

SAFE AND SUSTAINABLE DEVELOPMENT OF THE OCEAN FRONTIER

One ocean › Understanding change › Collaborating on solutions

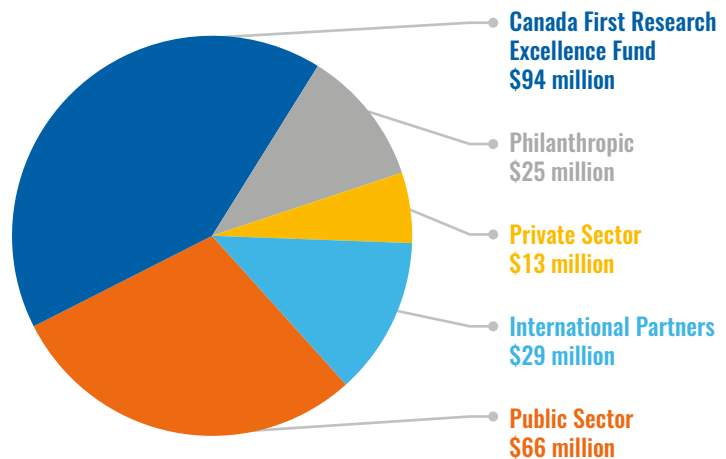


OFI: a collaborative approach

The challenges associated with the changing climate, a need for increased ocean food production and rapidly increasing access to the North Atlantic and Canadian Arctic Gateway are too large-scale and complex for one institution, one research sector or one country to tackle alone.

Diverse investments in world-leading research

The Ocean Frontier Institute (OFI) was established in September 2016 thanks to an investment of \$227 million from the Government of Canada and various private and public-sector organizations. OFI is led by Dalhousie University, Memorial University of Newfoundland and the University of Prince Edward Island, and includes partners in North America and Europe.



* All funds in Canadian dollars.

An underwater scene with sunlight filtering through the water. On the right side, there is a large, colorful circular graphic composed of overlapping segments in shades of red, orange, yellow, and blue, resembling a stylized wave or a globe.

ABOUT OCEAN FRONTIER INSTITUTE

An international hub for ocean research, OFI brings together experts from both sides of the North Atlantic to explore the vast potential of the world's ocean.

Research focus

OFI research focuses on the North Atlantic and Canadian Arctic Gateway, which includes the Labrador Sea and eastern portions of the straits of the Canadian Arctic Archipelago.

The region's unique physical, chemical and biological processes make it an epicentre of international scientific interest and a predictor for the global ocean. Its deep overturning circulation results in the most intense carbon sequestration on the planet. It has a highly productive marine ecosystem and air-sea interactions that modulate the weather and climate of North America and Europe. Diminished ice cover has increased shipping in the Canadian Arctic, raising sovereignty, security, social and environmental issues.

Research benefits

OFI research will help to improve prediction and mitigation of major storms, manage human activities as they relate to ocean resources, improve the fishing and aquaculture industry's potential to meet global seafood demand, strengthen marine safety, and transform how we monitor the ocean with new data capture and IT tools. Research has two priorities:

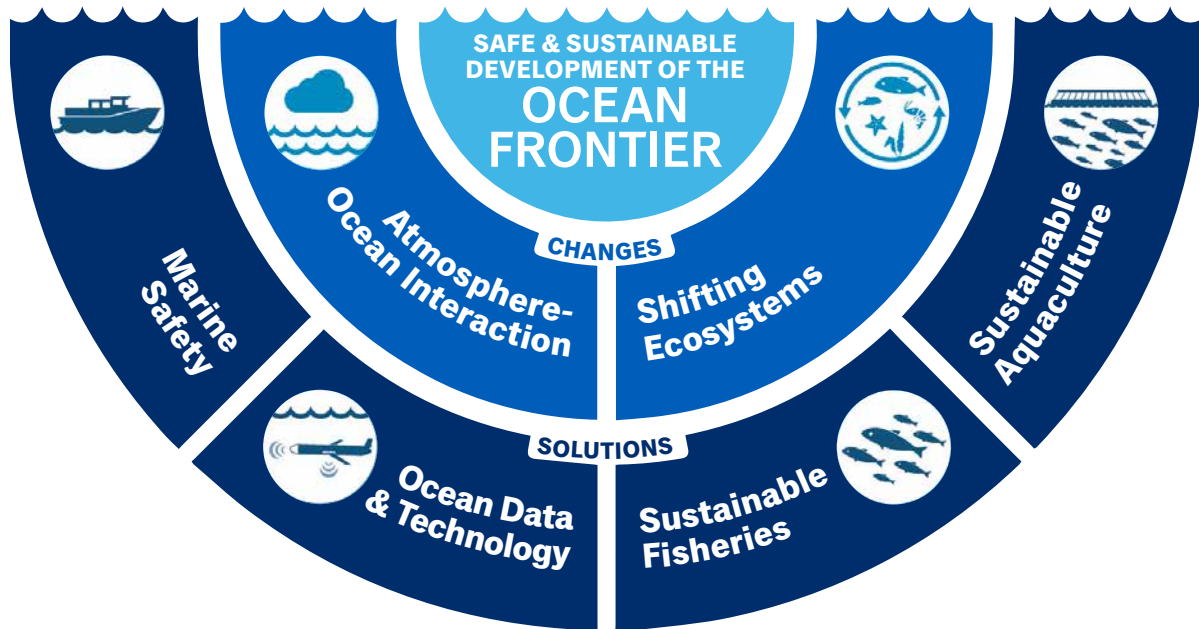
1. CHANGES

Examines key aspects of atmosphere-ocean interaction, resulting ocean dynamics and changes in ecosystems.

2. SOLUTIONS

Focuses on effective approaches to resource development that are sustainable, globally competitive, societally acceptable, and resilient to change.

RE-THINKING OCEAN RESEARCH



Large, multi-year research projects

Phase one includes 16 research projects that are expected to be complete in 2022. Research includes scientific analysis of air-sea interactions and ocean ecosystems as well as studies to strengthen marine safety, ocean data and technology, and the fishing and aquaculture industries. Phase two research projects are expected to be conducted from 2019 to 2023.

Seed Fund

Supports ocean-related projects that offer high potential for innovation success but need small amounts of funding to move forward, and grow.

Opportunities Fund

Provides financial support for ocean research activities that are unique and require rapid turnaround.

PROGRAMS

People exchange

OFI attracts — and retains — the best talent, advancing Atlantic Canada's position as a leader in ocean-related research, teaching and learning:

BILATERAL DOCTORAL PROGRAM

Graduate students are co-supervised and have research stays in partner institutions, providing the opportunity to gain international experience.

INTERNATIONAL POSTDOCTORAL PROGRAM

Postdoctoral fellows spend 50% of the award period at one of OFI's international partner institutions.

VISITING FELLOWS PROGRAM

Researchers from partner institutions are eligible to apply for short or long-term stays at OFI, undertaking research projects and co-supervising students.



Engagement & Literacy

Through Ocean School, OFI supports the development and delivery of resources and programs to advance ocean literacy. Ocean School combines leading edge audio-visual and teaching technologies with forward-thinking approaches to create compelling and integrated learning experiences. With ocean research at the core of its materials, Ocean School develops ocean literacy exhibits, online and classroom-based learning resources, social media-driven dialogue and other activities that illustrate the complex relationship between humans and the ocean. Learning tools include short films, digital games and 360-degree 'immersive' ocean experiences using head-mounted virtual reality displays and tablets.

 @oceanschoolnow



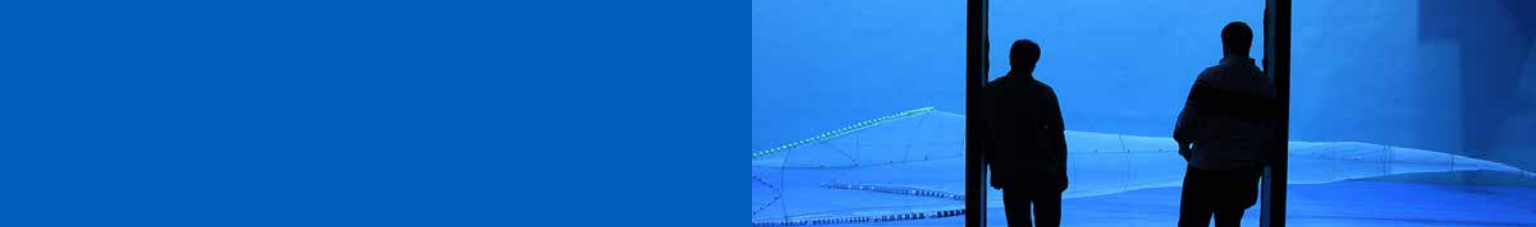
RESEARCH & LAB SPACE

OFI has access to unique research infrastructure as well as the experts to optimize use. From lab space to at sea, in-water and analytical infrastructure, OFI has the tools that allow scientists to think big and create extraordinary research results.

Collaborators

World-class researchers need top-notch facilities to do their work. OFI laboratories are based at its university partners in Atlantic Canada. In addition, OFI has access to research centres owned and operated by its Canadian and international partners. For example:

- ▶ **The Ocean Tracking Network (OTN)** uses electronic tags to track more than 140 commercially important and endangered species in 29 countries. OTN provides the expertise and technology to launch important components of OFI's research.
- ▶ **MERIDIAN (Marine Environmental Research Infrastructure for Data Integration and Application Network)** is a consortium that assists Canadian ocean researchers with advanced data science technology, focusing initially on ocean acoustics.
- ▶ **Marine Environmental Observation, Prediction and Response (MEOPAR)**, is a national Network of Centres of Excellence, connecting top marine researchers across Canada with highly-qualified personnel, partners and communities. MEOPAR aims to train the next generation of marine research professionals, fund leading-edge research, and connect research results to real-world solutions.



At Dalhousie University Halifax, NS

- ▶ **Steele Ocean Sciences Building**, a four-storey, 76,000-square-foot, state-of-the-art research space housing Dalhousie's world-leading ocean experts.
- ▶ **The Aquatron Laboratory**, considered to be one of the largest university aquatic research facilities in Canada.
- ▶ **The Canada Excellence Research Chair Ocean Laboratory** used to develop new technologies to measure changes in the ocean.
- ▶ **The Marine Gene Probe Laboratory** is dedicated to the application of molecular genetic methods, including ecology, evolution, conservation and resource biology.

The Canadian Healthy Oceans Network (CHONe)

- ▶ A national, strategic network that develops new conservation strategies for Canada's changing ocean by partnering with Canadian university researchers and government scientists.

At Memorial University St. John's, NL

- ▶ **The Fisheries and Marine Institute** at Memorial University is home to the world's largest flume tank (pictured above). Combined with cutting-edge analytical equipment, this tank is a unique laboratory setting for the testing of large, marine-based equipment.
- ▶ **The Dr. Joe Brown Aquatic Research Building** is designed to support aquaculture feeding trials and broodstock development.
- ▶ **The Cold-Ocean and Deep-Sea Research Facility** is equipped with a biocontainment facility for aquaculture health research, including vaccine and clinical diet development.

At the University of Prince Edward Island Charlottetown, PE

- ▶ **Atlantic Veterinary College (AVC)** is globally recognized for its research work in aquatic animal health and epidemiology, and plays a leading role in protecting the health and productivity of wild, and farmed, fisheries. Housed at AVC is an interconnected network of aquatic research centres and programs, involving internationally renowned researchers who collaborate with industry, government, and academic partners. Facilities include state-of-the-art aquatic research laboratories, a 12,000-square-foot aquatic animal facility, and an ISO-17025 accredited diagnostic service.



PUTTING RESEARCH TO WORK

Ship Time

While the bulk of a researcher's data analysis happens on land, most of the scientific action happens on the ocean. OFI works with partners to share access to ship time and in-water infrastructure.

- ▶ The Marine Institute is home to training and research vessels: the **MV Anne S. Pierce** and a highly sophisticated inshore hydro acoustic research vessel, the **RV Gecho II**.
- ▶ OFI researchers have access to vessels provided by international partners, the Canadian government and the private sector.

Knowledge Mobilization

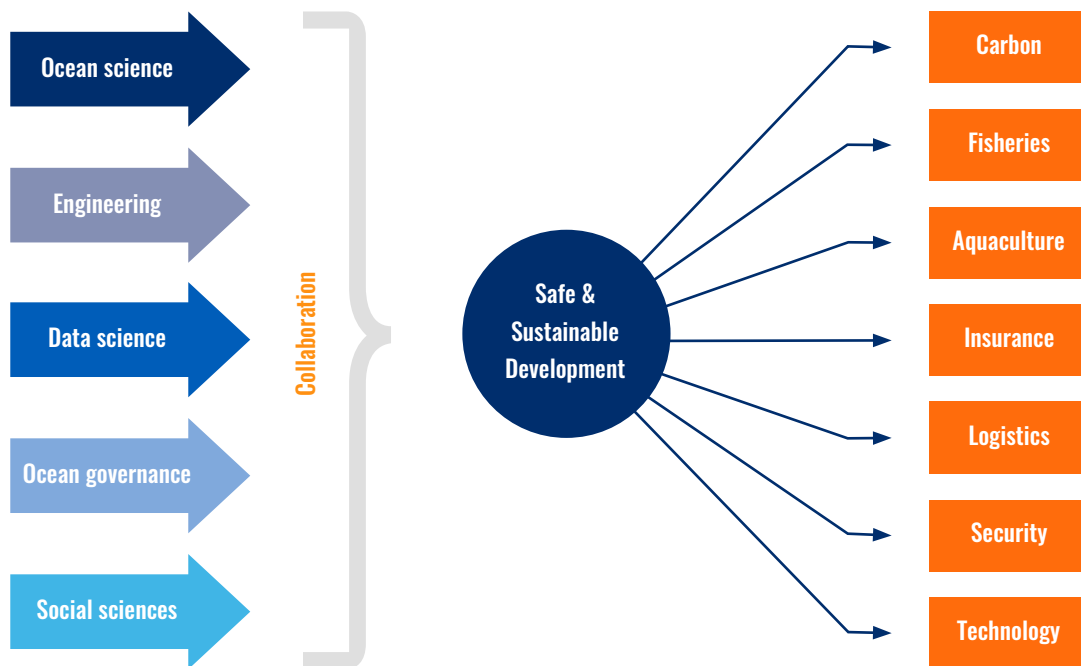
Through connections with industry, government and communities, OFI puts research to work — applying and testing theories through incubator projects with the eventual goal of achieving commercialization and/or policy development. This includes collaborating with the Centre for Ocean Ventures and Entrepreneurship (COVE) located on Halifax Harbour. COVE provides a home to ocean technology businesses, start-ups, researchers and local marine-based services.

Ocean Supercluster

OFI participates in the Ocean Supercluster, a private sector-led partnership concentrated largely in Atlantic Canada that brings companies together to boost innovation and modernization in Canada's ocean industries. Companies from different ocean sectors will co-invest to adopt and commercialize technologies to solve shared challenges. The Ocean Supercluster will also invest to develop talent, improve supply chain opportunities, and foster ocean start-ups.

GROUND-BREAKING RESEARCH DRIVING OCEAN INNOVATION

OFI enables strategic, interdisciplinary research through the collaboration of personnel, data sharing, and management. This integration allows researchers to share and access diverse infrastructure and technical expertise, which better enables scholars and scientists to achieve their common goal of measurably improving the sustainable benefits we obtain from ocean resources.



International Partners

- ▶ Alfred Wegener Institute (AWI), Germany
- ▶ Christian-Albrechts-Universität zu Kiel, Germany
- ▶ GEOMAR Helmholtz Centre for Oceans Research, Germany
- ▶ Institute of Marine Research (IMR), Norway
- ▶ LabexMER, France
- ▶ Lamont-Doherty Earth Observatory (LDEO), USA
- ▶ Marine Institute, Galway, Ireland
- ▶ Woods Hole Oceanographic Institution (WHOI), USA

Public Sector Support

- ▶ Canadian Food Inspection Agency
- ▶ Defence Research and Development Canada
- ▶ Environment and Climate Change Canada
- ▶ Fisheries and Oceans Canada
- ▶ National Film Board of Canada
- ▶ Nova Scotia Community College
- ▶ Province of Newfoundland and Labrador
- ▶ Province of Nova Scotia
- ▶ Royal Canadian Navy
- ▶ University of Alberta

Private Sector Partners

- › Acadian Seaplants Ltd.
- › ASL Environmental Sciences
- › AXYS Technologies
- › Clearwater
- › Cooke Aquaculture
- › EWOS Innovation
- › exactEarth
- › GenomeAtlantic
- › IBM
- › International Submarine Engineering Ltd.
- › Irving Shipbuilding Ltd.
- › LeeWay Marine
- › Ocean Choice International
- › Ocean Sonics
- › Ocean Technology Council of Nova Scotia
- › Pro-Oceanus Systems Inc.
- › RBR
- › Seaforth Geosurveys
- › VEMCO
- › Xeos Technologies Inc.



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Learn more at

oceanfrontierinstitute.org

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