

NEWSLETTER

Summer 2018

GOLD!

On March 18, 2018 the University of Manitoba Bison women's hockey team was crowned the 2018 U SPORTS champions beating the Western Mustangs 2-0. This was the first time the Bisons were seeded number one at a women's hockey national championship in their sixth appearance. With the win, the Bisons earned their first national championship in the program's 21-year history. Four of the Bison women's hockey champions are students in the Clayton H. Riddell Faculty of Environment, Earth, and Resources: Environmental Studies students **Caitlin Fyten** (Defense from Cremona, Alberta), **Alana Serhan** (Forward from Porcupine Plain, Saskatchewan), and **Erica Rieder** (Defense from Regina, Saskatchewan), and Environmental Science student **Rachel Dyck** (Goalie from Winnipeg Beach, Manitoba).

This Spring Rachel, Alana, and Caitlin will graduate while Erica has one more year to go and will continue to play for the Bisons. All three graduating students in addition to beginning their new careers plan to continue to play while Alana also intends to coach. Caitlin is returning to Alberta to pursue opportunities in the oil and gas field. These students while attracted to the University of Manitoba because of the Bison Women's Hockey Program have also enjoyed their time in the Riddell Faculty. To quote Alana: *"We've made so many friends. Jill Oakes (Environment and Geography) came to every single game and even came to the airport to greet us after we won the championship. She's our super fan".*



Pictured Left to Right: Alana Serhan, Erica Rieder, Caitlin Fyten, and Rachel Dyck.

New Faculty Profile – Paul Durkin.



Dr. Paul Durkin received his B.Sc. from McMaster University and his Ph.D. from the University of Calgary in 2016. His research interests are in the field of clastic sedimentology and involve the investigation of coastal plain and paralic depositional systems, with a particular focus on meandering fluvial deposits. Fluvial systems are an essential link between sediment source areas and depositional sinks. Their depositional products record the environmental conditions under which they form, making them a vital resource for understanding Earth’s past, and predicting future responses to environmental change.

Dr. Durkin’s research is primarily field oriented, which ranges from outcrop studies of ancient fluvial deposits of the Western Canada Sedimentary Basin, to modern morphodynamics and sedimentology of meandering river systems in southwestern Manitoba. His research combines traditional sedimentary analysis with innovative data acquisition techniques, including Unmanned Aerial Vehicle photogrammetry to create 3D digital outcrop models, as well as remote sensing of meandering river dynamics using LANDSAT satellite imagery. Results from outcrop and modern studies are applied to subsurface mapping and reservoir characterization of hydrocarbon-bearing units, including the vast Athabasca Oil Sands of northeastern Alberta. Through a combined approach studying ancient deposits and modern environments, Dr. Durkin aims to establish linkages between modern processes and their stratigraphic products, which are essential for holistic paleoenvironmental interpretations and stratigraphic prediction.

Dr. Durkin was awarded the Canadian Society for Petroleum Geologists Best Ph.D. Thesis Award in 2016, and he will be embarking on a CSPG Outreach lecture tour of Canadian Universities in the Fall of 2018. Paul is also an avid outdoorsman and enjoys combining his passion for geology with outdoor activities. He has recently canoed the Nahanni River through the Mackenzie Mountains, NWT, and kayaked the Colorado River through the Grand Canyon, AZ.



Exploring the Impact of Oil Spills at the IISD - Experimental Lakes Area.

What happens to oil following a spill in Canada’s freshwater lakes and rivers? And what are the long-term impacts on the aquatic organisms that call these environments home? With ongoing proposals to expand Canada’s oil and pipeline infrastructure, there is growing interest from Canadians about the risks associated with oil transport. A significant gap in our understanding of oil spills is the potential impact and the fate of the spilled oil in boreal ecosystems. This gap is best addressed by field-based studies focused on understanding the impact oil may have on trophic interactions and whole lake health.

Dr. Mark Hanson with colleagues and students from University of Ottawa, Queens, Environment Canada’s Emergencies Science and Technology Section, and International Institute for Sustainable Development-Experimental Lakes Area (IISD-ELA) (Photo, top right) are collaborating to examine the fate and effects of ‘*dilbit*’ in boreal aquatic ecosystems. Dilbit is a form of bitumen that is diluted with lighter oils to allow its transport through pipelines, making for different physical, chemical, and toxicological properties than conventional crude oils. In August 2017, the team conducted a pilot-scale experiment with small enclosures (about 1000 L) to explore how dilbit might behave in a lake environment, and to provide a safety training exercise for everyone on the project. This summer, with those lessons learned, they will use 10-metre diameter enclosures (over 100,000 L total volume) deployed in a lake at ELA to understand the fate and effects of oil over time. Rainfall, temperature, sunlight, and particulate matter are some of the factors that could affect the behaviour of dilbit and its potential to induce toxicity that may not be accounted for in lab exposures. Primary production, zooplankton, and insects, along with fish will all be monitored for responses over the course of several months. The results of this study will ultimately inform regulatory decisions regarding the transport of dilbit in Canada.

Photo, top right. Students and researchers from the University of Ottawa, Queen’s, University of Manitoba, and Environment Canada, who will be assessing the fate and effects of diluted bitumen at IISD-ELA in Summer 2018. Photo credit: IISD-ELA

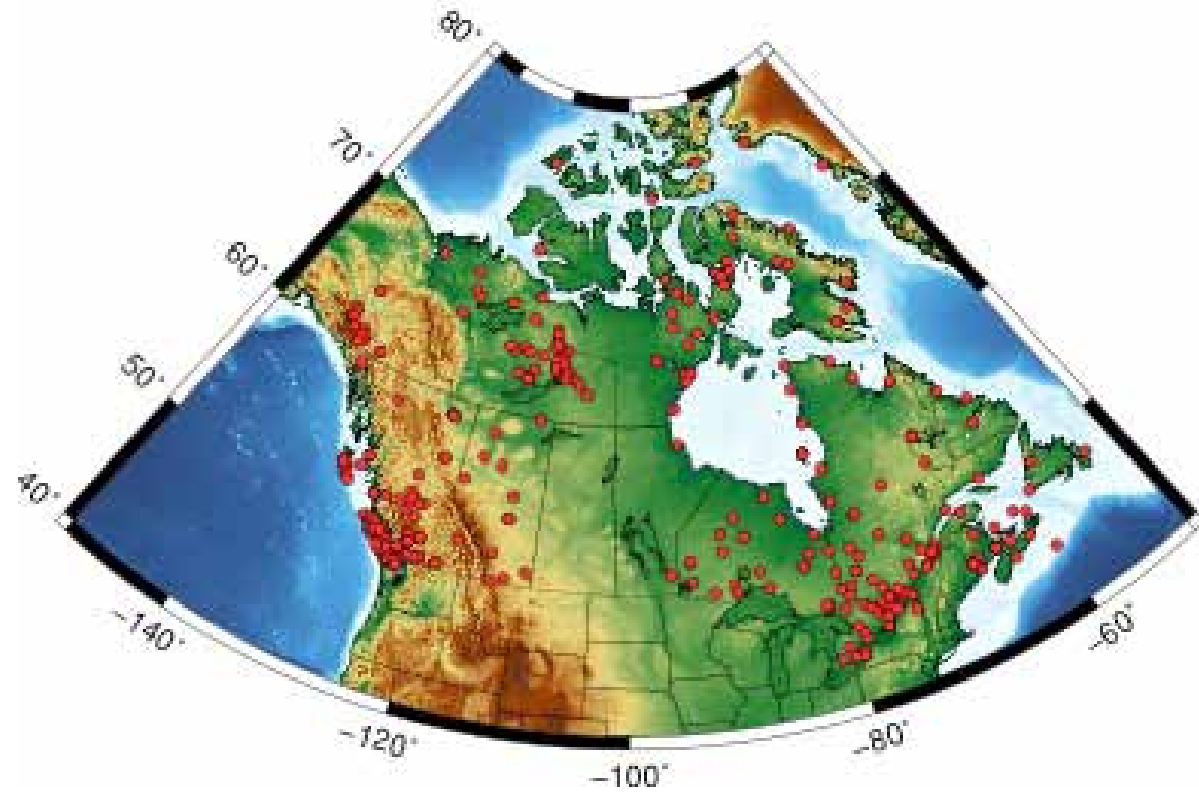
Photo, middle right. Sediment sampling being conducted as part of the 2017 pilot-scale study at IISD-ELA. Photo Credit: Dalila Seckar.

Photo, bottom right. Lake 260, site of the 2018 diluted bitumen study at IISD-ELA. Photo Credit: Tyler Black.



The National Facility for Seismic Imaging: Instrumenting the Seafloor.

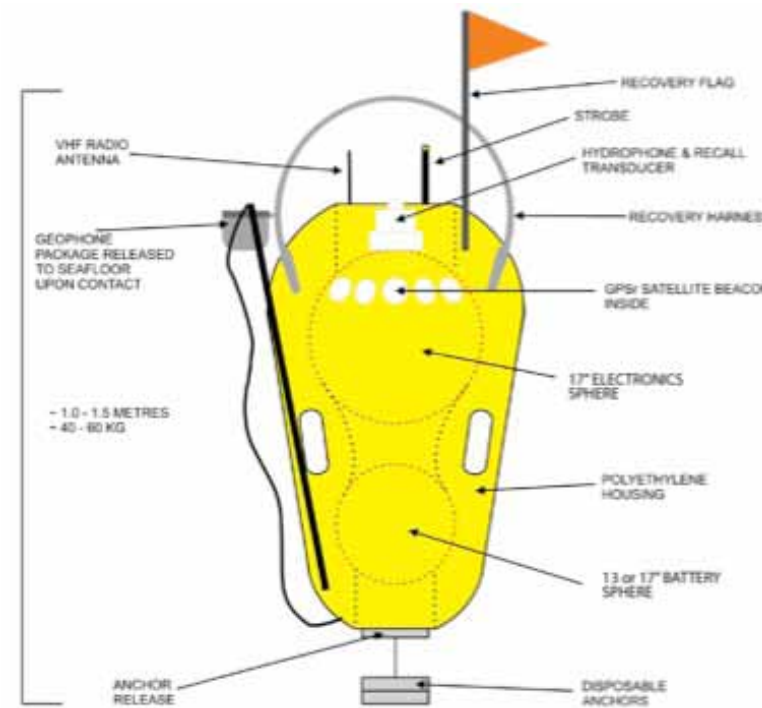
Much of our knowledge of the Earth's large-scale structure comes from seismic data: recordings of seismic waves produced by earthquakes or artificial sources. These waves have been used to generate detailed three-dimensional models of the Earth's interior – however, these models are biased: the vast majority of seismic stations are located on continents, producing models that resolve the continents in more detail than the oceans. Similarly, our knowledge of earthquake activity in ocean basins is more limited than on land, again due to the much greater density of continental instrumentation.



The map above shows locations of seismic stations (red dots) for which there are broad-band data in the Geological Survey of Canada archive. There is significant coverage (albeit with some gaps) over most of the Canadian landmass; however, apart from some islands, there is no offshore coverage. Instrumenting the oceans requires a different class of instrument: ocean-bottom seismographs (OBS).

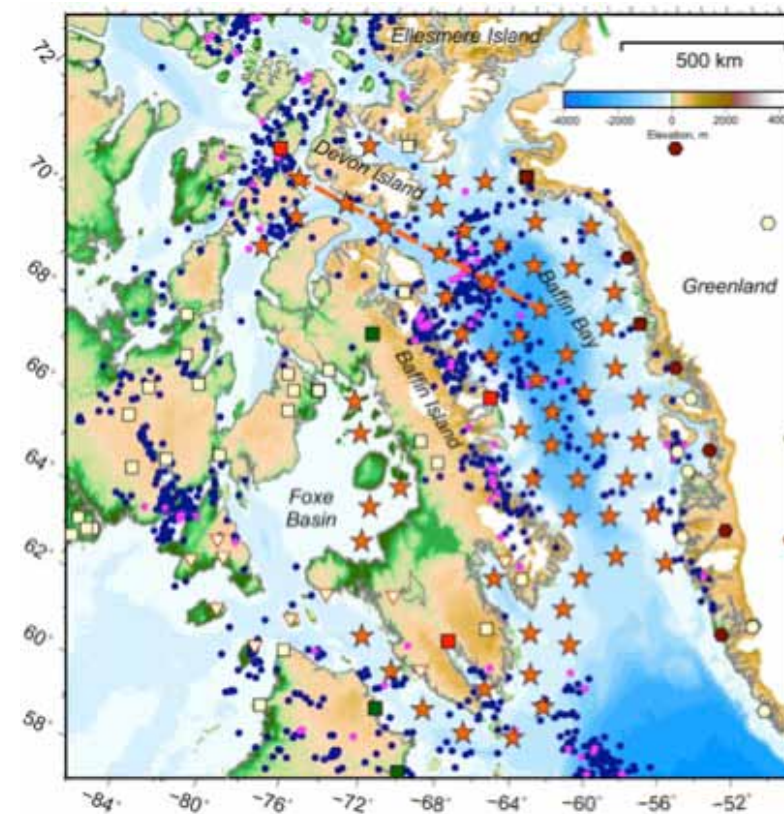
The National Facility for Seismic Imaging (NFSI) is a newly-funded national project to develop and operate a pool of Canadian OBS instruments, for projects in Canadian waters as well as worldwide. The project will be based out of Dalhousie University (primary investigator: Mladen Nedimovic), but includes co-primary investigators from six provinces and ten institutions. Thanks to matching funds from Research Manitoba, the University of Manitoba is one of these participating institutions, and will have a vote on instrument deployments as well as early access to data from OBS experiments.

An OBS is a complicated instrument — it must be capable of deploying to the ocean floor, recording seismic data for an extended period of time (on the order of one year) without external power, and then floating to the surface for recovery. The figure below shows the proposed design for NFSI instruments.



The NFSI instrument pool will consist of 120 of these instruments, which will include a broad-band seismometer for seismic recording as well as a hydrophone for ocean acoustics studies. The presence of the hydrophone opens up possibilities for additional oceanographic uses of NFSI data, such as recording marine mammal activity and sea-ice breakup.

The NFSI instruments will have a long useful life, and only the first few deployments have been discussed to date. One proposed early study is shown on the map below — a passive seismic study of eastern Arctic waters. Red stars indicate proposed OBS locations; dots are past earthquake locations (blue: last 30 years; magenta: last 2 years), and squares and hexagons are terrestrial seismic stations. The study will target lithospheric structure across Baffin Bay, a locus of past rifting. As well, it will lead to better understanding of eastern Arctic seismicity, crustal thickness, and the recently-discovered "icequake" process previously detected in the Greenland ice sheet.



For further information on the NFSI project, please contact **Andrew Frederiksen**, Andrew.Frederiksen@umanitoba.ca

A Bird in the Hand: Natural Resources Institute Professor wins International Award.

Dr. Nicola Koper (Natural Resources Institute (NRI)) has been working with graduate students of the Riddell Faculty for years to **“bring the birds to the people and bring the people to the birds”** in Grenada, West Indies. Together, they have presented numerous workshops, field trips, and lectures to Grenadian students of all ages, who enjoyed learning about bird behaviour, adaptations, identification, and about the science of studying birds. Dr. Koper’s work in developing this outreach program was recently recognized through the 2017 Partners in Flight Award for Public Awareness (Individual), which will be presented at the International Ornithological Congress in Vancouver in August, 2018. Partners in Flight is a network of over 150 partner organizations, including governments, NGOs, and academics, that works towards the conservation of land birds across the Western Hemisphere.

hand, youth can see birds up close, and sometimes even hold them. When possible to do safely, youth participate in the data collection – this might including reading mass off a scale, writing down measurements, measuring tail lengths, or releasing birds. This provides an uniquely intimate and engaging interaction with species that students may see every day, but pay little attention to until they realize how special each bird is.

To quote Dr. Koper: **“We want Grenada’s youth to be proud of their wonderful wildlife. By giving kids up-close experiences with birds, and teaching them about how interesting and beautiful they are, they’re going to want to conserve wildlife when they grow up.”**



Faculty and students from the Riddell Faculty have worked with numerous partners in Grenada to conduct bird workshops for kids and adults. Grenadian partners have included St. George’s University (SGU), Belmont Estates (an organic agri-tourism plantation), Almost Paradise cottages, and local NGOs including SPECTO and Gaea. Undergraduate students from SGU, trained in part through Dr. Koper’s outreach program, will soon start to contribute to these outreach initiatives. Canadian partners include the Riddell Faculty and Oak Hammock Marsh Interpretive Centre.

The highlight of most outreach activities have been mist-netting and banding, where wild birds in gardens and orchards are caught, measured, banded, and released. While in the



Collaborative Conservation, Management, and Education for Polar Bear Research Between Canada and Japan.

Dr. Rick Baydack (Environment and Geography and Chair of Environmental Science and Studies) was the leader of a 3-person delegation from Manitoba to the Sapporo Maruyama Zoo in February 2018 to discuss the development of long-term collaborative research opportunities between the two countries. Along with Dr. Baydack, the other Manitoba representatives included Endangered Species Biologist William Watkins from Manitoba Sustainable Development and Gary Lunsford, Director of Zoological Operations at the Assiniboine Park Zoo. The delegation spent several days in Sapporo where they discussed the next steps in developing a long-term agreement relating to polar bears with members of the Sapporo Zoo and Rakuno Gakuen University (RGU). RGU is a leading academic institution for wildlife management and conservation in Japan, and by collaborating with the Riddell Faculty’s Environmental Science and Studies Program and other Canadian scientists, polar bear research and wildlife conservation initiatives will be enhanced. The initiative will potentially involve exchanges of undergraduate and graduate students between the two universities as well as researchers from the zoos, government agencies, and university departments. Although captive breeding of polar bears has been quite successful in Japanese zoos, knowledge of polar bear ecology and management in the wild is somewhat lacking. This approach will help to bridge the gap by providing information to Japan’s universities and zoos that can be better used to educate their general public about polar bear management and conservation, especially as related to mitigating the effects of climate change on the species survival into the future.



Picturing the Planet.

As a regular feature "*Picturing the Planet*" brings inspiring and informative images taken by our students, staff, and faculty.

Jill Bueddefeld (PhD candidate, Environment and Geography) took this photograph in November of 2016 while conducting her doctoral research data collection in Churchill, Manitoba. Her research explores ways to communicate climate change issues to a broad audience through visitor experiences. Jill demonstrated her abilities in communicating her research effectively in the recent 3 Minute Thesis (3MT) competition, where she was the recipient of the People's Choice Award.

