

A YEAR IN REVIEW

 **MEOPAR**

MARINE ENVIRONMENTAL OBSERVATION  
PREDICTION & RESPONSE NETWORK

ANNUAL REPORT 2015 – 2016

# MEOPAR

MEOPAR is supported by the Government of Canada through the Networks of Centres of Excellence program, a joint initiative of the Natural Sciences and Engineering Research Council, the Canadian

Institutes of Health Research and the Social Science and Humanities Research Council, in partnership with Industry Canada and Health Canada. MEOPAR is hosted by Dalhousie University in Halifax, Nova Scotia.



Government of Canada  
Networks of Centres  
of Excellence

Gouvernement du Canada  
Réseaux de centres  
d'excellence

## COVER

Weather map of an explosive extra-tropical cyclone that hit the Canadian Maritime Provinces with hurricane force winds on March 26, 2014. MEOPAR PI Dr. Francis Zwiers (University of Victoria) and his team are investigating why widely used climate models tend to underestimate the number of these rapidly developing storms.

## AT RIGHT

Dr. Rachel Chang (Dalhousie University) in the field in West Pennant, Nova Scotia where she is gathering data for her research on fog formation.



## Message from Board Chair and Directors

This past year saw the completion of MEOPAR's portfolio of projects for Cycle I (2012 - 2017), graduation of the first of our MEOPeer trainees, and deepening dialogue with partners on critical issues related to marine environmental risk, including the design of a national approach to ocean observation. The Network's research efforts now connect researchers and partners across the country and we are witnessing the cross-fertilization of ideas and innovation that result from multidisciplinary and multi-sectoral cooperation.

These achievements are a testament to the vision and character of our late Executive Director, Neil Gall. Following a national search, we were fortunate to obtain the services of new Executive Director Stefan Leslie, who is working with the MEOPAR team to sustain the momentum that Neil helped so much to create.

The Network's national capacity and growing impact are the result of hard work and commitment of our researchers, HQP, staff, volunteer committees (our Board, Research Management Committee and International Scientific Advisory Committee) and the support and engagement of our partners. We thank them all for their efforts on behalf of MEOPAR.

**Dr. Robert Walker**, Chair, Board of Directors;

**Dr. Douglas Wallace**, Scientific Director;

**Dr. Ronald Pelot**, Associate Scientific Director



L to R: Dr. Douglas Wallace, Dr. Ronald Pelot, and Dr. Robert Walker

## Remembering Neil Gall



In early January, 2016, MEOPAR was shaken by the sudden passing of its Executive Director, Neil Gall. Neil joined MEOPAR in 2013 and was a driving force behind the Network's building and growth stages. His strong belief for MEOPAR's vision, combined with

skill, enthusiasm, and an outgoing and humorous personality, made Neil extraordinarily effective for the leadership and relationship building that was so critical to the first cycle of MEOPAR.

Neil's life touched a vast number of people, as evidenced by the contributions from nearly 200 individuals to the scholarship fund established in his memory. The Neil Gall Memorial Scholarship in Ocean Technology will be awarded annually to a student with demonstrated leadership potential studying at the School of Ocean Technology of the Fisheries and Marine Institute (Memorial University). The scholarship is a fitting way to celebrate the memory of a fine man who did so much for Canada's oceans sector.

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**Dr. Gilbert Brunet**  
Director, Meteorological Division, Environment & Climate Change Canada

**Dr. Stephanie Chang**  
Professor (School of Community & Regional Planning), University of British Columbia

**Dr. Brad deYoung**  
Professor (Department of Physics & Physical Oceanography), Memorial University

**Dr. Dany Dumont**  
Professor (Institut des sciences de la mer), Université du Québec à Rimouski

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Executive Director, MEOPAR

**Ms. Noémie Giguère**  
Executive Director, Technopole Maritime du Québec

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Professor (Dept. of Oceanography; Dept. of Mathematics & Statistics), Dalhousie University

**Dr. Francis Zwiers**  
Director, Pacific Climate Impacts Consortium

**Mr. Rick Schwartzburg (Observer)**  
Senior Program Manager, Networks of Centres of Excellence

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Professor (School of Earth & Ocean Sciences), University of Victoria

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Associate Scientific Director, MEOPAR, Dalhousie University

**Mr. Paul Lyon**  
Senior Scientific Advisor, Fisheries and Oceans Canada

**Dr. Maurice Lavoisier**  
Professor (Dept. of Biology), Université Laval

## MEOPAR STAFF

**Dr. Douglas Wallace**  
Scientific Director

**Dr. Ronald Pelot**  
Associate Scientific Director, Acting Executive Director (January – March, 2016)

**Mr. Neil Gall**  
Executive Director (2013 – January, 2016)

**Ms. Julie Atienza** Financial Controller

**Ms. Tanya Crawford** Training Coordinator

**Ms. Alison Maunder** Special Projects Officer

**Ms. Janet Marshall** Executive Assistant

**Ms. Alexa Reedman** Events Coordinator

**Ms. Janet Stalker** Communications Manager

## Network Profile

MEOPAR's premise is that Canada, and the world, need to adapt to the changing ocean environment. There are two types of change occurring simultaneously: the changing societal use of the marine environment, and the changing natural environment itself, which includes shifting ecosystems, climate and weather variability. The confluence of these streams of change creates shifting patterns of opportunity and risk, including fundamentally new hazards that Canadians and the international community need to understand and anticipate, and for which we must have ready a range of responses. Based on this premise:

MEOPAR's Strategic Outcome is the delivery of knowledge, technology, technique and highly trained personnel to enable Canada's coastal communities and marine industries to enhance economic opportunity and resilience to risk in the face of a changing ocean environment.



24

Universities



90+

Investigators



250+

Highly qualified  
personnel



100+

Industry, Government  
& Other Partners



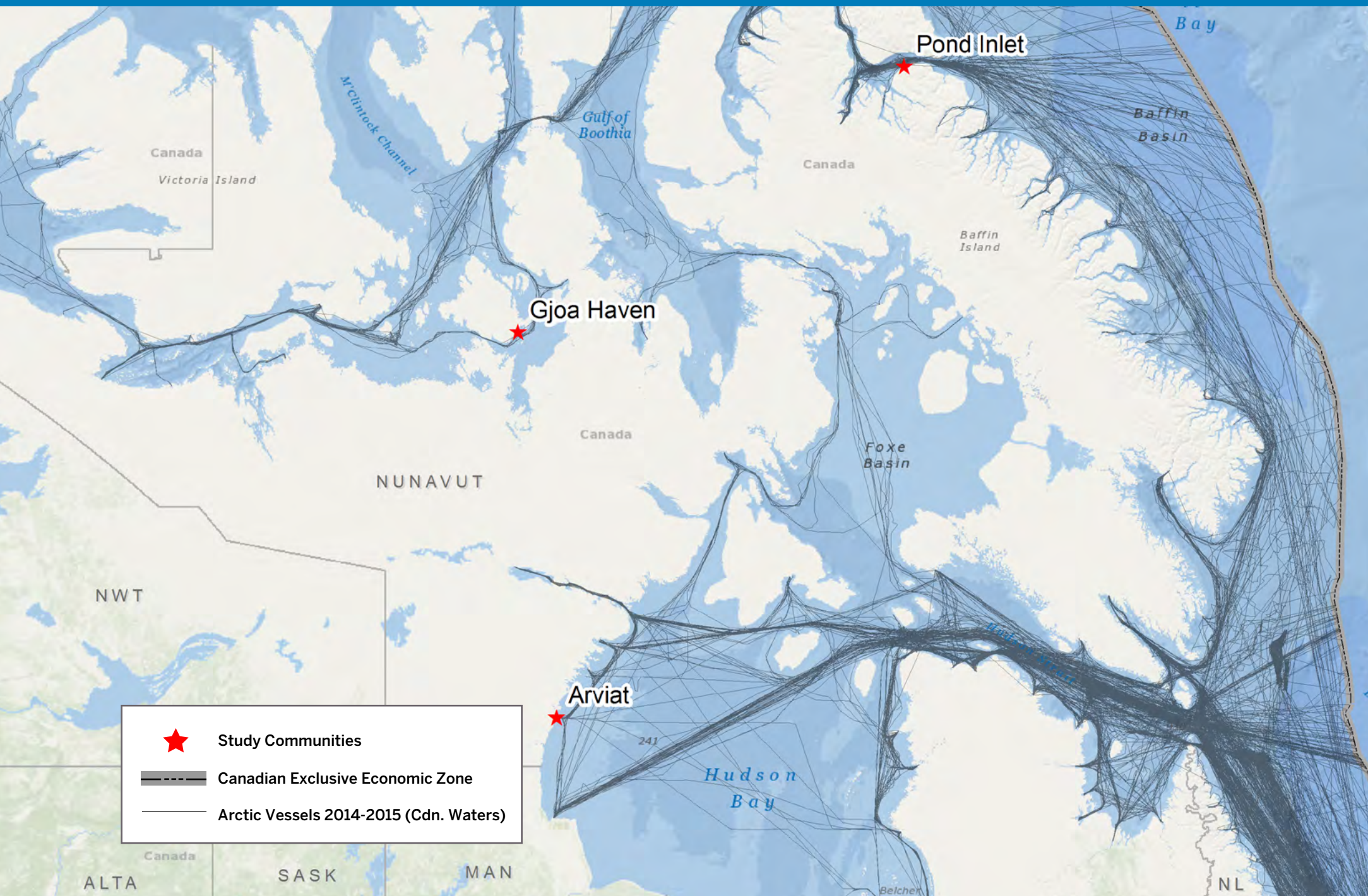
## Strategic Objectives (2012 – 2017)

### New Ocean Science

- > 1. Establish the first nodes of a new pan-Canadian network of integrated observing and prediction systems for strategically important locations
- > 2. Develop new tools and technologies for rapid environmental assessment and forecasting during marine environmental emergencies
- > 3. Link projection of future changes in storms, coastal flooding, and waves on local scales with consideration of economic impacts, safety, planning and policy
- > 4. Assess the impact of long-term, oceanic change on Canadian coastal communities, ecosystems and economic interests, including implications for resource management, regulation and policy

### New Approaches to Ocean Science

- > 5. Introduce new approaches for training of highly qualified personnel with skills in the natural and social sciences and their use in solving problems related to marine risk
- > 6. Implement new approaches for sharing natural and social science expertise, data and infrastructure in order to respond more effectively to marine emergencies
- > 7. Establish an "Expert Forum" involving Canadian and international experts, policymakers and stakeholders for the illumination, evaluation and communication of emerging and new risks in the marine environment



## Integrating Inuit Knowledge and Culturally Significant Areas Into the Northern Marine Transportation Corridors

Dr. Jackie Dawson (University of Ottawa) and her team are working with members of the Inuit community in Pond Inlet, Nunavut (at right) to identify marine areas of cultural, ecological, and archaeological importance to their community, and how they would like those areas respected. This information, along with similar data the team is gathering in other Arctic communities, will help inform the federal Northern Marine

Transportation Corridors Initiative and other key transportation initiatives in the Arctic. Working with partners including the Canadian Coast Guard, Transport Canada, Oceans North Canada, and in collaboration with Inuit Tapiriit Kanatami (Canada's National Inuit Organization), Dawson seeks to ensure the Arctic shipping industry is managed in a way that promotes safety and respects local people, cultures and practices.

*This image draws on Satellite AIS data which are provided by exactEarth Ltd. 2016, and processed courtesy of MEOPAR. (Shoreline) Esri, DeLorme, GEBCO, NOAA NGDC and other contributors. Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org and other contributors.*

## Launching New Ocean Research with Irving Shipbuilding Inc.

Joint funding from Irving Shipbuilding Inc. and MEOPAR launched nine ocean research projects in late 2015, laying the groundwork for new partnerships and over \$4.56 million in leveraged support.

Committed to ensuring a sustainable marine industry under the National Shipbuilding Strategy, Irving Shipbuilding partnered with MEOPAR to support fundamental research on marine hazards across the country.

A call for research proposals in August 2015, backed by \$1 million from Irving Shipbuilding and \$800,000 from MEOPAR, led to the funding of nine projects based at six Canadian universities. Together, the projects involve 48 partner organizations that committed an additional \$4.56 million of cash and in-kind support to the work. The strong showing of industry and network participation is indicative of the real-world need for the research, and further reinforces the success of MEOPAR's cross-sectoral, multidisciplinary approach.

The support from MEOPAR and Irving Shipbuilding also aims to develop the next generation of marine risk problem solvers, ensuring a legacy beyond the scope of research. A total of 57 Highly Qualified Personnel (predominantly students) are supported through the new projects, which will wrap up in 2018.



Members of the Inuit community in Pond Inlet, Nunavut identify significant marine use areas with Dr. Dawson's team. Photo Credit: Jonathan Pitseolak.

## An Integrated Response to Marine Challenges: MEOPAR's New Response Core

Funding awarded to six new research core activities marked the official launch of MEOPAR's Response Core in 2015.

In contrast to its research projects, which involve large teams investigating specific questions, MEOPAR's Cores provide capacity, technical support and other resources for multiple projects and partners. The Response Core completes a balanced approach to research support, complementing the previously established Observation and Prediction Cores by strengthening the Network's ability to integrate natural and social science perspectives. From vulnerability and preparedness to community planning, policy, and regulation, Response Core activities analyze and address real-world marine risk problems with direct involvement from end-users.

The Response Core's grounding in social sciences is crucial, according to Response Core investigator Dr. Steve Plante (Université du Québec à Rimouski). "If you don't involve communities or account for social relations, we cannot understand the management or development of different regions," says Plante. "We cannot understand the full problem."

The Response Core initiative adds decades of combined multisectoral research experience to MEOPAR's capacity, including Plante's experience engaging with communities.

"We can share examples of iterative process-based tools and knowledge developed over the years with our colleagues, and with the next generation of researchers," says Plante.



Dr. Steve Plante and Ph.D. student Julia Silve Santos.



### Coastal Communities: Moving from Planning to Implementation

Leading one of six Response Core activities, Dr. Steve Plante (Université du Québec à Rimouski) and his team seek to better understand the planning challenges facing coastal communities. "We hear from community administrators saying 'Yeah, we have a plan, but we don't know how to implement it' or 'we cannot use it.' With this funding, we can go deeper to identify the key variables for success." Plante and his colleagues

(including Ph.D. student Julia Silva Santos, pictured with Plante at left) will inventory the array of plans developed for coastal communities in the Estuary and Gulf of St. Lawrence, from adaptation plans to socioeconomic and sustainable development plans. The team will then work with communities in a collaborative process aimed at identifying barriers to implementation and variables that impact success.



## Improving Accessibility to Marine Earthquake Data

Post-Doctoral Fellow Dr. Maria-Elena Froese (pictured above, on left), presents her Earthquake Data Dashboard to Ocean Networks Canada (ONC) staff Dr. Maia Hoeberechts and Dr. Martin Heesemann. Maria-Elena developed a web-based application to display and dynamically explore seismic data as part of her 2015 summer

internship at ONC, which was funded through MEOPAR's Community of Practice on Ocean Data Management. Her work supports ongoing seismic research, makes ONC's seismic data more readily accessible to scientists and the public, and raises public awareness of emergency planning and response efforts in coastal British Columbia.

## From Observations to Knowledge: Community of Practice on Ocean Data Management Established

From historic information to long-term series to new observations pouring in, Canada boasts a vast, challenging sea of ocean data. The newly established Community of Practice (CoP) on Ocean Data Management, which includes representatives from the federal government and from major ocean data organizations in Canada, is working to make it more navigable. This year's Expert Forum and summer student training program were highlights among many important steps the CoP is taking to improve integration of, and access to, Canada's ocean data.

MEOPAR's Expert Forum on Ocean Data Management (Montréal, QC) gave CoP members the opportunity to share best practices and identify research gaps. Leaders from American and European ocean observation systems shared their experiences, and national experts laid out the current state of ocean data management in Canada. The forum developed a clear vision for a robust, sustainable Canadian Integrated Ocean Observing System, and its recommendations were published in a follow-up MEOPAR workshop report (available at [www.meopar.ca](http://www.meopar.ca)).

The CoP's efforts were further bolstered by a new summer student program, funded by MEOPAR and coordinated by the CoP. Students were placed with CoP member organizations for summer term positions to grow their professional experience, and to provide an additional pathway for the five participating marine data centres to collaborate and coordinate with one another. The program was such a success that it will be rolled out in the summer of 2016 as well.



MEOPeers at the 2015 National Training Meeting in Vancouver

## MEOPeers Gather for National Training Meeting

In June (2015), MEOPeers gathered together for two days of learning and networking in Vancouver, BC. As part of the meeting, the group traveled across the Strait of Georgia aboard a BC Ferries vessel that is equipped with MEOPAR-funded instruments, which gather oceanographic data while the ship is underway. Dr. Richard Dewey (Ocean Networks Canada) gave the MEOPeers an overview of the instruments and their role in ongoing research. He also took advantage of a chance sighting of orcas to describe the current state of knowledge about underwater noise and marine mammal detection – issues that are a central focus of several MEOPAR research projects.

The day continued on Vancouver Island, where MEOPeers heard research presentations from fellow trainees and from the keynote speaker, Dr. Grant Murray (Canada Research Chair, Coastal Resource Management, Vancouver Island University), before returning to the mainland.

Day two saw MEOPeers participate in skill development workshops on version control and technical writing.

## MEOPAR Pilots Employer Connector Initiative

MEOPAR's Training Program provides professional development opportunities and training to the Network's Highly Qualified Personnel, known as MEOPeers, to better prepare them to enter the Canadian workforce. This year, the program introduced an Employer Connector Initiative, which saw groups of MEOPeers visit a prospective employer's office to tour the facilities and learn about career opportunities and the skillsets the company is looking for in employees.

The initiative was piloted in the fall of 2015 with the environmental consulting company AMEC Foster Wheeler and with the Atlantic Office of the Canadian Hurricane Centre (a branch of Environment and Climate Change Canada). The initiative was such a success that MEOPAR plans to roll it out nationally in 2017.



## MEOPeer Training Expands Beyond Canada's Borders

MEOPAR's Training Program continues to expand the opportunities available to MEOPeers, the Highly Qualified Personnel set to become the next generation of marine risk problem solvers.

"We look at what employers will require of future employees, and compare that to the training offered at the universities our MEOPeers attend, so we can help fill the gaps," says MEOPAR Training Coordinator Tanya Crawford.

A needs assessment, developed with input from MEOPeers, identified exposure to international research perspectives as a key gap. "This generation has the potential to be the most mobile in terms of careers," says Crawford. "We needed to tap into those international opportunities."

A collaborative workshop in Cape Town, South Africa (November, 2015) presented a timely opportunity. Five MEOPeers traveled to Cape Town's Two Oceans Aquarium to participate in the workshop, which focused on the challenges of interdisciplinary study. The MEOPeers joined researchers from Rhodes University and Cape Town University for discussions on lessons learned, best practices, and ideas for how to further integrate interdisciplinary approaches into their own research.

Following the workshop, the group and their South African colleagues then traveled to coastal Gansbaai, where they spent a day mentoring public school students enrolled in the aquarium's junior marine science program. The experience provided MEOPeers with insight into the knowledge mobilization approaches commonly used by one of South Africa's premier marine education organizations.

The participating MEOPeers shared highlights and key take-aways from their experience with the larger MEOPeer community at the MEOPeer Annual Training meeting in February, 2016.

# Research Portfolio

MEOPAR's Research Program bridges sectors and disciplines, drawing together a strong complement of investigators, Highly Qualified Personnel and partners from the government, industry, academic and community sectors. Together, we are creating pathways for dialogue and collaboration that are advancing critical multidisciplinary science, generating impact and strengthening the resilience of Canada's coastal communities and industries.

## RESEARCH STRUCTURE

**Research Projects** are large, multi-investigator and multidiscipline projects based at Canadian universities that are grouped into two thematic categories based on timescale:

- > **Theme 1 – Hours to Seasons:**  
Prediction and rapid response to immediate marine issues (eg., oil spills, weather, navigation hazards)
- > **Theme 2 – Seasons to Decades:**  
Prediction, response and planning associated with longer term issues (e.g., ocean acidification, sea-level rise, changing patterns in extreme weather)

**Research Cores** develop and/or provide shared instruments, technology and resources in support of MEOPAR research projects, while also facilitating knowledge transfer and communication between projects.



Richard Davis (Technical Lead, Observation Core – at center of photo) discusses the Observation Core's newly established Coastal Ocean Dynamics Application Radar (CODAR) installation in Sandy Cove, Nova Scotia with Principal Investigator Dr. Jinyu Sheng (Dalhousie University – pictured at right) and Dr. Sheng's Research Associate, Dr. Kyoko Ohashi (pictured at left). The station gathers data on surface currents and wave heights, which Dr. Sheng and Dr. Ohashi will use for their work creating a predictive model for the Halifax Harbour Approaches.

## > RESEARCH PROJECTS

### MARINE FORECASTING

**Developing a re-locatable coupled atmospheric-ocean forecast system for use in marine emergencies**

Dr. Harold Ritchie, Dalhousie University & Environment Canada

**Building a network of fixed coastal observing and forecasting systems (Halifax Harbour and Strait of Georgia)**

Dr. Jinyu Sheng, Dalhousie University,  
Dr. Susan Allen, University of British Columbia

**Strait of Georgia indicators and impact scenarios**

Dr. Stephanie Chang, University of British Columbia

**Evaluation, improvement and communication of short-term hazardous weather forecasts over coastal British Columbia**

Dr. Daniel Kirshbaum, McGill University

**Enabling MEOPAR missions with autonomous marine systems**

Dr. Mae Seto, Dalhousie University & Defence Research and Development Canada

**Marine applications & downscaling of seasonal climate predictions**

Dr. Bill Merryfield, University of Victoria & Environment Canada

**Measuring marine boundary layers in an urban shipping environment: monitoring trace gases relevant to air quality and climate change**

Dr. Aldona Wiacek, Saint Mary's University

### FOG

**Understanding the factors that affect the properties of coastal and polar fog**

Dr. Rachel Chang, Dalhousie University

**Forecasting Grand Banks fog: assessment, improvement and application**

Dr. Joel Finnis, Memorial University

### SEA ICE

**Improving marine drift and dispersion forecasts**

Dr. Dany Dumont, Université du Québec à Rimouski

**Improving sea ice prediction by incorporating visual infrared sensors and synthetic aperture radar data sources into an operation sea ice forecasting system**

Dr. Andrea Scott, University of Waterloo

**Pressured ice: environmental monitoring, modeling and mitigation of risk for marine operations**

Dr. Rocky Taylor, Memorial University

**Safer shipping through summer sea ice: New Synthetic Aperture Radar (SAR) based tools for monitoring and prediction of sea ice conditions**

Dr. Randy Scharien, University of Victoria

**A meteorological observatory in the NW Passage: understanding sea ice changes and Inuit use of scientific information**

Dr. Brent Else, University of Calgary

**User-driven monitoring of adverse marine weather states in the Eastern Beaufort Sea**

Dr. David Atkinson, University of Victoria

### CLIMATE CHANGE ADAPTATION

**Insuring coastal communities in the era of wild weather**

Dr. Jason Thistlethwaite, University of Waterloo

**Adapting to climate change risks: planning and policy in Nova Scotia municipalities**

Dr. Gordon McBean, Western University

**Linking ocean and human health: coastal security and sustainability in Haida Gwaii**

Dr. Philip Loring, University of Saskatchewan

**Testing new, innovative and affordable technologies for monitoring and visualizing the impacts of sea level rise, erosion and storm surges on coastal environments**

Dr. Adam Fenech, University of Prince Edward Island



Photo Credit: Vishnu Nandan

### EXTREME EVENTS

**Climate change and extreme events in the marine environment: Predicting the likelihood and intensity of extreme events, and identifying issues related to the fishing industry and coastal communities**

Dr. Bill Merryfield & Dr. Greg Flato, University of Victoria & Environment Canada

**Coastal storm activity: understanding model biases in predicting frequency and intensity of weather bombs**

Dr. Francis Zwiers, University of Victoria

**Estimation of extreme wave statistics off the East Coast of Canada and their future change: improving extreme wave prediction by downscaling model resolution**

Dr. Jinyu Sheng, Dalhousie University

ABOVE: Dr. Randy Scharien (University of Victoria) and his team are working in partnership with the Canadian Ice Service to develop new synthetic aperture radar tools to improve the precision and accuracy of summer sea-ice observations and forecasts in Canada's North.

### OCEAN ACIDIFICATION

**Biogeochemical projections under a changing climate**

Dr. Katja Fennel, Dalhousie University

**Ocean acidification in Canadian coastal communities: an integrated coastal acidification program**

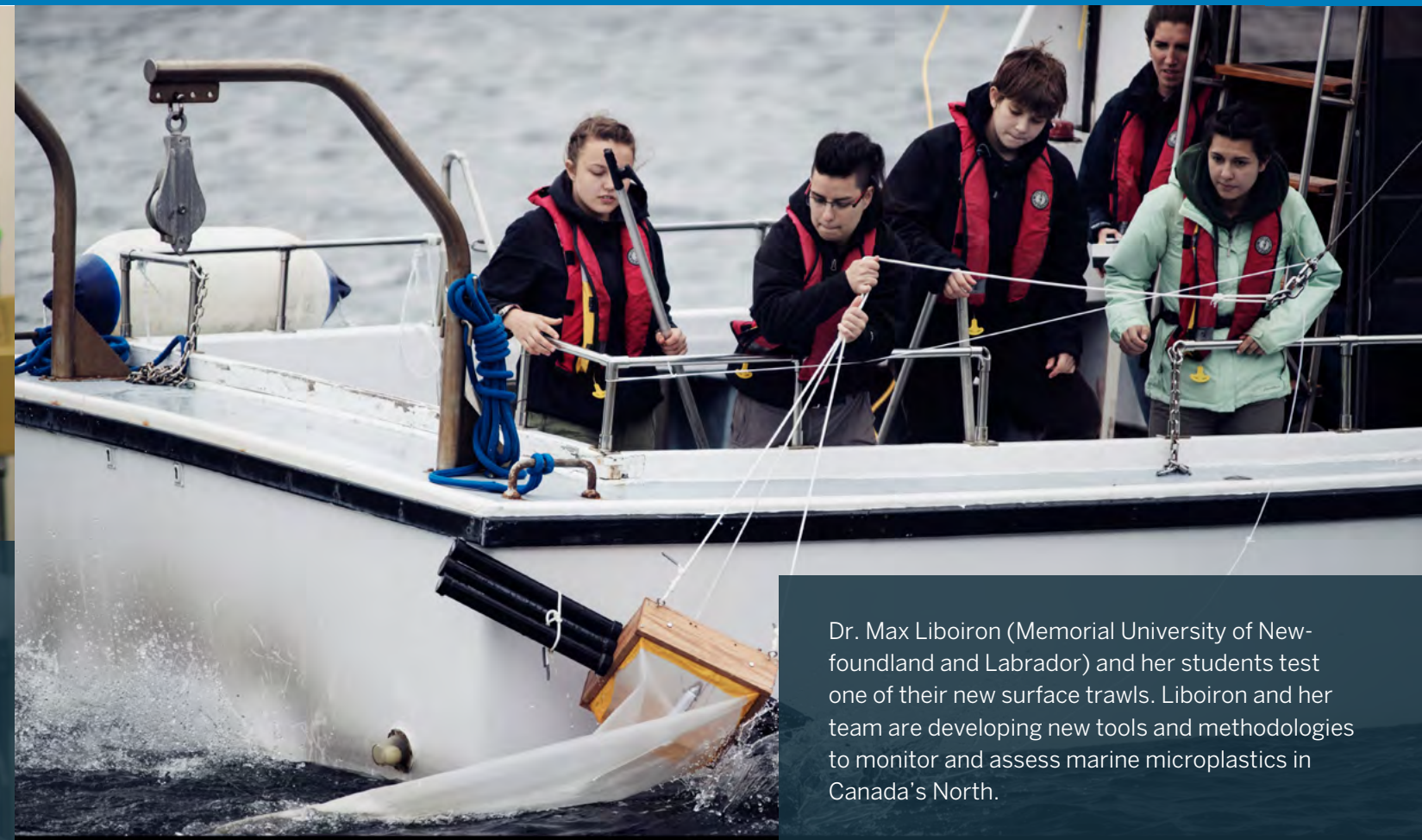
Dr. Karen Kohfeld, Simon Fraser University

**Canadian ocean acidification research program**

Dr. Helmuth Thomas, Dalhousie University



Technician Ian Luddington measures the cell size and abundance of phytoplankton in a seawater sample from Bedford Basin, Nova Scotia. Ian is part of a team led by Dr. Julie LaRoche (Dalhousie University) that is working with 4Deep Inwater Imaging on new optical methods for monitoring plankton diversity as an indicator of ocean health.



Dr. Max Liboiron (Memorial University of Newfoundland and Labrador) and her students test one of their new surface trawls. Liboiron and her team are developing new tools and methodologies to monitor and assess marine microplastics in Canada's North.

## FISHERIES & ECOSYSTEMS

**Using underwater video to optimize capture efficiency of invasive green crab to reduce their impact on fisheries**

Dr. Brett Favaro, Memorial University

**Modelling and predicting disease outbreak and spread in coastal seas**

Dr. Martin Krkosek, University of Toronto

**Assisting fisheries management by integration of data from non-specialized assets, ferries, citizens and satellites**

Dr. Maycira Costa, University of Victoria

**Assessing and reducing risk of injury and fatality associated with extreme events in Newfoundland and Labrador fishing**

Dr. Barbara Neis, Memorial University

**Risk analysis of the effects of extreme weather conditions and climate change in commercial fishing vessel incidents in Atlantic Canada**

Dr. Ronald Pelot, Dalhousie University

**Enhancing ecosystem resilience: integrating social and natural sciences to evaluate how fishing has altered ecosystems**

Dr. Natalie Ban, University of Victoria

**Prioritizing threat management strategies to ensure long-term resilience of Fraser River Estuary**

Dr. Tara Martin, University of British Columbia,  
Dr. Julia Baum, University of Victoria

**Observing and responding to pressures on Arctic marine ecosystem services**

Dr. Brent Else, University of Calgary

**Continuous assessment of plankton abundance and community structure in Canadian coastal waters with a novel, flow-through, high-throughput holographic microscope operated on volunteer observing ships**

Dr. Julie LaRoche, Dalhousie University

## CONTAMINANTS AND OIL SPILLS

**Improving oil spill models to support environmental emergency response and chemical dispersant use policy development**

Dr. Haibo Niu, Dalhousie University

**Predicting the microbial bioremediation response to marine oil spills in Canada**

Dr. Casey Hubert, University of Calgary

**International Fukushima Ocean Radionuclide Monitoring Network: Monitoring the presence/absence of Fukushima radiation in Canada's Pacific and Arctic oceans**

Dr. Jay Cullen, University of Victoria

**Monitoring marine plastics in Canada's North**

Dr. Max Liboiron, Memorial University

**Ocean observation using microbial genomics: A baseline tool for environmental effects monitoring of marine pollution**

Dr. Casey Hubert, University of Calgary

## MARINE TRANSPORTATION

**Maritime transportation disruption: an integrated assessment for coastal community resilience**

Dr. Stephanie Chang, University of British Columbia

**Modeling ship movements: application for noise exposure to the marine environment**

Dr. Rosaline Canessa, University of Victoria

**Whale Habitat and Listening Experiment (WHaLE): using new technology to locate whales and alert ships**

Dr. Chris Taggart, Dalhousie University

**Integrating the model of sound propagation into the Marine Mammal and Maritime Traffic Simulator**

Dr. Jérôme Dupras, Université du Québec en Outaouais

**Arctic Marine Activities Integration and Synthesis project: Enhancing ocean governance through the Northern Marine Transportation Corridors**

Dr. Jackie Dawson, University of Ottawa

## > RESEARCH CORES

### OBSERVATION CORE

The Observation Core develops data collection instruments and systems, and improves the exchange of data, expertise, and technological developments related to ocean observing in Canada.

#### **DORADO autonomous vehicle development**

Dr. Douglas Wallace & Dr. Mae Seto,  
Dalhousie University

#### **Tethered float developmen**

Dr. Brad deYoung & Dr. Ralf Bachmayer,  
Memorial University

#### **Coastal Ocean Dynamics Application Radar (CODAR) installation, Halifax**

Dr. Brad deYoung, Memorial University &  
Dr. Douglas Wallace, Dalhousie University

#### **Strait of Georgia observations (VENUS Network)**

Dr. Ken Denman & Dr. Richard Dewey,  
University of Victoria, Ocean Networks Canada

#### **Remote sensing support and observations from the Takuvik Research Station**

Dr. Marcel Babin, Université Laval

#### **Atlantic Shelf observations**

Dr. Douglas Wallace, Dalhousie University

#### **Natural sciences data management: expertise, research and support**

Dr. Mike Smit, Dalhousie University

#### **Social sciences data management: expertise, research and support**

Dr. Tony Charles, Saint Mary's University

#### **Technical workshop**

Dr. Brad deYoung, Memorial University

#### **Ocean acidification measurement and instrument sharing**

Dr. Douglas Wallace, Dalhousie University &  
Dr. Ken Denman, University of Victoria



M.Sc. student Megan Dewit (Simon Fraser University) using a terrestrial laser scanner in Davis Bay, British Columbia. Megan is working with MEOPAR PIs Dr. Nick Hedley (Simon Fraser University) and Dr. Nathan Vadebonceour (Community Risk Network) to create 3D models

that will help municipal planners and members of the public understand the risk posed to their communities by coastal flooding. The project is part of MEOPAR's newly established Response Core.

Photo Credit: Spatial Interface Research Lab

### PREDICTION CORE

The Prediction Core improves models to make them more precise, region-specific, and interpretive of socio-economic impacts.

#### **Downscaling from large to small spatial scales**

Dr. René Laprise, Université du Québec à Montréal

#### **Support for the NEMO model**

Dr. Youyu Lu, Dalhousie University / Fisheries and Oceans Canada

#### **Climate change: assessing and visualizing marine risk**

Dr. Ronald Pelot, Dalhousie University

#### **Bio-geochemical model development**

Dr. Jim Christian, University of Victoria / Environment Canada

#### **Socio-economic indicators**

Dr. Stephanie Chang, University of British Columbia

### RESPONSE CORE

The Response Core strengthens connections among MEOPAR's social scientists, increases the Network's focus on policy and impacts, and promotes social science perspectives and approaches throughout the Network.

#### **From computational models to warnings: Communicating flood risk through immersive 3D interfaces**

Dr. Nick Hedley, Simon Fraser University &  
Dr. Nathan Vadebonceour, Community Risk Network

#### **Mitigating social, economic and ecological trade-offs among marine activities in British Columbia's Great Bear Sea**

Dr. Aerin Jacob & Dr. Natalie Ban, University of Victoria

#### **Communicating hurricane risk in Eastern Canada: Enhancing the communication lines between the Canadian Hurricane Centre, municipalities and insurers**

Mr. Paul Kovacs, Institute for Catastrophic Loss Reduction (Western University)

#### **Mitigation of marine noise through strategic marine planning, conservation and management support**

Dr. Lauren McWhinnie & Dr. Rosaline Canessa,  
University of Victoria

#### **Inventory adjustment and resilience interventions Gulf of St. Lawrence pilot project: Serving Quebec**

Dr. Steve Plante, Université du Québec à Rimouski

#### **Evacuating the Halifax Peninsula: Multidisciplinary analysis and training to improve evacuation from coastal floods**

Dr. Kevin Quigley, Dalhousie University

# Financials

The following statements provide an overview of MEOPAR's financial activities for the year (April 1, 2015 – March 31, 2016).

MEOPAR's full set of audited financial statements is publicly available at [www.meopar.ca](http://www.meopar.ca).

## MEOPAR Incorporated Statements of operations and changes in net assets

Year ended March 31	2016	2015
<b>Revenue</b>		
Government assistance – Natural Sciences and Engineering Research Council of Canada (NSERC)	\$ 7,242,584	\$ 6,641,053
Partnership	203,300	57,600
Other	4,914	10,061
	<u>7,450,798</u>	<u>6,708,714</u>
<b>Grants</b>		
Research	4,537,765	4,397,580
Early career	570,863	583,308
Partnership	873,344	352,421
	<u>5,981,972</u>	<u>5,333,309</u>
<b>Excess revenue over grants</b>	<u>1,468,826</u>	<u>1,375,405</u>
<b>Expenses</b>		
Board insurance	15,200	13,851
Contract personnel	-	6,403
Depreciation	3,079	15,360
Marketing and communications	69,492	93,494
Meetings and receptions	14,626	13,427
Miscellaneous	4,992	4,959
Office supplies and administration	41,704	31,121
Outreach and events	32,873	33,372
Printing and publications	1,776	9,537
Professional fees	65,812	28,157
Research management	101,801	62,560
Salaries and benefits	596,105	585,799
Training and knowledge mobilization	403,940	337,440
Travel	108,984	110,032
	<u>1,460,384</u>	<u>1,345,512</u>
<b>Excess of revenue over expenses</b>	<u>\$ 8,442</u>	<u>\$ 29,893</u>
<b>Net assets, beginning of year</b>	<u>\$ 29,893</u>	<u>\$ -</u>
<b>Excess of revenue over expenses</b>	<u>8,442</u>	<u>29,893</u>
<b>Net assets, end of year</b>	<u>\$ 38,335</u>	<u>\$ 29,893</u>

## MEOPAR Incorporated Statement of financial position

March 31	2016	2015
<b>Assets</b>		
<b>Current</b>		
Cash and cash equivalents	\$ 94,151	\$ 44,603
Accounts receivable	20,000	-
Receivable from Dalhousie University	2,256,654	4,394,175
HST receivable	32,552	40,579
	<u>2,403,357</u>	<u>4,479,357</u>
<b>Capital assets</b>	-	3,079
	<u>\$ 2,403,357</u>	<u>\$ 4,482,436</u>
<b>Liabilities</b>		
<b>Current</b>		
Payables and accruals	\$ -	\$ 129,637
Deferred revenue	2,365,022	4,322,906
	<u>2,365,022</u>	<u>4,452,543</u>
<b>Net assets</b>		
Unrestricted net assets	<u>38,335</u>	<u>29,893</u>
	<u>\$ 2,403,357</u>	<u>\$ 4,482,436</u>

## MEOPAR Incorporated Statement of cash flows

March 31	2016	2015
<b>Increase (decrease) in cash and cash equivalents</b>		
<b>Operating</b>		
Excess of revenue over expenses	\$ 8,442	\$ 29,893
Amortization of capital assets	3,079	15,360
	<u>11,521</u>	<u>45,253</u>
<b>Change in non-cash operating working capital</b>		
Receivable from Dalhousie University	2,137,521	1,781,784
Receivables	(20,000)	-
HST receivable	8,027	(25,871)
Payables and accruals	(129,637)	102,648
Deferred revenue	(1,957,884)	(1,853,053)
	<u>49,548</u>	<u>50,761</u>
<b>Investing</b>		
Purchase of capital assets	-	(6,158)
<b>Net increase in cash and cash equivalents</b>	<u>49,548</u>	<u>44,603</u>
<b>Cash and cash equivalents</b>		
Beginning of year	<u>44,603</u>	-
<b>End of year</b>	<u>\$ 94,151</u>	<u>\$ 44,603</u>

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## Summary of cash and in-kind contributions 2015-2016

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	Cash	In-Kind	Total
<b>NCE</b>	<b>\$ 5,258,000</b>	<b>\$ 0</b>	<b>\$ 5,258,000</b>
<b>Non-NCE<sup>1</sup></b>			
Provincial	\$ 19,900	\$ 192,000	\$ 211,900
Federal <sup>2</sup>	\$ 607,865	\$ 2,332,379	\$ 2,940,244
Academia	\$ 766,184	\$ 591,370	\$ 1,357,554
Private Sector	\$ 333,193	\$ 3,190,439	\$ 3,523,632
Others	\$ 434,744	\$ 921,996	\$ 1,356,740
Total Non-NCE	\$ 2,161,886	\$ 7,228,184	\$ 9,390,070
<b>Total NCE and Non-NCE</b>	<b>\$ 7,419,886</b>	<b>\$ 7,228,184</b>	<b>\$14,648,070</b>

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<sup>1</sup> Certain funds contributed by Network Partners to support research projects are forwarded directly to researchers and are not managed by the MEOPAR, Inc. Administrative Centre

<sup>2</sup> These federal contributions do not include contributions received from the Federal granting councils



# MEOPAR

MARINE ENVIRONMENTAL OBSERVATION  
PREDICTION & RESPONSE NETWORK

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