

I SEMINARI DEL DCCI

Ocean in Danger: The Global Crisis of Chemical Pollution

Martedì 21 Aprile 2026 ore 14:30 Aula 1 DCCI



Professor Renato Carreira,

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Since 1991, Prof. Carreira has focused his studies on Chemical Oceanography, Organic Biogeochemistry, and Environmental Organic Chemistry in Brazil's estuarine, coastal, and continental margin systems. His work involves analyzing samples of water, sediment, biota, and atmospheric particulate matter. During this time, he has had the opportunity to collaborate with researchers from several national and international institutions, including Plymouth Marine Laboratory in England, Virginia Institute of Marine Sciences in the USA, Alfred Wegener Institute in Germany, University of Aveiro in Portugal, and the Portuguese Institute for Sea and Atmosphere. His research interests include:

1. The use of molecular and isotopic proxies to characterize the sources, transport, and fate of organic matter in the ocean, focusing on both modern processes and paleoenvironmental reconstructions.
2. Marine organic geochemistry, particularly the assessment and monitoring of contamination in aquatic systems caused by hydrocarbons, sewage, and emerging contaminants.
3. The characterization of microplastics in aquatic systems, including the risks posed by additives or adsorbed organic contaminants.

Abstract

Ocean in Danger: The Global Crisis of Chemical Pollution addresses one of the most pressing environmental issues of the twenty-first century: the progressive contamination of the oceans by synthetic chemicals and persistent waste. Industrial development, urban expansion, intensive agriculture, and modern consumption patterns have greatly increased pollutant emissions into marine systems. Today, substances such as PFAS (“forever chemicals”), hydrocarbons, pesticides, pharmaceuticals, and plastic residues can be detected from coastal zones to the open ocean, raising concerns about ecosystem integrity and long-term environmental quality.

In this talk, Professor Renato S. Carreira (PUC-Rio, Brazil) will present an accessible overview of how chemical pollution has intensified over recent decades, why many contaminants are difficult to control once released, and how current scientific knowledge helps us understand their global distribution and persistence. The discussion will also place marine pollution within the framework of **planetary boundaries**, where chemical pollution is represented by the boundary of **novel entities**—synthetic substances and materials capable of disrupting the Earth system beyond safe operating limits. Special attention will be given to PFAS and plastic pollution as emblematic examples of this broader global crisis affecting the marine environment.