



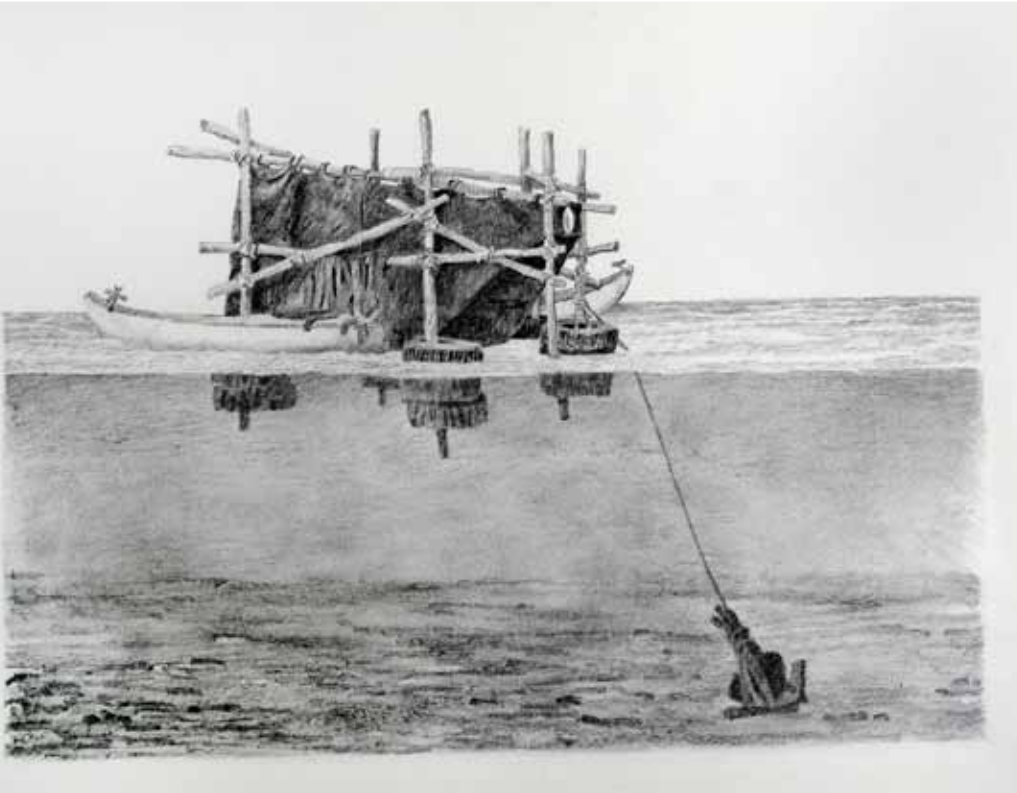
Research and Graduate Studies

ANNUAL REPORT 2013-2014

Bringing research, teaching,
creative practice and innovation together



THOMPSON RIVERS
UNIVERSITY



Donald Lawrence (Visual Arts) was an invited artist for the Art Marathon, an event organized by the Eastern Edge Gallery in St. John's Newfoundland. For the event, he created the Quidi Vidi Camera Obscura, a floating, paddle-in, camera obscura. Participants entered the darkened structure — which resembles fishing stages that once lined the shore — by kayak to view an image of historic Quidi Vidi Harbour that is projected inside through a lens at the front of the structure. The festival was held in early August, 2014. Read more about Creative Practice, Exhibitions & Exhibits on Page 19.

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CBC's *The Nature of Things* was on campus in July 2014 to collect footage for a piece on Dr. Naowarat (Ann) Cheeptham's research into creating pharmaceutical drugs out of bacteria found in caves. Read more about Mobilizing Knowledge on Page 22.

A Message from Will Garrett-Petts



Putting the year's research into perspective

- ▶ Over 100 peer-reviewed publications
- ▶ Over 130 academic papers presented, provincially, nationally and internationally
- ▶ 68 undergraduate research assistants hired
- ▶ 52 undergraduate research awards
- ▶ 33 external research grants received
- ▶ Tri-agency grants and external contracts valued at over \$1.9-million

“We are committed to the creation, cultivation, and communication of knowledge.”

Dear Colleagues and Friends,

It is with great pleasure that I introduce TRU's Annual Report on Research and Graduate Studies for 2013-2014. During the last decade — and especially since 2005 when we received our official research mandate — Thompson Rivers University has steadily built its research capacity, increasing the focus on supporting undergraduate research and graduate studies, on facilitating “curiosity-driven research” opportunities for individual faculty, on developing community-university partnerships, on liaising with business and industry, on securing enhanced funding support, on establishing research centres in areas of proven and emerging strength, on creating new research chairs, and on expanding our national and international presence. We are committed to the creation, cultivation, and communication of knowledge.

During the last year, research became one of five strategic priorities for the university, and the Research Office is committed to helping distinguish TRU as among the province's research leaders. Now a member of the Research Universities' Council of British Columbia, TRU is bringing teaching, scholarly activities and research, creative practice and innovation together to deliver research-informed learning to students regionally, nationally, and internationally.

To promote excellence in these areas — and to support faculty progression, faculty renewal, student engagement and recruitment, and enhanced graduate programming — we recognize that future development in research and graduate studies requires significant commitment to an institutional research infrastructure, with appropriate levels of staffing to scaffold steadily increasing research activity; new and enhanced research facilities (capital investment in research space, including research centres); internal research funding; internally and externally funded research chairs; knowledge translation and mobilization resources; and an increased focus on graduate and undergraduate research, including development of new graduate programs; and expansion of student research and scholarship support.

During the last year we were awarded a new BC Innovation Chair in Aboriginal Maternal and Child Health; and we secured significant additional external federal funding, enjoying an excellent success rate with Natural Science and Engineering Research Council (NSERC) Discovery Grant and Social Sciences and Humanities Research Council (SSHRC) Insight Development Grant competitions — and a first-place ranking among 51 universities applying for SSHRC's Aid to Small Universities Grants. We also implemented two internal funds (one to provide seed funds for emerging research projects, and one to provide release time in aid of those faculty holding external grants and providing enhanced student training); we expanded our commitment to community-engaged research; we helped scaffold development of new research initiatives and new graduate programming; and we continued to improve our website presence — and thus our ability to share our research stories. Finally, this year we completed the task of writing a new Strategic Research Plan, a collective articulation of our strategic vision for integrating research and creative inquiry into all areas of the university. I look forward to working with the university community on making this vision a lived reality.

Dr. Will Garrett-Petts, Associate Vice-President
Research & Graduate Studies

Pathways to Scholarly Achievement: A Strategic Plan for the Enhancement of Research, Scholarship and Creative Activity

A new five-year Strategic Research Plan was developed through collaboration with faculty, students and community partners. The plan provides a strong, clear vision for the integration of research and creative inquiry throughout the university. A final Townhall held in April 2014 helped to finalize TRU's five research themes, establish implementation strategies and identify potential metrics. Below, discover just a sampling of the research activities related to the five themes.

Community and Cultural Engagement

- Culture and heritage tourism
- Economic development
- Human rights
- Immigrant experience
- Mountain environments
- Tourism and adventure
- Small city and rural development
- Experience studies

Education, health and diversity

- Immigrant health needs
- Educational leadership
- Early childhood education
- Workforce training needs
- Nursing education
- Sleep science
- Spirituality and healing in health care

Sustainability, Environment and the Physical World

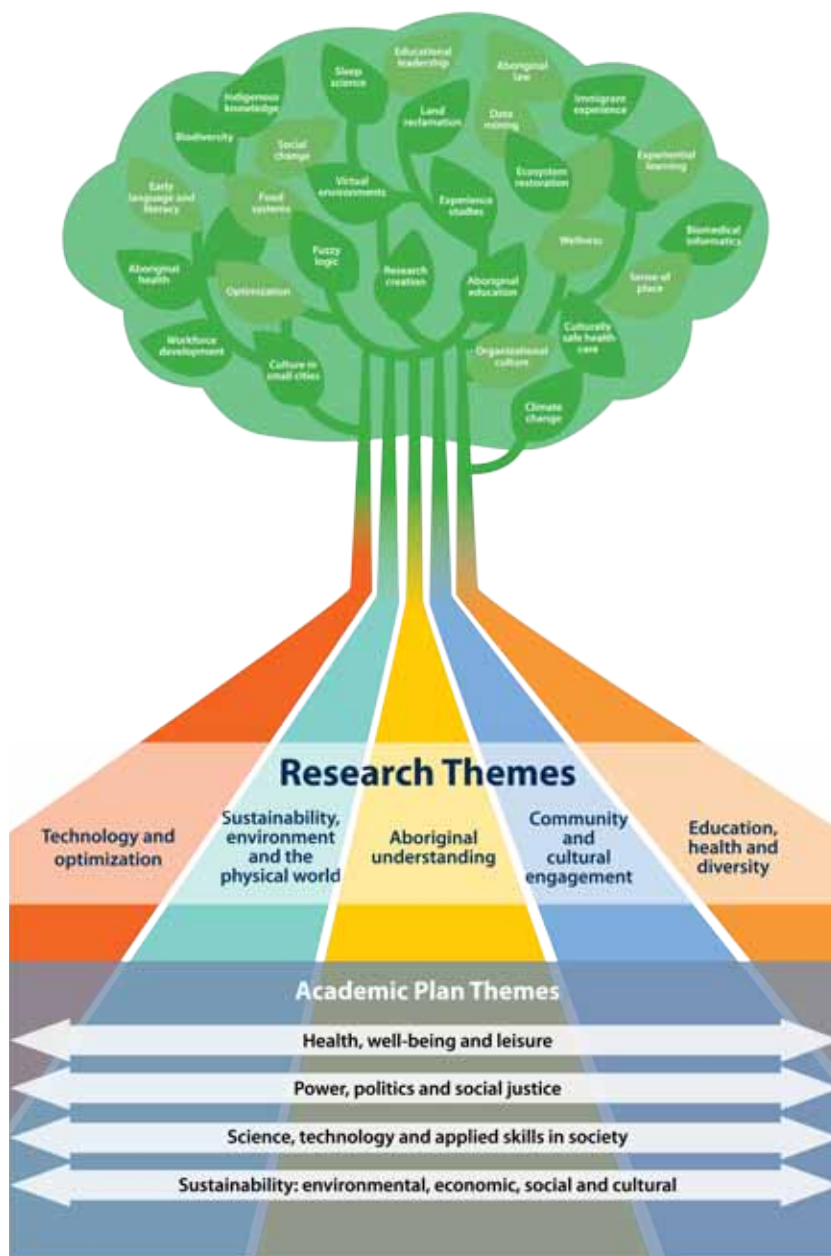
- Agriculture
- Botany and plant ecology
- Cattle industry sustainability
- Ecosystem restoration
- Computational chemistry
- Grassland conservation
- Urban agriculture
- Remote sensing
- Food systems

Aboriginal Understanding

- Aboriginal cultural identity
- Aboriginal health
- Aboriginal law
- Culturally safe health care
- Indigenous
- dementia care
- Maternal and child health
- Traditional knowledge and ways of knowing
- Aboriginal tourism

Technology and optimization

- Biomedical informatics
- Data mining
- Discrete mathematics
- Fuzzy logic
- Optimization
- Virtual environments
- Data visualization
- Wireless sensor networks
- Nonlinear optimization
- Data visualization



Aid to Small Universities Grant

Thompson Rivers University ranked first out of 51 applications submitted for the 2014 Social Sciences and Humanities Research Council-funded Aid to Small Universities (ASU) grant, providing just one more example of the depth and breadth of TRU's research capacity and quality. The grant, which totals \$87,556 over three years, will be used for the development of a **Research Centre for Community and Cultural Engagement**, with a focus on two key research areas: "Traditional Knowledge, Language and Cultural Resource Management in Small City and Rural Settings," and "Homelessness in Small Cities."

The projects benefitting from this grant will directly impact 12 faculty from TRU, five faculty from partnering universities, eight community research partners — including the Thompson Nicola Cariboo United Way and the City of Kamloops — and will provide unique training opportunities for 21 undergraduate and graduate students.

"The research that our faculty and students produce has been recognized as some of the best in the country, and that's wonderfully encouraging for all," said **Dr. Will Garrett-Petts**, Associate Vice President of Research and Graduate Studies. "This ranking more than illustrates why the development of research capacity has been identified as one of TRU's five strategic priorities."



The team of No Straight Lines: The Homeless Play Project is, from left, Ginny Ratsoy, Dr. Dawn Farough and Robin Nichol.

No Straight Lines: The Homeless Play Project

This research project provides an excellent example of the university working together with community partners. No Straight Lines involves the creation and performance of a play by individuals who have experienced homelessness. The play has been approved as part of the City of Kamloops' Homelessness Action Plan, and involves TRU faculty **Robin Nichol** (Theatre), **Dr. Dawn Farough** (Sociology) and **Ginny Ratsoy** (English), along with partners including the Thompson Nicola Cariboo United Way, Aids Society of Kamloops, the Elizabeth Fry Society and the City of Kamloops. No Straight Lines offers benefits across the spectrum, providing outstanding student research training as well as generating new information about homelessness and marginalized communities in small cities. The initial production was staged over four nights in August, 2014.

Rent Banks: A Solution to Homelessness

Dr. Ehsan Latif (Economics) and his team of community researchers seek to understand how the Rent Bank concept can be best tailored for smaller cities like Kamloops, which established a Rent Bank in January 2013. Rent Banks offer an innovative approach to providing support for those tenants in danger of eviction. Comparative data is available from rent banks in Ontario and BC. This project will evaluate the performance of the Kamloops Rent Bank in terms of its objective: preventing homelessness and improving housing stability. The three-year project begins with a series of structured interviews involving clients, landlords, and officers and staff of the Kamloops Rent Bank. Following a detailed literature review, statistical methods will be employed to calculate the cost per client for the rent bank and compare these figures with the cost per client for alternative homeless prevention approaches, such as emergency shelters. In years two and three, the study expands to include Kelowna, Nelson, Prince George and Victoria, BC, focusing in terms of needs assessment on homelessness trends, eviction trends, housing vulnerability, income insecurity, and on existing policies and institutions to prevent homelessness. Thanks to the active collaboration of confirmed community partners, including the Kamloops Homelessness Action Plan, the United Way and the Elizabeth Fry Society, Dr. Latif's study will identify the economic impact and feasibility of rent banks, and if and how rent banks can work in small city contexts.



The grant will be used to fund five projects in two key research areas: "Traditional Knowledge, Language and Cultural Resource Management in Small City and Rural Settings," and "Homelessness in Small Cities."

Revitalizing and Teaching the Secwepemctsin Language Using Gamification on Mobile Tablets

Secwepemctsin is an endangered language and many initiatives have been developed in different Secwepemc communities to preserve and promote their language, culture and history. The Sk'elep School of Excellence on the Tk'emlups reserve in Kamloops — the largest band-operated school in BC — is leading one of these initiatives, and two TRU Education faculty, **Drs. Gloria Ramirez** and **Patrick Walton**, are working with the Sk'elep curriculum team to develop and digitize Secwepemctsin language materials. A new line of inquiry proposed by this team includes the work of TRU faculty member **Dr. Haytham El Miligi** (Computer Science), an expert in mobile application development.

Together the team will explore how educational games designed for 10-inch tablets and featuring the Secwepemctsin language may accelerate vocabulary through the development of metalinguistic skills such as morphological analysis. In essence, they will be exploring whether advanced mobile technology can be used to develop fluency in and morphological awareness of the Secwepemctsin language. This three-year project will be developed through the Centre for Community and Culture and work in conversation with the other two traditional knowledge projects detailed below.



Dr. Gloria Ramirez (pictured) works with Drs. Patrick Walton and Haytham El Miligi to revitalize the Secwepemc language.

Traditional Ways of Knowing

This research project builds on a formal agreement between the Northern Shuswap Tribal Council and TRU. Led by professors **Dr. Beth Bedard** (Anthropology) and **Nan McBlane** (Sociology), this two-year project engages students and community members in archaeological and anthropological field school planning and research. The field schools —planned for Williams Lake, BC, and the Cariboo Chilcotin region — are constructed as sites for self-reflexive inquiry. The partnership ensures the research conducted is culturally responsive and employs joint protocols protecting the ownership of cultural knowledge. The findings will create a baseline of multi-disciplinary data, including archaeological, anthropological, sociological, historical, land-based and traditional ways of knowing and doing, with a specific focus on refining and sharing concepts of cultural resource management.

Community Participation in the Utilization of Biodiversity & Traditional Knowledge

Serving as a complement to *Traditional Ways of Knowing*, this project explores indigenous peoples' control over access to biodiversity and traditional knowledge in their territories in the BC Interior. The territories of Indigenous Peoples are home to the highest concentration of biodiversity world-wide. Traditional knowledge and practices have been found to enhance biodiversity and ensure environmentally, socially, culturally and economically sustainable development. **Drs. Tesh Dagne** and **Nicole Schabus** (Law), together with leading academics in the field, are working with Secwepemc leaders, elders and land users to further research and develop the concept of the territorial authority.



Dr. Nicole Schabus

Research Chairs & Research Centres

Thompson Rivers University is home to two **BC Innovation Chairs**, and four **Canada Research Chairs** that will be filled during the coming year. Funded through the Government of British Columbia and administered by the BC Innovation Council (BCIC), the Regional Innovation Chairs are leading researchers whose work has the potential for significant regional impact. Canada Research Chairs are leading scholars in their fields who act as catalysts for research activity at the university. Canada Research Chairs conduct intensive research in their fields of study and serve as mentors to fellow researchers. They are also highly active as supervisors for student researchers and provide students opportunities to engage in world-class research. Together, the research chairs foster an active and dynamic research environment for both faculty and students.

Canada Research Chair Dr. Lauchlan Fraser marks 10 years of informed grassland research



Dr. Lauchlan Fraser, Canada Research Chair in Community and Ecosystem Ecology, is the first Thompson Rivers University's first Canada Research Chair to complete two terms in the position. In this time, Fraser has fostered partnerships with a multitude of interest groups, including the BC Grasslands Conservation Council, as well as developing connections within the ranching and cattle industries and local First Nations communities. Research projects include work on grassland restoration and reclamation, agroforestry as well as the effects of climate change and grazing in grasslands.



BC Innovation Chair, Cattle Industry Sustainability
Dr. John Church assists ranchers throughout the Interior of BC in adopting technologies and practices for sustainability, and is collaborating with researchers across the disciplines.



BC Innovation Chair, Aboriginal Health
Dr. Roderick McCormick focuses on forming and improving policies related to Aboriginal communities and the health of Aboriginal women and children.



Truth and Reconciliation through the eyes of an artist

TRU provided the stage for Reconsidering Reconciliation, a showcase of 12 of 126 participants of Art + Reconciliation, a Massive Open Online Course (MOOC) which took place from July 15 to Sept. 30, 2013. Led by **Dr. Ashok Mathur**, the Canada Research Chair in Cultural and Artistic Inquiry, the result was an exhibit rich with drawings, photographs, sculptures, videos, poetry and drumming. According to Mathur, artistic practice is but one way to come to terms with the questions raised by the Truth and Reconciliation Commission of Canada's investigation into residential schools

Research with PROVINCIAL impact



TRU Entomologist leading expert on European Fire Ant Research in BC

With the help of a \$100,000 one-year grant from the BC Inter-Ministry Invasive Species Working Group, researcher **Dr. Robert Higgins** (Biology) and his team are hard at work developing methods to control the invasive and aggressive European Fire Ant. Colonies of the species are spreading throughout Metro Vancouver, infesting everything from airports and commercial garden centres, to botanical gardens and backyards. The funding allows Higgins' team, which consists of Simon Fraser University post graduate researchers Sean McCann and Erin Adams, and undergraduate researcher Mitchell Johnson, to investigate the ant's basic natural history and map out its activities. The priority is to develop an effective control method.

Mathematics researcher uses graph theory to solve previously unsolvable problems

Computational Complexity of Combinatorial Problems: Graph Homomorphisms, Packings and Good Characterizations — essentially, **Dr. Richard Brewster** (Mathematics and Statistics) is attempting to solve seemingly unsolvable problems.

Given the regular announcement of more and more powerful supercomputers, one might believe any reasonable problem can be solved in reasonable time. But this is not the case. There are problems that seem intractable by nature, including scheduling, vehicle routing and facility location efforts.

While the goal is always to assign resources in the most efficient way, the challenge in computing the most efficient assignment is the sheer number of possibilities; moreover, each choice affects what other choices can be made in future.

With the aid of an NSERC Discovery Grant, Brewster aims to understand the nature of these complex combinatorial problems — some of which contain mathematical structure. It is hoped this structure can be exploited to produce efficient algorithms, thereby potentially making seemingly unsolvable problems, solvable.



Dr. Richard Brewster



Converting a toxic chemical into a non-toxic product

Fluorinated organic compounds have been used since the 1950s to manufacture polymers found in an array of consumer products including water and stain repellents, but studies have shown those chemicals exhibit toxic effects and are difficult to biodegrade. Funded by an NSERC Discovery Grant, **Dr. Jonathan Van Hamme** (Biology) searches for ways to convert a toxic chemical into a non-toxic product in his study: *Unraveling the molecular basis of 6:2 fluorotelomer sulfonate biodegradation by Gordonia*. The goal of the research is to aid in the development of tools to remediate contaminated environments, and to provide necessary evidence to those responsible for regulating the production and use of these toxic chemicals.

Research with PROVINCIAL impact

Investigating Classroom Talk: Students and teachers learn together

Declining enrolment in secondary and post-secondary level science courses is an international concern, and as a result, **Dr. Carol Rees** (Education) explores new methods of engaging students. Despite a demonstrated increase in student interest, motivation, science literacy, critical, creative thinking and innovation ability, student-centred science inquiry remains rare in classrooms. With the help of a SSHRC Insight Development Grant, Rees embarks on her project: *Transitioning to Student Centred Science Inquiry: Investigating Classroom Talk*, and aims to transfer successful science inquiry into classrooms. The method requires teachers and students to change their mode of interaction, with teachers reducing their authority over the process, and students taking on more.



Dr. Carol Rees

Geographer works with big data to monitor and understand dwindling water resources

Dr. David Hill (Geography) explores ways to harness immense pools of weather-related data to create better understanding of how urban systems react in extreme weather events, and ultimately to help sustain dwindling water resources. In his NSERC-funded project, *Leveraging Ubiquity: A Big Data Approach to Environmental Observation*, Hill studies how to harness data created by the development of “intelligent” infrastructure to facilitate a more adaptive water resource management approach. Hill’s research addresses the challenge of providing environmental measurements that do not depend on the deployment of large networks of dedicated sensors, but that are also accurate and reliable.

The impact of climate change on the abundance of marine invertebrate populations

To what extent do intertidal animals (barnacles, mussels, hermit crabs and snails) differ in their ability to tolerate warmer temperatures and reduced ocean salinities, and what impact does climate change have on their abundance?

With the aid of an NSERC Discovery Grant, **Dr. Louis Gosselin** (Biology) takes on his project: *Role of early benthic phase in regulating the distribution and abundance of marine invertebrate populations*. Research has found the abundance of benthic marine invertebrates, including lobsters, oysters, barnacles and seastars, varies by as much as 400 per cent from year to year and from one location to another. The variations negatively impact the stability of natural communities and the availability of commercially harvested species, yet the cause or causes of these variations is not well understood. Evidence suggests variations are at least partly caused by low and variable levels of survivorship through the first few days or weeks of benthic life, when these animals are still in the larval or early juvenile forms. Through his research, Gosselin will enhance our ability to predict population abundance, leading to predictions regarding the impacts of climate change on early survivorship and the persistence of coastal invertebrate species.



Dr. Louis Gosselin

Research with PROVINCIAL impact

B.C. beef produced with more forage and less grain, produces healthier fatty-acid profile

Grass fed, versus grain fed, organic versus "natural" — for consumers, the marketplace can be extremely confusing, and at times, expensive to navigate.

Dr. John Church (Natural Resource Science) and his team of researchers are discovering what makes beef healthier, thereby making healthy choices simpler for consumers, and more cost-effective for producers. In the research paper, *Comparison of Fatty Acids in Beef Tissues from Conventional, Organic and Natural Feeding Systems in Western Canada*, the BCIC Regional Chair in Cattle Industry Sustainability has found that more forage in the diet of cattle improves the fatty acid profiles of beef, and that as a general rule, BC beef — because of the greater ratio of forage to grain — is healthier than beef produced from conventional



Canadian feedlots. The majority of beef products available at retail are produced using conventional feedlot finishing practices, where barley grain typically exceeds 70 percent of the diet. Grain-based diets increase total fat content, reducing the proportion of polyunsaturated fatty acids in meat. Additionally, grain-based diets adversely affect the polyunsaturated fatty acid profile of beef by lowering omega-3 while raising omega-6 fatty acid proportions, ultimately increasing the omega-6/omega-3 ratio.

Church's team found the ratio of omega-6 to omega-3 in conventional beef to be 8:1, while the ratio of grass-fed beef is 2:1. In British Columbia, for those producers that use more forage and only used minimal grain to finish the animals, the ratio jumped to 3:1, which is still remarkable. "We've discovered that while beef will never compare to salmon for omega-3 in terms of total amount, it can still make a significant contribution to diet. As such it is important that we produce beef with a healthy fatty acid profile."

As a result of the high cost of production of organic beef, a niche market has been created under the label of "natural" beef, with the objective of conforming to organic grain and grass-fed certification guidelines — no hormones or pesticides — without using strictly organic certified feed. The key to healthier beef is the forage to grain ratio, says Church, who explained that BC organic grain-fed beef was largely similar to purely grass-fed beef, and thereby a much healthier option compared to conventional beef.

Measuring the university's economic and social impacts on the province and region

Economic Impact Analysis: Thompson Rivers University is the result of research by **Dr. Laura Lamb** (Business and Economics) and shows the university's economic impact to be more than \$650 million on the provincial economy, with \$355 million directly benefiting Kamloops and region. The research shows that with a provincial grant of approximately \$65 million, TRU generates nearly 10 times that much provincially and more than five times locally. The report estimates that TRU's 1,400 full-time equivalent staff positions spin-off into 2,110 jobs locally, and nearly 3,202 jobs province-wide. It is increasingly common for universities to estimate the impact using the analytical methods of regional economics. The study estimates the additional economic activity generated by TRU on both the local Thompson-Nicola region as well as on the province. The local and provincial impacts were estimated using BC Statistics with use of the British Columbia input-Output Model (BCOIM). Lamb's research also highlights the social and cultural impacts of TRU. Foremost among these are TRU's students, faculty and staff and more than 50,000 alumni, 60 percent of whom continue to live in the Interior of BC.



Making GLOBAL Connections



Fostering a spirit of global outreach

TRU's Academic Plan emphasizes the value of both local and global cultural understanding. Activities such as conference participation and research collaborations that build connections between individuals and institutions around the world are an important component of global cultural understanding.

In 2013-2014, TRU researchers presented more than 130 papers at conferences around the world. Represented here are just a few of the many ways TRU researchers are building regional and global connections. See www.tru.ca/research for further details on research activity at TRU.

Research Excellence at TRU: Selected Activities

Lorne Neudorf moderated the keynote lecture, *The State as a Legal Tradition* by H. Patrick Glenn (McGill) at the annual conference of the Cambridge Journal of International and Comparative Law, Cambridge, England

Ginny Ratsoy presented *Inscribed Space and Chronology in Contemporary Indigenous Drama in British Columbia* at the Emotional Geographies Conference in Groningen, Netherlands

Ruby Dhand presented *Reflections on Socio-Legal Methodology: Creating Legislative Evaluative Tools for Mental Health Legislation* at the congress of the International Academy of Law and Mental Health in Amsterdam, Netherlands

Kellee Caton presented *Speaking of Tourism: Creating Our Own Voice in the Post-Disciplinary Academy* in Neuchâtel, Switzerland.

Kellee Caton and Billy Collins presented at the International Conference on Religious Tourism and Tolerance, Konya, Turkey

Anne Terwiel presented *Building Legacy: Best Practices in Olympic and Paralympic Games Volunteer Recruitment, Training, Management and Communication* at the VI International Conference, Olympic and Paralympic Games Legacy: Innovations, Technologies and Personnel in Sochi, Russia

Jim Hu presented *Dynamic Simultaneous Oral-Written Feedback: University ESL Students' Choice for Academic Writing Response* at the International Conference on Social Sciences, Shanghai, China

Ehsan Latif presented *The Impact of Income Inequality on Health Outcomes in Canada* at the International Academy of Business and Economics Conference, Bangkok, Thailand

Richard Frimpong Oppong presented his work on the enforcement of judgements of international courts in national courts at the Journal of Private International Law Conference, Madrid, Spain

John Hull and Harold Richins presented *Considerations for Creating Health and Wellness Experiences in Bali* at the Tourism in Indonesia Conference, Bali, Indonesia.

Tesh Dagne presented *Common Strategies to Protect Common Property* at the Global Congress and Open A.I.R. Conference, Cape Town, South Africa

Will Garrett-Petts gave a keynote presentation and taught a master class on Community Engagement at the Spectres of Evaluation Conference at the University of Melbourne, Australia.

Research with NATIONAL impact

Immediate or delayed gratification? Psychologist examines emotion regulation choices

Does a preference for immediate rewards also influence people's choice of emotion regulation strategies, and ultimately, their psychological well being? In her SSHRC-funded research project, **Dr. Catherine Ortner** (Psychology), working in collaboration with **Dr. Haytham El Miligi** (Computer Science) will use complementary laboratory and field methods to collect information and examine why people regulate their emotions in different ways and the resulting consequences of that behaviour.

The study: *Feel good now or later? Preferences for immediate versus delayed rewards underlying emotion regulation choices* has two phases.

The first includes a lab study to assess how preferences for immediate rewards predict

emotion regulation choices, and whether prompting subjects to consider the consequences of those choices encourages them to make healthier ones. The second phase works with Dr. El Miligi in the development of smart phone application to collect real-time data from participants, who will record their emotional status and emotion regulation several times per day for one week. The goal is for the app to eventually be used as an evidenced-based tool to facilitate healthy emotion in everyday life. It is hoped findings from the study will allow clinical psychologists to better assist clients to regulate emotions in healthy ways.



Dr. Catherine Ortner

Historian explores Canada's postwar shift to secularization in *Oral Histories of Unbelief*

Dr. Tina Block (History) undertakes an impressive two-year SSHRC-funded social history project exploring the rationale for Canada's postwar shift to secularization.

Oral Histories of Unbelief in Ontario and British Columbia, 1950s-1970s, gives voice to an understudied population — unbelievers — and reveals how class and gender shaped their decisions, experiences and identities. In this study, unbelief is approached as an element of social history — as something lived by ordinary Canadians rather than as an abstract philosophy.

The study will produce 80 oral histories, which will be analyzed through the lenses of class, gender and place. The project provides four undergraduate students the opportunity to gain experience in historical practice, and provides the groundwork for a comprehensive national study exploring the role of ordinary people in secularization.



Dr. Tina Block

Research with **INTERNATIONAL** impact

Do birds with more colourful plumage make better parents?

In ornithology circles technology is finally catching up with the questions, and **Dr. Matthew Reudink** (Biology) is at the forefront, using tools and techniques developed in collaboration with other faculty to answer previously intractable questions.

With the assistance of an NSERC Discovery Grant, Reudink is directing his research focus to the Mountain Bluebird, asking the question: Do birds with more colourful plumage make better parents? "There is often nestling mortality but we don't really know what causes it. It might be caused by the cold, or it might be due to bad parenting."

Physicist **Dr. Mark Paetkau** has developed a Radio Frequency Identifier (RFI) housed in leg bands that are placed on captured bluebirds, allowing Reudink a unique glimpse into parenting behaviours. With feeding data and temperature data recorded from inside the nesting boxes, Reudink and his team of graduate and undergraduate researchers now have real-time, detailed information that has never before been available. This research tool has been so effective, Reudink and Paetkau will share the technology with Swedish researchers at the University of Agricultural Sciences in October, 2014.



Dr. Matthew Reudink



The Underclass Strikes Back? Slovak Roma in Municipal Politics

Dr. David Scheffel (Anthropology) is a leading expert on the Roma peoples of Eastern Europe, and is presently studying Roma participation in local Slovak politics, examining the ways in which the arena of formal politics is being 'domesticated' to fit the needs of disenfranchised people. Awarded a SSHRC Insight Grant in 2012, Scheffel's three-year project has allowed him to spend many months in the field, with specific focus on six communities as they prepare for municipal elections scheduled for Fall 2014. The changing political conditions experienced by Slovak Roma mirror trends in other societies undergoing decolonization, including some Canadian Aboriginal communities.



Promoting individual rights to international justice

Dr. Richard Frimpong Oppong (Law) is receiving accolades for his SSHRC-funded project *Access to International Justice at the Post-Adjudication Phase of International Dispute Settlement: The Role of National Courts*. Throughout his research, Oppong has visited international courts, including the Court of Justice of the Economic Community of West African States in Nigeria, the African Court of Human and Peoples Rights in Tanzania and the European Court of Human Rights in France to conduct interviews and attend conferences. Oppong, together with Juris Doctor candidate **Lisa Niro** won the James Crawford Prize for the best paper of the year submitted to the *Journal of International Dispute Settlement*, for their paper: *Enforcing Judgments of International Courts in National Courts*.

Funding for RESEARCH

The federal granting agencies including the Natural Sciences and Engineering Research Council of Canada (NSERC), the Social Sciences and Humanities Research Council of Canada (SSHRC), and the Canadian Institutes of Health Research (CIHR), offer a major source of research funding. Grants are awarded through a peer-review process.

Projects that are funded through tri-agency include*:

Dr. Beth Bedard: Traditional ways of knowing

Dr. Tina Block: Oral histories of unbelief in Ontario and British Columbia, 1950s-1970s

Dr. Richard Brewster: Computational complexity of combinatorial problems: Graph homomorphisms, packings, and good characterizations

Dr. Lauchlan Fraser: Applying genetics to improve grassland restoration along the Trans Mountain Pipeline Project

Dr. Lauchlan Fraser: Use of soil amendments to increase reclamation success of a dry mine tailings site in the Southern Interior of BC

Dr. Lauchlan Fraser: Use of selective genotypes in developing a native seed nursery for grassland restoration

Dr. Lauchlan Fraser: Wastewater treatment using a constructed wetland at Mount Polley Mine

Dr. Louis Gosselin: Role of early benthic phase in regulating the distribution and abundance of marine invertebrate populations

Dr. Jim Hu: Evaluating error treatment in ESL academic writing

Dr. David Hill: Leveraging ubiquity: A big data approach to environmental observation

Dr. Bogumila Kwiatkowska: A knowledge-based framework for the management of imprecision in data

Dr. Karl Larsen: Natal dispersal: cues and mechanisms

Dr. Ehsan Latif: Rent Banks, a solution to homelessness

Donald Lawrence: The camera obscura project: Optics, learning and play in Canada's wilderness and the north

Dr. Nelaine Mora Diez: Theoretical studies in organic and environmental chemistry

Robin Nichol: No Straight Lines: The homeless play project

Dr. Richard Frimpong Oppong: Access to international justice at the post-adjudication phase of international dispute settlement: The role of national courts

Dr. Catherine Ortner: Feel good now or later? Preferences for immediate versus delayed rewards underlying emotion regulation choices

Dr. Gloria Ramirez: Revitalizing and teaching Secwepemctsin language using gamification on mobile tablets

Dr. Gloria Ramirez: Early language and literacy enrichment

Dr. Carol Rees: Student-led science inquiry supported by the Steps to Inquiry framework: A conversation analysis of talk in interaction

Dr. Matthew Reudink: Year-round behavioural and ecological influences on the function and evaluation of ornamental plumage in migratory birds

Dr. Jeanette Robertson: Spirituality and healing in healthcare: How does the integration of spirituality influence health outcomes or relieve suffering?

Dr. Cynthia Ross-Friedman: Viscin tissue of the dwarf mistletoe *Arceuthobium americanum* (Viscaceae): How does it develop, what is it made of, and how does it function in explosive seed discharge

Dr. Nicole Shabus: Community participation in the utilization of biodiversity and traditional knowledge

Dr. Mohamed Tawhid: Portfolio management investment system

Dr. Patrick D. Walton: Why do Aboriginal students stay or leave university?

Dr. Jonathan Van Hamme: Unraveling the molecular basis of 6:2 fluorotelomer sulfonate biodegradation by *Gordonia* sp. NB4

Dr. Qinglin (Roger) Yu: Key Performance Indicators (KPI) for energy conservation in the mining industry

Dr. Qinglin (Roger) Yu: Predictive models of energy conservation at Highland Valley Copper and its sensitivity analysis

Dr. Qinglin (Roger) Yu: Subgraph extension problem: structures, characterizations and its connection with edge-weighting coloring problems

**Only the principal investigator on each project is identified in this list*

Research Centres & Groups

TRU has dedicated resources to a number of research centres. These centres operate as research hubs, offering researchers opportunities to work collaboratively across disciplines on areas of shared interest. TRU's research centres include:

- ▶ Centre for Optimization and Decision Science
- ▶ Centre for Community-Based Youth Health Research (CCYHR)
- ▶ Centre for Community & Cultural Engagement

- ▶ Centre for International Social Work and Research (CISWR)
- ▶ Walking Lab: A Centre for the Examination of Walking, Health and the Civic Landscape
- ▶ Centre for Respiratory Health and Sleep Science
- ▶ Community and Ecosystem Ecology Centre
- ▶ The Small Cities Community-University Research Alliance
- ▶ Alliance for Mountain Environments

Recognizing Research EXCELLENCE

Grassland hydrology research boosted by prestigious Professorship

Dr. Thomas Pypker (Natural Resource Science) received a three-year Professorship funded by the Tom Northcote and Bert Brink Endowment, which was created to promote research excellence in the areas of grassland and freshwater ecology and conservation in British Columbia. Pypker's goal is to establish an internationally recognized research program in grassland hydrology. His research, which will build on the work of previous recipients of the professorship, will improve the ability of the cattle industry and other land managers — including provincial ministries — to mitigate the effect of land use and climate change on fragile grassland habitats. During the next three years, Pypker will receive \$10,000 annually from the endowment to support his research program. "The information gleaned from my research will benefit society through better management of grasslands, improved ecosystem function and improved cattle forage," says Pypker, who expects to train several undergraduate and graduate students, providing them with a hands-on research experience. Pypker plans to work collaboratively with other TRU researchers whose work has also been supported by the Northcote and Brink endowment, including **Drs. Brian Heise and Wendy Gardner, and Dr. John Church.**



Dr. Thomas Pypker

Graduate student named Western Canadian Champion in 3 Minute Thesis Competition

Master of Environmental Science student **Erika Dufort-Lefrancois** represented TRU at the national 3 Minute Thesis (3MT) competition after winning the Western Canadian round in Calgary in May 2014. The 3MT competition gives participants the opportunity to present their graduate research in three minutes or less. As well, research must be presented in a manner that is engaging and understandable by non experts. Dufort-Lefrancois' presentation titled "How Tightly do Indol and LPS Hug?: Determining a Binding Constant," edged out competition from the University of BC and the University of Manitoba, earning her the right to represent TRU at the national level. The competition was developed by the University of Queensland in 2008.



Erika Dufort-Lefrancois

Recognizing Excellence in Research and Mentorship

Each year staff, faculty and administration take a moment to celebrate the success and achievement of their peers during the President's Annual Merit and Service Awards. The 2014 event recognized 168 TRU employees, including 159 staff and faculty who received Long Term Service pins.

2014 Merit Award Winners:

Master Scholar Award

- ▶ Dr. Bruce Baugh, Philosophy, History and Politics

Award for Excellence in Scholarship

- ▶ Dr. Ehsan Latif, Economics

Graduate Research Mentorship Award

- ▶ Dr. Karl Larsen, Natural Resource Science

Undergraduate Research Mentorship Award

- ▶ Dr. Bogumila Kwiatkowska, Computer Science
- ▶ Dr. Naowarat Cheeptham, Biological Sciences



Dr. Bruce Baugh, receiving the 2014 Master Scholar Award

CREATIVE Practice, Exhibitions & Exhibits

Natural history captured through field journal drawings combine to create dramatic synergy

Art and science intersect in the work of plant ecologist **Dr. Lyn Baldwin**. In *Not Just a Snapshot: The Thompson Drainage through Field Journal Art*, an exhibit at the Kamloops Art Council Main Gallery from Jan. 9 to Feb. 1, 2014, the TRU Biological Sciences professor revealed the natural history of the region drained by the Thompson rivers, captured through field journal drawings in pen and watercolour, and hand-written observations.

In an interview on CBC Radio's North by Northwest Baldwin explained: "Attending to the natural world occurs through both images and words, and it is the synergy that happens between them on a full page spread that really seems to best capture that moment."

The artwork exhibited in *Not Just a Snapshot* represents much of her field journaling from the past year, notes Baldwin on her university blog, *The Viridian Life*. Among her drawings and watercolours, handwritten annotations highlight her botanical observations, and the musings that make up another facet of Baldwin's interdisciplinary working life—creative non-fiction.



Above, an image of the Tranquille River. Right, the path into Pine Park along Tranquille.



Debut novel blends poetic sensibility with issues of land stewardship and colonialism



Karen Hofmann

After Alice, the debut novel by **Karen Hofmann** (English) was released in April, and published by NeWest Press. The novel tells the story of retired professor Sidonie von Tähler, who returns to her ancestral Okanagan valley orchards still very much in the shadow of her deceased older sister Alice. As she sifts through the detritus of her family history, Sidonie is haunted by memories of trauma and triumph in equal measure, and must reconcile past and present while reconnecting with the people she left behind.

The novel is said to blend a poetic sensibility with issues of land stewardship, social stratification and colonialism. Hofmann's short fiction has been published in *Arc*, *Prairie Fire*, *The Malahat Review*, and *The Fiddlehead*. Her book of poetry, *Water Strider*, was shortlisted for the Dorothy Livesay Prize at the 2009 BC Book Awards, and "Uses for a Mole" won Editor's Choice in the 2012 Arc Poem of the Year Contest. *The Burgess Shale* was shortlisted at the 2012 CBC Short Fiction Contest.



Planning for the Midnight Sun Camera Obscura Festival

Work is well underway on the development of the **Midnight Sun Camera Obscura Festival**, scheduled for June 17-22, 2015 and led by **Donald Lawrence** (Visual Arts). The SSHRC-funded research project involves a team of international artist researchers, exploring both the technological and artistic potential of the camera obscura. The festival will take place in Dawson City, Yukon, and will involve a symposium, seminars, workshops, gallery exhibits, a portable camera obscura and other off-site projects. Dawson City was chosen for its summertime "midnight sun" and its history as a supporter of cultural events.

The value of STUDENT research

Inquiry-based and creative learning are recognized as academic foundations in the Academic Plan, and TRU places a high priority on providing undergraduate and graduate research opportunities. The **Comprehensive University Enhancement Fund Undergraduate Research Experience Award Program (UREAP)** provides a foundation for many student research projects. Over the past year, 52 UREAP awards with a total value of \$234,000 were given to support undergraduate research projects. In addition, 68 **Undergraduate Research Assistants** were hired to work with faculty on their research. Adding further value to undergraduate research is the newly established **Co-Curricular Record (CCR)**, an official document highlighting accomplishments and experiential learning gained through activities occurring outside the classroom. The purpose of the CCR is to provide an authentic record of student engagement, and to enhance learning inside the classroom via meaningful student engagement outside the classroom. It also provides an opportunity to recognize and encourage cognitive development, personal growth and interpersonal effectiveness that occurs as a result of involvement.



Photo by Rob Buchanan/Parks Canada

Investigating the health of bats in Glacier National Park

Several common species of hibernating bats are endangered due to a fungus that causes White Nose Syndrome. With the help of a UREAP grant, microbiology student **Baylee Out** spent Summer 2013 working collaboratively with Parks Canada in Glacier National Park to determine whether the fungus had arrived in B.C. caves used by hibernating bats. Out collected samples in the Nakimu caves and DNA tests were run on the samples. Parks Canada will use the results of her research to create measures for protecting hibernating bats in the park. Out presented her work at the BC Parks and Protected Areas Research Forum in December.



Can goats limit the spread of invasive weeds?

Kate Strangway spent last summer in the field, literally, analyzing how well grazing goats kept down invasive weeds including knapweed and thistle. Her fieldwork involved finding out how effective grazing animals are as an alternative to traditional, herbicide-based weed control methods, and was assisted by a UREAP grant. The fourth-year biology student was supervised by plant ecologist **Dr. Lyn Baldwin**, and found the experience enriching: "I learned that I am capable of thinking about and applying my classroom knowledge to a real world project, which has substantially boosted my confidence when contemplating my future as a scientist."

Serious fun: The economic impact of music festivals

With help from a team of undergraduate researchers, Tourism faculty member **Billy Collins** (pictured centre) discovered the Salmon Arm Roots & Blues Festival is vital to the regional economy, and in 2013, the festival generated more than \$4-million in new dollars spent in the community by non-locals. Collins' research was assisted by an Internal Research Fund Grant, which was then matched by an investment from Shuswap Tourism. The funding allowed him to hire recent tourism grad **Keri Lewis** as a research assistant, as well as an additional eight students who helped gather and input data from the 2013 event.



Community & Industry PARTNERSHIPS

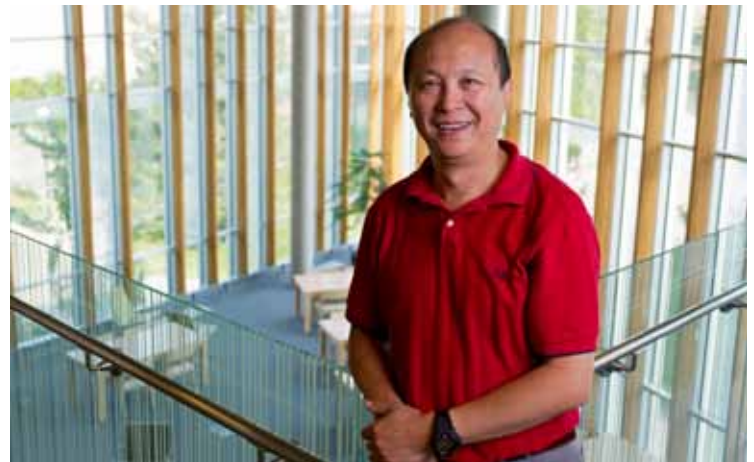
Relationships with industry partners contribute to the building of research infrastructure and provide important opportunities for applied research to faculty and students. Industry throughout the region relies on TRU for applied research expertise on issues ranging from energy optimization to land reclamation. Our mission is to foster and develop collaborative work environments between researchers, industry partners, community groups and funding agencies. As the only research university in the region, our researchers are uniquely positioned to find solutions to community-specific problems and industry-driven challenges. Our researchers are working through six active NSERC Engage Grants, worth \$150,000, which support the development of research partnerships between the university and industry.

Analyzing large pools of data on energy use helps local mine become more efficient

For more than 20 years, mathematician **Dr. Roger Yu** has focused his research on graph theory — looking at enormous pools of data to try to identify previously undiscovered links.

Director of the Centre for Optimization and Decision Science (CODS) and an NSERC-funded researcher, Yu's work and the work of his CODS colleagues is of great importance to the general public, industry and all levels of government as Canada tries to catch up with the new digital economy.

"We try to answer the questions posed by industry — what is their concern, what is the hot topic, and is my knowledge applicable to something they're doing?"



Dr. Roger Yu

There has been a resurgence in graph theory research, spreading out from mathematics to physics, biology, operations research, computing science and communications networks. As data becomes more available, researchers around the world are able to ask questions and develop algorithms to create meaningful outcomes to real-world problems. "We try to answer the questions posed by industry — what is their concern, what is the hot topic, and is my knowledge applicable to something they're doing?"

Mining is an energy-intensive industry, and a mine site like Teck Highland Valley Copper (HVC), which processes 130,000 tonnes of ore per day, can use up to \$40 million worth of energy per year. As part of reaching short and long-term energy efficiency goals, HVC turned to Dr. Yu to find a way to extract useful and concise information from the large amounts of data that the mine site collects on its energy use. Yu evaluated key performance indicators for energy consumption in the mining industry and developed a set of indicators specific to HVC's operation and goals. Chris Dechert, General Manager at HVC, says that the model Yu presented to HVC helps management decide where energy should be allocated. Dechert adds that the model will help HVC make energy usage decisions based on fact rather than on assumption, and that it is also helping HVC take a novel look at the data they collect.



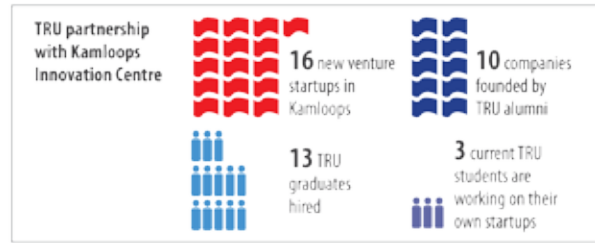
Partnership preserves habitat for endangered Spadefoot

Researchers at TRU are collaborating with New Gold's New Afton mine south of Kamloops on a wildlife conservation research project: the Great Basin spadefoot (*Spea intermontana*). **Dr. Karl Larsen** (Natural Resource Science) is supervising the work of Master of Science student **Jo-Anne Hales**, who is studying how spadefoots use the grassland landscape. The project focuses on the habitat selection of spadefoots, and she uses radio-telemetry and pond surveys to determine how spadefoots select water bodies for breeding and terrestrial sites for foraging and aestivation.

Fostering a spirit of INNOVATION

Innovation and entrepreneurship form the foundation of the regional economy, and have long been strategic priorities for research at TRU.

A multidisciplinary and collaborative approach underpins student learning and research. In 2012, TRU formalized a unique collaboration with Kamloops Innovation (KI) — the region's technology business accelerator. This partnership has created an ecosystem that provides access to student talent, research support, and the training and opportunity for emerging entrepreneurs and established companies to build business in the region.



The Generator: A venture acceleration centre designed to ladder students to entrepreneurship

With a \$50,000 grant from the BC Innovation Council (BCIC), Thompson Rivers University has established **The Generator**, a venture acceleration centre located within the House of Learning and designed to give students and faculty the support and mentoring they need to pursue their entrepreneurial goals. In addition to entrepreneurial programs and workshops, this space provides industry a portal onto campus to build and maintain applied research partnerships with TRU faculty.

The Generator is the brainchild of **Lincoln Smith**, Director of Research Partnerships and Enterprise Creation at TRU, and the Executive Director of Kamloops Innovation (KI). "The Generator exposes students to the routes into entrepreneurship and shows them the possibility of starting their own companies," says Smith, adding that the centre will also be an entry point for any business to engage and form collaborations with TRU researchers. Says Smith: "We have examples of students founding a company, expanding with TRU graduate hires, and returning to campus to collaborate with researchers in developing new innovative technologies and products."



Lincoln Smith (right), Director of Research Partnerships and Enterprise Creation at TRU and Executive Director of Kamloops Innovation hosts Startup Coffee: Regular, informal meets for entrepreneurs, students and anyone interested in #startuptime.

"Arrow's own technology development has benefited so much from working with the TRU Generator in the last year. It is exciting to be part of the technology and research community that is being built in our region, and I look forward to continued research partnerships with TRU."

— André Larouche, Chief Information Officer, Arrow Transport Services

"I expected to have to leave Kamloops to work at a tech company like Sewllkwe. Getting connected to Kamloops Innovation through the TRU Generator has been an amazing opportunity and a great learning experience."

— Chad Fawcett, BSc Computer Science student & software developer, Sewllkwe Tracking Solutions

TRU grad maps out the route to entrepreneurship

Natural Resource Science graduate **Dan Erikson** worked in the field as a geographic data analyst before launching his company, Truvian Labs, in 2011. The company builds user-friendly, web-based mapping and data management applications, removing the technical complexity inherent with other mapping programs, and providing intuitive tools to visualize and organize large amounts of relevant information. Truvian is one of Kamloops Innovation's founding companies, and benefits from its association with TRU. "TRU students are an important part of our hiring strategy," says Erikson, who adds that Truvian is expanding with plans to pursue new opportunities throughout North America.



Mobilizing KNOWLEDGE

Sharing and showcasing scholarship with researchers from around the world

Conferences and other research-based events that showcase the scholarship and research being conducted at TRU provide a unique opportunity for researchers to share their work, engage in dialogue with other researchers and form collaborations.

Some of the research-related events hosted by TRU included:

- ▶ 49th Annual Canadian Botany Association Meeting and Conference, June 2013: Thinking Plants.
- ▶ The BC Protected Area Research Forum, December 2013.
- ▶ Annual TRU Undergraduate Student Research & Innovation Conference and the Philosophy, History and Politics Undergraduate Conference are held in the Winter Semester each year.
- ▶ TRU Teaching Practices Colloquium, February 2014. Beyond the Boundaries: 21st Century Education.
- ▶ Annual Multidisciplinary Sleep Science Conference, March 2014: Focus on the biology of sleep and sleep medicine. The conference attracts researchers from a range of disciplines and includes sessions that are open to the public.
- ▶ Canadian Network for Innovation in Education Conference (CNIE). Confluences: Spaces, Places & Cultures for Innovative Learning, May 2014.
- ▶ Tourism Educators Conference: Back to Basics, June 2014.
- ▶ Annual International Research Institute: Language Culture and Community, July 2014: The Institute attracts researchers from around the world.

Café Scientifique considers spirituality in health care

What role does spirituality play in health care, and how could spirituality affect the welfare of health care consumers? **Dr. Jeanette Robertson** (Social Work), assisted by a grant from the Canadian Institutes of Health Research (CIHR), hosted the well-attended Café in April, bringing researchers together with the public to promote greater understanding.

Publishing

Small Cities Imprint Est. 2008: Publishes conference and workshop proceedings, peer-reviewed collections, monographs and works of creativity emerging from or related to the Mapping Quality of Life and the Culture of Small Cities research program, a component of the Community-University Research Alliance. Licensed under Creative Commons, the Imprint provides open access to all contents for registered readers.

Canadian Journal of Contemporary Law Est. 2013: Canada's newest double-blind peer-reviewed law journal publishes leading scholarship on a selected issue each year.

Cave Microorganisms and Drug Discovery

Featured at the Kamloops Art Gallery from Jan. 17 to March 22, this exhibition engaged the public in exciting new developments in the exploration of cave microorganisms, their identification and the potential for new drug discovery, while creating new perspectives in the popular and scientific view of microorganisms through art. Research on the microbiology of local caves has been published in scientific peer-reviewed journals, but it remains less-known to the general public. **Dr. Naowarat (Ann) Cheeptham's** microbiology research team produced several beautiful Scanning Electron Micrograph images of cave microorganisms. The images were used to promote an understanding of the potential role of these and other bacteria in treating diseases. The project also contributed to enhancing student engagement and learning innovation. Project funding was provided by the Society for Applied Microbiology Public Engagement Fund (SfAM), SfAM's President's Fund and TRU Internal Research Fund for Scholarship and Scholarly Teaching.



Establishing a research CULTURE



Promotion, Support and Advocacy: Thompson Rivers University's Research Mandate

- ▶ **Supporting** researchers — faculty, graduate students and undergraduate students — in the preparation and administration of grants and research agreements by providing grant writing workshops, mentoring, a sample grants library, legal advice and contract negotiation support
- ▶ **Promoting** research collaboration with community groups, universities, industry partners and federal and provincial granting agencies
- ▶ **Communicating** our research successes
- ▶ **Maintaining** a compliance environment to meet external funding requirements through the Ethics and Biosafety Committees, Integrity Policy and Strategic Research Plan
- ▶ **Advocating** for and managing research resources and infrastructure, including equipment through Canadian Foundation for Innovation and Western Development, research facilities, Canada Research Chairs, Indirect Costs Program, endowments, sabbaticals, seed funding and the Research Training Recognition Fund

Key contacts in the Office of Research and Graduate Studies

- ▶ **Dr. Will Garrett-Petts**
Associate Vice-President
- ▶ **Dr. Lincoln Smith**
Director, Research Partnerships & Enterprise Creation
- ▶ **Troy Fuller**
Manager, Research Services
- ▶ **Caroline Whitelaw**
Administrative Assistant
- ▶ **Debbie Krebs**
Ethics & Compliance Officer
- ▶ **Dr. Anita Sharma**
Research Grants Development Officer
- ▶ **Danna Bach**
Communications Officer



Iceland by **Doug Buis** was on exhibit at the Geor.gee Gallery in Los Angeles, California in October 2013. The focus of his research is on geological and geographical transformations brought about through volcanic and glacial activity.



THOMPSON RIVERS
UNIVERSITY

Office of Research and Graduate Studies

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