

2022-23 NSERC USRA PROJECTS – School of Earth and Ocean Sciences

SUPERVISOR(S):	PROJECT TITLE AND OUTLINE:	CODE:	START DATE:
<p>Dr. Laurence Coogan Professor, School of Earth and Ocean Sciences lacoogan@uvic.ca</p>	<p><u>Geochemistry Lab Assistant</u></p> <p>You will be involved in several projects preparing and analyzing samples in the geochemical facilities in SEOS. Your main focus will be on developing high precision analyses of Ca and Mg in river waters, hydrothermal fluids and seawater. This will involve: (i) literature review of existing methods, (ii) preparing samples for analysis (e.g., filtering, acidifying, pre-concentration, isotope spiking), (iii) analysis using the ICP-MS in SEOS, and (iv) data processing and data analysis. Once methods are developed, and data collected, you will interpret these (in the context of existing data from other studies) in terms of the cycling of Mg and Ca through the ocean on geological (Myr) timescales. Other projects may include Li-isotope analyses and/or progressive leaching of hydrothermal sediments to determine the particle types (mineralogy) within the sediments.</p> <p>Location – Bob Wright Centre</p>	<p>4013</p>	<p>May 1, 2022 Or September 1, 2022 Or January 1 2023</p>
<p>Dr. Stan Dosso Professor, School of Earth and Ocean Sciences sdosso@uvic.ca</p> <p>Dr. William Halliday Adjunct Assistant Professor, School of Earth and Ocean Sciences whalliday@wcs.org</p>	<p><u>Fish bioacoustics in rockfish conservation areas</u></p> <p>The student will conduct a bioacoustic analysis focused on sounds made by fish on passive acoustic data collected in rockfish conservation areas in the Salish Sea. The student may also examine boat noise in the data and how this boat noise affects fish acoustic behaviour.</p> <p>Location – UVic, Virtual</p>	<p>4701</p>	<p>May 1, 2022</p>
<p>Dr. John Dower Professor, School of Earth and Ocean Sciences dower@uvic.ca</p>	<p><u>Analysis of zooplankton and micronekton from the International Year of the Salmon 2022 program in the Gulf of Alaska</u></p> <p>This student will work alongside a PhD student to identify and enumerate zooplankton and micronekton species in samples that were collected during the International Year of the Salmon 2022 survey in the Gulf of Alaska. This will involve size-fractionating samples, identifying zooplankton and micronekton using taxonomic keys and supervisor consultation, and collating these data into a Microsoft Access database. Should the student is interested, they can also be trained in the use of Echoview software to quality control bio-acoustic echosounder data from the survey or to analyze some of the zooplankton data in R.</p> <p>Location – Bob Wright Centre, Dower Lab</p>	<p>4602 4702</p>	<p>May 1, 2022</p>

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<p>Dr. Victoria Arbour Adjunct Assistant Professor, School of Earth and Ocean Sciences varbour@royalbcmuseum.bc.ca</p> <p>Dr. Andy Fraass Assistant Professor, School of Earth and Ocean Science andyfraass@uvic.ca</p>	<p><u>Description of a Triassic ichthyosaur from Vancouver Island</u></p> <p>Ichthyosaurs were superficially dolphin-like reptiles that lived during the Mesozoic Era. Their fossils are well represented in the Triassic of northeastern British Columbia, but rare specimens are also known from Haida Gwaii and Vancouver Island. The only specimen collected from Vancouver Island, a partial 4-5 m long articulated skeleton discovered near Holberg, has yet to be documented and described in the scientific literature. The NSERC USRA student will photograph, illustrate, and describe this skeleton, making preliminary anatomical comparisons using published literature. The student will also learn relevant museum curatorial skills, such as repairing, re-housing, and updating catalogue records for other Triassic vertebrates and invertebrates in the collection. The student will have opportunities to share their work with the public either in person or virtually through the museum's public engagement channels.</p> <p>Location – This project is based at the Royal BC Museum and may include Covid-19 safety protocols such as vaccination requirements, mask-wearing, or some work-from-home time.</p>	<p>4000 (Earth Sciences), 4010 (Paleontology, paleobiology)</p>	<p>May 1, 2022</p>
<p>Dr. Kim Juniper Professor, School of Earth and Ocean Sciences kjuniper@uvic.ca</p> <p>Dr. Catherine Stevens Adjunct Professor, School of Earth and Ocean Science stevens.cjs@gmail.com</p>	<p><u>Molecular and biochemical analyses of mesopelagic fish</u></p> <p>The mesopelagic zone (200 to 1000 m) is home to large and mostly unexploited fish stocks, a resource that could represent an important future source of protein for humans. Scientists know very little about the life histories, behaviours, and diets of the animals found in the mesopelagic zone. Such knowledge will be essential to any sustainable exploitation of mesopelagic fish. The undergraduate student we are proposing for this NSERC USRA project, Emily Fricska, would work closely with Dr. Catherine Stevens in the laboratory to analyze critical mesopelagic fish samples. These samples were collected in 2021 as part of a pilot study to develop and test methodologies for this new line of research. Future work for Drs. Stevens and Juniper includes an analysis of the mesopelagic food web with the following objectives: determine the population structure of myctophid fish (via traditional barcoding), estimate mesopelagic fish biomass using active acoustics, develop molecular techniques to identify gut contents, determination of linkages between mesopelagic fish and plankton (e.g., gelatinous groups) using DNA and fatty acids, and analysis of the fat content of myctophids and other mesopelagic fish species. Emily's work on these samples would make a significant contribution to upcoming collaborations between Drs. Stevens and Juniper, as well as other biological oceanographers in the department.</p> <p>Location – UVic – Juniper Lab</p>	<p>4602 (Biological Oceanography)</p>	<p>May 1, 2022</p>

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<p>Dr. Hansi Singh Assistant Professor, School of Earth and Ocean Sciences hansingh@uvic.ca</p> <p>Dr. Dipti Hingmire Post-Doctoral Fellow, School of Earth and Ocean Science</p>	<p><u>How Biases in Extratropical Clouds Impact the Tropical Circulation: An Assessment of CMIP6 Earth System Models</u></p> <p>We are seeking an undergraduate student with an interest in large-scale climate dynamics, big data analysis, and AI methods for a project assessing extratropical Southern Ocean cloud biases and associated tropical circulation and precipitation teleconnections in CMIP6 Earth System Model (ESM) experiments. This project is a part of a larger multi-institutional effort (including collaborators in Silicon Valley) aimed at developing a hybrid AI framework to capture the effects of clouds on the global circulation and regional climate patterns.</p> <p>The student will use state-of-the-art machine learning techniques on large-scale CMIP6 ESM output and observational datasets to assess relationships between clouds, the tropical circulation, and precipitation, and will use energetics to constrain these relationships. The position offers the opportunity to learn big data analysis on the AWS cloud high performance computing platform using Python, in conjunction with state-of-the-art machine learning (AI) techniques. The student will be given appropriate co-authorship on papers that include results from the above analysis.</p> <p>Location - Victoria, BC (either in-person or virtual)</p>	<p>4404 Atmospheric Sciences - Climatology</p>	<p>May 1, 2022</p>
<p>Dr. Jay Cullen Professor, School of Earth and Ocean Sciences jcullen@uvic.ca</p>	<p><u>Research cruise on icebreaker CCGS Sir Wilfrid Laurier to measure surface water chemistry in the northeast Pacific and Arctic Oceans</u></p> <p>The student will be responsible for preparing equipment for, loading and participating in an oceanographic research expedition on a Canadian Coast Guard icebreaker to the northeast Pacific and Arctic Oceans. The research assistant will provide support in the laboratory to stage the expedition which is scheduled for July-Aug 2022. The ship departs from Victoria across the northeast Pacific, stops in Dutch Harbor Alaska before working in the Bering Sea and Beaufort Sea in the Canadian Arctic. The student will depart the ship in Barrow Alaska and return to Victoria by air. On the ship the student will be responsible for collecting large volume surface seawater samples and processing them for subsequent chemical analysis and also assist with the collection of samples for determining routine hydrographic/oceanographic parameters. Students with some background in chemistry and an interest in ocean field work are preferred.</p> <p>Location – Bob Wright Centre A415</p>	<p>4600, 4603</p>	<p>May 1, 2022</p>