

## Summer 2022 Sustainability Scholars Program Internship Opportunity

The UBC Sustainability Initiative (USI) is pleased to offer current UBC graduate students the opportunity to work on funded sustainability internship projects. Successful candidates work under the mentorship of a partner organization, and are immersed in real world learning where they can apply their research skills and contribute to advancing sustainability across the region.

- Visit the [Sustainability Scholars Program website](#) to learn [how the program works](#) and to [apply](#).
- Be sure to review the [application guide](#) to confirm your eligibility before applying.

**Applications close at midnight on Sunday January 30, 2022.**

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### Research Project Title: Evaluation of alternative breakwater materials for habitat restoration

#### Project description

##### Overview:

Shoreline infrastructure protection and resilience has been identified as a concern for critical components of the Metro Vancouver wastewater treatment system due to rising sea level, winter storm surges, and the effects of climate change. Common methods for hardening coastal infrastructure against erosion, such as emplacement of concrete or quarried rock, result in significant CO<sub>2</sub> emissions, which contribute to climate change.

Biorock, a mineral accretion technology, represents a potential net carbon sequestration solution for reinforcing shorelines against erosion from wave action. Additional benefits include augmented subtidal habitat for marine organisms and consequent increases in biodiversity and ecosystem function. Biorock, sometimes called “seament” and “seacrete”, is a cement-like engineered material that is produced by low-voltage, direct current (DC) electro-chemical precipitation (accretion) of calcium carbonate from seawater onto a metal frame (the scaffold). The Biorock scaffold advantages over conventional breakwaters include lower weight for transportation and superior maneuverability during installation which allows the use of Biorock mineral accretion in ecologically sensitive areas, in close proximity to existing infrastructure such as outfalls, and in high traffic areas, where rubble breakwater material would otherwise be arbitrarily dropped, a common concern in riprap repair. The modularity and macroscopic design flexibility of Biorock may provide an opportunity to promote specific species, including juvenile fish, seagrasses, kelp, and shellfish.

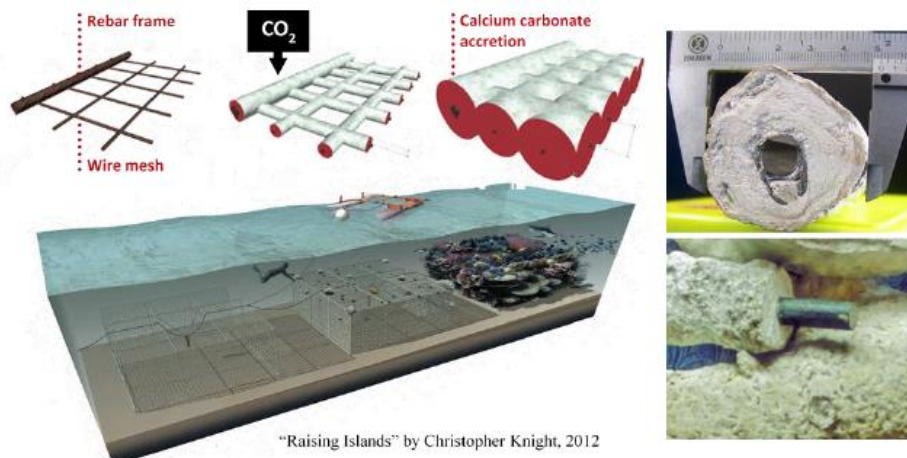


Figure 1: Biorock Generation Process

# SUSTAINABILITY SCHOLARS PROGRAM

Metro Vancouver would like to understand the potential for Biorock as a more sustainable breakwater material for protection its ocean-facing infrastructure. This project seeks to determine the ecological considerations for emerging breakwater technologies including methods of improving sustainability through design, material selection, and manual restoration projects.

## **Purpose of the Project:**

The sustainability of Biorock breakwaters in comparison to conventional materials and opportunities for design considerations which promote positive ecological impacts is poorly documented for coastal BC waters. This project seeks to identify marine species with symbiotic relationships to breakwaters, opportunities for ecosystem restoration, and considerations to incorporate habitat creation in a Biorock demonstration unit.

## **Project Scope:**

- Conduct a literature review on the environmental sustainability of breakwater building materials such as rock riprap, concrete tetrapod's, Reef Cubes, and Biorock (e.g. carbon intensity from extraction, processing/fabrication, and transportation to installation). Focus review on BC or Pacific Northwest coastal waters if possible. T. Goreau, Blue Regeneration
- Identify local marine plants and animal species that are compatible with Biorock structure at Iona Island Outfall Jetty, located in Richmond BC.
- Determine design considerations in Biorock scaffold such as macro and micro structures (e.g. shape or size of openings, surfaces for manual transplanting, etc.) which promote ecological protection, growth, and other biotic requirements for marine life.
- Outline and quantify if possible, the habitat restoration/regeneration capacity of Biorock, including creation of marine ecosystems for seagrass, kelp, and juvenile fish, to trap sediment to prevent erosion.
- Outline active habitat regeneration (e.g. transplanting) opportunities compatible with a Biorock design.

## **Deliverables**

The Scholar will deliver a final report containing a summary of their completed work along with a final presentation to key stakeholders. The report should include:

- A literature review of breakwater building materials including sustainability, ecological impact, and opportunities for novel materials.
- A summary of design considerations and ecological opportunities for Biorock at the Iona Island Outfall Jetty to restore habitat.
- A final report, containing a summary of completed work with recommendations, complemented by a final presentation to key stakeholders.
- A final report [or Executive Summary] for the UBC Sustainability Scholars online project library.

## **Time Commitment**

- This project will take **250** hours to complete.
- This project must be completed between May 2 and August 12, 2022
- The Scholar is to complete hours between 9 am and 5 pm Monday to Friday, approximately 20 hours per week.

# SUSTAINABILITY SCHOLARS PROGRAM

## Required/preferred Skills and Background

- Excellent research and writing skills
- Demonstrated interest in sustainability
- Experience conducting stakeholder engagement events, including facilitation skills, is an asset
- Excellent public speaking and presentation skills
- Strong analytical skills
- Familiarity preparing feasibility studies
- Interested in marine ecosystems or coastal engineering

Applications close **midnight Sunday January 30, 2022**

Apply here: [Click here to apply](#)

Contact Karen Taylor at [sustainability.scholars@ubc.ca](mailto:sustainability.scholars@ubc.ca) if you have questions

## Useful Resources

We are holding a special **resume preparation workshop for prospective Scholars** on January 19. [Click here for details and to register.](#)

Below are some links to useful resources to help you with your resume and cover letter (there are many more online). Some of these resources also provide information on preparing for your interview.

<https://students.ubc.ca/career/career-resources/resumes-cover-letters-curricula-vitae>

<https://www.grad.ubc.ca/current-students/graduate-pathways-success>

<https://www.grad.ubc.ca/cover-letter-cv-resume-templates-ubc-career-services>