

THE EDGE IS HERE



Crawford, Moran and Seitzinger. PHOTO: MIKE MORASH / UVIC

A rock-solid climate solution for CO₂

International team works to advance technology that will turn a greenhouse gas into rock

Scientists now know that for Earth to stay within the temperature increase limit set by the Paris Agreement, negative emission technologies (NET), which remove and permanently sequester carbon dioxide from the atmosphere, are essential.

The UVic-led Pacific Institute for Climate Solutions (PICS) is bringing together an international team of experts to take on this challenge with a new four-year feasibility study.

The Solid Carbon project aims to permanently and safely sequester carbon dioxide (CO₂) as rock. The vision is to extract CO₂ directly from the air, then, using deep-ocean technology powered by ocean-based wind and solar energy, inject the CO₂ into sub-seafloor basalt, where it will mineralize into solid carbonate rock.

PICS executive director Sybil Seitzinger says if this ambitious project proves feasible, oceans around the world could be home to floating platforms that house this NET solution.

"Drastic reductions in greenhouse gas emissions are essential but not sufficient to combat climate change,"

she says. "The ultimate goal is to develop a commercially viable solution to support negative emissions by 2050."

Solid Carbon boasts an international team with researchers from Canada, the US and Europe, who bring expertise in ocean science, carbon mineralization, renewable energy generation, engineering design, and oil-and-gas drilling/injection operations. Also onboard are experts able to navigate the social and legal implications of emerging NET advances.

Over the next four years, the Solid Carbon project will assess the integration of six existing technologies in a way that's never been conceived of before. The best outcome will be selected for a real-world demonstration 2,700 metres underwater at an Ocean Networks Canada (ONC) observatory site in the Cascadia Basin.

"With nearly 10 years of operation in the deep sea, ONC's observatory team brings expertise that will provide close analysis of the CO₂ injection and mineralization processes and environmental monitoring of the overlying sediments, seafloor, and water

column," says ONC President and CEO Kate Moran, who is also Solid Carbon's principal investigator.

Another key component—direct air capture technology on land—was developed by Squamish-based Carbon Engineering over the past 10 years. "One key design challenge will be adapting direct air-capture technology used on land to perform reliably on a floating offshore platform powered by renewable energy," explains Curran Crawford, an engineering professor with UVic's Institute for Integrated Energy Systems. Crawford will lead the investigation into what ocean technology design works best for capturing—and then injecting—the CO₂ into ocean basalt. Prototypes will then be built for further evaluation.

So why chose an ocean location for this project? In short, because 90 per cent of the planet's basalt is beneath the ocean floor. When CO₂ is injected into porous basalt, a type of volcanic rock, it reacts relatively rapidly with minerals to form a solid carbonate—permanently removing it from the atmosphere. And by using the world's largest

reservoir of basalt—the deep ocean—to incorporate and permanently store CO₂ as solid rock, the project will have an edge in expanding the use of the technology globally.

Another important aspect is ensuring that the venture has societal acceptance. A team from UBC will look at the social and regulatory needs of the project, including both a small-scale demonstration and a larger commercial-scale operation. That team will investigate the laws affecting offshore carbon capture and storage to ensure future projects are conducted in a manner that not only helps to mitigate climate change, but is also safe and environmentally responsible.

UVic's engineering faculty are experts in renewable energy and sophisticated monitoring and power systems, UVic's ONC operates world-leading ocean observatories that can deliver a demonstration project offshore of Vancouver Island, Carbon Engineering is a world-leading air-capture company, and UBC has an internationally-recognized research team on the interface of nature, humans, technology and policy related to climate.

PICS and its Solid Carbon team recognise both the enormous ambition of this project and its potential payoff for combatting climate change, if the technology succeeds. By leading this international project, British Columbia is showing it has the expertise, drive and know-how to be a pioneer in the emerging field of negative emissions technologies. bit.ly/19-carbon



Palliative nurse Katie Leahy and Dr. Fraser Black support the health needs of PORT clients. UVIC PHOTO SERVICES

End-of-life care for people in poverty

A new mobile palliative care program is addressing a need for end-of-life care by providing care and dignity to people in Victoria with life-limiting illnesses who are homeless and living in poverty. The Palliative Outreach Resource Team (PORT) launched in September, growing out of a three-year UVic nursing study which found that homeless and barely housed people have to navigate many systems—health care, housing, social care—and that as their health declines, their ability to access these systems also declines. PORT is a collaboration of UVic, Island Health, Victoria Cool Aid Society and Victoria Hospice. bit.ly/19-port

FOOD PRODUCTION IN A TIME OF CLIMATE CRISIS



Program participants on a hike with T'Sou-ke Chief Gordon Plaines (centre) to learn about Indigenous food systems. PHOTO: MIGUEL RAMIREZ BOSCAN

"Every land has its own seed"

An international group of food producers, sustainable food system advocates, and academics from Indigenous, refugee and farming communities gathered on Vancouver Island in September to shape a new four-year, SSHRC-funded program and documentary film—Four Stories About Food Sovereignty. Participants in the new project, led by a UVic historian, came from communities in Colombia, Jordan, South Africa and the T'Sou-ke First Nation to examine the historical roots of food crises, while trying to understand how vulnerable communities can gain decision-making power over the food they eat and how they access it. bit.ly/19-seed

DYNAMIC LEARNING AT THE LEGACY ART GALLERY



Granley. PHOTO: JOHN THRELFALL

Learning, curating, decolonizing

Melissa Granley, who graduated this week with a degree in art history and visual studies, developed a focus on Indigenous arts and activism while studying at UVic. That focus, combined with a summer 2018 internship with UVic's LE,NO,NET Indigenous support program, resulted in a seven-month position at downtown's Legacy Art Gallery.

Granley can see the outcome of her studies today: in addition to preparing to curate two exhibits for UVic's First Peoples House in 2020, she recently assisted with the installation of the exhibit *We Carry Our Ancestors: Cedar, Baskets and Our Relationships with the Land*, curated by Lorilee Wastasecoot, which runs at the Legacy Art Gallery downtown until Dec. 21.

"I did my honour's thesis on decolonizing museum and gallery spaces and the repatriation of what I consider stolen objects, so it's been very interesting to actually work in a gallery space," says Granley, who is Métis on her mother's side. bit.ly/19-curate

LOCAL ENTREPRENEUR, GUSTAVSON GRAD



Farboud

From Shawnigan Lake, the full flavour of international business

Limes, avocados and chilies, with a bit of squash thrown in for good measure: Avasta Farboud's days read like an adventurous vegetarian cookbook. This young entrepreneur, who graduated this week from UVic's Gustavson School of Business, has gone from marketing his family's Fat Chili Farm in Shawnigan Lake (and their new offerings as West Coast Kitchen) to international studies—spending one semester in his childhood home of Beijing, and another in an intensive Chinese language program in Taiwan. Add to that an ongoing role at top accounting firm PricewaterhouseCoopers—where Farboud spent a co-op work term—and you have a recipe for success. bit.ly/farboud

GLOBAL RESEARCH HUB



UVic ranks as a top-performing university in Canada based on research impact, and is #1 among North American universities for publishing highly-cited research based on international collaboration (2011–2019 Leiden rankings).

3 IN 4

UVIC CO-OP STUDENTS RECEIVE AN OFFER OF EMPLOYMENT



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IN THE GLOBAL TOP 300

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- Computer science
- Earth & marine sciences
- Education
- English language & literature
- Environmental sciences
- Law
- Mathematics
- Philosophy
- Physics & astronomy
- Psychology

43,548

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\$3.7

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University of Victoria

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