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A message from the Dean

Fifty years ago, forestry was emerging as a critical component of Alberta’s resource-based economy and our Faculty was eager to help train a new generation of forest professionals. We hosted our first class in the fall of 1970. Fast forward to today, and our forestry program is still producing influential students who are guiding the future of forest management in Canada and around the globe. As we celebrate the 50th anniversary of our forestry program, this issue of Renew showcases some of the significant achievements our faculty and students are making.

I would also like to take a moment to celebrate the work of Dr. Ellen Macdonald, Chair of the Department of Renewable Resources, and her recent awards: the Scientific Achievement Award from the International Union of Forest Research Organizations (IUFRO) and the University Cup. The University Cup is the highest academic honour awarded to faculty at the University of Alberta. I am sure you will agree with me when I say that Ellen characterizes the absolute best in academia: a curious mind, a passion for education, and a collaborative spirit that bridges the gap between quality research and on-the-ground changes for our partners.

I hope you enjoy reading about the work of our faculty and students. Please reach out to me if you have any questions or would like to discuss how our programs can benefit you, your family or your organization.

Sincerely,

Dr. Stanford Blade
Dean, Faculty of Agricultural Life and Environmental Sciences

Cherishing the Past
Shaping the Future

A recent study is helping bridge knowledge gaps about the effects of commercial thinning in lodgepole pine forests in Alberta and the results are promising. The study found thinning produced higher total volume growth, even in stands that were more than 70 years old at the time of thinning.

Thinning is not a new technique in forestry, but it is gaining significant interest as companies seek to make up for fibre volumes lost to wildfires and mountain pine beetle attacks.

“That is a shift in the industry from a focus on what they are harvesting to what they are growing, this is moving conversations about silviculture beyond reforestation,” said Dr. Brad Pinno, study co-lead and Assistant Professor of Silviculture in the Department of Renewable Resources.

Past research on thinning in lodgepole pine stands has focused on stands younger than 25 years, but the influence of thinning in older stands was largely unstudied. In 1996, Millar Western Forest Products set out to change this. They implemented a trial in 40- to 70-year-old stands and older to monitor the effects of thinning.

Fifteen years after the trials were implemented, the total volume obtained from thinned stands—including the volume of the trees removed during thinning—was slightly greater than in unthinned stands. Individual tree growth also increased in thinned stands: diameter growth of 40- to 70-year-old trees increased by 66% on average, compared with trees in unthinned stands.

“[The study] provides affirmation that thinning is a viable strategy in our operations,” said Tim McCready, Forestry Superintendent with Millar Western Forest Products Ltd.

The project was funded by an NSERC Engage Grant in partnership with Millar Western Forest Products Ltd. It was recently published in the Forestry Chronicle.

Thinning promotes greater lodgepole pine growth and long-term volume

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Lieffers planning to stay active during retirement

It has been a long and fruitful career for Dr. Vic Lieffers, Professor in the Department of Renewable Resources. This fall he will officially retire and become a Professor Emeritus.

Lieffers arrived at the University of Alberta in 1983 and held an NSERC Industrial Research Chair in Enhanced Forest Management for 10 years. Over the course of his career he supervised 75 graduate students and Post-Doctoral Fellows and published over 200 peer-reviewed journal papers.

Lieffers, reflecting on his career, says he is pleased with his scientific advancements related to silvicultural techniques and mixedwood management in boreal forests. His work has directly informed free-to-grow and forest regeneration approaches in western Canada.

As Lieffers adapts to the idea of retirement, he looks forward to the slower pace of work. He plans to stay active by focusing his attention on the interface of research and forest management policy.

“I’ve had the good fortune of enjoying the work I did all my life, why would I stop now,” said Lieffers.

Student builds tool to make climate adaptation more tangible for forestry

The creative energy of a new graduate student can often be a game changer in research. It’s this energy that allowed Zhaohan Sang, a Ph.D. candidate in the lab of Dr. Andreas Hamann, Professor in the Department of Renewable Resources, to develop a new tool for building tree planting strategies informed by current and future projected climate change.

For many years, Hamann and colleagues have been developing models and maps to show how Alberta’s forests are predicted to change in response to climate change. The maps and models have showcased critical climate vulnerabilities and have caught the attention of foresters province-wide. But there has always been a missing piece—these climate maps need to be translated into on-the-ground planting strategies before they can be used to help create future forests that are resilient to climate change.

Enter Sang’s creativity and programming expertise. Sang has created an online tool that allows foresters to select seed sources that are well-suited to planting environments under observed and future climate change scenarios. The tool is designed to help avoid mistakes, like planting new trees in areas they simply are not adapted to.

“It’s very difficult to implement climate adaptation strategies at scale. It will take years to perfect implementation and we hope to help inform this transition with this new tool, which lets users explore the feasibility of policy interventions to address climate change,” said Hamann.

The tool is still in alpha version—an early proof of concept. However, Hamann and Sang are working on a proposal that would see the project fully developed for use in Alberta. The tool could become a template for a government seed transfer system to address climate change in reforestation.

The project was inspired by a climate-based seed transfer system developed by the government of British Columbia and can be accessed at (http://tinyurl.com/SangAndHamann).

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Lieffers came to the University of Alberta on a special NSERC University Fellowship program established to support young professors in a depressed economic time. He received the IUFRO Scientific Achievement Award in 2005 and served as department Chair from 2011 to 2016.
Six years ago, Dr. Barb Thomas, Associate Professor in the Department of Renewable Resources, leveraged her relationships and expertise to bring an Associate NSERC Industrial Research Chair in Tree Improvement to the Department of Renewable Resources. She has made a lasting impact through her program and has been rewarded with a five-year renewal for her program.

One of the most significant achievements during her Chair program has been the training of graduate students to fill critical positions across the country. As companies and governments place more focus on tree improvement, graduates of Thomas’s program are quickly being snapped up.

Thomas receives five-year renewal for Industrial Research Chair in Tree Improvement

“Two of my graduates have already been hired into tree improvement positions,” said Thomas.

Thomas has also developed new approaches for integrating genetic gain from tree improvement programs into traditional growth and yield models, evaluated the economics of tree improvement, and tested the drought tolerance of hybrid pine trees in Alberta. This work has been completed with a clear eye to applications in policy and practice.

“Delivery of a useable product has always been key in what I do, and it’s been critical to continue this when given the opportunity of an Industrial Research Chair position here at the University,” said Thomas.

During the next phase of her Chair position, Thomas plans to continue her core area of research and expand her focus to integrating research findings into the province’s seed orchards and tree nurseries.

The Chair was made possible through the generous support of numerous forestry companies, NSERC and the Government of Alberta.

New Chair in Ecosystem-Based Forest Management eager to train new students

Dr. Charles Nock, Assistant Professor in the Department of Renewable Resources, has recently been announced as an NSERC Industrial Research Chair at the University of Alberta. Nock recently spent several years conducting research in the Black Forest while at the University of Freiburg in Germany and has worked with leading forest ecologists in Canada, including completing a postdoc with Dr. Christian Messier in Montreal.

Nock’s track record for undertaking influential science is already impressive, with a publication in Science and one of the 10 most cited papers in the last 25 years in the International Journal of Wildland Fire. But what Nock looks forward to the most is the opportunity to guide young students on their path of exploration and learning.

“Forests are key to our future and addressing key challenges to sustainability. I am excited to be back in Canada and to be working with the young researchers that will help to provide solutions,” said Nock.

Since being hired, Nock has worked alongside the forest industry and governments to design a research program that is both scientifically robust and relevant to the province’s changing forest industry. A central focus of Nock’s program will be understanding the patterns and processes that occur following wildfires and leveraging this knowledge to test and inform harvesting practices modeled after natural disturbance.

Nock plans to study how residual patches left following forest harvesting compare to those created by wildfire and how this might help improve the resilience of harvested sites. He will also investigate the resilience of Alberta’s forests to climate change, including the growth response of mixedwood forests to drought. His research will be building on a 20-year research program established at the world renowned EMEND (Ecosystem-based Management Emulating Natural Disturbances) research site.

Nock’s NSERC Industrial Research Chair in Ecosystem-Based Management for Forest Stand Resilience is supported by the University of Alberta, Mercer Peace River Pulp, the Forest Resources Improvement Association of Alberta, Alberta-Pacific Forest Products, Canfor, Tolko, West Fraser, and Weyerhaeuser.
A new fire research network is being established at the University of Alberta thanks to a $5 million investment from the Natural Sciences and Engineering Research Council of Canada (NSERC) with support from the Canadian Forest Service. This national collaboration, The NSERC/Canada Wildfire Strategic Network, will bring the best minds in wildfire science together to train new students, develop new tools and improve the state of knowledge related to wildfire management.

"It’s an exciting time in wildfire management. This network allows for synergies and collaborations that wouldn’t have happened otherwise," said Dr. Mike Flannigan, Professor in the Department of Renewable Resources and Principal Investigator for the new network.

The network is a culmination of considerable effort by the wildfire community. In 2019, the Canadian Forest Service released the Blueprint for Wildland Fire Science in Canada (2019–2029), which provided a roadmap of six priority themes for future investment in fire research and management. More than 100 individuals from government, academia, Indigenous organizations, and non-government partners from across Canada contributed to the effort.

"It’s time for our fire management systems to be enhanced and updated, and this network is a springboard for achieving that," said Flannigan. Developing tools relevant to forest-based communities is also a major focus of the network. Dr. Jen Beverly, Assistant Professor in the Department of Renewable Resources, is involved in two of the research themes and sees enormous opportunity. She will be working on projects to help plan evacuation routes and identify areas for strategic fire containment around communities to reduce the risk to people and property.

"One of our goals is to help position communities with information for when and if a fire approaches their community," said Beverly.

Beyond the potential research impact, the network is sure to leave a legacy on Canada’s wildfire community. A recent survey of fire professionals across Canada found that one third of them plan to retire in the next five years. The network will train and educate at least 66 students to help fill this void.

"These students will be the next generation of fire professionals,” said Flannigan.

The NSERC/Canada Wildfire Strategic Network will join the existing Canadian Partnership for Wildland Fire based at the University of Alberta. The network was made possible through the considerable vision and effort of colleagues at the Canadian Forest Service – Northern Forestry Centre.
Forests can face many challenges re-establishing on reclaimed mine sites, including challenges related to salt movement in soils. However, a new study exploring oil sands reclamation has found that applying up to 75 cm of tailings sand, or 200 cm of overburden as capping soils, can help protect trees and plants from groundwater with high salt concentrations.

The study was conducted by Dr. Scott Chang, Professor in the Department of Renewable Resources, and colleagues. Salt in groundwater can migrate up into the rooting zone of trees and other plants, slowing their growth and in some cases leading to mortality. Capping soils, which are used to shape the topography of reclaimed landscapes, can help create a barrier between salty groundwater and cover soils where vegetation grows.

Chang and colleagues established controlled trials in a greenhouse where 50 cm of a cover soil (peat mineral mix) was placed on different depths of capping soils (tailings sand or overburden). In one case, no capping soil was used, meaning cover soils were directly exposed to salty water. At the other extreme, 50 cm of cover soils and 150 cm of either tailings sand or overburden were placed over the salty water.

During the greenhouse study, Chang and colleagues found that a minimum of 20 cm of tailings sand or 50 cm of overburden was required to keep the salty groundwater from migrating up into cover soils and reducing plant growth or causing mortality. To be resilient to salt movement over a 15-year growth period, modelling results showed that a minimum barrier of 75 cm of tailings sand or 200 cm of overburden is required.

The results have important implications for oil sands companies as they design their reclaimed landscapes and determine how much capping soil is required in areas with a saline groundwater.

The study was a collaboration with InnoTech Alberta and was funded by Total E&P Canada Ltd.
Forest harvesting is often identified as a key contributor of sedimentation to nearby streams, particularly in mountain landscapes with steep slopes. However, a recent study is turning heads by showing that diligent attention to modern best management practices may lead to far different outcomes than historical studies have reported.

The results are emerging from the Southern Rockies Watershed project—a large-scale, long-term study about the effects of wildfire and forest harvesting on water quality and runoff in the Oldman River Basin.

After studying the effects of the Lost Creek Fire in 2003, Dr. Uldis Silins, Professor in the Department of Renewable Resources, and colleagues were asked to research a replicated harvest trial installed in 2015. The harvest trial was delivered by the Government of Alberta and Canfor to assess impacts of harvesting on sedimentation, runoff, and other water quality indices. Three different harvesting treatments were applied and the entire process was completed in less than 12 months (including reclaiming the roads).

To the surprise of Silins and his colleagues, sedimentation levels in local streams did not increase following harvesting or access road installation. Silins attributes the result to the diligent use of best management practices. These practices included creating surface roughness within scarified harvest blocks to increase water infiltration, carefully selecting creek crossing locations, and applying erosion control techniques during and after crossing installation.

These positive results likely cannot be expected at all sites and in all situations. However, Silins has been encouraged by how well the diligent attention to best practices paid off.

“Best management practices, when judiciously applied, dramatically change the impacts of harvesting on the landscape. The key is that operators need to ensure that what they are doing, they are doing well,” said Silins.

The study was completed as part of the Southern Rockies Watershed Project and was supported by numerous agencies.
the fifth-best program of its kind globally. The past decade has also seen significant interest in the program and consistent enrollment growth, with 2019 seeing one of the largest class sizes in recent memory.

“Our forestry program was established on the concept of managing forests as integrated ecological systems and a focus on sustaining a diversity of ecological, economic, and social values. That focus remains to this day and, indeed, has become ever more important as we address the multiple challenges facing our forest landscapes. We are so proud of our many alumni who are ensuring a sustainable future for our forests,” said Dr. Ellen Macdonald, Chair of the Department of Renewable Resources.

To help celebrate the landmark 50th anniversary, the Faculty and Department have been organizing a series of virtual events, including class reunions and discussions with Professors Emeriti. If you are an alumni and want to make sure you are included in these events please contact: cynthia.strawson@ualberta.ca.

In 1968, recently hired Dean of Agriculture Dr. Fenton MacHardy had a vision. As Alberta’s forest industry became more established, MacHardy knew there was a growing need for education specific to Alberta’s boreal forests. It was this vision, and the hard work of MacHardy and his colleagues, that saw the Bachelor of Science program in Forestry host its first students in the fall of 1970.

“I just had a vision that trees were another growing crop,” said MacHardy at the time.

Forestry has come a long way since those initial days, but the legacy of MacHardy’s initial vision is readily apparent: fifty years of teaching and research, a global reach of forestry graduates applying their skills in a wide range of disciplines, and a clear imprint on forest management practices of the past and the future.

Energetic and committed faculty members have been key to delivering the program and achieving its lasting impact. In 2017 the Centre for World University Rankings identified the University of Alberta’s Forestry program as

Inset photo: Class of 1977 seen here in the spring of 1977 on a forest recreation class tour in Jasper.

A year in Europe a transformative experience for forestry students

The city of Freiburg, Germany, is known for its architecture, mild climate, and proximity to the famous Black Forest. But for two recent University of Alberta graduate students, it also served as an excellent place to learn about international approaches to forest management.

Sara Venskaikitis and Zhihaohan Sang are graduates of the TransFor-M program, a two-year transatlantic forestry master’s program leading to dual degrees in forest and environmental management. Students spend one year in Europe and one year in Canada, gaining new cultural and educational perspectives.

Some of the students’ most memorable moments came during fieldwork where they were able to explore Germany’s Black Forest and learn about soils in Bavaria.

“It was a chance to learn about all aspects of forestry, especially from an international perspective,” said Sang. “I also learned you have to be a licensed hunter to be a forester in Germany.”

Venskaikitis came away with a greater international focus and she relished the opportunity to attend school and live abroad.

“The cultural exchange aspect was interesting,” said Venskaikitis. “[The trip] is something we’ll remember for the rest of our lives.”

The TransFor-M program is growing in popularity, with options for exchanges to the Universities of Vienna (Austria), Freiburg (Germany), Bangor (UK), Joensuu (Finland), and Padua (Italy).

For information about TransFor-M and to apply, contact Dr. Andreas Hamann at andreas.hamann@ualberta.ca or check out the program web page (https://tinyurl.com/ydxh5zeu).

Credits:
Content: Matthew Pyper, Fuse Consulting Ltd.
Sarah Pratt (p.14)
Photos: Uldis Silins (Cover, p.11), Brad Pinno (p.2), Mike Flannigan, Jen Beverly, Dave Schroeder (p.7,8).