



GEARING UP CASE STUDY REPORT

Optimize Group & The Artemis Project

 Developing Mining Talent Through Work-Integrated Learning



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Published October 2020

Canada

This project is funded in part by the Government of Canada.

The opinions and interpretations in this publication are those of the author and do not necessarily reflect those of the Government of Canada.



Gearing Up Case Study

Volume 3



Optimize
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The Mining Industry Human Resources Council (MiHR) is Canada's knowledge centre for mining labour market information (LMI). MiHR produces LMI for industry stakeholders to enable the sector to address labour market challenges such as recruitment, retention, workforce diversification and training.

MiHR's 2020 Canadian Mining Industry Labour Market 10-year Outlook report highlighted the need to hire approximately 100,000 workers in the next decade. Older workers are leaving, total enrolment across all 10 Canadian mining engineering programs is down 45% since 2015, and science, technology, engineering and math (STEM) occupations are becoming more prevalent with the adoption of new technology. It can also take anywhere from two to five years to train a skilled worker for the mining industry.

Where are companies going to find the next generation of mining talent?

There is no silver bullet to face this challenge. Industry needs to take a collaborative approach to grow the labour pool and to attract top talent – distinguishing themselves as employers of choice.

Industry also needs to make better use of all potential sources of talent. Women only made up 16% of the mining labour force in 2016, while internationally-trained professionals accounted for 13%.

To help shape the next generation of Canada's mining workforce, the Government of Canada provided MiHR with funding support through its Student Work Placement Program to create the Gearing Up program. Gearing Up brings mining employers, service providers, industry associations and post-secondary institutions together to create new work-integrated learning (WIL) opportunities for post-secondary students to be better positioned to secure employment in mining.

Gearing Up changes the way students in mining-related post-secondary educational programs perceive, pursue and acquire the skills needed for in-demand mining careers. It offers wage subsidies to Canadian mining employers that create new WIL opportunities for students enrolled in STEM or business programs. Opportunities can include co-ops, internships, field placements, applied projects, capstone projects and case competitions.



Photo courtesy of Agnico Eagle.

Gearing Up wage subsidies are tiered to promote early attachment to, and diversity in, high-demand mining occupations.

An Employer is eligible to receive a maximum amount of \$7,000.00, representing 70% of a participant's compensation for WIL participants from under-represented groups (women in STEM, Indigenous peoples, persons with disabilities, recent immigrants, first year students, and visible minorities). An Employer is eligible to receive a maximum amount of \$5,000.00 representing 50% of a participant's compensation for all other WIL participants.



Photo courtesy of Agnico Eagle.

The following study showcases examples of how Gearing Up was adopted, what WIL placements are like, and the benefits to the companies, post-secondary institutions and students involved.

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OPTIMIZE GROUP

For some companies, student interns are a cog that they are not sure how to fit in the machine. Yet when integrated effectively they make a world of difference. Optimize Group experienced the latter when they hired a co-op student through MIHR's Gearing Up program. An engineering consulting company headquartered in Toronto, Canada, with offices in Brisbane, Australia and Belo Horizonte, Brazil, Optimize Group partners with its clients to provide technical services on study development, capital projects, execution oversight and due diligence projects.

Alex Weryha is an associate for Optimize Group. She supervised University of Waterloo (UW) student Iris Ma for her second and third internships starting the summer of 2019. Weryha championed the Gearing Up application process. She said she has applied for numerous grants in the past, and that this application was easier than most. Gearing Up's wage subsidy application is just one page and available on MiHR.ca. Companies can apply as many times as they choose to, and support is always available if applicants have any questions.

Alex Weryha, Associate Engineer at Optimize Group in Toronto, Ontario.



"I found Gearing Up when I was looking for grants. I really like the idea that it was financial support to develop someone else. I'm a bit earlier in my career as well, so having the ability to help bring someone else into the industry and mentor them was amazing."

- Alex Weryha

Throughout her internship, Ma worked on a custom software application, which evolved into three separate applications. These included a customized proposal tool, a document storage tool, and a software trade-off analysis application. Ma also helped do some risk assessment work.

"It was obviously great to see the applications she worked on and the technical side of things, but for me it was definitely very rewarding to see her grow professionally," Weryha said. "When she first started, she was more quiet and reflective, but I really pushed her to do lunch and learns for the company, do presentations, and get feedback from other people."

Iris Ma, Corporate Process Software Developer and Product Management Application Developer at Optimize Group.



Weryha says they're currently in talks to apply for another Gearing Up student and are excited to fund another project that would benefit both the intern and the company. Iris Ma was in her second year of Data Science studies at UW when she landed her second internship. She had previously done a co-op term for another organization and said it staggered her confidence. Conversely, Optimize Group boosted Iris' confidence beyond her expectations.

"At first, I felt a little nervous working there because I wasn't familiar with the field and, at the time, I was the only co-op student," Ma said. "I just spent most of my days coding, figuring it out slowly, texting Alex."

She ended up being a key support in the development of three projects, which was very beneficial to the company. As Weryha said, not only was Iris' professional development impressive, but she also greatly improved on several social soft skills in the process.

"Before I started working at Optimize, as a math major and often just a programmer, I spent my time quietly, alone, and was kind of anti-social as well. Working there opened my eyes to speaking up."

- Iris Ma

Like many other students without prior mining knowledge, she was surprised with how different the industry was from her expectations. She said she was intrigued by the environmental aspects of mining, such as reclamation, and expressed great fascination with the industry's role in renewable energy.

"It is interesting that in some sense mining is more of a solution than a problem because extracted metals are able to be used for reusable material rather than using plastics," she said. "You can't be environmentally friendly without mining."

While not sure if she would like to pursue a career in mining, she was glad she explored it as a career possibility and would easily recommend it to her peers.

"I would tell my friends that I'm working for a mining company and they'd be like 'data mining?' and I was like no, gold mining," Ma said. "I think a lot of kids in my program are more oriented to technology companies and high-tech

Tara Gilfillan, President of Optimize Group.

things, but people don't realize that there are opportunities in any industry and that every industry could use some innovation."

Tara Gilfillan, the President of Optimize Group, was equally pleased with Ma as an intern and Weryha as her supervisor. Gearing Up provides both an incredible learning experience for interns, and valuable mentorship experience to existing employees.

"Part of Alex's background was on training engineers and how people learn and understand, which to me is a hard skill to find," she said. "Alex did such a great job. She created a great learning opportunity for Iris and real value to Optimize Group."

Gilfillan also spoke extensively about work-integrated learning's critical role in shaping the future of the mining industry.



"What I think is important for the industry is bringing in more technology and innovation. The younger generation are definitely going to be instrumental in moving our industry forward."

- Tara Gilfillan

Gilfillan added that student internships are one of the most efficient ways to find and develop young talent.

"You get the best people, and if you can find them right from the beginning it's such a great way to get the top talent and nurture it. As an industry I think we really need to focus on investing in students and grads. They add so much value, especially in this day and age where technology and innovation are so critical, and I believe that the younger generation just has a much more holistic view on it."



Iris working in Optimize's Toronto office in Summer 2019.

“Gearing Up is a great program and mining companies would be crazy not to use it.”
- Tara Gilfillan



Photo courtesy of Agnico Eagle.

CASE STUDY 6

ARTEMIS PROJECT

Thanks to modern innovations, mining is a vibrant field that is not only essential to everyday life, but also provides a wealth of social, economic and environmental good.

Heather Gamble, CEO of Women on the Move.



Heather Gamble understands this well. The CEO of Women on the Move, the first female business accelerator in Canada serving women entrepreneurs, Gamble co-founded the Artemis Project – a unique capacity building program led by Women on the Move that accelerates business outcomes for women entrepreneurs in the minerals and metals sector. Through training, corporate lobbying, research and networking, the Artemis Project builds capacity, capability and connection for women entrepreneurs in mining, and supports the socioeconomic and environmental sustainability of the industry.

Gamble said one of their biggest focuses currently is analysing how the United Nations' Sustainable Development Goals (UNSDGs) apply to the mining industry, and how they can accelerate their adoption by mining companies.

To help Artemis with their research, Gamble hired a student intern using MiHR's Gearing Up program - Ainsley Chiang, a fourth-year University of Toronto Environmental Science major. Gamble said she heard about the program from one of the businesses in their collective.

“To me it’s a very practical program. It helps the employer access some great talent, and is very practical for the students, especially given the pandemic situation, where their work learning experiences have been greatly reduced.”

- Heather Gamble

She also noted that based on Chiang's experience in university classes, STEM students are not exposed to much of what mining has to offer and are often only informed about the industry's negatives. Now three months into her internship, Chiang has become so passionate about mining that she wrote a letter to Gamble detailing her changed perspective on the industry after learning how essential it is to the world and how she feels she could help make a real difference in its environmental sustainability. (See Appendix for Chiang's full letter).

Gamble said Chiang has been instrumental in their UNSDG research. She contributed by doing presentations, assisting collective members, and helping set up Microsoft Teams infrastructure so that the organization can communicate and collaborate effectively during the COVID-19 pandemic.

"Her professional growth has been tremendous," Gamble said about Chiang. "She's learning things, about the UNSDGs, she's really learning about sustainability principles, and is getting an expansive, deep view around how business can contribute to being and creating a more peaceful, prosperous planet for everybody."

Chiang began her internship in June 2020 and worked until the end of September. As a result of her hard work during the internship, Chiang was onboarded by Gamble for a part-time position that will continue through her final year of University.

After finding the initial internship position online, Chiang said she has deeply appreciated the experience.

"It's amazing," she said. "I've been working in retail all my life so I've never had a job remotely close to my field, so this would be my first job that I'm actually experiencing anything related to my studies. It's super eye-opening and I really do like it."

She explained how she moved from Dalhousie University to the University of Toronto once she realized she wanted to focus on environmental sustainability for her undergraduate degree and said this caused her to take the introduction to environmental science class a couple of times. In each school's courses, she said that mining was barely touched upon, and when it was, only its environmental implications were mentioned. As a result, she had no interest in the mining industry.

A portrait of Ainsley Chiang, a young woman with long dark hair, smiling. She is wearing a black top and a brown blazer. The background is a plain, light-colored wall.

Ainsley Chiang, fourth-year University of Toronto student finishing her bachelor of science, double majoring in environmental science and environmental management.

Her letter to Gamble touches on the roots of her new understanding:

"As I continue to work alongside Heather and the Artemis team, I am continuously being exposed to new ideas driving my curiosity further. In Lucy Crane's Ted talk, Mining Our Way to a Low Carbon Future she states, 'If it's not been grown, then it's got to have been mined'."

"That really changed my perspective on everything. As an environmental student, if this is an industry that's so needed, I'd want to make it as green as possible."

- Ainsley Chiang

The minerals and metals mining extracts from the Earth's crust are necessary for the formation of green technology.

"I feel like it's such a simple concept, but no one has wrapped their head around it just yet," she continued. "We want to transfer into this green economy with green energy, but no one's been cluing in that we have to mine all those materials if you want technology like solar panels."

Chiang said that working directly with Gamble and the Artemis team is a rewarding experience, and that it has helped her narrow her career path.

"I never even considered mining as a career option, I always thought I'd take my masters in environmental science but I don't know in what path yet, so I think this internship really pushed me in a specific direction and I think it's mining!"

Gamble is also very pleased with Chiang's work for the organization and is thrilled to be able to aid her journey into the working world. She said Gearing Up is very beneficial for both the employer and the student.

"I've worked really closely with Ainsley and I think that's really important as well, to give students the best experience and make sure, as a business owner, I feel accountable to that student," she said. "I'm going to keep her on in a part time capacity so I think that's very enriching, and I think that's evidence of how the program's been very successful for both of us."

She also spoke of work-integrated learning's importance to the Canadian mining industry.

"Mining needs to attract new, fresh thinking, diverse talent. The more placements that are conducted the more opportunity mining has to attract the best talent. I think this is an opportunity for mining to recast itself and for the industry to attract best in class talent, such as the younger generation in university."

- Heather Gamble

"The more programs you have like Gearing Up, the more opportunity you have to go out and get diverse thinkers in STEM exposed to the mining industry."

Appendix

My Summer Work Experience, by Ainsley Chiang

... not what I expected and now I am considering a career in mining!!

From when I was a young girl, I was undecided on who I wanted to be and what I would become in the future. The one thing I always knew for certain was that I wanted to follow a path that would lead to purpose and impact; not only within myself, but the community around me. After graduating high school, I was off to Dalhousie University in Halifax, where I studied their marine biology program. As a first-year science student, the abundance of electives was overwhelming, and nothing caught my attention. It wasn't until a friend recommended I take 'Sustainability 1000', an introductory sustainability course focusing on issues ranging from food security to climate change and the linkages between each ongoing topic. I was always aware of these issues, but I was never educated on them. I experienced a complete mindset shift allowing myself to reevaluate my own actions and started advocating for various organizations while continuing to educate myself on the countless issues sustainability brings forth.

I was captivated by the idea of having a field of thought that has multiple social, political, and economic benefits seen through living within our planetary boundary. With conflicting information about these environmental implications, it leaves the public without a single specific solution. There are numerous conflicting perspectives on today's world issues, however, by viewing them through a sustainable framework it allows society to consider the life cycle of everything we do without being isolated in our own actions. What was truly fascinating to me at the time was how the concept of sustainability can be paired with any discipline, further indicating that by living through a sustainable narrative we are able to drive a generational mindset change to create a positive and holistic impact on today's global problems.

As second year drew near, I decided to move back to Toronto to pursue environmental science and management at the University of Toronto. I decided to continue my studies at the University of Toronto to refine my skill set toward environmental sustainability and the necessary changes we must make politically, socially, and environmentally for our future. Finally discovering my passion, I began volunteering at various organizations and ultimately became Co-President at UTM's Regenesys.

Looking back on the past three years, I have noticed the incredible bias the environmental courses I have taken has illustrated in the mining sector. Drawing merely from my university education, I am capable of discussing the link between HIV and miners to the human right watch report on child labor and mercury exposure in Tanzania. One also can not dismiss the endless impact the sector has on air, water, land, and human health; including the pollution from smelting and refining, effluents containing toxic metals from acidic and saline mine drainage, stripping of surface vegetation and soil, and human health concerns from mine collapse and rock bursts. From the act of mining itself to the various processes and operations that follow, the mining industry is inevitably coupled with numerous socioeconomic and environmental concerns.

That being said, anything past these issues are ones that I am extremely unfamiliar with.

Through this opportunity with Heather, I realized how flawed my perspective on the mining industry was. From just one conversation with Heather, I am now aware of initiatives that are bridging the gap between mining companies and local indigenous communities with influential women behind these organizations. Prior to knowing and working for Heather, the mining sector was portrayed as the "bad guy", while necessary for society to function, there are multiple drawbacks. I'm not naive to think that we don't need the extractive industries as \$47 billion of our GDP is fueled by mineral production and extraction. However, restoration and innovative efforts were never at the forefront of the discussions as the course's core focus was on the issues mining produces. As I conduct my research on the UN Sustainable Development Goals, it is evident how mining companies are able to be catalysts for change being a part of a transformative industry. All sectors but especially the extractive sector, align with all 17 goals and if properly incorporated within their framework, can have meaningful and lasting impacts on a local and global scale.

As I continue to work alongside Heather and the Artemis team, I am continuously being exposed to new ideas driving my curiosity further. In Lucy Crane's Ted talk, Mining Our Way to a Low Carbon Future she states, "If it's not been grown, then it's got to have been mined". Mirroring societal concerns of climate change, innovation in low carbon technologies required for this energy transition demand for the extraction of a lot more raw materials. Watching her Ted talk made me realize we need to remove the environmental and social stigma around mining. There is no doubt that mining has considerable concerns within its industry, however I believe society needs to view this as an opportunity to alter their understanding and establish new processes and frameworks. We as a collective of entrepreneurs, STEM leaders, and humanitarians are capable of reinventing the mining sector towards a sustainable and profitable future.

Personally, as an aspiring environmentalist, I agree with Lucy stating that it is undeniable that we need to change the conversation surrounding mining. We need to take responsibility on how these materials are being extracted as they are resource intensive and inevitably have an impact on the environment. With concerns about climate change on the forefront of today's global issues, it is evident we need people who care for the environment integrated within these corporations to transform the mining industry. Through their lens the extraction, life cycle, carbon footprint, and many more issues are all considered.

In retrospect, it is shocking to think how certain events influence and project your life in a particular direction. Without taking that first-year environmental studies introductory class, it would not have led to attending one of the top universities in Canada and thus, not leading me to meet and work with Heather. As a result of this opportunity with Heather, I am now able to rethink previous ideologies and move towards new opportunities. Taking away from what I learned in these last few months is that I advocate others to seek additional and alternative platforms as this exposure will allow for new and innovative ideas. The world is in a crisis state where without immediate accelerated action we will not experience change. We are that change the mining industry needs.

[illegible]

