

## **Student Experience Enhancement Fund Final Report**

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The McGill Student Experience Enhancement Fund awarded me money to travel for a one-month research stay at the Juan Carlos I Antarctic Station on Livingston Island, Antarctica. My trip was an enriching experience which introduced me to frigid oceans, ice cap covered islands, plentiful wildlife, and amazing people. The trip started on February 13<sup>th</sup> in Montreal and ended 5 weeks later in Montreal on March 21<sup>st</sup>. During this time, I travelled some 24,000 km. I flew to King George Island from Punta Arenas, Chile on February 17<sup>th</sup> where I was then picked up by a Bulgarian Navy vessel and transported to Livingston Island that same evening. Our hosts were the Spanish Polar Committee who operate the Juan Carlos I Antarctic Base on behalf of the Spanish government. Once arriving at the Spanish Antarctic Base, I stayed there for 27 days before boarding the Spanish Navy vessel, the Hesperides, spending one night onboard before catching a flight back to Punta Arenas on March 17<sup>th</sup>.

During our time in Antarctica, my colleagues and I had a few key projects we hoped to complete, I will only comment on mine as it was only mine that benefitted from SEEF funding however much of my time was also spent helping my colleagues complete their projects. My main goals were to collect ice cores from on top of the Livingston Island ice cap so that I could transport them back to McGill University to perform microbiological analysis on the microorganisms entrapped in the ice and my second goal was to field test a prototype metabolic activity assay under development in my lab which one day is envisaged to fly on a mission to another planet or moon to look for alien life. On day 8 of our stay in Antarctica, with the help of professional mountaineers as our guides we climbed up to the top of Johnsons Glacier, nearby the station to collect ice cores. We collected 2 ice cores from our first site and then another 2 ice cores from our second site. These cores ranged from 1 to 1.5 meters in length. On day 13 of our stay, I collected 2 more cores from site 2 so I would have enough replicates to do the analysis that lay ahead. Once collecting all the ice cores, I needed I used the lab facilities at the base to melt, filter and preserve the samples for transport back to McGill. Work with these samples at my lab at McGill has already begun and I hope to have genetic sequence data from the microorganisms in these samples by the end of the summer. To achieve my second goal, throughout our stay I collected various samples from around the glaciers to test with our prototype. These samples were biofilms from glacial streams, glacial ice samples and soils newly exposed after glacial retreat. In the lab at the base, I inoculated these samples into the metabolic activity assay and recorded the results. The results were mixed, seeing activity under some experimental conditions but not others but nevertheless, these field tests were immensely informative and provided valuable data on how to improve the assay.

In addition to the science that was conducted I gained many other valuable skills and experiences on this trip. The first I would like to share is the tremendous international collaboration and goodwill associated with research in Antarctica. Canada does not have its own Antarctic base so Canadian researchers are reliant on other countries like Spain to provide opportunities to Canadian researchers to do research there. I am forever grateful to the Spanish Polar Committee for hosting us at their base. Furthermore, just to travel to Antarctica requires

tremendous international collaboration; take my experience. We flew from Chile to a Chilean base on King George Island which is situated next to a Russian base, we were picked up there and transported to the Spanish Antarctic Station by a Bulgarian navy vessel. At one point, the zodiac our team was using to travel to a sampling site broke down and it was the Bulgarians who happily volunteered to pick us up. What strikes me about all of this and gives me hope for the future is that despite geopolitics and the many conflicts taking place in the world, Antarctica remains a place of peace and collaboration among all countries.

While staying at the base I was also completely immersed in Spanish culture. While some members of the base spoke English well, many spoke very little so to communicate I had to learn some Spanish. I partook in Spanish festivals such as Carnivale and learned much about the country through the traditional food that was served by the amazing cooks. I feel like I learned as much about Spain during my month in Antarctica as if I had travelled to the country.

I gained many practical skills as well, these included mountain safety when traversing glaciers and ice sheets, open water safety when travelling in small boats, and I was trained in how to recognize and prevent hypothermia. I also gained an appreciation for the logistics required to keep an Antarctic base running.

In conclusion, I learned a lot from my trip to Antarctica, a truly once in a lifetime experience and one I hope to share so others may appreciate this fragile continent and understand the need to protect it.



Me collecting ice cores on Johnsons Glacier



Raising the Canadian flag at the Juan Carlos I Antarctic Station



Posing for a photo atop Mount Sofia overlooking Mount Friesland and Johnsons Glacier



Juan Carlos I Antarctic Base