

Experimental Lakes Area Course.

The Experimental Lakes Area (ELA), near Kenora Ontario, is an iconic research station with a global legacy around how we understand and value freshwater ecosystems. It was at the centre of a firestorm around science and the role of government over the past few years, with the threat of permanent closure just over the horizon. Then, in 2014, the Governments of Ontario and Manitoba, along with the International Institute for Sustainable Development stepped in to re-ignite the research. This May marked another milestone in the history of the ELA when, for the first time, it hosted a university-based field course. Led by **Dr. Mark Hanson** (Department of Environment and Geography) the course focused on environmental monitoring and water quality.

Students from the Riddell Faculty and across the University of Manitoba, as well as Trent University participated. The course was also sponsored in part by the NSERC CREATE H₂O program, which is focused on challenges around drinking and wastewater treatment in First Nation communities. Over a week was spent working with the researchers on-site getting hands-on training in fisheries techniques, sediment and water sampling, contaminants monitoring, and whole-lake manipulations, which has made the ELA famous over the years. In addition, off-site excursions took place to put the science in perspective. This included an afternoon behind the scenes at the Domtar Pulp and Paper Mill in Dryden, Ontario for a tour of their facilities and environmental monitoring programs.

continued on page 2.

Photo Credit: Stewart Hill. Students seine net for young-of-the year perch as part of ELA's longterm fish monitoring program.



BaySys.

continued from front cover.

A special highlight for the students was the chance to draw in First Nations, specifically Anishinaabe perspectives on water quality and monitoring from elder teachings, and then participate in a traditional sweat lodge at the Waashkootsi Nanaandawe'iyewigamig Healing Lodge in Keewatin, Ontario. The course was very much a team effort, with **Drs. Jonathan Peyton** (Department of Environment and Geography), **Norman Halden** (Dean and Department of Geological Sciences) and **Iain Davidson-Hunt** (Natural Resources Institute) contributing to the teaching at the ELA. This also reflects the complexity and need for an interdisciplinary perspective when protecting water resources, which is a core strength of the Faculty. To quote undergraduate student Monica Mai (Faculty of Science): *"This course taught me a lot about the importance of understanding water quality from a scientific and socio-cultural perspective. It was really eye opening to see how First Nations communities are affected by changes in the water quality because the lakes or rivers are integral to their way of life."* Planning is already underway for an expanded course in 2016, building on the success of this pioneering initiative.

Pictured top right: A bit of fresh air after visiting Domtar's primary wastewater treatment facility in Dryden, Ontario. Pictured right, Searching for benthic macroinvertebrates from stream kick samples. Photo Credits: Stewart Hill.



The BaySys project (formally titled *"Contributions of climate change and hydro-electric regulation to the variability and change of freshwater-marine coupling in the Hudson Bay system"*) has received funding of \$9.14 million dollars. The funding from the Natural Sciences and Engineering Research Council of Canada (NSERC) and Manitoba Hydro was announced as part of new funding for three collaborative research teams at the University of Manitoba of more than \$13 million in direct and in-kind funding. The team led by **Dr. David**

Barber (Distinguished Professor and Canada Research Chair in Arctic System Science, Centre for Earth Observation Science (CEOS)) will study the role that freshwater plays in the Hudson Bay marine and coastal systems. The team is made up of collaborators from Manitoba Hydro and the Universities of Manitoba, Laval, Québec à Rimouski, Calgary, Northern British Columbia, and Trent. Their research will provide a scientific basis to separate the relative effects of climate change from

those of hydroelectric regulation of freshwater on changing physical, biological and biogeochemical conditions in Hudson Bay. 'Bay-wide' work will be conducted aboard the research icebreaker CCGS Amundsen, where scientists will focus on

"Contributions of climate change and hydro-electric regulation to the variability and change of freshwater-marine coupling in the Hudson Bay system"

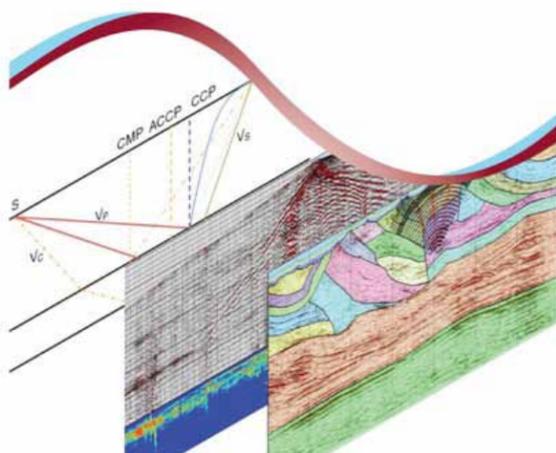
contrasting the Churchill (low) and Nelson (high) outflows into estuaries. This research will provide the basis for decision making around existing infrastructure operations and core fieldwork components. In addition, it will enhance the quality and capacity of environmental science in the regions in which it operates, produce reliable

assessment of impacts of climate change on water supply, and increase our understanding of the effects of climate change on northern ecosystems. More broadly, Nunavut and Canada will benefit from a better understanding of how seasonal shifts in freshwater, sediment and nutrient delivery and climate change may affect primary and fisheries productivity, and transportation in Hudson Bay and how this may change under a future climate.

A view of Hudson Bay. Photo Credit: Stephen D. Petersen, Assiniboine Park Zoo.



VISTA 2D/3D SEISMIC DATA PROCESSING



Geophysics Donation.

The Department of Geological Sciences has received a generous donation from Schlumberger Petrotechnical Services of Calgary, Alberta. The donation consists of a 3-year software license and maintenance for Schlumberger's Vista 2D and 3D software installed on 25 computers (valued at approximately \$2.8 million). To quote **Dr. Mostafa Fayek** (Head and Canada Research Chair in isotope geochemistry): *"This software is an invaluable teaching and research tool for our students and faculty members in Geophysics... and goes a long way toward ensuring the continued excellence of our Geophysics courses and programs."*

Image Credit: Schlumberger: www.slb.com (accessed May 27, 2015).

Faculty Awards.

Dr. C. J. Mundy (Department of Environment and Geography and the Centre for Earth Observation Science (CEOS)) (Pictured right.) is the recipient of the 2014 Rh award for natural sciences. The University of Manitoba's Rh awards were established in 1973 to recognize early career academic staff for their exceptional promise, innovation, and research excellence. Dr. Mundy's research on new observational techniques in the sea ice environment has significantly advanced our understanding of Arctic marine ecosystems. His recent work on the development of phytoplankton blooms in the water column underneath Arctic ice cover is groundbreaking and has influenced the development of new international projects in both the Arctic and Antarctic. Dr. Mundy is also the first to extensively show the influence of ice algal biomass on the spectral distribution of transmitted irradiance.



Dr. Vaclav Smil (Distinguished Professor Emeritus, Department of Environment and Geography) (Pictured right. Photo Credit: Andreas Laszlo Konrath.) is the recipient of the 2015 OPEC Award for Research. The award *"honours those who have shown dedication to research and analysis of oil-related issues; contributed to an enhanced dialogue between producers and consumers; demonstrated high levels of independence and integrity in their work; persistently presented a critical, yet impartial, view on oil-related issues; produced a substantial record of publications at the international level."* Dr. Smil is recognized for his outstanding work in the field of oil and energy research. The Award was presented at a Gala Dinner held at Vienna City Hall on Wednesday, June 3 as a part of the 6th OPEC International Seminar.



Elinor Ostrom Award.

Dr. Fikret Berkes (Distinguished Professor and Canada Research Chair in Community-Based Resource Management, Natural Resources Institute (NRI)) is the recipient of the 2015 Elinor Ostrom Award on Collective Governance of Common Resources. The award was created in 2012 by the International Association for the Study of the Commons (IASC) to honour the memory and legacy of the IASC's first president Dr. Elinor Ostrom. Dr. Ostrom (1933 – 2012) is best known for her research on how societies can sustainably manage their natural resources. She challenged the conventional view that people only act to maximize their own individual gains and are unwilling or unable to use collective natural resources sustainably. She demonstrated that collaboration is possible, frequent and occurs among diverse individuals and in different contexts. Dr. Ostrom shared the Nobel Prize in Economics with Oliver E. Williamson in 2009, and to this day remains the only woman to have won the Prize.

Dr. Berkes helped establish the notion that social and ecological systems should be regarded as linked adaptive systems (the focus of his books *Linking Social and Ecological Systems*, 1998, and *Navigating Social-Ecological Systems*, 2003, Cambridge University Press). He also developed the idea that traditional ecological knowledge is a cumulative body of knowledge, practice, and belief, connecting worldviews, knowledge, and commons institutions. His 1999 book *Sacred Ecology* (Routledge) was expanded through 2008 and 2012 editions, winning the 2014 Sustainability Science Award of the Ecological Society of America. His latest book *Coasts for People: Interdisciplinary Approaches to Coastal and Marine Resource Management* will be published by Routledge in 2015.

Dr. Berkes devotes considerable effort to graduate education and to international and indigenous professional development. He has conducted workshops for groups as diverse as Great Lakes Anishinaabe resource managers, Norwegian Saami, Zanzibar government officers, Taiwanese researchers, and Kyrgyz biocultural diversity scholars. Berkes' Centre for Community-Based Resource Management assists indigenous and international resource managers and communities by maintaining networks, providing educational material, and a case study database. Further details can be found at <http://elinorostromaward.org>.



Photo credit: Tony Foughse.

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Greenland Sea Ice Course.

In 2015, the Arctic Science Partnership (ASP) (a collaboration between the University of Manitoba, Aarhus University and Greenland Institute of Natural Resources) began a series of six field schools in Nuuk Greenland as part of a new education initiative. This initiative was led by the three education leads – Drs. Lise Lotte Sørensen (Aarhus University), Dorte Søgaard (Greenland Institute of Natural Resources) and **Dr. John Iacozza** (Department of Environment and Geography and the Centre for Earth Observation Science (CEOS)).

During Reading Week (February 13-20) this year, 21 national and international graduate students, including students from the University of Manitoba, Aarhus University and other institutions converged onto Nuuk to learn about various aspects of snow covered sea ice. These students were from various disciplines, including glaciology, biology, physics, and modelling. The multidisciplinary nature of the students not only enhanced the academic learning, but also led to interactions with students that might not be available through traditional conferences or workshops. The goal of the course was to provide a multi-disciplinary understanding of snow covered sea ice and to physically explore the Arctic marine system. Topics included the geophysics of snow and sea ice, the optical properties of sea ice and biological habitat relationships. Additional background on the social aspects of past and present societies in Greenland was provided. A critical component of the field school was hands-on experiential learning, with students actually going onto the sea ice around Nuuk and sampling both snow and sea ice.

It was not all work however. The Greenland Institute of Natural Resources hosted a reception for the students and mentors. This reception allowed students to interact with researchers at the Institute, as well as trying local foods including muktuk (skin and blubber of a whale), seal, and dried cod.

This field school was made possible by logistic and financial support from the Greenland Institute of Natural Resources, Clayton H. Riddell Faculty of Environment, Earth, and Resources, Department of Environment and Geography and ASP. The goal is to offer these field schools every year in the Greenland. For more information go to the ASP website (asp-net.org).



Verna Kirkness Science Education.

For the third year in succession, the Verna J. Kirkness Science and Engineering Program brought curious grade 11 students to the Riddell Faculty for a week of hands-on science. The Kirkness Program offers scholarships to Aboriginal students from across Canada to travel to the University of Manitoba to visit and interact with other young scientists through engagement with leading research groups across a range of disciplines. This year students from Norway House Cree Nation, Vancouver, and Winnipeg visited the Faculty and were mentored by **Dr. Norman Halden** (Dean and Department of Geological Sciences), **Dr. Mark Hanson** (Department of Environment and Geography), and **Dr. Feiyue Wang** (Department of Environment and Geography and the Centre for Earth Observation Science (CEOS)) and their teams in techniques to understand and mitigate contamination of water, soil, and biota.

At Dr. Hanson's Stress Ecology Lab, the students were mentored in both

environmental monitoring and toxicity testing to better understand the complexity of contaminants. The Kirkness scholars conducted their own laboratory bioassays using aquatic and terrestrial indicator species – but also in the field at the campus' Prairie Wetland Research Facility – where they could see how environmental realism is established through the use of model wetlands. To quote **Dana Moore** ((B. Env. Sc. (Hons.) October 2009) (Post-doctoral Researcher): *"All the tests the students conducted, from the simplified lab assays, to the more complex field testing, are all a part of the current science of contaminants. They really get to see the scope and scale of what is required to answer the question around 'is this contaminant an issue' well."*

In Dr. Halden's laboratory the students analyzed fish otoliths, or 'ear bones', for the presence of trace elements, revealing not only fish behaviour over the course of the organisms' entire life-time, but also contamination by metals such as mercury. The use of otoliths is an emerging approach in environmental monitoring, and this provided an

opportunity for the Kirkness scholars to gain insights of which even many leading environmental scientists are unaware. With Dr. Wang, the students were immersed in the Ultra-Clean Trace Elements Laboratory, where they analyzed trace metals in tap water from their own communities. **Debbie Armstrong** (UCTEL Technician) reflected about the program: *"This group was amazing, they were so excited about science, how vast the discipline is and how many different areas there are to study. I was impressed by their level of awareness of environmental issues and I hope they were inspired for future studies in environmental chemistry/science."*

"It was obvious that the students were having a great time but for us, the mentors, it was a great reminder of why we got excited about science and what made us choose this field in the first place" reflected **Chelsea Lobson** (M. Sc. student). With another successful program completed the faculty looks forward to participating in the Kirkness program in the future.

Photo credit: Adam Dolman.



Common Ground Research Forum.

CURA Project Concludes with Connecting Peoples and Lands Conference.

The CURA funded Common Ground Research Forum (CGRF) is a collaboration among Grand Council Treaty 3, the City of Kenora, Obashkaandagaang First Nation, Ochiichagwe'babigo'ining Ojibway Nation, Wauzhushk Onigum, the University of Winnipeg and the University of Manitoba that started in 2009. It has provided community support for building and renewing cross-cultural relationships between First Nations, Métis, and settler residents of the Kenora and Treaty 3 area, and it has produced research products that encourage sustainable development in the areas of arts and culture, forestry, water resources management, tourism and other land uses. The Common Ground Research Forum has funded more than 40 community-led projects undertaken by over 50 collaborating organizations, and by the CGRF's completion this summer, the project will have also produced ten student graduates.

women's knowledge of water and participation in water governance. The purpose of this study was to explore Anishinaabe and Métis women's teachings and knowledge of water and participation in water governance in Kenora, Ontario. Data was collected through a qualitative research approach and involved semi-structured interviews and modified workshops with local First Nation and Metis women and elders. Among other findings, the results show that "traditional" water governance activities are taking place in Kenora, but that these are not recognized by Western governance structures. As a result of her research, Natasha was contacted by the International Joint Commission working on water governance issues, keen to link her work into activities in the Rainy River – Lake of the Woods Watershed Board.



Several student research projects looked at values associated with the lands under cross-cultural shared management within the Tunnel Island Common Ground in Kenora. These included projects such as the development of a cultural atlas based on contemporary and recent historical Anishinaabe experiences of that landscape; explorations of people's sense of place connections to the island; and documenting current usage patterns and future visions for the site.

The research by Master of Natural Resource Management (MNRM) graduate Natasha **Natasha Penneys-Szach** (MNRM October 2013), for example, focused on Aboriginal

For more information on the Common Ground Research Forum, please visit www.cgrf.ca or contact Teika Newton (teika@teika.ca) or John Sinclair (John.Sinclair@umanitoba.ca).

Pictured left: The group is standing at the Tunnel Island landing across from the former HBC Rat Portage post on Old Fort Island (Winnipeg River). Photo Credit: Teika Newton. Pictured right: The Norman Dam. Photo Credit: Kim Pirie-Milko, Friends of Tunnel Island.

Bill Brisbin Field School Fund.

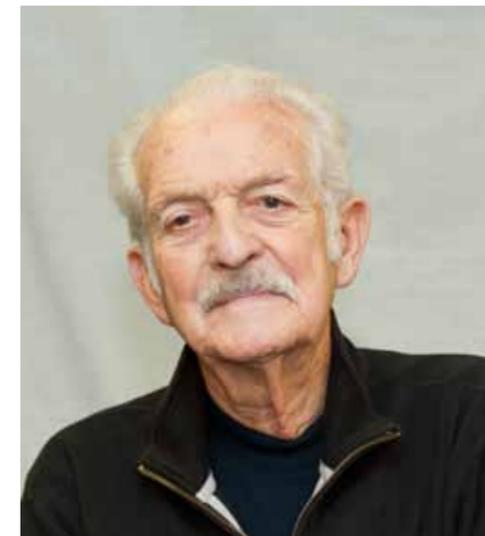
The renowned British geologist Herbert Harold Read once said "*the best geologist is the one who has seen the most rocks.*" This simple yet profound statement illustrates just how important hands-on experience is in the field of geology, especially for students. For this reason the Department of Geological Sciences recently established the Bill Brisbin Field School Fund – an endowment dedicated to providing geology students at the University of Manitoba with inspiring learning opportunities outside of the classroom.

In the classroom, students are taught about classic rock assemblages, deposit types, and geological processes. But it is in the field that students learn to apply that knowledge to the real world. Traversing challenging terrain, working late to meet deadlines, and spending weeks away from home builds camaraderie amongst students and faculty, and fuels their passion for geology.

The Bill Brisbin Field School Fund was established in recognition of **Dr. Bill Brisbin**, (Pictured right.) who was instrumental in developing the field school offering in the Department of Geological Sciences. Gifts to the fund will be endowed in perpetuity and the annual interest earned will help to fund all aspects of field-based courses offered by the department.

For more information, or to make a gift to support the Bill Brisbin Field School Fund, please contact Bridgette Parker, Donor Relations Officer at 204-318-2921 or by email at Bridgette.Parker@umanitoba.ca.

Pictured below **Jill Maxwell** (B. Env. Sc. (Hons.) June 2010) and **David Heavysege** (B.Sc.G.Sc.(Maj.) February 2013.) at Star Lake Field School.



Student Awards.

Megan Ross (B. Env. Sc. (Hons.) October 2014) is the recipient of the Dennis Raveling Scholarship. This prestigious award is presented to a *“student with a desire to pursue a career in waterfowl or wetlands ecology...and are based on the candidate’s resolve, high academic achievement, and project merit.”* The Scholarship is intended to provide field experience and training in the tools, methods, and concepts of waterfowl and wetlands research and management. Megan is working on her Masters at the University of Saskatchewan in partnership with Environment Canada and the Canadian Wildlife Service.

Justine Spearman (Pictured right. Photo Credit: Karinna Fletcher.) a Environmental Science (Coop) student is the runner up for the 2014 Cooperative Education University of Manitoba Champion. To quote **Leslie Goodman** (Cooperative Education Coordinator for the Riddell Faculty): *“Co-operative education is the best of both worlds for participants. Students can combine practical paid work experiences with their classroom-based education, enhancing their skill sets and work experience while employers connect with motivated, pre-selected students looking to make an impression.”*

Jean Lieppert Polfus (Pictured below. Photo Credit: Tee Lim.) a Ph. D. student in the Natural Resources Institute is a recipient of a Wilburforce Fellowship in Conservation Science. The newly established fellowships are comprised of training programs focusing on science communication and will see participants engage with journalists and reporters to develop skills to explain their research to the public. Jean’s research focuses on non-invasive population genetics and traditional knowledge of caribou populations in partnership with communities in the Sahtú Region of the Northwest Territories, Canada. To quote Jean: *“The Fellowship will help me to find innovative ways to translate ideas and concepts between worldviews and cultures to promote a more thorough and mutually affirming understanding of wildlife conservation in the Sahtú Region.”*



Spring Convocation.

On May 26, 2015 the Riddell Faculty held its annual convocation lunch. The reception celebrates the accomplishments of our graduands for the year and provides an opportunity to recognize the valuable role of friends and family in supporting students to achieve and excel. Over the past year (including the Fall convocation of 2014 as well as the February and Spring convocation) the Riddell Faculty has seen 37 graduate students (7 PhDs and 30 Masters) and 128 undergraduate students graduate from our programs. Numerous students and faculty received recognition and awards.

Of the nearly 40 faculty and students recognized at the event, Riddell Faculty Teaching Awards were presented to Prof. **Kristina Hunter** (Department of Environment and Geography) (Photo top right.) (Award of Excellence for Undergraduate Teaching), **Dr. Ann Marie Murnaghan** (Department of Environment and Geography) (Photo right middle.) (Award of Excellence for First Year Undergraduate Teaching) and **Dr. Jonathan Peyton** (Department of Environment and Geography) (Award of Excellence for Graduate Teaching).

Also recognized was Prof. **Jeff Young** who was selected for recognition under the Students’ Teacher Recognition Program organized by University Teaching Services.

Dr. Norman Halden (Dean) also recognized numerous students for their contributions to the Faculty as well as awards that recognize their achievements including:

University of Manitoba Gold Medal for Highest Standing in the Clayton H. Riddell Faculty, **Timothy Hayward** (B.Sc. G.Sc. (Hons.) Geophysics) October 2014.

Program Medals - Awarded for highest standing in a Clayton H. Riddell Faculty program.

Honours Degree – **Scott Kehler** B. Sc. in Physical Geography (Hons).

Advanced/Major Degree – **Lindsay McConnell** B. Env. St. (Major).

General Degree – **Janelle Kornelsen** B. A. in Geography (General).

Berkes Graduate Scholarship in Community-Based Research for an outstanding graduate student who is pursuing studies in community-based research methods including, but not limited to, community-based resource and environmental management, conservation and planning – Lydia Schoeppner.



Picturing the Planet.

As a regular feature "Picturing the Planet" brings inspiring and informative images taken by our students, staff, and faculty. This picture, taken by Wieter Boone (PhD student in the Department of Environment and Geography and the Centre for Earth Observation Science (CEOS)) shows an ice mass balance buoy installed in the Young Sound Fjord in North East Greenland. An ice mass balance buoy can be simply described as a weather station with a temperature string beneath it that measures the evolution of ice and water temperatures below. In the background you can see researchers Kunuk Lennert, Igor Dmitrenko and Sergei Kirilov working with a multi sensor profiler as part of a transect from inside the fjord near the Greenland icecap towards the Greenland Sea.

This image also won first place in the Department of Environment and Geography's annual photo contest.

Photo credit: **Wieter Boone**.

