UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

UNBC Annual Research Report

2017

About UNBC

Located in the spectacular landscape of Northern British Columbia, UNBC is Canada's best small university according to Maclean's magazine. We have a passion for teaching, discovery, people, the environment, and the North.

UNBC provides exceptional undergraduate and graduate learning and research opportunities. In addition to fostering and celebrating academic excellence, UNBC is a welcoming place, with a learning environment that is friendly, inclusive and supportive.

UNBC is a University both in and for the North. This mission has instilled a strong sense of ownership, purpose and adventure among our students, alumni, faculty, staff and the communities we serve.

We are also Canada's Green University leading the way to a more sustainable future for all through teaching, research and University operations.

Vice President's Message

It is my pleasure to provide a brief overview of research at UNBC. Research is an integral component to the success of UNBC and we are excited by the outstanding research impacts developed by our students and faculty. Our research program is grounded in Northern British Columbia but extends globally. UNBC continues to emerge as a research-intensive University utilizing our strengths in the areas of Natural Resources and the Environment; First Nations and Indigenous Studies; Northern, Rural and Environmental Health; and Community Development. Further, UNBC is committed to supporting the emerging research areas of Climate Change, Wood Engineering, Environmental Sustainability, Healthy Communities, Bio-Energy and Agriculture. UNBC researchers and scholars are committed to preserving, sustaining and enhancing the future of the Canadian North, and beyond, and through partnerships and collective investment, we can generate a breadth of scholarship benefiting society and our future generations. UNBC is truly creating local solutions that are globally relevant and I welcome you to connect with us.

Dr. Geoffrey W. Payne
Vice President Research and Graduate Programs

Mission

To grow capacity and opportunities for research and creative activities at UNBC by engaging our people and partners, leading to the discovery of new knowledge that has transformative academic, economic or social benefit for the region, province, nation, and beyond.

Vision

To build a flourishing research culture facilitated by state-of-the-art infrastructure and efficient support services, enabling UNBC scholars to undertake leading-edge local, national, and international research with respect for humanity and nature.

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Introduction

UNBC was included in the Times Higher Education World University Rankings for the first time ever in 2017. UNBC placed in the group of universities ranked 601st to 800th, putting the University in the top four per cent of post-secondary institutions worldwide. UNBC is the only Canadian university of its size to be included in the rankings. “Being included in this exclusive list is a testament to UNBC’s outstanding research culture and superb scholarship, as well as the commitment to excellence that our faculty, students and staff demonstrate each and every day,” says UNBC President Dr. Daniel Weeks. “In addition to being Canada’s best small, research-intensive university, the Times Higher Education World University Rankings recognizes UNBC as being among elite universities globally.” UNBC has also placed in the top three in its category in the Maclean’s rankings every year for a decade, the only university in its category to achieve this level of consistency. The research activity of UNBC faculty, graduate and undergraduate students has been paramount in achieving these important milestones.

Through sponsored research, institutional research partnerships and research linked to philanthropy, UNBC has been able to acquire and invest over $21 million dollars towards research activities in 2016-2017. The past year has also been one leading to a significant increase in research capacity at UNBC and here are a few highlights. A $5.3-million joint federal-provincial investment was announced for a Wood Innovation Research Lab that will accelerate innovation in timber engineering and development of wood products. The opening of the branch Research Data Centre at UNBC (RDC@UNBC) in June has provided our researchers a secure connection to Statistics Canada population, household survey and administrative microdata enabling researchers to answer critical questions facing British Columbians and Canadians without having to travel to Vancouver or Ottawa. In December, the Interior University Research Coalition (IURC) was formed. This memorandum of understanding between the University of Northern BC (UNBC), Thompson Rivers University (TRU), and the University of British Columbia’s Okanagan campus (UBCO) will facilitate mobility and academic opportunities for students and faculty, enhance research partnerships and enable greater overall co-ordination among the institutions. As partners, the three universities form a core of research and innovation talent in the BC Interior that will further develop the innovation ecosystem of the entire region, build and strengthen new and traditional industries, and enhance overall quality of life.

UNBC is committed to interdisciplinary and interconnected areas of scholarly inquiry of critical importance, as well as to Canada and the Circumpolar North, a commitment reflected in the collection of research stories presented throughout this report. UNBC’s four strategic research areas, (i) Environment and Natural Resources, (ii) Community Development, (iii) Northern, Rural and Environmental Health, and (iv) First Nations and Indigenous Studies align with our values, vision and mission, including fostering research that is internationally recognized for its quality and impact, and for its orientation to communities’ needs. UNBC’s 14 research chairs drive innovative research programs that are recognized at the national and international level.

UNBC’s research institutes, facilities and forests foster research collaboration among UNBC researchers and getting valuable research outcomes to communities of practice. These include:

Institutes and Centres:

- Community Development Institute (CDI)
- Health Research Institute (HRI)
- National Collaborating Centre for Aboriginal Health
- Natural Resources and Environmental Studies Institute (NRESi)
- Pacific Institute for Climate Solutions
- Urban Aboriginal Knowledge Network Western Research Centre
- Women North Network/Northern FIRE

Research Forest and Stations:

- Aleza Lake Research Forest
- Dr. Max Blouw Quesnel River Research Centre
- John Prince Research Forest

Research Facilities:

- Genetics Lab
- GIS & Remote Sensing Lab
- High Performance Computing Lab
- I.K. Barber Enhanced Forestry Lab
- Northern Anlytical Laboratory Services
- Northern BC Archives
- Tree Ring Lab
- UNBC Research Data Centre

UNBC has developed significant physical infrastructure for research, in part due to generous support from Canada Foundation for Innovation in partnership with the British Columbia Knowledge Development Fund, Western Economic Diversification Canada (WD), and other government funding initiatives. The UNBC Northern Analytical Laboratory Service (NALS) provides an extensive suite of analytical science instrumentation that enables a broad spectrum of biological, chemical and physical analyses.

Two research forests provide research and education facilities and opportunities to UNBC, other universities, government agencies, private sector research, and educational groups with an interest in ecosystem and resource management studies. The Dr. Max Blouw Quesnel River Research Centre is Western Canada's first field station established to support research and education in landscape ecology. The High Performance Computing (HPC) lab at UNBC enables research on projects such as weather hindcasting, regional climate model dynamic downscaling, simulation of shocks, fluid dynamics, computational chemistry and distributed transaction processing. UNBC’s Geoffrey R. Weller Library also plays a key role in enhancing research intensity at UNBC.

The Annual Research Report provides an overview of what we have achieved over the last year and offers a look at the impact of the diverse research pursued by our researchers.

A Research University: Growth and Partnerships

13,072
UNBC Alumni
22 Post-Doctoral Fellows

6 Canada Research Chairs
5 Endowed Chairs
2 BC Leadership Chairs
1 Knowledge Mobilization Chair

Total Acquired and Invested in Research

Over $21M

Funding Agency	$ Amount (Fiscal 2017)
NSERC	$847,961.00
SSHRC	$313,136.00
CIHR	$605,026.61

329 faculty members
184 Full-time faculty (tenure & tenure-track)
145 Part-time faculty
817 total employees
(2015/16 numbers)

3,800 Total Students
3,143 Undergrad
657 Graduate
(2016/2017)

11.2%
International Students

745 Credentials conferred
595 Undergraduate
160 Graduate
(2017)

Canada and British Columbia Invest in UNBC Wood Innovation Research Lab

Premier Christy Clark announced a $5.3-million joint federal-provincial investment that will accelerate innovation in timber engineering and development of wood products at the University of Northern British Columbia. Premier Clark made the announcement during the Natural Resource Forum in Prince George on behalf of the Province of B.C. and the Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development.

$1.9 million comes from the Government of Canada, with $3.4 million from the Government of British Columbia. The City of Prince George is providing land for the facility in downtown Prince George, adjacent to the Wood Innovation and Design Centre. The Wood Innovation Research Lab will be used by students in the master of engineering in integrated wood design program and the B.C. leadership chair in tall wood and hybrid structures engineering.

Premier Christy Clark is joined by UNBC President Dr. Daniel Weeks, Mayor Lyn Hall, MLAs Shirley Bond, Mike Morris and John Rustad and UNBC students at the Wood Innovation Research Lab announcement.

UNBC Opens Research Data Centre

Researchers at the University of Northern British Columbia and around the region now have a secure connection to Statistics Canada population, household survey and administrative microdata through the UNBC Research Data Centre.

"The Research Data Centre is a meaningful addition to UNBC's research capacity," says UNBC President Dr. Daniel Weeks. "It will facilitate microdata analysis by UNBC researchers as they seek answers to critical questions facing British Columbians and Canadians."

Prior to the opening of the UNBC Research Data Centre, researchers from Northern B.C. travelled to larger centres, including Vancouver and Ottawa, to access the secure computers necessary to conduct their work. Approved researchers, which can include faculty members, graduate students and others in the community, will now be able to access that same survey, census and administrative microdata in the data centre located on the first floor of the Geoffrey R. Weller Library at the UNBC Prince George campus.

"Statistics Canada is delighted to mark the launch of the Research Data Centre at the University of Northern British Columbia," says Anil Arora, Chief Statistician of Canada. "This centre will promote scientific research by making Statistics Canada population and household microdata available to researchers. The work that will be done here will inform public policy and public debate, while maintaining the confidentiality of the data involved."

The facility at UNBC is a Branch Research Data Centre affiliated with the British Columbia Inter-University Research Data Centre, which is, in turn, a member of the Canadian Research Data Centre Network.

The UNBC Research Data Centre received support from Statistics Canada, the Social Sciences and Humanities Research Council of Canada, the Canadian Institutes of Health Research, the Northern Medical Program and Northern Health.

"We're proud to support access to secure and sensitive data by researchers in the north. The Research Data Centre is important from a health perspective because we will now have access to information that can help us to better understand the needs of the people we serve in Northern British Columbia" says Fraser Bell, Vice President, Planning, Quality & Information Management, Northern Health.

UNBC is one of 29 University campuses in Canada to host a Research Data Centre.

"Supporting health research that seeks to make a difference in the lives of Northern B.C. residents plays a key role in our program," says Paul Winwood, Associate Vice President, Northern Medical Program, UNBC, and Regional Associate Dean, Northern BC, UBC Faculty of Medicine. "This new centre will help both our researchers and their colleagues at UNBC, and in the north, to more easily pursue their scientific queries."

From left, Associate Vice-President, Northern Medical Program and Regional Assoicate Dean, Northern B.C., UBC Faculty of Medicine Dr. Paul Winwood, Statistics Canada Regional Manager, Microdata Access Division Dr. Lisa Oliver, UNBC Research Data Centre Academic Director Dr. Cindy Hardy and UNBC Vice-President Research and Graduate Programs Dr. Geoff Payne celebrate the opening of the Research Data Centre.

Interior universities join forces to take research to a new level

Students at British Columbia's three Interior universities will benefit from enhanced research opportunities and increased mobility, thanks to a newly signed agreement that will be a game changer for higher education in the region.

The Interior University Research Coalition (IURC), a memorandum of understanding between the University of Northern BC (UNBC), Thompson Rivers University (TRU), and the University of British Columbia's Okanagan campus (UBCO), is the product of more than two years of collaboration.

As partners, the three universities form a core of research and innovation talent in the BC Interior that will further develop the innovation ecosystem of the entire region, build and strengthen new and traditional industries, and enhance overall quality of life. The agreement will facilitate mobility and academic opportunities for students and faculty, enhance research partnerships and enable greater overall co-ordination among the institutions.

The IURC commits to the creation of a tri-university partnership office, whose mandate will be to explore new possibilities for talent development, facilitate research collaboration and co-ordinate joint funding proposals. The office will be headed by Janice Larson, an expert in strategic planning with more than 22 years of experience in public policy development and implementation.

"It's great to see three of our universities collaborating to advance research and innovation opportunities," says Melanie Mark, Minister of Advanced Education, Skills and Training. "Research, innovation and entrepreneurship in the post-secondary sector are critical to our 21st century economy. Research and innovation supports industry demands as well as improving the lives of citizens in the Interior, throughout our province and across the country."

While each university contributes its own areas of expertise, co-ordination of efforts will enhance student access to equipment and mentorship across the partner institutions, help form clusters of expertise, and meet provincial and federal priorities, including fostering talent, training highly qualified personnel and driving innovation in the technology sector and all areas of the economy.

"Each of our institutions brings a unique set of research strengths that will ultimately lead to greater educational opportunities for graduate students in Central and Northern B.C. By working together we have the opportunity to apply innovative research solutions and ask meaningful questions about life in the 21st century," says UNBC President Dr. Daniel Weeks.

"This agreement recognizes the mutual interests our institutions have in supporting research in the province. Graduate students and researchers bring ideas, questions and solutions and can bring real benefits to communities through their collaborations," says TRU President and Vice-Chancellor Alan Shaver.

"Universities have a special role to play in partnership with the communities they serve. By collaborating more closely with our colleagues across the region, we can be drivers of discovery, understanding, and innovation for positive social and economic development," says UBC Okanagan Deputy Vice-Chancellor and Principal Deborah Buszard.

UNBC Partners with University of Toronto on Remote Internship Program

The University of Northern British Columbia and the Impact Centre at the University of Toronto are creating a new national entrepreneurial experiential learning opportunity for post-secondary students.

Together they are launching a new remote entrepreneurial work integrated learning program (eWIL) that will connect UNBC students with Toronto-based startups. These startup internships will provide students of all backgrounds an opportunity to gain valuable experience applying and developing their skills in a dynamic startup environment while obtaining course credit from UNBC.

The remote eWIL program builds on the Impact Centre's expertise in creating innovative experiential learning programs. Over the past four years, the Impact Centre has placed 176 students in 42 companies as part of course-based startup internships. Workshops, classroom activities, and regular interviews supplement the work experience and ensure that the students are gaining a meaningful opportunity to engage and learn during their internships.

"Since the establishment of our WIL programming we have seen significant impact on the student education experience," says Dr. Richard McAloney, Director, Technology Management & Entrepreneurship at the Impact Centre. "After some discussion with UNBC, we've decided to explore this new and innovative way to deliver Impact Centre programming."

To pilot the program, two Impact Centre supported companies, Steadiwear and Adrenalease, each brought on UNBC students during the winter term.

The students began their internships in Toronto on January 11 and 12 by meeting with the company founders and received Impact Centre workshops on market analysis, business development, and other skills. Their work for the companies was completed at UNBC with additional workshops delivered remotely and co-supervised by the companies and UNBC staff member Mark Barnes, Director, Office of Research.

Emily Norum, a first-year biomedical student at UNBC, is one of the students participating in the program. "This program allows me to gain much greater experience than I would generally receive through classroom education alone. I get the opportunity to work with someone who understands what it takes to make their product succeed, and apply my knowledge in real world situations."

Expanding the program to UNBC highlights the interest for these programs across the country.

"The entrepreneurship ecosystem is rapidly expanding in the region and developing programs with our partners, including the Impact Centre will bring exceptional opportunities to our students," says Mark Barnes, Director of Research. "This holds great potential for flow of students and startups between our regions."

"It was impressive to see the thirst for entrepreneurship from the students and the support programming that UNBC is putting in place," says McAloney. "We look forward to working with them on this program and providing new opportunities for both students and startups across Canada.

UNBC students Basil Hassoun and Emily Norum participated in a remote startup internship pilot with the Impact Centre at the University of Toronto.

Environment & Natural Resources

International study reveals large trees in extreme altitudes of Papua New Guinea

The first field campaign surveying Papua New Guinea's lush primary forests from the coast to clouds has revealed that the high mountain tops of the rugged country may house the largest trees ever recorded globally at such extreme altitudes. These findings may force a re-think of what we know about the ideal environments for growing large trees.

The study, led by Dr. Michelle Venter, a postdoctoral fellow at the University of Northern British Columbia and involved The University of Queensland's Dr. John Dwyer and James Cook University's Professor Michael Bird. The study was published in the journal Global Change Biology. In research that spanned three years, Dr. Venter conducted seven field expeditions in areas far from roads and villages, with the help of more than 70 field assistants from five forest-dependent communities working on slopes of up to 88 degrees spanning from the coastal lowland forests (50 metres) to upper montane tropical forests (3,100 m).

Unexpectedly, researchers found that the forest biomass had a major peak at altitudes of 2,400-3,100m, altitudes where forests fail to grow more than 15 m tall in other parts of the world.

"Upper montane forests are often typified as squat and gnarly," Dr. Venter said. "Current thinking is that tall mountains make small trees."

"However, we recorded more than 15 tree families with individuals growing from 30 to 40 m tall at extreme altitudes which brings this assumption into question." The tallest broadleafs recorded were a type of southern beeche (Nothofagus starkenborghii) (41 m) and an uncommon type of southern saspheras (Dryadodaphne crassa) (40 m), and the tallest conifers were an ancient pine-like tree (Dacrydium nidulum) (35 m) and a type of cypress (Libocedrus papuana) (31 m).

Dr. Dwyer said they became excited when they realized that climate conditions found on mountain tops of Papua New Guinea were remarkably similar to those of temperate maritime areas known to grow the largest trees in the world.

"Think of the foggy mid-west coast of the USA, which boasts the epically large coastal redwoods," he said. The world's tallest known tree is a 115.8 m coast redwood found in California, and the second tallest reliably measured specimen, is a 99.82 m (327.5ft) mountain ash in Tasmania.

Coast redwoods occur in elevations up to about 920 m, while the Australian mountain ash occurs in cool mountainous areas to 1000 m altitude. This is considerably less than the PNG altitudes.

"Believe it or not, why and how trees grow large is still under investigation, and reasons for the persistence of large old trees are still not clearly known," said Dr. Bird. Large trees are susceptible to many interacting threats, from disease to climate change and because of their size and age, they don't adapt well to rapidly changing, human-modified environments.

"Near UNBC, in central interior British Columbia, we are gifted with unique pockets of inland rainforests that boast large old trees that are more typical of maritime climates, though we are 700 km from the sea," added Dr. Venter.

Funding expands on changing environments of fish and insects

University of Northern British Columbia researchers received funding for equipment that will further their studies on how insects and fish adapt to changing environments.

Dr. Dezene Huber, Dr. Mark Shrimpton and Dr. Brent Murray from UNBC's Ecosystem Science and Management department were awarded $164,000 from the Canada Foundation for Innovation's John R. Evans Leaders Fund (JELF). It's among a Government of Canada investment of more than $52 million in 220 new infrastructure projects at 51 universities.

The infrastructure will allow them to conduct experiments in the field in central and Northern B.C. as well as in a series of aquaria housed in the basement of UNBC's Research Laboratory building.

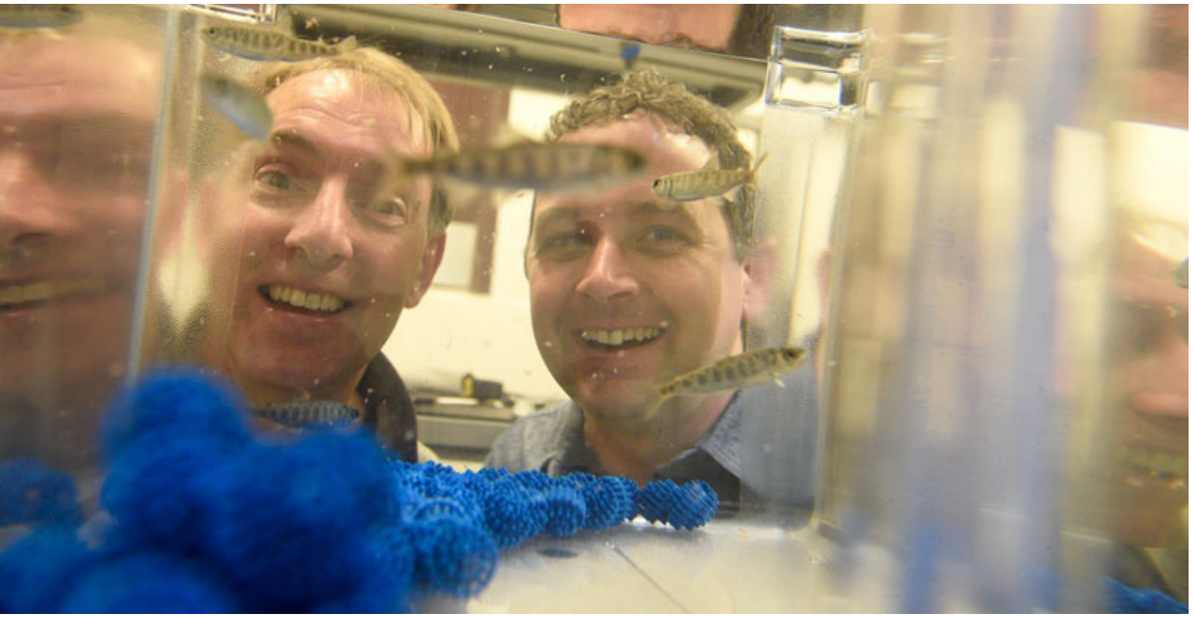
The research will help them develop innovative protocols to assess biodiversity in aquatic ecosystems, including a number of studies to monitor rare species through the analysis of environmental DNA obtained by water samples.

Highly sensitive and species specific sampling and detection techniques will be developed for species such as Arctic grayling, coastal-tailed frogs, western-painted turtles and Great Basin spadefoot toads.

Development of tools for monitoring population distribution and abundance will aid in the conservation and management of threatened species.

Funding will support lab and field equipment including pumps, microcentrifuges and microscopes that are needed to process and identify a range of samples. In addition, state-of-the art DNA extraction, quantification and digital PCR equipment will enhance capabilities for molecular genetic analysis.

Dr. Mark Shrimpton and Dr. Dezene Huber observe fish for a research project. New funding will provide more equipment to conduct aquaculture studies.



Melting Away: Tracking the Demise of a Western Canadian Ice Sheet

The Cordilleran ice sheet, which once covered all of present-day British Columbia, melted sooner than previously thought, according to a research paper led by University of Northern British Columbia Geography Professor Dr. Brian Menounos and published in the journal Science.

Menounos, the Canada Research Chair in Glacier Change, teamed up with 14 co-authors from five countries to produce the paper titled Cordilleran Ice Sheet mass loss preceded climate reversals near the Pleistocene Termination.

Previous researchers had relied on radiocarbon dating to establish when one of North America's former ice sheet disappeared from the landscape. Radiocarbon dating can be problematic for alpine regions where fossil organic matter is commonly absent. Instead, the researchers used surface exposure dating – a technique that measures the concentration of rare isotopes that accumulate in quartz-bearing rocks exposed to cosmic rays - to determine when rocks first emerged from beneath the ice.

Menounos and his co-authors showed that several alpine areas emerged from beneath the ice sooner than previously recognized. Their work also revealed that decay of the ice sheet was complex, partly due to presence of mountainous terrain, but also because Earth's climate rapidly switched between cold and warm conditions during the end of the last ice age.

"Our work builds upon a rich history of collaborative research that seeks to understand when and how quickly the Cordilleran ice sheet disappeared from Western Canada," Menounos says. "Projected sea level rise in a warming climate represents one of the greatest threats to humans living in coastal regions. Our findings are consistent with previous modeling studies that show that abrupt warming can quickly melt ice sheets and cause rapid sea level rise."
Science, published by the American Association for the Advancement of Science, is one of the world's top peer-reviewed journals with 400,000 readers each week and more than five million monthly website visits. Menounos is the first UNBC researcher to be the lead author in the journal.

"Our outstanding researchers at UNBC are creating local solutions with global impact and this publication in Science demonstrates the worldwide significance of their work," says UNBC Vice-President Research and Graduate Programs Dr. Geoff Payne. "The discoveries made by Dr. Menounos and his team of international collaborators will advance our understanding of the impact of glacial change."

In addition to covering what is now British Columbia, the Cordilleran ice sheet spanned part of the northwest portion of the United States and Alaska.

The paper presents a more refined timeline for when the ice sheet melted, and arose from fruitful collaboration between Canadian scientists and researchers from the United States, Sweden, Norway and Switzerland.

Their findings will help give researchers a better understanding of when paleo-humans may have migrated from Asia to North America as well as how the melting of the ice sheet transferred large amounts of fresh water into the Pacific and Atlantic Oceans. The findings also provide a model for researchers examining the deglaciation of modern-day ice sheets in Greenland and Antarctica.

The research received funding from the Natural Sciences and Engineering Research Council of Canada and Canada Research Chairs Program.

UNBC Geography Professor Dr. Brian Menounos (right) samples boulders associated with a terminal moraine in the Northwest Territories as part of his research into when the Cordilleran ice sheet melted. Credit: Chris Darvill, UNBC and University of Manchester

Partnering on Innovation

University of Northern British Columbia Associate Engineering Professor Dr. Thomas Tannert wants to change the way we build commercial buildings in British Columbia.

With a BC Innovation Council (BCIC) Ignite Award worth $110,000, Dr. Tannert and his colleagues at the Wood Innovation Design Centre will collaborate with BC Passive House and Equilibrium Consulting to develop and bring to market efficient and safe wood-based prefabricated commercial Mass Timber Panels (MTP).

Currently, there is no wood-based product available in North America for walls in large mass-timber buildings, but the Ignite funded research will fill that void.

The panels will be prefabricated at the BC Passive House factory in Pemberton to ensure quality. The lightweight design of the MTP will reduce transportation costs and make it easier to reach rural and remote communities. The ease of assembly will be designed with the shorter Northern construction season in mind.

This new generation of wall panels will utilize wood for its major components, enabling Passive House standard registration, faster building construction and a cost competitive wood-based solution for commercial buildings.

The BCIC Ignite awards provide funding for collaborative, industry-driven, academic research leading to projects that can be commercialized. The awards are funded through the Natural Resources and Applied Sciences (NRAS) Endowment Fund. The Province of British Columbia established NRAS to enhance the quality of life for British Columbians by building a strong research and development, advanced training, technology transfer and commercialization environment.

Community Development

UNBC to lead national research project on impacts of resource development

UNBC's Dr. Margot Parkes and a team of researchers and partners from across Canada have secured a five-year research grant focused on working together across sectors to prevent adverse impacts from resource development, with specific emphasis on rural, remote and Indigenous communities. The study will receive $2 million from the Canadian Institutes of Health Research (CIHR).

The project brings together university researchers and local knowledge-users who have identified a need to better understand and respond to the health, environment and community impacts of resource development. The research team is led by a steering committee comprised of different sectors, disciplines and communities, which is co-chaired by Dr. Parkes and Dr. Sandra Allison, chief medical health officer at Northern Health.

The team of more than 60 people will work together as the ECHO Network (Environment, Community, Health Observatory) and will draw on expertise spanning health, social and natural sciences, including UNBC professor Dr. Henry Harder, Dr. Donald B. Rix BC Leadership Chair for Aboriginal Environmental Health, and other UNBC colleagues. The research also draws on experience from four regional cases. Two are in B.C. (one in the North and the other cross-province), and the others in Alberta and New Brunswick respectively. The study also involves a range of national and international partners.

"Our research team will be looking at the impacts of resource development as a whole, including health, community and environmental considerations," said Dr. Parkes, a Health Sciences associate professor and Canada Research Chair in Health, Ecosystems and Society. "Exploring ways to work together across sectors and jurisdictions is a key part of this project, as well as working with research partners from across Canada and other parts of the world.

"Our goal is to encourage more integration, bringing together knowledge from across sectors, disciplines and organizations to address impacts of resource development that cannot be achieved by the health sector alone," added Parkes. "We have a lot to learn about how to work together on these kinds of issues. The aim is not to fix things when they go wrong but to prevent them in the first place."

The ECHO Network will develop and refine tools and processes that can help detect and prevent effects on health, communities and environments from resource-based operations. Building from current understanding of impact assessment, indicators and lived experiences, the research will focus on finding ways to better recognize and respond to cumulative impacts resulting from past and ongoing resource development within any particular region.

"This research will help fill important knowledge and capacity gaps in rural and other settings, increasing capacity across the country for observing and reporting on impacts related to resource development and how those decisions impact the health of communities and the environment," said Dr. Allison, who will act as the principal knowledge-user for the research project. "The collaboration of intersectoral partners and organizations will define novel approaches and tools to assist with improved resource decisions."

The project involves principal researchers from UNBC (Dr. Margot Parkes, Dr. Henry Harder), Simon Fraser University (Dr. Tim Takaro, Dr. Maya Gislason), the University of Alberta (Dr. Lars Hallstrom), the Canadian Wildlife Health Cooperative (Dr. Craig Stephen) and the Université de Moncton (Dr. Céline Surette). Key partners with each of the regional cases include Alberta's Battle River Watershed Alliance, the New Brunswick Environmental Network, and B.C.'s Northern Health Authority and First Nations Health Authority (FNHA). It will also involve numerous other researchers and stakeholders from around the country and the globe, including New Zealand, Australia and the Pacific.

"As First Nations people, our health and wellness is inextricably tied to the land and our territories. Everything is connected; we don't separate human health from the health of our land and environment. For us, resource development has deep and far-reaching challenges and impacts for our communities, past, present and future," said Dr. Evan Adams, chief medical officer for the FNHA. "This collaboration will facilitate connection, relationship-building, knowledge-sharing, and the generation of new ideas, supporting us to effectively respond to these complex challenges that impact the mental, emotional, spiritual, and physical health and wellness of our people."

"Building on a history of collaboration and capacity building across institutions and individuals, this project makes innovative contributions to research, and also the health, well-being and environmental quality of communities across Canada," said Dr. Lars Hallstrom, director of the Alberta Centre for Sustainable Rural Communities at the University of Alberta." The research approach recognizes that rural places and peoples still matter in Canada, but also that rural, remote and Indigenous communities can face particular challenges. Collaborative and highly interdisciplinary teams are one of the best ways to approach these challenges, and to find innovative ways to think differently about equity, the environment, and society in Canada."

"We are eager to share our best practices for cross-sectoral collaboration in addressing children's environmental health issues in New Brunswick, and to learn from best practices in other provinces," says Raissa Marks, executive director, New Brunswick Environmental Network. "It is only through working together across sectors and across the country that we can tackle the complex environmental, health, and social impacts of resource development".

"Improving the quality of life for people living in rural and remote regions, and beyond, is an important part of our research mandate," said UNBC President Dr. Daniel Weeks. "We are delighted that UNBC is actively involved with the creation of many strong partnerships through this project, and look forward to being able to build on these in future collaborations and initiatives."

"CIHR is enabling us to build upon Canada's reputation as an international leader in interdisciplinary environments and health research. This new network – ECHO – will answer questions that are of great importance to Canadians," said Dr. Steven Hoffman, Scientific Director, CIHR Institute of Population and Public Health. "Specifically, what is the relationship between the social and economic challenges of our most vulnerable environments? On behalf of CIHR, I offer my congratulations to the network and I look forward to the prevention strategies resulting from their work."

The research study is funded by a team grant as part of CIHR's Environments and Health Signature Initiative. It is supported by the Research Support Fund, a tri-agency initiative of the CIHR, SSHRC and the Natural Sciences and Engineering Research Council (NSERC), which assists Canadian post-secondary institutions and their affiliated research hospitals and institutes with the expenses associated with managing the research funded by these three federal research granting agencies.

Global Economy Spurs Change in Resource Communities

A new book written by University of Northern British Columbia researchers delves into the increasingly rapid pace of change resource-dependent communities are facing in the global economy.

Geography Professor Dr. Greg Halseth and Research Manager Laura Ryser collaborated on Towards a Political Economy of Resource-dependent Regions. The book explores how the pace of change has increased in resource-dependent communities over the past three decades due to complex and interwoven economic, political, social, demographic, cultural, environmental and community changes.

“This book is a major product from our long-term research work and it describes the broader context for the changes that are impacting resource-dependent communities and economies,” says Halseth, the Canada Research Chair in Rural and Small Town Studies. “All of it builds from our experiences and research engagement with the changes and issues that are important for Northern B.C.”

The book identifies critical matters of context to help explain the changes in regions ranging from Northern B.C. to the United States, the United Kingdom, Australia, New Zealand and the Nordic countries. By looking at the trajectories of the changes in different regions around the world, Halseth and Ryser are identifying local solutions with global impact.

“The acceleration of change is linked, in part, with the greater connectivity provided by new transportation and communication technologies as well as the increasing interconnectedness of the global economy,” Halseth explains.

Laura Ryser and Dr. Greg Halseth have collaborated on a new book on resource-dependant communities in the global economy.

Agriculture Research Network Pilot Project

The UNBC Office of Research is excited to announce the start of the UNBC Agriculture Research Network Pilot Project, which aims to build regional, producer-led applied research within the agriculture sector that will support local producers in building a sustainable, economic agriculture sector in Northern BC. UNBC alumnus Serena Black (MSc, BJ) was hired to lead the project, and is working as UNBC’s Agriculture Extension Specialist. Black has been working in applied agriculture research and extension throughout the Omineca Region for the past six years, with research experience in forage and grain crops, invasive weed management and soil health.

Recent interest in climate change adaptation, local food security, and community-based economic development has created opportunities to expand agricultural research initiatives in Northern BC. Communities and producers are looking to UNBC and its staff, faculty and students with northern environmental science and land productivity expertise to turn their attention to agriculture. This can only be done by growing networks with other centres of expertise across the country and expanding capacity at UNBC.

Through partnerships with producer associations, other academic institutions, government agencies, and other initiatives, this project will expand knowledge and outreach in northern agriculture at UNBC. Black is currently working with the BC Agriculture Climate Adaptation Research Network (BC ACARN) on developing provincial-scope agriculture research programs, working to help establish the Cariboo Agricultural Research Alliance (CARA), and on developing research opportunities for both undergraduate and graduate students.

Current projects range from crop feasibility trials, vegetable variety trials, provincial weather station gap analysis, provincial database infrastructure development, and agroforestry. Black is always looking for ways to connect students to local agriculture initiatives, and develop projects in new areas. The UNBC community is encouraged to connect with Black to discuss existing and potential projects involved with agriculture at any time.

Northern, Rural and Environmental Health

Vitamin D Important for Optimal Brain Function

Taking higher doses of Vitamin D, especially if you live in an area with long winters, can significantly improve your brain function.

Dr. Jacqueline Pettersen, a cognitive/behavioural neurologist with the Northern Medical Program, compared two groups of healthy adults from Northern BC in a randomized trial. One group took high Vitamin D doses (4000 IU/day) daily, while the other took low doses (400 IU/day), and various cognitive functions were assessed before and after 18 weeks of treatment.

Dr. Pettersen found that the high dose group performed significantly better on tasks of nonverbal (visual) memory, compared to both pre-treatment and the low dose group. She also found that the benefits were even more pronounced among those with lower levels of Vitamin D to begin with.

Vitamin D insufficiency has been estimated to affect one billion people worldwide and is particularly prevalent in the north. Dr. Pettersen found that over 60% of participants had blood levels of vitamin D considered to be "insufficient" prior to supplementation.

"This is one of the first studies to demonstrate a positive effect of vitamin D supplementation on brain function in healthy adults," says Dr. Pettersen. "While there has been good evidence that Vitamin D improves memory in animal models, research to date has been limited with respect to humans."

Vitamin D, also known as the 'sunshine vitamin', is not produced in the body but must be either synthesized in the skin in response to the sun's UVB rays, or else consumed through diet. However, there are few good food sources of vitamin D, and at northern latitudes there are also not enough UVB rays to help make Vitamin D during several months of the year. Unless you take a supplement during the winter (and possibly the summer as well if you take cover from the sun), you are likely to be insufficient. "These results have implications for public health," notes Pettersen. "For people living in Northern B.C., and other regions which experience extended winter, the findings suggest that they should be supplementing with Vitamin D during the cold weather months, and also taking a dose that is higher than the current recommended minimum daily amount.

"While 4000 IU per day (or even up to 10 000 IU per day) is considered safe, we don't know yet if supplementing with high doses for long periods of time is recommendable, as there are likely other important factors that need to be considered. As part of my ongoing research, I am looking at what roles other nutrients may play in addition to Vitamin D, and how genetics may help some individuals benefit more than others from supplementation."

The Institute of Medicine recommends a minimum intake of 600 IU per day for bone health. The optimal amount for cognition is not yet known, but Dr. Pettersen's study suggests it is higher than 600 IU per day, and more in-line with recommendations from the Endocrine Society and Vitamin D Council, who suggest doses between 1500 and 5000 IU per day for other health-related outcomes in addition to bone health.

Dr. Pettersen's research is part of a larger series of ongoing Vitamin D-related studies that she is pursuing, which includes the role of genetics and exploring the balance between vitamin D intake and the intake of other nutrients such as calcium, magnesium, zinc, vitamin A and vitamin K2.

Dr. Rob Olson receives grant for cross-Canada cancer care project

Dr. Rob Olson, a Northern Medical Program faculty member, will receive up to $270,000 in funding over three years from the Michael Smith Foundation for Health Research (MSFHR) as part of its inaugural Health Professional-Investigator Program.

Dr. Olson is one of 11 recipients for the 2017 awards, and the only researcher from Northern BC.

Through this grant, Dr. Olson will examine the use of new advanced radiation therapy techniques for cancer that has spread to the bone. The research will compare patients' reported outcomes of both treatment benefits and side effects, and will compare differences in use and availability of these techniques across Canada, starting with a partnership in the three Atlantic Canadian provinces.

"We are interested in studying patient feedback about treatment received to help guide cancer service delivery," said Dr. Olson, radiation oncologist and department head at the BC Cancer Agency Centre for the North; division head of radiation oncology, Department of Surgery, UBC Faculty of Medicine; and associate professor in the Northern Medical Program. "The focus will be on determining if efficiencies in service can be improved, while also helping to enhance care and quality of life by identifying patients most likely to benefit from advanced radiotherapy techniques, such as stereotactic ablative radiotherapy."

By using patient-reported outcomes, Dr. Olson's research will be able to include input from rural and remote patients who would otherwise not have the opportunity to participate if a clinical trial based research approach had been used.

Key partners include UNBC, UBC and the BC Cancer Agency. Dr. Olson will also work with stakeholders from across Canada, including the Canadian Partnership for Quality Radiotherapy, the Canadian Partnership Against Cancer, and various Canadian universities and cancer care health agencies.

"Clinically active health professionals have an intimate understanding of the challenges and opportunities associated with improving patient care, but often lack the support required to apply that knowledge in a research setting. We developed the health professional-investigator award to help fill that gap," said Dr. Bev Holmes, interim president & CEO, MSFHR.

The MSFHR Health Professional-Investigator Program supports health professionals who are actively involved in patient care to conduct and apply research relevant to health and/or the health system. The program is part of MSFHR's suite of new funding programs launched in 2016/17.

Dr. Olson's research will build on the Prospective Outcomes of Support Initiative that he leads at the BC Cancer Agency and research his team has performed on prescribing practices in radiation oncology across Canada.

Research finds link between marijuana use and testicular cancer

New research from Northern Medical Program Professor Dr. Russ Callaghan has found that use of marijuana is associated with the development of testicular cancer.

As part of a retrospective study, Dr. Callaghan and his team looked at data from young men conscripted for military service in Sweden in 1969 and 1970, and tracked their health conditions over the following 42 years. They found that heavy cannabis use (defined as more than 50 times in a lifetime, as measured at conscription) was associated with a 2.5-fold increased risk of developing testicular cancer.

"At this time, surprisingly little is known about the impacts of cannabis on the development of cancer in humans," said Dr. Callaghan, the study's lead author. "With Canada and other countries currently experimenting with the decriminalization or legalization of recreational cannabis use, it is critically important to understand the potential harms of this type of substance use."

The results from the recent study, as well as three prior case-control studies in this area, suggest that cannabis use may facilitate later onset of testicular cancer.

"Our study is the first longitudinal study showing that cannabis use, as measured in late adolescence, is significantly associated with the subsequent development of testicular cancer. My hope is that these findings will help medical professionals, public health officials and cannabis users to more accurately assess the possible risks and benefits of cannabis use."

The project included an international team of researchers from Karolinska University in Sweden and the Division of Cancer Epidemiology and Genetics at the National Cancer Institute in the U.S. The study is part of Dr. Callaghan's ongoing research assessing the potential health risks associated with cannabis use and the potential impacts of cannabis legalization on use and related harms.

Students and Faculty Collaborate on Health Research Project

At the University of Northern British Columbia, students get the opportunity to conduct research and have their work published at early stages of their studies.

Take Georgia Betkus and Kevin Adam, who collaborated with UNBC Assistant Professor of Nursing Dr. Shannon Freeman and University of Queensland researcher Dr. Melinda Martin-Khan to write The Evolution of Telehealth, a chapter in a new book Freeman co-edited on Mobile eHealth.

"It was really great to be a part of a project like this," says Betkus, who began working on the project as an undergraduate student. "It solidified my interest in telehealth, and I decided to return to UNBC for a Master's of Interdisciplinary studies so I could explore telehealth further."

Betkus is from McBride, B.C., and said working with Freeman on the past, present and future of telehealth struck a chord.

"As someone who grew up in a rural community, I think telehealth is a valuable tool that could increase access to health care for residents of rural communities," she says. The researchers examined how technology has influenced health-care delivery, beginning with when it was exclusively delivered face-to-face, to the advent of the telegraph, telephone, video conferencing and mobile phone technology.

"It is exciting to mentor and inspire UNBC undergraduate students by engaging them in research activities early in their academic studies," Freeman says. "This allows opportunity for students to apply their learnings outside of the UNBC classroom environment and learn first-hand how the process of research works from the start where the idea is first conceptualized through to the publication of the book chapter and knowledge dissemination of the project findings."

Adam, from Sechelt, B.C., is pursuing an undergraduate degree in Health Sciences, and like Betkus already had an interest in telehealth when he began to work on the paper. He said his work on the project has inspired him to continue to publish.

"This experience helped convince me I wanted continue on to a Master's program to further sharpen my research and critical analysis skills," he says.

The book is a collection of multidisciplinary essays exploring the opportunities and challenges presented by mobile eHealth technology.

Interdisciplinary Studies graduate student Georgia Betkus, Assistant Professor of Nursing Dr. Shannon Freeman and Bachelor of Health Sciences student Kevin Adam collaborated on a book chapter tracing the history of telehealth.

First Nations & Indigenous Studies

Banting Fellow to Study Early Intervention Therapy with Indigenous Communities

Early intervention therapy for infants and young children who have developmental delays or disabilities can be key to optimizing their health, well-being and participation in meaningful everyday activities.

However, for a variety of reasons Indigenous families may not feel safe in accessing early intervention therapy. Families may also lack access to timely and culturally safe programs or services.

UNBC postdoctoral researcher Dr. Alison Gerlach is seeking to learn how early intervention therapy - that is occupational therapy, speech-language pathology, and physiotherapy - can be provided in ways that are responsive, culturally safe, and effective with Indigenous communities and families in Northern B.C.

"There is a lot of research showing the earlier the intervention, the more benefits it can have for children who have developmental delays or disabilities including autism, cerebral palsy, and fetal alcohol syndrome. But a lot of Indigenous children are not getting identified and are not getting services until they are in Kindergarten or Grade 1," Gerlach says. "By that point families and children have missed that opportunity for the funding, supports, and early intervention therapy that is available for younger children."

She recently received a Banting Fellowship from the Canadian Institutes of Health Research (CIHR) for her proposed study 'Rethinking Early Intervention Therapy with Indigenous Communities and Families in Northern British Columbia: A Critical Inquiry'.

The Banting Fellowship funding started June 1, 2017 and will provide $70,000 per year for up to two years of research. The program, administered by the Government of Canada, aims to attract top-tier postdoctoral talent, develop leadership potential and position fellows for success as research leaders of tomorrow.

Each year, the three major federal granting agencies (CIHR, the Natural Sciences and Engineering Research Council of Canada and the Social Sciences and Humanities Research Council of Canada) award 70 Banting Fellowships to postdoctoral researchers working in Canada. Gerlach is the second UNBC researcher to receive funding through the program.

Gerlach is supervised by UNBC First Nations Studies and Education Professor Dr. Margo Greenwood, who is also the Academic Lead for the National Collaborating Centre for Aboriginal Health (NCCAH) located at UNBC. Gerlach, who completed her PhD at the University of British Columbia in 2015 and began working with the NCCAH in 2016, said being able to work with Dr. Greenwood and the NCCAH team helped secure the funding for her research. "The Banting Fellowship looks at the synergy between the fellow, the supervisor and the research environment," Dr. Gerlach says. "The NCCAH is an international leader in informing Indigenous public health issues. There is also a clear, strategic priority at UNBC to do research with Indigenous communities that benefits Indigenous communities."

Northern B.C. is a natural fit for Gerlach's research because of the large Indigenous population as well as the unique challenges that come with delivering programs in rural and Northern communities.

"There's a lot of really exciting work underway in the North in terms of innovative, community-driven approaches to improving Indigenous people's health," she says. "I think the North is leading the way in that area and this is a great opportunity to contribute to this work."

Dr. Alison Gerlach is the second UNBC postdoctoral researcher to earn a prestigious Banting Fellowship.

Celebrating the Tahltan Language and Culture with Edōsdi –Dr. Judy Thompson

On September 15, 2017 in the Tahltan community of Dease Lake, BC, the Tahltan Language and Culture Program launched Dah D?āhge Es?igits – We Write Our Language, a book that focused on the Tāłtān alphabet. This came after three years of work that involved Tahltan artists Peter Morin, Una-Ann Moyer, and Ts?ēma Igharas, as well as Tāłtān fluent speakers Angela Dennis, Regina Louie, and Margery Inkster. The book project came together due to the dedication of Tahltan Community Language and Culture Manager Odelia Dennis, the support of Telegraph Creek Language and Culture Coordinator Pauline Hawkins, with the book being edited by Tahltan Language and Culture Director Edōsdi – Dr. Judy Thompson, assistant professor in First Nations Studies at UNBC.

In the Tāłtān language, Edōsdi literally means "someone who raises up children and pets", or more simply, "someone who is a teacher." In 2012, Edōsdi successfully defended her doctoral dissertation, Hedekeyeh Hots'ih Kāhidi – "Our Ancestors Are in Us": Strengthening Our Voices Through Language Revitalization from A Tahltan Worldview, which focused on what the Tahltan Nation needed to do to revitalize their language, as well as looking at how language revitalization can positively affect the lives of their people.

Shortly after her oral defence, Edōsdi was hired by her nation to lead the start of a Tahltan Language and Culture Program and she used her doctoral research to create a Tahltan Language and Culture Framework. With a focus on the creation of new language speakers, the framework provides elements needed to both revitalize and preserve the language.

"The Tahltan Language and Culture Program continues to have an impact on the wellbeing of our Tahltan communities in terms of building capacity through a framework that focuses on language governance, language programming, documentation, and the training and professional development of teachers, researchers, and other language workers. Through the program's work, we have connected Elders and language learners of all ages, providing ways to build relationships between the generations, as well as to honour our first language speakers."

As a UNBC scholar, Edōsdi has been working with a consortium of BC post-secondary institutions that are in a partnership agreement with the First Nations Education Steering Committee and the Indigenous Adult and Higher Learning Association in the development of an Indigenous Languages Proficiency Degree framework for BC. Besides this work, Edōsdi has been working closely with other First Nations in BC, Ontario, and the Yukon.

"Relationship building with other nations is a crucial part of my language revitalization work, as is the sharing of the Tahltan Language and Culture Framework I developed as part of my doctoral research. I am currently completing a manuscript that outlines both the framework and the language revitalization work our nation has carried out since 2012."

Her work with her nation, as well as her position at UNBC, has allowed Edōsdi to focus her research specifically on documenting the successes and challenges of Tāłtān language nests as well as the effects of language revitalization on the wellbeing of her people, and has given her the opportunity to continue to learn her language as part of her scholarly work.

"I have received funding from First Peoples' Cultural Council to work with Jenny Quock, a Tahltan first language speaker, using the Mentor-Apprentice Program approach. I am documenting my learning and will be bringing my experiences into my research."

Dah D?āhge Es?igits – We Write Our Language is available for purchase at the UNBC Bookstore, online from Theytus Books (theytus.com), or directly from Edōsdi (judy.thompson@unbc.ca).

Assistant Professor of First Nations Studies Dr. Judy Thompson received the Confederation of University Faculty Associations of British Columbia Distinguished Academic Early in Career Award for her work helping the Tahltan Nation revitalize its language.

Students in Research

Synthetic Biology Club combatting MRSA super bug

The MRSA bacteria strain is known to health professionals as a super bug.

It's a big problem in North American hospitals and is resistant to even the strongest antibiotics.

Students in the Synthetic Biology Club at the University of Northern British Columbia want to attempt to come up with a detection and killing mechanism to combat this super bug.

It's their way of finding a real solution to a current problem. And the club wants to hear from UNBC students who are studying math, physics, biology, biochemistry or business at the undergraduate or graduate level.

It's an opportunity to brainstorm, be exposed to the scientific community, do cutting-edge research and fundraise so the club can return to compete in the 2017 iGEM (International Genetically Engineered Machine) competition next fall held at the Hynes Convention Centre in Boston, Mass.

"You get to be in a room full of the brightest minds in synthetic biology in the world. It's both humbling and exciting," said Club co-president Brendan Reiter about the competition.

Last year, the UNBC Synthetic Biology club, featuring 11 biochemistry and biomedical students, were among 10 teams from Canadian universities competing in the international event that featured 300 teams from around the world. It was the first time UNBC had competed at the event.

Reiter and co-president Keanna Woidak, both fourth-year biochemistry and biochemistry students, were on that team and can't wait to return to Boston.

UNBC students attempted to build a genetically engineered system using an e-coli strain, which is harmless to humans, to remove copper from water so that it is safe to drink. The copper-binding system could also be used to remove lead from water.

iGEM is an annual, world-wide synthetic biology event for high school, undergraduate and graduate students.

With the help from the Spirit of the North Healthcare Foundation, they raised $32,000 in six months to cover the majority of their costs. Each student only had to pay $200 from their own pocket to attend the competition in October, 2016.

Between fundraising and doing research for iGEM, as well as attending their regular classes, it was a lot of work.

This time around, the club would love to have more students involved to divide up specific tasks and work in separate groups.

Pictured below: the 2016 UNBC iGem team that competed in Boston in October.

Food for Thought

Sustainability is at the heart of Jessy Rajan's mission in life.

A 2016 University of Northern British Columbia Master of Natural Resources and Environmental Studies graduate, Rajan channeled that passion into a recently published paper examining food waste at the Prince George campus.

The paper, Measuring food waste and creating diversion opportunities at Canada's Green University, is published in the Journal of Hunger and Environmental Nutrition and looks at the composition of food waste at two campus food outlets, and looks at ways some of that waste can be diverted.

Rajan completed the research while she was pursuing her master's degree, but this project was done independent of her thesis. She says it is gratifying to have her work published in a journal she respects.

"It is a great opportunity to share research with others," she says.

During her time at UNBC Rajan worked in the Green Centre, co-ordinated Bike-to-Work Week and served a term as president of the Northern British Columbia Graduate Students' Society.

It was natural that when a group of UNBC students and faculty members were interested in doing a food waste audit on campus, Rajan was selected to lead the project.

Funded with a grant from the UNBC Green Fund, the researchers set out to look at how much food from the cafeteria and The Thirsty Moose pub went uneaten, and of that, how much could be diverted away from the landfill. "The reason we chose to carry out a food waste characterization was, in part, due to the lack of research in that area," she says. "It was a part of waste audit research that we hadn't come across and we thought it was an opportunity to fill that gap."

Rajan and the team of researchers including co-authors Ecosystems Science and Management Professors Dr. Art Fredeen and Dr. Annie Booth along with Forest Ecology and Management student Michael Watson and other student volunteers conducted two-week long audits.

"It was wonderful to have the opportunity to work with highly engaged and motivated professors on a project of mutual interest," Rajan said.

The researchers collected uneaten food from the kitchens, compost bins and plate scrapings then sorted them by type: grain-based, cooked vegetables, raw fruit and vegetables, and protein.

"One of the objectives was to compile data that would help assess the need and potential use of an industrial compost system," Rajan says. "Food content was relevant to the study to determine the type of compost that could potentially be suitable."

As a small, research-intensive University, UNBC offers graduate students like Rajan the opportunity to work closely with faculty members and have their research published. This study marks the second time Rajan has been the lead author on a paper, in collaboration with a UNBC faculty member.

Although her immediate plans do not involve a career in academia, working on research projects and publishing the results have helped her as she enters the workforce.

"Working on this project, I have been able to reinforce my scope of knowledge and skill set as I begin to step into my career," she says.

Master of Natural Resources and Environmental Studies graduate Jessy Rajan sorts food waste as part of a 2015 audit at UNBC's Prince George campus. Her findings were recently published in the Journal of Hunger and Environmental Nutrition.

PICS Fellow switches gears to explore more active transportation options

Heather Mitchell hopes people living in northern communities will eventually begin to think of cycling as an everyday sport and healthy lifestyle activity that can be integrated into their daily routines.

Canadians, she said, are hardy, as they have learned to cope with cold temperatures and the challenges that come with a long winter season.

"We can bring nature into our urban environment by exposing ourselves to the elements and in doing so we can limit our dependency on fossil fuels and build stronger, more resilient communities," Mitchell said.

Examining climate change action in northern communities and investigating how active transportation such as cycling can play a bigger role in reducing climate emissions is the focus of Mitchell's graduate research as a Pacific Institute for Climate Solutions (PICS) Graduate Fellowship at the University of Northern British Columbia.

PICS Fellowships are available on an annual basis to outstanding Masters and PhD students at PICS four collaborating universities (UNBC, the University of British Columbia, Simon Fraser University and the University of Victoria) conducting research in an area related to climate change impacts and adaptation.

Mitchell is one of two UNBC students who received the five available PICS fellowships this year. Nazrul Islam is the other successful 2017 PICS Fellow. His research is about quantifying methane emissions from the natural gas industry and evaluating how well B.C.'s current emissions reduction policies are working.

Both Nazrul and Mitchell's projects will involve collaborating with governments of all levels, as well as community stakeholders.

The PICS Fellowship will support Mitchell's thesis as a graduate student in the Master of Arts in Natural Resources and Environmental Studies program. Her supervisors are Environmental Planning Associate Professor Dr. Mark Groulx, Environmental Planning Assistant Professor Dr. Darwin Horning and Environmental Studies Assistant Professor Dr. Kyrke Gaudreau.

Mitchell earned her Bachelor of Environmental Planning degree in May and began her Master of Natural Resources and Environmental Studies in Environmental Planning in September.

"The City of Prince George currently has 72 km of bike lanes and has invested heavily in signage and road-user knowledge," she said. "The long-term benefits of an effective bicycle network are reduced carbon emissions and better air quality with the city, rider health benefits, and a more accessible city for everyone.

"A possible action plan to meet this vision could address lowering the barrier for bicycling and instilling confidence through safety, implementing protected bike lanes, providing bike lane network maps, rider education and awareness programs and year-round bike lane maintenance."

She added there is a major disconnect between city government, business and local culture regarding how we can work together to better reduce our carbon footprint within northern communities because there isn't a monitoring system to establish benchmarks for Prince George's sustainability efforts and a sure way of knowing when certain goals have been reached.

Some of those indicators, Mitchell said, could include measuring how many citizens feel safe commuting by walking or cycling, what the split of cars, public transit and cycling is and what educational services and programs are available to new cyclists.

When it comes to transportation and other larger sources of greenhouse gas emissions, avoiding creating them in the first place is the ultimate solution, says Michelle Connolly, PICS research manager – co-ordinator at UNBC.

"Heather's study will tackle this head-on," she said.

PICS is a research network that develops information on climate solution options that can be used by governments, so the results of work done by PICS Fellows has the potential to influence policy at the provincial, regional and local levels.

Undergraduate Research Experience

The Undergraduate Research Experience (URE) program provides opportunities for UNBC's undergraduate students to be involved in research and scholarly activities.

In 2017, Scott Brown and Carleen Paltzat participated in the URE program under the mentorship of a team of researchers led by Dr. Zoë Meletis. The Art, Change and Creativity project sits at the intersection of science, arts and public engagement. The students were involved with test-coding real data, compiling an annotated bibliography, partaking in the Ethics review process, document writing and editing and recording material for podcasts. "Mentorship from Dr. Groulx, Dr. Meletis and Michelle Connolly of PICS has given me new understandings of the complexities of research", says Brown. "The inclusion of social science, science and community engagement is giving me invaluable insight for my future career."

"Scott and Carleen brought new perspectives, younger and otherwise different ways of working and knowing to our team," says Meletis. The students also had the opportunity to attend the Conference of Irish Geographers in Cork, Ireland as part of the project team.

The next URE Competition Deadline is November 15, 2018 and students can choose to conduct their research during the winter or summer semesters of 2019. Please contact melanie.noullett@unbc.ca for more information.

Faculty Achievements

Dr. Darwyn Coxson receives Distinguished Academic Award

University of Northern British Columbia Ecosystem Science and Management Professor Dr. Darwyn Coxson has won one of three 2017 Distinguished Academic Awards from the Confederation of University Faculty Associations of B.C. (CUFA-BC).

His advocacy and research was instrumental in the establishment of the Ancient Forest/Chun T'oh Whudujut Provincial Park, a 12,000-hectare protected area conserving rare ancient Western redcedar stands in the inland rainforest, 120 km east of Prince George.

CUFA-BC's Paz Buttedahl Career Achievement Award is for sustained outstanding contributions to the community beyond the academy through research or other scholarly activities by an individual or group over the major portion of their career.

"He (Darwyn) played a pivotal role in bringing together stakeholders to determine protected areas and ensuring enduring ownership and participation by the Lheidli T'enneh First Nation," states the CUFA-BC media release. Coxson's research has focused on the conservation biology and biodiversity of B.C.'s unique inland rainforest ecosystem.

"I am honoured to receive the Paz Buttedahl Career Achievement Award from CUFA-BC," said Coxson. "The recognition by CUFA-BC of the collaboration between UNBC, the Lheidli T'enneh First Nation, and communities in Prince George and the Robson Valley, towards designation of the new Ancient Forest/Chun Cho Whudujut Provincial Park, reaffirms the importance of research and scholarly activity in our public universities.

"This award highlights the outstanding opportunities available to UNBC students for meaningful participation in the development of sustainable communities," added Coxson.

"Former UNBC students such as Dave Radies, for whom the "Radies" tree is named on the Ancient Forest trail, have shown that UNBC students are today's scholars and tomorrow's leaders."

UNBC Professor Named to Royal Society of Canada

UNBC researcher Dr. Sarah de Leeuw has been appointed as a member of the Royal Society of Canada's College of New Scholars, Artists and Scientists.

Dr. de Leeuw, a Northern Medical Program and Geography Program associate professor, is one of 70 researchers from across the country who will be inducted at the Royal Society of Canada's Celebration of Excellence weekend in November.

The College of New Scholars, Artists and Scientists is focused on addressing issues and concerns of new scholars, artists, and scientists. Inductees into the College are selected after demonstrating a high level of achievement in the early stages of their career.

"It is one of the highest honours one can receive. When fellow researchers, especially those outside your discipline, recognize your work," said Sarah. "I am excited to join the College and I look forward to generating dialogue around issues related to northern, rural, and marginalized geographies. I am interested in exploring the possibilities of what can happen when you bring artists and scientists together, when they consider each other's' works in their own disciplinary areas of specialty."

Dr. de Leeuw's areas of interest include the medical humanities and determinants of marginalized peoples' health.

"The breadth of Sarah's work and her research achievements are very deserving of this honour and we are proud to celebrate her appointment to this important national body," said UNBC President Dr. Daniel Weeks. "Through their commitment to research excellence, our faculty are helping to lead advancements in knowledge across regional, national and global fronts."

De Leeuw is the third UNBC professor to have been named to the Royal Society of Canada, of which UNBC is an Institutional Member. She joins Professor Emeritus of Political Science Alex Michalos and Associate Professor of History Dana Wessell Lightfoot.

The College of New Scholars, Artists and Scientists is one of four entities of the Royal Society of Canada, which also include the Academy of the Arts and Humanities, the Academy of Social Sciences, and the Academy of Science.

Engineering Professor Named Canada Research Chair

Engineering Associate Professor Dr. Thomas Tannert is the latest University of Northern British Columbia faculty member to be named a Canada Research Chair.

Dr. Tannert, who teaches in the Master of Engineering in Integrated Wood Design Program, is the new Canada Research Chair in Hybrid Wood Structures Engineering.

"This new chair will strengthen research excellence in our Wood Engineering program and enable UNBC to attract more outstanding students and post-doctoral research fellows," says UNBC President Dr. Daniel Weeks. "The Canada Research Chairs Program recognizes the exceptional work Dr. Tannert is undertaking to create local solutions with global impact."

The Canada Research Chairs Program is a federal initiative to attract and retain exceptional scholars in fields including engineering and the natural sciences, health sciences, humanities and social sciences.

Dr. Tannert is seeking to identify challenges and provide solutions to the structural design of tall wood buildings. He will explore many facets of engineering, including seismic performance, the ease of constructability and wood connections.

"This area of research is at the centre of an international movement to put more of an emphasis on wood construction," Dr. Tannert says. "Discovering innovative ways to use wood is an ideal solution to the challenge of reducing the carbon footprint of buildings."

Dr. Tannert will conduct his research in the Wood Innovation Research Laboratory, currently under construction in downtown Prince George.

Dr. Tannert also holds the BC Leadership Chair in Tall Wood and Hybrid Structures Engineering. He is one of six current UNBC faculty members who hold Canada Research Chairs.

Dr. Thomas Tannert is the latest UNBC researcher to be named a Canada Research Chair

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Office of Research