ACTIVITY REPORT

CIIMAR 2021

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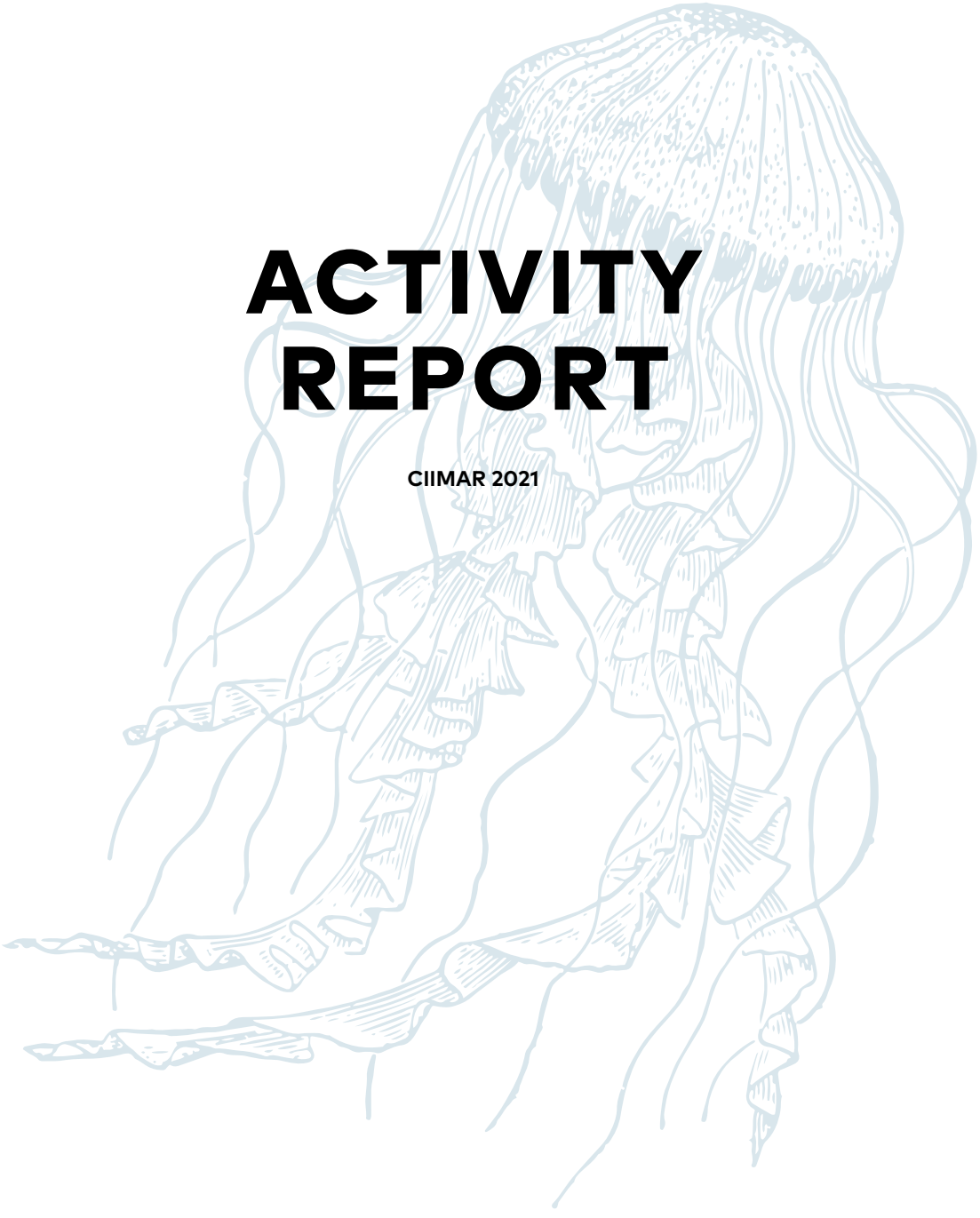
CIIMAR 2021



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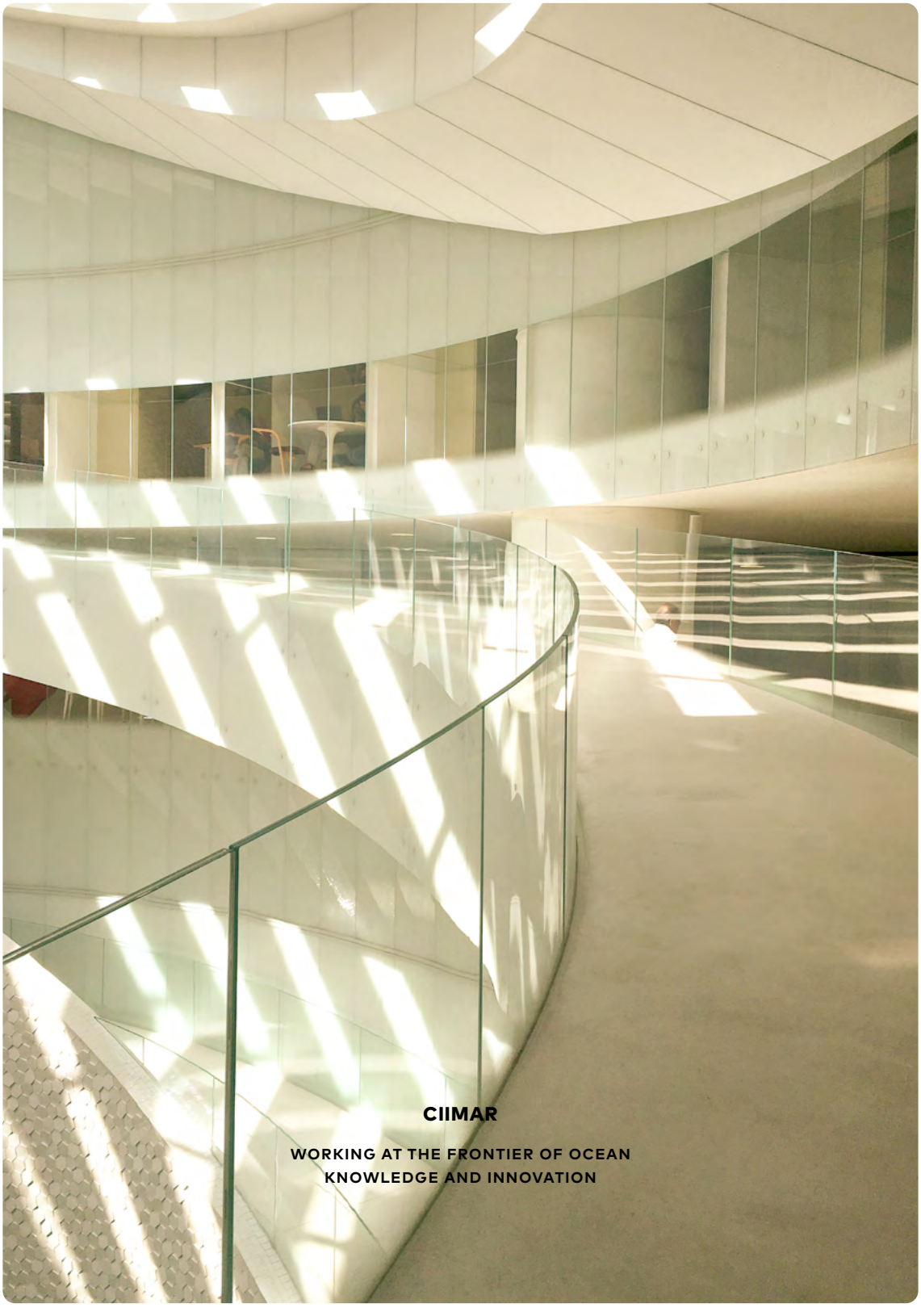

CIIMAR

WORKING AT THE FRONTIER OF OCEAN KNOWLEDGE AND INNOVATION

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MESSAGE FROM THE BOARD

THE DIRECTOR OF THE BOARD OF CIIMAR:
VÍTOR VASCONCELOS

In 2021, CIIMAR continued to withstand the covid-19 pandemic as any other institution all over the world. CIIMAR contingency plan and the covid-19 task force regularly informed our members and issued recommendations and together we continued to implement a strategy to pursue our work with a minimum risk. The board of CIIMAR wants to thank all of our members for the outstanding behaviour during this period what allowed us to keep our laboratories, technical and administrative services working all the time and no outbreak was registered in CIIMAR premises.

In 2021, we kept the trend of attracting national and international funds from the approval of new projects including MIDFun (Horizon 2020), NATURE (JPI Oceans), BLUEFORESTING (EEA Grants). In 2021, the sum of the projects in implementation in CIIMAR raised to 32.3 million euros, including the strategic FCT funding of CIIMAR and CIMAR-LA. CIIMAR participated in several calls and consortia regarding the PRR and three of the proposals were invited to present a final proposal for evaluation. In the framework of the regional funds, CCDR-N approved two new infrastructure projects – MIRRI-PT and PT-OPENSCREEN that will allow the implementation of these two European Infrastructures at CIIMAR. CIIMAR community was also highly engaged in writing proposals for calls of the new Horizon Europe program in the second semester of 2021.

CIIMAR members published 566 publications in internationally peer-reviewed journals and successfully contributed to the graduation of 20 PhD and 99 MSc students. In spite of the pandemic year, we were able to increase the publication rate by 6,2% compared to 2020.

In 2021, one international patents and three provisional patent were submitted, of a total of 18 submitted patents in the last 7 years, reflecting the increasing impact of our research and the success of the implementation of the measures to increase the technology transfer. In 2021 the CIMAR –LA, joining CIIMAR and CCMAR, granted the maintenance of the statute of Associated Laboratory for 10 years, assuring an additional funding for the next 5 years, mostly for human resources.

CIIMAR outreach activities were limited due to the covid-19, but 492 news (online, TV, radio, press) were produced along the year.

In 2021, CIIMAR started the process of ISO17025 and NP4457 and maintained the ISO 9001 certification.

CIIMAR in 2022 will strengthen the relationship with the University of Porto and the Polytechnic of Porto as well as with other public and private stakeholders to establish a legal status that will allow an even better cooperation among all institutions taken into account all the challenges that are expected in the near future. CIIMAR is working together with the Municipality of Matosinhos and the University of Porto to create the opportunity to establish a new headquarters building that will hold the current and growing CIIMAR community and the upcoming spinoffs.

ABOUT CIIMAR

CIIMAR ACTIVITY
REPORT 2021

ABOUT CIIMAR

WORKING AT THE FRONTIER OF OCEAN KNOWLEDGE AND INNOVATION

CIIMAR - Interdisciplinary Centre of Marine and Environmental Research - is a leading research and advanced training institution of the University of Porto, working at the frontier of Ocean Knowledge and Innovation.

CIIMAR fosters an integrated approach to Ocean and coastal areas promoting the understanding and knowledge on physical, chemical and biological dynamics of these environments and the impact of natural and human disturbances, aiming to unravel links between these processes, grasp Ocean and ecosystems functioning and responses to global changes.

CIIMAR uses this knowledge-base to promote the natural capital and the sustained management of marine resources through monitoring of ecosystems health, optimization of aquaculture, and biotechnological exploitation of the resources for environmental and human health applications.

CIIMAR provides innovative solutions and products responding to actual economic and societal challenges. Among them are the demand for high-quality seafood, new drugs and marine products for industrial and medicinal needs, water quality, sustainable fisheries, preparedness for and mitigation of oil and HNS spills, environmental monitoring & risk assessment, preservation of ecosystems services, ocean & coastal management and Ocean Literacy.

HEADQUARTERS

CIIMAR's state-of-the-art facilities for research, training and services are located at the heart of the maritime industry and services in the Northern region of Portugal (Leixões harbour). The Centre features well-equipped laboratories for marine and maritime research, technological core platforms, large scale micro and macroalgae cultivation and animal experimental facilities for freshwater and marine organisms approved by the Portuguese Veterinary Authority.

Besides its headquarters, CIIMAR comprises other partner facilities at five Units from U. Porto - ICBAS and Faculties of Sciences, Engineering, Pharmacy and Law – and at Polytechnic of Porto, Regional Secretariat for Agriculture and Fisheries (RG Madeira) and Portuguese Institute of Sea and Atmosphere (IPMA).

Together with the Algarve Centre of Marine Sciences (CCMAR-Algarve), CIIMAR constitutes the Associated Laboratory CIMAR.

OUR MISSION

To promote transdisciplinary research, technological development and training, contributing to advances in scientific knowledge and sustainability of the marine and coastal environments.

OUR VISION

To provide innovative solutions towards ocean's sustainability, driving oceans value to tackle tomorrow's societal needs.

OUR VALUES

To build a shared understanding and valorisation of the Ocean.

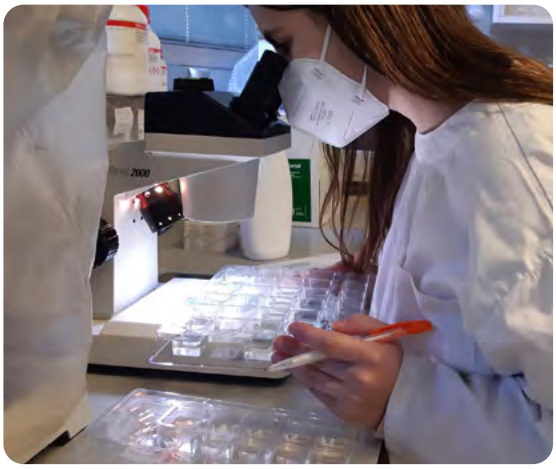
EXCELLENCE

INNOVATION

PARTNERSHIPS

PUBLIC ENGAGEMENT

SUSTAINABILITY



INNOVATION AND TECHNOLOGY TRANSFER

CIIMAR supports the development of a sustainable blue economy, while tackling important societal challenges. The centre follows an innovation-based strategy to foster the development and transfer of technologies, promoting market-oriented research, industry liaison, unravelling opportunities for new products and services with a strong technology and innovation component.

Disruptive ideas and technologies are driven to business ideation and acceleration programmes, enabling knowledge value creation through entrepreneurship.

CIIMAR participates in National and European Knowledge and Innovation Networks – e.g. EuroMarine, European Marine Board, Fórum Oceano, BLUEBIO ALLIANCE, and B2E CoLAB – Collaborative Laboratory for Blue Economy.

CIIMAR Technology Platforms are integrated in relevant National and European research infrastructures, such as European Marine Biological Resource Centre (EMBRC-ERIC), European Multidisciplinary Sea Floor and Water Column Observatory (EMSO-ERIC), MIRRI-PT, BioData.PT and OPENSCREEN-PT, as part of the technology transfer strategy of the Centre fostering collaborations with the industry.

SCIENCE AND SOCIETY

CIIMAR has an extensive Science Communication Program addressed to all society sectors. In 2021, in spite of the strong limitations due to the COVID-19 situation, CIIMAR developed a range of on-line and outdoor activities mostly dedicated to schools, with a special emphasis to the collaboration protocols with “Clubes Ciência Viva” and the Municipality of Matosinhos. In addition, CIIMAR continuously developed weekly seminars dedicated to science dissemination and provided a number of public lectures and debates, in particular under the Serralves Fundation Protocol. CIIMAR adapted many outreach activities to different online communication channels, including the production of numerous videos and contents. CIIMAR enriched communication with society by an extensive media outreach through the main media channels, including press and social media.

The exhibition “Marine Monsters”, made in collaboration with the artist Ricardo NicDealm about Ocean plastic pollution was present in Ponte de Sor, Matosinhos and Sintra and the traveling exhibition “Plastic Sea” was presented in 3 locations.

CIIMAR is also responsible for the scientific management of two Environmental Monitoring and Interpretation Centres (CMIAs) through cooperation protocols with the City Councils of Vila do Conde and Matosinhos.

SOCIAL ORGANS

THE CURRENT SOCIAL ORGANS:

GENERAL ASSEMBLY

PRESIDENT

Eduardo Rocha

CHAIRS

Aires Oliva Teles
Francisco Taveira Pinto
Carlos Vale
Susana Moreira

BOARD

PRESIDENT

Vítor Vasconcelos

BOARD MEMBERS

Ana Paula Mucha
Isabel Sousa Pinto
Luísa Valente
Rodrigo Ozorio

FISCAL COUNCIL

PRESIDENT

Luísa Bastos

MEMBERS

José Fernando Gonçalves
Helena Peres

RESEARCH

THE CENTRE IS SCIENTIFICALLY ORGANIZED IN THREE MAIN RESEARCH LINES

MARINE BIOTECHNOLOGY

Research is focused on the exploration of a wealth of Ocean resources for the discovery and characterization of new bioactive compounds with ecological, pharmaceutical or other industrial applications. The study of emerging toxins, development of biosensors for early detection systems, and development of bioremediation and phytoremediation tools for ecosystem recovery are other main goals of this research line.

P.I. Vitor Vasconcelos

GLOBAL CHANGES AND ECOSYSTEMS SERVICES

CIIMAR provides basic knowledge and tools to support the protection and management of marine, estuarine and freshwater ecosystems. Sustainable exploitation of ocean resources with production of valuable goods and services is fostered. Work is done in close collaboration with SMEs, international and local authorities, and stakeholders.

P.I. Lúcia Guilhermino

BIOLOGY, AQUACULTURE AND SEAFOOD QUALITY

Development of new aquaculture species, products, and innovative culture methods are central approaches to tackle societal challenges related to human nutrition and seafood quality. High impact scientific knowledge and innovation in these areas are provided through basic and applied research and transferred to end-users and the industry.

P.I. Luísa Valente

RESEARCH LINE	RESEARCH GROUPS	RESEARCH TEAMS
MARINE BIOTECHNOLOGY	BIOREMEDIATION PROCESSES	BIOREMEDIATION AND ECOSYSTEMS FUNCTIONING
	EVOLUTIONARY GENOMICS AND BLUE BIOTECHNOLOGY	BLUE BIOTECHNOLOGY AND ECOTOXICOLOGY
		CYANOBACTERIAL NATURAL PRODUCTS
		EMERGENT BIOTECHNOLOGIES AND SEAFOOD PROCESSING
		EVOLUTIONARY GENOMICS
	NATURAL PRODUCTS AND MEDICINAL CHEMISTRY	CHEMISTRY AND BIOLOGICAL ACTIVITY OF MARINE NATURAL PRODUCTS
		MEDICINAL CHEMISTRY: DRUG DISCOVERY AND DRUG DESIGN
GLOBAL CHANGES & ECOSYSTEMS SERVICES	AQUATIC BIODIVERSITY AND CONSERVATION	AQUATIC ECOLOGY AND EVOLUTION
		BENTHIC ECOLOGY
		COASTAL BIODIVERSITY
		DEEP SEA BIODIVERSITY AND CONSERVATION
		ESTUARINE ECOLOGY AND BIOLOGICAL INVASIONS
		HYDROBIOLOGY
	CONTAMINATION PATHWAYS AND MECHANISMS OF TOXICITY	CONTAMINANT PATHWAYS AND INTERACTIONS WITH MARINE ORGANISMS
		ECOTOXICOLOGY, STRESS ECOLOGY AND ENVIRONMENTAL HEALTH
		ENDOCRINE DISRUPTORS AND EMERGENT CONTAMINANTS
		MARINE AND COASTAL ENVIRONMENTAL TOXICOLOGY
		SOIL/WATER INTERACTIONS
	LAW OF THE SEA	LAW OF THE SEA
	OCEAN DYNAMICS, COASTAL AND WATER SYSTEMS	COASTAL AND OCEAN DYNAMICS
		COASTAL MONITORING AND MANAGEMENT
		MARINE ENERGY
		WATER RESOURCES SYSTEMS
	SUSTAINABILITY AND SOCIAL AND EDUCATIONAL INNOVATION	SUSTAINABILITY AND SOCIAL AND EDUCATIONAL INNOVATION
BIOLOGY, AQUACULTURE & SEAFOOD QUALITY	ANIMAL NUTRITION AND HEALTH	ANIMAL HEALTH AND AQUACULTURE
		ANIMAL PATHOLOGY
		NUTRITION AND IMMUNOBIOLOGY
	ANIMAL PHYSIOLOGY AND FUNCTIONAL GENOMICS	ANIMAL GENETICS AND EVOLUTION
		ECOPHYSIOLOGY
		HISTOMORPHOLOGY, PHYSIOPATHOLOGY AND APPLIED TOXICOLOGY
	AQUACULTURE AND SEAFOOD SAFETY	NUTRITION, GROWTH AND QUALITY OF FISH
		SAFE AND HEALTHY SEAFOOD AND SUSTAINABLE CONSUMPTION

TECHNOLOGY PLATFORMS

CIIMAR Platforms developed under various European Marine Sciences Infrastructure Networks (e.g. EMBRC, EMSO, MIRRI-PT and OPENSREEN-PT) represent a new strategic axis of the Centre to grant access from other institutions in the European Research Area and companies. These Platforms provide access and offer support and expertise to wide range of experimental services and equipment.

ADVANCED TRAINING

CIIMAR is a renowned centre for advanced training of researchers in Marine and Environmental Sciences, supporting several national and European Master and PhD programmes, undergraduate studies and advanced courses.

PHD PROGRAMMES

- ANIMAL SCIENCE (INDUSTRIAL SETTING – SANFEED)
- AQUATIC SCIENCES – BIOLOGY AND ECOLOGY
- BIOLOGY
- ENVIRONMENTAL TOXICOLOGY AN ECOLOGY
- MARINE BIOTECHNOLOGY AND AQUACULTURE
- MARINE SCIENCES AND MANAGEMENT (DO MAR)

CAL-AQUA

LABORATORY ANIMAL SCIENCES COURSE – AQUATIC ORGANISMS

The CAL-AQUA course is aimed at teachers, researchers, students and technicians who need to acquire training in Science in Aquatic Laboratory Animals, with a particular focus on aquatic vertebrates. The course is in accordance with the criteria established by the General Directorate of Food and Veterinary and FELASA (6 ECTS; Category B, functions (a), (c) and (d) defined by Directive 2010/63/EU).

BYT

BLUE YOUNG TALENT

A pre (BYT) and two post-graduate (BYTplus, BYTPhD) programs aims to attract talents to research areas such as marine biotechnologies, global changes, ecosystem services, conservation, aquaculture and nutrition, providing to the best students of the first, second and third cycle stimulating and excellent scientific environment training, in partnership with industry and SMEs.

CIIMAR SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

The Sustainable Development Goals (SDGs) are an urgent call for action, seeking the end of poverty and other deprivations, improve health and education, reduce inequality, and spur economic growth, while tackling climate change and working to preserve our oceans and life on Earth.

The CIIMAR mission and scope of action are in line with numerous UN Sustainable Development Goals, by developing advanced and applied research in many key societal areas, in particular:

CIIMAR has also a strong social commitment to contribute to increase Ocean literacy and education by promoting campaigns such as the Ocean Action, which aims to raise awareness about the problem of plastics in the Ocean, as well as traveling exhibitions, lectures and activities at schools and public spaces. CIIMAR has an ongoing protocol with Serralves Foundation to promote a communication plan about science and environmental emergent issues.

CIIMAR also participates regularly in social solidarity campaigns, e.g. collecting food and other goods for social solidarity institutions.

ENVIRONMENTAL RESPONSIBILITY

CIIMAR keeps in progress the campaign “Stop the Plastic Tide!” to decrease the use of single-use plastics. This campaign begun in the common areas, where there are no longer plastic water bottles on sale, nor plastic cups in the coffee machine. A filtration system has also been installed in a tap water. All guests are served in glass bottles and glass cups, and the use of reusable bottled water and coffee mugs with the campaign brand is encouraged. A recycling system has also been installed in the coffee lounge which best suits the needs of its users, and will soon be extended to other areas.

EMPLOYEE VALORISATION

Many activities and formations are developed for employee and career valorisation, such as SIS training actions, internal communication seminars and other areas of non-scientific interest, BOGA training workshops, career management seminar, Blue Think Conference.

2021 AT A GLANCE

JAN

Participation in the Assemble Plus Conference 2021

CIIMAR granted with quality certification by the ISO9001

FEB

Kick-off meetings of the PONDERFUL and MAELSTROM projects

First meeting of ATLANTIDA's RL3 project

CIIMAR Researcher Isabel Sousa Pinto nominated for FCT National Council for Science, Technology and Innovation

MAR

Celebration of the CIIMAR 21st anniversary

MODELRISK project was awarded with ITOPF R&D Award 2021

CIIMAR director Vitor Vasconcelos wins the UPorto Scientific Excellence Award 2021

Probio Vaccine project wins BIP Proof Award

APR

LEGE-CC collection 30th aniversary and Live Tour

CIIMAR integrates international consortium with the CetAMBICion project

3 Papers from CIIMAR Researchers recognized by the IACOBUS - Papers Award

Researchers from CIIMAR initiate POSEIDON research project

Disclose genome of the freshwater pearl mussel published at DNA Research

MAY

Kick-off meeting of the OCEAN3R project

Six CIIMAR scientists recognised as top influential researchers wordwide

Kick-off meeting of the Adaptchange project

"Marine Monsters" exhibition at the GREENFEST Braga

JUN

Biannual meeting of the Agritox project

Participation in the Bioblitz Serralves 2021

Celebration of Ocean Clean Up Day, organised by NetTag project

Launch meeting of the PONDERFUL project

Final event of the NetTag project

JUL

Sustainable antifouling agents projects wins Ocean Award 2021 by Mirpuri Foundation

CIIMAR organises the first Animal Health Symposium

Closing session of the Blue Young Talent (BYT) program

Final event of the VALORMAR project

Inauguration of the "Marine Monsters" and "Plastic Ocean" exhibitions at Ponte de Sor

AGO

Co-organization of the I Congreso Internacional de Biotecnología y Bioingenieria, at Arequipa, Peru

SEP

World Cleanup Day celebration with a Beach Clean up organised by Project MAELSTROM

Organisation of the Blue Think Conference, by the PhD Students'committee

Participation at the Global Conference on Aquaculture by FAO

European Maritime Day (EMD) organization at CIIMAR

OCT

CIIMAR Open Day celebration

Celebration of the 10th anniversary of Charcos com Vida campaign

Organisation of the 6th GelAvista Meeting

CIIMAR is part of the scientific consortium of the North Coast Observatory in Viana do Castelo

Participation in the University-Industry Meeting - Innovation and Entrepreneurship, Sherpa do Mar project

Participation in Aquaculture Europe 2021

NOV

ProbioVaccine project wins the 928Challenge

Several CIIMAR researchers among the top scientists at the Stanford University Ranking

CIIMAR joined BioData.PT

Organisation of the XIII Portuguese Polar Sciences Conference

Inauguration of the "Marine Monsters" and "Plastic Ocean" Exhibition at the SMAS, Sintra

Organization of the workshop Atlantida at Business2Sea 2021

DEZ

Organisation of the Final Workshops of the BIOREM and Tools4Breed projects

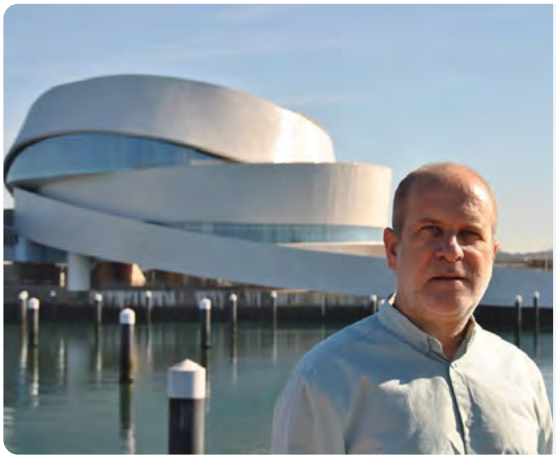
HIGHLIGHTS

CIIMAR QUALITY CERTIFICATION BY THE ISO9001

CIIMAR was granted quality certification by the ISO9001 standard, a management system that aims to guarantee the optimization of processes and greater agility and efficiency in product development. This international certification created by ISO (International Organization for Standardization) is adopted worldwide by successful companies and demonstrates the quality control and excellence of the research center.

CIIMAR RESEARCHERS AT TOP SCIENTISTS OF STANFORD UNIVERSITY RANKING

The ranking prepared by the Stanford University (USA) highlighted twelve CIIMAR researchers among the most influential worldwide: Anake Kijjoa, Aires Oliva Teles, Carlos Azevedo, Carlos Vale, Filipe Castro, Helena Peres, Jorge Eiras, Lucia Guilhermino, Luísa Valente, Madalena Pinto, Paula Enes and Vitor Vasconcelos. The analysis based on more accurate standardized citation metrics covered about 7 million scientists, with a ranking of the top 100,000.



VITOR VASCONCELOS WINS THE SCIENTIFIC EXCELLENCE AWARD 2021

CIIMAR director Professor Vitor Vasconcelos wins the Scientific Excellence Award at the University of Porto 2021, which aims to recognize the scientists of the institution that stand out in the field of scientific research. Vítor Vasconcelos sees the awarding of a 35-year connection to the University of Porto, where he started as a student and developed a path of excellence in the areas of research and teaching, but also in the fields of technology transfer and scientific dissemination.

30 YEARS OF LEGE-CC COLLECTION

The LEGE-CC collection of cyanobacteria and microalgae from CIIMAR celebrated 30 years of existence in April 2021. The collection gathers 1200 strains of cyanobacteria and microalgae, in an authentic library of marine and freshwater organisms, which is recognized worldwide through the platforms EMBRC, MIRRI and EU-OPENSCREEN. Through these platforms the collection is accessible to researchers around the world, making it possible to maximize its potential in the investigation of new products of natural origin.

FACTS & FIGURES

CIIMAR ACTIVITY
REPORT 2021

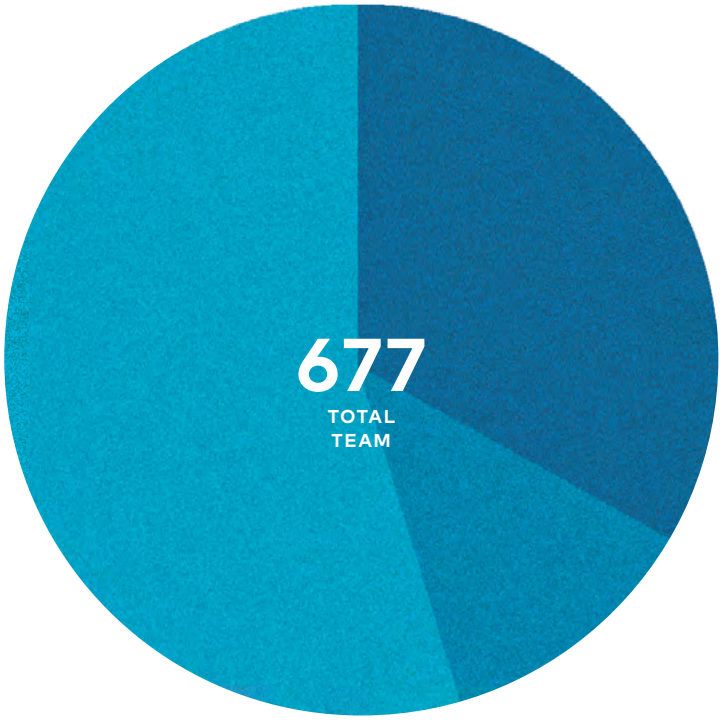
OUR TEAM

CIIMAR 2021

369 Non-PhD holders

225 Integrated PhD holders

83 Non-integrated PhD holders



Integrated PhD holders

Researchers
119

University Staff
63

Post Doctoral Fellows
10

Supporting Offices and Services
6

Lab Technicians
2

Other Professional Situations
25

Non PhD holders

PhD Students
171

Msc Students
77

Research Fellows
36

Supporting Offices and Services
26

Lab Technicians
9

Other Professional Situations
50

291 Male

386 Female

25 Nationalities

32 Supporting offices and services

SCIENTIFIC PUBLICATIONS

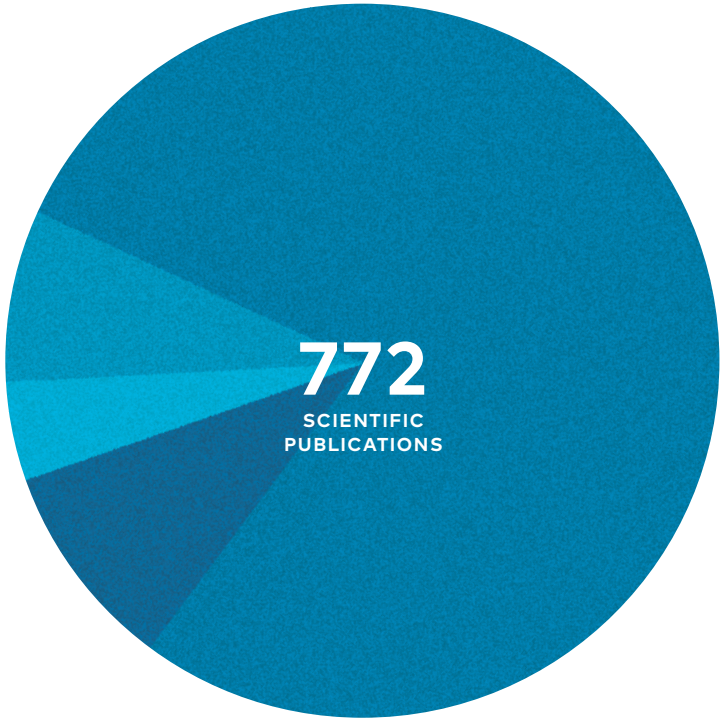
CIIMAR 2021

566 Publications in peer reviewed journals

57 Edited special issues of journals

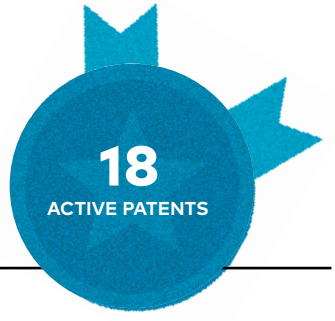
31 Books and Book chapters

68 Other publications



20 Completed PhD theses under the supervision of integrated members

99 Completed MSc theses under the supervision of integrated members



2021 Milestones

3 Provisional patent applications

1 National patent application

1 International patent application

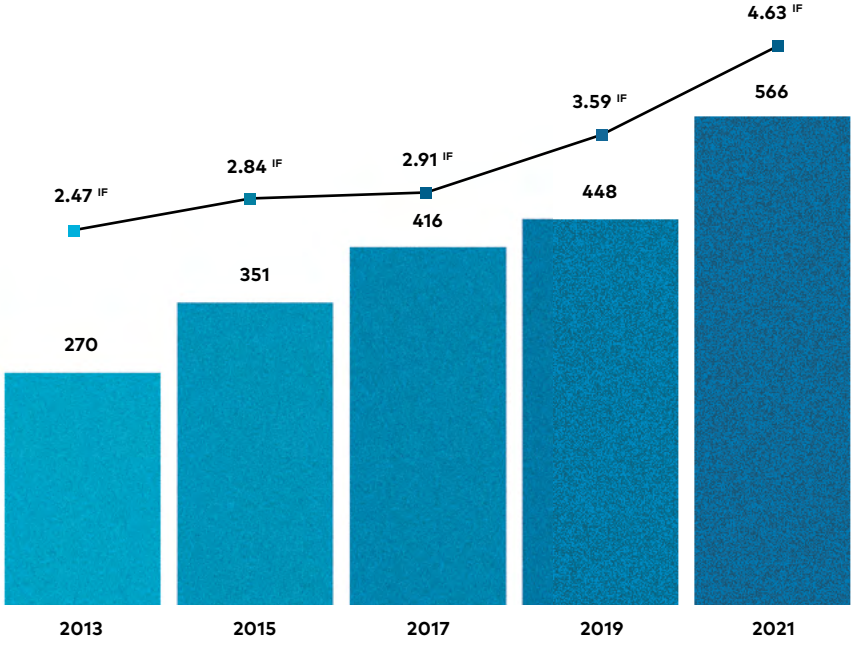
1 Granted national patent

PUBLICATIONS

CIIMAR 2021

Nr. of publications in peer reviewed journals

IF Average Impact Factor



R&D PROJECTS

CIIMAR 2021

13 — 7.36 M€ — (A) **European Funds** — Horizon 2020

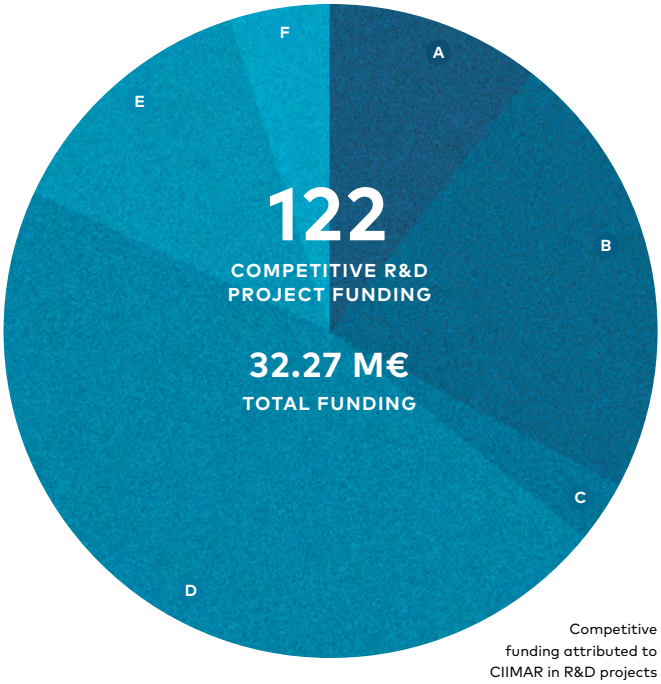
27 — 2.78 M€ — (B) **Other European Funds** — INTERREG, EEA GRANTS, Others

4 — 1.79 M€ — (C) **Regional Funds** — Norte2020

56 — 17.95 M€ — (D) **National funds** — FCT

16 — 2.14 M€ — (E) **National funds** — Portugal2020 | ANI, IAPMEI

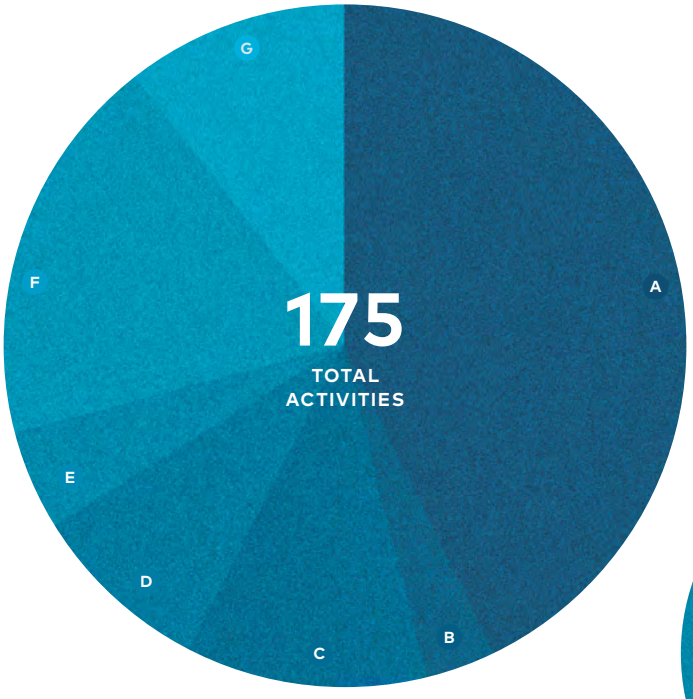
6 — 0.25 M€ — (F) **Other national funds**



Competitive funding attributed to CIIMAR in R&D projects in execution during 2021

OUTREACH ACTIVITIES

CIIMAR 2021



75 A **Activities and lectures at schools**
3431 Participants

6 B **Visits and activities at CIIMAR**
71 Participants

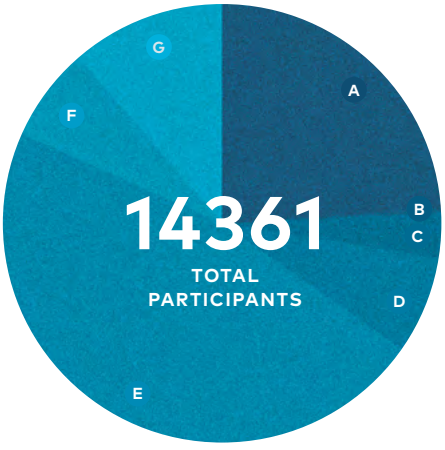
20 C **Outdoor activities**
485 Participants

15 D **Public lectures**
1006 Participants

8 E **Exhibitions**
6768 Participants

33 F **Scientific seminars**
990 Participants

18 G **Workshops**
1610 Participants

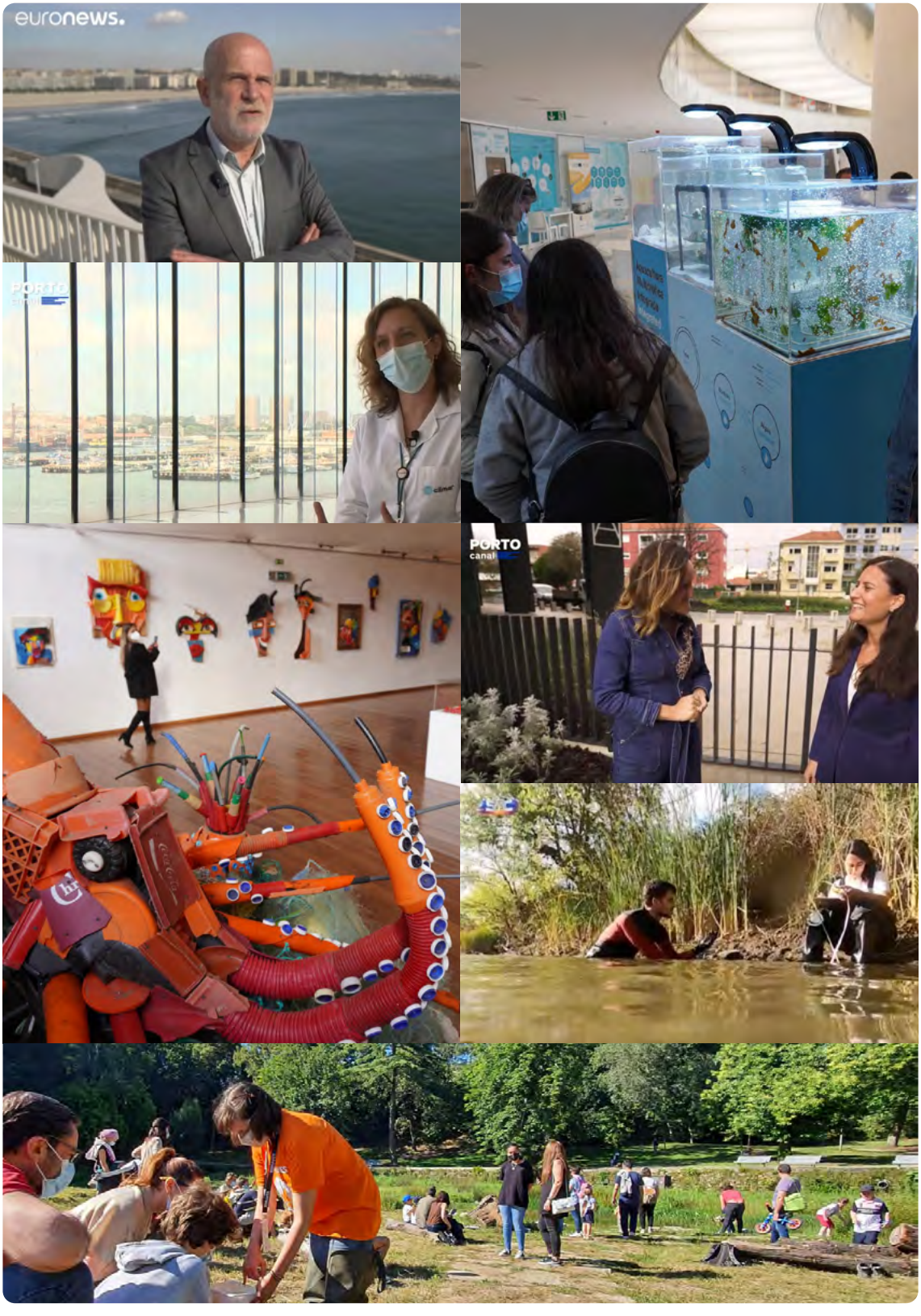


395 Online news
64 Print
17 Radio
16 TV

609 Twitter
630 Facebook
481 Linkedin
16 Youtube

431
COMMUNICATIONS IN INTERNATIONAL SCIENTIFIC MEETINGS

25
Training courses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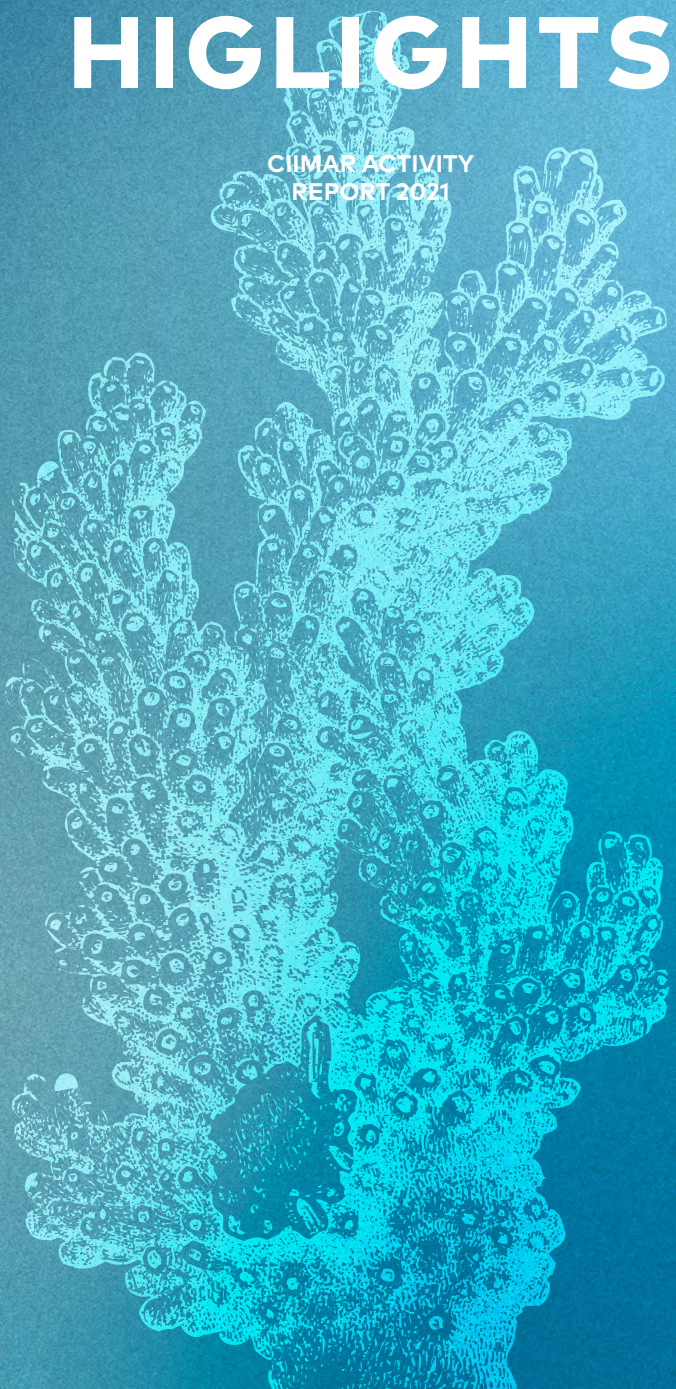
PROJECT HIGLIGHTS

CIIMAR ACTIVITY REPORT 2021



AQUACOMBINE

H2020 PROGRAM

INTEGRATED ON-FARM AQUAPONICS SYSTEMS FOR CO-PRODUCTION OF FISH, HALOPHYTE VEGETABLES, BIOACTIVE COMPOUNDS, AND BIOENERGY

Principal Investigator at CIIMAR: **Benjamin Costas**
Leader Institution: **Aalborg Universite**
Website: **aquacombine.eu**

Funded by the European Union

One of the most important challenges of the 21st century is to meet the world's demand for sustainably produced biomass for both food and the growing bio-products sector. Increased use of fresh water for agriculture and loss of farmland due to salinity are related concerns.

Salicornia europaea (S. *europaea*) is grown commercially in the EU for its fresh tips, which are edible as salad (marsh samphire). It is a halophyte plant and can grow on saline lands without requiring freshwater for irrigation. When grown as a vegetable only the fresh tips are used while the woody part of the plant is considered a residue.

Today, European farmers are using part of the fibrous residue for soil amendment and drying the fibers to produce herbal salt. However, the amount of residue to food product is large (approximately 80%) and the salt content of the residue is a problem when used for soil amendment, as it returns the salt to the soil.

There is a great wish from Salicornia farmers to increase the value of this fraction in line with the principles of circular economy. The woody residue part of Salicornia has been investigated as a source of pharma- and nutraceutical products due to its high content of phytochemicals e.g. hydroxycinnamic acids (HCA).

To help increase Salicornia farming there is a wish to valorize these residues via biochemicals and bioenergy production. The project will also examine the combination of aquaculture and Salicornia farming creating synergies such as formulation and test of phyto-chemicals rich functional fish feed and formulation and test of protein and lipids rich fish feed.

The outcomes of this study will enable Salicornia farmers and aquaponics farms to utilize all fractions of the produced biomass and produce value added HCAs, functional fish feed, and bioenergy. This will create new circular industries with co-production of food, pharma, and bioenergy from this new sustainable type of crop with very little or no production of waste streams.

ASSEMBLE PLUS

H2020 PROGRAM

ASSOCIATION OF EUROPEAN MARINE BIOLOGICAL LABORATORIES EXPANDED

Principal Investigator at CIIMAR: **Vitor Vasconcelos**
Leader Institution: **UPMC**
Website: **assembleplus.eu**

Funded by the European Union

ASSEMBLE Plus will provide scientists from academia, industry and policy with a quality-assured programme of access to the marine biological station facilities and resources. These stations offer a wide variety of services, including access to marine ecosystems, unique marine biological resources, state-of-the-art experimental and analytical facilities with integrated workflows, historical observation data, and advanced training opportunities. The goal of the project is to stimulate European fundamental and applied research excellence in marine biology and ecology, thereby improving our knowledge and technology-base for the European bioeconomy, policy shaping and education.

ASSEMBLE Plus brings together 32 marine stations and institutes with modern research infrastructures and track-records of unique service provision, from 14 European and two associated countries, under the leadership of the European Marine Biological Resource Centre (EMBRC), an ESFRI consortium developed from the previous ASSEMBLE (FP7) partnership.

The sum of the actions envisaged in ASSEMBLE Plus, including Access, Networking and Research will ultimately increase the number of users of marine biological stations and shape novel strategic development perspectives of the partners, to be based on effective integration and efficient complementarities, resulting in a key contribution to their long-term sustainability.

BLUEBIO4FUTURE

H2020 PROGRAM

BLUE BIOTECHNOLOGY AND BIOENGINEERING FOR THE CURRENT AND FUTURE DEVELOPMENT OF A BLUE BIOECONOMY IN PORTUGAL

Principal Investigator at CIIMAR: **Vitor Vasconcelos**
Leader Institution: **CIIMAR**
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Funded by the European Union

Marine Biotechnology (MB) was identified by the EU Blue Growth Strategy (2012) as an enabling activity of high potential for the bioeconomy of Europe. Many products from marine biotechnology are already used in global markets for food and feed, cosmetics, aquaculture, agriculture, chemistry and pharmacology. Nevertheless, the potential for new products development is huge since marine biodiversity and in special, the marine microbiome, is far from being known and exploited. For that purpose, the aspects of Bioengineering - bioprocesses, synthetic biology, green chemistry and bioinformatics – are fundamental. BlueBio4Future aims to enhance CIIMAR research excellence in MB area, in special Bioengineering, contributing to increase attractiveness for outstanding researchers and to establish a long-term impact at regional, national and European levels. The ERA Chair holder will establish a high-performing team in MB at CIIMAR, contributing to increase the knowledge and competitiveness of CIIMAR in the area of MB. This will be done by attracting funds at national and international level, by the supervision of MSc and PhD students, producing high-ranked research outputs, protecting intellectual property and transferring knowledge to stakeholders and contributing to increase literacy in MB. In order to produce structural changes at CIIMAR in the area of MB, there is a need to attract outstanding researchers in the field of Bioengineering that could implement the framework for strengthening a long-term research and innovation enabling environment in the area of MB. The establishment of the ERA CHAIR BlueBio4Future will increase the levels of the research activity in the area of bioengineering in CIIMAR, enhance the capability of the CIIMAR to succeed in competitive research funding, contribute to RIS3 strategies and increased interaction with main actors of the innovation ecosystem and will promote institutional changes to comply with ERA priorities.

EMERTOX

H2020 PROGRAM

EMERGENT MARINE TOXINS IN THE NORTH ATLANTIC AND MEDITERRANEAN: NEW APPROACHES TO ASSESS THEIR OCCURRENCE AND FUTURE SCENARIOS IN THE FRAMEWORK OF GLOBAL ENVIRONMENTAL CHANGES

Principal Investigator at CIIMAR: **Vitor Vasconcelos**
Leader Institution: **CIIMAR**
Website: **emertox.eu**

Funded by the European Union

EMERTOX aims at mapping the actual situation in emergent marine toxins and the producing organisms, developing new approaches to assess their occurrence and predicting the possible future scenarios in the framework of global warming.

The partnership, formed by a multidisciplinary team, will produce a joint research and innovation project that will exploit the complementary expertise of the participants and will create synergies among them.

The main objectives are:

1. to assess the current situation on potentially harmful algae and bacteria and the relevant emerging toxins in 8 countries belonging to different but geographically connected areas (Mediterranean Sea and North Atlantic);
2. to develop innovative approaches to sample, and analyze the producing organisms and their toxins by chemical and biological methods including immunoassays and sensors;
3. to estimate different future scenarios based on molecular data (routes of dispersion) and modelling.

FATTYCYANOS

H2020 PROGRAM

FATTY ACID INCORPORATION AND MODIFICATION IN CYANOBACTERIAL NATURAL PRODUCTS

Principal Investigator at CIIMAR: **Pedro Leão**
Leader Institution: **CIIMAR**

Funded by the European Union
erc European Research Council

Known, but mostly novel natural products (NPs) are in high demand – these are used in drugs, cosmetics and agrochemicals and serve also as research tools to probe biological systems. NP structures inspire chemists to develop new syntheses, and NP biosynthetic enzymes add to the metabolic engineer's toolbox.

The advent of next generation DNA-sequencing has revealed a vastly rich pool of NP biosynthetic gene clusters (BGCs) among bacterial genomes, most of which with no corresponding NP. Hence, opportunities abound for the discovery of new chemistry and enzymology that has the potential to push the boundaries of chemical space and enzymatic reactivity.

Still, we cannot reliably predict chemistry from BGCs with unusual organization or encoding unknown functionalities, and, for molecules of unorthodox architecture, it is difficult to anticipate how their BGCs are organized.

It is the valuable, truly novel chemistry and biochemistry that lies on these unexplored connections, that we aim to reveal with this proposal. To achieve it, we will work with a chemically-talented group of organisms – cyanobacteria, and with a specific structural class – fatty acids (FAs) – that is metabolized in a quite peculiar fashion by these organisms, paving the way for NP and enzyme discovery. On one hand, we will exploit the unique FA metabolism of cyanobacteria to develop a feeding strategy that will quickly reveal unprecedented FA-incorporating NPs.

On the other, we will scrutinize the intriguing biosynthesis of three unique classes of metabolites that we have isolated recently and that incorporate and modify FA-moieties. We will find the BGCs for these compounds and dissect the functionality involved in such puzzling modifications to uncover important underlying enzymatic chemistry.

This proposal is a blend of discovery- and hypothesis-driven research at the NP chemistry/biosynthesis interface that draws on the experience of the PI's work on different aspects of cyanobacterial NPs

FUTUREMARES

H2020 PROGRAM

CLIMATE CHANGE AND FUTURE MARINE ECOSYSTEM SERVICES AND BIODIVERSITY

Principal Investigator at CIIMAR: **Francisco Arenas**
Leader Institution: **University of Hamburg**
Website: **futuremares.eu**

Funded by the European Union

Marine and transitional ecosystems provide fundamental climate regulation, food provisioning and cultural services. FutureMARES provides socially and economically viable nature-based solutions (NBS) for climate change (CC) adaptation and mitigation to safeguard these ecosystems' natural capital, biodiversity and services.

The program advances understanding of the links between species and community traits, ecological functions and ecosystem services as impacted by CC by analysing the best available data from monitoring programs and conducting targeted experiments and beyond state-of--the-art modelling.

Ensemble physical-biogeochemical projections will identify CC hotspots and refugia. Shifts in the distribution and productivity of keystone, structural and endangered species and the consequences for biodiversity will be projected within different CC-NBS scenarios to reveal potential ecological benefits, feedbacks and trade-offs. Novel, socialecological vulnerability assessments will rank the severity of CC impacts on various ecosystem services and dependent human communities.

Complementary analyses at real-world demonstration sites will inform managers and policy-makers on the economic costs and tradeoffs of NBS. These physical, ecological, social and economic analyses will be integrated to develop three, climate-ready NBS:

1. restoration of habitat-forming species acting as 'climate rescuers' buffering coastal habitats from negative CC effects, improving seawater quality, and sequestering carbon,
2. conservation actions explicitly considering the range of impacts of CC and other hazards on habitat suitability for biota to preserve the integrity of food webs (e.g. marine protected areas) and protect endangered species (e.g. charismatic megafauna), and
3. sustainable, ecosystem-based harvesting (capture and culture) of seafood.

FutureMARES is co-developed with policy-makers and managers to ensure impactful and transformative cost--effective actions.

GENIALG

H2020 PROGRAM

GENETIC DIVERSITY EXPLOITATION FOR INNOVATIVE MACRO-ALGAL BIOREFINERY

Principal Investigator at CIIMAR: **Isabel Sousa Pinto**
Leader Institution: **Centre National de la Recherche Scientifique**
Website: **genialgproject.eu**

Funded by the European Union

Seaweed, or "macro-algae", has long been recognised as a valuable source of diverse bioactive compounds and has great potential to be used in pharmaceuticals, nutraceuticals and functional foods. However, until now, seaweed has been underexploited in Europe due to the challenges of expanding seaweed biomass production: costs need to be reduced, scales of production need to be increased, quality improved, and seaweed biomass needs to be successfully refined into multiple useful products. If these issues can be addressed, seaweed biomass production could become more economically and environmentally sustainable.

The overall objective of the GENIALG project is to boost the European Blue Economy by designing high-yielding seaweed cultivation systems. GENIALG aims to increase the production and sustainable exploitation of two high biomass yielding species of European seaweed: the brown algae (or sugar kelp) *Saccharina latissima* and the green seaweed (or sea lettuce) *Ulva rigida*. GENIALG is the first industry-driven project bringing together pioneering companies in large-scale integrated European biorefineries and experts in seaweed cultivation, genetics and metabolomics to boost the seaweed industry. GENIALG will combine available knowledge in seaweed biotechnology with reliable eco-friendly tools and methods to scale up current small cultivation seaweed operations.

Two pilot pre-industrial seaweed biorefinery plants will provide vital seaweed compounds for a wide range of products such as cosmetics, pharmaceuticals, food and feed ingredients, fine and specialty chemicals, additives and blends such as gels, as well as precursors for biodegradable plastics. GENIALG will help lead the way in the Blue Biotechnology sector in Europe, while addressing social acceptability and competition for maritime space.

IGNITE

H2020 PROGRAM

COMPARATIVE GENOMICS OF NON-MODEL INVERTEBRATES

Principal Investigator at CIIMAR: **Agostinho Antunes**
Leader Institution: **Ludwig-Maximilians-Universitaet Muenchen**
Website: **itn-ignite.eu**

Funded by the European Union

Invertebrates, i.e., animals without a backbone, represent 95% of animal diversity on earth but are a surprisingly underexplored reservoir of genetic resources. The content and architecture of their genomes remains poorly characterised, but such knowledge is needed to fully appreciate their evolutionary, ecological and socio-economic importance, as well as to leverage the benefits they can provide to human well-being, for example as a source for novel drugs and biomimetic materials.

Europe is home to world-leading expertise in invertebrate genomics and IGNITE will gather together this European excellence to train a new generation of scientists skilled in all aspects of invertebrate genomics. We will considerably enhance our knowledge and understanding of animal genome knowledge by generating and analysing novel data from undersampled invertebrate lineages and by developing innovative new tools for high-quality genome assembly and analysis.

The well-trained genomicists emerging from IGNITE will be in great demand in universities, research institutions, as well as in software, biomedical, agrofood and pharmaceutical companies. Through their excellent interdisciplinary and intersectoral training spanning from biology and geobiology to bioinformatics and computer science, our graduates will be in a prime position to take up leadership roles in both academia and industry in order to drive the complex changes needed to advance sustainability of our knowledge-based society and economy.

MAELSTROM

H2020 PROGRAM

NEW SOLUTIONS FOR THE RECOVERY OF MARINE PLASTICS AND LITTER

Principal Investigator at CIIMAR: **Isabel Sousa Pinto**
Leader Institution: **Consiglio Nazionale delle Ricerche, Italy**
Website: **maelstrom-h2020.eu**

Funded by the European Union

The global marine plastic litter challenge comprises an estimated stock of 83 million tonnes of plastic waste accumulated in oceans. The recovery of plastic materials already in the ocean is an arduous and costly task. This is why innovations are urgently needed. The EU-funded MAELSTROM project is bringing together key stakeholders – from research centres and recycling companies to marine scientists and robotic experts – for the sustainable removal of marine litter in different European coastal ecosystems. The project will design, manufacture and integrate scalable, replicable and automated technologies, co-powered with renewable energy and second-generation fuel, to identify, remove, sort and recycle all types of collected marine litter into valuable raw materials.

MAELSTROM leverages on the integration of complementary technologies for marine litter removal in different European coastal ecosystems, compounded with full-fledged circular economy and societal oriented solutions. In particular, the project:

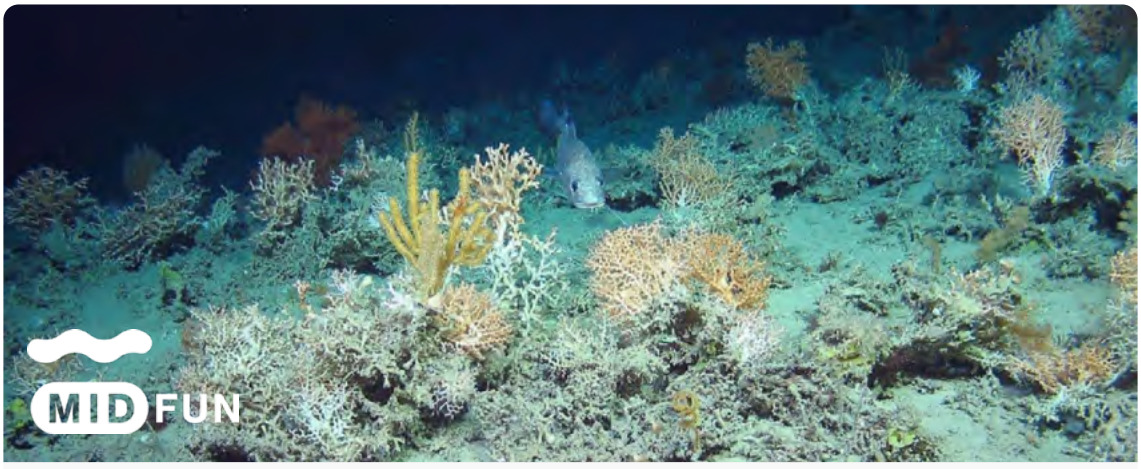
1. sets out a reliable multidisciplinary and scientifically sound approach for the assessment of marine debris distribution and impact on marine life in highly valuable ecosystems and protected areas;
2. designs and manufactures scalable, replicable and automated technologies, co-powered with renewable energy and second generation fuel, to identify, remove and sort marine litter;
3. evaluates over time the effectiveness of marine litter removal devices along with their impact on local ecosystems;
4. integrates different technologies to track, sort and recycle all types of collected marine litter into valuable raw materials for future marketisation;
5. assesses the economic and societal impact of the MAELSTROM solutions providing also a comprehensive life-cycle assessment of the technologies and products; (vi) enhances social awareness about the marine litter issue and engages citizens and stakeholders in MAELSTROM activities;
6. interplays with similar projects to maximize innovation uptake for marine litter removal within and outside the EU.

MAELSTROM consortium is a tight knit group made of research centers and foundations of excellence in marine life, biology and sustainable energy, AI and robotics, recycling companies with certified industrial plants, a market consultancy company, a micro-enterprise and a plastic-focussed NGO.

MIDFUN

H2020 PROGRAM

METAL IMPACTS ON DEEP-SEA MICROBIAL COMMUNITIES AND FUNCTION



Principal Investigator at CIIMAR: **Miguel Semedo**
Leader Institution: **CIIMAR**

Funded by the European Union

Deep-sea mining of earth minerals is expected to grow in the next decades. The increase in deep-sea mining activities may lead to the release of toxic concentrations of metals into the surrounding seabed. Increased concentrations of heavy metals can disturb important ecosystem services provided by microbial communities, such as growth, nutrient cycling activity, and microbial diversity.

However, the consequences of metal exposure on microbial ecosystem functions in deep-sea conditions are currently unknown. The overarching goal of this project is to evaluate the impacts of heavy metal exposure on microbial growth, metabolism, and diversity in deep-sea conditions. We propose the following specific objectives:

1. Determine the effects of heavy metal exposure on growth and N_2O reduction metabolism in a model bacterial culture, under deep-sea conditions.
2. Examine the effects of heavy metal exposure on the transcriptome of a model bacterial culture, under deep--sea conditions.
3. Determine the impacts of heavy metal exposure on overall N_2O fluxes from deep-sea sediments.
4. Evaluate the impacts of heavy metal exposure on the biological and functional diversity of deep-sea complex microbial communities.

This research will apply a mixed experimental approach in controlled conditions to address the stated objectives. We will combine the use of bacterial axenic cultures with the study of complex microbial communities under deep-sea conditions (low temperature and high hydrostatic pressure). We will use pressurized bioreactors and hyperbaric chambers to test the effects of two representative metals (copper and cadmium) on bacterial growth, metabolic reduction of N_2O, expression of functional genes, and functional diversity. The mining of the deep seafloor is still at an early stage of implementation. This research presents a unique opportunity to assess the environmental risks of an anthropogenic activity before it begins to shape the ecosystem.

PONDERFUL

H2020 PROGRAM

POND ECOSYSTEMS FOR RESILIENT FUTURE LANDSCAPES IN A CHANGING CLIMATE

Principal Investigator at CIIMAR: **José Teixeira**
Leader Institution: **Fundacio Universitaria Balmes**
Website: **ponderful.eu**

Funded by the European Union

Even the smallest ponds can play a big role in fighting climate change. Largely neglected and generally undervalued, ponds are actually remarkably important for biodiversity conservation. The EU-funded PONDERFUL project will investigate how ponds can be used as Nature-Based Solutions (NBS) for climate change mitigation and adaptation, biodiversity conservation and delivery of ecosystem services. The project aims to generate and integrate biodiversity, ecosystem, social, economic and policy knowledge to:

1. quantify the contribution that networks of ponds, known as pondscapes, can offer to mitigate and adapt to climate change and to deliver important services at local to international scales, both directly, and indirectly through enhancing biodiversity conservation;
2. identify possibilities, cost effectiveness and barriers to implementing pond-based NBS for climate change adaptation and mitigation and other ecosystem services;
3. and generate the social and ecological expertise for the practical implementation of enhanced blue infrastructure through the creation and management of climate-proof pond systems and pondscapes.

PONDERFUL will also develop future scenarios for pondscapes by conducting tests in DEMO-sites in eight countries across Europe and the Community of Latin American and Caribbean States (CELAC), incorporating direct and indirect interactions and using several land uses and pondscape scenarios. The findings of these tests will be used to develop a sustainable finance and investment guide for implementation of the proposed NBS, by delivering a technical handbook targeted to practitioners and a policy guidance document to help stakeholders implement science-based policies for climate change resilience, biodiversity protection and ecosystem services delivery.

SEAFOODTOMORROW

H2020 PROGRAM

NUTRITIOUS, SAFE AND SUSTAINABLE SEAFOOD FOR CONSUMERS OF TOMORROW

Principal Investigator at CIIMAR: **Maria Leonor Nunes**
Leader Institution: **IPMA**
Website: **seafoodtomorrow.eu**

Funded by the European Union

SEAFOODTOMORROW aims to strengthen the European seafood production and processing industry by providing validated, commercially viable, and eco-innovative solutions that will improve seafood quality and safety, minimise environmental impacts, and drive socioeconomic development within the seafood industry. Meeting the growing market need for safe, sustainable seafood is a formidable challenge for the European seafood industry. With European seafood imports presently reaching almost 70%, and global food demands projected to increase by 80-100% by 2050, it is vital to source and validate environmentally friendly and innovative seafood production and processing methods that will reduce European dependency on imports. Such solutions need to underpin seafood security in-line with market demand, whilst maintaining quality and traceability throughout the value chain to support consumer confidence.

Expected Results:

1. Validation of nutritional and safety aspects of eco-innovative seafood solutions through certified methodologies carried out by independent partners.
2. Easily-accessible database with seafood innovative products validation data for the implementation of a digital traceability tool linked to quality labels.
3. Improved understanding of market acceptance of eco-innovative seafood solutions in different European regions and demographics.
4. Validation of sustainable solutions from economic and environmental perspectives.
5. Benchmark for certification schemes of seafood quality and traceability for industry to strengthen consumer confidence and trust in European seafood.
6. Reduction of public health risks and promotion seafood consumption through transparent and responsible communication, dissemination, knowledge transfer and exploitation of the outcomes to the different stakeholders.

TOXICROP

H2020 PROGRAM

CYANOTOXINS IN IRRIGATION WATERS: SURVEILLANCE, RISK ASSESSMENT, AND INNOVATIVE REMEDIATION PROPOSALS

Principal Investigator at CIIMAR: **Alexandre Campos**
Leader Institution: **CIIMAR**
Website: **toxicrop.com**

Funded by the European Union

Water scarcity and food production are some of the greatest challenges of our times. Fresh water resources in many countries are vulnerable due to their biogeographical and climatic characteristics. Moreover higher water consumption and higher human impacts in the downstream water bodies is leading to a higher eutrophication with increased incidence and intensity of cyanobacteria blooms and their toxins. The scarcity of clean water resources leads to the compulsory use of water containing cyanobacteria and their toxins in agriculture.

This project aims through Research and Innovation Staff Exchange to map agricultural risk areas of cyanotoxin occurrence in consortium member countries, to access the fate of cyanotoxins in crops as also bioaccumulation in crops and food contamination related to the use of eutrophic waters in irrigation.

Environment-friendly, low-cost techniques of water treatment will also be developed, and methods to detect and assess toxicity of cyanotoxins improved.

This project seeks to integrate the activities already developed by the partners, and develop new multidisciplinary activities which could lead to the maximization of the research and foster the creation of knowledge in the domains of water toxicology, food safety and eco-technologies of water treatment.

The main innovation aspect of this project rely on the multidisciplinary approach to the subject under study, which is expected to contribute to the elucidation of the minimum quality requirements applied to the irrigation waters.

The integration of countries with different weather regimes and agricultural practices in one single project will constitute a unique approach to this subject and to consolidate the transnational collaborations.

The expected results will be delivered as guidelines for water management and treatment and will contribute to the implementation of a more sustainable and safe agriculture in Europe and worldwide.

ACCESS2SEA

NEW OPPORTUNITIES FOR MORE COMPETITIVE AND SUSTAINABLE BLUE GROWTH IN ATLANTIC AREA

Principal Investigator at CIIMAR: **Rodrigo Ozório**
Leader Institution: **CEEI Bahía de Cádiz**
Website: **access2sea.eu**

Marine aquaculture (fish, shellfish, algaculture) is a leading sector of the Atlantic Area blue economy that relies on an important tradition in many EU countries and that is economically relevant in many of its coastal areas. As only 10% of Atlantic shore seafood is aquaculture-sourced there is a great opportunity to increase its production in a sustainable way. Access2Sea aims to improve the attractiveness of the Atlantic shore for aquaculture SMEs by enabling and providing an easier access to new business opportunities. Its main objective is to enhance the exploitation and preservation of the Atlantic Area's natural assets:

1. By unlocking the existing barriers (legal/regulatory, technological, existence of suitable areas in costal zones, social acceptance) to provide the industry with technical solutions to give aquaculture businesses access to shore.
2. By enabling onshore production.
3. By disseminating existing and new solutions and providing support to the aquaculture SMEs, to fix them or attract them to the Atlantic Area This way it is expected to enable SMEs to assess spatial opportunities to settle in the Atlantic shore new aquaculture business, supporting them in exploiting the natural assets in a sustainable way as well as in improving its performance through the improvement of their business model and be better accepted by local communities.

It is also expected that Access2Sea improves the co-operation between stakeholders, business support organisations, research institutes, national and regional administrations and local councils facilitating the innovation and knowledge transfer in Aquaculture sector

ADAPTCHANGE

TRANSNATIONAL INNOVATION & TECHNOLOGY

TECHNICAL COOPERATION FOR STUDYING ADAPTATION TO ENVIRONMENTAL CHANGE

Principal Investigator at CIIMAR: **Rui Faria**
Leader Institution: **CIIMAR**

Iceland Liechtenstein Norway grants

Understanding the mechanisms of adaptation can provide precious information to improve predictions of species' response to abrupt environmental change.

In particular, the study of the adaptive potential and eco-evolutionary dynamics of intertidal species at two latitudinal extremes of their European range is expected to result in more accurate forecasts on how climate change affects biodiversity.

In this project, we established a collaborative network between institutions involved in research and outreach from Portugal, Iceland and Norway to develop a strategic cooperation program built upon three complementary pillars:

1. technical cooperation – implementation of a research project aiming to assess the mechanisms of adaptation of intertidal species to rapid environmental change;
2. capacity building - organization of technical workshops;
3. science dissemination – sharing good practices on effective science dissemination initiatives in schools and joint organization of a showcase for kids particularly focused on protecting the biodiversity living in our oceans.

BLUEBIOLAB

TRANSBOUNDARY MARINE BIOTECHNOLOGY LABORATORY

Principal Investigator at CIIMAR: **Vitor Vasconcelos**
Leader Institution: **Universidade de Vigo - Campus do Mar**
Website: **bluebiolab.eu**

The general objective of the BLUEBIOLAB project is the creation of a cross-border laboratory of scientific excellence in the area of marine biotechnology that boosts the capacity to develop excellence in R&D, reinforces and internationalizes the R&D capabilities of the territory, optimize the use of research infrastructures and contribute to achieving the expected results in the RIS3, RIS3T and in the blue growth strategy. In order to achieve this global BlueBioLab aims to:

1. Support the consolidation of biotechnology - an essential facilitating technology - as a fundamental tool for the study and valorization of marine biological resources, and the sustainable exploitation of marine biological resources, areas in which the Euroregion has already reached a critical mass of researchers, and has the potential to be internationally competitive.
2. To pool the existing infrastructures, integrated in the Transboundary Marine Biotechnology Laboratory, in line with the common strategic objectives of the regions (RIS3 Galicia, RIS3 North and RIS3T).
3. Develop actions to support talent and promote the mobility of researchers, including the programming of training activities.
4. Create networks of knowledge and joint work, with actors of the scientific system linked to marine biotechnology on both sides of the border, in order to increase critical mass and scientific excellence.
5. Promote the internationalization and integration of scientific infrastructures linked to marine biotechnology in international R&D&I networks through the Transboundary Marine Biotechnology Laboratory, to achieve the consideration of excellent research centers and international reference.

Therefore, BlueBioLab aims to establish the resources and mechanisms to strengthen, stimulate and project internationally strategic research lines for the territory and for the marine productive sector, promoting innovative capacity and territorial competitiveness through a TFE in which the Euroregion has already demonstrated its ability to be internationally competitive.

BLUEFORESTING

TRANSNATIONAL INNOVATION & TECHNOLOGY

CLIMATE RESILIENT MARINE FORESTS FOR A SUSTAINABLE FUTURE

Principal Investigator at CIIMAR: **Francisco Arenas**
Leader Institution: **CIIMAR**

Iceland Liechtenstein Norway grants

The ocean provides vital ecosystems services, threatened by anthropogenic and climate pressures. Their undesirable impacts can be mitigated if ecosystem-based management, adaptive marine spatial planning, and habitat restoration strategies were implemented.

BLUEFORESTING builds upon these approaches with the aim to provide climate change ready nature-based solutions (NBS) for successful sustainable management of the most iconic coastal habitats, Marine Seaweed Forests. Although threatened, they are biodiversity rich ecosystems, recognized as cost-effective NBS with potential to mitigate climate change effects. Their capacity to deliver a wide range of key ecosystem services and to support blue growth makes them natural blue infrastructures. Fostering healthy marine forests means promoting regional fisheries, recreational activities, and cultural traditions, but also fighting biodiversity loss and climate change.

In this context, BLUEFORESTING will develop science--based guidance for preserving marine forest functions and services, by assessing baseline information (genetics, processes, functions, services and conditions), by identifying species diversity and sensitivity and climate refugia areas. BLUEFORESTING will develop models and will implement tools for vulnerability assessments by promoting the co-development of effective and climate ready NBS. Expected results are of paramount importance as scientific foundations to support future marine protection and reforestation actions in a cost-effective and sustainable way.

BLUEFORESTING lines up with the EU Blue Growth agenda as it proposes sustainable ecosystem-based management actions that can help to proactively protect and increase the resilience of marine forests under climate change, guaranteeing the provision of associated services. BLUEFORESTING represent an excellent opportunity to prove how science based governance may promote sustainability of marine habitats and services.

The established partnership will promote bilateral knowledge transfer and dissemination, strengthening international cooperation and cooperation in the sector, while increase value creation and sustainable growth in the Portuguese blue economy.

BLUEFORESTS

TRANSNATIONAL INNOVATION & TECHNOLOGY

SEAFORESTS FOR BLUE CARBON - NATURAL CAPITAL FROM NATURE-BASED SOLUTIONS

Principal Investigator at CIIMAR: **Isabel Sousa Pinto**
Leader Institution: **CCMAR**

Iceland Liechtenstein Norway grants

Marine forests formed by seagrasses and macroalgae are important carbon sinks at global scale, with a high capacity for sequestering and storing carbon (known as "blue carbon") in their biomass and sediments. While seagrass meadows are widely known for their ability to remove CO_2 and particulate organic matter from the water and store significant amounts in their sediments, the global importance of macroalgae forests for carbon sequestration remains poorly understood.

In fact, macroalgae generally grow on hard substrata with no carbon burial potential, but they might be important donors of organic matter for the sediments of deeper ocean. Despite their importance, blue carbon forests have experienced a global decline in the past decades, mainly due to the severe exploitation of coastal areas, with a consequent loss of the associated ecosystem services.

Therefore, there is a growing urgency to implement reforestation efforts of blue forests to recover the natural capital, mitigate the effects of climate change by removing CO_2, while delivering extra benefits for people and nature.

The Blueforests project aims to improve knowdledge and test technological innovations to rebuild Portuguese marine forests and, as a result, improve the ecosystem services they provide and contribute to building a sustainable blue economy based on resilient and abundant marine natural capitals. New technologies to restore Portuguese marine forests, including models to reveal the best locations for reforestation and novel techniques of planting will be developed, tested and optimized.

The contribution of Portuguese marine forests to blue carbon sequestration and thus climate mitigation, will also be quantified as well as the economic value of the ecosystem services delivered by them.

The specific objectives of Blueforests are:

1. to test novel technologies to restore Portuguese marine forests, in suitable regions where they have disappeared, such as the production of "green gravel" (i.e. natural gravel seeded with target species) the use of biodegradable meshes to stabilize sediments of seagrass transplants and the use of existing coastal and offshore artificial structures;
2. to assess the contribution of Portuguese marine forests for carbon sequestration, estimating the in-shore blue carbon stocks and burial rates;
3. to quantify the ecosystem services and natural capital provided by Portuguese marine forests, including food provision, carbon sequestration, protection against extreme events, water purification, and cultural services;
4. to maximize the visibility of scientific achievements through the scientific community, policy makers and the general public.

BREEDFLAT

TRANSNATIONAL INNOVATION & TECHNOLOGY

NEW APPROACHES ON THE DIETARY-EFFECTS IN BROODFISH: THE ROLE OF NUTRITION ON SUSTAINABLE PRODUCTION OF FLATFISH

Principal Investigator at CIIMAR: **Benjamin Costas**
Leader Institution: **CCMAR**

Iceland Liechtenstein Norway grants

BREEDFLAT project aims to improve flatfish breeder's performance by enhancing immune system capacity, largely affected during reproductive season, and gamete quality, by providing key-role nutrients for successful reproduction. Innovative approaches on the study of dietary effects will be attained to promote a sustainable competitive production of eggs and larvae.

The consortium includes two Portuguese research teams, CCMAR (promoter) and CIIMAR, and the largest turbot producer, ACUINOVA. The Donor parties, Nord University, Akvaplan-niva, experienced in flatfish reproduction, and Sognaqua firm, will contribute with their experience in Atlantic halibut.

This collaboration will enhance Portuguese centers (CCMAR, CIIMAR) performance with technology transfer from Nord (microRNAs, epigenetics), and strengthen future bilateral collaborations.

The business sector (ACUINOVA) will gain from Norway experienced Aquaculture sector. The project focus in 3 important flatfish species for aquaculture diversification in Europe, Senegalese sole, turbot and Atlantic halibut, along 6 WPs. Specific breeders' feed will be developed, considering each species' nutritional requirements and efforts dedicated to gametogenesis.

A tool-set of parameters will be developed, allowing characterization of reproductive and immune system performance. These tools will be used to evaluate the efficiency of natural feed products supplementation on the enhancement of reproduction and fish resistance.

The final target is to achieve the improvement of off-spring through a better nutrition to breeders. More robust juveniles will contribute to a next generation of breeders developed in captivity. These bases will provide a more sustainable Aquaculture diversification with high price commercial species, creating a benefit for fish farms and feed suppliers in Europe, reducing economic and social disparities between donor and beneficiary states.

CETAMBICION

COORDINATED CETACEAN ASSESSMENT, MONITORING AND MANAGEMENT STRATEGY IN THE BAY OF BISCAY AND IBERIAN COAST SUB-REGION

Principal Investigator at CIIMAR: **Isabel Sousa Pinto**
Leader Institution: **Consejo Superior de Investigaciones Científicas - CSIS**
Website: **cetambicion-project.eu**

Funded by the European Union

This project addresses the urgent need to reduce cetacean bycatch in EU fisheries, consistent with the requirements of the Habitats Directive Marine Strategy Framework Directive and Common Fisheries Policy (Technical Measures Regulation).

In 2019, several NGOs requested that the European Commission introduce emergency fisheries measures to reduce bycatch of common dolphins in the Bay of Biscay and of harbour porpoises in the Baltic Sea. The Commission requested that The International Council for the Exploration of the Sea should evaluate these requests and provide advice on necessary actions.

ICES issued this advice in earlier 2020, supported by work by two of its Working Groups (WGBYC and WGMME) and a Workshop (WKEMBYC). ICES proposed a range of possible measures, and provided information on the expected reduction in bycatch arising from such measures. The Commission has subsequently request that France and Spain take action to address the cetacean bycatch issue in Bay of Biscay. An additional driver for reduction in bycatch of cetaceans is the request by the USA that all nations exporting fishery products to the USA should demonstrate that their management of cetacean bycatch is consistent with the requirements of the US Marine Mammal Protection Act.

The MSFD 2020 call provides an opportunity to develop work on measures to improve bycatch monitoring and mitigation in the Bay of Biscay and adjacent Iberian coastal waters, thus helping to achieve Good Environmental Status (GES) in relation to the descriptor D1 Biodiversity and, specifically, cetacean bycatch (criterion D1C1 and OSPAR common biodiversity indicator M-6). In so doing it will also consider criteria for abundance (D1C2), demographic characteristics (D1C3), distribution pattern and range (D1C4) and habitat (D1C5).

The CetAMBICion project involves 15 partners from the Member States (MS) France, Spain and Portugal, including Ministries as well as public research and conservation bodies, in collaboration with professionals and NGOs.

MININGIMPACT2

TRANSNATIONAL INNOVATION & TECHNOLOGY

ENVIRONMENTAL IMPACT AND RISKS OF DEEP-SEA MINING

Principal Investigator at CIIMAR: **Francisco Arenas**
Leader Institution: **GEOMAR Helmholtz Centre for Ocean Research Kiel**
Website: **miningimpact.geomar.de**

The MiningImpact project gathers 32 partners from 10 different countries and will set up a comprehensive monitoring programme of the impact of an industrial test to harvest manganese nodules in the Clarion Clipperton Zone, by the Belgian contractor DEME-GSR. Polymetallic nodules are mainly composed of manganese and iron oxides, but also contain economically valuable metals, such as nickel, copper, cobalt, lithium, and rare earth elements.

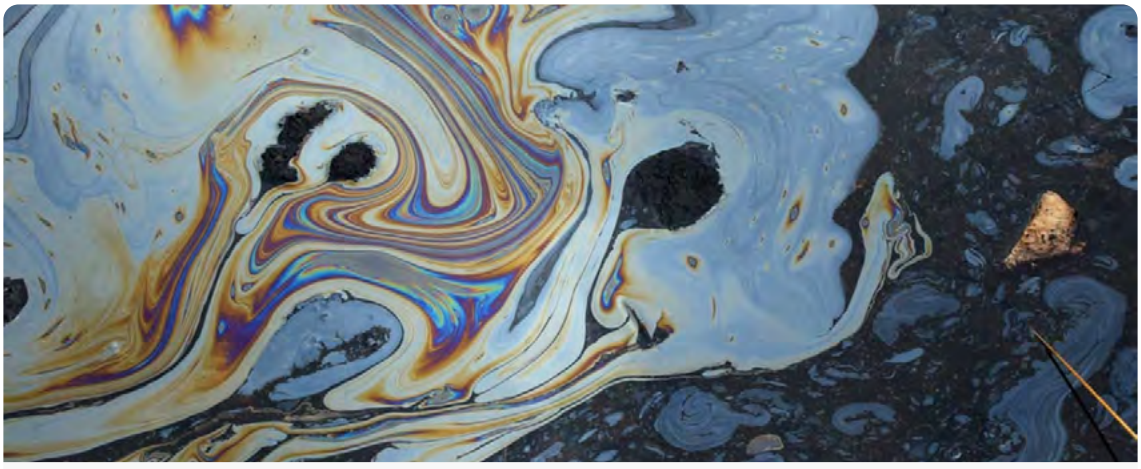
The DEME-GSR collector test intends to harvest nodules in approx. 0.1 km2 large areas of the seabed in the Belgian and the German contract areas of the Clarion Clipperton Zone in the Eastern Equatorial Pacific Ocean. Within the lifetime of MiningImpact2 researchers are planning two cruises to the test areas in order to constrain the spatial and temporal dynamics of the sediment plume created by the mining test and impact on the abyssal environment. The project will further study regional connectivity of species in the deep-sea and their resilience to impacts, and the integrated effects on ecosystem functions, such as the benthic food-web and biogeochemical processes. In this context, key objectives of the project are:

- To develop and test monitoring concepts and strategies for deep-sea mining operations
- To develop standardization procedures for monitoring and definitions for indicators of a good environmental status
- To investigate potential mitigation measures, such as spatial management plans of mining operations and means to facilitate ecosystem recovery
- To develop sound methodologies to assess the environmental risks and estimate benefits, costs and risks
- To explore how uncertainties in the knowledge of impacts can be implemented into appropriate regulatory frameworks

MiningImpact will be able to further close existing knowledge gaps and reduce uncertainties on the environmental impacts of deep-sea mining of polymetallic nodules. The project will specifically work towards policy recommendations and has reached out to the International Seabed Authority to become a partner in the project. It will further contribute to the preparation of environmental impact assessments (EIAs) for future European deep-sea pilot mining tests that are requested by the ISA, and to the Horizon2020 technology development projects Blue Atlantis and Blue Nodules.

MODELRISK

ECOSYSTEM MODELS TO SUPPORT ENVIRONMENTAL RISK ASSESSMENT OF MARINE ECOSYSTEMS UNDER HNS SPILLS



Principal Investigator at CIIMAR: **Irene Martins**
Leader Institution: **CIIMAR**

Alongside the increasing trend on maritime transport, the number of ships carrying Hazardous and Noxious Substances (HNS) is growing steadily with more than 200 million tonnes of chemicals traded annually by tankers. Nonetheless, knowledge regarding ecological hazards caused by HNS is scarce, narrowing preparedness and suitable responses in case of accidents with HNS cargoes at sea. Bearing this in mind, MODELRISK numerical framework aims at developing end-to-end models of marine ecosystems, supported by ocean circulation models, capable of predicting ecological hazards caused by HNS maritime spills. Within MODELRISK, ecosystem models will be developed by incorporating physical characteristics, biogeochemical processes, and food web interactions of the habitats under study.

The existing HNS database will be augmented to include ecotoxicological dose descriptors for benthic organisms, as well as derived predicted no-effect concentrations (PNEC) for sediments. To derive the physical parameters and the HNS concentrations needed for the ecosystem models, an oceanographic circulation model will be implemented for the specific areas under study and, after the proper characterization of the hydrodynamic patterns, the circulation model solutions for the targeted domains will be extracted. These solutions will offline force a Lagrangian model to represent the main HNS transport patterns providing plumes' behaviour and maps of potential hotspots of accumulation. The interconnection between the three tools will allow to retrieve the relevant information regarding HNS characteristics and effects from the online HNS database, which will be used by the HNS dispersion models, which in turn will force the ecosystem models.

Due to their economic and ecological importance, seamounts and hydrothermal vents of the Azores Mid-Atlantic Region (NE Atlantic) will be selected as test case studies to implement and calibrate the MODELRISK framework. Several HNS spill scenarios will be run to account for Environmental Risk Assessment of the targeted ecosystems with the ultimate goal of providing support for decision-making and management by the competent authorities

NANOCULTURE

TRANSNATIONAL INNOVATION & TECHNOLOGY

RISK ASSESSMENT AND MITIGATION OF THE PRESENCE OF ENGINEERED NANOMATERIALS IN ATLANTIC AQUACULTURE

Principal Investigator at CIIMAR: **Alexandre Campos**
Leader Institution: **INL**
Website: **nanoculture.ciimar.up.pt**

The objective of NANOCULTURE is to advance in knowledge, risk assessment and mitigation of environmental presence of the most-used engineered nanoparticles (ENPs) in market products: titanium dioxide (TiO2) and silver (Ag).

As metallic NPs present important improvements in diverse industrial applications, the frequency of their application is growing exponentially. However, the studies of risks and mitigation of their presence in the environment are lagging far behind the rate of utilization, which represents a critical environmental and safety challenge in the Atlantic Area.

The focus of the project are the aquatic ecosystems related to aquaculture, a sector of high economic relevance in the Atlantic Area, and specifically organisms used for human consumption (cultured fish, mollusks, seaweed, sea urchins, etc.). NANOCULTURE will investigate the effects of ENPs on aquaculture products, their bioaccumulation, and assess its impact on human intake.

In order to carry out this project, collaboration of all the participating centres is essential to ensure a wide range of industrial (aquaculture professionals) and scientific profiles (analytical chemists, physical chemists, molecular biologists), as well as providing infrastructure to run the analysis and deliver real samples from aquaculture plants.

NATURE

NATURE-BASED SOLUTIONS TO REDUCE ANTIBIOTICS, PATHOGENS AND ANTIMICROBIAL RESISTANCE IN AQUATIC ECOSYSTEMS

Principal Investigator at CIIMAR: **Marisa Almeida**
Leader Institution: **CSIC, Spain**

This project will assess nature-based solutions (NBS) as management option for water treatment on the catchment scale.

An array of NBS including conventional and high-end constructed wetlands, river re-naturalization, and restoration of wetlands will cover the continuum from urban sources to coastal biota in estuaries.

We propose a comprehensive quantification of the fate of ABs, pathogens, and AMR in these systems together with ecotoxicological and human health assessments. NBS performance will be analyzed using multivariate modelling techniques to identify parameters with the greatest empirical influence on the attenuation of targeted pollutants.

The NATURE project will encompass three interconnected phases: An experimental phase in which the reduction of aquatic pollutants will be evaluated in NBS and compared with reference sites. In a data modelling phase, diagnostic indicators (indicative parameters from the first phase) will be identified for cost-effective future monitoring. In a risk assessment phase, the effect of aquatic pollutants on environment and human health will be evaluated, estimating its reduction due to NBS implementation.

The unique combination of advanced approaches from analytical chemistry, molecular microbiology, modelling and ecotoxicology will be of paramount importance for an accurate evaluation of NBS treatment performance. NATURE's key objective is to promote the sustainable and green attenuation of aquatic pollutants.

NETTAG

TRANSNATIONAL INNOVATION & TECHNOLOGY

TAGGING FISHING GEARS AND ENHANCING ON BOARD BEST-PRECTICES TO PROMOTE WASTE FREE FISHERIES

Principal Investigator at CIIMAR: **Marisa Almeida**
Leader Institution: **CIIMAR**
Website: **nettag.ciimar.up.pt**

Funded by the European Union

NetTag project aims to reduce and prevent marine litter derived from fisheries, bringing together scientists, engineers and the fisheries industry. NetTag approach combines two different types of preventive measures:

1. new technology to prevent lost gears; and
2. awareness actions to promote best-practices for on-board waste management.

NetTag will develop new technologies to track fishing gears in case gears got lost, fostering a reduction of lost gears. The technology will include low cost, miniature and environmental-friendly acoustic tags and acoustic transceivers for uniquely localization (with fisher's personal ID) of lost gear and an automated-short-range robotic recovery system.

Participant fishers will, then, evaluate the new technology in a dedicated demonstrative field action. Awareness actions, developed by fishers for fishers, will be an innovative strategy to engage the fishing industry, increasing fishers' willingness to act and adopt better practices on-board to reduce marine litter from fishing vessels.

A major event entitled Clean Ocean Day will be organized, in which all fishers in that day will collect marine litter from the sea to have a snapshot of type and amount of marine litter present off NW Iberian Peninsula coast. In parallel, the environmental impact and harmfulness of lost gear as pollutant of the marine environment (e.g. source of microplastics and pollutants absorbed to the gears), will be investigated through in-situ and laboratory experiments.

We will also evaluate the cost-efficiency of the proposed solutions, estimating the economic viability of their implementation for reduction of marine litter derived from fisheries.

The project is based on synergistic activities between fishers and scientists to pilot innovative solutions to tackle the urgent need of reduction and prevention of marine litter.

NetTag consortium is a multidisciplinary and international team, gathering researchers from natural (CIIMAR-Portugal), social (UAVR-Portugal) and economic (USC-Spain) sciences, engineers (INESC TEC-Portugal, UNEW-UK) and fisheries industry, including two fishers associations (APMSHM-Portugal and ARVI-Spain) and a fishing nets production company (EURONETE).

NetTag intends to contribute to the reduction of lost gear at NW Iberian Peninsula, promote technological innovation of fishing gears and better practices to avoid discarding litter, and also improve the environmental performance of Portuguese and Spanish fisheries.

NORWATER

EMERGING POLLUTANTS IN THE WATERS OF GALICIA-NORTHERN PORTUGAL: NEW TOOLS FOR RISK MANAGEMENT

Principal Investigator at CIIMAR: **Miguel Santos**
Leader Institution: **CIIMAR**
Website: **nor-water.eu**

This project is aimed at identifying the main emerging pollutants (EPs) and their sources in the hydrographic basins of northern Portugal and Galicia. In addition, it is focused on developing, implementing and harmonizing a set of innovative multidisciplinary tools to minimize the impact of EPs on these water bodies. The project will also contribute to the improvement of water quality and will enhance the implementation of the Water Framework Directive (WFD) in this cross-border area.

The four main aims of NOR-WATER are:

1. Identifying the main emerging pollutants (EPs), including fire-related runoff compounds in rivers, as well as their sources and transformation products (TPs), in the hydrographic basins of northern Portugal and Galicia.
2. Developing new analytical methods and ecotoxicological tools, as well as prediction and modeling tools, for those EPs which pose the highest potential risk to ecosystems.
3. Assessing the efficiency of wastewater treatment plants (WWTPs) in removing EPs, as well as developing tools to improve treatment systems and increase their efficiency in EPs removal.
4. Transferring the results to the entities that are responsible for the implementation of the WFD in the management of inland and coastal water bodies, as well as to the technology companies in charge of water treatment. In parallel, cross-border activities focused on environmental education are intended to be carried out, thus contributing to a behavioral change in civil society.

OPTIRAS

TRANSNATIONAL INNOVATION & TECHNOLOGY

OPTIMIZATION OF THE CONTROL OF WATER QUALITY IN RECIRCULATING AQUACULTURE SYSTEMS

Principal Investigator at CIIMAR: **Alexandre Campos**
Leader Institution: **INL**

Iceland Liechtenstein Norway grants

Recirculating aquaculture systems (RAS) have been developed for land-based production of sea and freshwater species. These systems are designed to provide high biomass production while reducing resource usage and maximizing control of operational parameters.

Therefore, Optimizing control and management of water treatment in RAS is of paramount importance as water is renewed at very low rates (≤10%/day). Removal of organic matter, microorganisms and problematic chemical species such as nitrite is performed by applying different steps of filtration, fatty acids or protein skimming, biological treatment and, sometimes, oxidation processes.

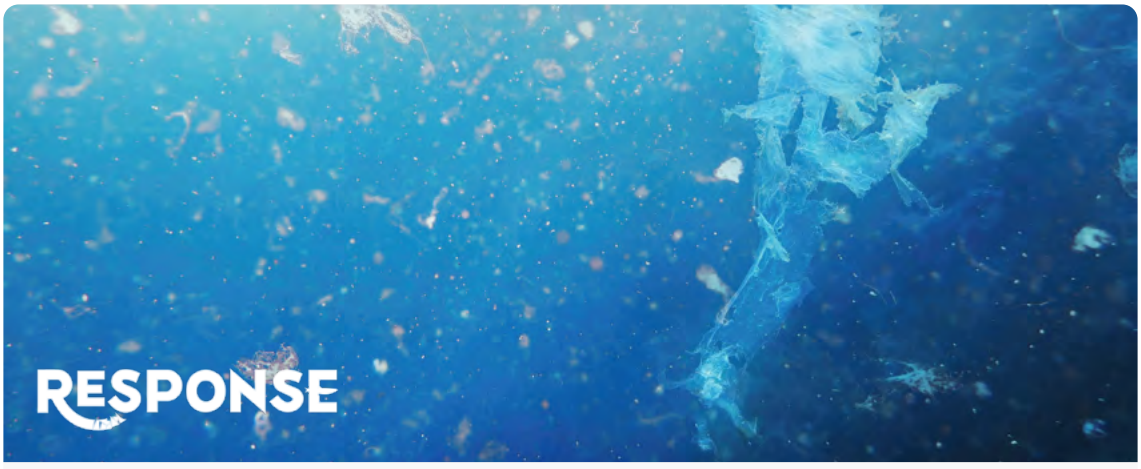
Among the later, application of ozone has been extensively used as a method to improve water quality to avoid the undesired effect of chemotherapeutants in aquaculture. However, residual ozone can affect various water chemistry parameters (formation of disinfection by-products from halogen anions present in seawater; iodide, chloride and, bromide) and other steps in the water treatment process (mainly biological treatment by disturbing microbial populations in biofilters) with important impacts on fish health and welfare.

The OPTIRAS project will tackle this issue in RAS systems, being the main objectives:

1. Investigate the changes in water chemical parameters, microbiome and physiology of fish in RAS;
2. Develop and deploy online monitoring systems for water chemical parameters relevant for the control of the water quality and the ozone demand;
3. Test the adequacy and impact of alternative water treatment processes on fish welfare status and water quality and
4. Demonstrate novel water quality control system in RAS pilots and improved cultivation protocols for diverse fish farming stages and species

RESPONSE

TOWARD A RISK-BASE ASSESSMENT OF MICROPLASTIC POLLUTION IN MARINE ECOSYSTEMS



Principal Investigator at CIIMAR: **Lúcia Guilhermino**
Leader Institution: **Polytechnic University of Marche**
Website: **response-jpioceans.eu**

RESPONSE integrates expertise on oceanography, environmental chemistry, ecotoxicology, experimental ecology and modelling to answer key research questions on fate and biological effects of microplastics (MPs) and nanoplastics (NPs) in marine ecosystems.

Hydrological transport dynamics will identify possible accumulation zones in European coastal ecosystems, while characterization of vertical distribution of MPs and NPs in the water column and sediments will optimise practical monitoring and sampling efforts.

Links between oceanographic conditions, environmental distribution of MPs and NPs, trophic transfer and impact to pelagic food webs and benthic communities will be addressed by analysing their abundance and typologies in representative marine species, as well as relevant ecosystem functions and services. Innovative mesocosm and laboratory studies will validate weighting factors and toxicological thresholds for MPs and NPs.

The approach will assess the role of size, shape and other polymer characteristics in modulating biological effects of particles, both alone and in combination with other environmental stressors. A technological Smart Hub, combining complementary instrumental facilities and expertise of some partners and external companies, will support analytical needs of the consortium and further methodological developments.

The overall aim of RESPONSE is to develop a quantitative Weight Of Evidence (WOE) model for MPs and NPs in the marine environment. The model will be designed to integrate and differentially weight data from a suite of lines of evidence, including:

1. the presence of MPs and NPs in water column and sediments;
2. their bioavailability and bioaccumulation in key indicator species from benthic and planktonic communities;
3. sublethal effects measured via biomarkers;
4. the onset of chronic adverse effects at the organism level, and;
5. ecological functioning.

The results will provide support for development of MSFD monitoring strategies.

SHERPA DO MAR

TRANSNATIONAL INNOVATION & TECHNOLOGY

EUROREGIONAL PLATFORM TO PROMOTE COMPETITIVENESS IN THE MARITIME AND MARITIME FIELD THROUGH THE PROMOTION OF TECHNOLOGY-BASED COMPANIES

Principal Investigator at CIIMAR: **Susana Moreira**
Leader Institution: **Universidade de Vigo**
Website: **sherpadomar.com**

Interreg España - Portugal

Sherpa do Mar intends to boost the creation and consolidation of new knowledge-intensive business activities in the marine-maritime environment, favoring job creation and increasing business competitiveness through:

1. Creation of a transboundary ecosystem of innovative entrepreneurship in the marine-maritime context.
2. Creation of companies in the marine-maritime sector with high added value through the enhancement of technological-scientific synergies.
3. Improving the competitiveness of pre-existing companies through the drive for innovation.
4. Sherpa do Mar will implement the following activities:

– Sectoral diagnosis and identification of the actors that will form the Euro-regional Sherpa do Mar platform.
– Design of a new methodology for monitoring and boosting innovative technology-based companies: Sherpa Journeys.
– Scientific-technical monitoring and knowledge transfer promotion program.
– Implementation of the Sherpa Journeys methodology for valuing innovative technology-based business projects.
– Selection and enhancement of 12 innovative technology-based business projects in the marine-maritime sector.
– Itinerary for the improvement of the capacities of 20 companies in the sector, stimulating the link with transfer entities, boosting R+D+i and sustainable growth.

SIDESTREAM

SECONDARY BIO-PRODUCTION OF LOW TROPHIC ORGANISMS UTILIZING SIDE STREAMS FROM THE BLUE AND GREEN SECTORS TO PRODUCE NOVEL FEED INGREDIENTS

Principal Investigator at CIIMAR: **Luísa Valente**
Leader Institution: **Sintef - Fisheries and Aquaculture, Norway**
Website: **sidestream.info**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 817992.

To what extent is it possible to process and use nutrients from aquaculture and agriculture waste?

Which novel organisms and approaches are best suited?

Can these organisms serve as ingredients for feed stuff?

How suitable and safe are feed ingredients produced on waste?

What is the market potential and economic feasibility of feed ingredients produced following sustainable circular principles?

SIDESTREAM addresses these questions to push forward the frontier for production of high value compounds by utilization of low trophic marine invertebrates and bacteria, which will be reared on waste streams, following circular principles.

Several industries are in demand for high value compounds such as marineoriginated lipids, proteins and pigments such as astaxanthin. Omega-3 long-chain (≥C20) polyunsaturated fatty acids (ω3 LCPUFA) are marine lipids that are abundant in fish oils and fish meals ("marine ingredients").

Use of ω3 LC-PUFA in aquafeeds ensures both growth and health of farmed species and their nutritional value for consumers.

Aquaculture is by far the largest consumer of marine ingredients thus requiring novel high nutritional quality ingredients to critically ensure sustainable expansion. Additionally, there is a trend towards natural bioactive compounds such as astaxanthin as a natural bioactive stimulant (nutraceutical), which adds value to the resulting feed. SIDESTREAM partners have shown that polychaetes and crustaceans can produce ω3 LC-PUFA de novo. Such striking capacity will be exploited in SIDESTREAM.

We will take side streams from aquaculture, agriculture and biogas sectors, and produce polychaetes and gammarids on the solid phase and bacterial astaxanthin on the liquid phase. Biomasses will be processed and tested as feed ingredients for fish and shrimp during all life stages.

SIDESTREAM cutting-edge approach will enable value creation from resources hitherto considered as waste, allowing for innovation and sustainable use in aquaculture.

SØLKELP

TRANSNATIONAL INNOVATION & TECHNOLOGY

NORTH-SOUTH SEAWEED CULTIVATION PARTNERSHIP

Principal Investigator at CIIMAR: **Isabel Sousa Pinto**
Leader Institution: **Algaplus**
Website: **solkelp.net**

Iceland Liechtenstein Norway grants

The cultivation of seaweed for food, fertiliser and as a raw material for the chemical industry has been a significant industry worth €9.3bn annually, with 30Mton of production volume in 2015 (half of which was used for human consumption). Production in Europe has been very low, while Asian countries produce currently 99% of the global annual production of this valuable resource. At the same time, efforts in improving the footprint of agriculture and promoting sustainable, healthy food production becomes increasingly important on the European policy agenda, which is reflected in particular through the Green Deal calls by the end of Horizon 2020, as well as the Horizon Europe work programme.

The highly sustainable and commercially promising low-trophic aquaculture in sea water, which does neither consume significant amounts of fresh water, nor fertilizer or feed, faces challenges with respect to economic feasibility and species and location availability for the expected massive growth in future.

The SølKelp project develops and implements innovative cultivation strategies with mutual relevance for both geographic ends and their leading SMEs, who can unlock a commercial head-start and sustained competitive advantage by jointly implementing the project. It therefore directly responds to the main call objective to “increase competitiveness and sustainability for Portuguese companies within the focus area of Blue Growth”.

SølKelp further aims to develop, apply, and commercialize innovative products and technologies, and fulfils the bilateral objective, by enhancing cooperation between Portuguese SME and R&D entities and a Norwegian SME.

SUDOANG

PROMOTE CONCERTED AND SUSTAINABLE MANAGEMENT OF EEL IN SUDOE AREA

Principal Investigator at CIIMAR: **José Carlos Antunes**
Leader Institution: **AZTI**
Website: **sudoang.eu**

The abundance of the European eel (*Anguilla anguilla*) has been declining in the last 50 years and is outside safe limits. For this reason, the European eel has been included in the IUCN Red List of threatened species.

The SUDOANG project arises to try revert several conditions that restrain the recovery of the eel stock, namely:

1. The lack of data and the variability of assessment methods limit the scope and effectiveness of the population monitoring.
2. Although the European eel is a single fish stock, it is assessed and managed as separate units.
3. There is a lack of dialogue and common strategies between the stakeholders (scientists, managers, fishermen, NGOs) and at different levels local / regional / national).

The SUDOANG project is co-financed by the ERDF through the Sudoe program, with a total budget of 1.6 million. In order to carry out the project, a partnership has been built that includes the entire value chain related to the management of the eel in the SUDOE area: 10 research centers and 27 associated partners including local, regional and national managers, NGOs and associations of fishermen.

UAV4SEA

TRANSNATIONAL INNOVATION & TECHNOLOGY

TECHNOLOGY DEVELOPMENT FOR DRONE-BASED COASTAL OBSERVATIONS

Principal Investigator at CIIMAR: **Débora Borges**
Leader Institution: **CIIMAR**

Iceland Liechtenstein Norway grants

This bilateral initiative between CIIMAR and The Norwegian Institute for Water Research (NIVA) has as objectives to strengthen bilateral relations between Portuguese and Norwegian scientists through exchange of experience and knowledge in unmanned aerial vehicles (UAV) remote sensing techniques applied to the mapping of coastal biological communities.

This initiative will also promote future partnerships for joint research projects and disseminate the acquired knowledge to the scientific community and stakeholders involved in the coastal resources management. "Technology development for drone-based coastal observations" will foster cooperation between researchers of both institutions by identifying synergies for advancing knowledge in this field of research. Therefore, it will allow the exchange of experience and technology between both research teams (CIIMAR and NIVA) and will transfer that knowledge to the scientific community and stakeholders involved on the coastal resources management.

The activities to be implemented include technical visits of each team to the partners' institution and a 3-days training action open to the academic and stakeholders' community of both countries.

The expected outcomes are the development of new methods and tools for aerial images classification; publication of scientific papers reviewing and comparing these methodologies; and the design of future joint research projects either in the scope of EEA Grants or other programmes.

Additionally, protocols will be developed for planning and implementing missions using drones (UAV's) for coastal environmental monitoring.

The knowledge and experience acquired during this collaboration will provide the stakeholders with new tools relevant for supporting the management and protection of coastal ecosystems.

MOBFOOD

MOBILIZING SCIENTIFIC AND TECHNOLOGICAL KNOWLEDGE IN RESPONSE TO THE CHALLENGES OF THE AGRI-FOOD MARKET

Principal Investigator at CIIMAR: **Luisa Valente**
Leader Institution: **PRIMOR SA**
Website: **mobfood.pt**

MobFood project is the result of an open debate carried out by several agents from the agribusiness that aims to find the right path to promote the competitiveness of the national food industry in an organized and integrated manner. It will be strategically undertaken with a close collaboration between scientific institutions and private companies grounded on economic growth measures based on R&D, innovation and technologies for new products, services and processes achievement with direct effects in all value chain. The principal aim is to make the sector totally sustainable, resilient, open, safer and with an effective utilization of resources being consumer-driven.

The main goals will be attained through the implementation of the solution in three fundamental principles: "Food Safety and Sustainability", "Food for Health and Wellbeing" and "Safe Food and Quality", embodied in the research and development for several processes, products or services.

The join-venture is composed by 47 entities that represent all Portuguese agribusiness, with participant companies from different agroindustry subsectors. R&D entities participants will bring the ability for a complete approach of the different areas of key knowledge for an acute development of the Portuguese food industry. The MobFood project is organized in 9 areas of intervention: Emerging Technologies, Resources Valorization, Sustainable Packaging, Nutrition, Health and Well-being, Quality and Food Safety, Authenticity and Traceability of products, Logistics, Consumer and Coordination, implementation, dissemination and exploitation of results.

VALORMAR

MOBILIZING PROGRAMS

INTEGRAL VALUATION OF MARINE RESOURCES: POTENTIAL, TECHNOLOGICAL INNOVATION AND NEW APPLICATIONS

Principal Investigator at CIIMAR: **Vitor Vasconcelos**
Leader Institution: **SONAE, CIIMAR**
Website: **valormar.pt**

The project ValorMar is led by a reference institution – SONAE - and integrates 20 enterprises and 16 Research and Development institutions, being CIIMAR the R&D leader of the project, with a wide national geographical distribution.

ValorMar will develop innovative technological solutions that potentiate the valorization and efficient use of marine resources by the integration of the value chains using the circular economy concept and integrating: food industry, biomedical, pharmaceutical, cosmetics and aquaculture. ValorMar main objective is the valorization of marine resources through research, development and demonstration of new products and the improvement of the productive processes, proposing innovative solutions that lead to the creation of new healthy food products using innovative, efficient and sustainable technologies.

The products, processes and services will be produced in the framework of a transversal mobilization of human resources with extensive curricula and experience in the development and implementation of R&D projects in the thematic areas of ValorMar.

EMBRC-PT

INFRASTRUCTURES

EUROPEAN MARINE BIOLOGICAL RESOURCE CENTRE - PORTUGAL

Principal Investigator at CIIMAR: **Vitor Vasconcelos**
Leader Institution: **CCMAR**
Website: **embrc.eu**

EMBRC.PT is a distributed research infrastructure with nodes in Faro, Horta, Coimbra and Porto/Matosinhos where CIIMAR headquarters are located. It will allow researchers to study marine biodiversity in its habitat, in tanks and in the laboratory with the latest technologies.

It is the national node of the European Marine Biological Resource Centre (EMBRC) and it is expected that the foreseen increased scientific activity will potentiate development of technologies and products with a positive impact in the regional and national economies.

CIIMAR via EMBRC.PT provides services in marine sciences: access to marine ecosystems and biodiversity, microorganism collections and model organisms, scientific diving, “omics”, bioinformatics and chemistry platforms.

It will also offer access to a variety of aquaria facilities, general laboratories, and marine observatories for long term observations.

The present project was designed to significantly improve the EMBRC.PT infrastructure and human resources so as to meet the excellence requirements of the European infrastructure and to remote research, training and knowledge transfer, so as to impact positively in the regional and national economy.

CETUS

EDUCATION AND OUTREACH

CETACEAN MONITORING PROJECT IN MACARONESIA

Principal Investigator at CIIMAR: **Isabel Sousa Pinto / Mafalda Correia**
Leader Institution: **CIIMAR**
Website: **cetusproject.com**

CETUS Project is a cetacean monitoring program in the Macaronesian region that aims at collecting whale and dolphin's occurrences to determine their distribution and abundance in this vast region of the Atlantic.

This is possible thanks to a partnership between different research institutions, led by CIIMAR | University of Porto and the company TRANSINSULAR | Grupo ETE. Since 2012, TRANSINSULAR offers its cargo ships to be used as a platforms of opportunity to monitor along routes between Continental Portugal and Madeira, Azores, Canary and Cape Verde islands.

The final research goal is to provide new insights into distribution and abundance of cetaceans, delivering habitat models to map, explore and predict cetacean hotspots in the area, addressing international and European conservation priorities and supporting management decisions.

OCEANCLASS

EDUCATION AND OUTREACH

DO OCEANO PARA A SALA DE AULA

Principal Investigator at CIIMAR: **Laura Guimarães**
Leader Institution: **CIIMAR**

Iceland Liechtenstein Norway grants

Increasing Ocean Literacy (OL) was identified as essential to enable ocean protection, in the short and long term, reversing its accelerated degradation and stimulating the blue economy. In Portugal, the Blue School is an OL program of Ministry of the Sea, which encourages schools and their teachers to work the Ocean in a formal (classroom) and non-formal context. However, the blue schools show a tendency to work the ocean outside the classroom, in approaches little focused on scientific knowledge about the ocean.

There is also a very limited work of the ocean in the classroom by basic schools in general, including those in the countryside (with less adherence to the Blue School). This stems from the lack of up-to-date scientific knowledge by teachers and resources they can easily fit into students' curricular needs.

The OceanClass project aims to develop a handbook of scientific contents about the ocean and practical activities to support teachers in the classroom.

The handbook is aimed at teachers from the Blue Schools and basic education in general, covering the first three basic learning cycles.

The project team is composed of researchers with experience in training for OL, and will develop the OceanClass with teachers and students from three Northern Portuguese schools.

The project includes holding training workshops on OL for teachers and students and ocean science days for the public. For its objectives, OceanClass contributes to UNESCO's SDG 4 (Quality Education), SDG 14 (Protect Marine Life) and SDG 17 (Partnerships for the Goals).

OCEAN ACTION

EDUCATION AND OUTREACH

MAR DE PLÁSTICO

Principal Investigator at CIIMAR: **José Teixeira**
Leader Institution: **CIIMAR-UP**
Website: **oceanaction.pt**

Iceland Liechtenstein Norway grants

More than 8 million tons of plastic reach annually the ocean, causing very significant negative impacts on marine life, economic activities and human health. Ocean Action Campaign developed different communication tools to raise awareness of school community and general public about the problem of plastic marine debris.

The traveling exhibition “Plastic Sea”, with a combination of art objects, sensory areas, multimedia and roll-up graphic panels, was exhibited so far in 18 localities. The “Marine Monsters” exhibition spread three large sculptures constructed with discarded plastics throughout different public noble spaces of Porto and neighbour cities, depicting different consequences of plastic debris on marine ecosystems. An original theatre piece “Pearl in Plastic Sea” was developed to raise awareness about marine litter and its consequences by recreating the story of the little mermaid in an adventure fraught with danger due to the ever increasing garbage that reaches the sea.

Plastic Sea project also included more conventional hands-on science activities and lectures in schools, beach cleaning activities and the production of educational videos. The combination of different communication methods aimed to encourage the critical reflection about this environmental problem of great importance and scientific complexity and the need to adopt environmentally responsible behaviour by the population through the use of complementary, artistic and innovative approaches. This Campaign was awarded in 2016 with the Green Project Award for the best Mobilization Initiative.

PONDS WITH LIFE

CHARCOS COM VIDA

Principal Investigator at CIIMAR: **José Teixeira**
Leader Institution: **CIIMAR**
Website: **charcoscomvida.ciimar.up.pt**

"Ponds with Life" ("Charcos com Vida") is a science communication and pond conservation campaign that aims to contribute to raise public awareness about these important and threatened freshwater habitats, and to promote the observation and contact with its unknown biodiversity.

Different entities are able to join the campaign, such as schools (from primary to high schools), NGO's, environmental education centres, municipalities, scouts organizations and other public and private institutions.

The campaign encourages the inventory, adoption, construction, conservation and pedagogical exploration of ponds and its biodiversity.

Our team develop numerous activities in school upon requesting, such as pond construction and exploration or talks, but entities are also inspired to perform autonomous activities using the available resources at our website.

The website contains relevant information regarding the project functioning, proposed pedagogical activities, species information and identification (aquatic plants, macro invertebrates, amphibians, reptiles, birds and mammals species most probable to find near ponds).

There is also valuable information for pond creation, designing, planning, construction and management.

OTHER NATIONAL R&D PROJECTS

PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
A&BM	The Sea and the Shore, Architecture and Marine Biology: The Impact of Sea Life on the Built Environment	Elsa Froufe U. Minho
ACTINODEEPSEA	Bioprospecting actinobacteria from Portuguese deep-sea waters for the production of novel secondary metabolites with pharmaceutical and biotechnological applications	Fátima Carvalho CIIMAR
ADAPTALENTEJO	Predicting ecosystem-level responses to climate change	Francisco Arenas U. Évora
ALGAVALOR	MicroALGAE: integrated production and valuation of biomass and its various applications	Vitor Vasconcelos CMP - Secil
ANTIBACFILM	Novel marine biomolecule with antibiofilm activity	Mariana Reis CIIMAR
AQUAVIP	Unraveling the role of viperin in the trout and turbot antiviral responses	Marina Machado CIIMAR
ATLANTIDA	Platform for the monitoring of the North Atlantic ocean and tools for the sustainable exploitation of the marine resources	Vitor Vasconcelos U. Porto
BEESNESS	Diversity and dynamics of Atlantic bee resources in relation to climate and pesticide load: data for pollination management and sustainable agriculture	Laura Guimarães CIIMAR
BIOREM	Bioremediation of hydrocarbon pollutants by autochthonous microorganisms in aquatic environment	Ana Paula Mucha CIIMAR
BUSHRISK	Tracking the bushmeat: a molecular framework for tracing the African bushmeat trade and risks of emerging diseases	Philippe Gaubert CIIMAR

PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
CANADAPT	Understanding Darwinian cancer evolution at the single-cell level	Miguel Fonseca CIIMAR
CAVIAR	Market valorisation of sea urchin gonads through dietary modulation	Luisa Valente U. Porto
CHLOROPYLL	Hydroxypheophorbide compounds, methods and uses thereof	Ralph Urbatza CIIMAR
CIGUA	The rise of toxic tropical and subtropical marine dinoflagellates *Gambierdiscus* spp: distribution, ciguatoxins trophic transfer and risk of ciguatera fish poisoning	Alexandre Campos IPMA
CONBIOMICS	The missing approach for the Conservation of freshwater Bivalves	Elsa Froufe CIIMAR
CONNECT2OCEANS	Connecting Atlantic and Arctic Oceans to decipher climate change impact on plankton microbiome functions	Catarina Magalhães CIIMAR
CONTRIBUT	Conversion of dietary tributyrin in rainbow trout	Leonardo Magnoni U. Coimbra
CRAGIAMP	Search for Antimicrobial Peptides in *Crassostrea gigas* oysters and *Paracentrotus lividus* sea urchin. Diminution of mortality rate in oyster culture: towards to a lower impact of diseases in oyster farms and search for novel compunds	Sergio Boo CIIMAR
CY-SENSORS	Biosensor and biomimetic recognition element based devices for detection and separation of cyanobacteria metabolites with ecotoxicological and therapeutical applications	Isabel Cunha CIIMAR
CYANCAN	Uncovering the cyanobacterial chemical diversity: the search for novel anticancer compounds	Mariana Reis CIIMAR
CYANOVACCINE	Cyanobacterial outer membrane vesicles as novel platforms for Vaccine technology	Cláudia Serra IBMC

PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
DEEPBASELINE	Co-creating a knowledge baseline on the diversity and distribution of sponge and coral vulnerable marine ecosystems of the Portuguese continental shelf	Joana Xavier CIIMAR
DEEPRISK	Deep-sea mining and climate change: new modeling tools in support of Environmental risk management	Luísa Bastos FCUP
E-IMUNO	Applying elasmobranch immunogenetics to fisheries management and the study of vertebrate adaptive immunity	Filipe Castro ICETA-UP
ECOS	New tools to evaluate the ecological status of rocky shores and its relationship with ecosystem services	Puri Veiga CIIMAR
EDGEOMICS	Freshwater Bilvalves at the edge: Adaptation genomics under climate-change scenarios	Elsa Froufe CIIMAR
ESCO ENSEMBLES	Estuarine and coastal numerical modeling ensembles for anthropogenic, extreme events and climate change scenarios	Fernando Veloso Gomes CIIMAR
EVODIS	The Metazoan Endocrine System in the Anthropocene Epoch: from EVOlution to DISruption	Filipe Castro CIIMAR
EXTRATOTECA	Microalgae extracts with high added value	Vitor Vasconcelos A4F, Alga Fuel, S.A.
FEEDMI	Improvements in disease resistance, stress and environmental sustainability in aquaculture systems through nutritional tools and modulation of microbial communities	Benjamin Costas Sparos Lda.
FUNG-EYE	A functional approach to unravel the interaction between fungicide pollution and fungi-mediated ecosystem processes	Sara Antunes U. Minho
GENIUSAMPLER	Autonomous biosampler to capture in situ aquatic microbiomes	Catarina Magalhães CIIMAR

PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
GLOBALED	Impacts of global change on environmentally realistic mixtures of endocrine disruptor compounds on the structure and functioning of coastal ecosystems. Implications for a sustainable environment	Patricia Teixeira CIIMAR
HALVERSITY	Genetic and chemical diversity of a novel halogenase class	Pedro Leão CIIMAR
HIPERSEA	Collection and Life Support in a Hyperbaric system for Deep-Sea Organisms	João Coimbra A. Silva Matos Metalomecânica S.A.
IMMUNAA	Methionine and tryptophan as nutraceutical strategies to improve mucosal immunity and vaccine efficiency in fish	Benjamin Costas Refojos CIIMAR
INFLAMMAA	Unraveling neuro-endocrine/immune modulatory roles of tryptophan during inflammation	Benjamin Costas Refojos CIIMAR
LEGATEE	Parental immune priming and in ovo delivery of immunostimulants applied to aquaculture of fish larvae	Ana Rocha CIIMAR
LIFELINE	Understanding temporal changes in aquatic biodiversity and their consequences for ecosystem functioning and services	Marina Dolbeth FCIÊNCIAS.ID
LINGUATOX	Bioelectronic Tongue System for the Paralytic Toxins detection in shellfis	Carlos Vale U. Aveiro
MAGAL	Magal Constellation - Setting the cornerstone of a future ocean and climate change monitoring constellation, based on radar altimeter data combined with gravity and ocean temperature and salinity measurements	Clara Lázaro EFACEC Energia
MICROPLASTOX	Microplastics in the marine environment: estimation and assessment of their ecotoxicological effects	Ruth Pereira U. Aveiro
MIRRI-PT-POLO NORTE	Northern node of the Portuguese Microbial Resource Research Infrastructure	Vitor Vasconcelos U. Minho

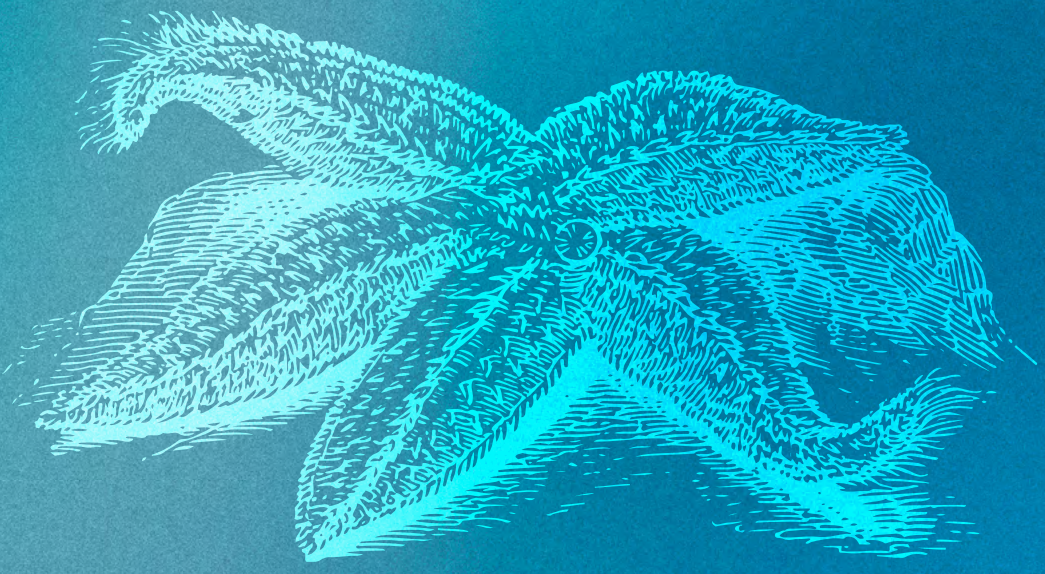
PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
MOREBIVALVES	Molecular strategies to be applied in the depuration of commercial bivalves for elimination of toxic compounds	Alexandre Campos CIIMAR
MP-BITOX	Microplastics in bivalves: identification of sensitive species in Portugal and assessment of microplastic-toxin aggregates toxicity	Carlos Vale IPMA
NANOLEGATOX	When old meets new: A novelty study on the human uptake, genotoxicity and immunotoxicity of nanoparticles and legacy contaminants mixtures	Miguel Santos ISP - UP
NANOSED	Adsorption of metallic nanoparticles to estuarine sediments: what implication for denitrification?	Ana Mafalda Baptista CIIMAR
NASCEM	Novel eco-friendly Antifouling Strategies based on Cyanobacterial bioactivE Metabolites	Joana Reis Almeida CIIMAR
NITROLIMIT	Life at the Edge: Define the Boundaries of the Nitrogen Cycle in the Extreme Antarctic Environments	Catarina Magalhaes CIIMAR
NOSTRESS	Novel functional foods for reducing stress effects in aquaculture	Benjamin Costas Refojos Sparos Lda.
OCEAN3R	Reduce pressures, restore and regenerate the NW-Portuguese ocean and waters	Ana Paula Mucha CIIMAR
PANDORAA	Unravelling the functional importance of amino acids in the fish neuroendocrine-immune network	Benjamin Costas Refojos CIIMAR
PERMAMERC	Mercury biogeochemistry, fate and impact in permafrost thaw ecosystems	Catarina Magalhães IST-ID
POSEIDON	Damage prediction and design of scour protections in complex foundations for marine renewable energy	Tiago Ferradosa CIIMAR
PROPELLER	Investigation of a new class of beta-propeller enzymes	Pedro Leão CIIMAR

PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
PROTALGAE	Method for obtaining proteins or a rich-protein extract from algae extracts and uses therefore	Luisa Valente CIIMAR
PROZYME	New probiotics isolated from fish intestine microbiota to improve vegetable raw material utilization, intestinal health and disease resistance in carnivore fish	Claudia Serra CIIMAR
PT-OPENSREEN	National Infrastructure for Chemical Biology and Genetics	Ralph Urbatza IBMC
REDEFINE	A multi-scale and multi-tiered toolbox for assessing ecosystem quality of freshwater reservoirs: bridging the gaps of the water framework directive approach	Sara Antunes CIIMAR
REMEDIGRASS	Seagrass beds as green and blue infrastructures for ecosystem restoration	Marina Dolbeth U. Aveiro
SEA ANTIMICROBIALS	Pyrazino [1,2-B]Quinazoline-3,6-Diones derivatives, their Production and uses thereof	Emília Sousa CIIMAR
SEA ANTINICROBIALS	Antimicrobials from the sea: models for innovative agents to revert multidrug resistance	Maria Emilia Sousa CIIMAR
SEA FOREST	Sea Forest Portugal	Isabel Sousa Pinto Casúlo Unipessoal Lda
SEEINGSHORE	Understanting and predicting the impact of climate change on coastal habitats	Francisco Arenas CIIMAR
SEXOMICS	Sex and the environment: Genomic decoding and the perpetuation of animal life in a changing world	Agostinho Antunes U. Minho
SITE	Integrated System of Wastewater Treatment with Macroalgae	Isabel Azevedo Aquacria
SPO3	Development of innovative sustainable protein and omega-3 rich feedstuffs for aquafeeds, from local agro-industrial by-products	Helena Peres CIIMAR

PROJECT ACRONYM	PROJECT TITLE	PRINCIPAL INVESTIGATOR LEADER INSTITUTION
SWUAV	Mapping the intertidal zone and assessing seaweed biomass using UAV images	José Alberto Gonçalves CIIMAR
SYMBIOMICS	Omics of marine symbioses: Metabarcoding and metagenomics characterizatio of host-microbe adaptation and novel biosysthetic gene clusters	Parthibaraj Anoop Alex CIIMAR
TOOLS4BREED	Challenge tests and genetic markers for Perkinsus as a tool for *Ruditapes decussatus'* selective breeding	Sergio Boo Oceano Fresco
TRANSOBESOGEN	Trans-phyletic obesogenic responses: from epigenetic modules to transgenerational environmental impacts	Miguel Santos CIIMAR
UNNOWN	Undiscovered Nitrogen micrOrganisms for Wastewater iNoculation: finding efficient microbial seed sludges for wastewater nitrogen removal	Catarina Teixeira CIIMAR
UVNATP	Novel UV protective compounds from natural sources as active ingredients for sun care products	Pedro Leão CIIMAR
VAL-WRACK	Wrack as a high value resource in a global warming scenario. Is it worthy to invest on it?	Marcos Rubal CIIMAR
XANTIFOUL	Oxygenated xanthone derivatives as antifouling agents	Marta Correira da Silva CIIMAR
	Mites associated with Red Palm Weevil (RPW; *Rhynchophorus ferrugineus* O.) in Portugal and recombinant anti-RPW endophytic bacteria	Camilo Pardo CIIMAR
	Causalities between diversity, ecosystem functions and services in marine ecosystems	Marina Dolbeth CIIMAR

SCIENTIFIC OUTPUTS

CIIMAR ACTIVITY
REPORT 2021



SCIENTIFIC OUTPUTS

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Institution: Faculty of Engineering, University of Porto
Supervisor: Francisco Taveira Pinto
Co-supervisor: Damien Violeau
Date: January 2021

Name: Bárbara Sofia Poléri da Silva
Thesis title: Enantioselectivity of pentedrone and methylone: enantioresolution by liquid chromatography and in vitro toxicokinetic/toxicodynamic studies
Doctoral Programme/Degree: Experimental and Clinical Pharmacology and Toxicology
Institution: Faculty of Medicine, University of Porto
Supervisor: Fernando Reimão
Co-supervisor: Carla Sofia Garcia Fernandes
Date: September 2021

Name: Celso Manuel Cristovão Mamdume
Thesis title: Avaliação Nutricional e Toxicológica do Pescado mais consumido na Província do Namibe - Angola
Doctoral Programme/Degree: Food Sciences
Institution: NOVA School of Science and Technology
Supervisor: Maria Paula Duarte
Co-supervisors: Maria Leonor Nunes, Narcisa Bandarra
Date: February 2021

Name: Francisca Silva-Brito
Thesis title: Effects of rearing conditions on the composition and bioactive content of seaweed: Potential applications as dietary supplements in the gilthead seabream (Sparus aurata)
Doctoral Programme/Degree: Ciência Animal - SANFEED
Institution: ICBAS, University of Porto
Supervisor: Leonardo Magnoni
Co-supervisor: Anake Kijjoa and Rui Pereira
Date: October 2021

Name: Joana Fernandes
Thesis title: Bioremediation of pharmaceuticals by aquatic microorganisms for the recovery of estuarine environments
Doctoral Programme/Degree: Doutoramento em Ciências Biomédicas,
Institution: ICBAS, University of Porto
Supervisor: Ana Paula Mucha
Co-supervisor: Marisa Almeida and Maria Fátima Carvalho
Date: April 2021

Name: Jorge Dinis Câmara Freitas
Thesis title: Application of quality safety and traceability system procedures in the aquaculture production of new species in Madeira Autonomous Region (RAM)
Doctoral Programme/Degree: Chemistry
Institution: Faculty of Exact Sciences and Engineering, University of Madeira
Supervisor: José de Sousa Câmara
Co-supervisor: Paulo Vaz-Pires
Date: December 2021

Name: José Antônio Salgado de Moura Muniz
Thesis title: Aproveitamento e valorização de polvo da costa portuguesa e de robalo de aquacultura
Master degree: Food Sciences
Institution: NOVA School of Science and Technology
Supervisor: Maria Leonor Nunes
Co-supervisor: Amparo Gonçalves and Maria Paula Duarte
Date: February 2021

Name: Luís Francisco Lima Baião
Thesis title: Characterization of the sensory profile of sea urchin aiming at the selection of premium gonads
Doctoral Programme/Degree: Ciência Animal - SANFEED
Institution: ICBAS, University of Porto
Supervisor: Luisa Valente
Co-supervisor: Luís Cunha, Rui Costa Lima and Amparo Gonçalves
Date: December 2021

Name: Maria João Xavier
Thesis title: Improving growth performance of fish larvae through early nutrition
Doctoral Programme/Degree: Animal Science
Supervisor: Luisa Valente
Institution: ICBAS, University of Porto
Co-supervisor: Luís Cunha and Amparo Gonçalves
Date: November 2021

Name: Natasha Travenisk Hoff
Thesis title: Wake of Death: Using historical and contemporaneous data to evaluate the Isopisthus parvipinnis (Sciaenidae) population structure at the Southwest Atlantic Ocean (23º- 26.9ºS).

Doctoral Programme/Degree: Oceanography
Institution: Institute of Oceanography, University of São Paulo
Supervisor: June Ferraz Dias
Co-supervisor: Alberto Teodorico Correia
Date: May 2021

Name: Paula Liliana Vila Nova Salgado
Thesis title: Insights on the biogeochemistry of marine nitrogen and organic sulfur cycles and implications for nitrous oxide emissions
Doctoral Programme/Degree: Biomedical Sciences
Institution: ICBAS, University of Porto
Supervisor: Adriano Agostinho Donas-Bôto Bordalo e Sá
Date: May 2021

Name: Pedro Luís Borralho Aboim de Brito
Thesis title: Rare Earth elements in the Tagus estuary: sources, biogeochemistry and toxicity
Doctoral Programme/Degree: Marine Sciences
Institution: Faculty of Sciences, University of Lisbon
Supervisor: Maria Violante Caçador
Co-supervisor: Miguel Caetano
Date: April 2021

Name: Rafael Schroeder
Thesis title: Estrutura populacional, padrão de movimento e conectividade da Sardinha-verdadeira, Sardinella brasiliensis, na região sudeste-sul do Brasil como ferramenta para o manejo pesqueiro.
Doctoral Programme/Degree: Science and Environmental Technology
Institution: University of Vale do Itajaí
Supervisor: Paulo Ricardo Schwingel
Co-supervisor: Alberto Teodorico Correia
Date: August 2021

Name: Sofia Valente Rocha Paula
Thesis title: Adaptative planning for coastal climate adaptation in Port-Cities: Integrating adaptation pathways into planning instruments
Doctoral Programme/Degree: Territory Planning
Institution: Faculty of Engineering, University of Porto
Supervisor: Paulo Pinho
Co-supervisor: Fernando Veloso Gomes
Date: September 2021

Name: Telmo André Pereira Vieira
Thesis title: Tropospheric corrections for satellite altimetry studies over coastal and inland water regions
Doctoral Programme/Degree: Surveying Engineering
Institution: Faculty of Sciences, University of Porto
Supervisor: Maria Joana Afonso Pereira Fernandes
Date: April 2021

Name: Vinicius Roveri
Thesis title: An integrated environmental assessment of the water and sediments from the coastal áreas of Guarujá, São Paulo, Brazil: a physico-chemical, biological and ecotoxicological approach.
Doctoral Programme/Degree: Ecology and Environmental Health
Institution: Faculty of Science and Technology, University Fernando Pessoa
Supervisor: Alberto Teodorico Correia
Co-supervisor: Luciana Lopes Guimarães
Date: November 2021

Name: Yuri Costa
Thesis title: Simulação e análise de performance de modelos computacionais aplicados a assembleias bentônicas em gradientes estuarinos
Doctoral programme/doctoral degree: Ecology
Institution: Federal University of Bahia, Brasil
Supervisor: Francisco Barros
Co-supervisor: Irene Martins
Date: December 2021

Name: Lucia Ivorra Gonzalez
Thesis title: The roles of the mangroves on the bioaccumulation and citogenotoxic effects of heavy metals and pesticides in the food web of a tropical system.
Doctoral Programme/Degree: Science
Institution: University of Porto and University of Saint Joseph Macau
Supervisor: Patricia Cardoso Teixeira
Date: July 2021

COMPLETED MSc THESES

Name: Adriana Alves de Oliveira
Thesis title: NUTRIMU and EPPO Internship: Larval rearing and fish health in Aquaculture.
Master degree: Biological Aquatic Resources
Institution: Faculty of Sciences, University of Porto
Supervisor: Ana Couto
Co-supervisor: Cláudia Serra
Date: December 2021

Name: Adriano Chessa
Thesis title: Effects of TBT on gene expression, locomotory behaviour and protein affinity prediction of Triops longicaudatus
Master degree: Environmental Contamination and Toxicology
Institution: ICBAS and Faculty of Sciences, University of Porto
Supervisor: Nuno Ferreira
Co-supervisor: Laura Guimaraes and Antonio Paulo Carvalho
Date: October 2021

Name: Alice Melzi
Thesis title: Selection and optimization of bacterial strains isolated from Port of Leixões for bioremediation of crude oil and maritime fuels
Master degree: Agricultural and Environmental Sciences
Institution: Faculty of Agricultural and Food Sciences, University of Milan, Italy
Supervisor: Lucia Cavalca and Ana Paula Mucha
Co-supervisor: Rafaela Perdigão
Date: December 2021

Name: Álvaro Eduardo da Silva de Abreu
Thesis title: Estudo da hidrodinâmica e dinâmica sedimentar na zona costeira de Esposende recorrendo ao modelo X-Beach
Master degree: Civil Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Francisco Taveira Pinto
Co-supervisor: Paulo Rosa Santos
Date: September 2021

Name: Ana Carolina Marmelo Bogalho
Thesis title: Avaliação do Estado Ambiental de uma Área Marinha Protegida Costeira: o Parque Natural do Litoral Norte
Master degree: Aquatic Biological Resources
Institution: Faculty of Sciences, University of Porto
Supervisor: Sandra Ramos
Date: November 2021

Name: Ana Francisca Silva Carvalho
Thesis title: Green roofs as biodiversity promoters in urban coastal areas
Master degree: Functional Biology and Biotechnology of Plants
Institution: Faculty of Sciences, University of Porto
Supervisor: Cristina Calheiros
Co-supervisor: Ana Paula Mucha, Isabel Mina
Date: December 2021

Name: Ana Laura Menoita da Costa Dias
Thesis title: Synthesis of 4-hydroxyxanthone, a key precursor for antitumor pyranoxanthones
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Carlos M. M. Afonso
Co-supervisor: José Xavier Soares
Date: October 2021

Name: Ana Patrícia Pinto Gomes
Thesis title: Contaminação por partículas suspeitas de serem plásticos e microplásticos e efeitos biológicos na população de Phorcus lineatus da costa noroeste de Portugal
Master degree: Environmental Contamination and Toxicology
Institution: ICBAS, University of Porto
Supervisor: Lúcia Maria das Candeias Guilhermino
Co-supervisor: Luís Gabriel Antão Barboza
Date: December 2021

Name: Ana Raquel Vieira Magalhães
Thesis title: Qualidade e tratamento de águas para consumo humano
Master degree: Biology and Water Quality Management
Institution: Faculty of Sciences, University of Porto
Supervisor: Maria da Natividade Vieira
Date: December 2021

Name: Ana Rita Favas
Thesis title: Anti-aging potential of cyanobacteria: effect on matrix metalloproteinases and oxidative stress
Master degree: Functional Biology and Biotechnology of Plants
Institution: Faculty of Sciences, University of Porto
Supervisor: Graciliana Lopes
Co-supervisor: Vitor Vasconcelos
Date: November 2021

Name: Ana Sofia Carvalho Soares
Thesis title: Local ecological knowledge of vulnerable marine ecosystems of the Portuguese mainland continental shelf and upper slope
Master degree: Applied Marine Biology
Institution: University of Aveiro
Supervisor: Joana R. Xavier
Co-supervisor: Cristina Pita (Univ. Aveiro) and Sandra Ramos
Date: December 2021

Name: Ana Sofia Cristão Lapa
Thesis title: Validação de duas ferramentas de apoio à decisão em aquacultura - FiT e FEEDNETICSTM - para truta arco-íris (Oncorhynchus mykiss)
Master degree: Zootechnical Engineering
Institution: University of Trás-os-Montes and Alto Douro
Supervisor: Paulo Rema
Co-supervisor: Filipe Soares (SPAROS Lda.)
Date: April 2021

Name: Anderson Barcellos Prado
Thesis title: GNSS-derived tropospheric delays applied to satellite altimetry over Latin America Coastal Zones
Master degree: Remote Sensing
Institution: Faculty of Sciences, University of Porto
Supervisor: Joana Fernandes
Co-supervisor: Nelson Ribeiro Pires
Date: November 2021

Name: André Pereira da Cunha
Thesis title: Effects of Ygeia+ on the European seabass immune response and disease resistance: New tools and opportunities – Y+Health
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Benjamín Costas
Co-supervisor: António Afonso.
Date: December 2021

Name: André Rafael Ferreira
Thesis title: An automatic algorithm to design primers for identification of highly infectious viruses using inter and intra-specific genome conservation scores
Master degree: Forensic Genetics
Institution: Faculty of Sciences, University of Porto
Supervisor: João Carneiro
Co-supervisor: Luísa Azevedo, Filipe Pereira
Date: December 2021

Name: Andreia Ferreira Ribeiro
Thesis title: Avaliação da qualidade ecológica de sistemas fluviais urbanos
Institution: Faculty of Sciences, University of Porto
Master degree: Biology and Water Quality Management
Supervisor: Maria da Natividade Vieira
Co-supervisor: Carolina Rodrigues
Date: December 2021

Name: Arianna Capparotto
Thesis title: Weekly fluctuations of microplankton community structure in a changing Arctic Ocean
Master degree: Molecular Biology
Institution: Biology department, University of Padova, Italy
Supervisor: Catarina Magalhães
Co-supervisor: Miguel Semedo and Alessandro Vezzi
Date: September 2021

Name: Artur André Gomes da Silva
Thesis title: Estudo da hidrodinâmica e dinâmica sedimentar num estuário: Aplicação a caso de estudo da costa portuguesa
Master degree: Civil Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Paulo Rosa Santos

Co-supervisor: Francisco Taveira Pinto
Date: September 2021

Name: Axel Chabrerie
Thesis title: Effects of elevated temperature and nutrient deprivation on semi-naturally structured assemblage
Master degree: Marine Environment and Resources – Erasmus mundus
Institution: University of Basque Country, Southampton University, Liege University, Bordeaux University
Supervisor: Francisco Arenas
Date: September 2021

Name: Bárbara Salazar Diogo
Thesis title: Contribution of ecotoxicological approach for Environmental assessment of urban Wastewater Treatment Plant under rehabilitation
Master degree: Biological Aquatic Resources
Institution: Faculty of Sciences, University of Porto
Supervisor: Sara Antunes
Date: November 2021

Name: Bernard Costa Vasconcellos
Thesis title: Exploitation of ground-based water vapour radiometers in satellite altimetry
Master degree: Remote Sensing
Institution: Faculty of Sciences, University of Porto
Supervisor: Joana Fernandes
Co-supervisor: Clara Lázaro
Date: December 2021

Name: Brenno Fernandes da Cunha Lima
Thesis title: Bioprospection of cyanobacterial strains for antifouling compounds
Master degree: Applications in Biotechnology and Synthetic Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Marco Preto
Co-supervisor: Vitor Vasconcelos
Date: December 2021

Name: Bruno Miguel Ferreira da Silva
Thesis title: Automatic detection of earthquake's deformations in SAR Interferograms
Master degree: Remote Sensing
Institution: Faculty of Sciences, University of Porto
Supervisor: António Cunha
Co-supervisor: Joana Fernandes
Date: November 2021

Name: Carlos André Costa Figueiredo
Thesis title: Analysis of the effectiveness of large-scale artificial sand nourishments on beaches: application to a coastal stretch in the northern coast of Portugal
Master degree: Civil Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Francisco Taveira Pinto
Co-supervisor: Paulo Rosa Santos
Date: September 2021

Name: Carolina de Melo Simões
Thesis title: Avaliação do comportamento alimentar, crescimento e eficiência alimentar de tilápias alimentadas com diferentes proporções de aminoácidos
Master degree: Zootechnical Engineering
Institution: University of Trás-os-Montes and Alto Douro
Supervisor: Paulo Rema
Date: 2021

Name: Carolina Dias Andrade
Thesis title: Avaliação do desempenho de uma intervenção de proteção costeira no Gana: caso de estudo
Master degree: Environmental Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Paulo Rosa Santos
Co-supervisor: Luciana das Neves
Date: October 2021

Name: Clara Hernandez
Thesis title: An integrative review on analytical methods for determination of BPA and derivatives released from resin composites
Master degree: Dental Medicine
Institution: IUCS, CESPU
Supervisor: Maria Elizabeth Tiritan
Co-supervisor: Lígia Rocha
Date: September 2021

Name: Cláudia Andreia Oliveira da Silva
Thesis title: Exploring biosynthetic pathways and ecological functions in Arctic Ocean microbiomes
Master degree: Biostatistics and Bioinformatics Applied to Health
Institution: School of Health, Porto Polytechnic
Supervisor: Catarina Magalhães
Co-supervisor: Pedro Leão and Rúben Fernandes
Date: January 2021

Name: Cláudia Sofia Ferreira Pinto
Thesis title: Enantioselective synthesis of new flavonoids with potential antitumor
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Maria Elizabeth Tiritan
Co-supervisor: Honorina Cidade
Date: November 2021

Name: Cláudia Sofia Oliveira Rodrigues
Thesis title: Optimization of a cetacean occurrence dataset: methods for controlling data bias, verification and validation
Master degree: Environmental Sciences and Technology
Institution: Faculty of Sciences, University of Porto
Supervisor: Ana Mafalda Correia
Co-supervisor: Isabel Sousa-Pinto
Date: September 2021

Name: Cláudia Teresa Pinto Amorim
Thesis title: Deep-sea pharmacies: Exploring deep-sea Actinobacteria for the production of novel natural products with pharmaceutical applications
Master degree: Biotechnology
Institution: University of Minho
Supervisor: Maria de Fátima Carvalho
Co-supervisor: Joana Azeredo
Date: January 2021

Name: Cristiana Isabel Simões Lavado
Thesis title: Avaliação da performance zootécnica do camarão-de-patas-brancas (Litopenaeus vannamei).
Master degree: Zootechnical Engineering
Institution: University of Trás-os-Montes and Alto Douro
Supervisor: Paulo Rema
Date: February 2021

Name: Daniel Jun Despujols
Thesis title: Integrative taxonomy of the genus Thenea (Porifera, Demospongiae, Tetractinellida) of the Portuguese shelf and slope: new records and new species for science
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Joana R. Xavier
Co-supervisor: Jorge Lobo Arteaga
Date: December 2021

Name: Diana Rodrigues Julião
Thesis title: The effect of drying process on undervalued brown and red seaweed species: Biochemical characterization
Master degree: Bioorganic Chemistry
Institution: NOVA School of Science and Technology
Supervisor: Carlos Cardoso
Co-supervisor: Paula Branco
Date: February 2021

Name: Diogo Alexandre Barros Lopes
Thesis title: Exploring microalgal derivatives for antifouling application: bioactivity and ecotoxicity
Master degree: Applications in Biotechnology and Synthetic Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Joana R. Almeida
Co-supervisor: Vítor Vasconcelos
Date: November 2021

Name: Elisangela Maria da Moura Semedo
Thesis title: Avaliação do impacto de diferentes atividades humanas na diversidade biológica de sistemas aquáticos – Diatomáceas
Institution: Faculty of Sciences, University of Porto
Master degree: Biology and Water Quality Management
Supervisor: Maria da Natividade Vieira
Date: December 2021

Name: Frederico de Nunes e Silva
Thesis title: Quantificação de 17 compostos desreguladores endócrinos no estuário do Rio Douro Avaliação do seu risco para a biota
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Maria João Rocha
Co-supervisor: Eduardo Rocha
Date: December 2021

Name: Gabriela Alves Moreira
Thesis title: Discovery of new cyanobacterial natural products with bioactivity
Master degree: Molecular Genetics
Institution: Faculty of Sciences, University of Minho
Supervisor: Sandra Figueiredo
Co-supervisor: Maria João Sousa
Date: October 2021

Name: Gabriella Vilella Vasconcelos
Thesis title: Identification of antimicrobial peptides in oysters selected for bacterial and virus disease resistance
Master degree: Environmental Sciences and Technology
Institution: Faculty of Sciences, University of Porto
Supervisor: Sergio Fernández Boo
Co-supervisor: Benjamín Costas
Date: November 2021

Name: Gisela Sofia Correia Costa
Thesis title: Caracterização e sustentabilidade do sistema socioecológico para a exploração de chicharro (Trachurus picturatus (Bowdich, 1825)) em São Miguel, Açores
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Georgios Stratoudakis
Co-supervisor: Eduardo Rocha
Date: December 2021

Name: Gonçalo Carvalho Oliveira
Thesis title: Geração automática de ortomosaicos de fotos aéreas de arquivo e o seu potencial como tema de informação geográfica
Master degree: Remote Sensing
Institution: Faculty of Science, University of Porto
Supervisor: José Alberto Gonçalves
Date: December 2021

Name: Guilherme Sampaio Rodrigues Gonçalves
Thesis title: Fishing impact on deep-sea cold-water coral communities of the Azores: contribution to Descriptor 6 of the Marine Strategy Framework Directive
Master degree: Aquatic Biological Resources
Institution: Faculty of Sciences, University of Porto
Supervisor: Telmo Morato (Univ. Azores)
Co-supervisor: Joana R. Xavier
Date: November 2021

Name: Hugo Sainz Meyer
Thesis title: Mapping of Intertidal shores of Parque Natural do Litoral Norte
Master degree: Remote Sensing
Institution: Faculty of Science, University of Porto
Supervisor: Cândida Gomes Vale
Co-supervisor: José Alberto Gonçalves
Date: December 2021

Name: Igor Santos Bernardo
Thesis title: Estágio Curricular na Empresa Riasearch, Lda.
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Rui Jorge Miranda Rocha
Co-supervisor: Benjamín Costas
Date: December 2021

Name: Iñaki Lacomba Marti-Belda
Thesis title: Screening of new natural products in cyanobacteriua with fatty acid incorporation
Master degree: Applied Blue Biotechnology
Institution: Catholic University of Valencia
Supervisor: Pedro N. Leão
Co-supervisor: Jeronimo Chirivella
Date: September 2021

Name: Ivan Langa
Thesis title: Analysis of psychoactive substances in surface waters
Master degree: Forensic Sciences and Laboratory Techniques
Institution: IUCS, CESPU
Supervisor: Cláudia Ribeiro
Co-supervisor: Maria Elizabeth Tiritan
Date: April 2021

Name: Javier Sanz Moxó
Thesis title: Appetite reduction by microalgae in zebrafish larvae for obesity treatment.
Master degree: Applied Blue Biotechnology
Institution: Catholic University of Valencia, Spain
Supervisor: Ralph Urbatzka
Co-supervisor: Jeronimo Chirivella
Date: September 2021

Name: Jessica Filipa Pereira Alves
Thesis title: Ensaio de toxicidade das beatas de cigarro utilizando Artemia franciscana
Institution: Faculty of Sciences, University of Porto
Master degree: Biology and Water Quality Management
Supervisor: Maria da Natividade Vieira
Date: December 2021

Name: Joana Daniela Martins de Sá
Thesis title: Bioactive compounds from the marine derived fungus Neosartorya spinosa KUFA 1047
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Anake Kijjoa
Co-supervisor: Honorina Cidade
Date: September 2021

Name: Joana de Matos Marques
Thesis title: Impactos das alterações climáticas (aquecimento e acidificação) na qualidade nutricional do sargo-veado
Master degree: Food Engineering
Institution: Instituto Superior de Agronomia (ISA), University of Lisbon
Supervisor: Patrícia Anacleto
Co-supervisor: Isabel Januário
Date: May 2021

Name: Joana Filipa de Olas e Sousa Martins Cardoso
Thesis title: Synthesis and antifungal activity of aminothioxanthones derivatives
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Maria Eugénia Pinto
Co-supervisor: Maria Emília Sousa
Date: October 2021

Name: Joana Rodrigues da Silva Gomes
Thesis title: Hybrids of flavonoids and cinnamic acid derivatives combining photoprotection and antioxidant activity
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Honorina Cidade
Co-supervisor: Isabel Almeida
Date: October 2021

Name: Joana Seabra-Silva
Thesis title: Modelação e previsão de caudais efluentes na barragem de Crestuma-Lever
Master degree: Mathematical Engineering
Institution: Faculty of Sciences, University of Porto
Supervisor: Paula Milheiro de Oliveira
Co-supervisor: Paulo Avilez-Valente
Date: December 2021

Name: Joana Maria Ferreira da Silva
Thesis title: Science communicators as leaders of change: profile and attitudes towards social innovation
Master degree: Science Education and Communication
Institution: Faculty of Sciences, University of Porto
Supervisor: Clara Vasconcelos
Co-supervisor: Richard Hazenberg
Date: November 2021

Name: João Eduardo Afonso Teiga Teixeira
Thesis title: Mitogenomic phylogeny of freshwater mussels (Bivalvia: Unionida)
Master degree: Bioinformatics and Applications to Life Sciences
Institution: University of Trás-os-Montes and Alto Douro
Supervisor: Elsa Froufe
Co-supervisor: Manuel Lopes-Lima; Eduardo Solteiro Pires
Date: January 2021

Name: Joelen Cruz da Silva
Thesis title: Use of multispectral UAV images for classification and biomass assessment of seaweed in intertidal rocky shores
Master degree: Remote Sensing
Institution: Faculty of Sciences, University of Porto
Supervisor: José Alberto Gonçalves
Co-supervisor: Débora Borges and Lia Duarte
Date: November 2021

Name: José Luís Sousa Andrade Gomes
Thesis title: Caracterização de cheias na Bacia Hidrográfica do rio Lima. Definição de Hidrogramas de cheias afluentes à Barragem do Alto Lindoso
Master degree: Civil Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Rodrigo Maia
Date: March 2021

Name: José Miguel Antunes Moreira
Thesis title: Impacts of climate change in temperate and subtropical fish species
Master degree: Environmental Engineering
Institution: Instituto Superior Técnico (IST), University of Lisbon
Supervisor: Gonçalo M. Marques
Co-supervisor: Patrícia Anacleto
Date: December 2021

Name: Karen Avellaneda Rodriguez
Thesis title: Evaluation of the diversity of deep-water sponges of the Selvagens Islands through DNA barcoding
Master degree: Marine Biology and Conservation
Institution: ISPA
Supervisor: Joana Robalo
Co-supervisor: Joana R. Xavier, Inês Tojeira
Date: December 2021

Name: Lai Wai Ian
Thesis title: Mangroves as nature-based solution for coastal water eutrophication in Macao SAR China
Master degree: Environmental Studies and Management
Institution: University of Saint Joseph, SAR Macao
Supervisor: Cristina Calheiros
Co-supervisor: Ágata Dias
Date: November 2021

Name: Layane Andrade Miranda Gonçalves
Thesis title: Development and evaluation of a Pirkle-type chiral stationary phase for flash chromatography
Master degree: Biology and Water Quality Management
Institution: Faculty of Sciences, University of Porto
Supervisor: Carla Fernandes
Co-supervisor: Maria Elizabeth Tiritan
Date: November 2021

Name: Leonor Ribeiro de Almeida e Figueiredo
Thesis title: BlueGrowthForBiodiversity: Integrating marine biodiversity policies into sustainable blue growth frameworks: The case of the European Atlantic Area
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Zacharoula Kyriazi
Co-supervisor: Joao Coimbra
Date: December 2021

Name: Letícia Weber Oliveira
Thesis title: Phytoremediation in Portugal: a comparison between plants and different wastewaters
Master degree: Biology and Water Quality Management
Institution: Faculty of Sciences, University of Porto
Supervisor: Cristina Calheiros
Co-supervisor: Maria Natividade
Date: December 2021

Name: Márcia Sofia Silva Martins
Thesis title: Synthesis and neuroprotection studies of new xanthenes and fluorenes
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Maria Emília Sousa
Co-supervisor: Renata Silva
Date: October 2021

Name: Marco Paulo R. Noblesala
Thesis title: Green roof application in Macao SAR
Master degree: Environmental Studies and Management
Institution: University of Saint Joseph, SAR Macao
Supervisor: David Gonçalves
Co-supervisor: Cristina Calheiros
Date: July 2021

Name: Marcos António Pereira Domingues
Thesis title: NRfinder: A pipeline for the characterization of the number and type of nuclear receptors in a genomic sequence
Master degree: Bioinformatics and Computational Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Filipe Castro
Co-supervisor: Pedro Ferreira
Date: October 2021

Name: Maria de Jesus Rios Sousa
Thesis title: Avaliação de efeitos ecotoxicológicos de salinidade e metmorfina em Gambusia holbrooki
Master degree: Applied Marine Biology
Institution: University of Aveiro
Supervisor: João Honrado
Co-supervisor: Sara Antunes
Date: December 2021

Name: Maria Esperança Glórias Marques
Thesis title: Avaliação de soluções para redução do risco de galgamento em frentes costeiras urbanizadas para diferentes cenários de alterações climáticas
Master degree: Environmental Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Francisco Taveira Pinto and Paulo Rosa Santos
Co-supervisor: José Victor Ramos
Date: October 2021

Name: Maria Francisca Amorim Cardoso e Sá
Thesis title: Reproductive status and early stages of development in the green macroalga Codium tomentosum
Master degree: Biological Aquatic Resources
Institution: Faculty of Sciences, University of Porto
Supervisor: Isabel Sousa-Pinto
Co-supervisor: Gonçalo Silva Marinho
Date: November 2021

Name: Maria Francisca Lacerda Petracchi Rodrigues Sarmento
Thesis title: Impacto hidrodinâmico e morfodinâmico das alterações climáticas no Estuário do Douro
Master degree: Civil Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Paulo Avilez-Valente
Co-supervisor: Isabel Iglesias
Date: September 2021

Name: Maria Inês Nogueira Duarte
Thesis title: Dietary tryptophan supplementation and its modulatory role in juvenile European seabass (Dicentrarchus labrax) during chronic inflammation
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Benjamín Costas
Co-supervisor: Rita Azerdo
Date: December 2021

Name: Maria João Abreu de Santa Rosa
Thesis title: Environmental enrichment effects on Zebrafish (Danio rerio) fecundity, fertility and survival rate
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Eduardo Rocha
Date: December 2021

Name: Maria José Pereira Henriques
Thesis title: Estudo da produção de sedimentos em bacias hidrográficas e análise do seu impacto em albufeiras.
Master degree: Civil Engineering
Institution: Faculty of Engineering, University of Porto
Supervisor: Rodrigo Maia
Date: September 2021

Name: Maria Leonor Felgueiras Lemos
Thesis title: A preliminary study of Campylobacter spp. in dogs in Portugal - a One Health perspective
Master degree: Veterinary Medicine
Institution: ICBAS, University of Porto
Supervisor: Paulo Martins da Costa
Co-supervisor: Mónica Oleastro
Date: March 2021

Name: Maria Pacheco Pereira
Thesis title: SARS-CoV-2: Comunicação de risco e crise em emergência
Master degree: Veterinary Medicine
Institution: ICBAS, University of Porto
Supervisor: Paulo Martins da Costa
Date: March 2021

Name: Mariana Alves Pires
Thesis title: Regulation at the gene expression level of nitrogen acquisition in a nitrogen fixing-cyanobacteria: implications in ecological interactions
Master degree: Environmental Contamination and Toxicology
Institution: Faculty of Sciences and ICBAS, University of Porto
Supervisor: Aldo Barreiro Felpeto
Co-supervisor: Ana Rebelo Vieira
Date: December 2021

Name: Mariana da Costa Almeida
Thesis title: Indolylmethyl Pyrazinoquinazoline Alkaloids inspired by the sea: Total synthesis and evaluation of antimicrobial activities
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Diana Resende
Co-supervisor: Paulo Martins da Costa
Date: September 2021

Name: Mariana Miranda Moutinho
Thesis title: Manipulation of growth conditions of cyanobacteria to potentiate the production of high value compounds for obesity treatment
Master degree: Applications in Biotechnology and Synthetic Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Ralph Urbatzka
Co-supervisor: Vítor Vasconcelos
Date: December 2021

Name: Mariana Pereira Fernandes da Silva
Thesis title: Improving Neuroblastoma Therapy with TAp73-Targeting Agents
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Emília Sousa
Co-supervisor: Lucilia Saraiva
Date: September 2021

Name: Marta Duarte Caldas Ribeiro
Thesis title: Chronic life-cycle studies with the priority pharmaceutical metformin: molecular and biochemical assessment with Danio rerio
Master degree: Environmental Contamination and Toxicology
Institution: ICBAS and Faculty of Sciences, Universisity of Porto
Supervisor: Maria Teresa Neuparth
Co-supervisor: Miguel Santos
Date: December 2021

Name: Neide Esperança Pedrosa
Thesis title: Recombinant Bacillus subtilis spores as oral vaccines against aquaculture diseases
Master degree: Applications in Biotechnology and Synthetic Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Claudia R. Serra
Co-supervisor: Aires Oliva-Teles
Date: November 2021

Name: Patricia Alexandra Lima Alves
Thesis title: Instalação e manutenção de uma parede verde com produção de bens alimentares
Master degree: Agricultural Engineering
Institution: Faculty of Sciences, University of Porto
Supervisor: Ruth Pereira
Co-supervisor: Cristina Calheiros
Date: December 2021

Name: Rafael Paiva Nunes Júnior
Thesis title: Multivariate statistics applied to microplastic analysis techniques
Master degree: Advanced Methods and Accreditation in Chemical Analysis
Institution: Faculty of Sciences, University of Porto
Supervisor: Carlos Rocha Gomes
Co-supervisor: Marisa R. Almeida
Date: December 2021

Name: Raquel Maria Rocha Magalhães
Thesis title: Study of the influence of seawater in antibiotic susceptibility
Master degree: Applications in Biotechnology and Synthetic Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Olga Lage
Co-supervisor: Sandra Quinteira
Date: November 2021

Name: Ricardo Alexandre Abreu Barroso
Thesis title: SARS-CoV-2: Susceptibility of cats and dogs to infection
Master degree: Applications in Biotechnology and Synthetic Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Isabel Fidalgo Carvalho
Co-supervisor: Agostinho Antunes
Date: December 2021

Name: Rita Alexandra Ferreira Alves de Lima
Thesis title: Synthesis of new polymeric materials based on chitosan with potential anti-tumor activity
Master degree: Pharmaceutical Chemistry
Institution: Faculty of Pharmacy, University of Porto
Supervisor: Carla Sofia Garcia Fernandes
Co-supervisor: Madalena Pinto
Date: October 2021

Name: Rita Biltes Lopes Gonçalves Machado
Thesis title: Optimization of a molecular cell-based sensor to detect PPARg ligands – a tool for drug discovery in cyanobacteria
Master degree: Molecular and Cell Biology
Institution: ICBAS, University of Porto
Supervisor: Isabel Cunha
Co-supervisor: Inês Páscoa
Date: October 2021

Name: Rita Loewenstein Simões
Thesis title: Evaluation of microalgae Chlorella vulgaris for their potential beneficial effects on human metabolic diseases.
Master degree: Functional Biology and Biotechnology of Plants
Institution: Faculty of Sciences, University of Porto
Supervisor: Ralph Urbatzka
Co-supervisor: Ana Regueiras
Date: December 2021

Name: Rita Santos Teixeira
Thesis title: Evaluation of microalgae for their potential beneficial effects on human metabolic diseases
Master degree: Environmental Contamination and Toxicology
Institution: Faculty of Sciences and ICBAS, University of Porto
Supervisor: Ralph Urbatzka
Co-supervisor: Vítor Vasconcelos
Date: December 2021

Name: Rithielli Rodrigues Marassi
Thesis title: Ecotoxicology of deep-sea environments: effects of suspended sediments under
hyperbaric conditions
Master degree: Environmental Sciences and Technology
Institution: Faculty of Sciences, University of Porto
Supervisor: Miguel Santos
Co-supervisor: Filipe Castro
Date: October 2021

Name: Sabrina de Angeli Cavatt
Thesis title: Otimização do sistema de gestão documental numa industria alimentar
Master degree: Food Science and Technology
Institution: Faculty of Sciences, University of Porto
Supervisor: Paulo Vaz-Pires
Co-supervisor: Victor Freitas
Date: November 2021

Name: Sara Fidalgo Marques
Thesis title: Manipulação das condições de crescimento de cianobactérias para potencializar a produção de compostos de alto valor para o tratamento da obesidade
Master degree: Environmental Contamination and Toxicology
Institution: Faculty of Sciences and ICBAS, University of Porto
Supervisor: Ralph Urbatzka
Co-supervisor: Vítor Vasconcelos
Date: December 2021

Name: Sofia Isabel Faria Correia
Thesis title: In search of chemical treasure troves hidden in the sea: Exploring deep-sea-Actinobacteria chemical diversity by using the OSMAC approach
Master degree: Biochemistry
Institution: Faculty of Sciences, University of Porto
Supervisor: Maria de Fátima Carvalho
Co-supervisor: Ralph Urbatzka
Date: November 2021

Name: Sónia Isabel Ribeiro Ferreira
Thesis title: Future ocean warming and acidification: Simultaneous impacts on the green crab Carcinus maenas
Master degree: Marine Sciences - Marine Resources
Institution: ICBAS, University of Porto
Supervisor: Francisco Arenas
Co-supervisor: Laura Guimarães
Date: December 2021

Name: Sónia Raquel Gomes Ribeiro
Thesis title: Characterization of natural products in cone snails from the Cabo Verde archipelago
Master degree: Molecular and Cell Biology
Institution: Faculty of Sciences, University of Porto
Supervisor: Jorge Neves
Co-supervisor: Ralph Urbatzka
Date: November 2021

Name: Susana Afonso João
Thesis title: Unveiling the bioactive potential of marine bacteria
Master degree: Microbiology
Institution: University of Aveiro
Supervisor: Olga Lage
Co-supervisor: Artur Alves
Date: December 2021

Name: Tatiana Filipa Alves Pereira
Thesis title: Novas estratégias de redução dos teores de sal nos produtos da pesca e aquacultura
Master degree: Food Technology and Safety
Institution: NOVA School of Science and Technology
Supervisor: Helena Oliveira
Co-supervisor: Maria Paula Duarte
Date: February 2021

Name: Tiago Nuno Matos Vale Pereira Guimarães
Thesis title: Isolation and identification of toxin-producing fungus associated with macroalgae
Master degree: Environmental Contamination and Toxicology
Institution: Faculty of Sciences and ICBAS, University of Porto
Supervisor: Vitor Vasconcelos
Date: November 2021

Name: Victor Mendes de Sousa
Thesis title: Análise da receptividade pública a produtos caseiros e industriais no combate ao Aedes aegypti em duas cidades do Brasil: Belo Horizonte-MG e Alto Paraíso de Goiás-GO
Master degree: Ecology and Environment
Institution: Faculty of Sciences, University of Porto
Supervisor: João Honrado
Co-supervisor: Sara Antunes
Date: December 2021

OTHER SCIENTIFIC OUTPUTS

PROVISIONAL PATENT APPLICATIONS

Inventors: Peres H., Belo I., Castro C., Seara J., Oliva-Teles A., Fernandes H. 2021. PT 117165 – ENZYME-RICH EXTRACT AND USE THEREOF IN PRE-TREATMENT OF PLANT FEEDSTUFF-BASED DIETS. Applicants: CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, Universidade do Minho.

Inventors: Correia-da-Silva M., Neves A.R., Almeida J.R., Geraldes E., Sousa E., Vasconcelos V., Pinto M., Vilas-Boas C., Gomes L. 2021. PT117494 – ANTIFOULING COMPOUND, METHOD AND USES THEREOF. Applicants: CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, Faculdade de Ciências da Universidade de Lisboa.

Inventors: Sousa E., Neves A.R., Correia-da-Silva M., Silva J.M.F., Durães F., Martins da Costa P., Pinto E., Geraldes E., Mergulhão F., Gomes M., Santos R. 2021. PT117633 – ANTIMICROBIAL PROPERTIES OF CATIONIC STEROIDS, METHOD AND USES THEREOF. Applicants: Universidade do Porto, CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Faculdade de Ciências da Universidade de Lisboa.

NATIONAL PATENT APPLICATIONS

Inventors: Valente L., Dias J.P., Sá T., Garrido I., Baião L., Guedes A.C., Costa I. 2021. PT 117061 – URCHIN FEED, METHODS AND USES THEREOF. Applicants: CIIMAR - CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, SPAROS LDA, ISS ÍNCLITA Seaweed Solutions Lda.

INTERNATIONAL PATENT APPLICATIONS

Inventors: Pintado M.M., Rodrigues H.M., Costas B., Casimiro M.M., Pereira C., Valente L., Resende D. 2021. PCT/IB2021/058511 – NEW HYDROLYSATES TO CONTROL INFECTIONS, METHODS AND USES THEREOF. Applicants: Universidade Católica Portuguesa - UCP, CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Instituto Politécnico de Coimbra, Universidade do Porto.

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Inventors: Leão, P., Rosário, M.M., Costa, M., Vasconcelos, V., Nogueira, F., Domingues, V. 2019. US Patent US 10,287,228 – ANTIMALARIAL AGENT, METHODS AND USES THEREOF. Applicants: CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, IHMT-NOVA – Universidade Nova de Lisboa – Instituto de Higiene e Medicina Tropical, IPP – Instituto Politécnico do Porto.

Inventors: Leão, P., Rosário, M.M., Costa, M., Vasconcelos, V., Nogueira, F., Domingues, V. 2019. European Patent EP3313807 – ANTIMALARIAL AGENT, METHODS AND USES THEREOF. Applicants: CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, IHMT-NOVA – Universidade Nova de Lisboa – Instituto de Higiene e Medicina Tropical, IPP – Instituto Politécnico do Porto.

Inventors: Gaudêncio, S., Almeida, R., Pereira, M.F., Sanches, I., Gonçalves, S., Cunha, I., Almeida, J.R., Vasconcelos, V. 2021. Portuguese Patent 115055 - Utilização de napiradiomicinas com actividade anti-incrustante e composições da mesma. Applicants: CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, Universidade Nova de Lisboa, Instituto Politécnico de Setúbal.

NEW MATERIALS, DEVICES, PRODUCTS AND PROCESSES, SOFTWARE, COMPUTER CODES AND ALGORITHMS

Magalhaes J.M., Maarten B., da Silva J.C.B. 2021. Modelling internal solitary waves with MIT global circulation model. A new configuration to model nonlinear and non-hydrostatic mode-1 and mode-2 internal solitary waves in realistic oceanographic conditions.

Fernandes M.J., Lázaro C., Vieira E., Vieira T. 2021. UPorto GPD+ Wet Tropospheric Correction Processing System, Software for the computation of an improved Wet Tropospheric Corrections for Satellite Altimetry.

Fernandes M. J., Lázaro C., Vieira E., Vieira T. 2021. UPorto GPD+ Wet Tropospheric Correction Database: UPorto GPDC Wet Tropospheric Correction, Dataset. doi: 10.23831/FCUP_UPORTO_GPDPlus_v1.0

Eduardo J. 2021. Mitogenomics tree - Chondrichthyes. https://github.com/JoaoEduardo12/Mitogenomics/tree/master/Chondrichthyes

Rodrigues P., Oliva-Teles L.; Carvalho A.P., Guimarães L. 2021. “NorFluox”, Mendeley Data, V1, gene expression data related to the exposure of zebrafish embryos to fluoxetine and norfluoxetine. Dataset. doi: 10.17632/42x6pchwhm.1

Fernandes M. J., Lázaro C., Vieira T. 2021. New algorithm GPD+ improves Sentinel-3 SRAL/MWR WTC, https://www.eumetsat.int/new-algorithm-gpd-improves-s3-sral-mwr-wtc

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