(Oral presentation)

**Advancing concepts and methods in marine connectivity research to strengthen resource management frameworks: the SEA-UNICORN COST Action.**

Audrey M. Darnaude1, Oscar Gaggiotti2, Maria Partidario3, Filip Volckaert4, Susanne Tanner5, Anna Sturrock6, Lucia Lopez-Lopez7, Loic Pellissier8, Rigers Bakiu9, Maria Beger10, Federica Costantini11, Myron A. Peck 12.

*1 MARBEC, Univ Montpellier, CNRS, IRD, Ifremer, Montpellier, France.*

*2 Scottish Oceans Institute, East Sands, St Andrews, Fife, United Kingdom*

*3 CEG-IST, Universidade de Lisboa, Instituto Superior Técnico, Lisboa, Portugal*

*4 KU Leuven, Laboratory of Biodiversity and Evolutionary Genomics, Leuven, Belgium*

*5 MARE – Marine and Environmental Sciences Centre, Faculdade de Ciências, Universidade de Lisboa, Campo Grande, 1749-016 Lisboa, Portugal*

*6 School of Life Sciences, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, United Kingdom*

*7 Oceanographic Centre of the Balearic Islands, Spanish Institute of Oceanography. Moll de Ponent, Palma, Spain*

*8 Landscape Ecology, Institute of Terrestrial Ecosystems, Department of Environmental Systems Science, ETH Zürich, Zürich, Switzerland & Unit of Land Change Science, Swiss Federal Research Institute WSL, Birmensdorf, Switzerland*

*9 Department of Aquaculture and FIsheries, Faculty of Agriculture and Environment, Agricultural University of Tirana, Koder-Kamez, Tirana, Albania*

*10 School of Biology, Faculty of Biological Sciences, University of Leeds, Leeds, LS2 9JT, United Kingdom*

*11 University of Bologna, Dipartimento Di Scienze Biologiche, Geologiche e Ambientali, Ravenna, Italy*

*12 Department of Coastal Systems (COS), Royal Netherlands Institute for Sea Research (NIOZ), Texel, the Netherlands*

The ongoing unprecedented changes in marine habitats require a comprehensive understanding of marine connectivity and its impacts on ecosystem functioning to identify effective strategies for sustainable management. Marine connectivity research so far mostly focussed on species-specific approaches, primarily measuring and modelling population dispersal patterns. However, recent methods allowing researchers to link individual movements and trait expression to ecosystem function are advancing the new field of Marine Functional Connectivity (MFC). Functional connectivity characterizes the migratory flows of organisms in space and time that determine the ecological and evolutionary interdependency of populations, and the overall functioning of ecosystems. Gathering effective knowledge on MFC can, therefore, greatly improve our ability to predict species and ecosystem responses to environmental changes and refine management and conservation strategies for the oceans. This is challenging though, because marine ecosystems are particularly difficult to access and survey. Currently, a wide variety of scientists investigates MFC worldwide by using complementary direct and indirect methods from multiple research fields to describe the ecology of marine species, and developing theoretical approaches to integrate MFC in conservation and management decision-making. Combining novel approaches with traditional methods offers unprecedented new opportunities for advancing knowledge in this emerging field of research, which also urgently requires building on the knowledge and practices of marine stakeholders to design and apply research actually addressing societal issues. To start fulfilling this need, the COST Action CA19107 - Unifying Approaches to Marine Connectivity for improved Resource Management for the Seas (SEA-UNICORN, 2020-24) brings together a large, international and interdisciplinary group of scientists and stakeholders. Its academic participants have already started to share their expertise in order to collate existing MFC data, identify knowledge gaps, and integrate disciplines. Inputs from the connectivity theoreticians, ecosystem modelers, and conservation scientists, but also marine policy-makers and managers in the network, further contribute to advance concepts and methods in MFC science, aiming to facilitate the incorporation of MFC data into the projection models and decision support tools used for decision-taking in marine resource management.