. And although we can hypothesize as to the reasons for these seemingly unjust distributions, we don't yet know how different factors influence the distribution of urban forests in different contexts.

To better understand these connections, another aspect of our research, also with a focus on select US cities, is exploring the meaning and dimensions of urban green

outcomes. It also enables processes and forums that are of interest to a diverse cross-section of participants, and that are structured to encourage a broad spectrum of participation. These elements are key to ensuring that urban forest strategies and plans, tree planting decisions, and urban forest stewardship programs are truly equitable.

The importance of equitable urban forest governance and stewardship has been highlighted by our recent research locally in Vancouver, BC. It explores the biocultural diversity that lives and grows within the city. Bioculture is the intersection and interaction between human culture and the natural environment; it describes our relationships with nature and is a key aspect of how we as humans



# ALUMNUS LEADS BC-BASED CONSULTING FIRM



Summer jobs don't often get much attention. For many students, they are a way to make money for the coming school year, and if they learn a thing or two along the way that's a bonus.

But for alumnus **John Drew**, a summer job changed his academic focus completely, leading him to eventually establish one of BC's most successful forest management companies.

Born in Kamloops and raised in Salmon Arm, John was one of six children in a sawmilling family. His father never had the opportunity for postsecondary education, so as John says, "It was always a priority for us kids to go to university somewhere. UBC appealed to me because it was relatively close."

John was accepted into the Faculty of Commerce (now Sauder School of Business) at UBC, where he intended to apply his business knowledge to help with the family business.

However the summer before entering UBC John got a job working in forestry that changed his

path completely. "I was doing timber development for cut blocks as well as some firefighting, and I loved it," he says. "I switched out of commerce to science, because back then forestry students had to take first year sciences. I never attended a single business class!"

John met his wife Cheryl in high school, and she also attended UBC, in the Faculty of Agriculture (now Land and Food Systems). They were married in 1981.

John graduated with a BSF in 1984, and entered an extremely tough job market. "The BC economy wasn't doing very well then," he says. "My dad had lost his sawmill, so the vision of working in that business was gone. I got a summer job working in Houston for Weldwood, but they weren't hiring permanent staff and I got laid off in the fall."

Expecting their first child, John and Cheryl moved back to Salmon Arm to live with family while getting back on their feet. John began to do contract work with local companies, learning more about forestry with each

one. "It was challenging to move back home without work, but we were both pretty determined and independent," he says.

In 1987 John established Forsite along with two partners. The initial focus of the company was timber development and reforestation, based on the strengths of the principals. "When we started out we used our diverse skills and training to give clients the services they needed," he says. "After a few years, as we started to grow, we began to get involved in strategic planning and forging a future several years out. We have been committed to that process ever since."

Today Forsite employs over 130 people and has 11 offices in BC, Alberta, Saskatchewan, and Ontario. The company is headquartered in Salmon Arm.

"We have become known for the ability to bring the right team together to package solutions for our customers. We have a broad range of skill sets across the company," John says.

"Our success is tied very closely to our people," he adds. "We have people here who are very specialized and they are experts in their fields. And we have very good project managers as well. We spend a lot of time doing employee reviews and finding out what people want in their careers; then we incorporate those desires into our strategic plan for the business."

"We also employ a lot of UBC graduates," John says. "When you work for Forsite, you can use your training differently in different projects, and you will always be seeing and learning new things. There are lots of opportunities for career development and growth."

# DONORS SUPPORT EDUCATION PROGRAM ON HAIDA GWAI



Gary and Louise Kenwood in SGang Gwaay, Haida Gwaii

In a world where it's easier than ever to shut out dissenting opinions, surround yourself with like-minded people, and become insulated from the unfamiliar, the Faculty of Forestry has developed a successful program that does just the opposite – and students love it.

The UBC Haida Gwaii Institute (HGI) offers third and fourth-year students exceptional learning experiences in natural resources management, reconciliation studies, marine conservation, community resilience, and more. The semester-long programs during the academic year allow students to earn credits while learning, living and volunteering in small, remote communities on Haida Gwaii, while the four-week summer sessions offer immersive classroom and field experiences.

Caitlin Laidlaw is a forestry student who attended HGI in 2016. "Perhaps the most unique aspect is the integration of the students within the Haida community," she says. "Where else in Canada would I be able to live on a First Nations reserve and get invited to community dinners and potlatches, and openly discuss how Canada and First Nations

communities can work towards reconciliation?"

Joseph Moric, a third-year forestry student, says that HGI "has allowed me to become more honestly open to different perspectives, different ways of knowing, and pushed me to understand the value of diversity not only in ecosystems but also in people."

HGI also gives students learning opportunities that are unavailable on UBC campuses. Third-year student Georgia Hall says, "Learning about ancient Haida village sites while actually being in Kuuna or hearing about the Lyell Island standoff of 1985 while staring at the Windy Bay Legacy Pole made the information relayed even more meaningful. I woke up every morning eager for class and excited for whatever unique adventure that day would involve."

Over and over, students relate how the HGI experience gave them a new perspective. In some instances this has led to "light-bulb" moments, such as this one for Erin Stewart: "Our time at Tarundl Creek brought me to realize my passion for riparian ecosystem conservation and research of land use effects on salmon life cycles. I now hope to study this throughout a graduate degree."

As enriching and beneficial as HGI is, it's also expensive for students. The program fee is \$4,000 for a semester and \$1,600 for a summer session, above and beyond UBC tuition. On top of that there's the cost of travel to and from Haida Gwaii, as well as accommodation and living expenses that are generally higher than usual due to the remote location.

To help bridge the financial gap for forestry students in need, the Faculty has established a Travel Award program. With the help of donors, 12 or more Travel Awards will be given each year to deserving students.

**Gary and Louise Kenwood** have supported forestry students for many years, initially through their award for Aboriginal students, and now through the Travel Awards program. They recently renewed their commitment to support two students for the next three years. "We have visited Haida Gwaii and have talked with students in the HGI Travel Award program," Gary says. "It's clear to us that this program provides a valuable learning experience, with impacts that extend beyond academics into cross cultural understanding. Certainly it's important that we all support programs of this nature."

Other donors have come on board as well. A private grant-making foundation funds four full-semester grants each year, and UBC alumna **Dee Rothwell** will be supporting the first grant for summer session students, starting in 2020.

*Additional opportunities remain to assist students in experiencing a deeply meaningful and possibly life-changing semester on Haida Gwaii. Please contact Emma Tully at [emma.tully@ubc.ca](mailto:emma.tully@ubc.ca) or 604.822.8716.*



# FORESTRY'S DAY IN THE WOODS



Alumni and their families gathered on Sunday April 28, 2019 for the annual Forestry's Day in the Woods. Participants enjoyed a presentation from Dr. Cole Burton, Assistant Professor in Wildlife Ecology and Conservation. Kids (aged 4-12) learned how to sur-

vive in the wild, then alumni along with students battled it out in a logger sports competition before settling in for a reception and gourmet BBQ dinner. Thank you to all who attended. Visit the Faculty of Forestry's Flickr account for photos.

## WILDFIRE: CAUSES, CONSEQUENCES AND COEXISTENCE PODCAST

On May 1, 2019 the Faculty of Forestry, in partnership with alumni UBC, hosted an event titled, Wildfires: Causes, Consequences, and Coexistence. You can now hear the presentation and podcast which features UBC Faculty of Forestry's Professor Lori Daniels, MSc'94, followed by a Q&A moderated by UBC's President & Vice-Chancellor, Professor Santa J. Ono. Listen to the podcast at [www.alumni.ubc.ca/podcasts](http://www.alumni.ubc.ca/podcasts).



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