

A Workshop on Ocean-based CDR Opportunities and Challenges

Part 3: Ecosystem Recovery & Seaweed Cultivation

February 2, 2021

12 - 4pm EST

Speaker Bios

Carlos M. Duarte is the Tarek Ahmed Juffali Research Chair in Red Sea Ecology at the King Abdullah University of Science and Technology (KAUST), in Saudi Arabia. He also holds an adjunct position at the Arctic Research Center in Aarhus University, Denmark. Duarte's research focuses on understanding the effects of global change in marine ecosystems, developing marine-based solutions to global challenges, including climate change, and develop evidence-based strategies to rebuild the abundance of marine life by 2050. He has conducted research across all continents and oceans, spanning most of the marine ecosystem types, from inland to near-shore and the deep sea and from microbes to whales. Professor Duarte led the Malaspina 2010 Expedition that sailed the world's oceans to examine the impacts of global change on ocean ecosystems and explore their biodiversity. He has published more than 850 scientific papers, and was recently ranked as the top marine biologist in the world. Professor Duarte served as President of the American Society of Limnology and Oceanography between 2007 and 2010. He has received many honors, most recently the Carlo Heip award for Excellence in Marine Biodiversity Research (2018), the Ramon Margalef Ecology Award (2019), and the BBVA Foundation Frontiers of Knowledge Award in Ecology and Conservation Biology (2020). He has been appointed to the Expert Group supporting the High Level Group that under the UN is working to propose a pathway towards a Sustainable Ocean Economy.

More information: https://en.wikipedia.org/wiki/Carlos_M._Duarte

Marc Von Keitz joined ARPA-E in 2015 and has since been managing and developing funding programs to advance innovative biomass production as well as biochemical and thermo-chemical conversion processes for the production of fuels and chemicals. These processes have included the REMOTE program for the biological conversion of methane to liquid fuels, the MARINER program focused on the large scale-production of seaweed in the open ocean, and most recently the OPEN 2018 methane pyrolysis cohort for the production of hydrogen and higher value carbon materials from methane. Before joining ARPA-E, Marc co-founded BioCee, Inc. an industrial biotechnology startup company, and served as its President and CTO. Previous other roles included program director at the Biotechnology Institute of the University of Minnesota, where he managed the university's central fermentation and bioprocessing facility as well as Minnesota's first biotech startup incubator, consulting environmental engineer at Montgomery-Watson in California, as well as founder and president of Green Homes Market Space, a web-based marketing company focused on energy- and resource-efficient housing. Marc studied biology and chemical engineering at University of Karlsruhe and INSA Toulouse. He also holds a Ph.D. in Civil/Environmental Engineering from the University of Minnesota and an M.S. in Environmental Engineering and Science from Stanford University.

Halley E. Froehlich earned her B.Sc. in Animal Biology from the University of California, Davis (2009) and her Ph.D. in Marine Ecology & Fishery Sciences from the University of Washington (2015). For her dissertation, she took an interdisciplinary approach studying the impacts of anthropogenic stressors, including hypoxia, on exploited marine ecosystems and species. As a Postdoctoral Scholar at the National Center for Ecological Analysis and Synthesis, she studied the potential of sustainable offshore aquaculture under a changing climate. Dr. Froehlich started her Interdepartmental Graduate Program in Marine Science (IGPMS) faculty appointment at the University of California, Santa Barbara in 2019, joining the Department of Ecology, Evolution, & Marine Biology and Environmental Studies Program. She is currently a PI on several cross-departmental, national, and international seafood and aquaculture projects, including as a contributing author to the upcoming AR6 IPCC report (2022) and co-lead on the California State Aquaculture Action Plan (2021-2023).

Olavur Gregersen is M. Sc. in Business Administration, Economics and International Trade and Olavur has been an entrepreneur since 1988. He has more than 20 years of experience working with business development, marine management and economics. In addition, he has been an executive and non-executive director in several innovative companies and projects.

Since 2011 he has been main co-founder and CEO of Ocean Rainforest which is a limited company located in the Faroe Islands and Santa Barbara, CA, engaged in the production of marine biomass from macroalgae in open ocean cultivation installations. Ocean Rainforest has approximately 95.000 meter (12 ha) of seaweed lines deployed at two sites in the Faroe Islands, where continuous current and stable sea temperature provide the perfect condition for seaweed farming. Ocean Rainforest has since 2010 developed and proven a survivable and sustainable method for cultivating seaweeds on the open ocean - thus moving this maritime resource away from a hunter-gathering style of procurement and into the realm of true aquaculture.

The operation of Ocean Rainforest spans an unbroken chain from seeding, cultivation, harvesting, and processing into a storage stable condition and sales to the business-to-business market. In 2020 Ocean Rainforest was awarded a contract from the ARPA-E Mariner Program to develop offshore cultivation systems in California waters.

Brian von Herzen obtained his A.B. in Physics, Magna Cum Laude, from Princeton University and his Ph.D. in Computer and Planetary Science from Caltech where he was the recipient of the prestigious Hertz Fellowship (<http://www.hertzfoundation.org>). While at Princeton, Brian spent four years working closely with Woods Hole Oceanographic Institute. At Princeton, his dissertation on global climate models demonstrated how changes in the Earth's orbit affects climate. During his Caltech years Brian worked on models of the overabundance of carbon in Jupiter's atmosphere. Little did he know that a decade later we would have to solve this problem for the Earth's atmosphere. From these experiences he acquired a detailed understanding of the Earth's carbon cycle and has envisioned sustainable approaches to restoring carbon balance in our atmosphere. Nature does a great job of fixing carbon. Primary production on the Earth has been fixing carbon for billions of years. By restoring natural carbon cycles, we can restore food productivity of Earth while concurrently balancing carbon. Once we reduce the carbon intensity of our own lifestyles, natural biogeochemical processes can take our civilization carbon negative using technologies comprising biochar to withdraw gigatons of carbon from the atmosphere for millennia.

Much of Brian's career has been in Silicon Valley, where he developed innovative technical solutions for companies like Pixar, Dolby, Microsoft, and others. Among other projects, he designed field programmable gate array (FPGA) applications considered to be among the world's fastest at the time.

Brian leads projects on land and sea with individuals and groups in all parts of the world, including India, Africa, and the USA.

Dorte Krause-Jensen is a professor in marine ecology and biodiversity at the Department of Bioscience, Aarhus University, Denmark. Her research focuses on vegetated marine ecosystems, particularly seagrass meadows and kelp forests with a key interest in blue carbon (BC) and the protection and restoration of marine vegetation as nature-based solutions to mitigate and adapt to climate change and biodiversity loss. She leads/participates in national, European and global projects targeting BC of seagrasses, macroalgae and saltmarshes. Her research portfolio includes basic, strategic and applied research and has wider societal impact due to her role as advisor to Environmental Authorities on monitoring and management of marine vegetation.

Trisha B. Atwood is an assistant professor at Utah State University where she runs the Aquatic Ecology and Global Change lab. She is also a National Academies of Sciences, Engineering, and Medicine Gulf Research Early Career Fellow. Atwood's research program uses marine and freshwater ecosystems to understand the influence of global change on ecological communities and biogeochemical cycles. As both a community ecologist and ecosystem ecologist, she studies how interactions among microbes, plants, and animals influence ecosystem properties (e.g., carbon stocks) and processes (e.g., carbon cycling). More specifically, her research program focuses on two broad questions; (1) how do anthropogenically-mediated changes in animal behavior, populations, or community structure affect ecosystem functions and services, especially those related to climate mitigation, and (2) what locations and best conservation/management practices within aquatic ecosystems deliver the greatest climate change mitigation and adaptation benefit? She answers these questions through a combination of observational data, experiments, spatial modeling, and global syntheses across a broad array of ecosystems (coral reefs, mangroves, salt marshes, seagrasses, and freshwater systems). The nature of Dr. Atwood's research allows her to investigate novel questions that help advance our understanding of basic ecological theory, as well as inform conservation actions to protect aquatic species and habitats. Dr. Atwood has published over 40 peer-reviewed scientific papers with over 180 co-authors from 47 countries. More information about Dr. Trisha Atwood's research program can be found at <https://trishaatwood.weebly.com/>

Nick Kamenos is a Reader at the University of Glasgow in Scotland and leads the Marine Global Change Group. His group's research asks questions about how the oceans are altered by the synergy between natural and anthropogenic change while trying to better determine the actual extent of global change. He and his group investigate the relationships between global change (e.g. climate variability, ocean acidification & multiple stressors) and ecosystem engineers (e.g. macroalgae, coralline algae, corals and seagrass) along with the services they provide. In particular, this focuses on understanding the role of marine benthic algal systems in sequestering and burying carbon as a nature-based solution to climate change. Dr Kamenos' research is strongly multidisciplinary, pioneering novel approaches to answer these emerging questions in Arctic, temperate and tropical marine ecosystems.

Andy Pershing is director of climate science at Climate Central, focusing on expanding public awareness and understanding of climate science across disciplines. His role includes bridging primary research and media analysis of findings and impacts to amplify critical work on climate change and make it accessible to audiences around the world. As a scientist, Pershing has led interdisciplinary research teams to study the impact of global warming on marine ecosystems in the northwest Atlantic. More recently, his work has focused on how climate trends interact with decisions that people make. He was the lead author for the Oceans and Marine Resources chapter of the Fourth U.S. National Climate Assessment. As a communicator, Pershing has deep experience working with journalists to present climate science on air and in print, including featured interviews on NPR and in the New York Times, The Guardian, and the Boston Globe.

Previously Pershing served as chief scientific officer for the Gulf of Maine Research Institute, where he headed the Climate Change Ecology Lab. He was also a member of the University of Maine faculty, as associate professor of oceanography in the School of Marine Sciences. Pershing holds a Ph.D. in ecology and evolutionary biology from Cornell University and a B.S. in aquatic biology from Brown University.

Xabier Irigoien is both Scientific Director in AZTI and IKERBASQUE Research Professor since 2016. His research is focused on Biological oceanography, plankton ecology, and physics-plankton-fish interactions. Since 1994, Xabier Irigoien successively worked in “Instituto de Ciencias del Mar” (CSIC, Barcelona), “Plymouth Marine Laboratory” (NERC, Plymouth) and “Southampton Oceanography Center” (NERC, Southampton) and AZTI from 2002 to 2011 before joining King Abdullah University for Science and Technology (KAUST) in 2011. Xabier was the Head of the Biological Oceanography & living resources section in the Marine Research Division of AZTI foundation from 2004 to 2011 and director of the Red Sea Research Center in KAUST from 2011 to 2016. Xabier is a member of the editorial council of Journal Plankton Research, editorial board of Scientific Data, associate editor in Marine Biology.

Catherine Lovelock is Australian Research Council Laureate Fellow and Professor in the School of Biological Sciences at The University of Queensland. Her research focuses on climate change and its impacts on coastal plant communities as well as the role of coastal wetlands in adaptation and climate change mitigation or Blue Carbon. She is a member of the International Scientific Blue Carbon Working Group of The Blue Carbon Initiative. She leads projects in Australia and internationally focused on climate change adaptation, carbon sequestration and restoration of mangroves. She was lead author for the Wetlands chapter for the 2019 refinement of the IPCC Guidelines for National Greenhouse Gas Inventories, and she advises governments on incorporating coastal wetlands within policies for climate change adaptation and mitigation.