

ACTIVITY REPORT

CIIMAR 2024



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MESSAGE FROM THE BOARD

In 2024 we maintained ISO 9001 certification and continued implementing the Gender Equality Plan and the Social and Environmental Responsibility Plan. In the 1st FCT Tenure competition, we obtained 9 researcher positions (1 main and 8 assistant positions) that will help us retain talent at CIIMAR. 2024 was also the year of CIIMAR's evaluation by FCT, with the final evaluation visit taking place during our annual event in September.

In 2024, CIIMAR saw an increase in competitive funding, especially at European level (10 Horizon Europe projects) and 10 FCT exploratory projects. Additionally, the CCDDR-N launched a competition for University of Norte projects for the sea area, at the end of 2024. Notably, FCT launched the call for IC&DT projects in all scientific domains in 2024, registering an interval of two years. However, the results are still unknown. The 7th CEEC competition was delayed, with the application phase closing at the end of November 2024, and results expected in 2025.

In 2024, we implemented 53 international projects, including 29 funded by the Horizon 2020 and Horizon Europe programmes and 24 supported by the Life, EEA Grants, Interreg Atlantic Area, La Caixa programs, among others. We also implemented 3 projects financed by the PRR, totaling 92 projects and 29.16 M EUR. CIIMAR coordinates, in the Blue Bioeconomy Pact, financed by the PRR, the creation of the Portuguese Blue Biobank, a national network of marine biobanks, including in this network CIIMAR's Biobanco Azul. This biobank currently comprises three collections: LEGE-CC, CM2C and DeepBiobank. New facilities for the Biobanco Azul will be established in 2025 in the basement of the Cruise Terminal building, funded by HUB AZUL. Additionally, we maintained the multi-annual financing UIDB/04423/2020 (3.11 M EUR) and UIDP/04423/2020 (1.12 M EUR) and the financing allocated to CIMAR-LA (2.21 M EUR) for 5 years. We also secured 17 researcher contracts funded by the 6th individual CEEC, 3 assistant researcher positions at CEEC CIMAR-LA and 30 FCT doctoral fellowships.



CIIMAR members published 516 papers in internationally peer-reviewed journals and successfully contributed to the graduation of 44 PhD and 133 MSc students. In 2024, 3 provisional patents were submitted, of a total of 30 patents submitted by CIIMAR members in the last 8 years. This reflects the growing impact of our research and the success of initiatives aimed at increasing technology transfer.

CIIMAR outreach activities were extensive, with 685 news (online, TV, radio, press), 538 visits to CIIMAR and outreach activities including the Open Day in September, which reached over 57,300 people during 2024. Additionally, the Environmental Monitoring and Interpretation Centres (CMIAs) in Matosinhos and Vila do Conde held 582 initiatives engaging about 71,900 people.

Looking ahead to 2025, CIIMAR will strengthen its relationship with the University of Porto and the Polytechnic of Porto, following the approval of the new legal status last November. We will also enhance cooperation with public and private stakeholders to better address upcoming challenges. CIIMAR is working together with the Municipality of Matosinhos and the University of Porto to create the opportunity to establish a new headquarters building that will accommodate our growing community and the upcoming spinoffs. We hope that the upcoming results of the evaluation process will boost CIIMAR on its path toward excellence.

The director of the Board of CIIMAR
Vitor Vasconcelos

ABOUT CIIMAR

Established in 2000, CIIMAR - Interdisciplinary Centre of Marine and Environmental Research is a leading research and advanced training institution of the University of Porto research ecosystem, working at the frontier of ocean knowledge and innovation.

CIIMAR promotes excellent transdisciplinary research, technological development, advanced training, and support for public policies, contributing to advances in scientific knowledge and sustainability of ocean and coastal environments. This drives innovation and paves the way for future solutions to society's needs, opening new avenues to Blue Economy and job creation. Furthermore, CIIMAR is tackling several societal and economic challenges that humanity faces, contributing to the UN Sustainable Development Goals, and National and European relevant agendas.

CIIMAR is performing research and field monitoring programmes to enhance the physical, chemical, and biological knowledge of the marine environment and ongoing changes, while also addressing land/river/ocean and ocean/ocean/atmosphere interactions.

CIIMAR research programmes allow the discovery and study of new species and ecosystems, at different depths of the ocean or in other aquatic systems, and provide basic knowledge and tools to support the protection and management of marine, estuarine, and freshwater ecosystems. CIIMAR research leads to the discovery of marine products with potential biotechnological applications in multiple areas including environmental (bioremediation), human and animal health (drugs, cosmetics, nutraceuticals), and industrial (food and feed; paints and coatings). In addition, CIIMAR has research programmes dedicated to optimizing the growth potential of current and alternative species for aquaculture and to providing high-quality seafood for human consumption, which is vital for tackling nutrition and seafood quality issues.

CIIMAR Research and Innovation programmes are conducted with and for society, with several research projects engaging diverse social actors as partners. The Centre follows an innovation-based strategy to foster the development and transfer of technologies, promoting market-oriented research and industry liaison.



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

In addition, CIIMAR promotes ocean literacy and public engagement in marine and environmental research, through dedicated science communication and outreach programmes. These include the management of two dynamic Centres for Environmental Monitoring and Interpretation (CMIA, acronym in Portuguese), through cooperative agreements with Vila do Conde and Matosinhos City Councils.

CIIMAR has a vibrant international community composed of members at all stages of their careers. The Centre is the hosting institution for many Master's and PhD students conducting projects in marine and environmental research. Moreover, researchers and staff can benefit from an advanced training programme that allows continuous education in scientific and transversal topics.

CIIMAR's headquarters are at the stunning Porto Cruise Terminal, in Matosinhos, at the heart of the maritime industry and services in the Northern region of Portugal. The Centre has state-of-the-art facilities, with well-equipped laboratories for marine and maritime research, technological core platforms, large-scale micro and macroalgae cultivation, and animal experimentation facilities for freshwater and marine organisms approved by the Portuguese Veterinary Authority. Moreover, the Centre has supporting offices that strategically contribute to its mission, namely in attracting competitive funding, transferring technology, management of research projects, and promoting advanced training, among others.

Besides its headquarters, CIIMAR comprises other partner facilities at five units from the University of Porto – ICBAS and Faculties of Sciences, Engineering, Pharmacy and Law –, at the Polytechnic Institute of Porto, the Portuguese Institute for the Sea and Atmosphere (IPMA), and the University of Madeira.

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

OUR VALUES

Excellence

Sustainability

Partnership and Internationalization

Public Participation

Innovation

Communication with Society

CIIMAR also upholds the principles of freedom of research, ethical conduct, professional responsibility, good research practices, recognition of the profession, non-discrimination, gender equality, guarantee of fair working and training conditions, as well as protection of intellectual property rights.

SOCIAL ORGANS

GENERAL ASSEMBLY



PRESIDENT

Eduardo Rocha

CHAIRS

Aires Oliva Teles

Carlos Vale

Francisco Taveira Pinto

Susana Moreira

BOARD



PRESIDENT

Vítor Vasconcelos

BOARD MEMBERS

Ana Paula Mucha

Isabel Sousa Pinto

Luísa Valente

Rodrigo Ozorio

FISCAL COUNCIL



PRESIDENT

Luísa Bastos

MEMBERS

Helena Peres

Paulo Rosa Santos

CORPORATE MEMBERS

Algaplus

Allmicroalgae - Natural Products, S.A.

Soja de Portugal, S.A.

Flatlantic, Actividades Piscícolas. S.A.

Hydromod

Oceano Fresco

RiaSearch, Lda.

Polytechnic Institute of Porto (IPP)

Ecoinside

Tintex

University of Porto (UPorto)

SONAE MC

NGC

Port Authority Douro-Leixões -Viana do Castelo (APDL)

COMMITTEES

EXTERNAL ADVISORY COMMITTEE

Françoise Médale (INRAE, France)
William Gerwick (Scripps Institute of Oceanography - USA)
Mike Elliott (University of Hull, UK)
Laura Giuliano (CIESM)

BLUE YOUNG TALENT COMMITTEE

Lígia Sousa
Marina Dolbeth Silva
Sérgio Boo

ETHICS COMMITTEE

Lúcia Guilhermino
Aires Oliva Teles
Maria Emilia Sousa

PHD COMMITTEE

Diogo Oliveira
Eva Lopes
João Pedro Sousa
Leonor Pizarro
Marta Ribeiro
Raquel Pinto
Rúben Pereira

ORBEA

Responsible for CIIMAR:

Vítor Vasconcelos

Responsible for supervising animal welfare:

Helena Peres

Responsible veterinarian:

Nuno Ribeiro

Scientific responsables:

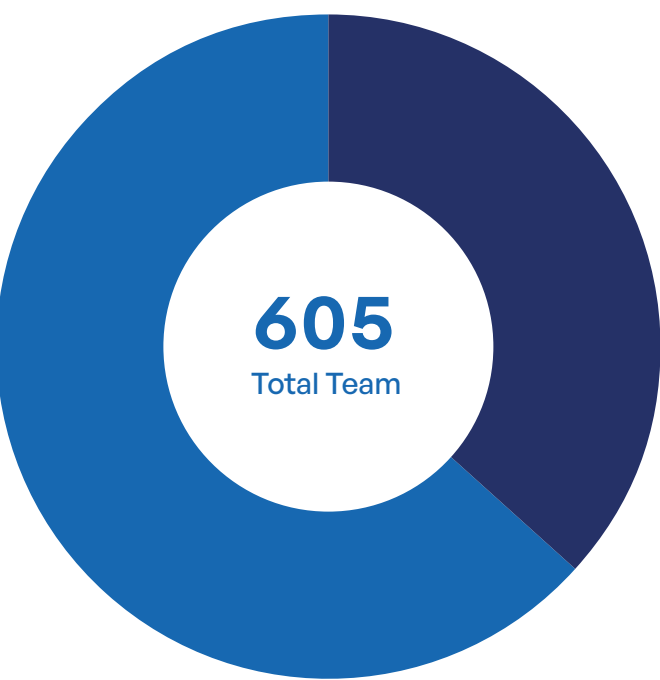
Francisco Arenas
Laura Guimarães
Benjamin Costas Refojos
Luísa Valente

SUPPORTING OFFICES

OFFICE	HEAD/COORDINATOR
Accounting	Susana Barbedo
Administrative Services	Isabel Regal
Advanced Training & Careers	Ana Salgado
Biobank	Vítor Vasconcelos
Data Management & Open Science	Maria Paola Tomasino
Environmental & Social Responsibility	José Teixeira
Financial Services	André Martins
Human Resources	Isabel Regal
Image, Communication & Outreach	Ana Mena
Information Technologies	Vítor Rodrigues
Legal Support	Isabel Regal
Maintenance & Security	Rodrigo Ozório
Onboarding Services	Isabel Regal
Project Management	Ana Machado
Public Procurement	Isabel Regal
Quality Management	Marlene Cruz
Research & Innovation Strategy & Funding	Susana Moreira
Safe Lab	Renata Soares
Secretariat & Events	Emília Afonso
Scientific Diving	Óscar Babé
Technology Transfer and Business Development	Carla Domingues
Treasury	Patrícia Todo Bom

FACTS & FIGURES

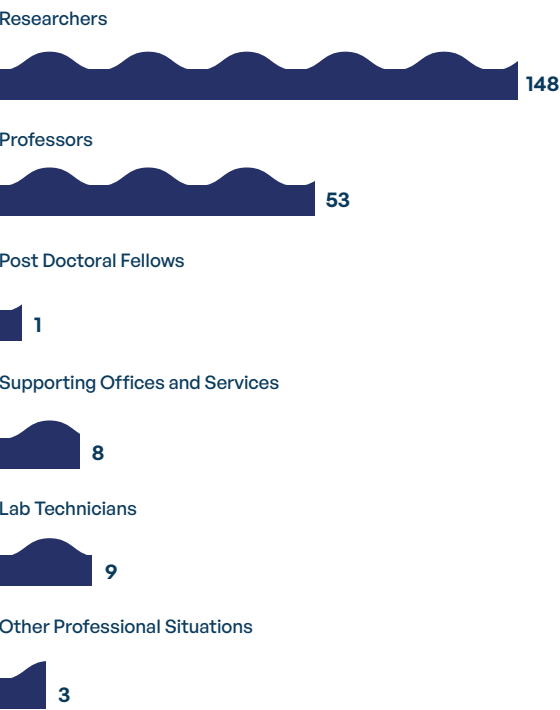
OUR TEAM



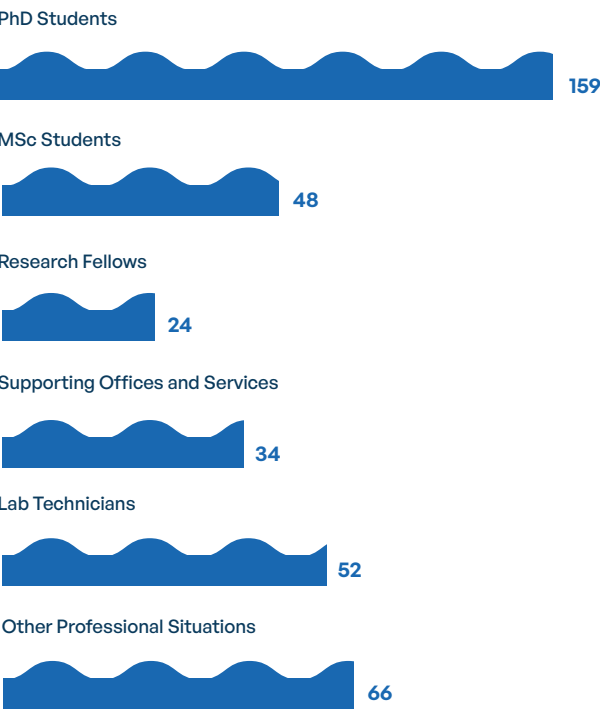
222
Integrated PhD holders

383
Non-PhD holders

INTEGRATED PHD HOLDERS

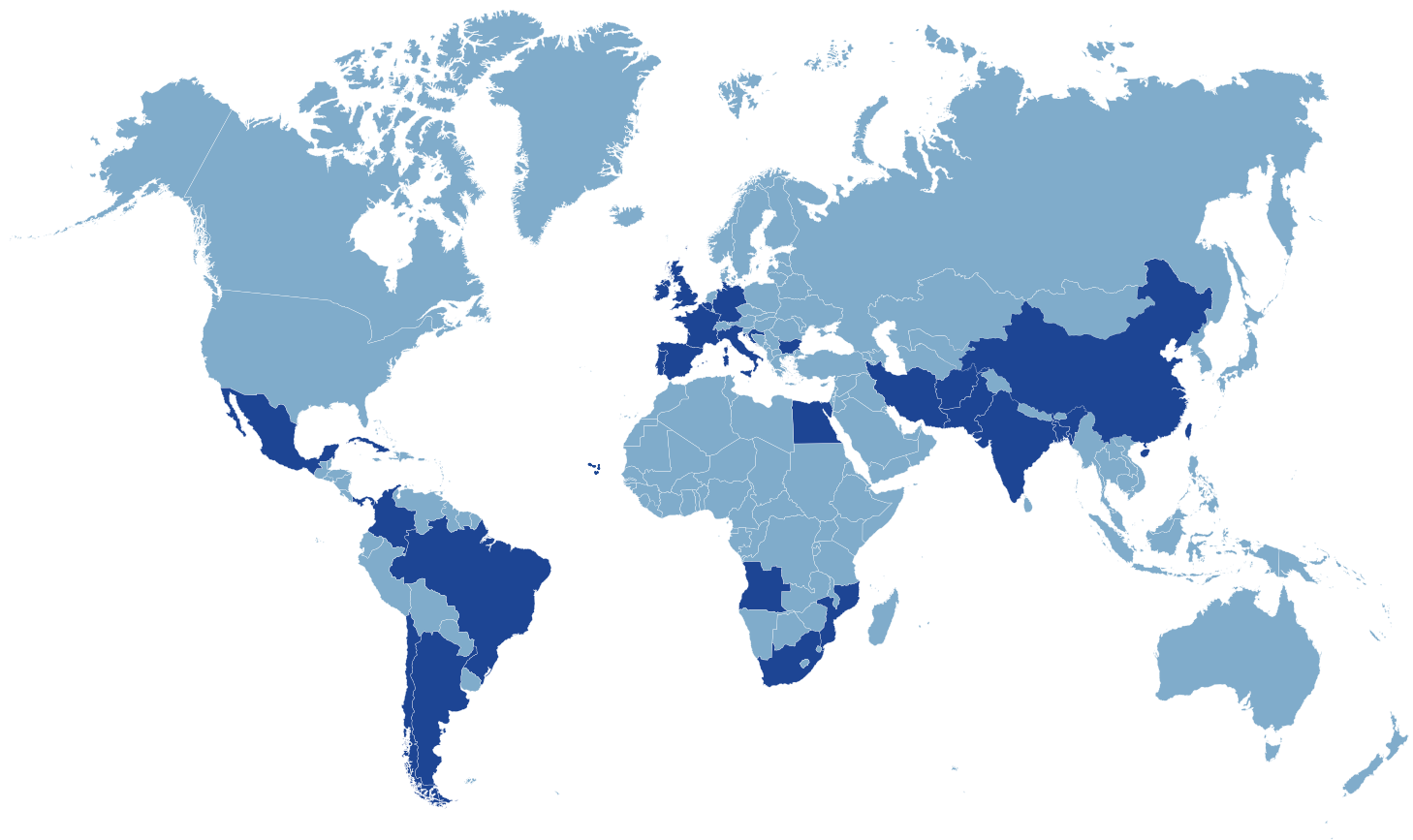


NON PHD HOLDERS



 **370**
Female

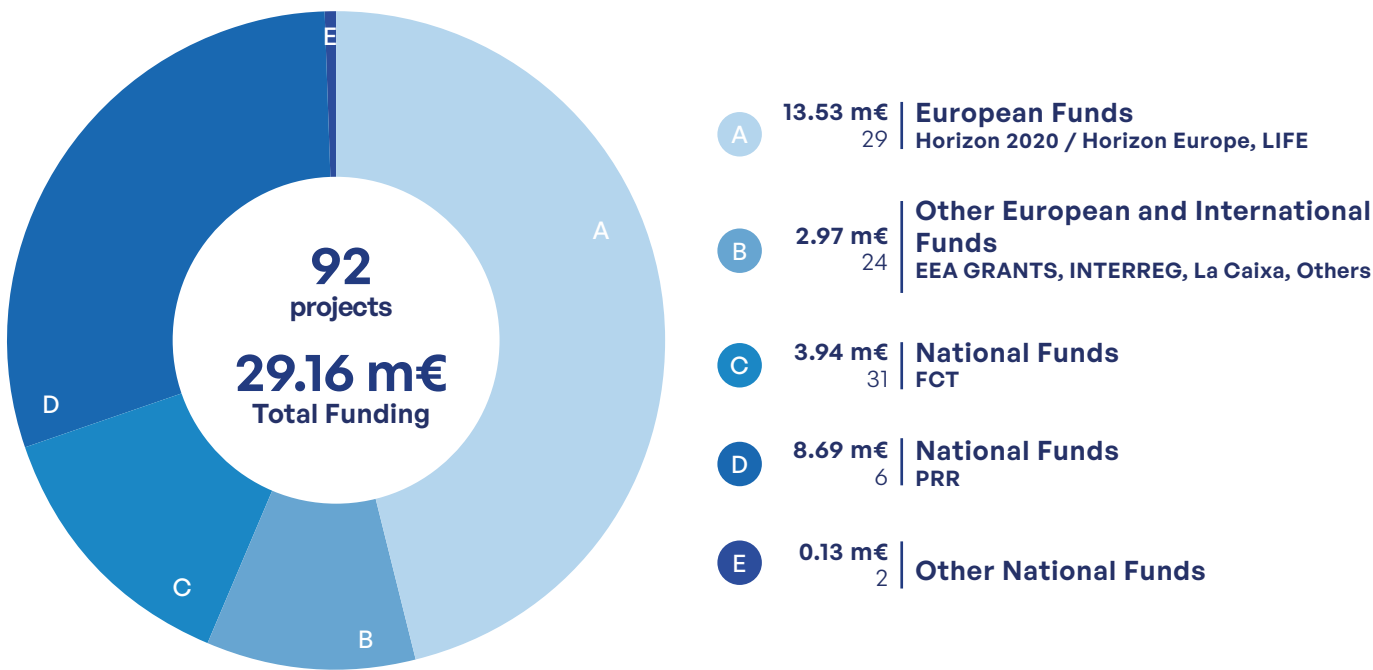
 **235**
Male



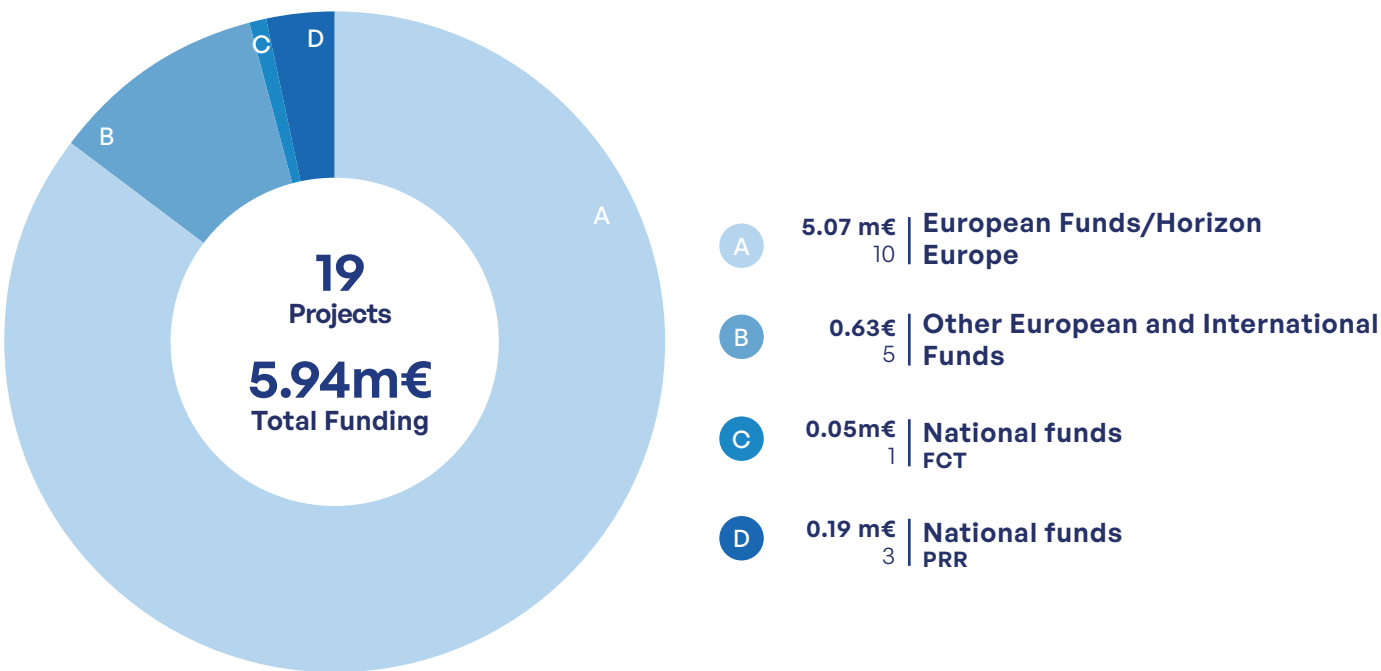
1 Afghanistan	3 Colombia	2 India
1 South Africa	2 Cuba	2 Islamic Republic of Iran
2 Angola	1 Cape Verde	7 Italy
1 Argentina	4 Germany	1 Mexico
1 Bangladesh	4 Egypt	2 Mozambique
2 Belgium	21 Spain	1 Panama
26 Brazil	7 France	1 Pakistan
1 Chile	1 United Kingdom	506 Portugal
2 China	3 Croatia	

R&D PROJECTS

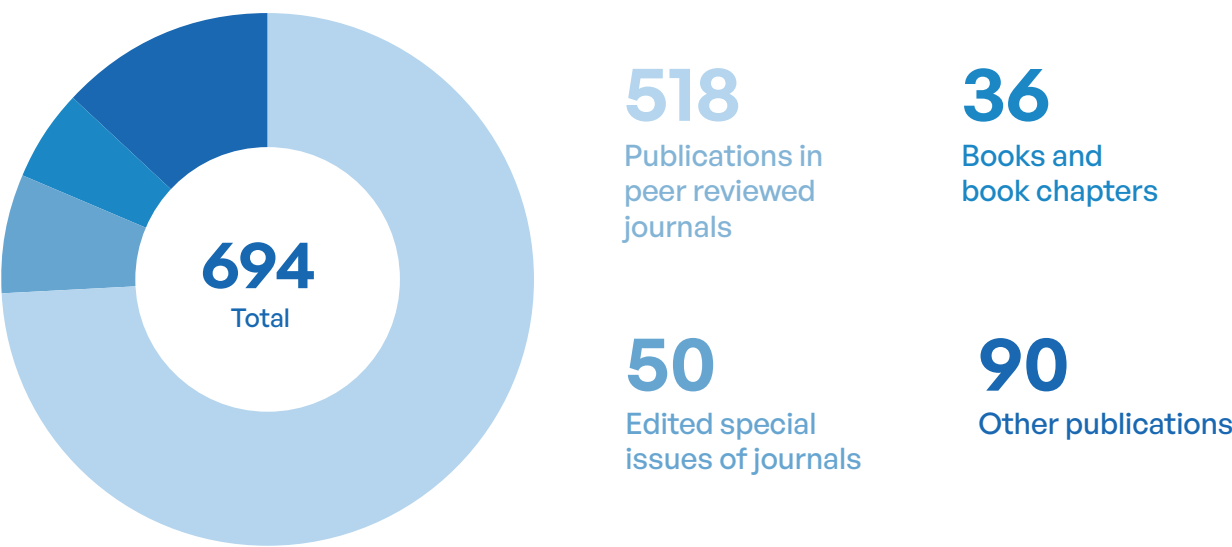
R&D PROJECTS IN EXECUTION DURING 2024 RESULTING FROM COMPETITIVE FUNDING



R&D PROJECTS INITIATED IN 2024 RESULTING FROM COMPETITIVE FUNDING

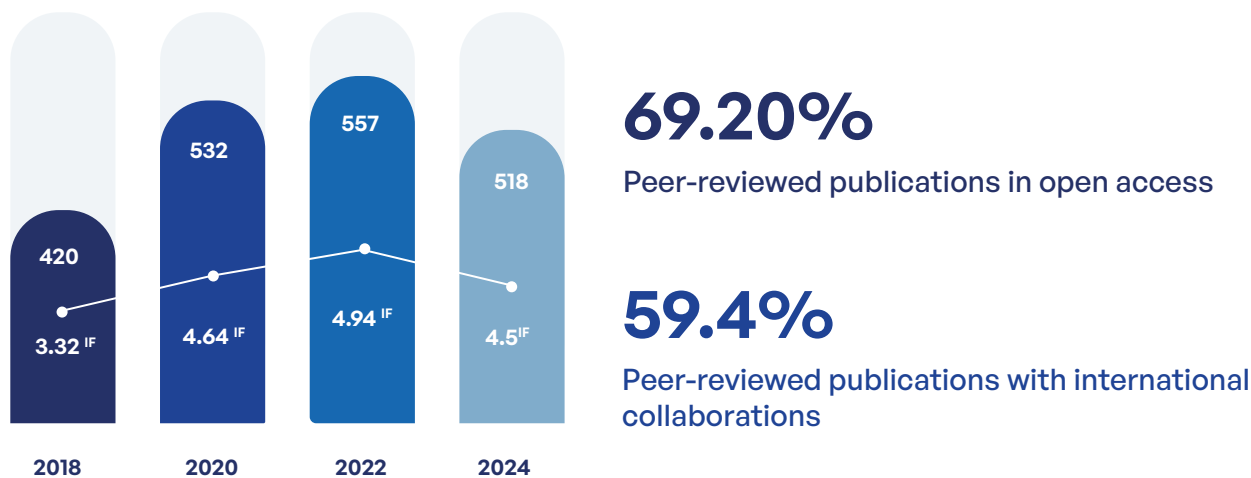


SCIENTIFIC PUBLICATIONS



NR. OF PUBLICATIONS IN PEER REVIEWED JOURNALS

^{IF}Average Impact Factor



PATENTS



PRIZES AND HONOURS



SCIENTIFIC COMMUNICATIONS AND EVENTS



61
Scientific events organised

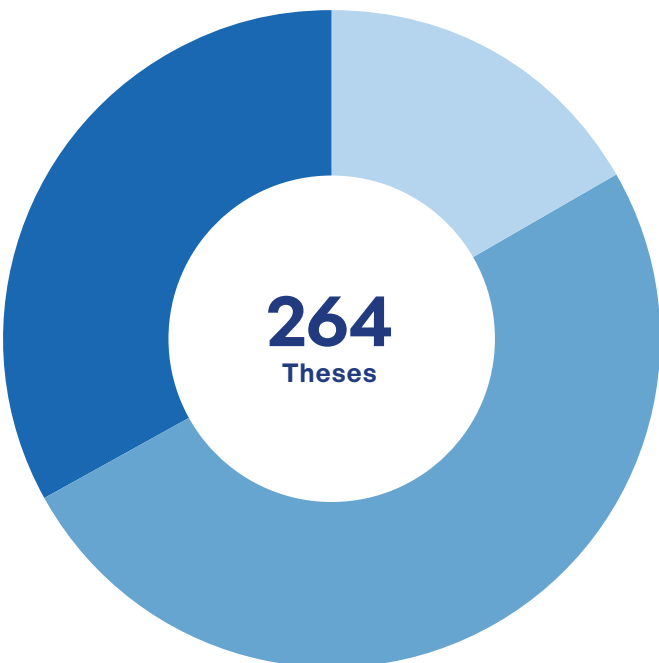
25
Scientific seminars at CIIMAR

470
Communications
in International
scientific meetings

307
Communications
in National scientific
meetings

DATA INCLUDE ORAL AND WRITTEN COMMUNICATIONS IN CONFERENCES AND MEETINGS

ADVANCED TRAINING



44
PhD theses

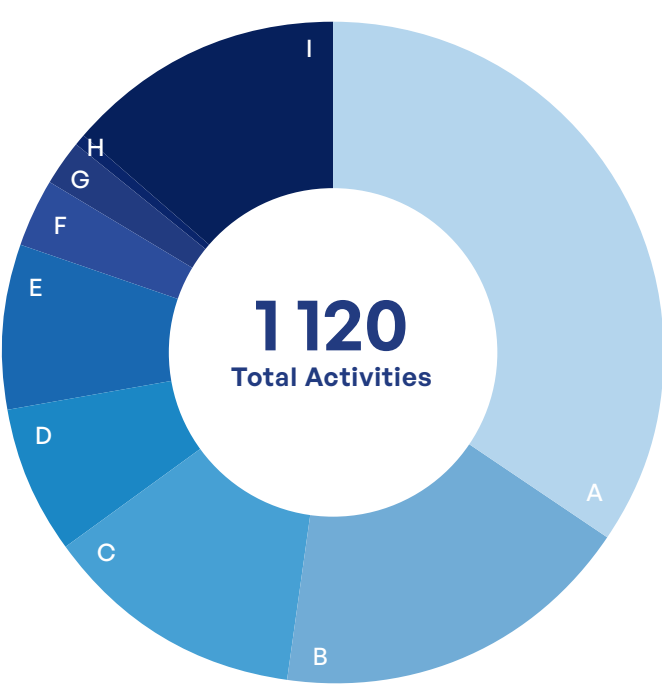
133
MSc theses

87
BSc theses

35
Training courses
organised

760
Participants in
training courses

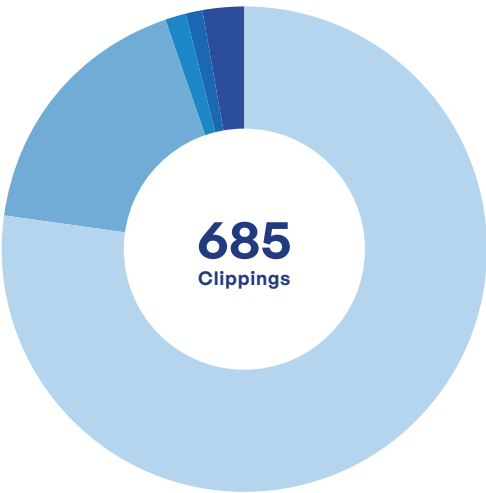
OUTREACH ACTIVITIES



- A** 386 | Activities and lectures at schools
9 476 Participants
- B** 199 | Visits and activities at CIIMAR
5 088 Participants
- C** 144 | Visits and activities at CMIA's
3 700 Participants
- D** 81 | Outdoor activities
2 552 Participants
- E** 92 | Public lectures
12 155 Participants
- F** 35 | Exhibitions
30 931 Participants
- G** 25 | Workshops
710 Participants
- H** 6 | Training actions
60 Participants
- I** 152 | Public events
64 547 Participants

These data include figures from CIIMAR, CMIA Vila do Conde and CMIA Matosinhos outreach activities.

MEDIA OUTREACH



529
Online news

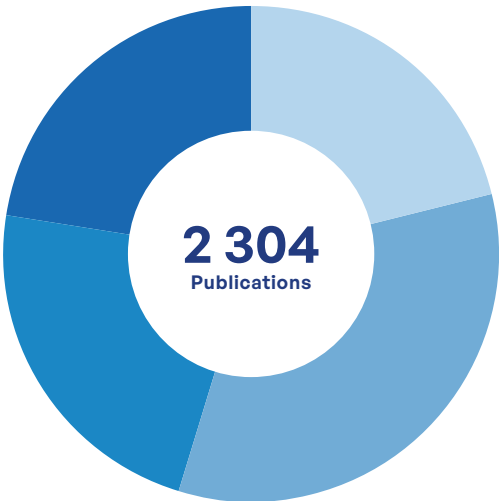
120
Print press

10
Radio

8
TV

18
Online TV

SOCIAL MEDIA



489
LinkedIn

775
Instagram

523
Facebook

517
Twitter

Note: Bluesky channel was created in December 2024.

FINANCIAL KEY FIGURES

	2022 (k€)	2023 (k€)	2024 (k€)
Revenues from sales and rendering of services	581	704	541
Operating subsidies	7 728	10 007	11 965
Other operating income	523	542	502
Supplies and services rendered	- 2 934	-3 027	-3 791
Employee benefits expenses	-5 359	-7 402	-8 357
Other operating expenses	-92	-293	-293
Depreciation and amortization	-457	-459	-583
Cash Flow	9	869	-96
CAPEX (Capital Expenditure)	538	569	604
Net Cash	1 683	2 852	2 756
EBITDA (Earnings before interest, taxes, depreciation and amortization)	451	546	650
Profit for 2024	-61	46	67

2024 AT A GLANCE

JANUARY

- - CIIMAR formalizes a memorandum of understanding with IBERBLUE WIND
- 3rd Meeting of the Portuguese Blue Biobank Consortium

FEBRUARY

- - Secretary of State for Maritime Affairs visits CIIMAR

MARCH

- - CIIMAR 24th Anniversary
- CIIMAR Blue Woman Talent Award 2024 to Patrícia Todo Bom
- CIIMAR creates “Living Lab” at Lima River
- 3rd edition of the CIIMAR Scientific Photography Contest
- Marta Correia da Silva wins European programme for women entrepreneurs

APRIL

- - CIIMAR, FURG and FIO celebrate agreement for Oceanic Observation Station in Rio Grande
- Open Call for BYT candidates
- CIIMAR at Mostra UP
- Vitor Vasconcelos receives the Matosinhos Medal of Honour

MAY

- - First CIMAR-LA meeting

JUNE

- - 8th Congress of the International Society for Applied Phycology

JULY

- - Four CIIMAR students highlighted by IJUP2024
- Enzimar project awarded at Educaixa competition
- BYT and BYT+ 2023/2024 Closing Session
- The Regional Secretariat for the Sea and Fisheries of the Azores visits CIIMAR
- CIIMAR joins the Porto Climate Pact
- CIIMAR Watch is launched to monitor the Northern Coast of Portugal

AUGUST

- - CIIMAR participates in the first campaign of the Ocean Marine Protected Areas Project
- Two CIIMAR projects recognized as Ocean Decade Actions

SEPTEMBER

- CIIMAR Annual Meeting
- 5th edition of the Blue Think Conference
- Inauguration of “Mexilhões de Água Doce” (Fresh water mussels) exhibition at SEA LIFE Porto
- CIIMAR Open Day 2024
- Ocean Slim-G project wins 3rd place in BIP Acceleration Programme

NOVEMBER

- LEGE-CC biobank achieves ISO9001 certification
- CIIMAR at Science and Technology Week
- Open letter for a restoration plan that pays attention to the sea
- PONDERFUL project awarded at the Braga Science Film Fest
- AlgaBioTec project wins third edition of BluAct competition

DECEMBER

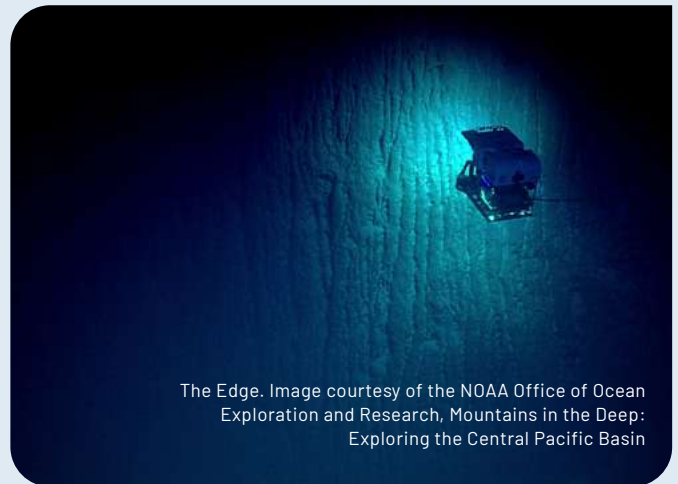
- Isabel Sousa Pinto invited to chair the National Restoration Plan



HIGHLIGHTS

TWINDEEPS – A TWINNING PROJECT THAT CAPACITATES CIIMAR IN DEEP SEA EXPLORATION

CIIMAR won a TWINNING project, funded with 1.5M euros by the European Commission, to leverage Portugal R&I capacity in deep-ocean exploration and observation. The TwinDEEPS project, led by Joana Xavier, will partner CIIMAR with top tier European partners, benefitting from the complementary expertise of this multidisciplinary and highly technological consortium.



OPEN LETTER FOR THE NATIONAL RESTORATION PLAN

Following the approval of the Nature Restoration Act by the European Parliament, researchers from CIIMAR led an open letter to the Portuguese Minister for the Environment and Energy, to encourage a national restoration plan that pays attention to the sea and marine habitats. This letter was signed by researchers from all over the country as well as experts in marine, environmental and social sciences, representatives of national non-governmental organizations and the civil society.

**CARTA ABERTA
AO GOVERNO**

POR UM PLANO NACIONAL
DE RESTAURO QUE NÃO
DEIXE O MAR PARA TRÁS

CIIMAR WATCH LAUNCHED IN 2024

CIIMAR Watch is the new monitoring programme launched by CIIMAR in 2024. It aims to deepen the knowledge of the marine ecosystems of the coastal region of northern Portugal and to understand their dynamics and changes over time. This programme is a response to the need for long-term data series to understand the challenges and changes observed, offering continuous monitoring of the region's biological, chemical and physical data.



MAR2PROJECT LIVING LAB AT RIVER LIMA

As a partner in the MAR2PROJECT, CIIMAR was responsible for the opening of the new LivingLab created in Viana do Castelo, whose main objective is to guarantee good environmental status and surface water quality in the Lima River estuary. The aim is to prevent the contamination of groundwater from the impacts of climate change and global change through different innovative technologies and nature-based solutions.



PRIZES AND HONOURS

A SELECTION OF PRIZES AND HONOURS ATTRIBUTED TO CIIMAR MEMBERS IN 2024:



MARTA CORREIA DA SILVA WINS EUROPEAN PROGRAMME FOR WOMEN ENTREPRENEURS

The OceanCare Chemicals project, led by Marta Correia da Silva, granted the CIIMAR researcher one of the five awards of the 2024 Womenture Competition. This project develops compounds for ship paints that prevent biofouling without harming the ocean. The Womenture Competition is a European women's entrepreneurship programme co-funded by the European Union.

VITOR VASCONCELOS RECEIVES THE MATOSINHOS MEDAL OF HONOUR

The President of CIIMAR's Board of Directors received the Matosinhos Medal of Honour, within the municipality's celebrations of the 50th anniversary of April 25th. The award recognizes Vitor Vasconcelos outstanding contributions to science and the community.



PONDERFUL PROJECT AWARDED AT THE BRAGA SCIENCE FILM FEST

The short film "The Importance of Ponds", produced by the PONDERFUL project, won Braga Science Film Fest's "Audience Award". Competing among 80 films, the film highlights how ponds support biodiversity and ecosystem services and how to create them. It is available in 10 languages on YouTube. The PONDERFUL project is led at CIIMAR by José Teixeira.

CIIMAR RESEARCHERS WIN THIRD EDITION OF BLUACT COMPETITION

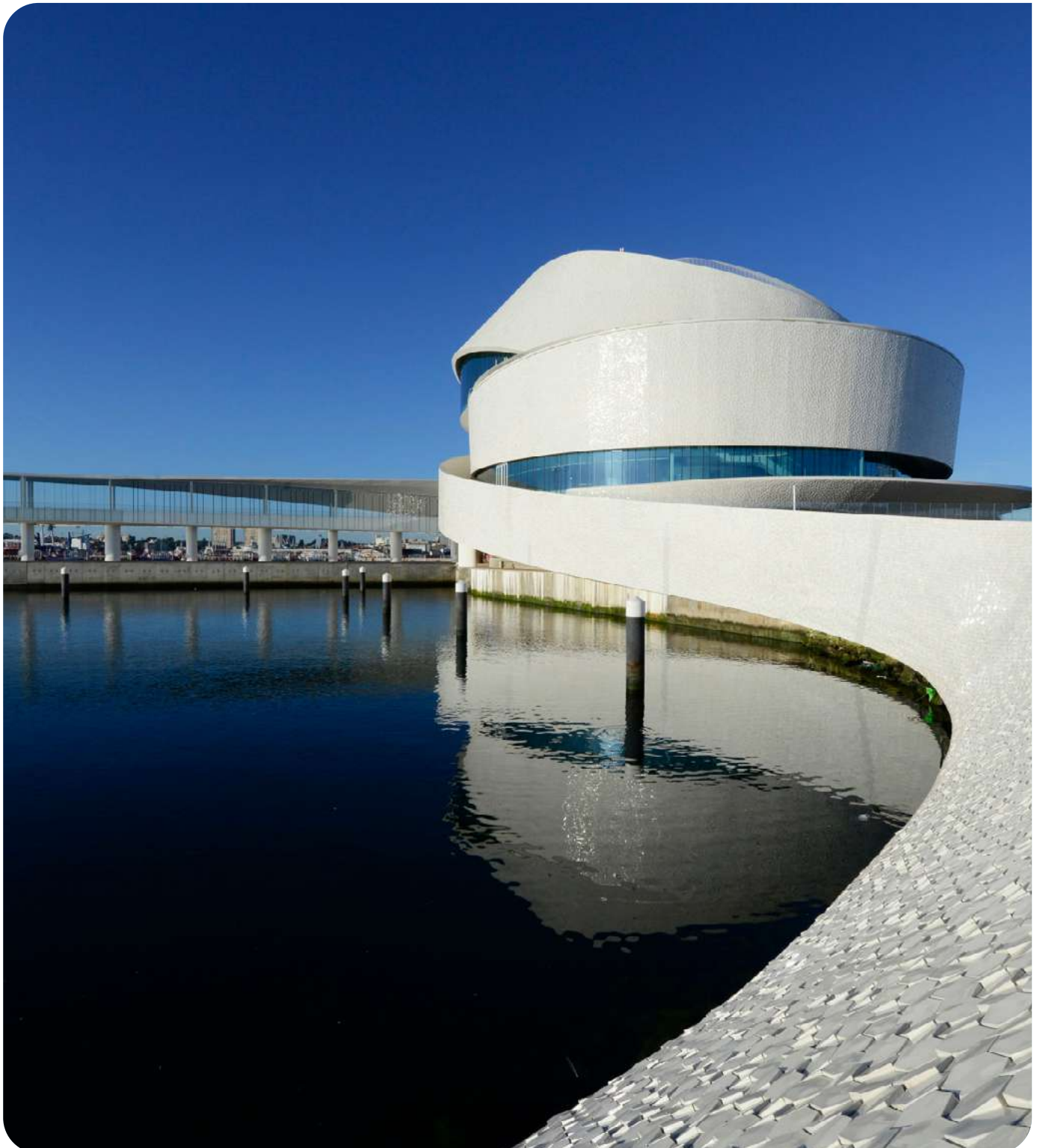
The AlgaBioTec project won the BluAct competition, an initiative by Matosinhos City Council supporting innovative blue economy projects. The team, composed of Isabel Cunha and Isabel Oliveira, from CIIMAR, Raquel Vaz, from University of Coimbra, and Paulo Patrício, developed a fertilising bioplastic that repurposes macroalgae from Portuguese coasts, offering a sustainable solution for agriculture.





ISABEL SOUSA PINTO NOMINATED CHAIR OF THE COMMITTEE FOR THE NATIONAL RESTORATION PLAN

The Portuguese Government invited Isabel Sousa Pinto to chair the Monitoring Committee of the National Restoration Plan. The CIIMAR researcher will be responsible for overseeing the plan's progress and ensuring proper discussions, working with experts to design and implement a strategy that could include the restoration of marine ecosystems.



SCIENCE STORIES

2024 WAS RICH IN SCIENTIFIC ACTIVITY. HERE YOU CAN FIND A SHORT SELECTION OF OUR SCIENCE STORIES.

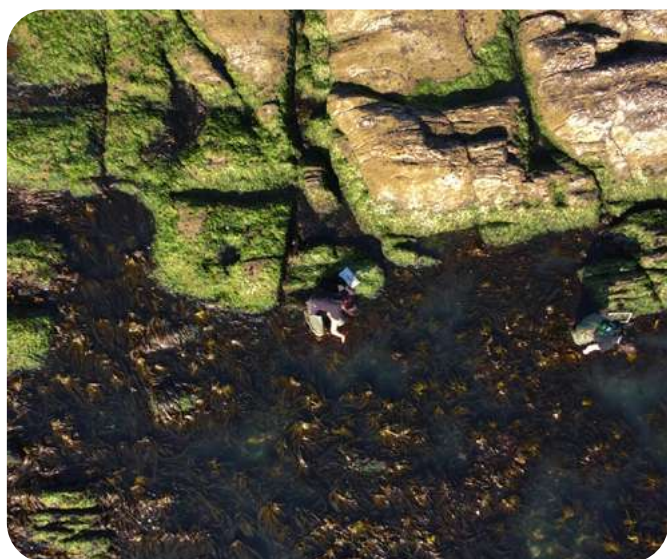


CIIMAR AT THE FOREFRONT OF CORAL GARDEN RESTORATION

CIIMAR is at the forefront of coral garden recovery with the BUFFER and RED-COR2 projects focused on the conservation of habitat-forming Mediterranean corals. Led by Jean-Baptiste Ledoux, their main tool is population genetics. A first study assessed the response of colonies of the red gorgonian species (*P. clavata*) to marine heatwaves and shows that Mediterranean coral gardens may inevitably be jeopardised.

INNOECOFOOD PROMOTES SUSTAINABLE AQUACULTURE ON THE AFRICAN CONTINENT

The INNOECOFOOD project, led by António Marques, has started work on developing, testing and demonstrating innovative and sustainable agro-ecological food production systems in six African countries. With the installation of four ECOHUBS and monitoring on six aquaculture farms, the project uses digital technologies that will be the impetus for generating new business areas and training rural farmers and aquaculture producers, young people and women in the African countries involved.



MARINE FORESTS AS ALLIES IN REMOVING OCEAN CARBON AND FIGHTING CLIMATE CHANGE

A study published in Nature Geoscience revealed that marine kelp forests transport around 56 million tonnes of carbon to sinks in the deep ocean, contributing significantly to regulating the amount of CO₂ in the atmosphere and, consequently, the Earth's climate. This discovery opens up new opportunities for mitigating climate change through the preservation and restoration of marine kelp forests. This work resulted from an international collaboration that included researchers from CIMAR-LA, namely Isabel Sousa Pinto (CIIMAR) and Jorge Assis (CCMAR).

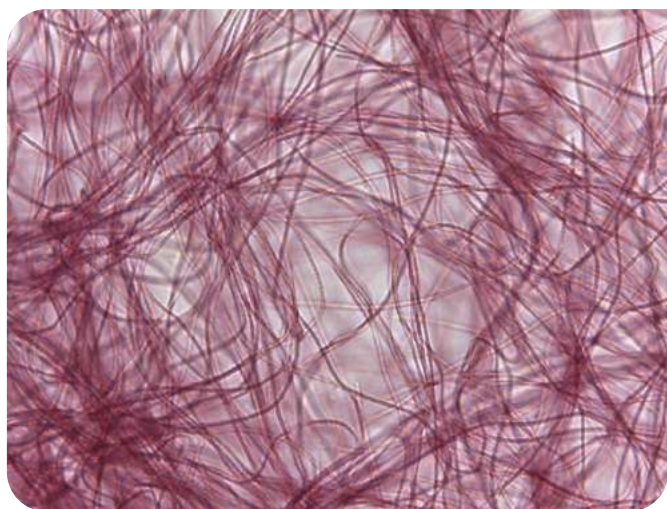
RESEARCHERS REVEAL RECORD SURFACE MELTING ON THE ANTARCTIC PENINSULA

A study led by Irina Gorodetskaya revealed the impact of extremely hot events on the melting of the surface of the Antarctic Peninsula. The study looks at the drivers and impacts of the heatwave on the Antarctic Peninsula in February 2022, the latest in an alarming series of such events in the region, indicating a significantly stronger warming trend compared to the rest of Antarctica.



STRUCTURE OF NATURAL CYANOBACTERIAL COMPOUNDS DISCOVERED 30 YEARS AGO UNRAVELLED

Thirty years of research has finally unravelled the chemical structure of leptochelins, compounds produced by marine cyanobacteria. These molecules show great biotechnological potential for the production of cancer drugs and as chelating agents with uses that can range from the pharmaceutical industry, food industry, agriculture and metal recycling, among other bioremediation applications. Mariana Reis, Leonor Ferreira, João Morais and Vítor Vasconcelos were involved in this international study.

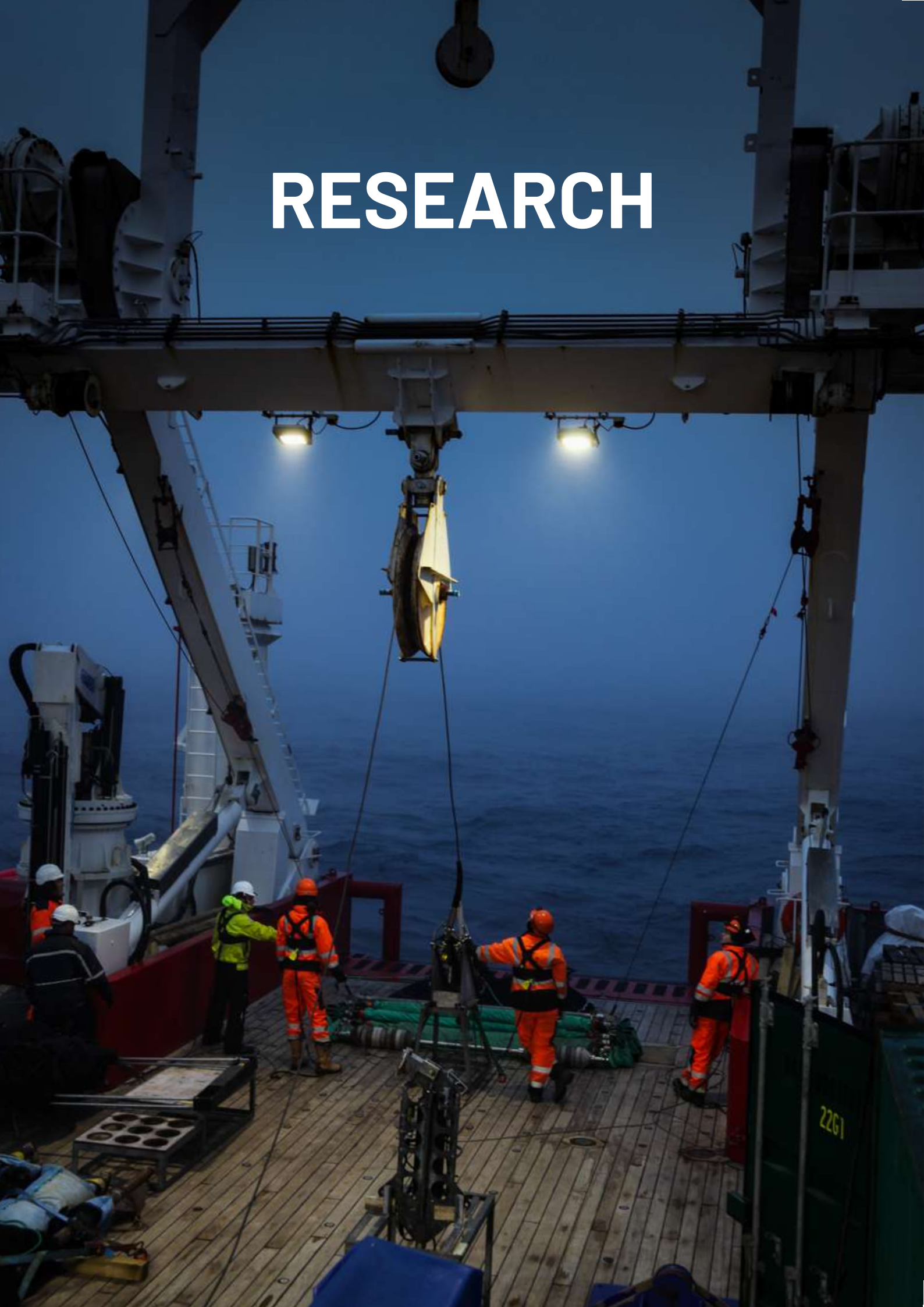


MARINE CYANOBACTERIA IN THE ORIGIN OF ANTI-INFLAMMATORY MOLECULES WITH DERMATOLOGICAL AND COSMETIC APPLICATIONS

In response to the growing demand for anti-inflammatory solutions for skin conditions, the study carried out in the context of the doctoral work of Janaina Morone, under supervision of Graciliana Lopes, reveals that extracts rich in carotenoids originating from marine cyanobacteria are strong anti-inflammatory ingredients for the skin with dermatological and cosmetic applications of natural, sustainable and vegan origin.



RESEARCH



RESEARCH

CIIMAR IS SCIENTIFICALLY ORGANISED IN THREE MAIN RESEARCH LINES.

MARINE BIOTECHNOLOGY

CIIMAR research topics include the investigation of the richness 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. Pedro Leão



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 through this research line. This work is done in close collaboration with SMEs, international and local authorities, and stakeholders.

P.I. Lúcia Guilhermino



BIOLOGY, AQUACULTURE AND SEAFOOD QUALITY

CIIMAR promotes sustainable aquaculture and innovating sea food extraction, which are vital for tackling nutrition and seafood quality issues. Understanding the diverse traits and needs of key aquatic species, along with their susceptibility to disease, is crucial. Significant scientific advancements and innovation stem from both basic and applied research, benefitting industries and consumers alike.

P.I. Luísa Valente



RESEARCH LINE

GLOBAL CHANGES AND ECOSYSTEM SERVICES

RESEARCH GROUPS

GROUP LEADERS

Aquatic Ecology and Evolution

Elsa Froufe

Aquatic Ecotoxicology and One Health

Lúcia Guilhermino

Benthic Ecology and Environmental Solutions

Francisco Arenas

Coastal Biodiversity

Isabel Sousa Pinto

Contaminant Pathways in Marine Environment

Miguel Caetano

Deep-Sea Biodiversity and Conservation

Joana Xavier

Ecosystem Monitoring and Sustainability

Laura Guimarães

Endocrine Disruptors and Emerging Contaminants

Miguel Santos

Fish Ecology and Sustainability

Sandra Ramos

Hydrobiology

Adriano Bordalo e Sá

Land-Ocean-Atmosphere Interactions

Ana Bio

Marine Ecosystem Modelling

Irene Martins

Marine Energy and Hydraulic Structures

Francisco Taveira Pinto

Microbiome Ecology and Biogeochemistry

Catarina Magalhães

Rivers and Coastal Ecology

Carlos Antunes

Social and Educational Innovation

Clara Vasconcelos

Soil/Water Contamination and Interactions

Natividade Vieira

BIOLOGY, AQUACULTURE & SEAFOOD QUALITY

Animal Genetic and Evolution

Filipe Castro

Animal Morphology and Toxicology

Eduardo Rocha

Animal Parasitology and Pathology

Maria João Santos

Aquatic Animal Health

Benjamin Costas Refojos

Feed and Seafood Quality

Luísa Valente

Fish Biology and Fisheries

Alberto Correia

Fish Nutrition and Welfare

Aires Oliva Teles

Microbiology and Biotechnology in Aquaculture

Cláudia Reis Serra

Seafood Safety and Processing

Maria Leonor Nunes

RESEARCH LINE

MARINE BIOTECHNOLOGY

RESEARCH GROUPS

Biodiscovery for health

Bioinspired Ocean Interfaces

Bioremediation and Microbes for Sustainability

Blue Biotechnology, Environment and Health

Cyanobacterial Natural Products

Emerging Biotechnology and Seafood
Processing

Environmental Chemistry and Recovery

Evolutionary Genomics and Bioinformatics

Marine Natural Products and Medicinal
Chemistry

Microbial Biodegradation and Bioprospecting

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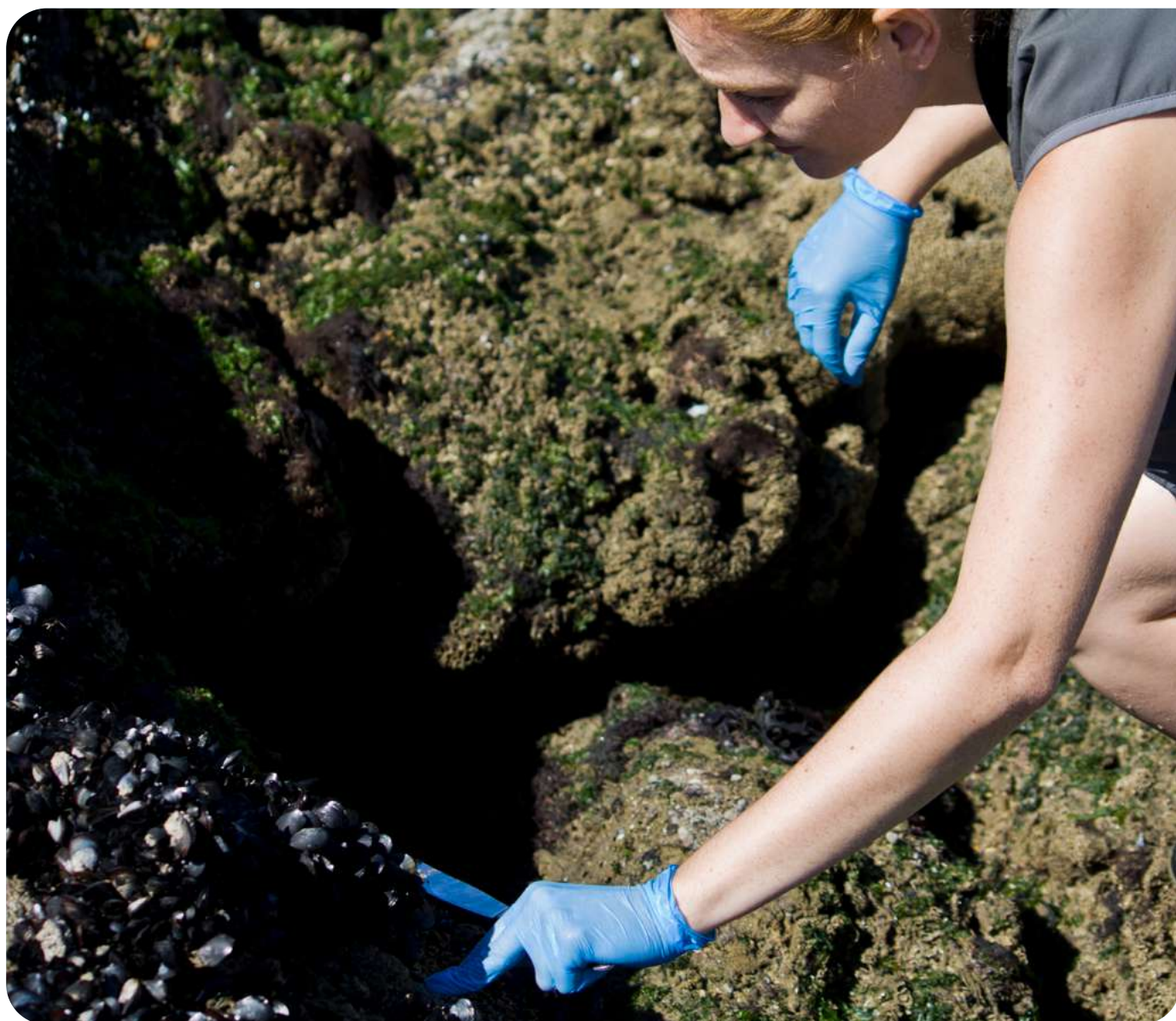
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CIIMAR WATCH

This year, CIIMAR launched a new strategic environmental monitoring programme, CIIMAR WATCH. This initiative brings together nine CIIMAR research teams and 40 researchers, with financial and logistical support from CIIMAR, ensuring continuous data collection and management. The programme establishes a long-term environmental monitoring effort focused on coastal and estuarine ecosystems in northern Portugal.

CIIMAR WATCH includes two key monitoring regions: VIANA WATCH (Viana do Castelo) and PORTO WATCH (Porto), covering essential coastal areas in northwest Portugal. These regions have been the focus of extensive monitoring by CIIMAR research teams, with historical environmental data being integrated into the programme's database. The monitoring stations encompass coastal, intertidal, subtidal, and estuarine environments, including the Douro Estuary and Lima Estuary. This interdisciplinary effort addresses critical environmental challenges such as climate change, pollution, and biodiversity loss, systematically collecting biological, chemical, and physical data across these diverse habitats.

In its first year, CIIMAR WATCH established 16 monitoring stations, conducting seasonal campaigns in winter, spring, summer, and fall. Activities include, water and sediment sampling, cetacean observation, plankton trawling, intertidal biodiversity surveys and subtidal diving. The programme also prioritizes public outreach and education, promoting marine conservation awareness and contributing to the training of graduate and undergraduate students.

To enhance data collection and analysis, CIIMAR WATCH plans to start employing cutting-edge technologies in 2025, including Unmanned Aerial Systems (UAS) and real-time monitoring buoys. The project aims to provide high-quality, open-access data for scientific research, policy-making, and public engagement, supporting sustainable resource management and conservation efforts.



RESEARCH PROJECTS THAT ENDED IN 2024

MAELSTROM

SMART TECHNOLOGY FOR MARINE LITTER SUSTAINABLE REMOVAL AND MANAGEMENT



European project



MAELSTROM's main goal was to reduce the impacts of marine litter in coastal ecosystems by identifying accumulation hotspots and removing the existing litter from the coastal seabed and the water column of rivers before it reached the sea. This action was supported and enacted through circular economy and societal-oriented solutions.

MAELSTROM has achieved numerous significant results, including mapping areas heavily impacted by marine litter (ML), developing new hydrodynamic models, and creating innovative sustainable technologies to collect, remove, sort, and transform ML from coastal and estuarine ecosystems into new products that contribute to the circular economy. Two innovative technologies were implemented for marine litter removal: a Bubble Barrier in Vila do Conde, Portugal, and a Robotic Seabed Cleaning Platform in Venice, Italy. These initiatives involved local stakeholder engagement, co-design, and multidisciplinary research. The project has facilitated extensive outreach, communication, and network building

with a diverse, globally spread audience, resulting in over 40 deliverables and reports. Project outputs also include one Working Group on Marine Litter Management (WG-MLM), ten theses and dissertations, scientific articles in peer-reviewed journals, conference proceedings, an interactive forum, two booklets, a legacy document, two policy briefs, four technology workshops, seven thematic webinars, five international side events, twelve newsletters, five interviews on television, the organization of sixteen MAELSTROM events, and fifteen clean-up initiatives, in addition to more than forty-five talks. MAELSTROM was recognized by the European Commission, receiving the Atlantic Project Award in the Healthy Oceans and Resilient Coasts category. Furthermore, the project was honoured with the Sustainability Leadership Award in Robotics by the European Robotics Forum. These awards reflect MAELSTROM's commitment to its core objectives: protecting marine environments and advancing technological innovation.



ANTARCTIC PENINSULA SURFACE MASS AND ENERGY BALANCE: THE ROLE OF ATMOSPHERIC RIVERS



During the recent years, several extreme warm events were observed around the Antarctic Peninsula (AP). Most of them were triggered by atmospheric rivers (AR) with moisture and heat transport from subtropical Pacific Ocean. The last event in February 2022 brought record high surface melt extent over the AP and its already vulnerable ice shelf. With our previous Antarctic fieldwork projects (APMAR/TULIP/APMAR2) we measured some of the key characteristics of the ARs affecting the AP, including vertical structure of the troposphere, cloud liquid water content, and precipitation profiling using ground-based radar. With the APMAR-2024 project

we continued to strengthen our atmospheric observations and precipitation composition analysis at the King Sejong station (King George Island) reinforcing them with additional analysis of precipitation chemical and microbiological composition aiming at understanding the presence of sea salt aerosols (inorganic or biogenic) and their role in cloud phase.



BlueForeesting project aimed to provide science-based guidance for the design and implementation of nature-based solutions (NBS) to foster sustainable and healthy marine forests in North Atlantic seashores, as mitigation and adaptation solutions to climate change.

As part of the project, we mapped the entire extent of marine forests in northern Portugal and investigated the processes that drive seaweed responses to multiple climate change drivers. To this end, we developed regional downscaled projections of climate change associated with the different Representative Concentration Pathways (RCP) scenarios for the region, assessed species vulnerability and identified potential refugia to climate change (CC). We also tested different marine forest restoration techniques and analysed public perceptions of the value of marine forests and their willingness

to support conservation and restoration actions. Furthermore, we initiated the development of CC-informed scenarios for marine forest services and natural capital by combining ecological and socio-economic evidence to provide evidence-based management recommendations for climate-safe NBS. Finally, the project has fostered dialogue between marine researchers, stakeholders, decision-makers and the public to advance the application of BlueForeesting solutions. Altogether, BlueForeesting work has been published in more than 20 publications and has reached more than 40,000 people through various communication channels (workshops with stakeholders, activities for teachers and schools, dedicated questionnaires, as well as major events for the general public).



The goal of this project was to provide socially and economically viable actions and strategies in support of nature-based solutions (NBS) and nature-inclusive harvesting for climate change adaptation and mitigation. For this, FutureMares developed these solutions to safeguard future biodiversity and ecosystem functions to maximise natural capital and its delivery of services from marine and transitional ecosystems. Its specific goals were to: a) advance our understanding of the links between species and community traits, ecological functions and ecosystem services as impacted by climate change (CC); b) deliver projections of the physical and biogeochemical effects of CC to identify climate hotspots and refugia; c) project the effects of CC

on the distribution and productivity of important species and consequences for marine biodiversity and food webs; d) conduct novel, social-ecological vulnerability assessments ranking the severity of effects of CC on various ecosystem services and dependent human communities e) perform economic analyses of implementation scenarios of NBS at real-world demonstration sites and f) co-develop project research with decision- and policy-makers and managers to ensure science-based advice to contribute to CC adaptation and mitigation strategies.

A summary of the main actions and policy impacts can be consulted at the FutureMares website.



The project focuses on using nature-based solutions (NBS) to help reduce antibiotics, antimicrobial resistance and harmful pathogens from wastewater treatment plants all the way to coastal areas, aiming to show how these solutions can improve water quality and reduce pollutants.

Results showed NBS attenuation potential. In Denmark, where small NBS are used, trimethoprim was the most common antibiotic. In Spain, clindamycin and azithromycin were found in the highest amounts in treated wastewater. But NBS outperform conventional wastewater treatment methods. Restoring natural river flows in Spain has improved the breakdown of antibiotics by 30-40% in comparison to non-restored river streams and cut toxic effects on aquatic life by 80%.

In Denmark's restored wetlands reduction was ca. 20-30%. In a Portuguese river estuary, results emphasize the saltmarsh's potential in improving water quality. In all locations, NBS caused a shift in the types of bacteria in the water, indicating minimal negative environmental impact, in contrast with reference technologies without NBS. In Mali, the project found that hospital wastewater discharging into the Niger River was a significant source of antibiotics, highlighting the urgent need for NBS in such areas to reduce the spread of antibiotics and resistant bacteria. NATURE findings have been published in 12 journals and shared with stakeholders through workshops, which is expected to promote the adoption of these technologies in both Europe and North African countries.

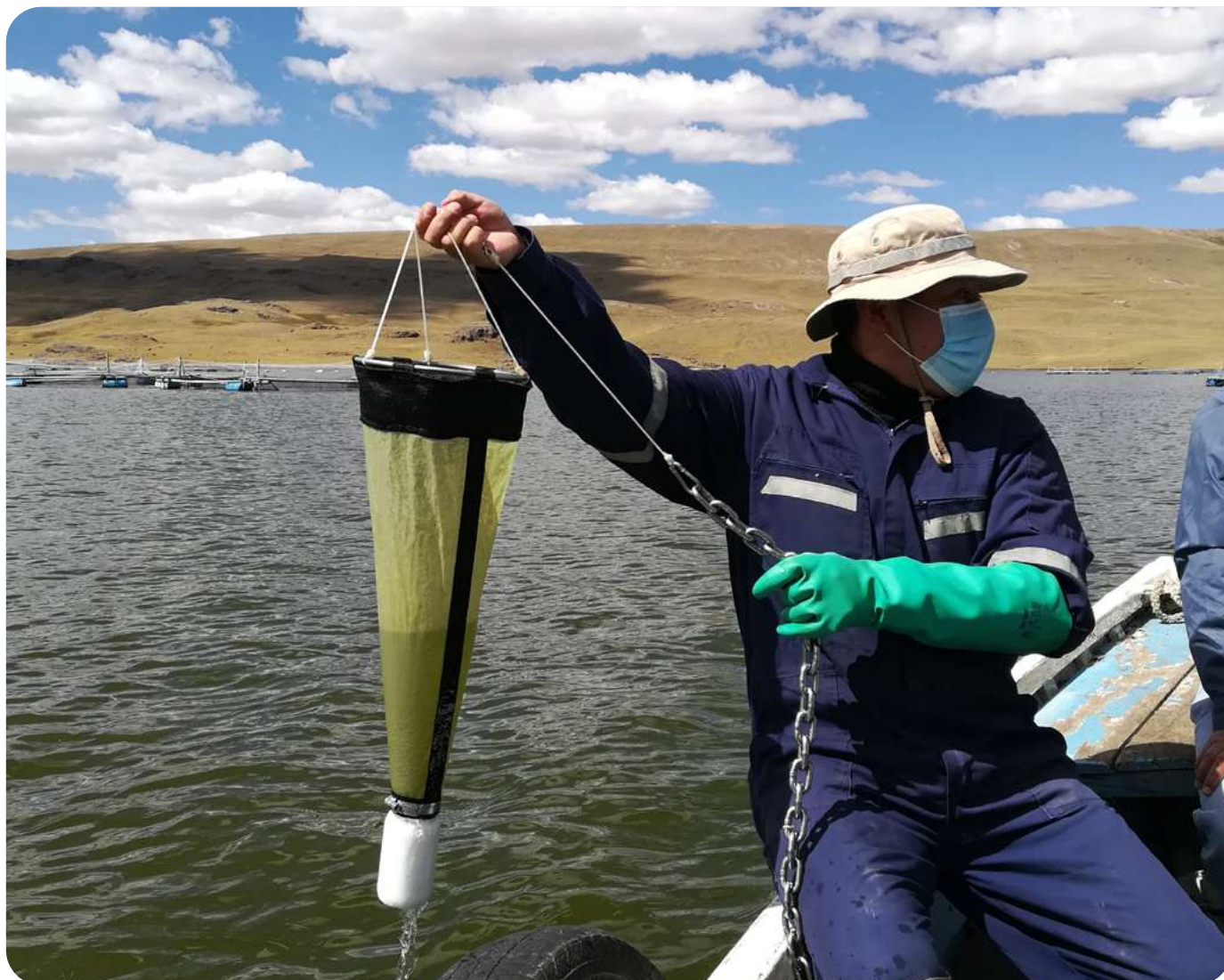


Even the smallest ponds can play a significant role in fighting climate change. Often overlooked and undervalued, ponds are critical for biodiversity conservation and the health of ecosystems. Recognizing this potential, the EU-funded PONDERFUL project studied over 1900 ponds and eight DEMO sites to explore how ponds can serve as Nature Based Solutions (NBS) for climate change mitigation and adaptation, biodiversity conservation and the delivery of essential ecosystem services.

Building on this research, the project developed science-based tools to implement pond-pondscape NBS to address pressing societal challenges, such as biodiversity loss, global warming, water scarcity, flood risks, public health and overall wellbeing.

Key outputs include: an inventory of 183 NBS in Europe; CLIMA-Pond designs which showcase prototype ponds designed to address climate challenges in natural, rural, and urban landscapes; a technical handbook on restoring, managing and creating ponds and pondscape NBS; a guidance document for policy makers, including a guide to developing a national plan for ponds and pondscape NBS; and a multi-criteria decision-making tool to support the implementation of pond and pondscape NBS.

These resources highlight the transformative potential of ponds as tools for addressing environmental and societal challenges. You can find out more about the project and explore our resources at the PONDERFUL website and our social media platforms.



An International Consortium, constituted by members from CIIMAR – Portugal, AU – Denmark, USE – Spain, UCA – Morocco, SOU – Egypt, GIAS-UTP and UNAL – Colombia, UNSA and CIENPR – Peru, CEAC – Cuba, LIMNOS – Slovenia, CIFGA – Spain and NOSTOC – Portugal, joined efforts to investigate agricultural risk areas of cyanotoxin occurrence, and to access the fate of cyanotoxins in crops and crop contamination with cyanotoxins. The project sought, among other goals, proposals concerning the maximum levels of cyanotoxins admitted in irrigation waters.

Main achievements of the project include the establishment of methods to monitor and identify cyanobacteria and cyanotoxins; the characterization of contaminants of algal origin in understudied waterbodies; the risk assessment of low-quality waters in agriculture; and the development of nature-based solutions to water treatment.

ATLANTIC INTERACTIONS VIA ATMOSPHERIC WATER CYCLE: EXPLOITING A UNIQUE DATASET FROM THE ANTARCTIC CIRCUMNAVIGATION EXPEDITION FOR BETTER UNDERSTANDING OF CLOUDS AND PRECIPITATION



In the spirit of the first circumnavigation expedition, undertaken by the Portuguese explorer Fernão de Magalhães 500 years ago, that made the scope of the proposal call, ATLACE project explored the unique new comprehensive measurements gathered during the Antarctic Circumnavigation Expedition (ACE) in December 2016–March 2017 to gain unprecedented insight into the precipitation formation processes in the context of the global atmospheric water cycle. The focus of ATLACE was specifically over the regions undergoing significant changes in precipitation

with important impacts – marked freshening in the southern Atlantic Ocean sector and anomalous snow accumulation in the Atlantic sector of the East Antarctic ice sheet compensating for the entire ice sheet mass loss from ice melting and contribution to the global sea level rise. Further, ATLACE aimed to extend new process understanding of intense moisture transport, combined with aerosol-cloud interactions, and their effect on precipitation formation gained from observations over the South Atlantic region to the region of Portugal.



The BEESSNESS project was anchored on previous work and expanded in the collaboration among CIIMAR, Cardiff University and Brazilian researchers, who aimed to unravel diversity patterns, pressures, challenges and opportunities to protect bees and support local farmers and beekeepers. The BEESSNESS project provided a wealth of novel information about Caatinga bees and their ecosystems. The project was recognised in 2020 with the Prize for Scientific Research and Technological Development of the Commemorations of the Vth Centenary of the Magellan Circumnavigation Travel, which honored the whole team and served as an additional motivation to the whole team. Over 115 outputs were produced, from publications, open access datasets, communications, reports, Master dissertations, contribution to PhD theses, organisation of workshops and seminars, training of other early career researchers and graduation students, app development, outreach activities to school students and the public, and mobilities for exchange, knowledge transfer and networking. From the research work developed we highlight in particular: (i) the assessment of bee biodiversity in the Caatinga biome and in the different areas of production of export

fruits, i.e. areas under conventional cultivation with application of pesticides, areas under organic cultivation and areas in transition; (ii) the establishment of a quality profile for melipona honey, with application to quality and origin certification, valuing the local producers; (iii) the assessment of sensitivity to pesticides of several melipona species from the Caatinga, of value to the management of pesticides use in the Valley; (iii) the health assessment of the mandaçaia of the Caatinga, contributing relevant information to the establishment of protection and conservation measurements; and (iv) the omics results obtained, from primers to bees barcoding, to metatranscriptomic data on the native bee species or the protein-ligand modelling approach to understand mechanisms of toxicity and predict hazardous effects. The data gathered provided a basis to the continued inventory of these species, their protection and the sustainable management of agricultural production in the São Francisco Valley. Overall, the work brought new insight and questions for future research and collaboration, related solitary bees, Caatinga melipona species, their life cycle, social structure and behaviour, opening perspectives and setting the ground for continued collaboration.

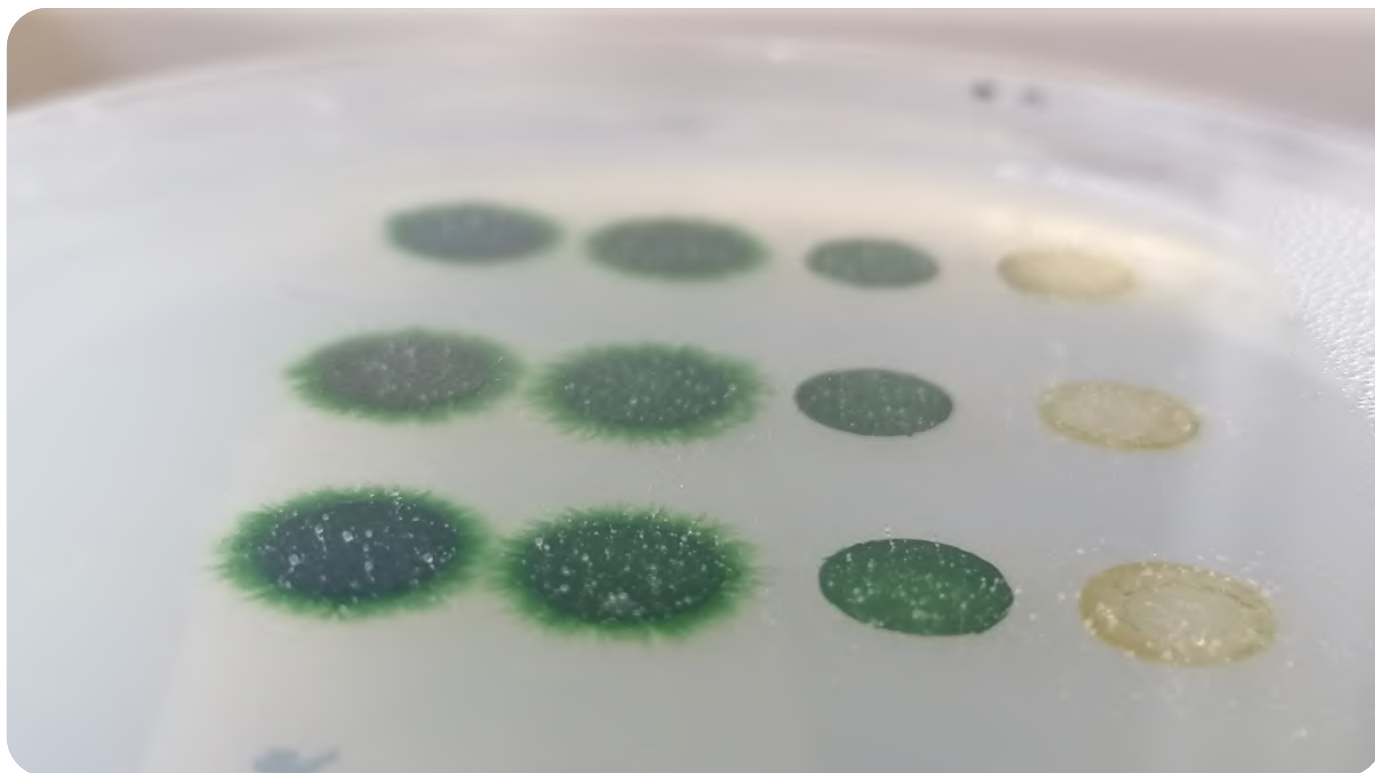
CONNECTING ATLANTIC AND ARCTIC OCEANS TO DECIPHER CLIMATE CHANGE IMPACT ON PLANKTON MICROBIOME FUNCTIONS



This project investigates how the Atlantification of the Arctic Ocean, driven by increased heat inflow from Atlantic Waters, impacts Arctic plankton microbiome diversity and functions. Microbiomes play critical roles in ocean stability, sustaining primary production and food webs, yet their responses to these climate-driven changes remain poorly understood. We hypothesized that warming Atlantic waters would reduce temperature gradients, increased microbiological connectivity, and drove shifts in microbial metabolic regimes with ecosystem-wide implications. We addressed our objectives by leveraging long-term genomic datasets collected from Atlantic and Pacific Arctic

monitoring campaigns, alongside controlled Arctic expeditions conducted between 2022 and 2023. These controlled experiments tested the combined effects of Atlantic and Arctic Waters on plankton diversity and functional shifts. To enhance data collection, we validated an autonomous DNA sampler, in the Arctic, to extend microbiome monitoring in remote and under-sampled environments. This interdisciplinary effort will provide insights into climate impacts on polar microbiomes, delivering data crucial for understanding oceanic biogeochemical processes, ecosystem resilience, and global climate risks.

CHEMICAL-MEDIATED INTERACTIONS BETWEEN CYANOBACTERIA AND AMOEBAE



An estimated 80-90% of BGCs are not usually expressed under standard laboratory conditions. As a consequence, cultivation of individual microorganisms in a laboratory setting may only reveal a small fraction of the metabolic space encountered in nature. Therefore, exploring microbial interactions from an ecological perspective is a particularly fruitful approach to unveil both new chemistry and bioactivity.

Cyanobacteria and amoebae have been known for a long time to co-exist in aquatic environments, however, the interactions between these organisms are poorly understood. So, the aim of this project is to study the interactions between these two organisms in order to find novel natural products mediating this interaction. To achieve this goal, a screening assay was designed in this project to identify the cyanobacterial strains from the LEGE-CC that were systematically resistant to the grazing of a marine and a soil

amoeba strains. More than 100 cyanobacterial strains were tested and 6 grazing resistant strains were selected for genome sequence. After bioinformatic analysis of the genome of these strains, the *Synechococcus* sp. LEGE 11428 was selected for further small-scale growth with and without amoebae. A few mass features were identified in more abundance in the co-cultures in comparison with the monocultures, which might represent compounds with a chemical ecological role. The work on this project was presented in several national and international conferences and in the final workshop that was organised in the scope of this project. Two publications regarding this project work are being prepared, including one that was already submitted to a scientific journal. In December 2024, the master student working on the scope of this project, successfully defended his thesis.



The overall scientific objective of DeepResist was to evaluate the impacts of metal exposure on the resistance and denitrifying transcriptomes of deep-sea microorganisms.

In this exploratory project that lasted for one year and a half, we performed more than 15 incubation experiments in high-pressure bioreactors with two deep-sea model isolates (*Shewanella loihica* PV-4 and *Thalassospira indica* PB8B) and investigated their whole transcriptome and metabolic production of N_2O , a potent greenhouse gas, under exposure to cadmium (Cd) and copper (Cu), two metals that may be potentially released after seabed disturbance.

Regarding the impacts of the metals on N_2O metabolism in *S. loihica* PV-4, we observed contrasting results between the two metals. While Cd inhibited net N_2O production from PV-4 (Pizarro et al., 2023), Cu appeared to promote net N_2O (article in preparation). In *T. indica* PB8B, preliminary results suggest that Cu

delayed N_2O reduction, inhibiting the capacity to fully reduce N_2O , while Cd showed no impacts on N_2O metabolism (article in preparation), underscoring the differential impacts between the two metals. In most of these experiments, gene expression patterns, measured by both qPCR and whole transcriptome sequencing, were good predictors of net N_2O production, which is informative for future environmental monitoring strategies. The links between N cycling and metal resistance genes are also being evaluated (article in preparation). Preliminary results indicate that denitrification may be more tightly linked to metal resistance than dissimilatory nitrate reduction to ammonia, two competing pathways for NO_3^- . Methodological advances from these projects, such as high-pressure bioreactor experimentation and gene expression markers, as well as the associated scientific results are contributing to the ongoing discussion on monitoring deep-sea mining's environmental impacts.

DEEP-SEA MINING AND CLIMATE CHANGE: NEW MODELING TOOLS IN SUPPORT OF ENVIRONMENTAL RISK MANAGEMENT



Over the last four years, a team of scientists from the Faculty of Sciences of the University of Porto (FCUP), the Interdisciplinary Centre for Marine and Environmental Research (CIIMAR-UP), the Portuguese Institute of the Sea and Atmosphere (IPMA) and the Okeanos marine science research institute of the University of the Azores, studied the impacts of deep-sea mining activities and developed innovative tools to support the management of their environmental risk.

Both the models developed and the experiments carried out showed the harmful and/or lethal effects on the deep-sea species studied when subjected to the sulphide particles that could potentially result from the mineral extraction or returning water.

The dispersal of sediments during the mining process is the most immediate and expected consequence of deep-sea mining. However, the research carried out in the project made it possible to discover that mining also releases large quantities of dissolved metals into the water column.

These plumes can potentially spread over long distances, carried by currents and potentially affecting organisms several kilometres from the initial mining source. The researchers assessed the effects of sediment plumes on various groups of coastal organisms, such as sponges, bivalves and deep-sea organisms like cold-water corals, using advanced systems that simulate deep-sea conditions and the results point to negative effects on all the groups studied. The innovative nature of the project has also resulted in the development of new hydrodynamic and ecological models to assess the behaviour of sediment plumes and anticipate the evolution of these ecosystems in the presence of this stressor. The ecological models show that hydrothermal ecosystems impacted by plumes collapse, indicating that they have little resilience to overcome this impact. These data are essential to better characterise the risks of this activity and implement mitigation and management measures to minimise the negative effects.



The main goal of this interdisciplinary project was to integrate ecological experiments, in situ behavioural observations and genomic approaches, to evaluate and predict the impact of climate change in lotic freshwater ecosystems.

The six tasks were fully finalised, resulting in 11 scientific papers; 2 PhD (one being finalised), 2 Master and 1 BSc thesis concluded; 17 oral communications and 6 posters presented in congresses and several outreach activities, including TV news and one podcast. The year 2022 was very dry and through the fieldwork, the team realised that some of the freshwater mussel populations had disappeared due to the drought where they were occurring. Given the lack of long-term monitoring programs and the paucity of hard data on freshwater mussel declines, the team decided to survey their diversity and abundance across Portugal.

Thus, the team surveyed the same 147 sites across Portugal as done previously between 2002-2004 (Reis 2006), following the same methodology. This comprehensive new survey shows an extensive decline of freshwater mussels across Portugal and calls attention to the importance of effective monitoring and conservation actions in freshwater species that are exposed to multiple threats and a rapidly changing environment, including habitat destruction and fragmentation, invasive species, and climate change. All mussel species are rapidly declining and are now risking extinction. More, their new status was included in the Portuguese Invertebrate Red Book. Thus, although not originally planned these results have a huge impact on the project outputs, including outreach.

MITES ASSOCIATED WITH RED PALM WEEVIL (RPW; *RHYNCHOPHORUS FERRUGINEUS* O.) IN PORTUGAL AND RECOMBINANT ANTI-RPW ENDOPHYTIC BACTERIA

FCT project



This project aimed at obtaining a Red Palm Weevil (RPW; *Rhynchophorus ferrugineus* o.) RPW laboratory colony as a source of high-quality insects for bioassays; studying mites associated with the invasive RPW in Portugal; and identifying anti-RPW factors and endophytic bacteria as carriers.

We successfully established a laboratory colony of RPW at the University of Porto, replicating its entire life cycle under controlled conditions, which provided valuable biological insights, supported bioassays for anti-RPW factors, and contributed to academic outputs including a conference poster and student theses. We characterized the diversity and ecology of phoretic deutonymphs associated with RPW in Northern Portugal, later extending the study to the south, including Lisbon, the Algarve, and Madeira, revealing regional differences in mite

diversity. We also identified five fungal species associated with RPW, including a novel *Fusarium tonkinense* association capable of causing *Fusarium wilt* in *Phoenix canariensis*, highlighting RPW's role as both a pest and a potential vector of palm pathogens. We isolated palm-associated endophytic bacterium *Lysinibacillus irui* and conducted comparative genomics studies to determine the existence of beneficial traits for the plant host. We also identified a *Bacillus thuringiensis* (Bt) pesticidal protein against RPW and new targets for RNAi pesticide in this insect species. Transformed bacteria expressing the Bt toxin or double-stranded RNA of the RNAi target induced the insect death indicating their usefulness for RPW management strategies. This work resulted in conference presentations, student theses and one publication. Two publications are in preparation.



The main aims of this project were to uncover the mechanism underlying BrtB's unusual reactivity and leverage its potential for biocatalysis, and to discover the novel chemistry that is hidden in biosynthetic gene clusters encoding BrtB-homologs.

One of the project's objectives focused on advancing knowledge about the enzyme BrtB and brt biosynthetic pathways. Key accomplishments included identifying 27 new bartoloside variants, correcting misconceptions in the literature, and uncovering BrtB's ability to catalyze both O-C and C-C bonds, highlighting its catalytic versatility. However, structural characterization of BrtB was hindered by its self-proteolytic

behavior, complicating efforts to stabilize the enzyme for biotechnological applications. It was also an aim to explore novel chemistry in biosynthetic gene clusters (BGCs) with BrtB homologs. While one pathway was successfully expressed in *E. coli*, resulting in the identification of unique compounds, overlap with independently published findings reduced the novelty of the results. Despite these challenges, the project provided valuable insights into BrtB's function and mechanism, laying a robust foundation for future research and resulting in multiple high-impact publications.

CIIMAR SEED AND CIIMAR OUT OF THE BOX PROJECTS ENDED IN 2024

CIIMAR created two funding schemes to support the implementation of projects by young researchers - CIIMAR SEED -, and by more experienced researchers - CIIMAR Out of the Box - at CIIMAR. In both typologies, it was compulsory to have researchers from more than two teams to push forward inter-laboratorial and interdisciplinary experiences.

CIIMAR SEED PROJECTS:

Title	Acronym	Principal Investigator
New approaches to assess aquatic toxicity of nanomaterials resulting from trophic transfer	Safenano	Mário Araújo
Reliable Pivoting Wave Energy Converter	RPWEC	Gianmaria Giannini
<i>Bacillus</i> spp. as source of bioactive compounds for aquaculture bacterial diseases control	AquaBakillus	Rafaela Santos
Towards an understanding of the selective accumulation and effects of exposure to environmentally weathered plastic particles in Mediterranean mussels (<i>Mytilus galloprovincialis</i>)	NaturePlastic	Luiz Barbosa
The role of 5-HT system in stress-gut-brain interactions	5-HT system	Marta Monteiro
Discovering Vasco da Gama & Vigo seamounts - expedition to the unknown	GAMA	Ana Mafalda Correia
Fish gut-brain axis - a target for health-enhancing strategies	Fish gut-brain axis	Rita Azeredo
Sustainability of Seabass: a comparative Life Cycle Assessment of Wild vs Farmed fish	SOS-LCA	Ana Azevedo
Mechanism of action elucidation of CIIMAR nature-inspired antifoulants	Antifoulants	Ana Sara Gomes

Title	Acronym	Principal Investigator
Investigation of type II polyketide synthases in cyanobacteria	Type II polyketide	Ana Vieira
2DBD nuclear receptors as targets for Effective Drugs	2DED	Elza Fonseca
Exploring nitrogen cycle modularity and resilience with mixed cultures	NitroCoupling	Miguel Semedo
Understanding the spatial organization of the cyanobacterial BrtB pathway	CYANO Click	Amaranta Kahn
Ecological Risk Assessment of bioactive metabolites with antifouling activity produced by cyanobacteria for use in aquaculture facilities	ERABiosAFé	Isabel B. Oliveira
Cyclicdepsipeptides from cyanobacteria	CYanoCYclic	Sandra Figueiredo
Eco-sustainable improvement of habitat restoration methods	EcoReforest	Silvia Chemello
Prospecting cellulolytic bacteria to improve the (bio)circularity of natural and semi-synthetic textiles	BactoCell	Diogo Alexandrino

CIIMAR OUT OF THE BOX PROJECTS:

Title	Acronym	Principal Investigator
Impact of synthetic chelating agents on metal toxicity in deep-sea bacteria		Diana Resende
Computer-Aided Search for Next Generation Antibiotics from Cephalopod's Salivary Glands Proteomes		Guilhermin Agüero-Chapin
Cyanobacterial extracellular vesicles as producer of appetite regulating peptides in fish with applications on aquaculture		Ralph Urbatzka
Cyanobacteria as a novel green route for maximizing the utilization of insect meals as feed ingredient for fish in Aquaculture	Cyano4Feed	Paulo Oliveira
A MicroBiome-driven way to assess marine environmental connection and impact on human health	MB WAVE	Joana Almeida
Machine Learning Models to Predict Plastic Degrading Enzymes with Application in Blue Biotechnology		João Carneiro
From the sea to the farm using green chemistry principles	SEA2FARM	Isabel Cunha
An open-source model for carbon footprint assessment in aquaculture production	OSCAR	Irene Martins
Moving Beyond Nature vs. Nurture: Cracking the Code of Social Behavior in Octopuses		Manuel Nande
Marine Actinobacteria as Fluorescent Biotools for textile applications	ActINGlow	Fátima Carvalho

RESEARCH PROJECTS STARTING IN 2024

Title	Acronym	Funding Programme	Principal Investigator at CIIMAR	Leader Institution
Co-Creating Transformative Pathways to Biological and Ecosystem Ocean Observations	BioEcoOcean	Horizon Europe	Isabel Sousa-Pinto	Uppsala Universitet, Sweden
Research infrastructure services for sustainable aquaculture, fisheries and the blue economy	AQUASERV	Horizon Europe	Vitor Vasconcelos	CCMAR, Portugal
Integrated Research Infrastructure Services for Climate Change risks	IRISCC	Horizon Europe	Vitor Vasconcelos	Luonnonvarakeskus, Finland
Aqua Research Infrastructure Services for the health and protection of our unique, oceans, seas and freshwater ecosystems	AQUARIUS	Horizon Europe	Vitor Vasconcelos	Marine Institute, Ireland
Integrated Research Infrastructure Services for Climate Change risks	GREASEDLIGHTNING	Horizon Europe	Pedro Leão	CIIMAR
Eco-innovative technologies for improved nutrition, sustainable production and marketing of agroecological food products in Africa	INNOECO-FOOD	Horizon Europe	António Marques	CIIMAR
Reducing bycatch of threatened megafauna in the East Central Atlantic	REDUCE	Horizon Europe	Isabel Sousa-Pinto	Universitat de Barcelona, Spain
Advancing area-based management tools to accelerate the protection and restoration of marine biodiversity across the European Sea Basins	BioProtect	Horizon Europe	Joana Xavier	Matis Ohf
Lighthouse for Atlantic and Arctic Basin	PHAROS	Horizon Europe	Sandra Ramos	PLOCAN, Spain

Title	Acronym	Funding Programme	Principal Investigator at CIIMAR	Leader Institution
Twinning deep-ocean exploration and observation capacity for sustainable development	TwinDeeps	Horizon Europe	Joana Xavier	CIIMAR
Integrated approaches at local scale for enhancing water reuse efficiency and sustainable soil fertilization from wastewater's recovered nutrients	CIRQUA	Partnership for Research and Innovation in the Mediterranean Area Programme (PRIMA), H2020	Cristina Calheiros	Democritus University of Thrace (DUTH), Greece
Exploring relict deep-sea habitats in Portugal with local fishing communities	DEEPrelicts	National Geographic Society	Joana Xavier	CIIMAR
Nature-Based solutions to protect a temperate coral impacted by extreme climatic events: eFfective consERvation and restoration of <i>Paramuricea clavata</i> in the Parc National Des Calanques	BUFFER	Pure Ocean Foundation	Jean-Baptiste Ledoux	CIIMAR
E-DNA, Microbiomes, Photogrammetry and Hormones - Assessment Techniques in Cetaceans	EMPHATIC	Biodiversa+ 2022 Call - BiodivMon	Catarina Magalhães	Institute of Marine Research, Spanish National Research Council, Spain
Boosting the resilience of European shellfish production against climate change-related challenges through genetic selection	SHELL-FISHBOOST	SBEP 2023	Sérgio Boo	CIIMAR
Portugal Blue Digital Hub	PBDH	PRR	Ana Paula Mucha	Fórum Oceano, Portugal
Key monitoring requirements for effective management of the Portuguese Network of Marine Protected Areas	INDIMAR	PRR	Isabel Sousa Pinto	CIIMAR
Shifts in Portuguese Marine Ecosystem Services under Climate Change Scenarios: Impacts on Coastal Tourism	SHIFT-MARES	PRR	Irene Martins	CIIMAR
Microphysical and microbiological signatures of precipitation in Antarctica: role of atmospheric rivers and local sources in a warmer climate	MICROANT	FCT	Irina Gorodetskaya	CIIMAR

A close-up, high-magnification microscopic image of biological cells, likely from a plant or fungus, showing a honeycomb-like structure of cells with thick, brownish walls and lighter, granular interiors. The word "INNOVATION" is superimposed in white, bold, sans-serif capital letters in the upper center of the image.

INNOVATION

TECHNOLOGICAL PLATFORMS



ACCESS TO ECOSYSTEMS

CIIMAR Access to ecosystems platform aims to facilitate research activities by sharing its deep and long-term knowledge on the fauna, flora and environmental conditions of the different ecosystems of the North Portuguese coast and by providing logistic facilities and guidance throughout the research activity process. It includes a Scientific Diving Centre, fully equipped to support research at underwater level following European Scientific Diving Standards. CIIMAR ocean research facilities include multi-parametric CTD, underwater deployable light and temperature sensors, water and plankton sampling devices, underwater hydrophone, Van Veen sediment grabs, among other equipment.

P.I. Francisco Arenas



ANALYTICAL LABORATORIES

CIIMAR Analytical Laboratories are well equipped with different analytical equipments, including Segmented Flow Analyzers (SFA), Atomic Absorption Spectrometers (AAS), Liquid Chromatography-Mass Spectrometers (LC-MS/MS) and HPLC, Gas Chromatographs with different detectors (Flame Ionization Detection (GC-FID) and Mass spectrometry), Organic Elemental Analyzer-Isotope Ratio Mass Spectrometer (EA-IRMS), that enables the quantification of a vast array of compounds in different matrices with multiple purposes.

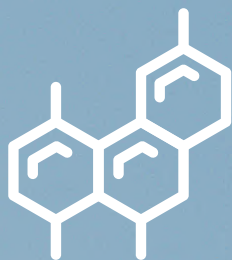
P.I. Marisa Almeida



AQUACULTURE AND ANIMAL EXPERIMENTATION FACILITY

The CIIMAR Aquaculture and animal experimentation facility – Bioterium of Aquatic Organisms (BOGA) – is a fully dedicated and highest standard infrastructure to the experimentation and maintenance of a wide range of aquatic organisms (macro and microalgae, fish, cephalopods and other invertebrates). The facility is licensed and inspected by the Portuguese Authority on the protection of animals used in experimentation with scientific or education purposes (DGAV – Direção Geral de Alimentação e Veterinária).

P.I. Benjamin Costas Refojos



BIODISCOVERY AND OMICS

With an overall goal of providing a sustainable access to the chemical diversity from our ocean, CIIMAR has developed a platform for navigating from biological material to pure compounds. CIIMAR provides large-scale microalgae culture and biomass processing facilities as well as last-generation photobioreactors, a collection of fractionated extracts from marine microorganisms and a growing library of pure compounds. In addition, CIIMAR's Biodiscovery and Omics Platform has the ability to carry out natural products isolation in the milligram scale, structural characterisation and medicinal chemistry interactions.

P.I. Pedro Leão



BLUE BIOBANK

The Blue Biobank of CIIMAR is a repository of marine biodiversity that includes biological resources with biotechnological potential deposited at three institutional biobanks: the Blue Biotechnology and Ecotoxicology Culture Collection (LEGE-CC), with around 2000 strains of Cyanobacteria and microalgae, the CIIMAR Microbial Culture Collection (CM2C), with around 400 strains of Bacteria and Fungi isolated from environmental samples, and the DEEP-biobank, with around 400 specimens collected at the deep sea. It provides services to the scientific community and the industry. The Blue Biobank of CIIMAR is part of the Portuguese Blue Biobank, a network of national marine biological collections.

P.I. Vítor Vasconcelos



ECOTOXICOLOGY

CIIMAR's Ecotoxicology platform supports research and environmentally sustainable technological development, providing toxicity testing and other ecologically relevant assessments of environmental contamination to researchers, environmental managers, municipalities, wastewater treatment plants and other interested stakeholders. State-of-the-art infrastructures are available for the required testing, which are developed under the guidance of certified personnel.

P.I. Laura Guimarães

TECHNOLOGICAL OFFERS

IN 2024, THE FOLLOWING PATENT APPLICATIONS WERE GRANTED:

ANTIMALARIAL AGENT, ITS METHODS AND USES THEREOF

Malarial drug-resistant strains are emerging worldwide, in particular mefloquine and chloroquine-resistant, becoming a significant concern on a global scale. This technology relates to halogenated alkyl-aromatic secondary metabolites, obtained from *Cyanobium* sp. (LEGE 06113), hierridin C, and its derivatives and their use in formulations for treating, preventing, or inhibiting malaria in humans. The technology comprises methods for obtaining the compound

from cyanobacterial cultures and methods for chemically synthesizing hierridin C and its derivatives under laboratory conditions.

Inventors: Leão P., Rosário M.M., Costa M., Vasconcelos V., Nogueira F., Domingues V.

Applicants: CIIMAR, University of Porto, Institute of Hygiene and Tropical Medicine, Polytechnic Institute of Porto.

Granted in: Brazil – ref: BR 1120170280159 (this patent was previously granted in Europe, USA and India).

XANTHONIC COMPOUNDS AND THEIR USE AS ANTIFOULING AGENTS

Biofouling is a severe concern to numerous industrial sectors with costly high maintenance. This solution relates to synthetic small molecules from an important class of heterocyclic derivatives and homologs – xanthonic compounds - and their use as antifouling agents for protection against marine biofouling. These compounds are environmentally friendly and can reduce marine

biofouling without inducing toxic effects to target and non-target species.

Inventors: Correia-da-Silva M., Pinto M., Sousa E., Vasconcelos V., Almeida J.R., Gerales E.

Applicants: CIIMAR, University of Porto, Faculty of Sciences – University of Lisbon.

Granted in: USA – ref.: US 12,030,891 (this patent was previously granted in China).

ULTRA-VIOLET ABSORBING COMPOUNDS

Ultraviolet (UV) radiation is a harmful and mutagenic component, causing premature skin aging, eye damage, and skin cancer. The patent is related to scytonemin analogs, a novel class of compounds, obtained from natural sources, namely cyanobacteria. These compounds can absorb up to 90% of UV-A radiation and can cover a broader UV to blue light absorption range. The compounds present faint colouration, and some are even colourless, thus being easily incorporated in formulations for cosmetic

products, sunscreens or lenses for sunglasses. Furthermore, some of these molecules present interesting antimicrobial properties, acting as multifunctional ingredients.

Inventors: Martins T., Leão P., Reis M., Vasconcelos V., Ramos V., Hassouani M., Sabour B.

Applicants: CIIMAR, University of Porto, Chouaib Doukkali University.

Granted in: China – ref.: CN 113924345.

HALOGENATED COMPOUNDS AND USES THEREOF

Healthcare-associated infections are the most frequent adverse cases in the healthcare settings worldwide, namely the biofilm-associated microbial infections related to medical devices. This technology relates to novel halogenated fatty acid lactylates, in particular chlorinated fatty acid lactylates, with antimicrobial and antibiofilm activity towards healthcare-associated microbial infections. The novel halogenated fatty acid lactylates – isolated from cyanobacteria – present antibacterial activity against *Staphylococcus aureus* and antibiofilm activity against coagulase-negative staphylococci.

The compounds can be used in medicine with potential applications in the treatment and prevention of biofilm-associated infections.

Inventors: Vasconcelos V., Leão P., Ramos V., Morais J., Castelo Branco R., Oliveira F., Reis M., Soto S., López Y., Cepas V., Lombo F., Villar C.J., Gutiérrez-del-Río I., Redondo-Blanco S., López Ortiz F., Iglesias M.J., Soengas R.G., Rodolfi L., Sampietro G.

Applicants: CIIMAR, University of Oviedo, University of Almería, Barcelona Institute for Global Health (ISGlobal), Fotosintetica & Microbiologica SRL (F&M), University of Porto.

Granted in: India – ref.: IN 543824, and in China – ref.: CN 114746393.

URCHIN FEED, METHODS AND USES THEREOF

Sea urchins, such as *Paracentrotus lividus*, face challenges due to overexploitation of their natural stock and seasonal reproductive cycles, which affects the quality and characteristics of their gonads – a prized gourmet seafood. This technology describes a cold extruded, dry and stable sea urchin feed, that enhances gonadal growth and colour of *P. lividus*. The feed can be produced at a large scale and stored for an

extended period of time. The ingredients are provided by natural sources including spices, vegetables, seaweeds, microalgae, and synthetic sources.

Inventors: Valente L., Dias J.P., Sá T., Garrido I., Baião L., Guedes A.C., Costa I.

Applicants: CIIMAR, University of Porto, Sparos Lda., ISS Ínclita Seaweed Solutions Lda.

Granted in: Portugal – ref.: PT 117061.



ENTREPRENEURSHIP



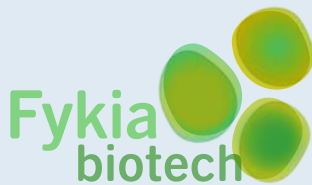
ALGAplus has been dedicated to the controlled and sustainable cultivation of native marine macroalgae from the Atlantic coast, in a system on land as innovative as it is natural, and with organic certification. Located in Ria de Aveiro, within a Natura 2000 area, we are pioneers in Europe in doing so from a circular blue bioeconomy perspective, by integrating organic-certified fish aquaculture throughout the process.

www.algaplus.pt



Cell4Food kickstarts a Cell-Based Agriculture in Portugal. Cell4Food aims to create a network of businesses that will lead the market in the next decade, driven by technological knowledge on Cell-Based protein production. Our goal is to democratize access to new proteins and fibers with origin in cell-based agriculture production. We find many analogies between conventional agriculture and the production of cultivated meat or fish, so the name, Cellular Agriculture, is used.

www.cell4food.eu



Fykia is a young, research-intensive, microalgae biotechnology start-up that develops innovative solutions, based on exclusive microalgae and proprietary technologies to tackle modern problems in healthcare, skincare and agriculture. Fykia is based at CIIMAR's headquarters in the metropolitan area of Porto, Portugal, a bustling hub for algal technology.

www.fykia.pt



Inclita Seaweed Solutions (ISS) is a Portuguese company that harnesses the power of seaweed to create bioactive ingredients while collaborating with sustainable seaweed producers and applying cutting-edge science to deliver natural and low-carbon products. ISS offers high-quality ingredients to diverse industries such as cosmetic, nutraceutical, petceutical and functional food and beverages.

www.inclitaseaweedssolutions.com

NETWORKING AND PUBLIC POLICIES



COLLABORATIVE & NETWORKS

CIIMAR IS A MEMBER OF THE FOLLOWING NETWORKS, INFRASTRUCTURES AND ORGANIZATIONS:

EUROPEAN RESEARCH INFRASTRUCTURES



ELIXIR is an intergovernmental organisation that brings together life science resources from across Europe, that include databases, software tools, training materials, cloud storage and supercomputers. The goal of ELIXIR is to coordinate these resources so that they form a single infrastructure, making it easier for scientists to find and share data, exchange expertise, and agree on best practices.



The European Marine Biological Resource Centre (EMBRC) is Europe's research infrastructure for marine biological resources that provide access to marine resources, as well as cutting-edge services and facilities that allow researchers, from both academia and industry, to study the ocean and develop innovative solutions to tackle societal issues. EMBRC facilitates collaboration between researchers and staff at EMBRC marine stations across Europe.



The European Multidisciplinary Seafloor and water column Observatory (EMSO) is a marine multidisciplinary, distributed Research Infrastructure, with the goal to explore, monitor and better understand the phenomena happening within and below the oceans and their critical impact on the Earth. EMSO brings together diverse and numerous scientific partners, Institutes and Research Centres operating in key sites in European seas.



The Microbial Resource Research Infrastructure – European Research Infrastructure Consortium (MIRRI-ERIC) is the pan-European distributed Research Infrastructure for the preservation, systematic investigation, provision and valorisation of microbial resources and biodiversity. The mission of MIRRI is to serve Bioscience and Bioindustry users by facilitating access to a broad range of high-quality bioresources and data in a legal compliant way.



EU-OPENSOURCE is a not-for-profit European Research Infrastructure Consortium (ERIC) for chemical biology and early drug discovery that aims to support the global scientific and economic competitiveness of Europe by delivering public health benefits. EU-OPENSOURCE provides open access to the most advanced screening and medicinal chemistry technologies and expertise.

INTERNATIONAL COLLABORATIVE ORGANIZATION



The Atlantic International Research Centre is an international collaborative framework to address global challenges and local priorities in the Atlantic Ocean. It promotes an integrative approach to climate and ocean issues in the Atlantic, supported by emerging technological innovations and advances in space, and data science, and through international cooperation.

SCIENCE-POLICY PLATFORMS



The European Marine Board (EMB) is the leading European think tank in marine science policy. It provides a platform to advance marine research and to bridge the gap between science and policy. The EMB facilitates the transfer of the best scientific knowledge available to the core of marine research policy. This is done by interacting directly with decision makers, and steering discussions between scientists and policy makers on a certain topic. EMB represents the European marine scientific community in different events.



EuroMarine is a member-based network of European marine research organisations and research institutes. EuroMarine's mission is to support the identification and initial development of important emerging scientific topics or issues and associated methodologies in marine sciences, as well as to foster new services relevant to the marine scientific community.



The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.



The European Platform for Biodiversity Research Strategy is a forum at which natural and social scientists, policy-makers and other stakeholders identify structure and focus the strategically important research that is essential to use the components of biodiversity in a sustainable way; maintain ecosystem functions that provide goods and services; conserve, protect and restore the natural world; and halt biodiversity loss.



The Group on Earth Observations Biodiversity Observation Network (GEO BON) is a global network of researchers dedicated to improving the acquisition, coordination, and delivery of biodiversity information at the global, regional, and national levels. GEO BON and its partners support the monitoring of biodiversity change through the coordination and collaboration among biodiversity observation networks, the generation of Essential Biodiversity and Ecosystem Service Variables, and the development of indicators, forecasts and various information services, making them readily available to all users.



SCIENCE POLICY

For many years, CIIMAR has been contributing to science policies related to ocean and environmental conservation, and to the blue bioeconomy. CIIMAR is a member of several international organisations that are deeply involved in the establishment of science and environmental policies, with some of CIIMAR's members playing key roles in those organisations. Furthermore, in some research projects CIIMAR's researchers are leading work packages focusing on science-policy, aiming at promoting engagement of researcher with policy-makers and other stakeholders, and ultimately contributing to better policies based on the most recent scientific advancements. In some cases, this already resulted in the local implementation

of science-based solutions, addressing societal problems that impact nature and the blue economy.

Examples of activities implemented in 2024 in the framework of European research projects include the organisation of events by the Coastal Biodiversity research group that promoted discussion of the main findings of the European project FutureMares: Nature-based Solutions for marine conservation and restoration with policy-makers from the European Commission (DG Environment, DG research, and DG MARE) and other stakeholders, and of the European project Mission Atlantic with Azorean policy-makers and other local stakeholders.



EDUCATION AND TRAINING



BYT– BLUE YOUNG TALENT PROGRAMME

The Blue Young Talent Programme (BYT) is CIIMAR's talent attraction programme in the field of marine and environmental sciences and biotechnology, developed in partnership with industry and SMEs. The programme has three branches: BYT, aimed at undergraduates, BYT+ for master's students, and BYT PhD for PhD candidates. As part of the programme, selected students carry out their work in a CIIMAR research team, with a research grant, and benefit from the training activities offered by the programme.

The 2023/24 academic year was the 11th edition of the BYT programme, the 6th edition of BYT+, and the continuation of the 1st edition of BYT PhD, which began in 2020. Fourteen bachelor's and 56 master's degree proposals were submitted by CIIMAR researchers; of these, 8 BYT and 8 BYT+ internships were selected (with 6 scholarships in each programme).

In the 2023/2024 edition, students had the opportunity to take part in 5 training workshops, namely in Communication and Dissemination, Working Status, Scientific Writing, Career Perspective, and a visit to Next Generation Chemistry (NGC)-KOD Bio company, and 2 science dissemination events, Mostra U.Porto and the Biochemistry Days. The academic year

concluded with each student publicly presenting their research projects at the final BYT event that included representatives of the organisations that funded the grants, namely the Amadeu Dias Foundation and Soja Portugal, and the partners, the University of Porto and the KOD Bio & Next Generation Chemistry.

Since its first edition, the BYT programme hosted 92 students from 7 undergraduate degrees at the University of Porto, 53 students from 23 master's degrees at Portuguese universities, and 15 PhD students from 5 different PhDs programmes.



ADVANCED TRAINING

As part of its mission to thrive excellence in science, CIIMAR facilitates high-quality advanced training in its laboratories and technological platforms. During 2024, 35 courses in scientific, technical, or transversal skills were organised by CIIMAR researchers or staff, reaching out to 760 participants, out of which 139 were foreign.

Furthermore, the Centre is a host institution for Master's and PhD students interested in conducting research programmes in marine and environmental sciences. It also hosts students undertaking work for a Bachelor's thesis. In 2024, 44 PhD candidates and 133 MSc students successfully completed their PhD and Master respectively.

In 2024, a dedicated office for advanced training and career management was created. It aims to coordinate the vast offer of advanced courses that are available to the community, and to support students, early and senior researchers in their career development.

STUDENTS THAT FINISHED THEIR PHD AND MASTER THESES WERE ENROLLED IN:

PHD CANDIDATES:

PhD programmes

22

Portuguese Universities

8

International Universities

3

MASTER'S STUDENTS:

MSc programmes

53

Portuguese Universities

7

Portuguese Polytechnics

2

International Universities

10



SOCIETY



PUBLIC ENGAGEMENT IN SCIENCE

CIIMAR is dedicated to promote Ocean Literacy and public engagement in marine and environmental research-related topics. To achieve this, CIIMAR runs a public engagement programme targeting different audiences. This programme is led by CIIMAR's Image, Communication and Outreach Office, and benefits from a very active community of scientists, who also organize and participate in several science communication and education initiatives, within the scope of their research projects or as part of their mission to promote science in society. Moreover, CIIMAR coordinates two dynamic Environmental Monitoring and Interpretation Centres (CMIA, acronym in Portuguese) in Vila do Conde and Matosinhos, which run independent programmes that further promote science in society.

The Communication office is responsible for all the institutional communication, including website, press and social media. In 2024, the press office worked closely with the media, sharing a steady stream of stories - including collaborative new articles with other entities - that showcased CIIMAR's research and initiatives, generating widespread visibility and interest. In addition to Facebook, Instagram, LinkedIn, Twitter, in 2024, CIIMAR joined Bluesky social channel.

Engagement on these platforms has been consistent, with a growing number of followers actively interacting with the content.

The Communication office also runs an outreach programme targeting different audiences. A comprehensive educational programme was implemented in 2024, with activities for students from primary school to high-school and teachers, and with protocols established with Matosinhos City Hall and with different schools through their Ciência Viva Clubs. The Outreach programme includes online and face-to-face initiatives, from science cafés, to public talks and debates, and the organization or participation in public events. In 2024, we continued our partnership with Serralves Foundation and Parque Biológico de Gaia to further engage society in science. The 2024 edition of the iconic CIIMAR Open Day showcased CIIMAR research to about 17 000 visitors. CIIMAR scientists and science communicators also joined Mostra U. Porto, European Researchers Night, and Encontro Ciência 2024.

With our coordinated actions, we aim to empower citizens with tools to take action in protecting the ocean, estuarine and fresh-water ecosystems.



CMIAS

The Environmental Monitoring and Interpretation Centres (CMIA, acronym in Portuguese) in Matosinhos and Vila do Conde were established under a protocol between each City Council and CIIMAR. CIIMAR is responsible for the scientific coordination of both. These local centres are dedicated to scientific dissemination and environmental education, with a focus on the Ocean and the Environment. Both CMIA are engaged in environmental monitoring and research, environmental education, science communication

and outreach, and collaborate with the Blue Flag Programme, being CMIA de Vila do Conde a Blue Center. Their action includes activities related to water quality assessment, monitoring on marine and riverine litter, as well as the monitoring of fauna and flora associated to different ecosystems. Additionally, they run an extensive programme of educational initiatives, which encompasses exhibitions, lectures, workshops, field trips, pedagogical activities, and training activities in schools.

CMIA VILA DO CONDE

Scientific Coordinator: Cristina Calheiros

CMIA MATOSINHOS

Scientific Coordinator: Sandra Ramos

NUMBER OF PARTICIPANTS	TYPE OF ACTIVITY	NUMBER OF PARTICIPANTS
25,714	Exhibitions	5,091
4,759	Educational Activities	2214
7,948	Talks and Seminars	991
245	Training Courses and Workshops	40
539	Environmental monitoring, field trips, interpretative trails, and/or beach clean-ups	1,005
17,803	Outreach events	52,501



SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

Sustainability is central to CIIMAR's culture, reflected in our research, mission, and actions supporting numerous UN Sustainable Development Goals. This commitment is outlined in our annual Social and Environmental Responsibility Plan, coordinated by the Environmental and Social Sustainability Office, with the support of numerous CIIMAR offices and informal groups.

In 2024, new shared community spaces like the "Ecological Dishwashing Station" and "Tea Corner" were introduced, along with dissemination campaigns to promote recycling and reduce waste. CIIMAR GreenLab advanced efforts to reduce our labs ecological footprint. Campaigns like "Precious Racks", second-hand "Circular Markets", and the "Book Sharing" initiative promoted circularity and sustainable consumption.

CIIMAR organised regular leisure and wellness activities, including a collective bike ride for World

Bike Day, biweekly yoga classes, football, volleyball and padel groups, and participation in the Porto de Leixões and São João races, a football tournament, and two trail competitions. Our educational programmes and campaigns engaged schools and the general public through lectures, practical activities, beach cleanups, pond creation, field trips, traveling exhibitions, seminars, and media outreach.

13 Created and 26 restored small waterbodies for biodiversity in public spaces and schools

2 New community spaces created "Ecological Dishwashing Station" and "Tea Corner"

10 Kg/month of pipette tip boxes plastic recycled

100 Second-hand items circulated within the community

92 Community sports events

336€ 179 items of clothes, 115 essential goods items donated to local charities in the "Circular markets"



ACKNOWLEDGEMENTS

We are grateful to everyone at CIIMAR – researchers, students and staff - who supplied information, text and images used in this report.

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PHOTOGRAPHY

Images used in the report's cover and tabs are from the 2024 CIIMAR's Scientific Photography Contest:

Cover – “Calming Tension” by Anxo Gende.

Caption: A common dolphin just before breaking the surface tension of the water to come up for air. The animal appears to have its eyes closed, giving it a calm look. This photo was taken under a marine mammal survey in Galician waters, on board the "Chasula".

Research tab – “Sampling the mesopelagic” by Ricardo Matias.

Caption: The deployment of an RMT8 (rectangular midwater trawl) near the Antarctic Peninsula's coast on board of the British Antarctic Survey scientific vessel, RRS James Clark Ross. The sampling of mesopelagic organisms occurs at night when they move to productive surface waters, since during the day they move to higher depths to avoid predators.

Innovation tab – “The White Fungus Mountain” by Fábio Faria.

Caption: Macro photography of a Petri plate containing a fungus strain of CIIMAR Microbial Culture Collection (CM2C). The intricate details with ridges and valleys of the fungus growth create an interesting visual texture, reminiscent of a snowy landscape seen from above.

Networking and Public Policies tab - “Life Amongst Relics” by Daniel Despujols.

Caption: A coral skeleton rests upon a shelf, its branches reaching silently into the air. A small spider weaves delicate strands of silk across the branches of the coral. Despite its quiet scene, the image speaks volumes: although the coral has died, nature found a way to flourish and persist.

Education and Training tab – “Sunrise on Ria de Aveiro” by Aires Duarte.

Caption: As part of Aires Duarte's PhD, he frequently goes to Ria de Aveiro, where he has the chance to see this spectacular landscape.

Society tab - “It tastes fishy” by Ricardo Matias.

Caption: A gentoo penguin feeds her two fledgling chicks with the freshest catch. This picture was taken on Christmas Day in 2019, near Bertha's Beach in the Falkland Islands.

Images used in other pages of the report are from the Image, Communication and Outreach Office, and from members of the research groups or of the illustrated research projects.

More information about CIIMAR's activities in:
www.ciimar.up.pt

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