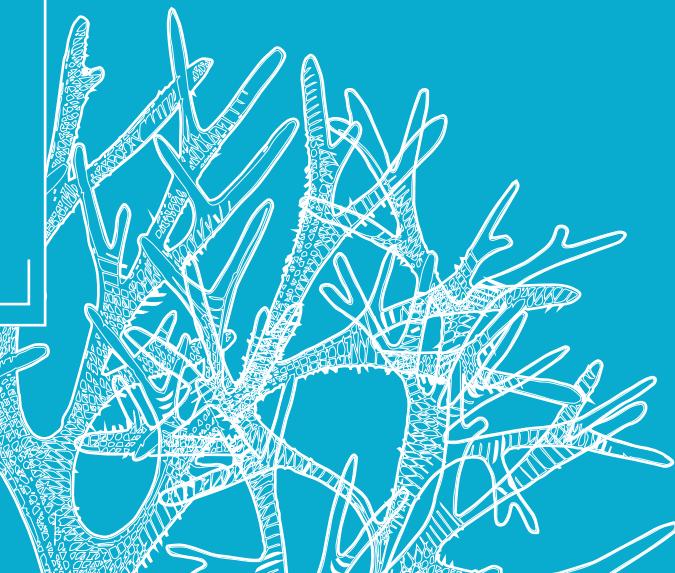


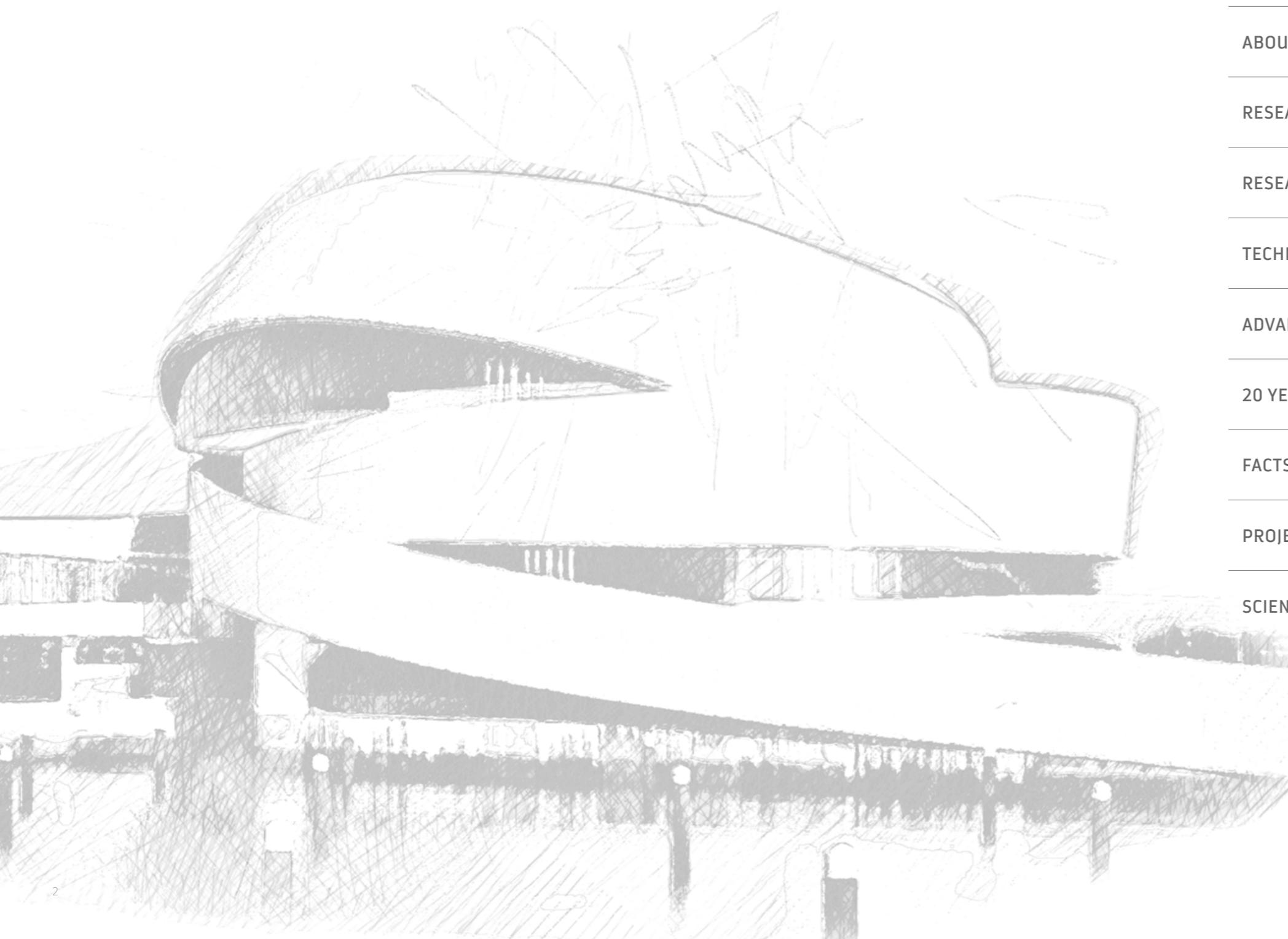


ciimar

ACTIVITY REPORT 2020



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MESSAGE FROM THE BOARD



In 2020, CIIMAR was hit by the covid-19 pandemic as any other institution all over the world but we were able to resist to development of outbreaks in our facilities. CIIMAR developed a contingency plan, created a covid9 task force that regularly issued recommendations and together we implemented a strategy to continue our work with a minimum risk. The board of CIIMAR wants to thank all of our members for the outstanding behavior during this period what allowed us to keep our laboratories, technical and administrative services working all the time.

CIIMAR 20th anniversary was celebrated right before the first lock down due to covid19. It was composed of three outstanding and unforgettable events: the team building event; the dinner party including the opening of the exhibition of Russel-Pinto shell collection and after dinner party, and the final "SOS Conference" with the presence of the Minister of the Sea – Ricardo Serrão Santos, and the Minister of Science, Technology and Higher Education – Manuel Heitor. We are looking forward similar moments in the near future.

In 2020, we kept the trend of attracting national and international funds from the approval of new projects including 4 H2020 (BlueBio4Future, MAELSTROM, PONDERFUL e FutureMARES). In 2020, the sum of the projects in implementation in CIIMAR raised to 28.04 million euros, being 33% of European funds.

CIIMAR members published 533 papers in internationally peer-reviewed journals and successfully contributed to the graduation of

20 PhD and 76 MSc students. In spite of the pandemic year, we were able to increase the publication rate by 20% compared to 2019. In 2020, five international patents and one provisional patent were submitted, of a total of 14 submitted patents in the last 6 years, reflecting the increasing impact of our research and the success of the implementation of the measures to increase the technology transfer. The Collaborative Laboratory for the Blue BioEconomy (B2E) hired in 2020 its initial team.

In 2020 the CIMAR -LA, joining CIIMAR and CCMAR, submitted its application for the maintenance of the statute of Associated Laboratory and early in 2021 we succeeded in obtaining that for 10 years, granting an additional funding for the next 5 years, mostly for human resources. In 2020, CIIMAR finished the process to obtain the ISO 9001 certification that was granted in January 2021.

CIIMAR outreach activities were limited due to the covid19, but almost 500 news (online, TV, radio, press) were produced along the year.

CIIMAR in 2021 will strengthen the relationship with the University of Porto to establish a legal status that will allow an even better cooperation between both institutions taken into account all the challenges that are expected in the near future.

The director of the Board of CIIMAR
Vitor Vasconcelos



ABOUT CIIMAR

CIIMAR is a leading research and advanced training institution of the University of Porto, working at the frontiers 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.



OUR MISSION

To promote **transdisciplinary research, technological development and training**, contributing to advances in scientific knowledge and to provide innovative solutions towards ocean's sustainability.

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

OUR VALUES



EXCELLENCE



INNOVATION



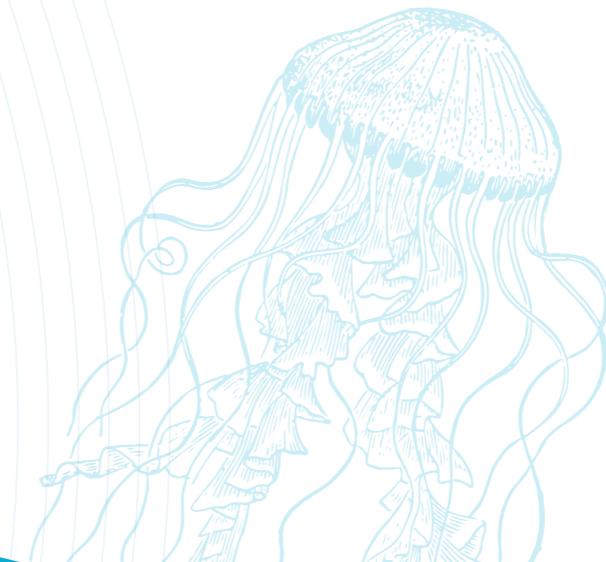
PARTNERSHIPS

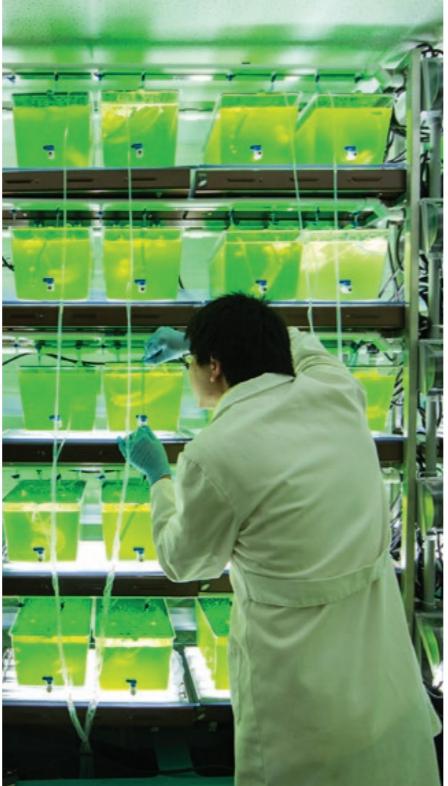
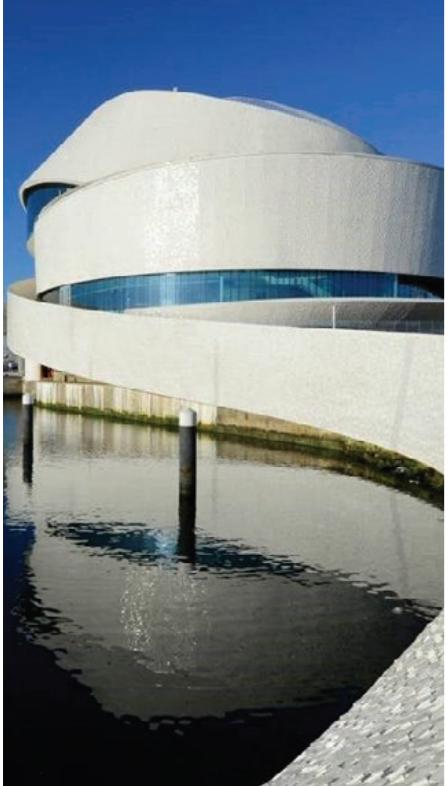


PUBLIC ENGAGEMENT



SUSTAINABILITY





Headquarters

CIIMAR's new 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, high 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 - Abel Salazar Biomedical Sciences Institute, and Faculties of Sciences, Engineering, Pharmacy and Law – and at Porto Polytechnic Institute, Regional Secretariat for Agriculture and Fisheries (RG Madeira) and Portuguese Institute of Sea and Atmosphere (IPMA).

CIIMAR is an integral research Centre of CIMAR - Associated Laboratory, together with CCMAR - University of Algarve.

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 EMBRC-ERIC, EMSO-ERIC, MIRRI-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 2020, in spite of the strong limitations due to the COVID-19 situation, CIIMAR received the visit of 68 school groups, mostly linked to a new Protocol with the Municipality of Matosinhos, and performed 26 activities in schools, 5 outdoor activities and 12 public lectures, in particular related to the “Clubes Ciência Viva” and Serralves Fundation Protocols. CIIMAR also adapted its outreach activities to different online communication channels, including the production of numerous videos and contents to celebrate the World Ocean Day and CIIMAR Open Week.

A new traveling exhibition “Marine Monsters” about Ocean plastic pollution by the artist Ricardo NicDealm opened at Porto Rectorate and the exhibitions “Amphibians: a paw on land, another on earth” and “Plastic Sea” were presented in 7 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 initiated their mandate in January 2019 and are composed as follows:

GENERAL ASSEMBLY	BOARD	FISCAL COUNCIL
President Eduardo Rocha	President Vitor Vasconcelos	President Luísa Bastos
Chairs › Aires Oliva Teles › Francisco Taveira Pinto › Carlos Vale › Susana Moreira	Board members › Ana Paula Mucha › Isabel Sousa Pinto › Luísa Valente › Rodrigo Ozorio	Members › José Fernando Gonçalves › Helena Peres

RESEARCH STRUCTURE



RESEARCH LINES



Marine Biotechnology

Top research is also 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 LINES	RESEARCH GROUPS	RESEARCH TEAMS
MARINE BIOTECHNOLOGY	BIOREMEDIATION PROCESSES	BIOREMEDIATION AND ECOSYSTEMS FUNCTIONING
	EVOLUTIONARY GENOMICS AND BLUE BIOTECHNOLOGY	BLUE BIOTECHNOLOGY AND ECOTOXICOLOGY
	NATURAL PRODUCTS AND MEDICINAL CHEMISTRY	CYANOBACTERIAL NATURAL PRODUCTS
	AQUATIC BIODIVERSITY AND CONSERVATION	EMERGENT BIOTECHNOLOGIES AND SEAFOOD PROCESSING
		EVOLUTIONARY GENOMICS
		CHEMISTRY AND BIOLOGICAL ACTIVITY OF MARINE NATURAL PRODUCTS
		MEDICINAL CHEMISTRY: DRUG DISCOVERY AND DRUG DESIGN
		AQUATIC ECOLOGY AND EVOLUTION
		BENTHIC ECOLOGY
		COASTAL BIODIVERSITY
GLOBAL CHANGES & ECOSYSTEMS SERVICES	CONTAMINATION PATHWAYS AND MECHANISMS OF TOXICITY	DEEP SEA BIODIVERSITY AND CONSERVATION
		ESTUARINE ECOLOGY AND BIOLOGICAL INVASIONS
		HYDROBIOLOGY
		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
BIODIVERSITY, AQUACULTURE & SEAFOOD QUALITY	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
		ANIMAL HEALTH AND AQUACULTURE
		ANIMAL PATHOLOGY
		NUTRITION AND IMMUNOBIOLOGY
		ANIMAL GENETICS AND EVOLUTION
ANIMAL NUTRITION AND HEALTH	ANIMAL PHYSIOLOGY AND FUNCTIONAL GENOMICS	ECOPHYSIOLOGY
		HISTOMORPHOLOGY, PHYSIOPATHOLOGY AND APPLIED TOXICOLOGY
		NUTRITION, GROWTH AND QUALITY OF FISH
		SAFE AND HEALTHY SEAFOOD AND SUSTAINABLE CONSUMPTION
ANIMAL PHYSIOLOGY AND FUNCTIONAL GENOMICS	AQUACULTURE AND SEAFOOD SAFETY	

TECHNOLOGY PLATFORMS

CIIMAR Platforms developed under various European Marine Sciences Infrastructure Networks (e.g. EMBRC and EMSO) 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



PhD PROGRAMMES

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.

ANIMAL SCIENCE (INDUSTRIAL SETTING – SANFEED)

AQUATIC SCIENCES – BIOLOGY AND ECOLOGY

BIOLOGY

ENVIRONMENTAL TOXICOLOGY AND ECOLOGY

ENVIRONMENTAL SCIENCES AND TECHNOLOGY

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).



UNDERGRADUATE PROGRAM

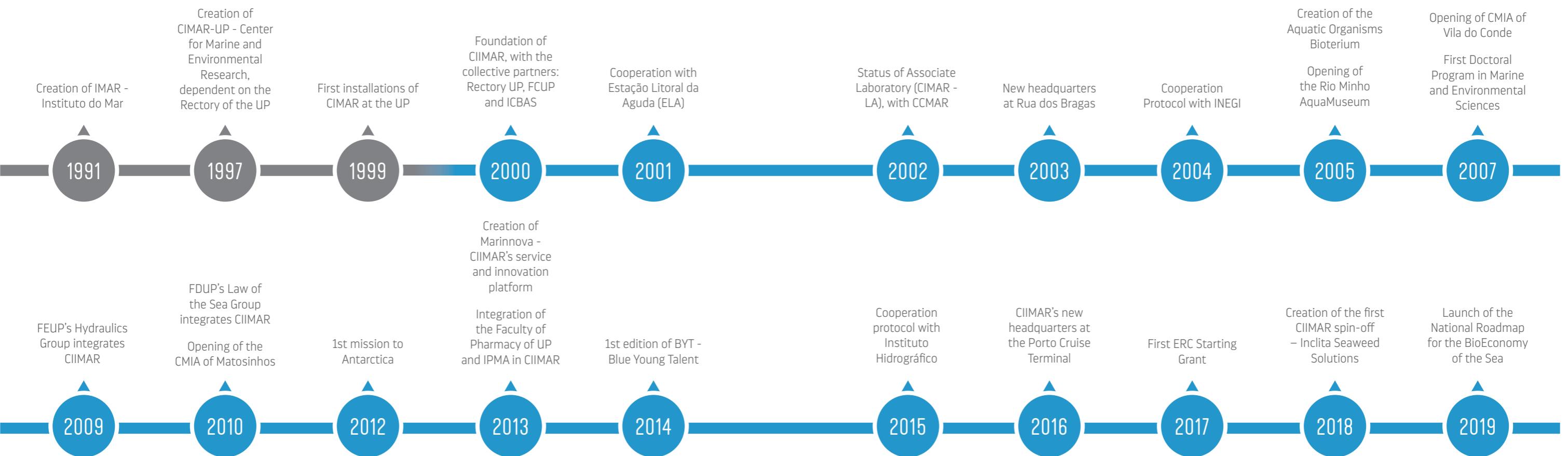


POST-GRADUATE PROGRAM

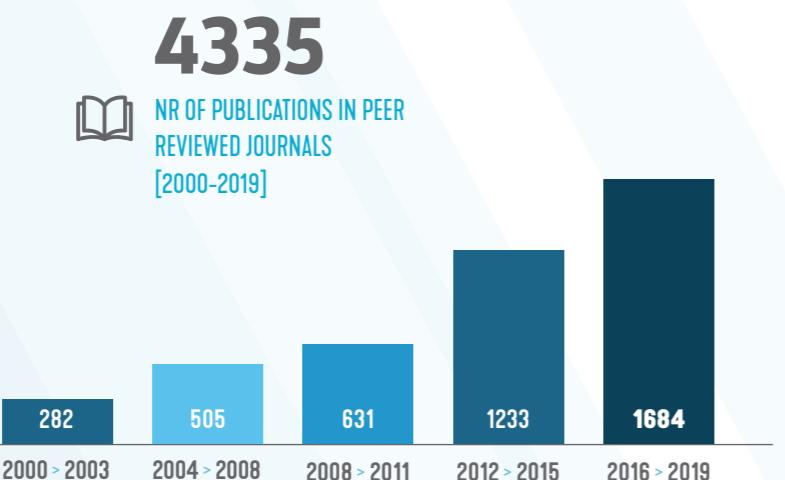


A pre (BYT) and two post-graduate (BYTplus, BYTPhD) programs aims to attract talents to research areas such as marine biotechnologies, global changes, ecosystem services, conservation, aquaculture and nutrition, providing to the best students of the first, second and third cycle stimulating and excellent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

20 YEARS OF OCEAN RESEARCH



20 YEARS OF OCEAN RESEARCH



Source: Scopus, CIIMAR Affiliation ID: 60013435, 2010-2019



In 2020 CIIMAR accomplished its 20th Anniversary with one intense week of celebrations that included a team building day, the birthday dinner and honour medals attribution, the launch of the Russell-Pinto shell collection and the international SOS Conference "Sustainable Ocean Strategies" with the participation of several world references on conservation of the oceans.

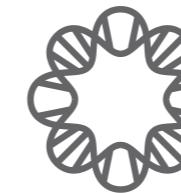
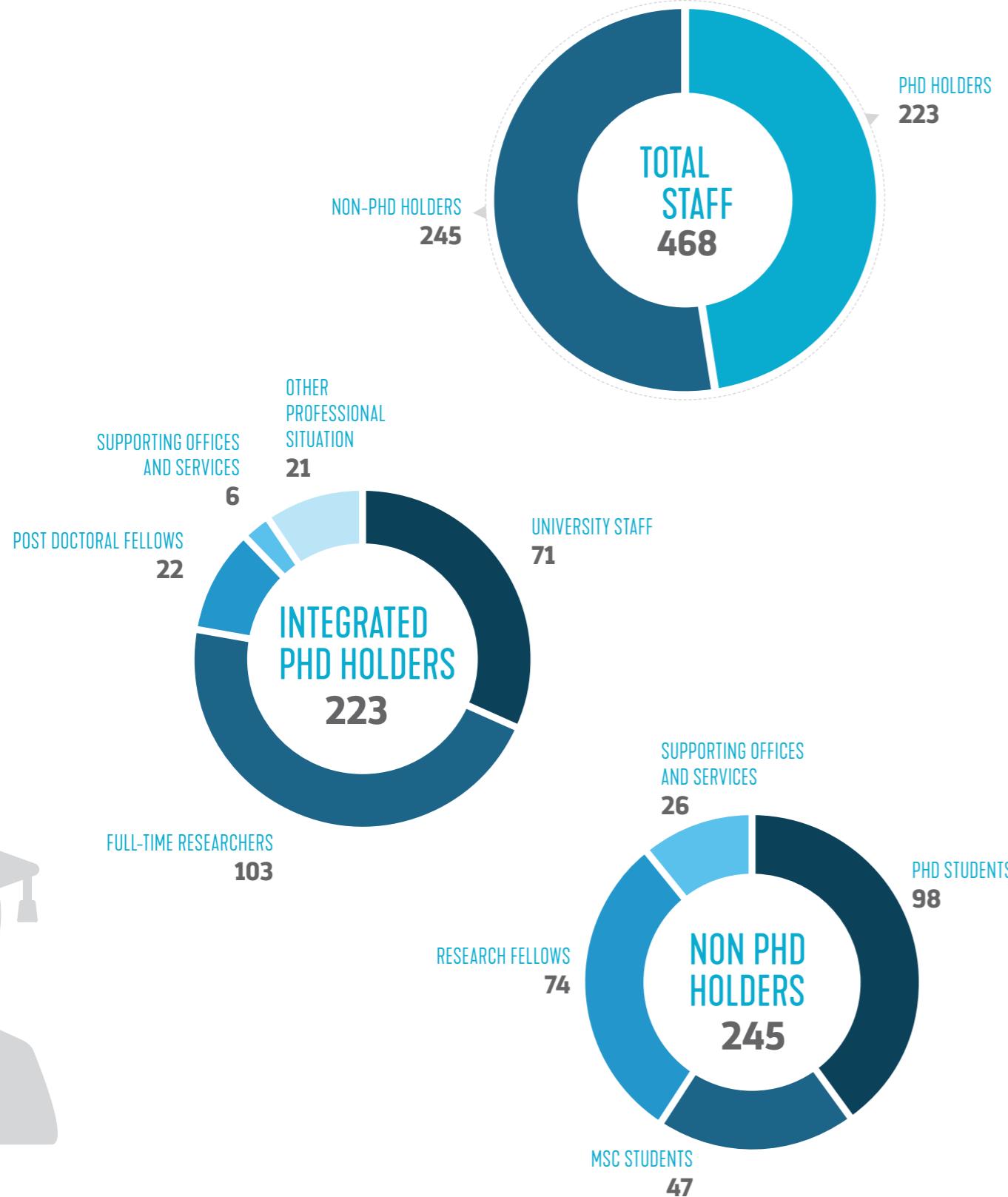




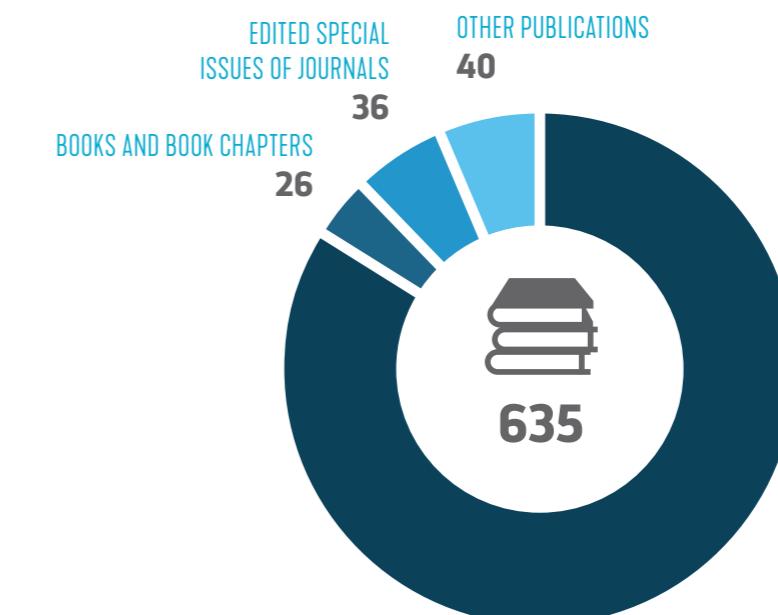
FACTS & FIGURES



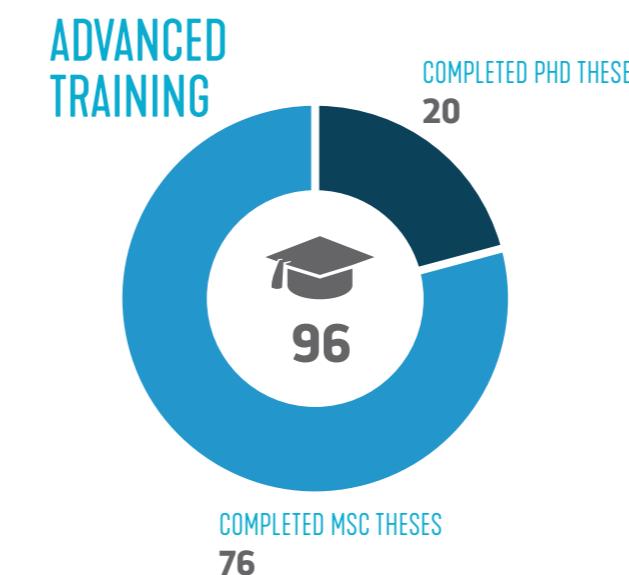
TEAM



SCIENTIFIC PRODUCTIVITY



SCIENTIFIC PUBLICATIONS



13 PATENTS

2020 MILESTONES

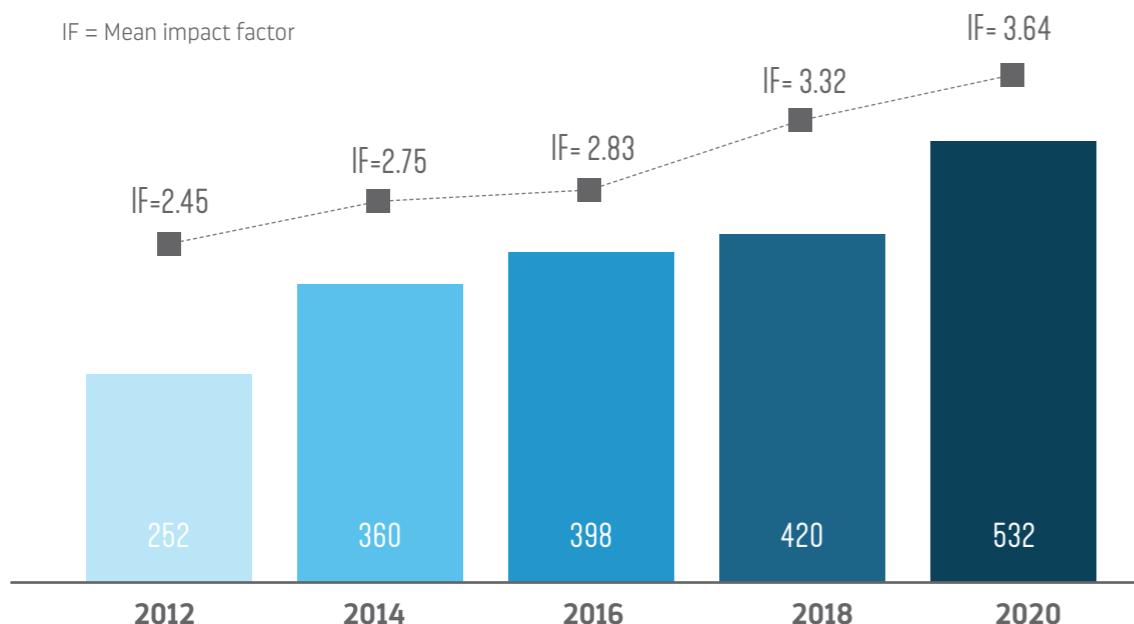
1 PROVISIONAL PATENT APPLICATIONS

5 INTERNATIONAL PATENT APPLICATIONS

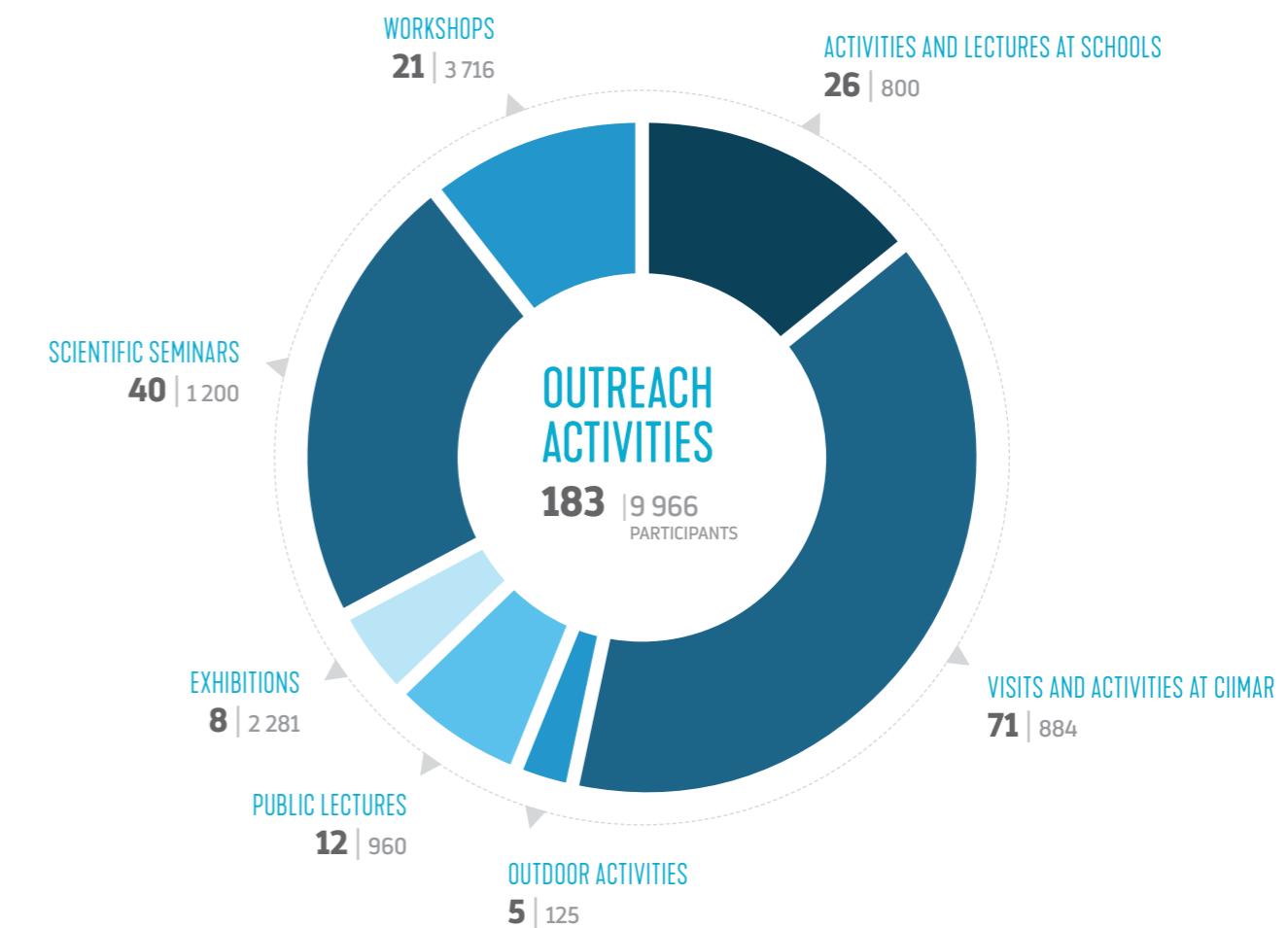


NR OF PUBLICATIONS IN PEER REVIEWED JOURNALS [2012-2020]

IF = Mean impact factor

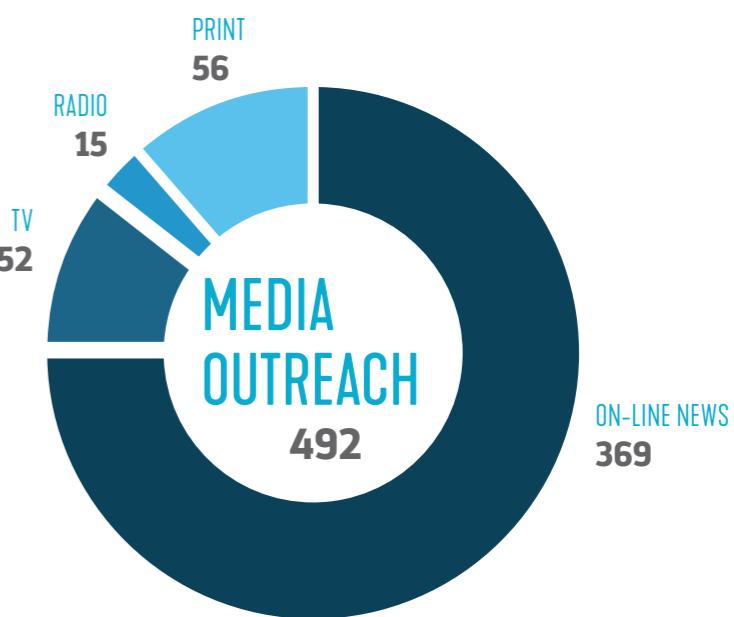
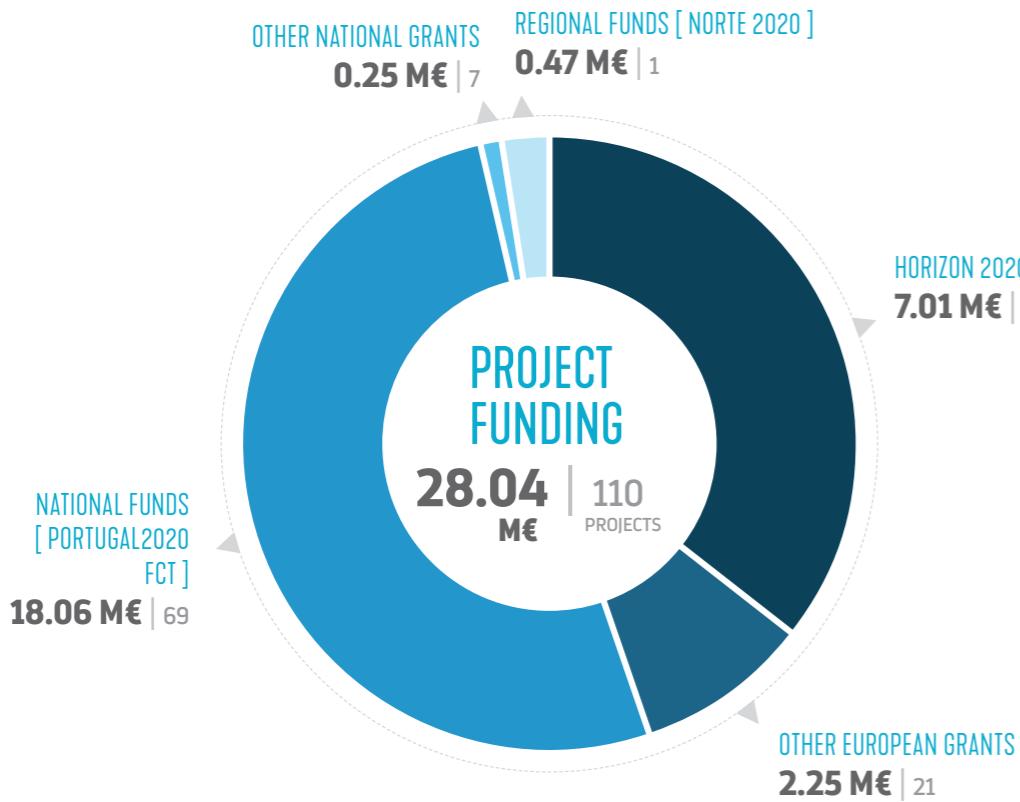


OUTREACH ACTIVITIES



COMPETITIVE R&D PROJECT FUNDING

Competitive funding attributed to CIIMAR in R&D projects in execution during 2020



JAN

Delegation visit of the **BluAct** European Project for transferring good practices in the area Blue Economy

Ocean Action selected to be part of the Campaign "EEAch Drop Counts"

Swap Market at CIIMAR

FEB

CIIMAR's 20th anniversary celebrations

Organization of the international **SOS Conference "Sustainable Ocean Strategies"**

Opening of **Russell-Pinto shell collection**

Participation in the preparatory meeting for the UN Oceans conference at New York

Visit of BIAL representatives

MAR

Attribution of **ERA CHAIR BlueBio4Future**

Institutional membership of The **Porto Protocol** to combat climate change

PINKTech project wins the **BluAct contest**

Collaboration protocol with CS Diving Center

APR

Partnership with **Águas do Porto** to detect new corona viruses in wastewater in Porto

CIIMAR integrates international consortium **RESPONSE**, JPI OCEANS

Research published in **Nature Communications** of new enzyme reaction description

MAY

CIIMAR present at the **II Biodiv Summit**, in Proença-a-Nova

Research on the genetic history of the lion published in PNAS

JUN

Collaboration agreement with the **Atlantic International Research Center**

Celebration of **World Oceans Day**

9 artificial reefs placed in the sea by 3D STOP Project

CIIMAR integrates international consortium **SIDESTREAM**, ERA-NET BLUEBIO COFUND

2020 AT A GLANCE

JUL

Closing session of the BYT and BYTplus 2019/20 Edition

Launch session of the BYT, BYTplus and PYTPhD 2020/21 Edition

Visit of the new team of B2E - Collaborative Laboratory for Blue Bioeconomy

Summer internships with the support of Ciência Viva

Visit by Mr Minister of Science Manuel Heitor

AUG

CIIMAR, Oceano Forum, U.Porto Inovação and UPTEC organize the **Sherpa Journeys** (Sherpa do Mar project) to promote entrepreneurship and the Blue Economy

CIIMAR integrates international consortium **FutureMARES**, H2020

CIIMAR **founding member of the platform #EU4Ocean** - Coalition for Ocean Literacy

SEP

Inauguration of the **"Marine Monsters"** Exhibition at the Rectorate of the University of Porto

CIIMAR Open Week celebration

Organization of the **Blue Think - Share Science, Spread Knowledge conference**, by the PhD Students' committee

Participation at **Soapbox Science** Lisbon

Protocol signature for scientific and technical cooperation between **ICNF** and CIIMAR

OCT

Subscription to the **Transparency Agreement on Animal Research** in Portugal.

BEESNESS Project awarded by FCT - Commemorations of the 5th Centenary of the Circum-Navigation Trip

Organization of the **Think Tank "National Solutions to Global Problems"**

Organization of the **5th GelAvista Meeting**

Participation in **Aquaporto 2020**

Launch of the new **CIIMAR Education Program** for 20/21

NOV

Organization of the **5th Aquaimprove Workshop** and the **12th Portuguese Conference on Polar Sciences**

Protocol signature with the **University of Madeira** and the **Blue Pioneers investment fund**

Launch of the **ATLANTIDA** Project, NORTE2020

Participation in the **Science 2020** Meeting

DEC

CIIMAR integrates international consortium **PONDERFUL**, H2020

"Marine Monsters" exhibition awarded at the **CommOcean** conference

CIIMAR integrates the **Challenger 150 Program**, a DOSI - Deep Ocean Stewardship Initiative

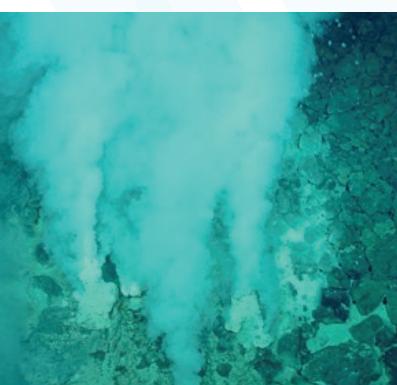
Participation in the preparatory workshops for the National Intelligent Specialization Strategy

HIGHLIGHTS



TWO NEW TEAMS AT CIIMAR

The Sustainability and Social and Educational Innovation (SSEI) and Deep Sea Biodiversity and Conservation (DeepSeaBiodiv) teams joined CIIMAR in 2020. SSEI team aims to promote changes in Education and Science Communication, updating them to our times, while DeepSeaBiodiv focuses its research on the understanding of diversity, distribution and connectivity patterns of deep-sea vulnerable marine species and ecosystems, and how ecological and evolutionary processes, as well as anthropogenic pressures underpin such patterns.



MARINE MONSTERS EXHIBITION

"Marine Monsters" exhibition, organized by CIIMAR with the artist Ricardo Nicolau de Almeida, was displayed at the Portico of the Rectory building of the University of Porto. From plastics picked up on Portuguese beaches, the artist recreated a seabed composed of fantastic imaginary and frightening sea creatures, built an army of human figures and masks, and compiled countless small installations and pieces of an almost museological nature to alert to the problem of plastic pollution of our Ocean.



BLUE THINK CONFERENCE

The Blue Think Conference (BTC) 2020 was the first meeting organized by the CIIMAR PhD Students' Committee. The presentations were divided into three sessions framed in the scope of CIIMAR's main research lines. The event counted with the presence of renowned scientists who shared about their scientific careers, experiences and most important achievements. This day allowed CIIMAR students who work in different groups and laboratories, scattered through several faculties and institutes of the University of Porto, to create bonds and collaborations in a casual and relaxed environment.



A close-up photograph of a compound light microscope. The eyepiece lens is labeled "OLYMPUS UPlanFL N 10x/1.30 Oil 0.17/FN26.5". The objective lens is labeled "UPlanFL N 4x/0.13 00/- /FN26.5". A glass slide with a small, clear rectangular sample is positioned on the stage. The background is dark, and the lighting highlights the lenses and the sample.

PROJECT HIGHLIGHTS



AQUACOMBINE - 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 Universitet

WEBSITE
www.aquacombine.eu



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 edible fresh tips. 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 food product residue 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 (e.g. 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 - ASSOCIATION OF EUROPEAN MARINE BIOLOGICAL LABORATORIES EXPANDED

PRINCIPAL INVESTIGATOR AT CIIMAR
Vitor Vasconcelos

LEADER INSTITUTION
UPMC

WEBSITE
www.assembleplus.eu

TWITTER
[@ASSEMBLE_Plus](https://twitter.com/ASSEMBLE_Plus)



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.



EMERTOX - 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

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:

- 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);
- to develop innovative approaches to sample, and analyze the producing organisms and their toxins by chemical and biological methods including immunoassays and sensors;
- to estimate different future scenarios based on molecular data (routes of dispersion) and modelling.



FATTCYANOS - FATTY ACID INCORPORATION AND MODIFICATION IN CYANOBACTERIAL NATURAL PRODUCTS



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.



PRINCIPAL INVESTIGATOR AT CIIMAR
Pedro Leão

LEADER INSTITUTION
CIIMAR-UP



European Research Council



FUTUREMARES - CLIMATE CHANGE AND FUTURE MARINE ECOSYSTEM SERVICES AND BIODIVERSITY

PRINCIPAL INVESTIGATOR AT CIIMAR
Francisco Arenas

LEADER INSTITUTION
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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, socioecological 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: i) restoration of habitat-forming species acting as 'climate rescuers' buffering coastal habitats from negative CC effects, improving seawater quality, and sequestering carbon, ii) 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 iii) 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.



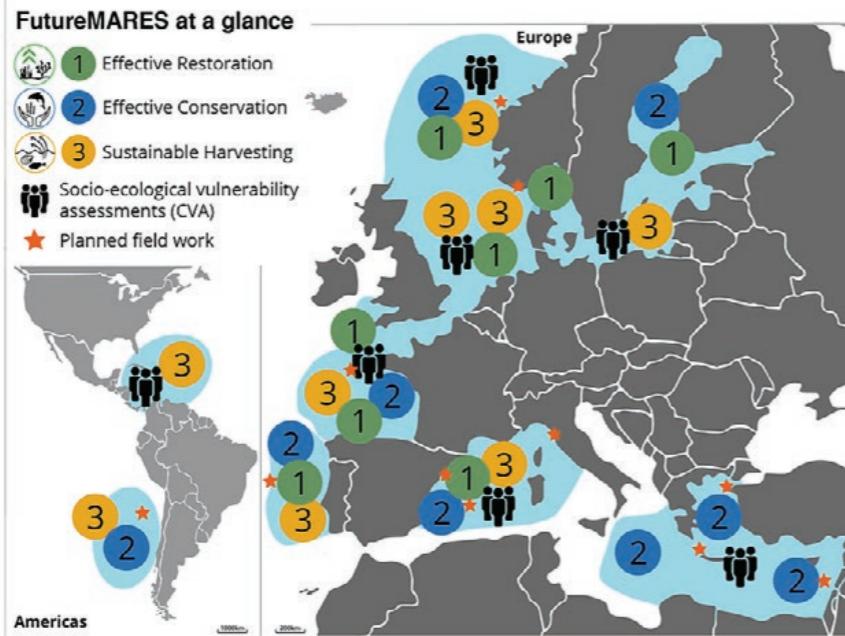
NBS 1 EFFECTIVE RESTORATION



NBS 2 EFFECTIVE CONSERVATION



NBS 3 SUSTAINABLE HARVESTING



GENIALG - GENETIC DIVERSITY EXPLOITATION FOR INNOVATIVE MACRO-ALGAL BIOREFINERY



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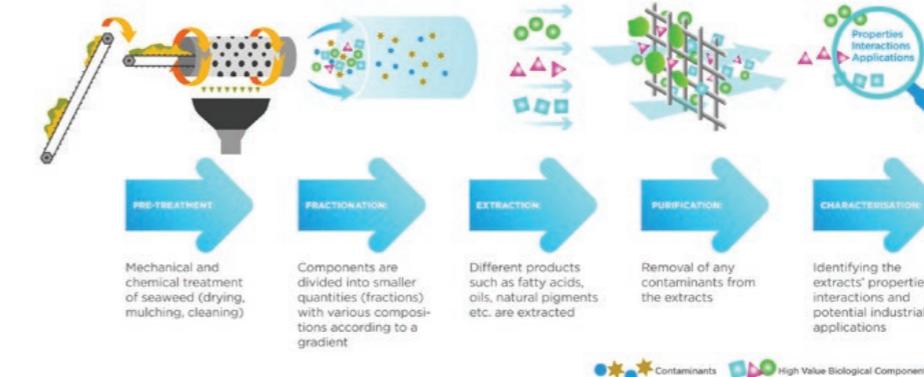
Seaweed, or "macro-algae", has long been recognised as a valuable source of diverse bioactive compounds and has great potential to be used in pharmaceuticals, nutraceuticals and functional foods. However, until now, seaweed has been underexploited in Europe due to the challenges of expanding seaweed 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.



Seaweed Biorefinery Process





IGNITE - COMPARATIVE GENOMICS OF NON-MODEL INVERTEBRATES

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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.



PODERFUL - POND ECOSYSTEMS FOR RESILIENT FUTURE LANDSCAPES IN A CHANGING CLIMATE

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. It will evaluate the interaction and feedback between biodiversity, ecosystem services and climate in pondscapes. PONDERFUL will also develop future scenarios for pondscapes in the EU, Latin American and Caribbean States (CELAC), where it will conduct tests. The findings of these tests will be used to develop a sustainable finance and investment guide for implementation of the proposed NBS.

It will also raise awareness among policymakers about the use of pondscapes for biodiversity conservation.

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SEAFOODTOMORROW - NUTRITIOUS, SAFE AND SUSTAINABLE SEAFOOD FOR CONSUMERS OF TOMORROW

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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:

- Validation of nutritional and safety aspects of eco-innovative seafood solutions through certified methodologies carried out by independent partners.
- Easily-accessible database with seafood innovative products validation data for the implementation of a digital traceability tool linked to quality labels.
- Improved understanding of market acceptance of eco-innovative seafood solutions in different European regions and demographics.
- Validation of sustainable solutions from economic and environmental perspectives.
- Benchmark for certification schemes of seafood quality and traceability for industry to strengthen consumer confidence and trust in European seafood.
- 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.



SponGES - DEEP-SEA SPONGE GROUNDS ECOSYSTEMS OF THE NORTH ATLANTIC: AN INTEGRATED APPROACH TOWARDS THEIR PRESERVATION AND SUSTAINABLE EXPLOITATION

The objective of SponGES is to develop an integrated ecosystem-based approach to preserve and sustainably use vulnerable sponge ecosystems of the North Atlantic. The SponGES consortium, an international and interdisciplinary collaboration of research institutions, environmental non-governmental and intergovernmental organizations, will focus on one of the most diverse, ecologically and biologically important and vulnerable marine ecosystems of the deep-sea - sponge grounds – that to date have received very little research and conservation attention. Our approach will address the scope and challenges of EC's Blue Growth Call by strengthening the knowledge base, improving innovation, predicting changes, and providing decision support tools for management and sustainable use of marine resources.

SponGES will fill knowledge gaps on vulnerable sponge ecosystems and provide guidelines for their preservation and sustainable exploitation. North Atlantic deep-sea sponge grounds will be mapped and characterized, and a geographical information system on sponge grounds will be developed to determine drivers of past and present distribution. Diversity, biogeographic and connectivity patterns will be investigated through a genomic approach. Function of sponge ecosystems and the goods and services they provide, e.g. in habitat provision, benthopelagic coupling and biogeochemical cycling will be identified and quantified. This project will further unlock the potential of sponge grounds for innovative blue biotechnology namely towards drug discovery and tissue engineering. It will improve predictive capacities by quantifying threats related to fishing, climate change, and local disturbances.

SponGES outputs will form the basis for modeling and predicting future ecosystem dynamics under environmental changes. SponGES will develop an adaptive ecosystem-based management plan that enables conservation and good governance of these marine resources on regional and international levels.



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

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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



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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:

- 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.
- By enabling onshore production.
- 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.





BLUEBIOLAB - TRANSBOUNDARY MARINE BIOTECHNOLOGY LABORATORY

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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+i 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:

- Support the consolidation of biotechnology as a fundamental tool for the study and valorization of marine biological resources, and the sustainable exploitation of marine biological resources.
- To pool the existing infrastructures, integrated in the Transboundary Marine Biotechnology Laboratory, in line with the common strategic objectives of the Regions.
- Develop actions to support talent and promote the mobility of researchers, including
- The programming of training activities.
- 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.
- Promote the internationalization and integration of scientific infrastructures linked to marine biotechnology in international R+D+i networks.

Therefore, BLUEBIOLAB aims to establish the resources and mechanisms to strengthen and stimulate internationally strategic research lines for the territory and for the marine productive sector, promoting innovative capacity and territorial competitiveness.



CVMAR+i - INDUSTRIAL INNOVATION UNDER THE CONTEXT OF BIOTECHNOLOGICAL VALORIZATION OF MARINE RESOURCES AND BY-PRODUCTS

Industrial innovation through specific collaborations between enterprises and research centers in the context of marine biotechnological valorization - CVMar+i aims to promote industrial innovation around marine biotechnology by the proposal of new products based in marine compounds. This will be done by a synergic effort of enterprises and research enters in the transboundary area, benefiting from the complementarity of the partners.

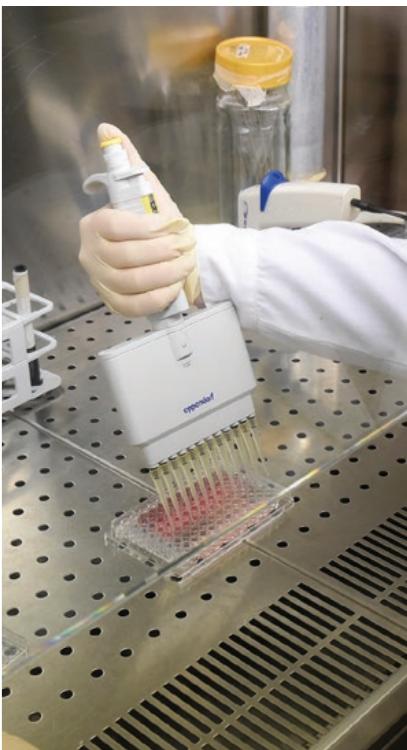
The project will benefit from former POCTEP projects implemented by partners of this Consortium that can now be potentiated and without who's the innovation proposed would not be possible. We will develop tools that allow the enterprises of the region to increase their investment in innovation, reinforcing the role of the region in the Blue Economy. This is in alignment with RIS3T Galicia-North Portugal, developing products based on marine resources and sub-products in the areas of health (tissue regeneration and pharmacology), food and industrial applications.



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CYANOBESITY - CYANOBACTERIA AS A SOURCE OF BIOACTIVE COMPOUNDS WITH EFFECTS ON OBESITY-ASSOCIATED MORBIDITIES - SCREENING AND MOLECULAR MECHANISM

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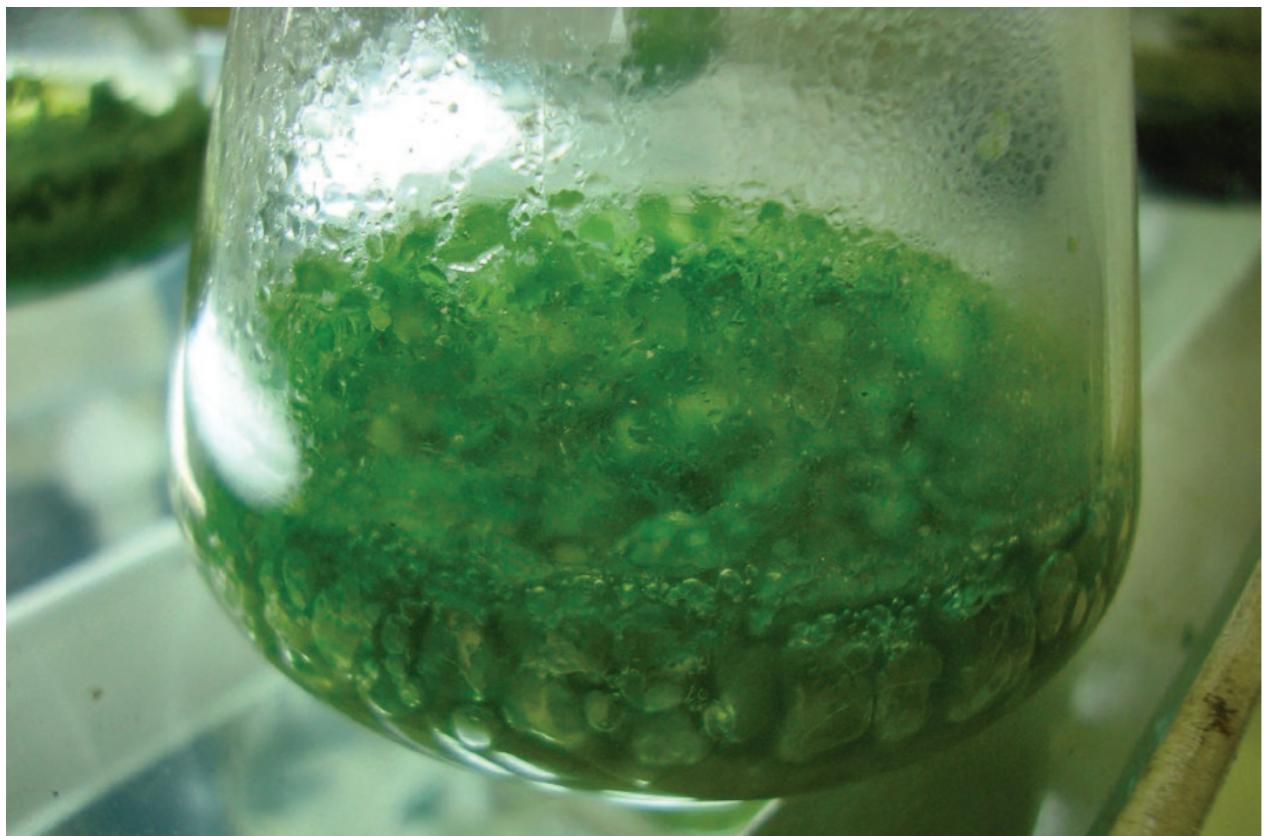
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An urgent demand for new anti-obesogenic compounds is present, and marine cyanobacteria promise to be an excellent source for natural-derived molecules and novel nutraceuticals. Some strains of cyanobacteria are commercially available for consumption due to their beneficial properties to human health. Preclinical studies have been performed in various animal models and demonstrated hypolipidemic activities in rats and mice, lowering hepatic cholesterol and triglyceride levels.

In the proposed project, marine cyanobacterial strains of a culture collection will be screened for beneficial properties towards obesity and obesity-related comorbidities (obesity, fatty liver disease, diabetes, appetite and hyperlipidaemia) and the chemical structure will be elucidated. By applying an innovative biotechnological platform, the interactions from oral administration to the blood stream will be analyzed, and with different target tissues in vitro. A proof of concept regarding the improvement of metabolism will be performed in a relevant physiological model.

The general aim of the project is to develop novel nutraceuticals that have the potential to improve the quality of life for millions of people worldwide.



EBB - EUROPEAN MARINE BIOLOGICAL RESOURCE CENTRE BANK



The coastal regions in Europe through their S3s acknowledge the potential of Marine Biological Resources (MBRs) and especially blue biotechnologies (technological applications that use marine biological systems, living organisms or derivates to make or modify products or processes for specific uses, as defined by the Convention on Biological Diversity) to generate and promote employment, economic and regional development, contributing to growth and cohesion.

MBRs are one of the main services provided by marine ecosystems. Culture collections of MBRs are key to the systematic research of interesting and unique genes, bioactives and biomaterials from the marine environment with potential for commercial development and job creation in coastal regions.

The EMBRC BioBank (EBB) will set the basis for the common operation of the distributed marine biobanking facilities of the European Marine Biological Resource Centre (EMBRC) by:

- Setting up technological tools and common procedures for the ex-situ maintenance of MBRs along the whole phylogenetic tree of life; and:
- The application of best practice guidelines throughout the EBB collections to ensure compliance with regulatory framework that sets the rules on access and benefit sharing (ABS) on the use of marine bioresources for commercial and academic research.
- The development of innovation use cases involving industrial end users and administrations at the national and European level with competence in regulating ABS for the production of a set of best practice guidelines for ABS compliance when using MBRs for innovation purposes.

The EBB will ultimately facilitate sustainable access to Atlantic marine biodiversity, its associated data, and extractable products for local and international academia and industry users.





MARINALGAE4aqua - IMPROVING BIO-UTILISATION OF MARINE ALGAE AS SUSTAINABLE FEED INGREDIENTS TO INCREASE EFFICIENCY AND QUALITY OF AQUACULTURE PRODUCTION

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Global population growth and increase in living standards will push up the demand for fish-derived protein in the future. However, resource scarcity (feed, water and energy), environmental impacts, and changes in climate and growing conditions can seriously hamper aquaculture that supplies a significant proportion of human food. New sustainable protein and lipid sources and improved technologies to increase bio-availability of existing sources will be needed to ensure adequate supply of aquafeeds to ensure growth of aquaculture. On the other hand, the growth of the industry has caused environmental concerns. Interestingly, aquaculture effluents can be an excellent medium for algal growth, although they are not usually reused since they contain residual organic compounds, minerals and other micro-pollutants. MARINALGAE4aqua is an innovative research project that targets the development of strategies to increase efficiency of important European farmed fish species (Atlantic salmon and European sea bass) and reduce the environmental impact using micro- and macro-algal biomass as feed ingredients by:

- Culturing marine algae under optimized technological processes to remove organic compounds and minerals from fish farm effluents, and producing high value products for aquafeeds while recycling nutrients, thus improving the water body quality and reducing the environmental impact.
- Identifying novel feed additives to improve fish digestive capacity and nutrient metabolism upon using the selected algae.
- Improving fish growth and end product quality, reducing time to slaughter and providing a safe and healthy food item with wide consumer acceptance.

MARINALGAE4aqua aims to tackle the sustainability challenges of the aquafeed industry by developing cost-effective and resource-efficient alternatives to FM and FO. MARINALGAE4aqua is innovative and cutting edge - it adopts a multidisciplinary approach, integrating molecular (genomics, proteomics) and traditional tools to address physiological, nutritional and environmental challenges in modern aquaculture – providing state-of-the-art knowledge to identify strategies to increase efficiency of farming important European fish species.



MarRISK - COASTAL ADAPTATION TO CLIMATE CHANGE: KNOWING THE RISKS AND INCREASING RESILIENCE

MarRISK aims to ensure an intelligent and sustainable growth of the Galician and Portuguese coastal zones through evaluation of the coastal risks that are most important in terms of climate change scenarios.

Floods, intensification of extreme events, toxic algae blooms and coastal erosion are examples of the risks that shall be analysed in order to improve the resilience of traditional economic sectors and of other, emerging sectors, like marine renewable energies.

This way, the adaptation of the cooperation region to potential disasters will be improved, and applications and services to guarantee a coordinated response will be developed, given that environmental risks require a cross-border approach.

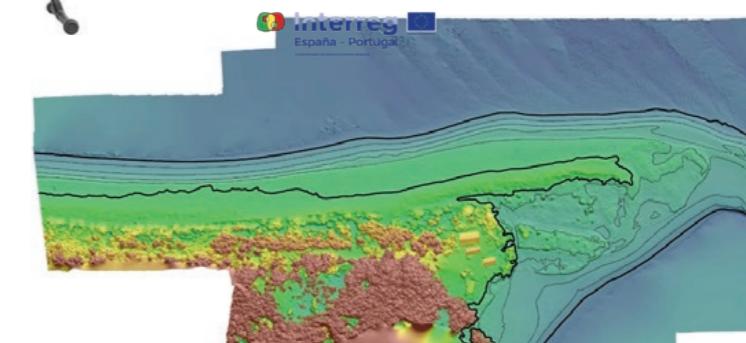
MarRISK shall evaluate coastal climate evolution, at a better resolution than is presently done, and will enable monitoring and warning systems. MarRISK will deliver decision support tools to public authorities, the productive sector and the general public, to improve coastal management.



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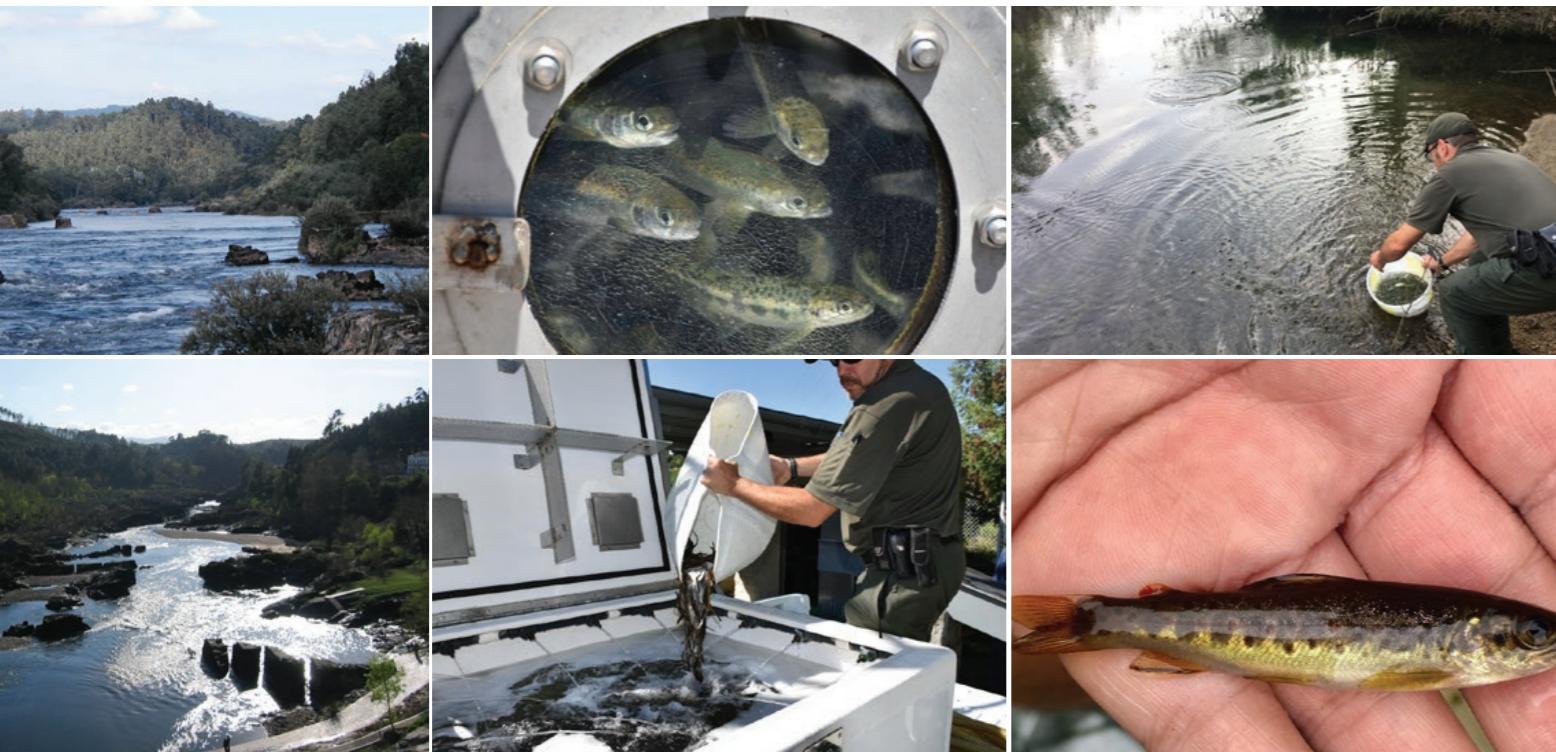
MIGRAMIÑO-MINHO - PROTECTION AND CONSERVATION OF MIGRATORY FISH IN THE INTERNATIONAL SECTION OF MINHO RIVER AND ITS TRIBUTARIES

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The MIGRA MIÑO - MINHO project proposes as main challenge to improve the protection and sustainable management of the natural boundary area that forms the sub-basin of the international section of the Minho River

MIGRA MIÑO - MINHO aims to improve the protection and conservation of river habitat of the sub-basin of the river Minho, from the Frieira Dam (province of Ourense) until its mouth, with actions to improve the conservation status of river beds and migratory fish species present in the Minho River and its tributaries.

In addition to the environmental component, this project aims to solve the socio-political aspects of protecting and improving the natural state of the international river Minho, through the conservation of one of the most threatened key elements - the migratory fish species. This will contribute to the preservation and exploitation of traditional fishing activities, as well as the improvement of sustainable socio-economic development of cross-border territory, by of commercial activities such as fishing, tourism or energy sector.

MiningImpact2 - ENVIRONMENTAL IMPACT AND RISKS OF DEEP-SEA MINING



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 MiningImpact 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.

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MOSES - MARITIME, OCEAN SECTOR AND ECOSYSTEM SUSTAINABILITY: FOSTERING BLUE GROWTH IN ATLANTIC INDUSTRIES

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The MOSES objectives of the MOSES project is to examine the 'blue' growth path for the sustainable development of the major sectors operating in the Atlantic space as envisaged in the Atlantic Action Plan. MOSES will quantify blue growth for key marine sectors and develop a common methodology for the quantitative assessment of sectoral pressures on the marine environment and the vulnerability of marine and coastal areas. The methodology will contribute to the joint implementation of integrated marine industry sustainability assessment toolkits across the Atlantic region.

To achieve these aims the consortium will work on four major blocks:

- Evaluate the evolution of the Atlantic marine sectors using the previous Atlantic Area project MARNET framework;
- Examine the sectoral pressures on the Atlantic marine environment in order to identify best management practices;
- Assess the vulnerability of coastal marine areas/features to marine sector to the identified sectoral pressures;
- Using case studies, develop sustainable transition plans to blue growth for a number of key marine sectors and test policies for how well they manage activities to meet Marine Spatial Planning and Maritime Strategy Framework Directive goals.



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

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.

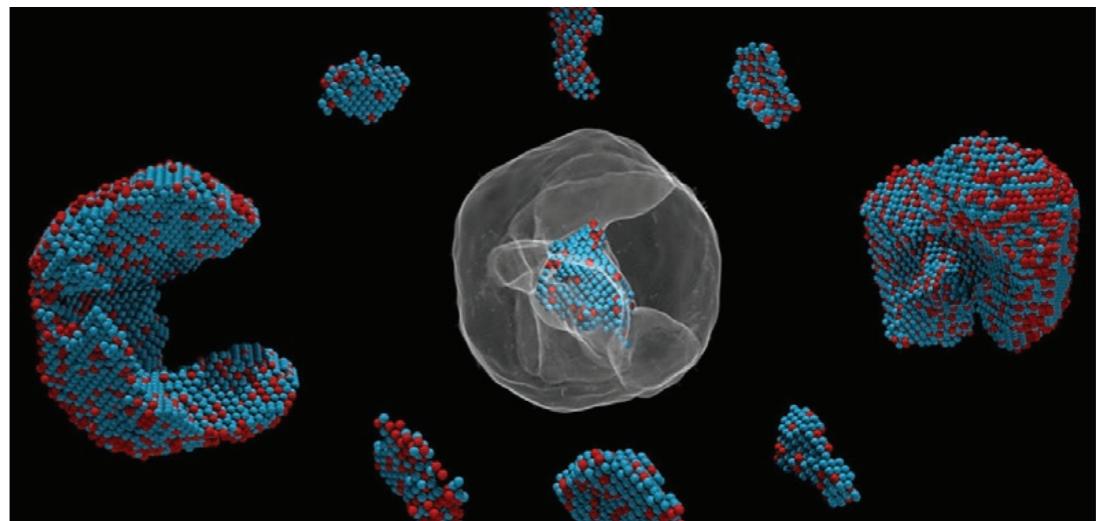
The focus of the project are the aquatic ecosystems related to aquaculture, a sector of high economic relevance in the Atlantic Area, and specifically organisms used for human consumption (cultured fish, mollusks, seaweed, sea urchins, etc.). NANOCULTURE will investigate the effects of ENPs on aquaculture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



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

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[@NetTagProject](https://twitter.com/NetTagProject)


NetTag project aims to reduce and prevent marine litter derived from fisheries, bringing together scientists, engineers and the fisheries industry.

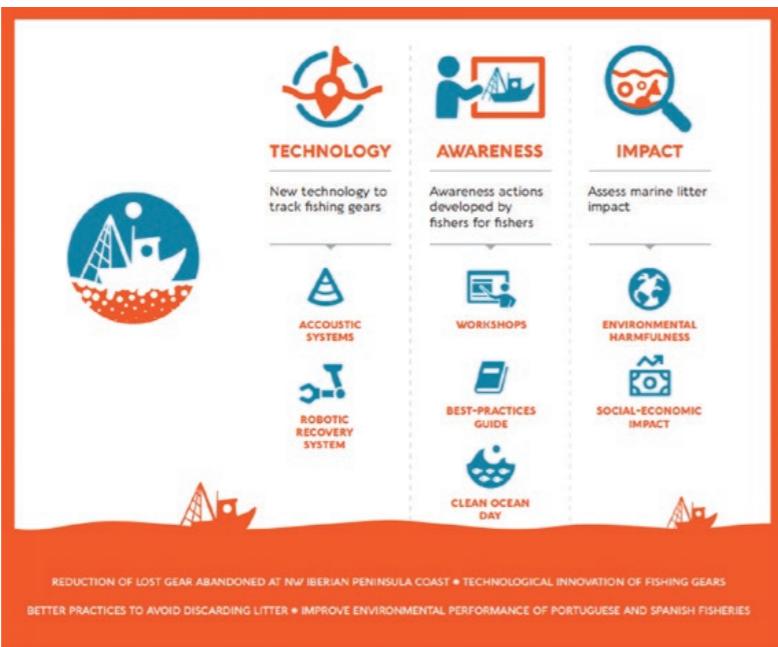
NetTag approach combines two different types of preventive measures:

- new technology to prevent lost gears;
- 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. In parallel, we will assess the reduction of environmental impact of lost gears as a new pollutant. 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.



NOR-WATER - EMERGING POLLUTANTS IN THE WATERS OF GALICIA-NORTHERN PORTUGAL: NEW TOOLS FOR RISK MANAGEMENT

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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:

- 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.
- 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.
- 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.
- 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.





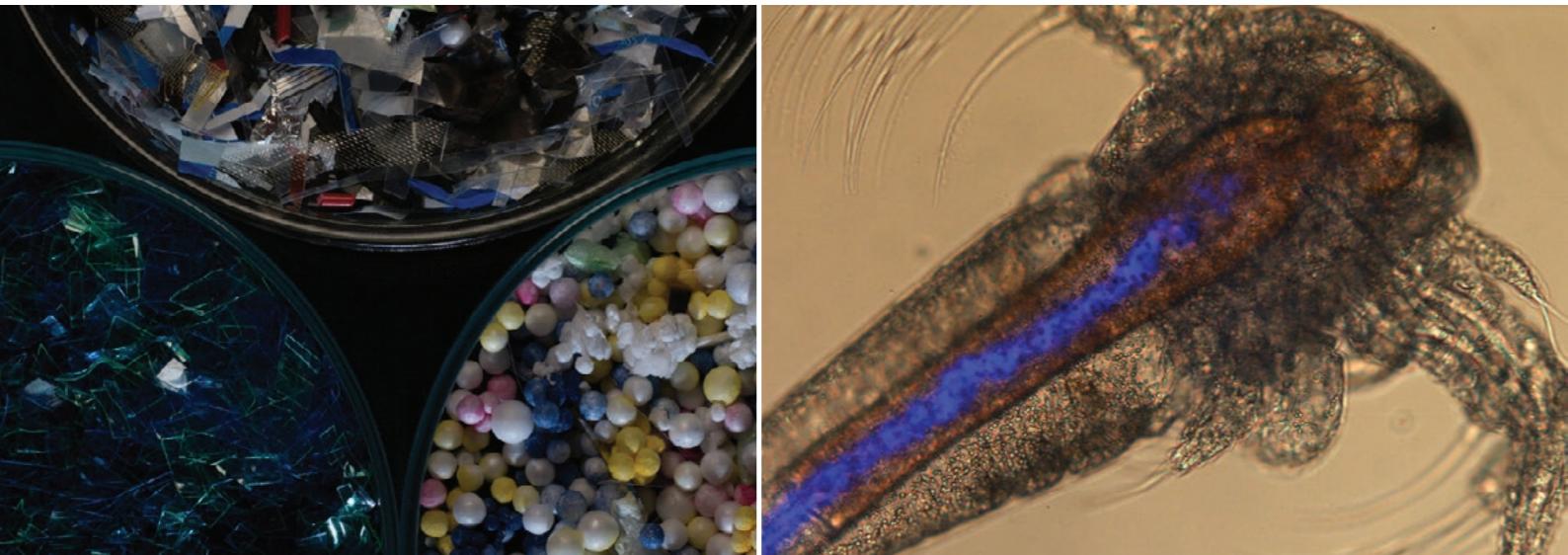
RESPONSE - TOWARD A RISK-BASED ASSESSMENT OF MICROPLASTIC POLLUTION IN MARINE ECOSYSTEMS

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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.



REWATER - SUSTAINABLE AND SAFE WATER MANAGEMENT IN AGRICULTURE: INCREASING THE EFFICIENCY OF WATER REUSE FOR CROP GROWTH WHILE PROTECTING ECOSYSTEMS, SERVICES AND CITIZENS' WELFARE

Water is a natural resource vital for social wellbeing and agriculture economy. Yet, during the past decades, geographic and climatic features, as well as active release of man-made chemicals, have been driving to water depletion and a loss of quality. This creates a major need for water reuse in increasingly situations, such as in agriculture. Wastewater treatment plants (WWTP) are crucial sources for water reuse, since they promote the removal of unwanted substances. However, one of the major challenges restricting wastewater (WW) reuse is the presence of emerging contaminants (ECs), as they are usually not properly managed by conventional treatment technologies. These technologies still need urgent innovative development and integrated solutions, in order to promote sustainable water reuse and safety.

REWATER proposes to develop an innovative joint research and application of technologies producing a final integrated solution for reuse of WW for agricultural purposes, and their economic and environmental evaluation with a Life Cycle Assessment. This systematic approach, inspired in technological, organizational and bio-based economy, will minimize negative impacts of WW reuse in the environment, decreasing the undesirable introduction of ECs in agriculture and aquatic systems and reducing their spread within the food chain.

REWATER provides a unique interdisciplinary expertise of consortium scientific partners and SMEs specialized in WW treatment. Work programme will include tuned improvement or development of: 1) biosensors for in-field rapid and selective detection of micropollutants and their corresponding metabolites and/or degradation products (MMDs), 2) treatment processes for MMDs removal through integration of electrochemical and biological technologies, 3) ecotoxicological tools to evaluate treated water for reuse and develop expeditious surveillance, and 4) analytical monitoring, scaling-up and environmental/economic assessment. REWATER will provide tools and solutions contributing to WW reuse, environmental health, and economic and social welfare. Interaction among consortium partners, allied to stakeholders of water industry, will enhance collaborative research and innovation, as well as international cooperation in the water sector, during and beyond REWATER lifespan.



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

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:

- Creation of a transboundary ecosystem of innovative entrepreneurship in the marine-maritime context.
- Creation of companies in the marine-maritime sector with high added value through the enhancement of technological-scientific synergies.
- Improving the competitiveness of pre-existing companies through the drive for innovation.
- 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.

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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.

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Norway grants



SØLKELP - NORTH-SOUTH SEAWEED CULTIVATION PARTNERSHIP

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 - PROMOVER A GESTÃO CONCERTADA E SUSTENTÁVEL DA ENGUIA NA ÁREA SUDOE

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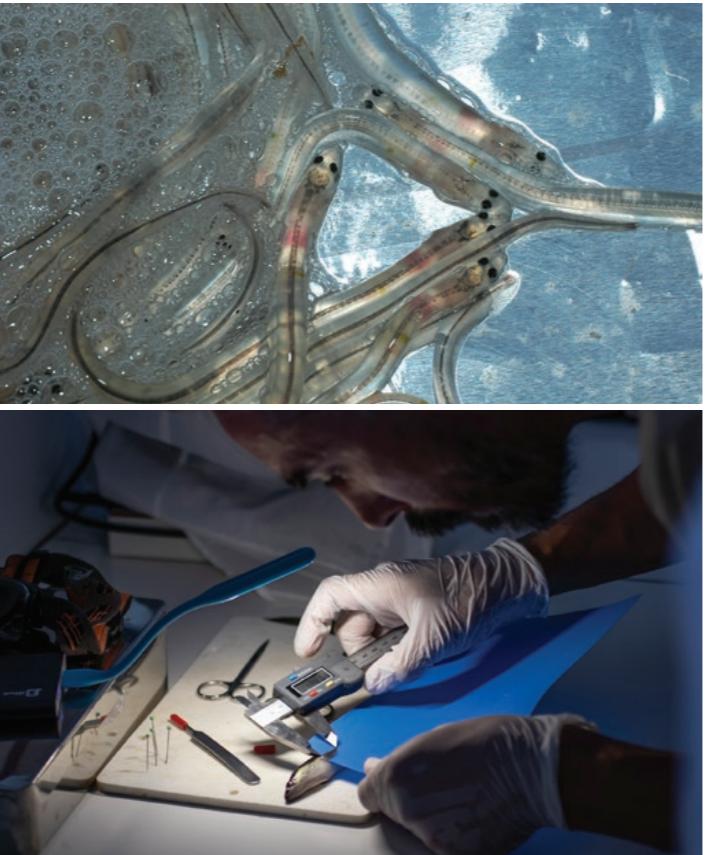
Interreg Sudoe

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:

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

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.



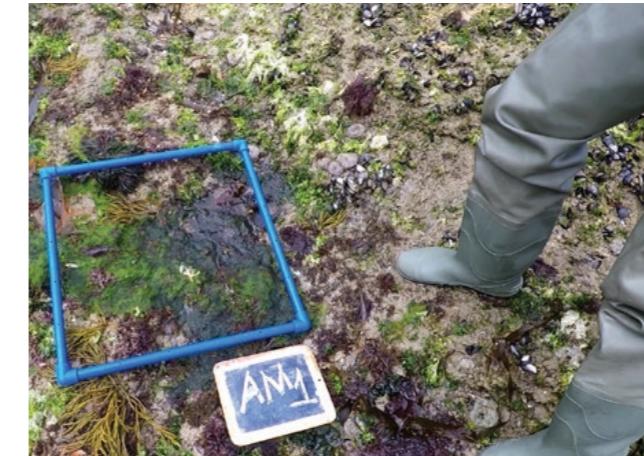
UAV4SEA - TECHNOLOGY DEVELOPMENT FOR DRONE-BASED COASTAL OBSERVATIONS

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.

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Iceland
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Norway grants





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

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COMPETE 2020

Lisb@20²⁰

PORTUGAL 2020



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 Well-being" and "Safe Food and Quality", embodied in the research and development for several processes, products or services.

The joint-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.

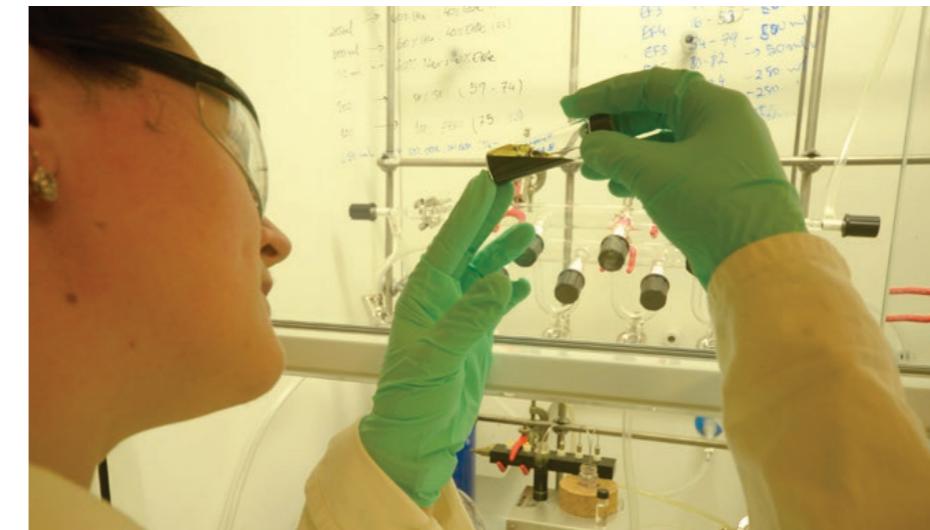
The MobFood project is organized in 9 areas of intervention: Emerging Technologies, Resources Valorization, Sustainable Packaging, Nutrition, Health and Well-being, Quality and Food Safety, Authenticity and Traceability of products, Logistics, Consumer and "Coordination, implementation, dissemination and exploitation of results".



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

The project ValorMar is leaded 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 thorough 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.



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EMBRC-PT - EUROPEAN MARINE BIOLOGICAL RESOURCE CENTRE - PORTUGAL

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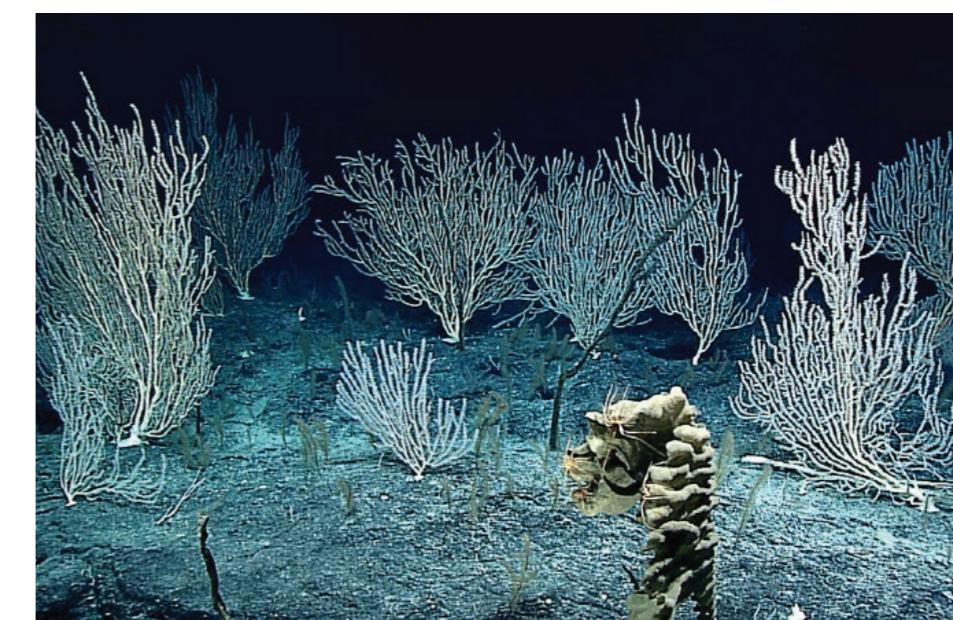


EMSO-PT - EUROPEAN MULTIDISCIPLINARY SEA FLOOR AND WATER COLUMN OBSERVATORY - PORTUGAL

The deep-sea floor ecosystem, one of the largest on the planet, is poorly monitored. Challenges related to direct or indirect anthropogenic actions can only be dealt with if long lasting seafloor and water column observatories networks are deployed. EMSO is a large-scale European Research Infrastructure, of which Portugal is one of its five funding members, established with the objective of real-time, long-term monitoring of environmental processes related to the interaction between the geosphere, biosphere, and hydrosphere. It is a geographically distributed infrastructure at key sites in European waters.

EMSO-PT objectives are to create long term, sustainable, deep sea marine observatories integrated in the European EMSO-ERIC and in cooperation with other international similar networks. These aim at promoting long term time series of sea-floor and water column of various abiotic and biotic parameters in order to serve the international community of scientists, students, general society and stakeholders. EMSO identifies eight main scientific questions: 1) Dynamics of tectonic plates; 2) Climate and greenhouse gas cycling; 3) Ocean productivity; 4) Marine mammal and fish stocks; 5) Non-renewable marine resources; 6) Episodes, events and catastrophes; 7) Origins and limits of life; 8) marine ecosystems dynamics. All these topics are dependent on long-term, continuous, observations, able to capture data for significant episodes as they occur.

The ultimate goal of EMSO-PT is to organize the Portuguese contribution to the EMSO network. In the mainland, two sites will be considered, one deep (Cadiz) and another shallow (North Portugal). The site to be developed in North Portugal will be a test bench for emerging monitoring strategies, towards implementing sustainable monitoring operations and setting the basis for the development of new marine products and services.



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PONDS WITH LIFE: CHARCOS COM VIDA

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"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.



OCEAN ACTION - MAR DE PLÁSTICO



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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 neighbor 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 behavior 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.





CETUS - CETACEAN MONITORING PROJECT IN MACARONESIA

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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-UP 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. The CETUS Project gathers different components related to cetacean conservation:

- It enables data collection on cetacean occurrence over a big habitat extent, mostly in high-seas where little or no data exists due to logistic and economic constraints;
- The data analysis is being used, providing results that address international and European conservation priorities and support management decisions;
- The marine mammal observers involved are international volunteers that go under an intensive course on monitoring techniques putting it into practice on several sea-surveys, substantially improving their Curriculum and experience. Additionally, being an international call, volunteers from all over the world get together, exchanging experiences, culture and knowledge;
- By putting together people from different backgrounds: scientists, volunteers and ships' crewmembers, the CETUS Project becomes a stage where sea-work and marine research merge towards marine conservation;
- An environmental educational component is being developed with an exclusive pedagogical material to be applied at remote schools to enhance critical-thinking, ocean literacy and marine awareness in different islands.



Project	PI at CIIMAR	Leader Institution
A&BM - A&BM - The Sea and the Shore, Architecture and Marine Biology: The Impact of Sea Life on the Built Environment	Elsa Froufe	UMINHO
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
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
CanAdapt - Understanding Darwinian cancer evolution at the single-cell level	Miguel Fonseca	CIIMAR
CARDIOFISH - Effects of dietary components and exercise on energy use and oxidative stress in the hearts of fish	Leonardo Magnoni	CIIMAR
Causalities between diversity, ecosystem functions and services in marine ecosystems	Marina Dolbeth	CIIMAR
CAVIAR - Market valorisation of sea urchin gonads through dietary modulation	Luisa Valente	U.PORTO
CIGUA - The rise of toxic tropical and subtropical marine dinoflagellates <i>Gambierdiscus</i> spp: distribution, ciguatoxins trophic transfer and risk of ciguatera fish poisoning	Alexandre Campos	IPMA
ConBiOomics - The missing approach for the Conservation of freshwater Bivalves	Elsa Froufe	CIIMAR

Project	PI at CIIMAR	Leader Institution
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 compounds	Sergio Boo	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
CY-SENSORS - Biosensor and biomimetic recognition element based devices for detection and separation of cyanobacteria metabolites with ecotoxicological and therapeutical applications	Isabel Cunha	CIIMAR
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
ECOS - New tools to evaluate the ecological status of rocky shores and its relationship with ecosystem services	Puri Veiga	CIIMAR
E-IMUNO - Applying elasmobranch immunogenetics to fisheries management and the study of vertebrate adaptive immunity	Filipe Castro	ICETA
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.
Functional feeds to tackle meagre (<i>Argyrosomus regius</i>) stress: physiological responses under chronic and acute stressful conditions	Ana Couto	CIIMAR
FunG-Eye - A functional approach to unravel the interaction between fungicide pollution and fungi-mediated ecosystem processes	Ana Couto	U.MINHO
GENiuSAMPLER - Autonomous biosampler to capture in situ aquatic microbiomes	Catarina Magalhães	CIIMAR

Project	PI at CIIMAR	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 SA
INFLAMMAA - Unraveling neuro-endocrine/immune modulatory roles of tryptophan during inflammation	Benjamin Costas	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 shellfish	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
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 - U.PORTO
NASCEM - NASCEM - Novel eco-friendly Antifouling Strategies based on Cyanobacterial bioactive Metabolites	Joana Reis Almeida	CIIMAR
NITROLIMIT - NITROLIMIT Life at the Edge: Define the Boundaries of the Nitrogen Cycle in the Extreme Antarctic Environments	Catarina Magalhães	CIIMAR
OMARE - Marine Observatory of Espoende	Francisco Arenas	Espinho Ambiente

Project	PI at CIIMAR	Leader Institution
PANDORAA - Unravelling the functional importance of amino acids in the fish neuroendocrine-immune network	Benjamin Costas	CIIMAR
PROTALGAE - Method for obtaining proteins or a rich-protein extract from algae extracts and uses therefore	Luisa Valente	CIIMAR
PROZYME - Novos probióticos isolados do microbiota do intestino de peixes para melhorar a utilização de matérias-primas vegetais, saúde intestinal e resistência a doenças em peixes carnívoros	Claudia Serra	CIIMAR
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 - Antimicrobials from the sea: models for innovative agents to revert multidrug resistance	Maria Emilia Sousa	CIIMAR
Sea Forest - Sea Forest Portugal	Isabel Sousa Pinto	Casulo Unipessoal Lda
SeeingShore - Understanding 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	CIIMAR
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
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 biosynthetic 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

Project	PI at CIIMAR	Leader Institution
UNNOWN - UNdiscovered Nitrogen microOrganisms 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 - 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
Y+Health - Effects of Ygeia+ on the European seabass immune response and disease resistance: New tools and opportunities	Benjamin Costas	CIIMAR

THE MAN ON THE PEAK

THE MAN ON THE PEAK

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you won't expect it—I know I don't. It's helped me considerably, coming here."

"I am very happy to have it," Tom Jermaine replied. "It helps to sit still, you know." And he turned to his mother who had come through Alice Edge. "I told her to sit down again this evening. I thought with you not being well you might feel better if you sat down. He is calling you at seven o'clock."

"I hope so," Alice said. "He has been very kind."

"And I did not tell him about your accident? A pause.

"No, I am Hong

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SCIENTIFIC OUTPUTS

PUBLICATIONS	
Books and book chapters of international circulation	26
Publications in peer reviewed journals	533
Edited special issues of journals	36
Other Publications	40
ADVANCED TRAINING	
Completed PhD thesis under the supervision of integrated members	20
Completed Master thesis under the supervision of integrated members	76
OTHER SCIENTIFIC OUTPUTS	
Provisional Patent Applications	1
International Patent Applications	5
New materials, devices, products and processes, software, computer codes and algorithms	4

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- Calheiros C.S.C., Pereira S. 2020. Guest Editors of the Special Issue: Wetland Ecology: Principles and Conservation. A special issue of the International Journal of Environmental Research and Public Health. MDPI. ISSN 1660-4601.
- Calheiros, C.S.C. 2020. Guest Editor of the Special Issue: Water Management: New Paradigms for Water Treatment and Reuse. A special issue of Water. MDPI. ISSN 2073-4441.
- Campos A.M., Almeida A.M., Vasconcelos V. 2020. Guest Editors of the Special Issue: Proteomics and the Study of Marine Toxins: Implications for Life Sciences. A special issue of Toxins. MDPI. ISSN 2072-6651.
- Campos A.M., Turkina M., Benjamin M., Vasconcelos V. 2020. Guest Editors of the Special Issue: Advances in Ecotoxicology Research of Harmful Algal Blooms Using OMICs. A special issue of Frontiers in Marine Science. Frontiers. ISSN 2296-7745.
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- Ferreira R.J., Reis M.A., Silva D., Scapin E., Dewanjee S., Carrasco M.P. 2020. Guest Editors of the Research Topic: Inspired by Nature: Towards Novel Anti-infective Agents. A research topic of Frontiers in Pharmacology. Frontiers. ISSN 1663-9812.
- Freitas M., Campos A., Vasconcelos V. 2020. Guest Editors of the Special Issue: Learn from Plants Toxin and Phycotoxins: Impacts and Application. A special issue of Plants. MDPI. ISSN 2223-7747.
- Gaudêncio S., Pedrosa R., Vasconcelos V. 2020. Guest Editors of the Special Issue: Selected Papers from XVI MaNaPro and XI ECMNP. A special issue of Marine Drugs. MDPI. ISSN 1660-3397.
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- Prokai-Tatrai K., De Sousa M.E., Rovainen A., Gomes P.A.C., Galdiero S., Gemma S., Spetea M. 2020. Guest Editors of the Special Issue: Advancing Medicinal Chemistry with a Feminine Touch. A special issue of Molecules. MDPI. ISSN 1420-3049.
- Rodríguez-Seijo A. 2020. Guest Editor of the Special Issue: Microplastics - Macro Challenge for Environmental Sustainability. A special issue of Sustainability. MDPI. ISSN 2071-1050.
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Zanella T.V. 2020. Jurisdição Sobre Navios Sem Nacionalidade. Revista da Escola de Guerra Naval (Ed. Português), v. 26.

ADVANCED TRAINING

Completed PhD Thesis

Name: Ana Carolina Melo Rodrigues

Thesis title: Diversidade e distribuição espaço-temporal da densidade larval de *Anomura* MacLeay, 1838, *Axiidea* de Saint Laurent, 1979 e *Gebiidea* de Saint Laurent, 1979 (Crustacea, Decapoda) na plataforma continental do Amazonas

Doctoral Programme/Doctoral degree: Aquatic Ecology and Fishing

Faculty/University: Federal University of Pará, Brazil

Supervisor: Jussara Moretto Martinelli Lemos

Co-supervisor: Antonina dos Santos

Date: February 2020

Name: Ana Mafalda Tomás Correia

Thesis title: Distribution and habitat modelling for cetacean species in the eastern north Atlantic Ocean

Doctoral Programme/Doctoral degree: Biology

Faculty/University: Faculty of Sciences, University of Porto

Supervisor: Isabel Sousa Pinto

Co-supervisor: Graham J. Pierce; Massimiliano Rosso

Date: January 2020

Name: Ana Teresa Ribeiro

Thesis title: Desenvolvimento de fiambres de pescado com utilização de fibras vegetais e aplicação de diferentes tecnologias de gelificação

Doctoral Programme/Doctoral degree: Agricultural and Environmental Sciences

Faculty/University: University of Évora, University of Algarve

Supervisor: Miguel Elias

Co-supervisor: Rogério Mendes

Date: February 2020

Name: Ana Vanessa Pinto Modesto

Thesis title: Impacts of the invasive species *Corbicula fluminea* on native freshwater mussels

Doctoral Programme/Doctoral degree: Molecular and Environmental Biology

Faculty/University: School of Sciences, University of Minho

Supervisor: Ronaldo Sousa

Co-supervisor: Martina Di Iulio Ilarri

Date: November 2020

Name: Carlos Eduardo Salgueiro e Silva Monteiro

Thesis title: Biogeochemistry of Platinum-Group Elements (PGE) in aquatic ecosystems

Doctoral Programme/Doctoral degree: Environmental Engineering

Faculty/University: Instituto Superior Técnico, University of Lisboa

Supervisor: Margarida dos Santos Romão

Co-supervisor: Miguel Caetano

Date: October 2020

Name: Claudia Filipa Devesa André Moreira

Thesis title: Population structure, movement patterns and habitat connectivity of the blue jack mackerel, *Trachurus picturatus*, in the NE Atlantic: otolith morpho-chemistry, body shape and genetic markers as combined tools for a rational management of fisheries resources.

Doctoral Programme/Doctoral degree: Biomedical Sciences

Faculty/University: ICBAS, University of Porto

Supervisor: Alberto Teodorico Correia

Co-supervisor: Elsa Froufe; Paulo Vaz-Pires

Date: July 2020

Name: Decha Kumla

Thesis title: Bioactive secondary metabolites from marine-derived fungi collected from Thai waters

Doctoral Programme/Doctoral degree: Biomedical Sciences

Faculty/University: ICBAS, University of Porto

Supervisor: Anake Kijjoa

Co-supervisors: José Augusto Pereira; Tida Dethoup

Date: January 2020

Name: Dimítri de Araújo Costa

Thesis title: Environmental education and the ecological-taxonomic study of marine invertebrates associated with rhodoliths/maërl beds in tropical coast

Doctoral Programme/Doctoral degree: Development and Environment

Faculty/University: Federal University of Paraíba, Brazil

Supervisor: Reinaldo Farias Paiva de Lucena

Co-supervisors: Marina Dolbeth; Martin Lindsey Christoffersen

Date: February 2020

Name: Emanuel Maldonado

Thesis title: Optimization of gene-finding and annotation methods for *in silico* Genomics and Transcriptomics inferences Bioinformatics Applications for Optimizing Downstream Analyses in Evolutionary Genomics

Doctoral Programme/Doctoral degree: Environmental Sciences and Technology

Faculty/University: Faculty of Sciences, University of Porto

Supervisor: Agostinho Antunes

Co-supervisor: Vitor Vasconcelos

Date: June 2020

Name: Elza Sofia da Silva da Fonseca

Thesis title: Nuclear Receptors in Metazoan lineages: the cross-talk between Evolution and Endocrine Disruption

Doctoral Programme/Doctoral degree: Biology

Faculty/University: Faculty of Sciences, University of Porto

Supervisor: Filipe Castro

Co-supervisor: Rodrigo Ozório

Date: June 2020

Faculty/University: Faculty of Sciences, University of Porto

Supervisor: Ralph Urbatzka

Co-supervisor: Vitor Vasconcelos; Rosário Martins

Date: March 2020

Name: Marina Machado Casimiro

Thesis title: Mediators of inflammation: unravelling the role of methionine and tryptophan during infection

Doctoral Programme/Doctoral degree: Animal Science

Faculty/University: ICBAS, University of Porto

Supervisor: Benjamín Costas

Co-supervisor: Aires Oliva-Teles; Nuno dos Santos

Date: May 2020

Name: Rafael Costa Morgado Soares Braga

Thesis title: Gestão ambiental em portos Brasileiros: Contributos para melhoria considerando boas práticas em portos Europeus

Doctoral Programme/Doctoral degree: Environmental Engineering

Faculty/University: Faculty of Engineering, University of Porto

Supervisor: Fernando Veloso Gomes

Date: December 2020

Name: Rayda Ghribi

Thesis title: A multi-biomarker approach using three different marine species to assess the marine sediment quality of the Zarzis area, Gulf of Gabes, Tunisia

Doctoral Programme/Doctoral degree: Environmental Engineering

Faculty/University: National School of Engineers, University of Sfax, Tunisia

Supervisor: Boubaker Eleuch

Co-supervisor: Alberto Teodorico Correia; Bruno Nunes

Date: January 2020

Name: Renato Barbosa Ferraz

Supervisor: Gertrud Müller Antunes
Co-supervisor: Maria João Santos
Date: June 2020

Completed Master Thesis

Name: Albertina Alice Ribeiro Mota
Thesis title: Implementação do método de contagem de Legionella spp e Legionella pneumophila e auditoria ao método
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Natividade Vieira
Date: December 2020

Name: Alexandra Raquel Soares Marques
Thesis title: Robalo Europeu (*Dicentrarchus labrax*) alimentado com gorduras de origem animal: qualidade do filete baseada na composição em ácidos gordos, cor e textura
Master degree: Quality Control
Faculty/University: Faculty of Pharmacy, University of Porto
Supervisor: Luísa Valente
Co-Supervisor: Beatriz Oliveira
Date: November 2020

Name: Álvaro Huguet Lopez
Thesis title: Evaluation of microalgae for their potential beneficial effects on human metabolic diseases
Master degree: Applied Blue Biotechnology
Faculty/University: Catholic University of Valencia, Spain.
Supervisor: Ralph Urbatzka
Date: September 2020

Name: Anabel Mejido Estévez
Thesis title: Reducción de sodio en productos marinos procesados mediante el uso de diversas estrategias
Master Degree: Chemical Engineering Processes
Faculty/University: Faculty of Chemical Engineering, University of Granada
Supervisor: Helena Oliveira
Co-supervisor: Maria Leonor Nunes
Date: April 2020

Name: Andreia da Silva Sousa
Thesis title: Impact of defatted mealworm larvae meal on European sea bass flesh quality
Master degree: Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Luísa Valente
Date: December 2020

Name: Bárbara Cláudia Usha Ochs da Fonseca
Thesis title: Genomes comparisons through immune related genes in mammalian species
Master degree: Bioinformatics
Faculty/University: School of Engineering, University of Minho
Supervisor: Agostinho Antunes
Co-supervisor: Miguel Rocha
Date: June 2020

Name: Bárbara Ribeiro
Thesis title: Potential of lost fishing gears for adsorption of pollutants, the case of metals
Master degree: Toxicology and Environmental Contamination
Faculty/University: ICBAS, University of Porto
Supervisor: C. Marisa R. Almeida
Co-supervisor: Sandra Ramos
Date: November 2020

Name: Bárbara Xavier

Thesis title: Assessment of the ecological status of an intermittent river: water quality and ecosystem services
Master degree: Ecology and Environment
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Sara Antunes
Date: December 2020

Name: Beatriz Neto Fernandes
Thesis title: Effects of plant protection products application on the quality of vineyard soils from Douro Region
Master degree: Agricultural Engineering
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Anabela Cachada
Co-supervisor: Ruth Pereira
Date: December 2020

Name: Bruna Souza
Thesis title: Gestão de áreas protegidas e a conservação da biodiversidade: Uma análise da área de proteção ambiental Ilha do Combú, Belém-Pará, Amazônia, Brasil
Master degree: Ecology and Environment
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Sara Antunes
Co-supervisor: Octávio do Canto
Date: December 2020

Name: Bruno Miguel Monteiro Vale
Thesis title: Avaliação da gestão de albufeiras para cenários de alterações climáticas
Master degree: Environmental Engineering
Faculty/University: Faculty of Engineering, University of Porto
Supervisor: Rodrigo Maia
Co-supervisor: Anabela Peres
Date: October 2020

Name: Carla Daniela Mota de Sousa
Thesis title: Functional feeds to tackle meagre (*Argyrosomus regius*) stress: physiological responses under chronic and acute stressful conditions
Master degree: Biological Aquatic Resources
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Ana Couto
Co-supervisor: Paula Enes
Date: December 2020

Name: Carla Sofia Ribeiro dos Santos
Thesis title: The genes from the pseudoautosomal region 1 (PAR1) of the mammalian sex chromosomes: synteny, phylogeny and selection
Master degree: Forensic Medicine
Faculty/University: ICBAS, University of Porto
Supervisor: Agostinho Antunes
Co-supervisor: Tito Mendes
Date: December 2020

Name: Cândido Artur Carmezim Xavier
Thesis title: Single and combined effects of four emerging pollutants and two polycyclic aromatic hydrocarbons on the macroinvertebrate communities from the Minho estuary under different temperature rise scenarios
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Irene Martins
Co-supervisor: Natividade Vieira
Date: December 2020

Name: Carlos Alexandre Mendes Medeiros
Thesis title: Potential of solid-state fermented wineries and olive oil by-products as functional ingredients for European sea bass feeds
Master degree: Biological Aquatic Resources
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Helena Peres

Co-supervisor: Carolina Castro
Date: December 2020

Name: Carmo Filipa Silva Cunha
Thesis title: Application of biofloc technology in an IMTA system with production of *Dicentrarchus labrax* and *Paracentrotus lividus*
Master Degree: Biological Aquatic Resources
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Filipe Coutinho
Co-supervisor: Helena Peres
Date: December 2020

Name: Catarina Moreira Oliveira Duarte
Thesis title: Efeitos da acidificação oceânica no crescimento, calcificação, sobrevivência e integridade da concha nos juvenis de *Chamelea gallina* (Linnaeus, 1758)
Master degree: Aquaculture
Faculty/University: ESTM, Polytechnic of Leiria
Supervisor: Laura Sordo de las Nieves
Co-supervisor: Domitília Matias
Date: December 2020

Name: Cristiana Patricia Gonçalves Paiva
Thesis title: Assessment of toxicity and behavior of Cu (nano)formulations in vineyard soils.
Master degree: Toxicology and Environmental Contamination
Faculty/University: ICBAS and Faculty of Sciences, University of Porto
Supervisor: Anabela Cachada
Co-supervisor: Ruth Pereira
Date: December 2020

Name: Daniel Borrajo Lage
Thesis title: Macroalgae as a source of essential nutrients in food and feed
Master degree: Chemical Engineering Processes
Faculty/University: Faculty of Chemical Engineering, University of Granada
Supervisor: António Marques
Co-supervisor: Ana Luisa Maulvault
Date: April 2020

Name: Daniela Andreia Carvalho Ferreira
Thesis title: Bioactivity screening of cyanobacteria for appetite reduction and intestinal lipid uptake
Master degree: Biochemistry in Health
Faculty/University: School of Health (ESS), Polytechnic of Porto
Supervisor: Ralph Urbatzka
Co-supervisor: Ricardo Ferraz
Date: September 2020

Name: Diana Catarina Antunes da Silva Freitas
Thesis title: Effects of climate change on limpets (*Patella spp.*): Biology and distribution
Master degree: Ecology
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Débora Borges
Co-supervisor: Francisco Arenas; Cândida Vale
Date: November 2020

Name: Esperança Edna Alexandre Chibite
Thesis title: Avaliação do estado de conservação da Floresta de Mangal e seu impacto para a Biodiversidade
Master degree: Applied Ecology
Faculty/University: Lúrio University, Mozambique
Supervisor: Fernando Morgado
Co-supervisor: Luis R. Vieira
Date: February 2020

Name: Eva Silva Lopes
Thesis title: Prokaryotic dynamics across the North Pacific Subtropical Front
Master degree: Marine Sciences - Marine Resources

Faculty/University: ICBAS, University of Porto
Supervisor: Catarina Magalhães
Co-supervisor: Miguel Semedo
Date: December 2020

Name: Filomena Santos
Thesis title: Ecotoxicidade enantiosseletiva de fármacos e drogas psicotrópicas
Master degree: Forensic Science and Laboratory Techniques
Faculty/University: IUCS, CESPU
Supervisor: Cláudia Maria Rosa Ribeiro
Co-Supervisor: Maria Elizabeth Tiritan
Date: March 2020

Name: Francisco Vilela de Carvalho Taveira Pinto
Thesis title: Erosões localizadas em intervenções de proteção costeira destacadadas
Master degree: Civil Engineering
Faculty/University: Faculty of Engineering, University of Porto
Supervisor: Paulo Rosa Santos
Co-supervisor: Jose Victor Ramos
Date: July 2020

Name: Gabriela Catarina Chaves Gonçalves
Thesis title: Probiotic Bacillus spores as antigens delivery vehicles: towards development of oral vaccines for aquaculture
Master degree: Food Science and Technology
Faculty/University: Faculty of Science, University of Porto
Supervisor: Cláudia Serra
Co-supervisor: Filipe Coutinho
Date: December 2020

Name: Gina Alexandra Barbosa Salazar
Thesis title: Internship Report: Short-term reactions of *Delphinus delphis* and *Tursiops truncatus* to the activity of whale-watching in the Azores
Master degree: Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Paulo Vaz-Pires
Date: July 2020

Name: Glauce Campos
Thesis title: Nature based solutions to enhance water quality and ecosystem restoration
Master degree: Environmental Sciences and Technology
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Cristina Calheiros
Co-supervisor: Ana Paula Mucha; Marisa Almeida
Date: December 2020

Name: Helena Cabral de Lima Reis Pereira
Thesis title: The challenges of veterinary medical activity in reptiles in Zoological Parks and exotic animal clinics
Master degree: Veterinary Medicine
Faculty/University: University of Trás-os-Montes e Alto Douro
Supervisor: José Manuel Almeida
Date: September 2020

Name: Helena Monteiro
Thesis title: Avaliação das comunidades planctónicas no estuário do Sado.
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Carla Palma
Co-supervisor: Sara Antunes
Date: December 2020

Name: Henry Van der Gracht
Thesis title: Potential of lost fishing gears for adsorption of pollutants,

the case of PAHs

Master degree: Environmental Sciences and Technology
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: C. Marisa R. Almeida
Co-supervisor: Sandra Ramos
Date: November 2020

Name: Inês de Castro Fernandes
Thesis title: Comparison of DNA sequencing technologies using sensory systems genes in bird genomes
Master degree: Bioinformatics
Faculty/University: School of Engineering, University of Minho
Supervisor: Agostinho Antunes
Co-supervisor: Miguel Rocha
Date: June 2020

Name: Inês Oliveira Cândido
Thesis title: Estudo de novas soluções para a estabilização da restinga de Espesende
Master degree: Civil Engineering
Faculty/University: Faculty of Engineering, University of Porto
Supervisor: Francisco Taveira Pinto
Co-supervisor: Paulo Rosa Santos
Date: July 2020

Name: Isa Silva
Thesis title: Application of brewery spent grain by-product extract produced through solid-state fermentation in European sea bass diets.
Master degree: Biological Aquatic Resources
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Carolina Castro
Co-supervisor: Helena Peres
Date: December 2020

Name: Ivan Carmelo Vieira Trainito
Thesis title: Sustainable strategies for modern fish farming
Master degree: Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Benjamín Costas
Co-supervisor: José Fernando Gonçalves
Date: December 2020

Name: João Alberto Henriques Rebola Branco
Thesis title: Influence of rearing conditions on early development of pike perch (*Sander lucioperca*) larvae
Master Degree: Biological Aquatic Resources,
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Ana Couto
Co-supervisor: Ivar Lund (DTU), Paula Enes
Date: December 2020

Name: João Carlos Mendonça Duarte
Thesis title: Afluências indevidas em sistemas de drenagem e tratamento de águas residuais. Gestão operacional
Master degree: Environmental Engineering
Faculty/University: Faculty of Engineering, University of Porto
Supervisor: José Tentúgal Valente
Co-supervisor: Cristina Santos
Date: July 2020

Name: João Manuel Félix Silva
Thesis title: Assessing the antioxidant and antimicrobial potential of brewery, winery and olive-oil by-product extracts produced through fermentation in European sea bass.
Master degree: Food Science and Technology
Faculty/University: Faculty of Sciences, Porto University
Supervisor: Helena Peres
Co-supervisor: Carolina Castro
Date: December 2020

Name: João Silva
Thesis title: Biodegradation of two widely used fluorinated pesticides with environmental relevance
Master degree: Environmental Contamination and Toxicology
Faculty/University: ICBAS and Faculty of Sciences, University of Porto
Supervisor: Maria de Fátima Carvalho
Co-supervisor: C. Marisa R. Almeida
Date: December 2020

Name: Jorge Paulo Esteves Figueiras
Thesis title: Otimização da etapa de tratamento terciário da ETAR de Gaia Litoral
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Natividade Vieira
Date: December 2020

Name: Juliana Cristina Ferreira Rodrigues
Thesis title: Age, growth and reproductive biology of the tub gurnard (*Chelidonichthys lucerna*) in North-East Portugal
Master degree: Aquaculture and Fisheries
Faculty/University: Faculty of Sciences and Technology, University of Algarve
Supervisor: Alberto Teodorico Correia
Co-supervisor: Karim Erzini
Date: September 2020

Name: Manuel Vladimiro Ferreira Pinto
Thesis title: Monitorização topográfica de estruturas de proteção costeira usando drones - Quebra-mar destacado da foz do Rio Douro
Master degree: Surveying Engineering
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: José Alberto Gonçalves
Date: November 2020

Name: Maria Inês Ribeiro Carvalho
Thesis title: Effects of dietary histidine and plant lipids on the Atlantic salmon (*Salmo salar*) health status following transfer to seawater
Master degree: Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Benjamín Costas
Co-supervisor: Sofie Remø (IMR, Norway)
Date: December 2020

Name: Maria João Pedrosa
Thesis title: Avaliação e caracterização de sedimentos no estuário do Sado
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Carla Palma
Co-supervisor: Sara Antunes
Date: December 2020

Name: Maria João Sintra Coelho Gonçalves
Thesis title: Ecotoxicological effects of environmental stressors in the mussel *Mytilus galloprovincialis*
Master degree: Veterinary Medicine
Faculty/University: Faculty of Veterinary Medicine, University of Lisbon
Supervisor: Lúcia Guilhermino
Co-supervisor: Berta São Braz
Date: June 2020

Name: Maria Miguel dos Santos Serrano
Thesis title: Cultivo e utilização de *Fucus vesiculosus* e *Nannochloropsis gaditana* em rações para corvina (*Argyrosomus regius*)
Master degree: Biological Aquatic Resources
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Ana Couto
Co-supervisor: Paula Enes
Date: December 2020

Name: Mariana Cruz Anastácio
Thesis title: Jellyfish, a threat or an opportunity? The non-indigenous *Blackfordia virginica* as a potential food source for humans and aquatic organisms
Master degree: Marine Biology
Faculty/University: Faculty of Sciences and Technology, University of Algarve
Supervisor: Ester Dias
Co-supervisor: Luísa Custódio
Date: January 2020

Name: Mariana Isabel Soares Ferreira Moreira
Thesis title: Pré-avaliação da produção de energia eléctrica através de dispositivos de extração de energia
Master degree: Civil Engineering
Faculty/University: Faculty of Engineering, University of Porto
Supervisor: Francisco Taveira Pinto
Co-supervisor: Paulo Rosa Santos
Date: December 2020

Name: Mariana Ribeiro da Costa Ferreira
Thesis title: Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) reproduction and management
Master degree: Veterinary Medicine
Faculty/University: University of Trás-os-Montes e Alto Douro
Supervisor: José Manuel Almeida
Co-supervisor: Celso Sá Santos
Date: July 2020

Name: Marina Zaroni
Thesis title: Zooplâncton como bioindicador da qualidade ambiental em dois estuários brasileiros: um levantamento bibliográfico
Master degree: Ecology and Environment
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Sara Antunes
Co-supervisor: Luciana Chequer
Date: December 2020

Name: Marta Sousa
Thesis title: Biogeography of Arctic Eukaryotic Microbiome: A comparative approach between 18S rRNA gene metabarcoding and microscopic analysis
Master degree: Environmental Sciences and Technology
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Catarina Magalhães
Co-supervisor: Maria Paola Tomasino
Date: November 2020

Name: Meggie Aldina Pereira Aires
Thesis title: Comparative analysis between the French and Portuguese reality in Zoological Parks and exotic animal clinics
Master degree: Veterinary Medicine
Faculty/University: University of Trás-os-Montes e Alto Douro
Supervisor: José Manuel Almeida
Date: September 2020

Name: Mirella de Souza
Thesis title: An evaluation of the ecotoxicity of surface water of Pernambuco Rivers (Brazil)
Master degree: Environmental Sciences and Technology
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Joana Soares
Co-supervisor: Miguel Santos
Date: December 2020

Name: Miriam Lena Eder
Thesis title: Microplastics as vehicles for chemical exposure in

freshwater environments
Master degree: Technical Environmental Management and Ecotoxicology
Faculty/University: FH University of Applied Sciences Technikum Wien, Austria
Supervisor: Romana Hornek-Gausterer
Co-supervisor: Laura Guimarães
Date: October 2020

Name: Nelson Monteiro
Thesis title: Competitive exclusion of toxic cyanobacterial species by an allelopathic strain of *Phormidium*
Master degree: Environmental Toxicology and Contamination
Faculty/University: ICBAS, University of Porto
Supervisor: Aldo Barreiro Felpeto
Co-supervisor: Vitor Vasconcelos
Date: October 2020

Name: Olívia Patrícia Gonçalves Pinto
Thesis title: Dietas funcionais para peixes de aquacultura
Master degree: Bioresources
Faculty/University: ISEP, Polytechnic of Porto
Supervisor: Luísa Valente
Co-Supervisor: Cristina Delerue-Matos
Date: July 2020

Name: Orlando Couto Ferreira
Thesis title: Plastics and microplastics contamination and biological biomarkers in marine species, human exposure through seafood consumption, and potential applications in Forensic Medicine
Master degree: Forensic Medicine
Faculty/University: ICBAS, University of Porto
Supervisor: Lúcia Guilhermino
Co-supervisor: Gabriel Barboza
Date: November 2020

Name: Paulo Joaquim da Silva Santos
Thesis title: Immune responses of gilthead seabream (*Sparus aurata*) to *Photobacterium damsela* subsp. *Piscicida*: searching for health biomarkers
Master degree: Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Benjamin Costas
Co-supervisor: Teresa Maria Coelho Baptista
Date: December 2020

Name: Pedro Alexandre da Rocha Costa
Thesis title: Effects of pesticide formulations containing cypermethrin and tebuconazole, individually and in mixture, on the earthworm *Eisenia fetida*
Master degree: Environmental Toxicology and Contamination
Faculty/University: ICBAS and Faculty of Sciences, University of Porto
Supervisor: Ryszard Laskowski
Co-supervisor: Lúcia Guilhermino
Date: February 2020

Name: Pedro Diogo Faria Nascimento
Thesis title: CTAQUA internship under the projects INTEGRATE, BIOSEA & SIMBA
Master degree: Biological Aquatic Resources
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Ana Couto
Co-supervisor: Erik-Jan Malta (CT-AQUA), Paula Enes
Date: December 2020

Name: Pedro Nuno Mendonça Gonçalves Marques Figueiredo
Thesis title: Mercado do pescado dos Estados Unidos da América e respetivos requisitos

Master degree: Veterinary Medicine
Faculty/University: ICBAS, University of Porto
Supervisor: Paulo Vaz-Pires
Co-supervisor: Maria Gracieta Araújo Machado
Date: September 2020

Name: Pedro Tiago Lima Aguiar
Thesis title: Detecção de outliers derivados do processamento de séries temporais InSAR usando algoritmos de Deep Learning
Master degree: Surveying Engineer
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Maria Clara Lázaro
Co-supervisor: António Cunha
Date: June 2020

Name: Pratyasha Dash
Thesis title: Assessment of constructed wetland functions planted with Phragmites australis for the treatment of lake water contaminated with harmful cyanobacterial cells
Master degree: Integrated Biotechnology
Faculty/University: Vellore Institute of Technology, India
Supervisor: Alexandre Campos
Co-supervisor: C. Marisa R. Almeida
Date: June 2020

Name: Raquel Abrunhosa Pinto
Thesis title: Raman Spectroscopy applied to diatoms for environmental diagnosis
Master degree: Biology and Management of Water Quality
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Luís Oliva Teles
Co-supervisor: António Paulo Carvalho, Laura Guimarães
Date: December 2020

Name: Ruben Pereira
Thesis title: Environmental control of planktonic communities in a coastal Marine Protected Area (PNLN)
Master degree: Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Sandra Ramos
Date: December 2020

Name: Rui Pedro Neves Silva
Thesis title: Giardia and Cryptosporidium in natural waters: Characterization of water courses and correlation with physical/microbiological parameters
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Natividade Vieira
Date: November 2020

Name: Rute Luís de Almeida Mateus
Thesis title: Evaluation of algae biomasses in diets for gilthead seabream (*Sparus aurata*) juveniles - effects on immune condition and general performance
Master degree: Marine Sciences – Marine Resources

Faculty/University: ICBAS, University of Porto
Supervisor: Benjamín Costas
Co-supervisor: António Afonso
Date: December 2020

Name: Sandra Filipa Carvalho Barreiro
Thesis title: Marine-Derived Compounds as Potential Neuroprotective Agents
Master degree: Analytical, Clinical and Forensic Toxicology
Faculty/University: Faculty of Pharmacy, University of Porto
Supervisor: Renata Silva
Co-supervisor: Emília Sousa
Date: December 2020

Name: Sofia Hernandez
Thesis title: Larval fish connectivity between estuaries and coastal area – a review
Master degree: Biodiversity, Ecology and Evolution
Faculty/University: Faculty of Sciences, University of Montpellier
Co-supervisor: Sandra Ramos; Claire Paris (University of Miami, EUA)
Date: September 2020

Name: Sofia Mendes Ferreira
Thesis title: Effects of microplastics and other contaminants in freshwater organisms
Master degree: Environmental Toxicology and Contamination
Faculty/University: ICBAS and Faculty of Sciences, University of Porto
Supervisor: Lúcia Guilhermino
Co-supervisor: Patrícia Oliveira
Date: November 2020

Name: Susana Cristina da Rocha Ferreira
Thesis title: Efeitos histopatológicos em fígado de pregado (*Scophthalmus maximus*) exposto cronicamente a concentrações ambientalmente realísticas de metais pesados
Master degree: Pharmaceutical Sciences
Faculty/University: Faculty of Health Sciences, University Fernando Pessoa
Supervisor: Alberto Teodórico Correia
Co-supervisor: Bruno Nunes
Date: December 2020

Name: Tânia Isabel Alexandre Mestre Ferreira
Thesis title: Data mining study on data collected in Arctic oceanographic campaigns
Master degree: Network and Information Systems Engineering
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Rita Ribeiro
Co-supervisor: Catarina Magalhães
Date: December 2020

Name: Tiago José Pinha Alves
Thesis title: Digestão Anaerobia – Co-digestão de óleos, gorduras e lactosoro na ETAR de Sousa e ETAR de Ponte da Baía
Master degree: Biology and Water Quality Management
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Natividade Vieira
Date: November 2020

Name: Tony Gomes Cardoso
Thesis title: Mecanismos de reconhecimento molecular e determinação da afinidade de ligação de catinonas sintéticas à albumina sérica humana, por cromatografia de afinidade de alta eficiência
Master degree: Analytical, Clinical and Forensic Toxicology
Faculty/University: Faculty of Pharmacy, University of Porto
Supervisor: Carla Fernandes
Co-supervisor: Fernando Remião
Date: December 2020

Name: Vernita Priya
Thesis title: Effects of cylindrospermopsin and glyphosate at environmentally relevant concentrations on toxicity, growth and mineral content in beetroot plants (*Beta vulgaris*)
Master degree: Integrated Biotechnology
Faculty/University: Vellore Institute of Technology, India
Supervisor: Sudhakaran R; Vitor Vasconcelos
Co-supervisor: Alexandre Campos; Marisa Freitas
Date: June 2020

Name: Vitor Silva
Thesis title: Remote Sensing methodology to assess water quality

over Portuguese reservoirs
Master degree: Ecology and Environment
Faculty/University: Faculty of Sciences, University of Porto
Supervisor: Sara Antunes
Co-supervisor: Giorgio Pace
Date: December 2020

GRANTED PATENTS

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. Institutions: 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. Institutions: 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.

OTHER SCIENTIFIC OUTPUTS

PROVISIONAL PATENT APPLICATIONS

Inventors: Pintado M.M., Valente L., Resende D., Costas B., Casimiro M.M., Pereira C. 2020. Provisional Patent Application PT 116742 - NEW HYDROLYSATES TO CONTROL INFECTIONS, METHODS AND USES THEREOF. Applicants: UCP - Universidade Católica Portuguesa, CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, ESAC - Escola Superior Agrária de Coimbra.

INTERNATIONAL PATENT APPLICATIONS

Inventors: Martins T., Leão P., Reis M., Vasconcelos V., Ramos V., Hassouani M., Sabour B. 2020. International Patent Application PCT/EP2020/050025 – ULTRA-VIOLET ABSORBING COMPOUNDS. Applicants: CIIMAR – Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto, Chouaib Doukkali University.

Inventors: Urbatzka R., Freitas S., Leão P.N., Sousa M.L., Reis M.A., Silva N.G., Vasconcelos V., Ribeiro T., Rosa F. 2020. International Patent Application PCT/IB2020/051759 – HYDROXYPHEOPHORBIDE COMPOUNDS, METHODS AND USES THEREOF. Applicants: CLIMAR – Centro Interdisciplinar de Investigação Marinha e Ambiental, Universidade do Porto.

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