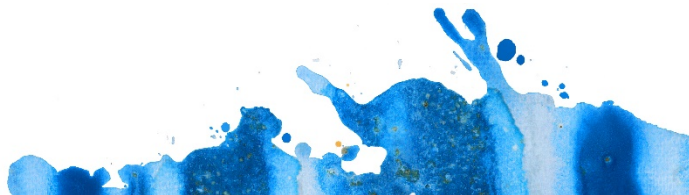


**Oceans in Change** focuses on the importance of research and knowledge as well as responsible communication of topics related to the Oceans. Our Speakers will talk about the importance of how to bring facts to the spotlight and raise empathy for Ocean Issues. Furthermore, they will consider the significance of research based development and investment.

Ocean Week MONDAY 6: <b>OCEANS IN CHANGE</b> <i>Registration Opens 08:30</i>		
Time	Speaker	Topic
<b>PLENARY SESSION MONDAY 6: OCEANS IN CHANGE</b> Chair: Ingrid Schjøllberg, Director NTNU Oceans. Moderator: Nancy Bazilchuk, Scientific Journalist, Communication Division		
10:00	Francesca Thyssen-Bornemisza - Founder and Chair of Thyssen-Bornemisza Art Contemporary (TBA21)	“Sounds Too Many”, performative lecture
10:25	Vidar Helgesen - Norway’s Special Envoy to the High-level Panel on Building a Sustainable Ocean Economy	Ocean health is ocean wealth
10:40	Iselin Nybø - Norwegian Minister for Science and Higher Education	Knowledge for a sustainable ocean economy
<b>10:55-11:20</b>	<b>Ocean Talks:</b> Communication of ocean research and facts. How to bring facts to the spotlight and raise empathy/awareness for ocean issues?  <i>Panelists: Francesca Thyssen-Bornemisza, Founder &amp; Chair of the Thyssen-Bornemisza Art Contemporary; Vidar Helgesen, Norway’s Special Representative for the Ocean; Mathilde Enkerud, President of ISFIT2021; Vegar Johansen, CEO SINTEF Ocean; Ingrid Schjøllberg, Director NTNU Oceans</i>	
11:20	Thierry Béchet - EU Ambassador & Head of the EU Delegation to Norway	Together we take care of our oceans
11:35	Jarl Frijs-Madsen - Ambassador of Denmark	Oceans of energy: A Danish perspective
11:50	Liv-Sissel Hagemann Hammer - Senior Vice President DNB Bank ASA	Banking in change
<b>12:05-12:30</b>	<b>Ocean Talks:</b> The role of international alliances, research, technology, innovation & the arts for a healthy ocean <i>Panelists: Thierry Béchet, EU Ambassador; Jarl Frijs-Madsen, Ambassador of Denmark; Markus Reymann, Director TBA21–Academy; Anna Lim, PhD Candidate Dept. Geoscience &amp; Petroleum; Toril A. N. Hernes, NTNU, Pro-Rector Innovation</i>	
<b>EARTH LAW – Exhibition Area (12:30-12:40)</b> <i>Earth law: Spatial research and advocacy as artistic research tools for expanding the legal protection of the oceans under international justice</i>		
<b>Nabil Ahmed</b> (INTERPRT), postdoctoral fellow, KIT/NTNU <b>Mari Sanden</b> , PhD fellow, KIT/NTNU <b>Florian Schneider</b> – Head of department KIT (Trondheim Academy of Fine Art)		
<b>LUNCH at the Radisson Blu Royal Garden (12:30 – 13:30)</b>		

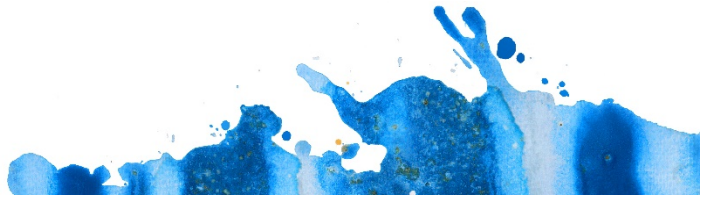


**MONDAY May 6 – AFTERNOON PARALLEL SESSIONS**

1. **Technology and New Solutions in our Oceans**
2. **Other Voices, Other Stories**
3. **Exploring the Poles – Research to Action**

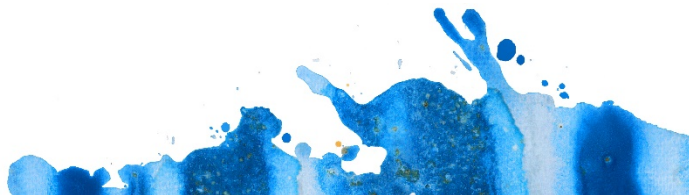
**Technology and new solutions in our Oceans** focuses on the positive and necessary application of research based new technology for a sustainable interaction with our Oceans. Our speakers will present new research and innovation opportunities. Discussion will unfold under the concept of responsible technological development.

PARALLEL SESSION MONDAY 6: <b>TECHNOLOGY AND NEW SOLUTIONS IN OUR OCEANS</b>		
Moderator: Ingrid Schjøllberg, Director NTNU Oceans		
Time	Speaker	Topic
13:30	Knut Thomas Kusslid, Director Trondheim Port Authority	Technological solutions for new harbours
13:45	Vegar Johansen - CEO SINTEF Oceans	Innovative solutions based on reliable science, a sustainable business
14:00	Olav Bolland - Dean of the Faculty of Engineering, NTNU	Is technology a positive driver of sustainability?
14:15	Elisabeth Maråk Støle - Director NORCE Norwegian Research Centre AS	An ocean of opportunities – responsible observation, prediction and decision
14:30	Tonje Eskeland Foss - Regional Director, North, ATEA	Does data driven insight create sustainability in your value chain?
14:45	<b>Oceans Talks</b> Towards a blue-green economy: Collaboration across sectors. Knut T. Kusslid, Vegar Johansen, Olav Bolland, Elisabeth M. Støle, Tonje E. Foss	
15:05	<b>BREAK</b>	
15:35	Ståle Emil Johansen, Dept. of Geoscience and Petroleum, NTNU	Electromagnetic detection of mineral resources: A sustainable solution to exploration
15:50	<i>PhD Pitch Session:</i> Anna Lim, Dept. Geoscience & Petroleum;  Bent Haugaløkken, Dept. Marine Technology; Øystein Sture, Dept. of Marine Technology	Multi-scale geophysical data interpretation to aid effective exploration; SEARM - An underwater manipulator arm for small underwater vehicles; Application of underwater hyperspectral imaging on seafloor massive sulphides
16:05	Steffan Lindsø, Director of Emerging Technology, Oceaneering Europe	New autonomous systems for subsea inspection
16:20	João Borges de Sousa, LSTS - Porto University	Exploring the Northern Pacific subtropical front with multiple robots



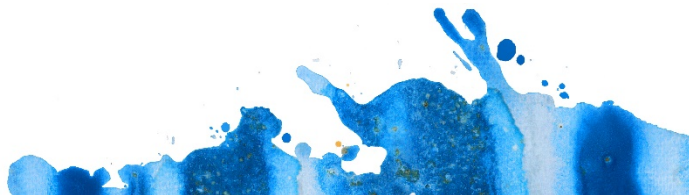
16:35	Christopher Harman, Research Director NIVA	Autonomous monitoring systems for a sustainable ocean
16:50	Asgeir Sørensen, NTNU AMOS	Resident underwater vehicles - the next frontier for efficient underwater operations
17:05 17:30	<b>Oceans Talks:</b> Business development in ocean technology. <i>Panelists:</i> Helle Moen, Regional Director EGGs Design; Liv-Sissel H. Hammer Senior Vice President, DnB Bank ASA; Clara Gonçalves, Executive Director Science and Technology Park - University of Porto	

OTHER EVENTS - MAY 6: <b>OCEAN WEEK DEMO</b> Brattørkaia (18:00h-19:30h)		
18:00	Welcome to Ocean Week Demo - Ingrid Schjøberg	
Time	Company/Speaker	Technology
18:05	Maritime Robotics, Eirik Hovstein	Seabed mapping using Otter USV
18:10	Kongsberg Seatex AS, Kjell Kristiansen	Autonomous sensor testing platform
18:15	Blueye Pioneer, Erik Byrkoren	Blueye Pioneer: Premium underwater drone
18:20	Water Linked, Oliver Skisland	Underwater GPS and wireless communication
18:25	NTNU LAUV, Trygve Fossum	Autonomous underwater vehicles
18:30	Milliampere, Egil Eide	Electric autonomous passenger ferry
18:35	AutoNaut, Alberto Dallolio	Green energy wave-powered ASV
18:40	Saro, Bent Haugaløkken	Searm
18:45	<b>Demo Starts</b>	
19:15	Asgeir J. Sørensen /// Martin Ludvigsen, NTNU – Closure	



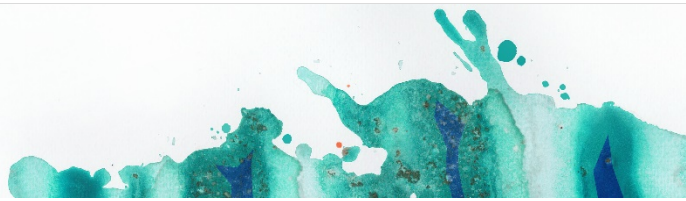
**Other Voices, Other Stories:** The Ocean nourishes and sustains not only human life, but all life on Earth. But what can we do to nourish and sustain the ocean? How have humans constructed and represented their relationship to the ocean through the stories we tell about it? How do ocean narratives help us to understand the relationship between our ocean stories and the environmental challenges we now face: climate change, pollution, extinctions, sea level rise, environmental justice, food insecurity, and more? How do the humanities provide new approaches to interpretations, representations, imagination and new understandings of ocean narratives? This session is organized by HAVANSVAR Humanities Ocean Initiative – an NTNU Oceans Pilot on Ethical, Social and Cultural aspects of Ocean Research & Innovation.

PARALLEL SESSION MONDAY 6: <b>OTHER VOICES, OTHER STORIES</b>		
Moderator: Siri G. Carson, NTNU leader of HAVANSVAR Humanities Ocean Initiative		
Time	Speaker	Topic
13:30	Siri G. Carson, leader of HAVANSVAR, NTNU	HAVANSVAR & Ocean Week
13:40	Ursula Munster, Director Environmental Humanities School at UiO	Surviving in a sea of plastic: Biographies of marine life in the anthropocene
14:00	Markus Reymann – Director TBA21 Academy	TBA21 Academy
14:15	Julia Leyda, Dept. of Art and Media Studies, NTNU	Oil, ocean, and the climate unconscious in Norwegian scripted television
14:30	<b>Ocean Talks:</b> Interdisciplinary work for ocean sustainability, the role of humanities and arts <i>Panelists: Ursula Munster; Markus Reymann; Julia Leyda; María Azucena Gutiérrez Glez, NTNU Oceans</i>	
14:55	<i>PhD Session:</i> Kim Kirsten Ménage Widar Aalrust Kristoffersen	Perverting plastics Futures past: The history of Norwegian aquaculture research
15:05	<i>BREAK</i>	
15:35	Martin Lee Mueller, Associate Professor, Rudolf Steiner University Colleague	Being Salmon, Being Human
15:50	Anne Trine Kjørholt, Leader Norway as a Sea Nation, NTNU.	“The sea, the boat and the fish”. Coastal childhood work and knowledge in transition
16:05	Hanna Musiol, Dept. of Language and Literature, NTNU	<i>Plotting</i> futures: Hydro fiction, zones of sacrifice, and ecological imagination
16:20	Kaja Lønne Fjærtøft, Passion for Ocean	Beneath the surface
16:35	Anna Madlener, Robotics at KTH Stockholm;  Elisabeth Stubberud, Norway as a Sea Nation, NTNU	Synergetic ocean immersion: Music, art and robots; Narratives of integration and belonging in a fjord village in Finnmark
16:45 - 17:15	<b>Oceans Talks:</b> Innovation in arts, humanities and social sciences – An ocean perspective <i>Panelists: Kaja Fjærtøft; Hanna Musiol; Dagfinn Døhl Dybvig, innovation leader at the faculty of humanities, NTNU</i>	
18:00-19:30	OTHER EVENTS - MAY 6: <b>OCEAN WEEK DEMO</b> Brattørkaia	



**Exploring the Poles – Research to Action** focuses on the great significance of the Arctic and Antarctic both for observation of climate change and for its impact on the overall Ocean Health. The Speakers will discuss the effects of climate change & the actions imperative to reduce human impact.

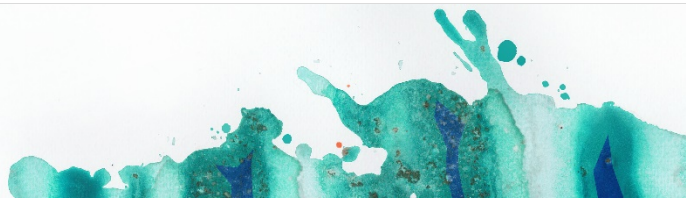
PARALLEL SESSION MONDAY 6: <b>EXPLORING THE POLES – RESEARCH TO ACTION</b>		
Moderator: Tore Aunaas, SINTEF Ocean		
Time	Speaker	Topic
13:30	Geir W. Gabrielsen, Head Environmental pollution section, Norwegian Polar Institute	Microplastics in the Arctic
13:50	Susan R. Eaton, Founder & Leader, Sedna Epic Expedition	Bringing the ocean to eye level: Empowering the next generation of Inuit women leaders in the Arctic
14:05	Ingrid Ellingsen, Environment and New Resources SINTEF Ocean	Polar ocean circulation
14:20	Chantel Nixon, Dept. of Geography, NTNU	Gas hydrates in the Barents Sea
14:35	Emlyn Davies, Environment and New Resources SINTEF Ocean	Monitoring the Arctic
14:50	Pitch session: Nicolas Sanchez, Dept. of Chemistry;  Martina Lan Salomon, Dept. Environmental & Civil Engineering; Glauca Moreira Fragoso, Department of Biology	Bi-polar biogeochemistry; Trace metals role in marine life in a changing Arctic and Antarctic ecosystem; The mysterious interaction between ice and oil; Functional role of phytoplankton communities in a changing climate
15:05 – 15:35	<i>BREAK</i>	
15:35	Liv-Guri Faksness, Environment and New Resources SINTEF Ocean	Oil spills in the Arctic: Are we prepared?
15:50	Arthur Mason, Dept. of Social Anthropology, NTNU	New Arctic: Expressions of neoliberal interest in the wake of Exxon Valdez oil spill
16:05	Dag Ottesen, Researcher NGU	The Weddell Sea expedition 2019, Antarctica. Preliminary scientific results
16:20	Ida Øverjordet, Environment and New Resources SINTEF Ocean	Pollution: Fat matters
16:35	Bjørn Munro Jensen, Dept. Biology, NTNU	Pollutant trends in the Arctic
16:50 – 17:15	<b>Oceans Talks:</b> The poles and climate change: How to communicate and inspire action  <i>Panelists: Geir W. Gabrielsen; Irina Rogozhina, Dept. of Geography, NTNU; Ramón Larramendi, Project Leader Inuit Windsled Antarctic expedition; Nils A. Røkke, Executive Vice President Sustainability, SINTEF</i>	
18:00-19:30	OTHER EVENTS - MAY 6: <b>OCEAN WEEK DEMO</b> Brattørkaia	



**Policies and Other Initiatives for a Fragile Living Ocean** focuses on the efforts that Industry, Institutions and research make to preserve our fragile Oceans and the knowledge that we need for a better decision-making process for all Ocean related activities.

<b>PLENARY SESSION TUESDAY 7: POLICIES AND INITIATIVES FOR A FRAGILE LIVING OCEAN</b> Chair: Ingrid Schjølberg, Director NTNU Oceans. Moderator: Nancy Bazilchuk, Scientific Journalist, Communication Division		
Time	Speaker	Topic
<i>Registration Opens 08:00</i>		
09:00	Alan Simcock, Joint Coordinator at UN Group of Experts of the Regular Process (World Ocean Assessment)	Sustainability for 7/10ths of the planet: the United Nations' first global integrated marine assessment and the 2030 sustainability goals
09:20	Harald Solberg CEO Norwegian Ship-owners Association	Sustainable shipping
09:35	Bjørn Haugland, CEO Norway203040	Ocean sustainability. Leadership, collaboration & innovation
09:50	Anna Mária Sikó, Ambassador of Hungary	All waters lead to the ocean. Water initiatives of a country far from the shores
10:05	Bozena Michalowska-Jach, First Counselor Embassy of the Republic of Poland	Synergy in diversity: Creativity, safety and cooperation as pillars of effective seas and oceans management
10:20	Richard Thompson, Director of the Marine Institute - University of Plymouth	Marine litter: Are there solutions to this global environmental challenge?
10:35	Ramón Larramendi; Project Leader Inuit Windsled Antarctica expedition	The Inuit Windsled project. The first zero emission platform for continental Antarctic research
<i>10:50-11:00 – Arrival to Conference Venue of His Majesty King Harald visiting NTNU on May 7 during Ocean Week 2019</i>		
11:00	Ingrid Schjølberg, Director NTNU Oceans	Technology for sustainable use of the oceans
11:10	Allan Ellingsen, State Secretary at the Ministry of Transport and Communications	The Norwegian government's strategy for sustainable sea transport
11:20	NTNU Students: Maria G Digernes Brage Sæther	Sailing for science (S4S); Autonomous passenger ferries: Revitalizing urban waterways
<b>11:30-11:45</b>	<b>Ocean Talks:</b> Research and education for join international actions for a sustainable ocean. <i>Panelists:</i> Dag Rune Olsen, Rector University of Bergen; Andreea Strachinescu, Head of Unit, Maritime Innv., Marine Knowledge & Invst. DG Mare; Waldemar Coutts, Ambassador of Chile; Alexandra Bech Gjørsv, President & CEO SINTEF; Gunnar Bovim, Rector NTNU	



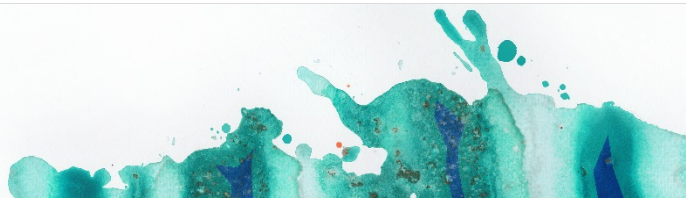


<i>11:45-11:45 His Majesty King Harald visits Ocean Week Stands</i>		
11:45	Jan-Gunnar Winther, Director Norwegian Centre for the Ocean and the Arctic, NOFIMA & Specialist Director Norwegian Polar Institute	Sustainable blue economy in the Norwegian Arctic: A foresight for 2030 and 2050
<b>12:00-12:20</b>	<b>Ocean Talks: Oceans and Climate Change</b> <i>Panelists: Alan Simcock, Joint Coordinator at UN Group of Experts of the Regular Process; Richard Thompson, Director of the Marine Institute - University of Plymouth; Jan-Gunnar Winther, Director Norwegian Centre for the Ocean and the Arctic; Susan R. Eaton, Founder &amp; Leader, Sedna Epic Expedition</i>	
12:20-12:30	<i>Being Salmon, Being Human – Teaser of the performance</i>	
<b>LUNCH 12:30-13:30</b>		

**TUESDAY May 7 – AFTERNOON PARALLEL SESSIONS**

1. Coastal Engineering Crossing Over
2. New Biomarine Value Chains Based on Resources Low in the Food Chain
3. Green Energy Impacts on a Blue Ocean

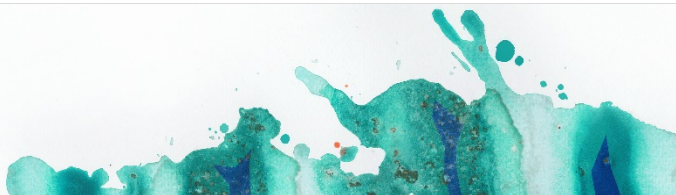
<b>OTHER EVENTS OCEAN WEEK - Radisson Blu Royal Garden</b>	
17:10 – 17:40	<b>Reception and mingling</b> Oceans’ Jazz: <b>JUNO</b> in collaboration with Trondheim Jazz Festival Line up: Thea Ellingsen Grant, vocal; Malin Dahl Ødegård, vocal; Mona Krogstad, tenor saxophone; Georgia Wartel Collins, upright bass; Ingvald Vassbø, drums
17:40 – 19:10	<b>Being Salmon, Being Human – The performance</b> Norwegian-British storyteller Georgiana Keable, Renowned Sami Joiker and Composer Torgeir Vassvik; Author and Environmental Philosopher Dr. Martin Lee Mueller



**Coastal Engineering Crossing Over** focuses on innovation linked to coastal development and the use of coastal resources.

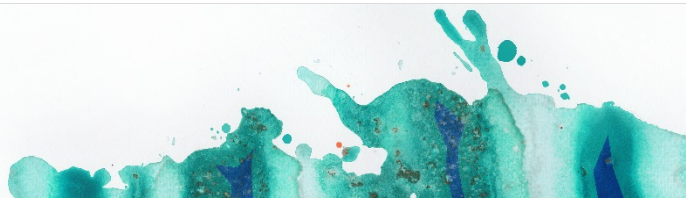
PARALLEL SESSION TUESDAY 7: <b>COASTAL ENGINEERING CROSSING OVER</b> Moderator: Hans Bihs, Dept. Civil and Environmental Engineering, NTNU		
Time	Speaker	Topic
13:30	Hans Bihs, Dept. Civil and Environmental Engineering, NTNU	Welcome
13:35	Athul Sasikumar, Norconsult	New design innovations and modeling approaches in coastal engineering
13:50	Bruno Sainte-Rose, Lead Computational Modeler at The Ocean Cleanup	Computer models to help clean the oceans
14:05	Kjersti Bruserud, Management assistant/advisor to Chief Technology Officer (CTO) Equinor	Perspectives on technology collaboration for shallow waters
14:20	Nils Goseberg, TU Braunschweig/GWK	The future of experiments in coastal engineering
14:35	Arun Kamath, Dept. Civil and Environmental Engineering, NTNU	Cutting-edge aquaculture structure hydrodynamics - from research to teaching
14:50	Csaba Pakozdi, SINTEF Ocean	Future wave hydrodynamic modeling needs for the Norwegian offshore industry
15:05 – 15:35	<i>Break</i>	
15:35	Claes Eskilsson Ålborg University/RISE Gøteborg	On the wave energy research and development in Sweden
15:50	Knut V. Høyland, Dept. Civil and Environmental Engineering, NTNU	Arctic coastal engineering
16:05	Marit Reiso, SAP	Physics based digital twins in the ocean space
16:20	<b>PhD pitch:</b> Tobias Martin, Dept. Civil & Environ. Engineering;  Weizhi Wang, Dept. Civil & Environ. Engineering; Sungsoo Lim, Dept. Civil & Environ. Engineering;	Modelling the interaction of moored-floating structures and waves in a 3D numerical wave tank using CFD; Efficient wave modelling cascade for multi-scale coastal hydrodynamics; Numerical modelling of elastic fluid-structure interactions for aquaculture applications
16:35– 17:00	<b>Ocean Talks</b>	
17:10-19:10	<b>Other Events MAY 7</b> After sessions reception and mingling Oceans' Jazz: JUNO in collaboration with Trondheim Jazz Festival Being Salmon, Being Human – The Performance	





**New Bio Marine Value Chains Based on Resources Low in the Food Chain** addresses the potential for establishing new bio marine value chains through exploitation of low-trophic species from the oceans. Solutions on how to develop circular bio economy and produce more food, feed and materials for a growing population will be presented.

PARALLEL SESSION TUESDAY 7: <b>NEW BIO MARINE VALUE CHAINS BASED ON RESOURCES LOW IN THE FOOD CHAIN</b> Moderator: Berit Løkensgard Strand, NTNU; Ana Karina Carvajal, SINTEF		
Time	Speaker	Topic
13:30	Berit Løkensgard Strand, NTNU; Ana Karina Carvajal, SINTEF Ocean	Welcome
13:35	Karl Almås, SINTEF Ocean	Prospects for new marine value chains
13:50	Lotte Skolem, Director Product & Technology, Aker BioMarine	How to create business value from krill
14:05	Kurt Tande, Chief Technology Officer Calanus	Sustainable harvesting and biorefining of the marine zooplankton Calanus finmarchicus
14:20	Stein Kaartvedt, Dept. of Biosciences University of Oslo	Abundance and distribution of mesopelagic fish
14:35	Hanne Digre, Research Director, SINTEF Ocean	Novel technologies for sustainable harvesting and processing of underutilized marine resources
14:50	Nils Christian Steig, Managing Director, SpermVital	Prolonging the life span of semen with an alginate based technology
15:05 – 15:35	<i>Break</i>	
15:35	Andreas Hagemann, SINTEF Ocean	PLANKTONLAB: Norwegian center for plankton technology
15:50	Terje Finstad, Dept. of Interdisciplinary Studies of Culture, NTNU	Seaweed as horizon resource in blue imaginaries, Norway 1950s to 2000s?
16:05	Philip D. Rye, Chief Scientific Officer, AlgiPharma	Seaside to bedside: A pharmaceutical application
16:20	Finn Aachmann, Dept. of Biotechnology, NTNU	Norwegian seaweed processing platform
16:35	<b>PhD pitch session:</b> Haiqing Wang, Department of Biology;  Margrethe Gardlø, Dept. of Biotechnology and Food Science; Daria Zaytseva-Zotova, Dept. of Biotechnology & Food Science	Waste from land based salmon farm recycled by polychaete; Design of marine polymers: Studying alginate epimerases; From seaweed to human tissue: Alginate in tissue engineering
17:00	<b>Close session – Conclusions</b>	
17:10-19:10	<b>Other Events MAY 7</b> After sessions reception and mingling Oceans' Jazz: JUNO in collaboration with Trondheim Jazz Festival Being Salmon, Being Human – The Performance	



**Green Energy Impacts on a Blue Ocean** focuses on what will the development of green energy sources and new technologies mean in terms of the impact that these could have in our Oceans and the development of the blue economy. Our speakers will present the latest developments in energy technology and initiatives for international collaborations.

PARALLEL SESSION TUESDAY 7: GREEN ENERGY IMPACTS ON A BLUE OCEAN		
Time	Speaker	Topic
13:30	Johan Einar Hustad, Director NTNU Energy	NTNU: Research efforts on renewable energy
13:40	Andreea Strachinescu, Head of Unit, Maritime Innovation, Marine Knowledge and Investment, in the Directorate General for Maritime Affairs and Fisheries	Innovative investments for our future ocean
13:55	Tor Eldevik, University of Bergen, Geophysical Institute	Energy-climate balance, finding the right formula
14:10	Bente Pretlove, Program Director, Ocean Space DNV GL Group Technology and Research	Clean shipping for sustainable oceans
14:25	Henriette Undrum, Vice President Technology Management TPD R&T FVC/New Energy Solutions Equinor	Offshore wind: New opportunities in the ocean environment
14:40	<b>Ocean Talks</b> – Energy-climate balance Tor Eldevik, Janne Harstad Rasten & Hildegunn Blindheim, Director climate and the environment Norsk Olje&Gass	
15:10 – 15:35	<i>BREAK</i>	
15:35	Janne Harstad Rasten, Senior Vice President, Head of Products Norway Aker Solutions	Offshore wind
15:50	Elisabetta Tedeschi, Dept. of Electric Power Engineering, NTNU	Large-scale offshore electric grids: Perspectives and challenges
16:05	Anders Valland, Anders Valland SINTEF Ocean	Reducing cruises emissions to world heritage fjords
16:20	Trond Strømgren, Subsea Innovator at GCE Ocean Technology	Marine energy, hydrogen and zero emission propulsion
16:35	Ingrid B. Utne, Dept of Marine Technology, NTNU	Safety and emergency preparedness of cruise ships in Norwegian waters
16:50	Erick Fernando Alves, Dept. of Electric power Engineering Atousa Elahidoost, Dept. of Electric power Engineering  Spyridon Chapaloglou, Dept. of Electric power Engineering  Seok Ki Moon, Dept. of Geoscience and Petroleum	Enabling the power of wind for oil and gas platforms; Model-based design and optimization of offshore HVDC grids; Energy management and control of offshore platforms integrating renewable energy; Improved planning methods for more energy efficient & environ. friendly fields in the Barents Sea



**WEDNESDAY May 8 – ALL DAY PARALLEL SESSIONS**

1. **Life Cycle Thinking in Deep-Sea Mining**
2. **Aquaculture in Society – How to Match the UN SDGs?**
3. **Ocean Health**
4. **Autonomous Ships**

**Life Cycle Thinking in Deep-Sea mining** focuses on the interrelationship between deep-sea mining and sustainability. Our speakers will try to answer question as: Can deep-sea resources contribute to sustainable *development*, and how do we make deep-sea mining sustainable? How life cycle thinking can contribute to sustainable deep-sea mining? Generally applied in support of technology development and environmental management, life cycle thinking also forms the basis for environmental legislation in Europe and Norway. Deep-sea mining in Norwegian and international waters will occur in harsh conditions, where Arctic marine operations and offshore oil and gas provide highly relevant experience. Our speakers bring together experience in life cycle thinking in legislation as well as offshore and mining industries.

PARALLEL SESSION WEDNESDAY 8: LIFE CYCLE THINKING IN DEEP-SEA MINING		
Time	Speaker	Topic
<i>Registration Opens 08:00</i>		
09:00	Steinar Løve Ellefmo, NTNU	UN sustainable development goals and deep sea mining: An introduction
<b>Can deep-sea resources contribute to sustainable development?</b>		
09:10	Donald Singer, Consultant, Resource geologist	Future copper supplies
09:35	Johan Berg Pettersen, Dept. of Energy and Process Engineering, NTNU	Life cycle thinking in industrial development
09:55	Daniel Müller, Dept. of Energy and Process Engineering, NTNU	Circular economy: Metals in society, stocks and flows
10:15	<i>Break</i>	
10:45	Heidi R. Nilsen, Dept. Philosophy & Religious Studies, NTNU	Crossing the planetary boundaries. Consequences for sustainability and DSM?
11:05	Tom Heldal, Researcher NGU	Minerals and metals - what society will need and the earth can give
11:25	PhD pitching session: Aravinda Perera, Dept. of Electric Power Engineering Dmitry Shcherbin, Dept. of Chemistry Espen Dyrnes Stabell, Dept. of Philosophy and Religious Studies	Reliable motor drives, the key to sustainable mining;  Where's the plume gone?;  The need for minerals
11:35	<b>Ocean Talks (panel):</b> Can deep-sea resources contribute to sustainable development?	



<b>12:00</b>	<i>LUNCH</i>	
	<b>What is a sustainable deep-sea mining value-chain?</b>	
13:00	Stephen Northey, Dept. of Civil Engineering Monash University	A life cycle perspective on the trade-offs between land and deep sea resource extraction
13:20	John Eirik Paulsen, Eni Norge AS	Experiences from implementing life cycle management in offshore drilling operations
13:40	Paul Midford, Dept. of Sociology and Political Science, NTNU	East Asian maritime conflicts and UNCLOS: Can Japan's deep sea mining be sustainable?
14:00	Renee Grogan, Gro Sustainability Pty Ltd	Sustainable deep sea mining. A contradiction in terms?
14:20	Rolf Arne Kleiv, Dept. of Geoscience and Petroleum, NTNU	Classification of DSM processing concepts as a tool for environmental impact assessment
<b>14:40</b>	<i>Break</i>	
15:10	Francesca Verones and John Woods, Dept. of Energy and Process Engineering, NTNU	Understanding the ecological consequences of deep sea mining
15:30	Jens Laugesen, Chief Specialist Environment, DNV GL	Risk assessment methods for deep sea mining
<b>15:50 – 16:20</b>	<b>Ocean Talks:</b> Can the deep-sea mining value-chain be sustainable?	



### Aquaculture in Society – How to Match the UN SDGs?

Aquaculture is an important contributor towards the achievement of many of the SDGs defined by the UN. During this session, researchers, PhD students and experts from the sector will present technologies, insights and potential solutions for a sustainable development of the aquaculture industry and of the coastal societies that largely depend on it. Its focus will be on five of the major development goals of relevance to producing food from the oceans.

PARALLEL SESSION WEDNESDAY 8: <b>AQUACULTURE IN SOCIETY – How to match the UN SDGs</b>		
Time	Speaker	Topic
<i>Registration Opens 08:00</i>		
<b>GOAL 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture</b> <b>GOAL 3: Ensure healthy lives and promote well-being for all at all ages</b>		
09:00	Welcome by Eva Falch, Vice Dean, Education & Innovation NTNU Faculty of Natural Sciences	
09:05	Waldemar Coutts Ambassador of Chile	Sustainability efforts by the Chilean salmon industry
09:15	António Quinteiro Nobre Ambassador of Portugal	Aquaculture in Portugal: present and future
09:25	Ragnar Tveteraas, University of Stavanger (UiS)	Aquaculture as an active contributor to reaching the UN SDGs
<b>GOAL 9: Build resilient infrastructure, promote inclusive &amp; sustainable industrialization &amp; foster innovation</b>		
09:50	Hans Bjelland, SINTEF Ocean	Novel aquaculture production systems in the coastal zone
10:05	Eivind Dale, DNV-GL	Sustainable logistics– results from a pilot study
10:20	<i>Coffee Break</i>	
10:45	Martin Føre, NTNU AMOS	Aquaculture cybernetics – increasing the control in fish production through improved precision and new technologies
11:00	Rune Wilhelmsen, Business Manager Smart Aquaculture at Telenor	Communication in aquaculture
11:15	Maria Bergvik, Planktonic	Innovative feed solutions in a global market
11:30	PhD pitching session: Hans Tobias Slette, EXPOSED;  Tale Skrove, Dept. of Biology; Kristbjörg Edda Jónsdóttir, Dept. of Engineering Cybernetics	Simulation of vessel operations in exposed aquaculture for improved logistics support; Managing water column effects of aquaculture;  Applying fish welfare parameters to classify ocean current speeds at aquaculture sites
11:45	Student innovation Believing in blue – Artfish use nature to ensure ocean farming future	
12:00	<i>LUNCH</i>	
<b>GOAL 12: Ensure sustainable consumption and production patterns</b>		
13:00	Anette Grøttland Zimowski, Norwegian Seafood Council	Brand building and mythbusting: communicating sustainable Norwegian aquaculture across the world



13:15	Helen Ann Hamilton, Dept. of Energy & Process Engineering, NTNU	Aquaculture's footprint: research tools and methods – globally
13:30	Anne Hilde Midttveit, Lerøy Seafood Group	World's best protein producer from a sustainability perspective
13:45	Shraddha Mehta, SINTEF Ocean	The environmental footprint of seafood production
14:00	PhD pitching session: Vilde Steiro Amundsen, Social Anthropology;  Inka Seekamp, Dept. of Biology;  Siv Anina Etter, Dept. of Biology;  Frank Thomas Mlingi, Dept. of Biology	Navigating through a sea of indicators: The impression, implementation and impact of sustainability certification for aquaculture;  Integrated multi-trophic aquaculture – combining salmon and red algae cultivation;  Cultivation potential of macroalgae species integrated with open Salmon fish Aquaculture;  Using photoperiod and temperature regimes for management of sexual maturation in lumpfish ( <i>Cyclopterus lumpus</i> )
14:20	<b>Ocean Talks - Moderators Kjell Inge Reitan &amp; Alexandra Neyts</b>	
14:40	<i>Coffee Break</i>	
<b>GOAL 11: Make cities and human settlements inclusive, safe, resilient and sustainable</b>		
15:10	Svein Johan Frisvoll, Research Manager Ruralis	Aquaculture and its need for social legitimacy
15:25	Marit Kvernmo, BDO Norway	Smart cities in a global setting of sustainability
15:40	Morten Wolden, Rådmann Trondheim Municipality	The importance of aquaculture for Trondheim's municipality
16:00	<i>Close and Walk to boat terminal (Brattørkaia)</i>	

The **Norwegian Salmon Industry** started off at the islands of Hitra & Frøya.

The Mid-Norwegian region is still one of the most productive areas in Norway, thanks to very suitable natural conditions and to people with entrepreneurial capacities. Innovative solutions and disruptive technologies are being rapidly implemented in aquaculture farms and hence contribute to tackle the challenges on the sector. Participants at the excursion will get the chance to visit a state-of-the-art salmon cage farm at sea and a fish processing plant. The latter was established only in 2018 and has taken into use a variety of automated systems along the processing chain.

***Join us for a visit to the idyllic islands! Enjoy its unique seafood, meet the local business people, and feel the touch of aquaculture out on a sea cage.***

<b>ADDITIONAL PROGRAM AQUACULTURE HITRA FRØYA – Evening May 8 - May 9</b>	
<b>Program</b>	<b>Content</b>
May 8	16:30 – Departure from Trondheim by boat
	19:30 – Dinner at the hotel in Frøya, Sistranda
May 9	08:30 – Aquaculture Site excursion - Visit to a sea-based salmon production unit and to a salmon processing plant 15:30 – Arrival in Trondheim





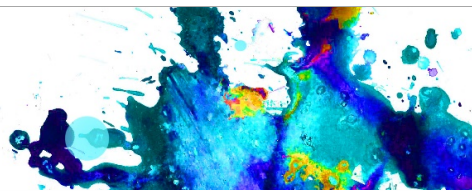
**Ocean Health** focuses on the changes faced by our Oceans due to climate change. How could humans reach a better understanding on how to interact with the Oceans without leaving a negative environmental print? Can we help restore the Ocean health, and how can research help.

PARALLEL SESSION WEDNESDAY 8: <b>OCEAN HEALTH</b>		
Time	Speaker	Topic
<i>Registration Opens 08:00</i>		
09:00	Mimmi Throne-Holst, SINTEF Ocean	Introduction
09:15	Nina Jensen CEO RevOcean	Ocean health: Challenges and solutions
<b>Climate Change and Ocean Health</b>		
09:45	Helene Muri, Dept. of Energy and Process Engineering, NTNU	Expected changes to oceans and ocean health, according to the IPCC special report on global warming of 1.5C
10:00	Anne Deininger, University of Agder	Coastal darkening: How does this affect ocean health?
10:10	<i>Coffee Break</i>	
<b>Legacy Contaminants</b>		
10:45	Murat Van Ardelan, NTNU	Contaminants, when and where?
11:00	Marianne Olsen, Senior Research Scientist NIVA	Legacy mercury contaminated seabeds: Should we take remediation action or not?
11:15	Alexandros Asimakopoulos, Department of Chemistry, NTNU	Legacy POP's: A cocktail challenge
11:30	PhD pitching session: Annie Vera Hunnestad, Dept. of Chemistry; Mathew Kuttivadakkethil Avarachen, Dept. of Biology; Stian Løkken Myrvold, Dept. Biology	It's not easy being green: The struggles of cyanobacteria in an ever changing ocean; Role of bacteria in biological carbon pump; GoJelly: Driving mechanisms and predictions of jellyfish blooms
11:45	<b>Ocean Talks</b> - Q&A session with the speakers and teaser for to the next topic	
12:00	Lunch	
<b>Plastic in the Ocean</b>		
13:00	Kristine Berg, Circular Economy Advisor, TOMRA Collection Solutions	eXXpedition: Sailing through the great Pacific garbage patch
13:15	Martin Wagner, NTNU	Risk to all or none: On the impacts of plastic pollution on the environment and societies
13:30	Andy Booth , SINTEF Ocean	Microfibre: How dangerous are your clothes to the ocean?
13:45	Erlend Standal, SALT	Fishing for litter
14:00	Susie Jahren, SINTEF Industry,	How do we solve our plastic problem?
14:15	<b>Ocean Talks</b> - Q&A session with the speakers and teaser for to the next topic	
14:30	<i>Coffee Break</i>	
15:00	Lisbet Sørensen, SINTEF	Plastics in the environment: A sink, source or vector for emerging pollutants
15:15	Fredrik Myhre, Senior advisor, Fisheries, Ocean Environment WWF	The importance of a healthy ocean
15:45/16	<b>Ocean Talks</b> - Q&A session with the speakers and concluding remarks	



**Autonomous Ships** focuses on the challenges of research and innovation of new concepts & methods which will enable the development of autonomous methods of transport for people in urban water channels. This technology can be transformative both technologically, societally and in terms of new business opportunities.

PARALLEL SESSION WEDNESDAY 8: <b>AUTONOMOUS SHIPS</b>		
Time	Speaker	Topic
<i>Registration Opens 08:00</i>		
09:00	Morten Breivik, Dept. Engineering Cybernetics NTNU	Autonomous ships: An ocean of opportunities
09:20	Kjell Røang Senior Advisor, Research Council of Norway, Dept. Transport & Maritime	The Maritim21 strategy
09:50	Bjørn-Olav Holtung Eriksen & Erik Wilthil, Dept. of Engineering Cybernetics, NTNU	Collision avoidance for autonomous surface vehicles
10:10	<i>Coffee Break</i>	
10:30	Thomas Porathe, Dept. of Design, NTNU	Autonomous ships and human interaction
10:50	Patrick Waldermar, Vice President Telenor, Technology Research	5G digitizing societies: Autonomous ships and smart ports
11:10	Roy Nilsen, Dept. Electric Power Engineering, NTNU	Innovative hybrid and battery powered ships
11:30	Øyvind Smogeli, DNV GL, Digital Assurance program	Testing and verification of autonomous navigation systems
11:50	Nils Haktor Bua, Norwegian Maritime Authority	Autonomous ships: Regulating a fast changing sector
12:10	Lunch	
13:00	Kjetil Fagerholt, Dept. of Industrial Economics and Technology Management, NTNU	Can Norwegian coastal shipping become more cost-efficient from using autonomous vessels?
13:20	Anders Strømman, Ind. Ecology Programme, NTNU	Climate change mitigation in the maritime sector
13:40	Erlend Solem, Trøndelag County Council	How can a country be an accelerator for autonomous ships
14:00	Vegard Evjen Hovstein, Maritime Robotics	Autonomous personnel transportation at sea - the pathway to realization?
14:20	Øystein Utbjoe Andersland, Vortex NTNU Kristian Sandaa, Ascend NTNU	Vortex & Ascend - student driven projects which includes autonomy
14:40	<i>Coffee Break</i>	
15:00	Beate Kvamstad Lervold, SINTEF Ocean	E39 and autonomous ferries
15:20	Jon Herman Ulvensøen, University of South-Eastern Norway	Risk analyses related to the small passenger ferry "Ole 3"
15:40	Ingrid Utne, Dept. of Marine Technology, NTNU	Online risk management and risk control for autonomous ships
16:00	Close of session	



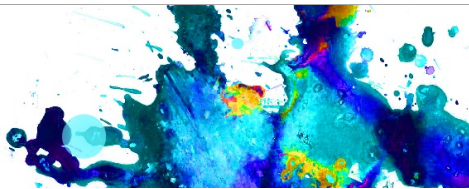
**OCEAN WEEK 2019 – Ålesund – THURSDAY May 9**

**LOCATION: Campus Ålesund, different locations depending on the Session:**

- **Our Blue Vision - Plenary**  
 Location: Norsk Maritimt Kompetansesenter, Borgundveien 340, 6009 in Ålesund
- **Blue Proteins: Towards a Sustainable Use of Marine Resources**  
 Location: Naftadjupe Auditorium, NTNU Campus in Ålesund
- **Safe, Clean and Efficient Exploration of Ocean Resources, Through Low Emission Solutions and Advanced Simulation Technologies**  
 Location: Brosundet Auditorium, NTNU Campus in Ålesund
- **Sustainable Development Goal 14: Life under water. How to address the issue of marine plastic**  
 Location: Brosundet Auditorium NTNU Ålesund

**Our Blue Vision** What is our vision for sustainable oceans and how can technology and decision-support tools help make the right choices?

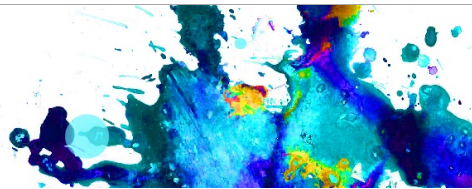
<b>PLENARY SESSION THURSDAY MAY 9: OUR BLUE VISION</b> Conference Chair, Moderator: Annik Magerholm Fet		
<b>Time</b>	<b>Speaker</b>	<b>Topic</b>
08:30	Registration	
09:30	Annik Magerholm Fet, Vice-Rector NTNU in Ålesund Ingrid Schjølberg, Director NTNU Oceans	Welcome at NTNU Ålesund Ocean Week 2019
09:40	Sveinung Rotevatn, State Secretary for Climate and the Environment	Opportunities in a sustainable ocean economy
10:05	Thina Saltvedt, Chief Analyst, Nordea	Can green finance save the ocean?
10:25	Andreas Seth, SVP Integrated Solutions Kongsberg Maritime	Can technology save the ocean?
10:45	Frode Pleym, Greenpeace	Protection and sustainable use of our oceans
11:10	Bergljot Landstad, Regional og næringssjef Møre og Romsdal	Ocean strategies and the region's blue future
11:15	<b>Ocean Talks:</b> Ocean sustainability, what does it mean for the maritime and marine industry? <i>Panelists: Ingrid Schjølberg, Annik M. Fet, Sveinung Rotevatn, Thina Saltvedt, Andreas Seth, Frode Pleym, Anna Maria Siko, Ambassador of Hungary</i>	
11:35	Gunnar Bovim, NTNU Rector: Closing plenary session for Ocean Week – reflections	
11:45	<i>LUNCH Cultural performance from Sunnmøre</i>	



## AFTERNOON PARALLEL SESSIONS

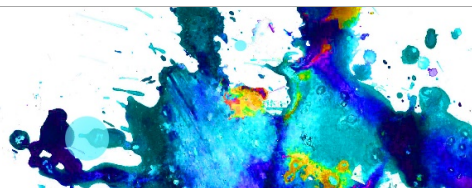
**Blue Proteins: Towards a Sustainable Use of Marine Resources** What is the key to a sustainable use of fish and other marine life? New species are being coveted for food, pharmaceuticals and cosmetics. Advances in biotechnology are laying the foundation for the use of residual raw materials. Is a marine food system with no waste possible?

PARALLEL SESSION THURSDAY MAY 9		
<b>BLUE PROTEINS: TOWARDS A SUSTAINABLE USE OF MARINE RESOURCES</b>		
Brosundet Naftadjupet Auditorium NTNU Ålesund - Moderator: Ann-Kristin Tveten		
Time	Speaker	Topic
12:30	Ann-Kristin Tveten, Research Coordinator Institute for Biological Sciences, NTNU	Introduction and welcome
12:40	Ana Carvajal – Sintef Ocean	Overview of research in the area of blue proteins
13:10	Grete Hansen Aas, NTNU	From residual material to human consumption
13:25	Miroslava Atanasova, Møreforskning	Alternative and emerging protein & bioactives sources with special focus on sea cucumbers and insects
13:45	Inge Bruheim, Rimfrost	Krill as a source of marine protein
14:10	<i>BREAK</i>	
14:40	Ola Ween, Møreforskning	Latest development in fish meal
15:00	Margrethe Lundevold Norland, Plarva Solution	Larvae as an alternative source of protein
15:10	Kristine Kvangarsnes, Dept. of Biological Sciences, NTNU	Protein hydrolysates from fish heads
15:20	<b>Oceans Talks – wrap-up</b>	
<b>16:00h-19h</b>	<b>Activities in common tour around simulators, food, pitch session for student companies etc.</b>	



**Safe, Clean and Efficient Exploration of Ocean Resources, Through Low Emission Solutions and Advanced Simulation Technologies** In this session we will explore the maritime sector of the future. How will a Hydrogen society look like? What opportunities lie in offshore wind? How can we use simulation technology to optimize operations? In the last hour we will delve into in-house research, with a special focus on advanced simulation technology.

PARALLEL SESSION THURSDAY MAY 9		
<b>SAFE, CLEAN AND EFFICIENT EXPLORATION OF OCEAN RESOURCES, THROUGH LOW EMISSION SOLUTIONS AND ADVANCED SIMULATION TECHNOLOGIES</b>		
Brosundet Auditorium NTNU Ålesund - Moderator: Hans Petter Hildre		
<b>Time</b>	<b>Speaker</b>	<b>Topic</b>
12:30	Hans Petter Hildre, Head of Department Ocean Operations and Civil Engineering, NTNU	Introduction
12:40	Vegard Fredheim, Hexagon	The hydrogen society
13:05	Jan Kvålsvold, Director - Global Business Development at DNV GL	Energy transition outlook towards 2050 – what could it mean for shipping
13:30	Joel Mills, Offshore Simulation Centre	Simulation as a tool for operation planning
13:45	John M. Lervik, Cognite	Data liberation: Breaking the barrier between sea and land
14:10	<i>BREAK</i>	
14:40	Niels Henrik Mortensen, Technical University of Denmark, DTU	Large scale service and maintenance of ocean installations
Ocean research at NTNU in Ålesund - Pitch session		
14:50	Hans Petter Hildre, Head of Dept. Ocean Operations and Civil Engineering	Møre Ocean Lab - Ocean research at NTNU in Ålesund
	Karl Henning Halse, Dept. Ocean Operations and Civil Engineering	Simulation of critical marine operations, SFI Move
	Houxiang Zhang, Dept. Ocean Operations and Civil Engineering	Digital twins ship, the Gunnerus case
	Dina M. Aspen, Dept. Industrial Economics and Technology Management	Decision-support for sustainable oceans
	Vilmar Æsøy, Dept. Ocean Operations and Civil Engineering	Data analytics for decision support – machine learning
15:40 – 16:00	<b>Oceans Talks – Wrap-up</b>	
<b>16.05h</b>	<b>Activities in common tour around simulators, food, pitch session for student companies etc.</b>	



PARALLEL SESSION THURSDAY MAY 9 <b>SUSTAINABLE DEVELOPMENT GOAL 14:</b> <b>LIFE UNDER WATER. HOW TO ADDRESS THE ISSUE OF MARINE PLASTIC</b> Brosundet Auditorium NTNU Ålesund - Moderator: tbc		
Time	Speaker	Topic
16:10	Annik Magerholm Fet	Introduction to SDG 14 and societal challenges for life under water
16:15	Plastpiratene	What are the issues on the ground and what is needed from the authorities?
16:25	Discussion With Ålesund Council: Commitment to SDG 14, one year later, what are the opportunities and how can we collaborate?	
16:35	Siv Marina Grimstad	Blue circular economy: what are the challenges and business opportunities around recycling end-of-life fishing gears?
16:50	Runde Miljøsender	Building a network for marine plastic research and action
17:05	Dina Aspen, NTNU	Decision-support tools for clean oceans
17:20	Student project pitch: Ocean watch - Clean App	
17:30	Panel Discussion with ÅKP: How can businesses tackle societal challenges through innovation?	
<b>18:00</b>	<b>End</b>	