Schmidt Ocean Institute planning workshop
"Critical opportunities for advanced shipboard oceanography in 2017"

Steering Committee Members: Dr. Deborah Bronk (*Ocean Sciences Division Director*, National Science Foundation), Dr. Russ Moll (*retired, former Director of California Sea Grant*), Dr. Moninya Roughan *(Senior Lecturer*, The University of New South Wales), and Professor Stefan Williams (*Professor*, Australian Centre for Field Robotics, University of Sydney)

Schmidt Ocean Institute is convening a focused group of international experts in ocean sciences, technologies, and scientific marine operations to identify critical opportunities for technologically advanced shipboard oceanography in the next 3-5 years.

Tuesday August 19, 2014

8:00 am – 8:30 am	Breakfast - HAWAII Meeting Room
	Welcome remarks - Dr. Victor Zykov, *Director of Research*, Schmidt Ocean Institute
8:30 am - 8:50 am	Introductions & Housekeeping - Carlie Wiener, *Communications Manager*, Schmidt Ocean Institute
	Discussion 1 - Chaired by Dr. Moninya Roughan
	What new and emerging societal needs will shipboard oceanography be addressing in the next 3-10 years in the following areas:
8:50 am – 9:10 am	Global change - Prof. Malcolm McCulloch, *Deputy Director,* ARC Centre of Excellence for Coral Reef Studies, The University of Western Australia
	15 min plenary talk + 5 min Q&A
9:10 am – 9:30 am	Marine Pollution - Ms. Julia Reisser, *PhD Candidate,* University of Western Australia
	15 min plenary talk + 5 min Q&A
9:30 am – 9:50 am	Polar Regions - Dr. Phil McGillivary, *US Coast Guard Pacific Area and Icebreaker Science Liaison*
	15 min plenary talk + 5 min Q&A
9:50 am - 10:00 am	Break
10:00 am – 11:45 am	Breakout sessions to discuss and articulate critical societal needs that oceanography will be addressing in 3-10 years

Breakout Session 1: HAWAII Room - Climate Change

This session will focus on identification and definition of emerging societal needs related to climate change that shipboard oceanography will be expected to address in the next 3-10 years. We will discuss issues related to melting polar ice, extreme weather events, and other associated phenomena.

Breakout Session 2: OAHU Room - Fisheries/Sustenance

This session will seek to identify and better define societal needs related to fisheries and marine pollution that shipboard oceanography will be expected to address in the next 3-10 years. We will discuss the threat that fisheries may not be able to provide healthy human sustenance as well as related issues of marine pollution with plastics and radioactivity.

Breakout Session 3: MAUI Room - Ocean Acidification

This session will seek to identify and better define societal needs related to ocean acidification, for example, as a threat to marine ecosystems, that shipboard oceanography will be expected to address in the next 3-10 years.

11:45 am – 12:45 pm	Lunch - HAWAII Meeting Room
12:15 pm – 1:15 pm	(Concurrent with the end of Lunch) Large group reconvenes and breakout groups report summaries of their deliberations
	Discussion 2: Chaired by Prof. Stefan Williams
	What major changes will ocean sciences be experiencing in the next 3-5 years due to the continued technological innovation in the following areas:
1:15 pm – 1:35 pm	Remote sensing - Dr. Euan Harvey, *Professor,* Curtin University 15 min plenary talk + 5 min Q&A
1:35 pm – 1:55 pm	Instrumented robotic platforms - Dr. Luc Rainville, *Senior Oceanographer,* University of Washington 15 min plenary talk + 5 min Q&A
1:55 pm – 2:15 pm	Telecommunications - Dr. Kate Moran, *President & CEO*, Ocean Networks Canada 15 min plenary talk + 5 min Q&A
2:15 pm - 2:30 pm	Break
2:30 pm – 4:15 pm	Breakout sessions to discuss and articulate areas of opportunities for the technological advancement in ocean sciences in the next 3-5 years

	<u>Breakout Session 1: HAWAII Room - Robotic Vehicles</u> *This session will focus on the transformations that ocean sciences will likely be experiencing due to the technological innovation in marine robotics, including AUVs, ROVs, UAVs, ASVs, gliders, long endurance vehicles, and other various systems.* *<u>Breakout Session 2: OAHU Room - Innovation in Sensing</u>* *This session will focus on the transformations that ocean sciences will likely be experiencing due to the advancement of sensing technologies - imaging, acoustic, in-situ, and remote, both with respect to the innovation that may occur in the next 3-5 years and the innovation that needs to/should occur.* *<u>Breakout Session 3: MAUI Room - Observation Networks</u>* *This session will focus on the transformations that ocean sciences will experience due to the advancement in telecommunications and networks that support oceanographic research and their increasing role for future data collection.*
4:15 pm – 5:15 pm	Large group reconvenes and breakout groups report summaries of their deliberations

Wednesday August 20, 2014

8:00 am – 8:30 am	Breakfast - HAWAII Meeting Room Recap of Day 1 (M. Roughan & S. Williams), Introduction to Day 2 (D. Bronk) **Discussion 3: Chaired by Dr. Debbie Bronk** **What critical research and exploration will technologically innovative ship-based oceanography enable in the next 3-5 years in the following fields:**
8:30 am – 8:45 am	Biological Oceanography - Dr. David Karl, *Director,* Center for Microbial Oceanography: Research & Education, University of Hawaii, 10 min plenary talk + 5 min Q&A
8:45 am – 9:00 am	Chemical Oceanography - Dr. Lyndon Llewellyn, *Program Leader, Data Technology and Innovation, Australian Institute of Marine Science* 10 min plenary talk + 5 min Q&A
9:00 am – 9:15 am	Geological Oceanography - Prof. Mike Coffin, *Executive*

	Director, Institute for Marine and Antarctic Studies, University of Tasmania 10 min plenary talk + 5 min Q&A
9:15 am - 9:30 am	Physical Oceanography - Dr. Richard Brinkman, *Lead Physical Oceanographer,* Australian Institute of Marine Science 10 min plenary talk + 5 min Q&A
9:30 am - 9:45 am	Break
9:45 am – 11:30 am	Breakout sessions to discuss and articulate transformative research opportunities for technologically advanced ship-based oceanography in the next 3-5 years *<u>BO Session 1: HAWAII Room - High-resolution data collection</u>* *This session will discuss the role of robotic vehicles serving as infrastructure for persistent high resolution data collection, which may include (but not be limited to) establishing healthy ecosystem networks, ecosystem monitoring, bio-physical interactions, and improved energy harvesting from the ocean.* *<u>BO Session 2: OAHU Room - Multi-scale data collection</u>* *This session will discuss innovative research directions enabled with the advancing innovative multimodal sensor technologies including the fields of marine microbiology and genomics, zooplankton ecosystems - from phytoplankton to fisheries, and/or acoustic monitoring of cetaceans and ocean noise.* *<u>BO Session 3: MAUI Room - Deep Ocean Exploration</u>* *This session will explore frontier oceanography; both in the deep ocean and in remote geographic areas and can include discussions on the exploration and exploitation, as well as topical research such as deep ocean ecosystem responses to climate change and specific geographies such as the Pacific Ocean.*
11:30 am – 12:30 pm	Large group reconvenes and breakout groups report summaries of their deliberations
12:30 pm – 2:15 pm	Lunch - HAWAII Meeting Room
1:30 pm – 1:40 pm	Overview of the critical sea-going research and exploration opportunities from 3rd breakout session - Dr. Bronk
1:40 pm – 2:00 pm	UH Student presentations & Concluding Remarks