



Centre for Northern Innovation in Mining

CNIM update

January 2023

YukonU.ca/CNIM



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Heavy Equipment Technician

The 2022/23 Heavy Equipment Technician Pre-Apprenticeship program began October 11 with eight participants.

Students have completed industrial safety coursework and begun repairs and servicing of CNIM's Volvo dump truck which included the installation of tires from a generous donation by Mercer Contracting and Yukon Heliski.

CNIM's tandem truck equipped with a knuckle boom crane is undergoing a complete makeover for use with crane, Class 3 operator and air brake training. On January 9, three Level 1 apprentices will join the group for their eight-week period of Level 1 instruction.

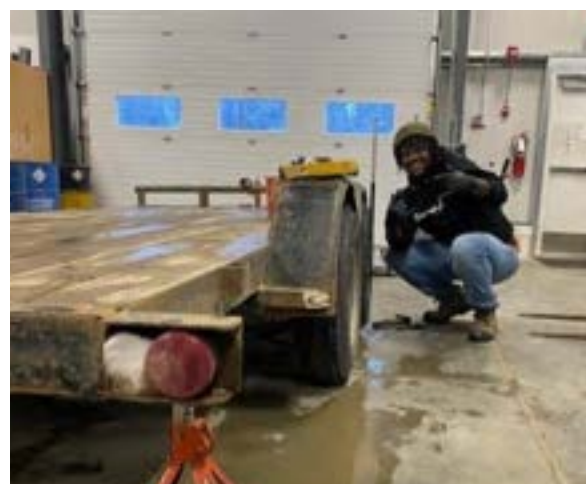


Pre-Apprenticeship Millwright

The Pre-Apprenticeship Millwright program began January 3 with three students. Projects for the semester will include trailer wheel bearings, chainsaw mills, trailer spindles, pump and motor alignment.

The students are looking forward to field trips to local millwright workshops and Yukon's active mines.

Pre-Apprenticeship Millwright program students hard at work.



Surface Mining/ Heavy Equipment Operator Training program

CNIM is currently preparing for the delivery of Surface Mining/Heavy Equipment Operator training throughout the Yukon Territory with the support of industry and Yukon First Nations.

Class 1, 3 and Air Brakes

CNIM is continuing to develop commercial driver training in advance of the Yukon's Motor Vehicle Act revision to include mandatory entry level training for new commercial drivers. CNIM has permission from the Government of Saskatchewan to use Saskatchewan's Mandatory Entry Level Training (MELT) curriculum in the Yukon Territory as recommended by Yukon's Motor Vehicle Branch.

Yukon University continues to deliver Air Brakes courses and Class 3 instruction throughout the Yukon.

Underground Mining Operations

CNIM continues to explore responsive and responsible delivery options for underground mining programming to prepare the Yukon workforce for underground mining employment opportunities.

Multi-Trades for Mining programming—Baker Lake, Nunavut

CNIM continues to work with ABF Arctic Inc. (a partnership between Peter's Expediting Ltd. and Agnico Eagle Mines Ltd.) to develop a Multi-Trades for Mining program for delivery in Baker Lake, Nunavut. This project remains a revenue contract for CNIM and will allow Yukon University to expand its northern expertise to the Hamlet of Baker Lake, Nunavut.



Baker Lake, Nunavut

Yukon Geoscience Forum 2022

CNIM participated in the annual Yukon Geoscience Forum held in Whitehorse in November 2022 with presentations, exhibits and a trade show booth.

(See also Industrial Research Chair in Northern Mine Remediation).

The Earth Sciences program looks forward to a fantastic Winter semester. Faculty Dr. Joel Cubley, Mary Samolczyk and Dr. Chad Morgan are busy teaching a combination of courses in both the first and second years of the diploma program.

Courses include:

Introduction to Physical Geography II (GEOG 102)

taught by Mary Samolczyk (seven students)

Historical Geology (GEOL 106)

taught by Dr. Chad Morgan (five students)

Introduction to the Mineral Exploration and Mining Industries (GEOL 112)

online delivery taught by Dr. Chad Morgan (nine students)

Geochemistry (GEOL 211)

taught by Dr. Joel Cubley (six students)

Geophysics (GEOL 213)

taught by Dr. Joel Cubley (three students)

Hydrogeology (GEOL 301)

taught by Mary Samolczyk (three students)

Faculty continue to seek out hands-on and industry-relevant experiences for students in the Winter 2023 semester. Students will hear from several guest speakers in courses, such as Maurice Colpron, Head of Bedrock Geology with the Yukon Geological Survey talking about Yukon's geothermal potential and; Robert Dickson, Senior Engineer with the Government of Canada talking about the Faro Mine Remediation Project. Students will also be out in the community learning at various locations, including ALS.

Laboratories' sample prep facility and a multi-week field project at a suite of monitoring wells on the shores of Marsh Lake. The latter is a partnership with Yukon Government's Water Resources Branch in which students will investigate linkages between groundwater and surface flooding.



Marketing material created for student recruitment showcasing why current Earth Sciences students love earth science.

Program faculty continue to work on the Virtual Geology project. A particular highlight of this project was the poster presentation by Earth Sciences student Mark Inkster at the Yukon Geoscience Forum. Feedback from conference attendees was very positive with many geologists suggesting future field trip ideas.



Earth Sciences student, Mark Inkster, presenting his poster entitled, 'Yukon Virtual Geology: Online Field Trips Showcasing Yukon's Geology to Students and the Public' at the Yukon Geoscience Forum 2022.

Congratulations to Mark for a fantastic presentation! The first two virtual field experiences will be released in February/March of 2023.

The Earth Sciences program has also secured funding from Co-operative Education and Work-Integrated Learning Canada (CEWIL Canada) to bring students down to Quadra Island and run the second-year senior field school in collaboration with Vancouver Island University (VIU). Running a May/April field school on Quadra Island will guarantee that snow cover is not an issue—a recent headache for YukonU's spring field schools—and it is a fantastic opportunity for VIU and YukonU students to network. Graduates of Earth Sciences in May 2023 (five total) will have the option to complete their Earth Science degrees (years three and four) at VIU.

Joel Cubley is offering the X-ray Fluorescence Analyzer Operator Certification training program in January to his Geochemistry students and some interested geologists from local industry. NRCAN requires anyone using portable XRF to be certified, and this is a valuable skill on a resume for new employees in the field. Both Joel and Mary hold current Level 2 XRF operator licenses from NRCAN, allowing them to offer the mandatory training components.



Environmental Monitoring Certificate

Currently, there are 16 students active in the Environmental Monitoring Certification (ENVM) program. Between September and December 2022, the ENVM program delivered one course to the Cohort 5 group and kicked off the Cohort 6 group with their first two courses. Cohort 5 students also completed some non-credit certifications associated with the certificate program, including Wilderness First Aid, TDG, WHMIS and Pleasure Craft Operator's Certificate.

In September, Cohort 5 students travelled to the Mt. Nansen Mine Site for course ENVM 098 – Restoration, Reclamation and Erosion Control and were hosted for three days by Ensero Solutions, Care/Maintenance and Reclamation Planning contractor. Ensero Solutions Ltd. provided a site tour and explained the care and maintenance activities, water treatment processes, and reclamation/closure research and planning activities. Students also learned the erosion and sediment control principles and techniques in the field. Students travelled to Kimberley, British Columbia, for the Technical Research Committee on Reclamation's Annual Mine Reclamation Conference. While in British Columbia, students toured Teck's Green's Creek mine site to view Teck's reclamation work.

October brought the first course (ENVM 090 – Introduction to Environmental Monitoring) instruction to a new Cohort 6 at Minto Mine. Minto Metals Ltd. hosted six students and two instructors with a tour of the mine site and an overview of environmental monitoring programs and activities onsite. Students learned about the basics of environmental monitoring which included water quality and quantity monitoring principles and techniques, as well as the scientific method.

Environmental Monitoring Certificate

The second course in the program (ENVM 091 – Introduction to Environmental Monitoring 1) was delivered to the Cohort 6 students in early December. Students were introduced to monitoring methods and theories in terrestrial ecosystems including mapping and navigation basics. This course included excursions to Yukon Government’s Environmental Health laboratory, Yukon Wildlife Preserve, Yukon Government’s Department of Environment – Fish and Wildlife and Kwanlin Dün First Nation’s Lands Department.

In 2023, students within Cohort 5 will be completing two final courses (ENVM 092 – Introduction to Environmental Monitoring 2 and ENVM 099 – Capstone Project) where students will engage in a land based activity (TBD) and engage in environmental monitoring activities for industry, Government of Yukon, Government of Canada or their respective First Nation. The students in this cohort will also continue to complete mandatory non-credit safety courses.

It is anticipated that seven students will graduate this spring.



Environmental Monitoring Certification program students and faculty field trip to Kwanlin Dün First Nation’s Lands Department.

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Other Yukon University programming

Housing Maintainer

Housing Maintainer - Kwanlin Dün First Nation project

The house is currently being lifted to allow for it to be moved out of CNIM shop. The house will be finished on site on KDFN land.



Kwanlin Dün First Nation's Housing Maintainer House Project

Housing Maintainer - Little Salmon/ Carmacks First Nation project

The Housing Maintainer project in Carmacks had its last day on December 16, 2022. The students were given certificates of completion and YukonU hoodies. We are hoping to start another program in May 2023 and finish the house construction.



Little Salmon/Carmacks First Nation's Housing Maintainer Project

Housing Maintainer - Champagne and Aishihik First Nations project

CNIM plans planning to start a new program and construction of a new house for Haines Junction in CNIM's shop on February 16, 2023.

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Other Yukon University programming

Norther Capacity Project

The Northern Capacity Project (NCP) continued to fund/help fund the Housing Maintainer, Yukon First Nation Arts and Environmental Monitoring programs at Yukon University.

Targeted Occupations Programs and Supports Project

In January 2023, Employment and Social Development Canada (ESDC) announced the approval of YukonU's Targeted Occupations Programs and Supports (TOPS) project which will support heavy equipment operator/surface mining, commercial driving, workforce readiness, instructor train-the trainer and community workforce development instruction throughout the Yukon Territory over a two-year period.

The \$2.49 million funding will strengthen CNIM's efforts to build Yukon's workforce capacity.



Yukon University's NSERC Industrial Research Chair in Northern Mine Remediation leads applied research projects that address challenges facing the northern mining industry.

This research program supports the development of new evidence-based approaches to northern mine development and operations, and supports mining companies as they navigate the environmental assessment process and operate mines in northern Canada.

Areas of expertise are:

- passive treatments;
- tailing management; and
- mine revegetation.

Industry & academic partnerships

Our industry partners, known collectively as the Yukon Mining Research Consortium, include Newmont Corporation, BMC Minerals Ltd., Victoria Gold Corp., Casino Mining Corp., Selwyn Chihong Mining Ltd. Alexco Resource Corp. and Minto Explorations.

Our academic partners across the country help us ensure we build a successful, collaborative research team. Engaging students and faculty, we work with Yukon's mine-impacted and First Nations communities to reduce barriers between science and decision-making.

Working with YukonU Research allows CNIM to create a direct link between researchers and industry, facilitating projects and development related to mining. This coordinated, holistic approach addresses specific northern challenges and opportunities in the mining industry, making it more sustainable, more environmentally aware, as well as fostering innovation.

Taylor Belansky, MSc Candidate.
Picture from Radio Canada article (ici.radiocanada.ca/nouvelle/1879928/yukon-mines-science-bacteries-nitrate-recherche-universite).



General updates

New Laboratory Technician hired

Inderjeet Kaur was a YukonU student hired as a research assistant in December 2022. Inderjeet was the successful candidate for the NMR laboratory Technician position.



YukonU Lorax column Partnership with Newmont

Dr. Morgane Desmau, Post Doc Fellow in NMR team and who has a strong experience working with Synchrotron travelled to Saskatoon with samples in November 2022.

The analysis will be included in the draft peer reviewed publication we initiated before Christmas.

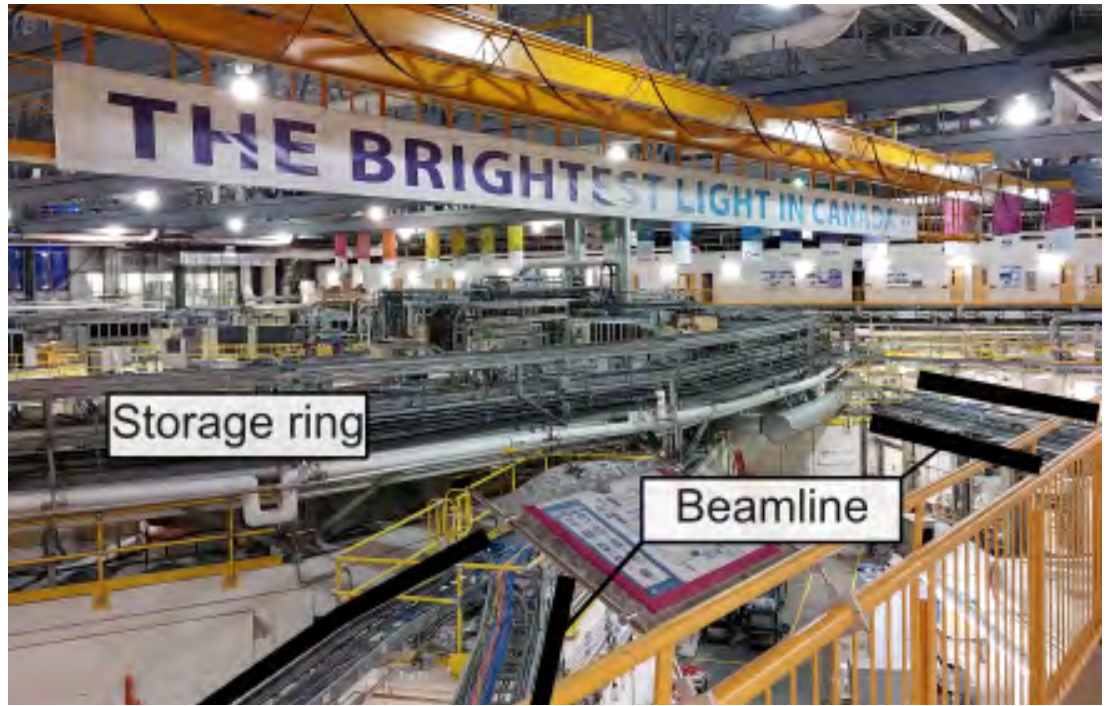
Experimental hutch BioXAS

Workstation BioXAS



Picture of the experimental hutch at the BioXAS beamline (left) and picture of the workstation of the BioXAS beamline (right), with the door leading to the experimental hutch on the right of the picture.

Photo credit: Morgane Desmau Nov. 2022.



Picture of the Canadian Light Source from the mezzanine. The rounded structure of the storage ring (zone of electron acceleration) and the beamline going out of the storage ring are visible.

Photo credit: Morgane Desmau Nov. 2022.

Industrial report can be found here:
[REN401_FinalReport_0.pdf](#)
(YukonU.ca)

No analysis from synchrotron will be added to this report to protect the peer reviewed publication planned in 2023.



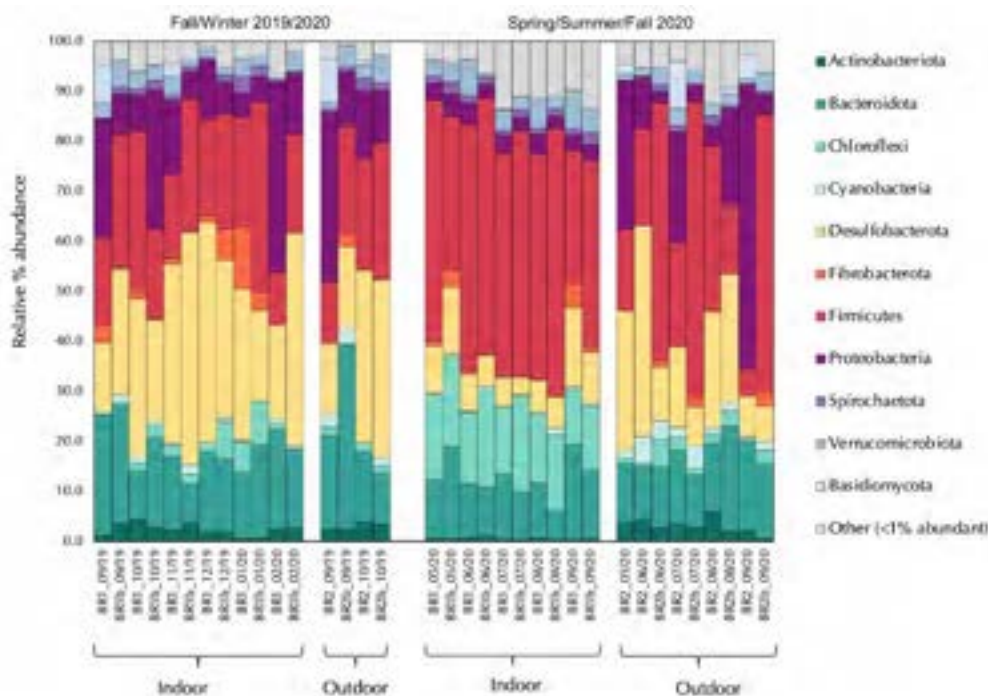
Directed study at YukonU

Ayesha Ahmad, research assistant in NMR team, conducted a directed study under Guillaume's supervision in course RENR 401. Her report: Role of saturated covers as oxygen buffers in cold climates, reviewed by Katie Aitken in charge of RENR 401 program gave Ayesha an A+.

Eagle Gold Bioreactors

Partnership with Victoria Gold

- Partnership with UBC that did genomic characterization, and we are collaborating in writing the peer reviewed paper.
- Pilot scale experiment will be dismantled 2023.



Stacked barplot of relative abundance at the phylum level (the percent of reads assigned to a taxon). Phyla that comprised less than 1% across all samples are grouped as “Other”. Samples are grouped as indoor vs outdoor with season.

Geoscience 2022

The NMR team presented three presentations. Very good feedback from audience and organization committee that offered the host a session next year.



(top image to bottom) Dr. Desmau, PDF in NMR team; Taylor Belansky, Master's student in NMR team and Ayesha Ahmad, research assistant in NMR team presenting at Geoscience 2022.