



## Abstracts of inaugural lectures 3 March 2023

### Dive in—ocean technology and blue innovation

#### Professor Patrizio Mariani

The ocean is a vital component of the Earth System and it plays a critical role in regulating climate and in providing several goods and services for human wellbeing. Being the largest on the planet, marine habitats are home to an incredible amount of biodiversity, plant, and animal and they are a vital source of food, energy, and trade. However, despite its importance, the ocean remains one of the least understood and explored environments on Earth. Recent developments in marine science and technology are changing this perspective and are powering the innovation flywheel into the so-called blue economy. In this presentation, I will introduce a range of tools and systems that we are currently developing to study and understand the ocean in new and exciting ways. This will include an overview of the research frontiers in science and engineering for marine sensors, robotics, autonomous platforms, satellite technology and numerical modelling. These innovations are helping us to learn more about the ocean's ecosystems, enabling the protection of the services and goods they provide, and a better assessment of the impacts of human activities on the marine environment.



So let's dive in and learn more about the exciting research in ocean technology and the blue innovation!

### Functional diversity of plankton controls the ecosystem services in the open ocean

#### Professor Marja Koski

We rarely think about the organisms – biodiversity – that are central for the ocean's capacity to provide us with fish or to store the CO<sub>2</sub> that we release into the atmosphere. Open ocean food webs are based on plankton: phytoplankton that do the photosynthesis and zooplankton that regulate the fate of the primary production, and the functional properties of plankton determine whether the primary production is transferred up in the food web, recycled in the surface ocean or transported to depth. These processes are changing due to the climate change and other human-induced disturbances to the marine environment. I will give examples of how multiple stressors affect marine planktonic food webs from the Arctic to Africa, and how changes in the functional groups of plankton might result in critical changes to ecosystem services. I argue that understanding of the functioning of marine ecosystems is critical for the sustainable use of oceans and should be an essential part of the curriculum in any engineering education dealing with maritime activities.

