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future ocean
KIEL MARINE SCIENCES



Alexander von Humboldt
Stiftung/Foundation

Research Alumni Conference

"Frontiers in Ocean Sustainability - Co-designing Research and Solutions"

A Perspective from former, current and future Kiel Marine Scientists

September 19 – 21, 2018 | Halifax - Canada

National Research Council of Canada, 1411 Oxford Street, Halifax

organized by the Cluster of Excellence 'The Future Ocean' at Kiel University
under the auspices of the sponsorship programme "Research Alumni Meetings Abroad" administered by
the Alexander von Humboldt Foundation
and funded by the German Federal Ministry of Education and Research



Context

The meeting is a constituent part of the collaborative project "International Research Marketing" which is a joint initiative by the Alexander von Humboldt Foundation, the German Academic Exchange Service, the Deutsche Forschungsgemeinschaft and the Fraunhofer-Gesellschaft. All the activities within the project are part of the "Promote Innovation and Research in Germany" initiative under its brand "Research in Germany". The initiative is funded by the German Federal Ministry of Education and Research.

Welcome

to the second International Alumni Conference of Kiel Marine Research on 'Frontiers in Ocean Sustainability - Co-designing research and solutions - A Perspective from Former, Current and Future Kiel Marine Scientists' jointly organized by the Cluster of Excellence 'The Future Ocean' at Kiel University, and the Ocean Frontier Institute and Department of Oceanography at Dalhousie University, Halifax.

The goal of this conference is to connect Kiel alumni researchers from Canada and the US with the current Kiel marine sciences community for multidisciplinary exchange on solution-oriented research in support of sustainable ocean development. We hope that the symposium will lead to ideas for new lines of inquiry in the field of integrated and transdisciplinary ocean research, as well as enhance community and network building. We are specifically aiming to establish the framework for more joint activities amongst former, current and future Kiel marine scientists and to create an environment that is conducive to further strengthen international collaborations in which the Ocean Frontier Institute is one of our key partners.

We are very pleased that representatives from the Center for Ocean Ventures and Enterprise (COVE) in Halifax are supporting the conference by hosting the third day of the program and sharing their expertise on solution oriented approaches. We also welcome representatives from the State Ministry of Schleswig-Holstein and the German Association for Maritime Technology (GMT) highlighting the special emphasis of the conference on transdisciplinary aspects of marine research. We hope for an inspiring discussion fostering cooperation between science and industry in the maritime sector.

Finally, we are grateful for the financial support provided by a grant from the Alexander von Humboldt Foundation within the framework of the Research Alumni Strategy Campaign, as well as by generous contributions from the Ocean Frontier Institute and the Center for Ocean Ventures and Enterprise. Again welcome to Halifax and productive and inspiring discussions during the conference!

Ralph Schneider
Kiel University

Markus Kienast
Dalhousie University, Halifax

Sponsors and Supporters

The symposium has been generously sponsored by the Alexander von Humboldt Foundation and significantly supported by the Ocean Frontier Institute at Dalhousie University and the Cluster of Excellence “The Future Ocean” at Kiel University.

The Research Alumni Meeting “Frontiers in Ocean Sustainability - Co-designing research and solutions - A Perspective from Former, Current and Future Kiel Marine Scientists” has been organized by the Cluster of Excellence “The Future Ocean” at Kiel University, Kiel, and the Ocean Frontier Institute at Dalhousie University, under the auspices of the sponsorship programme “Research Alumni Meetings Abroad” which is administered by the Alexander von Humboldt Foundation and funded by the German Federal Ministry of Education and Research.

www.research-in-germany.org

www.research-alumni.de



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The Ocean Frontier Institute (OFI) was established in September 2016 thanks to an investment from the Government of Canada (Canada First Research Excellence Fund) and various private and public-sector organizations. OFI is led by Dalhousie University, Memorial University of Newfoundland and the University of Prince Edward Island. As a transnational hub for ocean research, the Ocean Frontier Institute (OFI) brings together researchers from both sides of the North Atlantic to explore and understand our changing ocean and create



safe, sustainable solutions for development. OFI research will improve prediction and projection of ocean conditions, help better manage the ocean's living resources, improve aquaculture's potential to meet global seafood demand, strengthen marine transportation policy and risk reduction, and transform how we monitor the ocean with new data capture and IT tools.

<http://oceanfrontierinstitute.com>

Kiel Marine Science (KMS) is the Centre for Interdisciplinary Marine Science at Kiel University. As one of four priority areas at the University, KMS is the organizational unit of the marine researchers. These are 39 working groups (led by the KMS members) at seven faculties and 18 institutes. KMS working groups cover expertise from areas such as climate research, coastal research, physical chemistry, botany, microbiology, mathematics and computer science, economics as well as law and social sciences.

www.kms.uni-kiel.de



The Cluster of Excellence "The Future Ocean" is an interdisciplinary research group in Kiel with 250 experts in marine science, economics, medicine, math, informatics, law, sociology and art from Kiel University, GEOMAR Helmholtz Centre for Ocean Research Kiel, the Institute for the World



Economy and Muthesius Academy of Arts. They investigate climate and ocean change, evaluate the opportunities and risks of such change and develop sustainable ocean resource management options. “The Future Ocean” is supported within the framework of the ‘excellence initiative’ of the German Research Foundation (DFG) on behalf of the German government and the federal states of Germany.

www.futureocean.org

The Centre for Ocean Ventures & Entrepreneurship (COVE) is a collaborative facility for applied innovation in the ocean sector. Its mission is to propel the ocean economy by providing high quality marine infrastructure and a collaborative space in which a community of ocean enterprises can start, grow and prosper. Members have access to shared equipment and infrastructure, and the resources of the management team to nurture partnerships in forming technology leadership projects. The advances that are developed through COVE will have practical, commercial and revolutionary applications in ocean tech. There is a global need for ocean tech solutions. The impact of what happens at COVE has local, provincial, national and international significance.

<https://coveocean.com>



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Wednesday, 19/9/2018 - Day 1

- 08.30 – 09.00 a.m. Registration and coffee
- 09.00 – 09.20 a.m. Opening Welcome
Alice Aiken, Dalhousie University, Halifax
Ralph Schneider, Kiel University,
Kiel Marine Science
- 09.20 – 09.50 a.m. Cathleen Fisher | *Strengthening international research collaboration: Funding programs and engagement opportunities for research alumni*
- 09.50 – 11.00 a.m. Key note
Rashid Sumaila | *Is the Paris Agreement good for fish, fishers, seafood workers, and consumers?*
- 11.00 – 11.30 a.m. Refreshment break

Session 1: Fisheries and Aquaculture

- 11.30 – 11.45 a.m. Topic Overview (Megan Bailey, Jörn Schmidt)
- 11.45 – 12.00 a.m. Boris Worm | *Fisheries conservation from space*
- 12.00 – 12.15 a.m. Heike Lotze | *Climate change impacts on fish, fisheries and marine ecosystems: Recent results from the Fish-MIP project*
- 12.15 – 12.30 a.m. Biniam Samuel-Fitwi | *Create your own fish farm: A business approach of enabling everyone to produce fish*



12.30 – 12.40 a.m.	<p>Pitch talks</p> <p>Andrea Bryndum-Buchholz <i>Climate change impacts on global fish production – a multi-model analysis on an ocean basin scale</i></p> <p>Martina Stiasny <i>Ocean acidification effects on commercial fish species – from larval ecology to fisheries economics</i></p> <p>Derek Tittensor <i>An introduction to the Fisheries and Marine Ecosystem Model Intercomparison Project (FishMIP)</i></p>
01.00 – 2.00 p.m.	Lunch
	Session 2: 4D Ocean Dynamics
02.00 – 02.15 p.m.	Topic Overview (Birgit Schneider, Markus Kienast)
02.15 – 02.30 p.m.	Caroline Ummenhofer <i>Drivers of multi-decadal variations in upper-ocean heat content in the Indian Ocean</i>
02.30 – 02.45 p.m.	Syee Weldeab <i>Link between Indian Summer Monsoon strengthening and reversals of tropical Indian Ocean SST gradient</i>
02.45 – 03.00 p.m.	Barret Kurylyk <i>Ocean-aquifer mixing on the Scotian Slope: Implications, patterns, and drivers</i>
03.00 – 03.10 p.m.	<p>Pitch talks</p> <p>Stephanie Kienast <i>Organic carbon fluxes in recent sediments from the Labrador Shelf</i></p> <p>Nina Keul <i>Assessing “patchy distribution” of zooplankton biomass using pteropods in the North Atlantic as an example</i></p> <p>Siren Rühs <i>The VIKING family – global ocean general circulation models with an eddy-rich North Atlantic</i></p> <p>Jonathan Durgadoo <i>Considerations for modelling the drift of marine debris</i></p>

- 03.15 – 04.15 p.m. Workshop in World café format, all participants rotate and get different perspectives of the two topics (incl. coffee and cookies)
- 04.30 – 05.00 p.m. Plenary session - Summary of the working groups, presented by the responsible persons of the topic groups.
- 06.00 p.m. Conference Dinner during a harbor cruise
Murphy`s, The Cable Wharf, Halifax



Thursday, 20/9/2018 – Day 2

08.30 – 09.00 a.m.	Morning coffee
09.00 – 09.10 a.m.	Welcome Note Anya Waite, Dalhousie University, Ocean Frontier Institute, Halifax
09.10 – 09.50 a.m.	Partnerships in Marine Research in Kiel and Halifax Ralph Schneider, Kiel Marine Science Douglas Wallace, Ocean Frontier Institute
09.50 – 11.00 a.m.	Key note Aldo Chircop <i>Climate change mitigation and ship emissions. The challenge of reconciling multiple regime ambitions</i>
11.00 – 11.30 a.m.	Refreshment break
Session 3: Ocean Governance and Law	
11.30 – 11.45 a.m.	Topic Overview (Aldo Chircop, Nele Matz-Lück)
11.45 – 12.00 a.m.	Bleuenn Guilloux <i>The relations between ocean and climate legal frameworks: A groping governance in a controversial environment</i>
12.00 – 12.15 a.m.	Erik van Doorn <i>Twenty thousand laws under the sea: How to translate value assessment of seabed resources and risks of exploitation into regulations</i>
12.15 – 12.30 a.m.	Yoshinobu Takei <i>Processes relating to the sustainable development of oceans and seas at the United Nations – potential contributions by marine science and marine scientists</i>
12.30 – 12.45 a.m.	Nengye Liu <i>Regulating China's distant water fishing in polar waters: Interaction between international and domestic law</i>

12.45 – 12.50 a.m. Pitch talks
Scarlett Sett | *Nagoya protocol and ABS regulation 101 - practical implications for microbiologists*
Julia Poertner | *The international law of the sea steps back on land: The cultural ecology of Elisabeth Mann Borgese*

01.00 – 02.00 p.m. Lunch

Session 4: Ocean Observation and Data

02.00 – 02.15 p.m. Topic Overview (Toste Tanhua, Marlon Lewis)

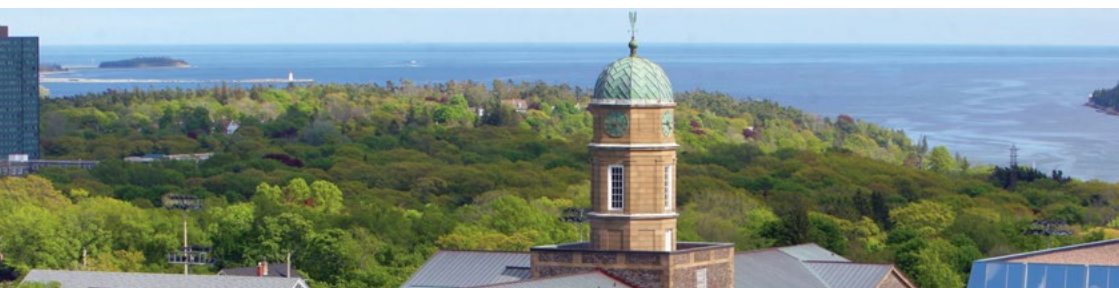
02.15 – 02.30 p.m. Douglas Wallace | *Multidisciplinary ocean time-series: The importance of internationalization and new support structures*

02.30 – 02.45 p.m. Shaomin Chen | *The development of sea surface carbonate chemistry in the coastal upwelling area off Peru following a simulated OMZ upwelling event*

02.45 – 03.00 p.m. Rebecca Scott | *Trans-disciplinary approach to ocean conservation in central West Africa*

03.00 – 03.15 p.m. Cathleen Schlundt | *Visualization of bacterial communities on plastic marine debris using advanced laser scanning confocal microscopy*

03.15 – 03.30 p.m. Pitch talks
Tania Maria Anders | *Ocean Literacy – Making a difference one student at a time*
Julie LaRoche | *Genome sequence and physiology of a novel heterotrophic diazotroph, broadly distributed in the North Atlantic*



Erin Black | *Thorium isotopes as tracers of particulate export and remineralization in the Arctic Ocean*

Lorenza Raimondi | *Multi-decadal variability of anthropogenic carbon dioxide in Central Labrador Sea*

Damian Arévalo-Martínez | *Better, faster, more clean: Perspectives on nitrous oxide measurements in the ocean*

- 03.45 – 04.45 p.m. Workshop in World café format, all participants rotate and get different perspectives of the two topics (incl. coffee and cookies)
- 05.00 – 05.30 p.m. Plenary session - Summary of the working groups, presented by the responsible persons of the topic groups.
- 06.00 p.m. Poster session with finger food and drinks
Dalhousie University, Atrium, Halifax

Friday, 21/9/2018 – Day 3

09.30 – 10.00 a.m.	Morning coffee
10.00 – 10.20 a.m.	Welcome Note Sheila Paterson, Center for Ocean Ventures and Enterprise (COVE) Karin Schwarz, Kiel University
10.30 – 11.00 a.m.	Visit of the COVE facilities
11.00 – 01.00 p.m.	Short presentations Wendy Watson-Wright <i>Ocean Frontier Institute, OFI</i> Gordon Gale <i>Ocean Technology Council of Nova Scotia (OTCNS)</i> Shauna Cotie <i>Nova Scotia Business Inv. (NSBI)</i> Melody Pardoe <i>Canada's Supercluster</i> Lorenza Raimondi, Kirsten Laing <i>Introduction Graduate School Transatlantic Ocean System Science and Technology (TOSST)</i> Steffen Luesse <i>Maritime economy and its opportunities in Schleswig-Holstein</i> Petra Mahnke <i>Introduction of the German Association for Marine Technology</i> Eric v. Doorn, Scarlett Sett <i>Lecture series as a tool to foster transdisciplinarity</i> Anthony Charles <i>Coastal communities and transdisciplinary ocean research</i> Wiebke Müller-Lupp <i>CAPTin Kiel – An example of a transdisciplinary project</i> Biniam Samuel-Fitwi <i>Can scientists be entrepreneurs? The road from the science of farming to business reality</i>
01.00 – 02.00 p.m.	Round table discussion: Existing and future opportunities for knowledge and technology transfer, fostering innovation with best practice examples, open discussion on future collaboration

Thematic introduction of the topic groups

Session 1 – Fisheries and Aquaculture

Chairs: Joern Schmidt, Kiel / Megan Bailey, Halifax

Food from the ocean will play a crucial role in feeding the increasing world population. Aquatic organisms are an important source of nutrition and health for many coastal, but also inland communities, by providing essential micronutrients and animal protein. Fish provides more than 3.1 billion people with almost 20% of their average per capita intake of animal protein. Over 800 million people rely directly or indirectly on fisheries and aquaculture for their income. Moreover, seafood is one of the most traded food commodities worldwide, with more than half of exports by value originating in developing countries. The question is how and to what extent wild capture fisheries and mariculture will contribute in the future to a healthy diet and serve as a source of income. How can food from the ocean contribute in a sustainable way to fulfilling future needs? Improved fishery management approaches and changes in technology, will be required, together with the development of sustainable marine aquaculture. Both the future role of small-scale fisheries to contribute to the well-being of coastal communities as well as the regulation of world markets to allow for just distribution need to be determined.

Session 2 – 4D Ocean Dynamics

Chairs: Birgit Schneider, Kiel / Markus Kienast, Halifax

The ocean plays a crucial role in the climate system, providing a large reservoir for heat, moisture, trace gases and many other substances of climatic relevance. It is a three-dimensional system evolving over time, exchanging energy and matter across its interfaces with the atmosphere and the seafloor. Ocean circulation, which controls the transport of heat, moisture and matter, is not only strongly affected by climate (change), but in turn also shaping climate (change). A key region of the global climate system is the North Atlantic, which is the major uptake area of anthropogenic CO₂ from the atmosphere via gas exchange. Due to the formation of deep waters, large amounts of anthropogenic CO₂ can thus be transported into the ocean

interior and effectively stored away from the atmosphere. It is of societal relevance to estimate the potential future oceanic carbon sink. Therefore, a thorough understanding of the most relevant processes and driving factors of ocean circulation, gas exchange, biological productivity, sediment interaction and their interplay is needed.

Session 3 – Ocean Governance and Law

Chairs: Nele Matz-Lück, Kiel / Aldo Chircop, Halifax

Ocean governance concerns all aspects of influencing human behavior towards ocean utilization. Governance mechanisms or tools comprise inter alia political agenda-setting and implementation, economic drivers, planning as well as legal regulation on different levels. Ocean governance and law should be directed at setting standards and targets that promote ocean sustainability by balancing legitimate interests in using the oceans while maintaining resources at sustainable levels and taking an integrated approach to protecting ocean ecosystems from increasing pressures. While law is only one aspect of ocean governance has relevance on different levels of regulation; from public international law frameworks addressed at States and international organizations to local rules for individuals. While the effectiveness of norms is difficult to measure, it can be assessed to what extent legal regulation adheres to principles that promote sustainability, how they are implemented and what enforcement mechanisms exist. Legal norms can also be discussed from the perspective of environmental ethics and justice, particularly when the effects of climate change on the oceans are taken into consideration.

Session 4 – Ocean Observation and Data

Chairs: Toste Tanhua, Kiel / Marlon Lewis, Halifax

The ocean is the natural system that ultimately provides most of the air we breathe and the fresh water we drink. The ocean is further the primary controller of the global climate that makes this planet habitable for humankind. The ocean is changing, Shrinking ice caps, sea level rise, ocean acidification, degradation of coastal and open-ocean habitats, plastics and other pollutants, over-exploitation of fish populations, the death of coral

reefs, other declines in biodiversity, extreme storms and coastal flooding. For decades, ocean observations have supported a scientific understanding of ocean processes, as well as forecast and warning products. A very broad, but not well-coordinated collection of local, national, regional and international organizations has evolved to address these challenges. The challenge is great. The ocean is vast, variable, an expensive place to operate, and critically under-observed. Understanding, forecasting, and adapting to these growing risks urgently requires that more ocean information are collected, processed and made available in better ways to support multiple users.

A pdf-document containing all of the abstracts from the symposium is available for download on the Future Ocean website: <https://www.futureocean.org/dalconference>



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