

Ocean Sustainability (The 2030 Agenda for Sustainable Development Goals 13 and 14 interlinkages and the Decade of the Ocean for Sustainable Development (2021–2030))

Ocean Sustainability (The 2030 Agenda for Sustainable Development Goals 13 and 14 interlinkages and the Decade of the Ocean for Sustainable Development (2021–2030))

Advanced course (6 ECTS)

Work load

Contact hours: 40 hours

Independent study: 60 hours

Lecturers

Prof. Ulisses M Azeiteiro, Department of Biology and CESAM, University of Aveiro, Portugal

Dra. Ana Isabel Lillebø, Principal Researcher - CESAM's Scientific Coordinator, University of Aveiro, Portugal

Dr. Ricardo Calado, Principal Researcher (Research Career), Department of Biology and CESAM, University of Aveiro, Portugal

Dra. Rosa Freitas, Department of Biology and CESAM, University of Aveiro, Portugal

Dra. Catarina Ribeiro Marques, Researcher, Department of Biology and CESAM, University of Aveiro, Portugal

Science Coffees

Prof. Miguel Â Pardal, Director of the Life Sciences Department and Vice-Coordinator of CEF, FCT, University of Coimbra, Portugal (Invited Professor)

Prof. Amadeu MVM Soares, Department of Biology and CESAM, University of Aveiro, Portugal

Prof. Mário Jorge Pereira, Department of Biology and CESAM, University of Aveiro, Portugal

Dra. Cristina B Pita, Principal Researcher, Department of Environment and Planning & Centre for Environmental and Marine Studies (CESAM), University of Aveiro, Portugal

Dr. Heitor Oliveira Braga, Department of Biology and CESAM, University of Aveiro, Portugal

Dates

June 15 to 19 June, 2020

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Venue

University of Aveiro

Timetable and rooms (Portuguese time)

Morning sessions: 9h00-13h00, lectures and discussion, room 8.1.18

Afternoon sessions: 14h00-16h00, paper reading and discussion, room 8.1.18

Late afternoon sessions: 16h30-18h, science café, room 8.1.18

Background and objectives

The year 2020 will be pivotal for the ocean: The UN 2030 agenda and the SDGs 13 (Take urgent action to combat climate change and its impacts) and 14 (Life below water. Conserve and sustainably use the oceans, seas and marine resources for sustainable development), interlinkages and the Decade of the Ocean for Sustainable Development (2021–2030) together with the second UN Ocean Conference happening in Portugal.

Are we prepared?

Course structure

All lectures will be held in the morning. In the afternoon sessions previously distributed papers will be discussed (and new papers allocated for the next lectures).

The science cafés include short presentations of published research by the invited speakers.

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Syllabus

- The Sustainable Development Goals. The 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the Goals (the SDGs 13 and 14). (Ulisses M Azeiteiro) [the 15th in the morning]
- IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (Ulisses M Azeiteiro) [the 15th in the afternoon]
- United Nations Decade of Ocean Science for Sustainable Development (2021-2030) (Ulisses M Azeiteiro) [the 16th in the morning]
- The Role of Research and Development in Strengthening Ocean Innovation Research (Ana Isabel Lillebo CESAM and Ricardo Calado ECOMARE) [the 16th in the afternoon]
- Blue BioEconomy, Sustainable Aquaculture and Traceability of Seafood and Live Marine Organisms (Ricardo Calado) [the 17th in the morning]
- Challenges to Ocean Sustainability (Pollution, Anthropogenic Climate Change) (Rosa Freitas) [the 17th in the afternoon]
- Coping with Challenges of Marine Ecosystems' Quality, Bioremediation and Protection (Catarina Marques) [the 18th in the morning]
- Evaluation [the 19th in the afternoon].

Science Coffees

1. *Turtles Conservation*, Prof. Mário J Pereira. June 15.
2. *Ethnobiology, Ethnoecology, Traditional Ecological Knowledge of Fishermen and Conservation Biology*. Dr Heitor O Braga. June 16.
3. *Small scale fisheries*, Cristina B. Pita. June 17.
4. *Invited Talk*, Prof. Miguel Ângelo Pardal. June 18.
5. *NutriMo - Development of handmade diets for tilapia nutrition in community-based aquaculture in Mozambique*, Prof. Amadeu MVM Soares. June 19.

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Suggested reading

2-4 papers per each chapter.

These papers will be distributed before the course.

Lecturer's AND Science Coffees Scientists CVS

Prof. Miguel Â Pardal (Miguel Ângelo do Carmo Pardal é Licenciado em Biologia pela Universidade de Coimbra (1991), Doutorado em Biologia (1999) e Agregado em Ecologia Marinha (2008) pela mesma Universidade. É Professor Catedrático desde fevereiro de 2019).

Miguel Â Pardal é, até ao momento, coautor de 283 artigos ISI (factor h 42) e de cerca de 20 Capítulos de Livros com Edição Internacional, entre outras publicações. Já orientou 27 Doutoramentos e mais de 50 Mestrados. Coordena uma das 6 Linhas de Investigação do Centro de Ecologia Funcional, uma das unidades de investigação da Universidade de Coimbra, pertencendo à sua Comissão Executiva. Ao longo da sua carreira tem coordenado vários Projetos de Investigação e de Transferência de Saber angariando para a Universidade de Coimbra e seus Centros de Investigação cerca de 2 600 000 €. Tem ainda ao longo destas duas décadas desempenhado vários cargos de gestão a nível Departamental, nomeadamente coordenando o Doutoramento em Bociências, o Mestrado em Ensino da Biologia e Geologia, o Mestrado em Biologia Animal e foi ainda SubDiretor (2013) e Diretor do Departamento de Ciências da Vida (2013-2015) eleito novamente para o mandato de 2019-2021.)

Prof. Ulisses M Azeiteiro (Associate Professor, Departamento de Biologia & CESAM - Centro de Estudos do Ambiente e do Mar, University of Aveiro, ulisses@ua.pt)

Ulisses is the Director of the Biology undergraduate degree being a member of the course coordination of the Masters in Applied Marine Biology, Applied Ecology and Applied Biology. He teaches Global Change Ecology, Global Change Biology and Ecology in the Marine Environment and Planktonology. He is the Coordinator of the Climate Change and Biodiversity Assets Unit from the Biology Department and his main research interests are Global Change Biology and Ecology and Climate Action and Sustainability. He was member of several evaluation panels from research projects and grants (International, European and National - Portuguese and outside Portugal), referee of several leading journals and special issues guest editor, member of the organizing and scientific committees of >75 international and national congresses, member of more than 150 exam panels for viva voce examinations (for PhD and MSc) and career

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assessment and supervised > 65 Postgraduate students (MSc and PhD students). He was the editor of >25 international books (>50 chapters) and author of >90 papers in SCI with IF international refereed journals. H-index 22

Prof. Amadeu MVM Soares (full professor, PhD in Zoology, University of Sheffield, UK, 1989. Vice-Coordinator of CESAM-Center for the Environment and Marine Studies (2010-present); Head of Department of Biology of University of Aveiro, Portugal (02/10/2001-30/09/2019); Former SETAC-Europe president (Society of Environmental Toxicology and Chemistry; the Scientific Coordinator of ECOMARE, University of Aveiro; Associate Fellow of the Canadian Rivers Institute, University of New Brunswick, Canada, from 2006 to present; Member of the Advancing Canadian Wastewater Assets (ACWA) Advisory Council, from 2017 to present; Special Visiting Professor at Federal University of Tocantins – Campus Gurupi, Brazil (2013-2016). Member of the Scientific Advisory Council of the Institute of Environmental Assessment and Water Research-IDAEA, Spanish Council of Scientific Research (CSIC), Barcelona, from 2011.).

Amadeu Soares was awarded/prizes in: - 2015: ranked within the top-30 European most cited scientists in Toxicology, according to the ranking of LabTimes, based on the ISI Web of Science citations; - 2013: SETAC-Europe Environmental Education Award, for the contributions to post-graduate training and education in the area of Environmental Toxicology; - 2010: Galardão Gulbenkian/Oceanário de Lisboa: Governação Sustentável dos Oceanos. Responsabilidade Solidária; Capacitar para Conservar; - 2007: SETAC Special Award, for the outstanding contribution for the environmental society; - 2004: Excellence Award from the Ministry of Science and Higher Education, Portugal. He Supervised 53 MSc students, 73 PhD students and 20 post-docs, all concluded, and Participated in research projects funded by the EC (13 as overall project coordinator), INTAS (as coordinator), and nationally funded projects (16 as coordinator/PI). Participated >250 panels for academic degrees and professorship positions. Participated also, some as panel coordinator, >50 evaluation panels for research programs, projects and grants, 25 internationals. Coauthor > 600 papers from ISI Web of Science, h-index=50, 12771 citations (10484 without self-citations) - see <http://www.researcherid.com/rid/A-8304-2008> (updated September 2019).

Drª Ana Isabel Lillebø (Investigadora Principal, Departamento de Biologia & CESAM - Centro de Estudos do Ambiente e do Mar, Universidade de Aveiro, lillebo@ua.pt)

Ana is the Scientific-Coordinator of CESAM - Centre for Environmental and Marine Studies and was between 2016-2019 the Director of the Postgraduate master's degree in marine biology at University of Aveiro. She holds a PhD in Biology, specialization in Ecology (2001) from University of Coimbra, Portugal. She has

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recognised experience in ecology, biodiversity and ecosystem services of coastal ecosystems, and contributions to the integrated management of coastal zones considering Science-based knowledge, environmental policies and stakeholders. She has experience in the coordination of national and international funded research projects; in RTD activities and knowledge transference to Aquaculture SMEs; and in advisory activities at national and international levels. She is the national contact point for Ria de Aveiro LTER site at the Portuguese E-Infrastructure for Information and Research on Biodiversity and at ILTER marine task force. She has contributed to 110 ISI journals, 25 book chapters and edited 3 books. H-index 28 (homepage: www.cesam.ua.pt/ana-lillebo).

Dr. Ricardo Calado (Principal Researcher, Department of Biology & CESAM & ECOMARE, University of Aveiro, rjcalado@ua.pt)

Ricardo Calado is the PI of CESAM's research Thematic Line on Marine Ecosystems & Resources and is responsible for CEPAM-ECOMARE at UA. He represents CESAM/UA in the executive board of the Collaborative Laboratory for the Blue BioEconomy (B2E) and the Portuguese Network for Blue BioResources (BlueBio Alliance). Ricardo obtained his PhD in Biology (specialization in Animal Biotechnology) in 2005 from the Faculty of Sciences of Lisbon University (FCUL) and currently develops independent research on Sustainable Blue Growth, namely in the research fields of Applied Marine Ecology, Sustainable Aquaculture and Marine Biotechnology. Author of 180 publications in international peer reviewed journals listed on Web of Science (Clarivate Analytics), he has +2850 citations, an h-index of 28 and an accumulated impact factor >500 (according to Clarivate Analytics metrics). He lectures the MSc discipline of Life Support Systems and Stocking of Marine Organisms at UA.

Dr^a Rosa Freitas (Assistance Researcher, Department of Biology & CESAM, University of Aveiro, rosafreitas@ua.pt)

Rosa Freitas is an Assistant Researcher with a PhD in Biology (2005) from the Department of Biology, University of Aveiro (Dbio-UA). Currently she develops independent research on Marine Biology, namely in the research field of ecotoxicology. In the last 10 years Rosa Freitas devoted her research to the marine systems, investigating the toxicity of classical and emerging contaminants, including metals, pharmaceuticals and personal care products, nanoparticles and more recently technological critical elements (TCEs), all in combination with CC scenarios, towards marine invertebrate species. She has published 160 papers (h-index 24, according to web of knowledge metrics), supervised several PhD and master students, with a team of more than 20 members. At the Dbio-UA Rosa Freitas has been teaching at MSc and BSc programs since 2010.

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Dr^a Catarina Marques (Researcher, Department of Biology and CESAM, University of Aveiro, Aveiro, Portugal, crmarques@ua.pt)

Catarina Marques (homepage: www.cesam.ua.pt/crmarques) has a PhD in Biology (University of Aveiro). She is a National Expert and the Coordinator of the National Experts of the Portuguese Institute of Quality (IPQ), deeply involved in standardization activities under the Technical Committee (TC190) for Soil Quality of the International Organization for Standardization (ISO). She is currently coordinating two projects, one is directed to innovative strategies for the bioremediation of uranium mine effluents (NANOBINDERS), and the other targets the development of novel and sustainable measures for controlling fish diseases that provoke great outbreaks and economic losses in recirculated saltwater aquaculture systems (MAXIAQUA). Catarina is the author/co-author of 4 book chapters and 35 papers, rendering an h-index of 11. She is also an editor of a national online journal (CAPTAR; <http://captar.web.ua.pt>).

Prof. Mário J Pereira (Mário Jorge V. Pereira is Assistant Professor at the Biology Department of Aveiro University (Portugal) where he got its PhD mverde@ua.pt).

Mário J Pereira research interests are multidisciplinary, focusing on conservation biology and sustainable development in particular of coastal zones of Southern Africa.

Dr^a Cristina B Pita (Cristina Pita is Principal Researcher at CESAM/ University of Aveiro (UA). She is the co-leader of CESAM's research line Marine Ecosystems & Resources (MER) and responsible for the Coastal and Ocean Planning and Governance (COPING) group in the Department of Environment and Planning)

Cristina Pita is an expert in socioeconomic aspects of fisheries for the United Nations World Ocean Assessment (UN-WOAI), and an expert of the National Hub (Portugal) for the Atlantic Action Plan. She is a member of the Management Committee of two COST actions (OCEANGOV and MARCONS) and takes part on several committees at the International Council for the Exploration of the Sea (ICES) (WGSOCIAL, WGRMES, WGCEPH, SIHD). She is also part of several international networks (TBTI international network, ECOMAR-CYTED Ibero-American network). Her research has been related to fisheries and coastal areas, focusing on socioeconomic characterization, governability, fisher organizations and small-scale fisheries markets. She is currently the PI in UA of 8 national and international projects focused on these topics. She has contributed to 42 ISI-indexed publications, 12 book chapters, 2 Technical Reports for the European Parliament, and co-edited a book and special issue on Marine Policy focused on small-scale fisheries.

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Dr. Heitor Oliveira Braga

(Postdoctoral Researcher at the Department of Biology & CESAM - Centre for Environmental and Marine Studies, University of Aveiro, Portugal, heitorob@ua.pt).

Ph.D. in Biosciences (Specialization in Marine Ecology) from the University of Coimbra, Portugal (2014-2018). Recognized as a Doctor in Ecology, Conservation and Wildlife Management (CAPES 6) by the Federal University of Minas Gerais, Belo Horizonte, Brazil (2018). Master in Ecology and Biodiversity Conservation (CAPES 5) by the State University of Santa Cruz, Ilhéus, Bahia, Brazil (2010-2012). Graduate in Biological Sciences by the Federal University of Uberlândia, Minas Gerais, Brazil (2006-2010). Research Area: Marine Ecology and Biodiversity Conservation with a focus on Human Ecology, Ethnobiology, Ethnoecology, Ethnozooology, Environmental Education, Ecological Development and Sustainability. The Postdoctoral Researcher currently works on the Cooperminho project, which is funded, through the Municipal Council of Vila Nova de Cerveira, through the Mar 2020 program - Operational Program Mar 2020 Notice nº 5/2016.

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Ricardo Calado Lecture

Madeira, D. & **Calado R.** 2019. Defining research priorities to detect live fish illegally collected using cyanide fishing in Indo-Pacific coral reefs. *Ecological Indicators*. 103: 659-664.

Marques, B., Lillebø, A.I., Ricardo, F., Nunes, C., Coimbra, M.A. & **Calado, R.** 2018. Adding value to ragworms (*Hediste diversicolor*) through the biorremediation of a super-intensive marine fish farm. *Aquaculture Environment Interactions*. 10: 79-88.

Leal, M.C., Rocha, R.J.M., Rosa, R. & **Calado, R.** 2018. Aquaculture of marine non-food organisms: what, why, and how? *Reviews in Aquaculture*. 10: 400-423.

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Rosa Freitas Lecture

Rosa Freitas*, Serena Silvestro, Francesca Coppola, Valentina Meucci, Federica Battaglia, Luigi Intorre, Amadeu M.V.M. Soares, Carlo Pretti, Caterina Faggio (2020). Combined effects of salinity changes and

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Salicylic Acid exposure in *Mytilus galloprovincialis*. *Science of the Total Environment*
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Rosa Freitas*, Celso Cardoso, Silvana Costa, Tiago Morais, Pedro Moleiro, André F. D. Lima, Márcio Soares, Samuel Figueiredo, Tiago L. Águeda, Pedro Rocha, Gonçalo Amador, Eduarda Pereira (2020). New insights on the impacts of e-waste towards marine bivalves: the case of the rare earth element Dysprosium. *Environmental Pollution*, 113859. <https://doi.org/10.1016/j.envpol.2019.113859>

Lucia De Marchi, Francesca Coppola, Amadeu M.V.M. Soares, Carlo Pretti, José Monserrat, Camilla Della Torre, **Rosa Freitas*** (2019). Engineered nanomaterials: from their properties and applications, to their toxicity towards marine bivalves in a changing environment. Review paper. *Environmental Research*. 178: 108683 <https://doi.org/10.1016/j.envres.2019.108683>

Catarina Marques Lecture

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Martins M.C., Santos E.B.H., **Marques C.R.** (2017) First study on oyster-shell-based phosphorous removal in saltwater - A proxy to effluent bioremediation of marine aquaculture. *Science Of The Total Environment*, 574 605-615.

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Science Coffee with Mário J Pereira

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Science Coffee with Cristina B Pita (to be completed)

Science Coffee with Heitor Oliveira Braga

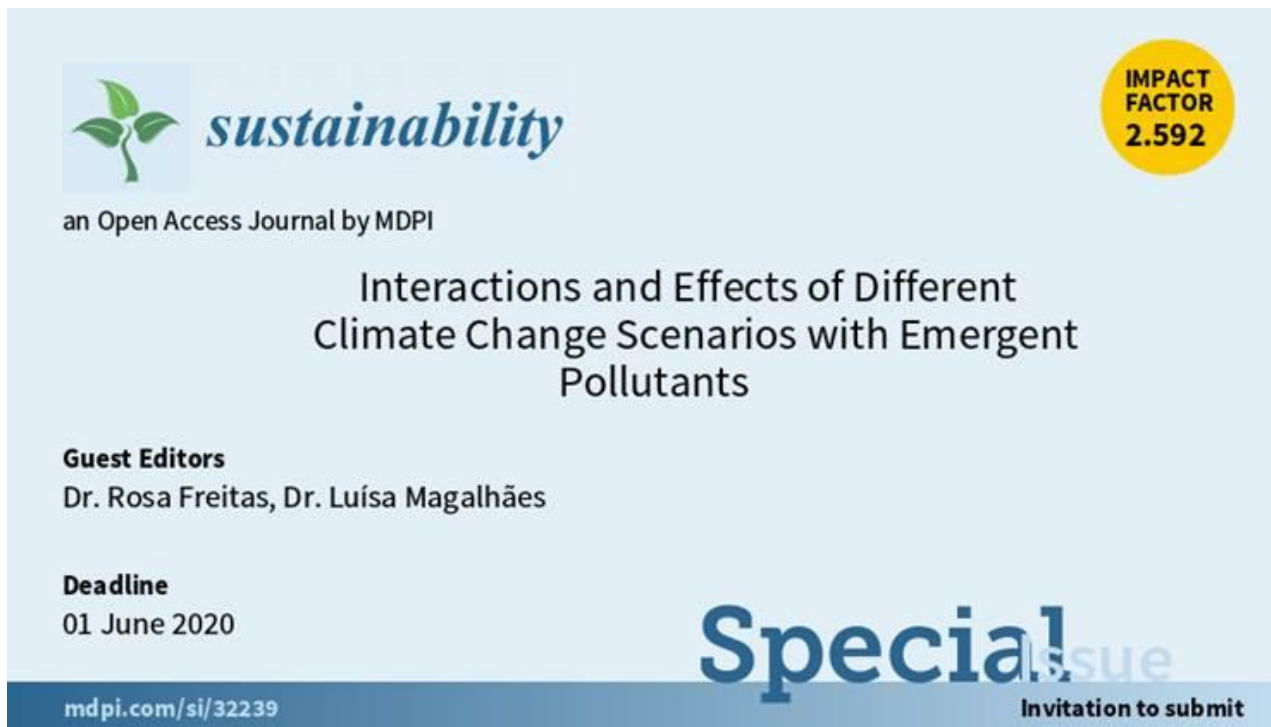
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