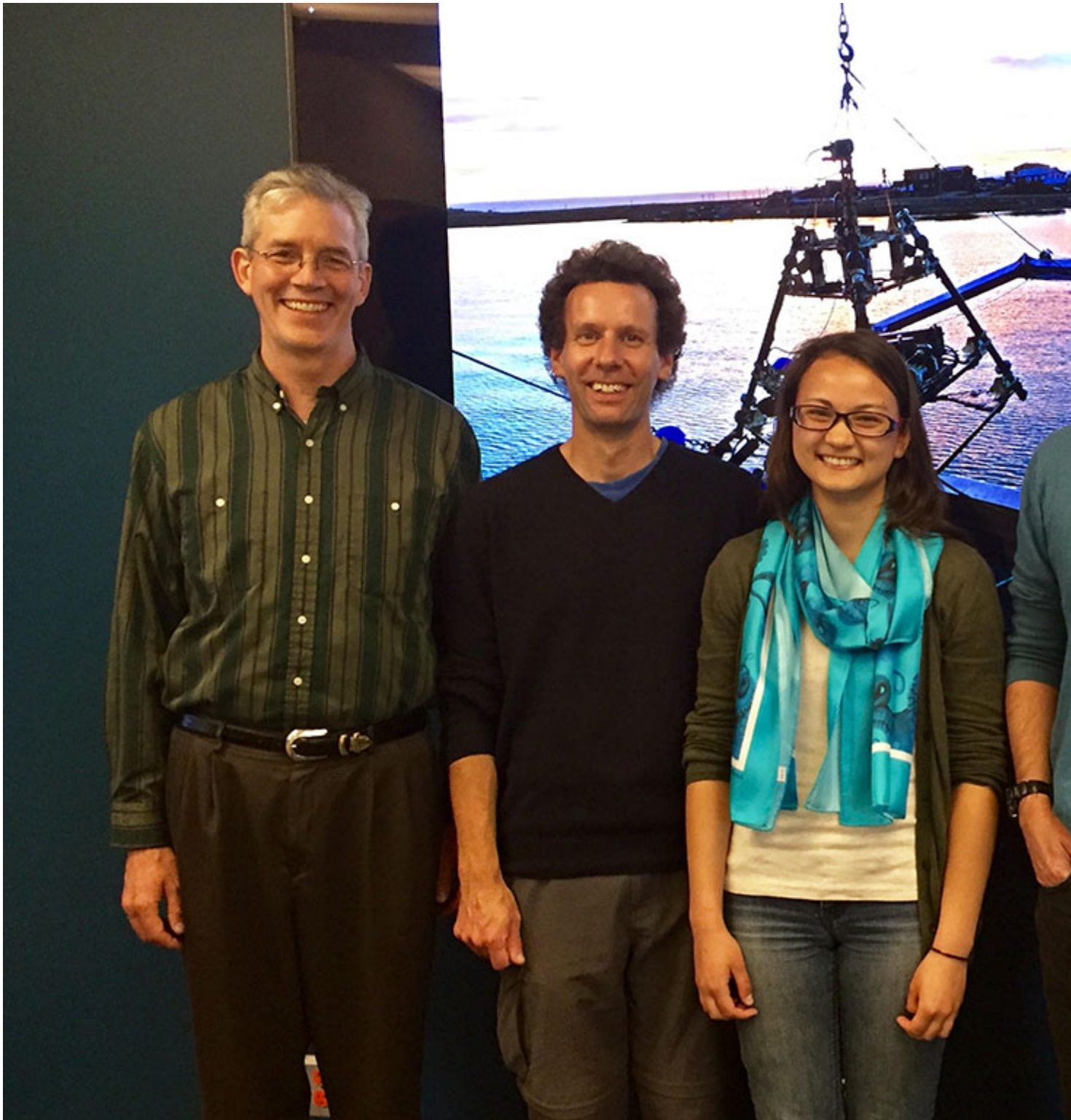


## **Ocean Networks co-op student improves thermodynamic sea-ice model**

Submitted by Lindsay Wallace Fri, 2016-09-30 13:12

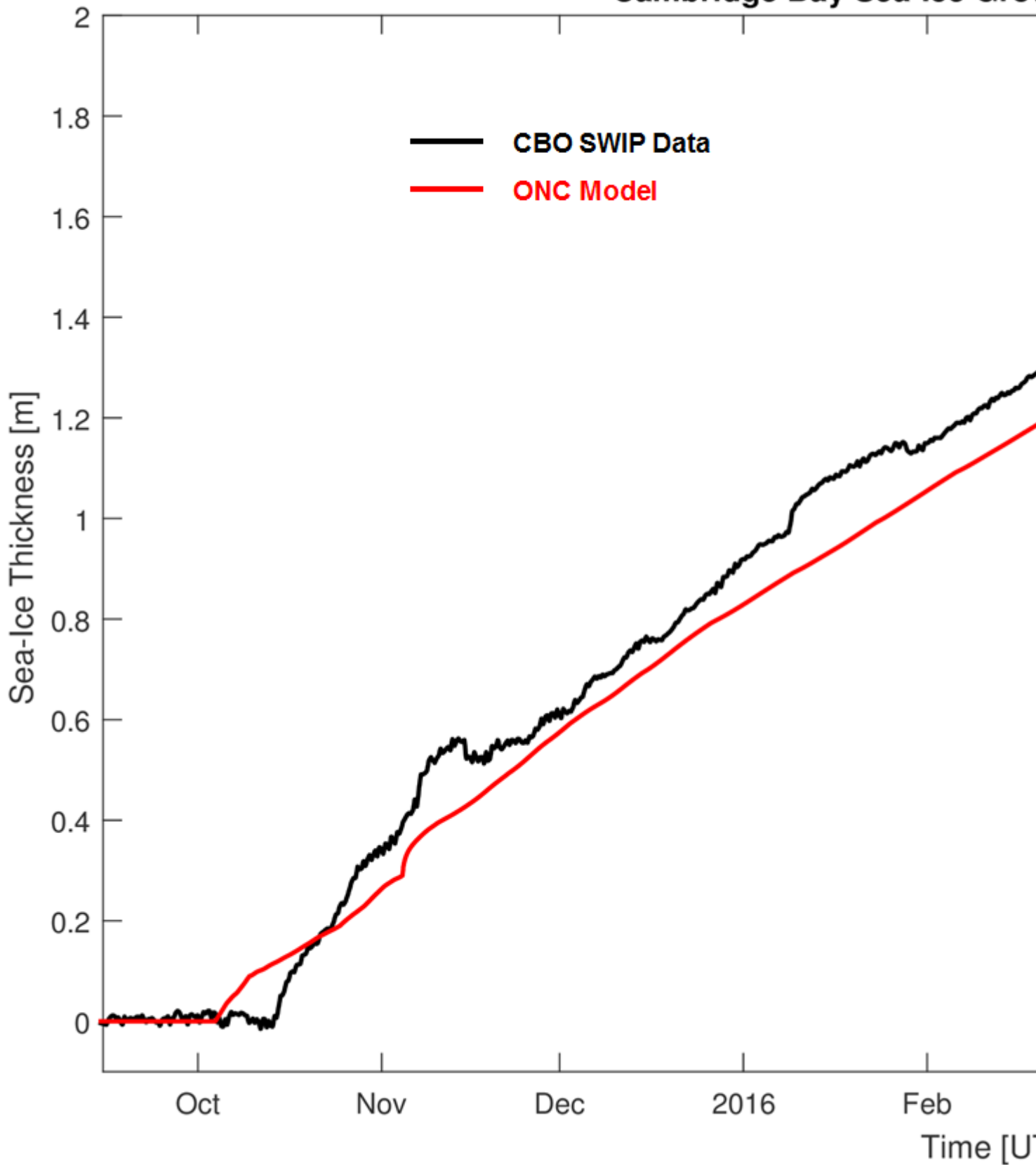
Undergraduate student, Ada Loewen, just completed her co-op term at Ocean Networks Canada (ONC) as part of her combined University of Victoria degree in physics and ocean sciences. Using data from the Cambridge Bay observatory, Ada improved a one-dimensional thermodynamic sea-ice model funded through ONC's Safe Passage project with Polar Knowledge Canada.



Ada Loewen with ONC staff (l-r) Dwight Owens, Martin Scherwath, Fabio De Leo and Pere Puig

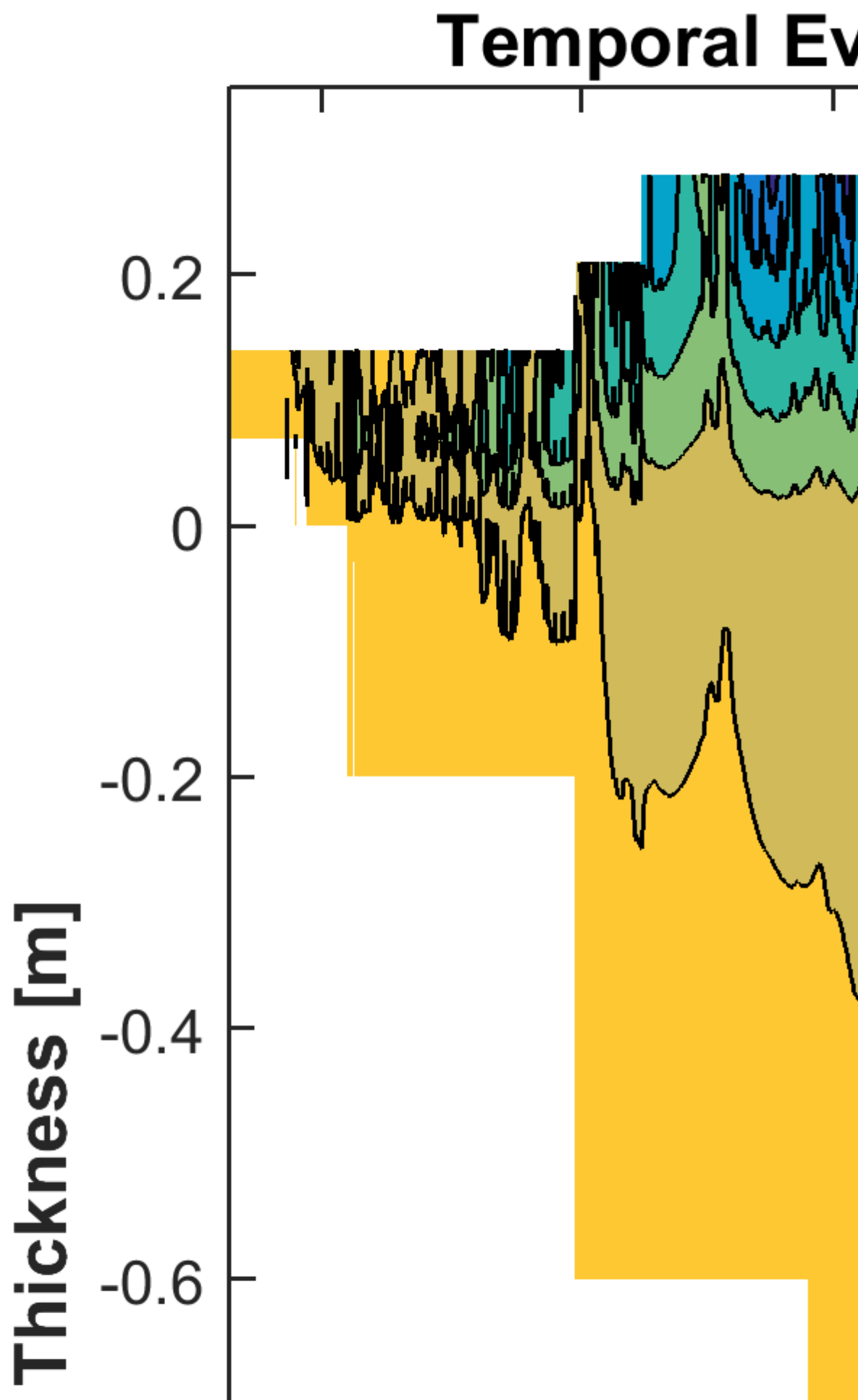
The purpose of the model is to simulate sea-ice growth in Cambridge Bay using mathematical equations that represent the physical processes that affect sea-ice growth. The model also uses data from ONC's Cambridge Bay observatory such as air and water temperatures, solar radiation, and salinity to calculate the ice thickness.

## Cambridge Bay Sea-Ice Growth



Preliminary model results (in red) of ice thickness during the 2015-16 ice growth season, compared with Cambridge Bay observatory ice thickness data (in black) from the shallow water ice profiler instruments (upward looking single beam echosounders mounted on the ocean floor that measure ice draft).

By comparing the model results with the actual ice thickness data from the shallow water ice profiler, researchers can assess the relative importance of different processes or how well they are represented in the model. If the parameterized physics in the model are accurate, we can predict sea-ice thickness as environmental conditions in the arctic change. In the future, the hope would be to use forecasted weather and other relevant data to more accurately predict the dates of sea ice freeze-up and melt.



Temporal evolution of modeled sea-ice and snow temperatures for a full ice growth season (2014-2015) which varies throughout the year and at different depths.

Sea ice is an important factor for life in the Arctic and for safe navigation, says Ada. The main thing we wanted to understand using the model were the freeze-up and melt periods, because during these times it can be dangerous to go into the water or onto the ice. This can affect people who need to travel either by boat (in open water), or by snowmobile or by other means (when ice is present).

During her eight months with ONC, Ada had several opportunities to enrich her co-op experience by engaging with the research community and learning from other scientists. Specifically,

- In April 2016, Ada partnered with University of Victoria Master's student Lucianne Marshall to develop hands-on learning experiences in arctic science for high school students at ONC's Ocean Science Symposium.
- In June 2016, Ada presented her one dimensional sea-ice model at the Canadian Meteorological and Oceanographic Society congress in Fredericton, New Brunswick.
- In August 2016, Ada traveled to the Arctic as part of the Cambridge Bay annual observatory maintenance mission. Ada recorded metadata on the operations, helped collect physical samples for researchers back in Victoria, and engaged with students and community members in learning more about the positive outcomes of ONC's presence in Cambridge Bay.



Ada Loewen in Cambridge Bay, Nunavut.

Ada will spend the next two years completing her undergraduate degree before applying for graduate school. ?I have come away from this co-op experience with a greater enthusiasm for research and ocean sciences, valuable experiences and skills that I will take with me in my future studies and career.?

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