



ACTIVITY REPORT

2016



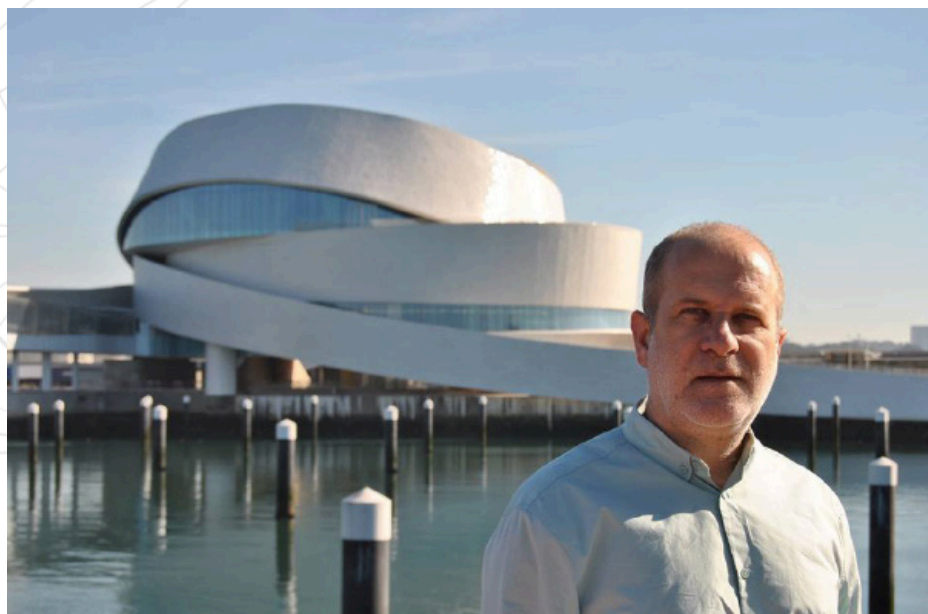


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MESSAGE FROM THE BOARD



In 2016 we finally accomplished our dream and started moving our headquarters by the Ocean at the Cruise Terminal of Leixões Harbour. In spite of all the trouble related to the move and some slow down associated to that, we managed to maintain the increasing trend of our main indicators.

CIIMAR started the implementation of our strategic projects INNOVMAR (NOVELMAR, INSEAFood, ECOSERVICES), CORAL, MARINFO, BLUEandGREEN and got significant funds from new FCT projects.

CIIMAR members published 398 papers in internationally peer-reviewed journals and successfully contributed to the graduation of 22 PhD and 81 MSc students.

In 2016, three patents were submitted, reflecting the increasing impact of our research and the success of the implementation of the measures to increase the technology transfer.

CIIMAR will strength its role as the major research center of the U. Porto in the area of the OCEAN, increasing our interactions in the framework of the U. Porto Competence Center – OCEANUS, reinforcing the brand OCEAN of our university.

President of the Board of Directors

Vitor Vasconcelos



ABOUT CIIMAR

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

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

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

applications.

CIIMAR assembles the understanding and knowledge on physical, chemical and biological dynamics of the coastal and oceanic environments, and the impact of natural and human disturbances.

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



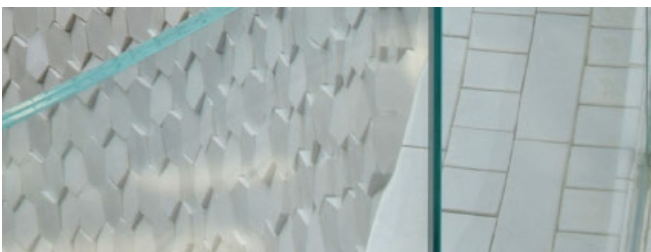
Mission

CIIMAR develops exceptional transdisciplinary and transnational research, promotes technological development and supports public policies and governance in Marine and Environmental Sciences.

Social Organs

The current social organs initiated their mandate in January 2016 and are composed as follows:

GENERAL ASSEMBLY	BOARD	FISCAL COUNCIL
President João José Oliveira Dias Coimbra	President Vitor Manuel de Oliveira e Vasconcelos	President Maria Luísa Machado Cerqueira Bastos
Chairs <ul style="list-style-type: none">› Aires Manuel Pereira Oliva Teles› Fernando Francisco Machado Veloso Gomes› Aurélia Maria de Pinho Marques Saraiva› Ana Paula de Campos Mucha	Board members <ul style="list-style-type: none">› Luísa Maria Pinheiro Valente› Maria Natividade Ribeiro Vieira› Luís Filipe Costa de Castro› Miguel Alberto Fernandes Machado e Santos	Members <ul style="list-style-type: none">› José Fernando Magalhães Gonçalves› Maria Helena Tabuaço Rego Martins Peres





Headquarters

CIIMAR's new state-of-the-art facilities for research, training and services are located at the heart of the maritime industry and services in the Northern region of Portugal (Leixões harbour). The centre features well-equipped laboratories for marine and maritime research, technological core platforms, high scale micro- and macroalgae cultivation and animal experimental facilities for freshwater and marine organisms approved by the Portuguese Veterinary Authority. At U. Porto, besides its headquarters, CIIMAR has research groups in five organic units: Abel Salazar Biomedical Sciences Institute, and at the Faculties of Sciences, Engineering, Pharmacy and Law. CIIMAR is an integral research centre of CIMAR - Associated Laboratory, together with CCMAR - Center of Marine Sciences of the University of Algarve.

Innovation and Technology transfer

CIIMAR is involved in clustering activities, participating in National and European Knowledge and Innovation Networks, relevant in the Marine Economy Sector (OCEANUS, FORUM OCEANO, BLUEBIO ALLIANCE, EUROMARINE, European Marine Board). The centre follows an innovation-based strategy to foster technology transfer, promoting market-oriented research and industry liaison activities. Disruptive ideas and technologies are driven to technology acceleration programmes, identifying opportunities for new products and services.

Science and Society

CIIMAR has an extensive and exciting Outreach Programme addressed to all society sectors. It is responsible for the development and implementation of several national and international science dissemination campaigns directed towards improving Ocean Literacy among students and general public. Ocean Action Campaign was awarded in 2016 with the Green Project Award for the best Mobilization Initiative.

At the regional level, the cooperation protocols with the City Councils of Vila do Conde and Matosinhos for the scientific and technological management of their Environmental Monitoring and Interpretation Centres (CMIA's) are of particular significance. CIIMAR was the first Portuguese research centre to become member of the European Network of Science Centres and Museums (ECSITE), increasing its responsibility in the improvement of Ocean Literacy.



RESEARCH LINES

Biology, Aquaculture and Seafood Quality

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

P.I. **Luísa Valente**

Global Changes and Ecosystems Services

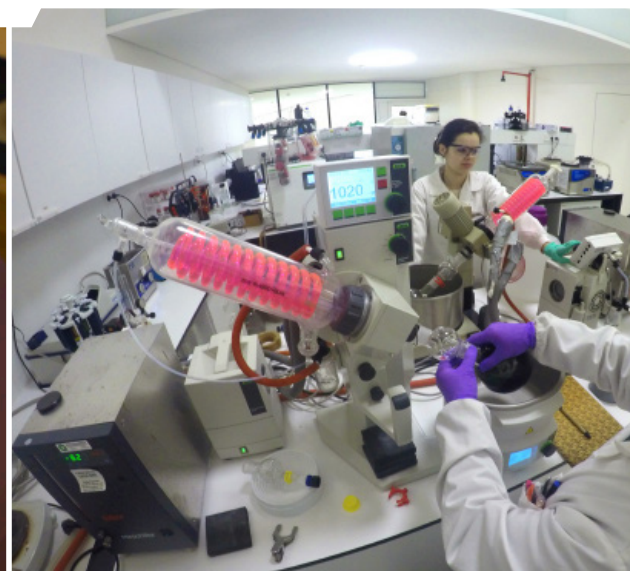
CIIMAR provides basic knowledge and tools to support the protection and management of marine, estuarine and freshwater ecosystems. Sustainable exploitation of ocean resources with production of valuable goods and services is fostered. Work is done in close collaboration with SMEs, international and local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

P.I. **Carlos Vale**

Marine Biotechnology

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

P.I. **Vitor Vasconcelos**







BLUEandGREEN: BOOSTING SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY IN BIOREFINERIES BASED ON MARINE RESOURCES

PRINCIPAL INVESTIGATOR AT CIIMAR

Vitor Vasconcelos

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(AGE)

Animal Genetics and Evolution

(EcoBioTec)

Bioremediation and Ecosystems

Functioning

(BBE)

Blue Biotechnology and

Ecotoxicology - Chemistry and

Biological Activity of Marine

Natural Products

(BioCost)

Coastal Biodiversity

(EGB)

Evolutionary Genomics and

Bioinformatics

(MEDCHEM)

Medicinal Chemistry

(LANUCE)

Drug Discovery and Drug Design-

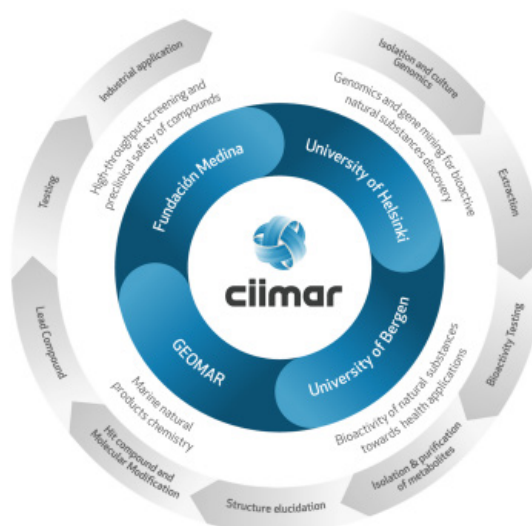
Nutrition, Growth and Quality of

Fish

WEBSITE

www.ciimar.up.pt/BLUEandGREEN/

The exploitation of the ocean unraveled a huge diversity of organisms producing innovative compounds used as pharmaceuticals, nutraceuticals, cosmeceuticals and antifoulings. The aim of BLUEandGREEN is to strength the performance of CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, from the low performing Member State Portugal, in the emergent area of marine biotechnology. This will be done by the establishment of a scientific strategy for stepping up and stimulating scientific excellence and innovation capacity in partnership with four internationally-leading counterparts at the EU level: the University of Helsinki, Finland, the University of Bergen, Norway, GEOMAR, Helmholtz Centre for Ocean Research Kiel, Germany, and Fundación MEDINA, Spain. BLUEandGREEN scientific strategy includes: to review the latest research and innovation advances in the sector, identify and address institutional network gaps and deficiencies; to raise staff's research profile and excellence by training and mentoring; to increase stakeholder interaction and mobilization to research and innovation partnerships; to guide research to contribute to economic growth; to deliver a framework for strengthening a long-term research and innovation environment in marine biotechnology. The network enhancement will enforce cluster dynamics in close interaction with industrial partners to contribute to regional, national and EU Blue Growth strategies, especially to marine biotechnology industry. The implementation of brokerage with stakeholders and market-oriented projects will dismantle trade barriers, increase the ways of communication among partners and promote knowledge enhancements and its conversion in business. Being Portugal, especially North Portugal, a peripheral region, this will contribute to the change its economic landscape, giving new opportunities for development and job creation and reinforcing the role of marine biotechnology in the economic development of Europe.



NOMORFILM: NOVEL MARINE MOLECULES AGAINST BIOFILM - APPLICATION TO MEDICAL DEVICES



In the last decades, an increasing number of antibiotic resistant bacterial pathogens have become an important problem worldwide. This includes also biofilm-associated pathogens, causing prosthetic devices infections, and requiring costly implant replacement. In addition, the discovery of new antibiotics has not occurred at the expected rate and only two new molecules have been marketed in the last years. It is estimated that more than 60% of the human infections are caused by microorganisms able to form biofilms. These structures allow such pathogens to avoid the antibiotic and immune system actions. Biofilm formation is especially important in infections related to implants and catheters. Although some of these colonizing microorganisms do not cause infection, they can promote an immune reaction giving rise to inflammation at underlying tissue. This finally causes a release of the implant, which must be removed and replaced by a new one. These surgical interventions entail an increase in antibiotic consumption, together with a health cost of about 50,000-90,000 € per infection episode.

Taking both problems in account, the search of new antimicrobial agents that will be effective against bacteria in their two stages of life (planktonic and biofilm), is a priority need in the clinical practice. For this reason, the overall objective of this project is to search for such bioactive compounds from EU microalgae collections. These compounds will be useful in the treatment of these kinds of infections and will be incorporated in the manufacturing of medical prosthetic devices.

The NOMORFILM project introduces a new concept to tackle biofilm infections which combines the two major antibiofilm strategies in use: high throughput screening and coating. NOMORFILM makes use of microalgae as the source of compound libraries. 6,800 Microalgae species coming from diverse ecosystems and different continents will be screened and cultured in order to maximize their potential for production of antibiofilm molecules. Thus, each microalgae species will act as a natural multireactor producing a large number of compounds and microalgae biodiversity, which is very high, will increase significantly the degree of structural diversity of the different families of compounds.

In order to get the most of the potential provided by the new lead compounds discovered, they will be incorporated into functionalized nanoparticles and applied for coating prosthetic devices. These novel bionanomaterials will certainly make a breakthrough to the infection control and thus will make a great impact in the growing field of nanomedicine.

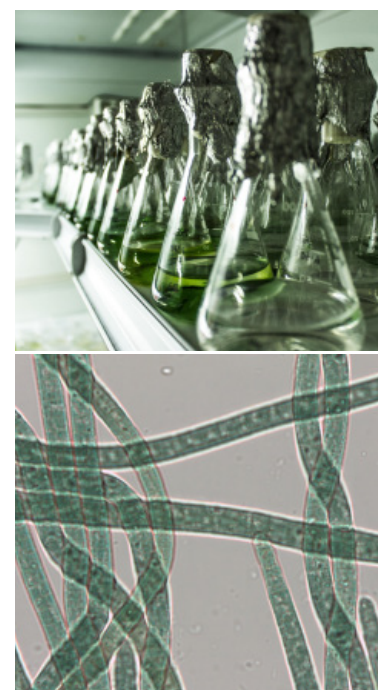
In NOMORFILM all aspect from the discovery of a new lead compound to preclinical assays will be covered.

PRINCIPAL INVESTIGATOR AT CIIMAR
Vitor Vasconcelos

LEADER INSTITUTION
IS Global (Barcelona)

PARTICIPANT TEAMS AT CIIMAR (BBE)
Blue Biotechnology and Ecotoxicology

WEBSITE
www.nomorfilm.eu





ATLANTOS: OPTIMISING AND ENHANCING THE INTEGRATED ATLANTIC OCEAN OBSERVING SYSTEMS

PRINCIPAL INVESTIGATOR AT CIIMAR

Isabel Sousa Pinto

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(BioCost)

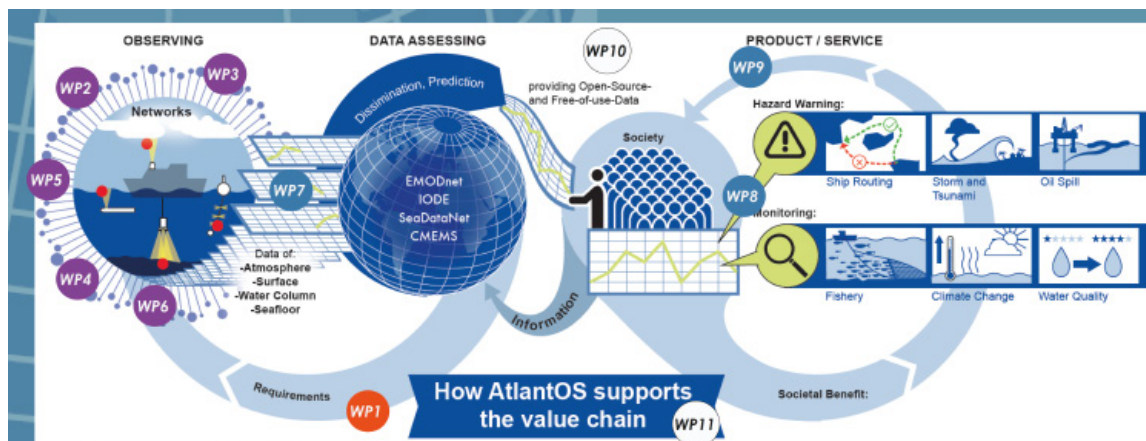
Coastal Biodiversity

WEBSITE

www.atlantos-h2020.eu



The overarching objective of AtlantOS is to achieve a transition from a loosely-coordinated set of existing ocean observing activities producing fragmented, often monodisciplinary data, to a sustainable, efficient, and fit-for-purpose Integrated Atlantic Ocean Observing System (IAOOS). This will be achieved through research and innovation activities focused on: defining requirements and systems design, improving the readiness of observing networks and data systems, engaging stakeholders around the Atlantic, as well as strengthening Europe's contribution to the Global Ocean Observing System (GOOS), a major component of the Group on Earth Observations (GEO), its Global Earth Observation System of Systems (GEOSS), and specifically on its emerging "Oceans and Society: Blue Planet" initiative. AtlantOS contributes to blue growth by merging new information needs relevant to key sectors such as transport, tourism, fisheries, marine biotech, resource extraction and energy with existing requirements. AtlantOS significantly contributes to trans-Atlantic cooperation by integrating existing observing activities established by European, North and South American, and African countries and by filling existing gaps to reach an agile, flexible IAOOS and associated ocean information systems around the Atlantic.



SEA CHANGE PROJECT



Sea Change is an EU H2020 funded project that aims to establish a fundamental “Sea Change” in the way European citizens view their relationship with the sea, by empowering them, as Ocean Literate citizens, to take direct and sustainable action towards a healthy ocean, healthy communities and ultimately a healthy planet.

By using the concept of Ocean Literacy, Sea Change will create a deeper understanding amongst European citizens of how their health depends on the health of our seas and ocean. Sea Change will move to bring about real actions using behavioural and social change methodologies. Building upon the latest social research on citizen and stakeholder attitudes, perceptions and values, the Sea Change partnership will design and implement mobilisation activities focused on education, community, governance actors and directly targeted at citizens. These actions will be assessed for their effectiveness which, in turn, will allow the project to improve its techniques and spread a “Sea Change” in behaviour across Europe.

PRINCIPAL INVESTIGATOR AT CIIMAR

Isabel Sousa-Pinto

LEADER INSTITUTION

Marine Biological Association of the United Kingdom

PARTICIPANT TEAMS AT CIIMAR

(BioCost)

Coastal Biodiversity

WEBSITE

www.seachangeproject.eu

FACEBOOK

[/SeaChangeProjectEU](https://www.facebook.com/SeaChangeProjectEU)





INNOVMAR: INNOVATION AND SUSTAINABILITY IN THE MANAGEMENT AND EXPLOITATION OF MARINE

PRINCIPAL INVESTIGATOR AT CIIMAR

Vitor Vasconcelos (INNOVMAR, NOVELMAR), Luísa Valente (INSEAFood),
Lúcia Guilhermino (ECOSERVICES)

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

Aquatic Ecology & Evolution
Animal Genetics & Evolution
Animal Pathology
Bioremediation & Ecosystems Functioning
Chemistry & Biological Activity of Marine Natural Products
Coastal & Marine Environmental Toxicology
Coastal & Ocean Dynamics
Coastal Biodiversity
Contaminant Pathways & Interactions with Marine Organisms
Ecotoxicology & Blue Biotechnology
Ecotoxicology, Stress Ecology and Environmental Health
Emergent Biotechnologies & Seafood Processing
Endocrine Disruptors and Emergent Contaminants
Estuarine Ecology & Biological Invasions
Evolutionary Genomics & Bioinformatics
Histomorphology, Physiopathology & Applied Toxicology
Hydrobiology
Medicinal Chemistry: Drug Discovery & Drug Design
Modelling & Coastal Management
Nutrition, Growth & Quality Of Fish
Nutrition & Immunobiology
Safety & Healthy Seafood & Sustainable Consumption
Soil/Water Interactions

WEBSITE

innovmar.ciimar.up.pt

INNOVMAR – Innovation and Sustainability in the Management and Exploitation of Marine Resources aims to develop and consolidate the main research lines of CIIMAR through the implementation of 3 projects: INSEAFood, NOVELMAR and ECOSERVICES. INNOVMAR will unravel novel marine products with biotechnological applications; promote innovation and valorization of seafood products, in especial new aquaculture species and assess the environmental quality, vulnerability and risks for the sustainable management of NW coast natural resources and ecosystem services.

INSEAFood – Innovation and valorization of seafood products: meeting local challenges and opportunities – aims to enhance CIIMAR scientific competences in the area of Aquaculture and Seafood Quality that are relevant for the implementation of the North Portugal Smart Specialization Strategy. Research effort will be focused on economically important and well established shellfish (Pacific oyster, *Crassostrea gigas*) and finfish species (European seabass, *Dicentrarchus labrax*) that play a major role in the Portuguese aquaculture sector. The project will also monitor marine algae and natural populations of sea urchin (*Paracentrotus lividus*). The production and promotion of innovative seafood products of high value is expected, such as high quality sea urchin gonads or added nutritional value fish, in order to better exploit Portuguese marine resources and boost the economic and social sectors.

NOVELMAR – Novel marine products with biotechnological applications – aims to strengthen and consolidate CIIMAR know-how and competence in the area of marine biotechnology in special on the use of marine organisms (e.g. cyanobacteria, bacteria, fungi and other organisms) bioactive products that may have pharmacological, nutraceutical, cosmeceutical, antifouling and other industrial applications. The main innovation this research line will be the use of a double approach – a genomic and a bioassay-guided approach, to study a diversity of industrial applications using a biorefinery pipeline concept, aiming to produce zero residues. We will apply a methodology that will involve several levels of biological organization from the DNA (sequencing and survey of gene clusters that produce some of the compounds and further heterologous expression) to the organisms.

ECOSERVICES – Assessing the environmental quality, vulnerability and risks for the sustainable management of the NW coast natural resources and ecosystem services in a changing world, is aligned CIIMAR's research line: Global Changes and Ecosystem Services. The central goal of ECOSERVICES is to strengthen and consolidate CIIMAR expertise and competence to assess environmental quality, vulnerability and risks providing knowledge, technology and solutions for the sustainable management of natural resources and ecosystem services. One of the main innovations of ECOSERVICES is the assessment of the effects, pressures and risks of a wide range of abiotic and biotic factors (exotic invasive species, pathogens, chemical contamination, physical and other alterations due to global climate changes) acting together. This will be achieved through a multidisciplinary approach including endpoints at different levels of biological organization (from molecular to the ecosystem level), physical, chemical and other system parameters, supported and integrated through robust integration modelling with distinct components.



CORAL: SUSTAINABLE OCEAN EXPLOITATION: TOOLS AND SENSORS



CORAL
Sustainable Ocean
Exploitation

A considerable fraction of human populations inhabit coastal regions and crucially depend on the resources and services provided by marine ecosystems. Historically, fisheries have been a central resource providing a substantial fraction of the human dietary intake, namely vital nutrients for human health. More recent developments have open new horizons for Oceanic resource exploitation, namely those related with discoveries in biotechnology or new mineral non-hydrocarbon sources in deep-sea ecosystems. The later has been more and more often recognized as an important source of minerals and biotech-molecules. The limited available information on deep-sea environments implies a great effort on the acquisition of baseline scientific knowledge to ensure a sustainable and responsible exploitation of deep-sea resources. In this context, the development of adequate technological tools and sensors is a fundamental task. The project devised by CIIMAR and INESC TEC, CORAL - Sustainable Ocean Exploitation: Tools and Sensors, sets as central objective to address the sustainable exploitation of marine resources towards filling societal needs and to propose challenge-driven solutions in deep-sea environments. This implies the improvement of the knowledge of the natural processes governing ocean dynamics and ecosystem functions, as well as the major forces driving ecosystems changes, both on regional and global scales. This approach is also directly linked with our capacity to “measure” resources and the impact of their exploitation, and finally to exploit with minimal environmental impact. Our ability to interpret this conceptual “triad”, Ecosystem - Resources-Environment, is largely dependent with the capacity to develop new tools to in situ measure resources, to collect samples at distance for analysis, to develop new standards for environmental assessment in new frontiers such as deep sea, and thus develop sensing abilities capable of diagnosing vital variables for living organisms in rearing conditions (e.g. aquaculture), but also to exactly anticipate negative impacts in humans and wildlife via the development of biological sensors.

PRINCIPAL INVESTIGATOR AT CIIMAR

Filipe Castro (Sensors) and
Miguel Santos (Tools)

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(EcoBioTec)

Bioremediation and
Ecosystems Functioning
(BBE)

Blue Biotechnology and
Ecotoxicology

(EDEC)

Endocrine Disruptors and
Emergent Contaminants

(LOS)

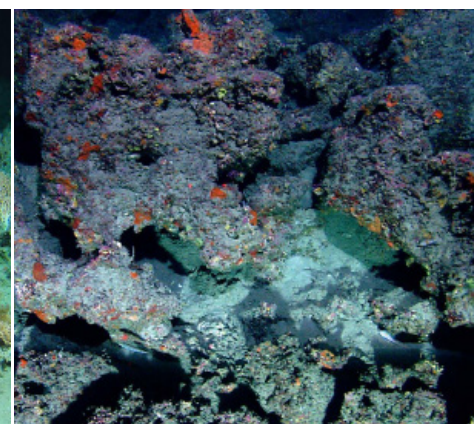
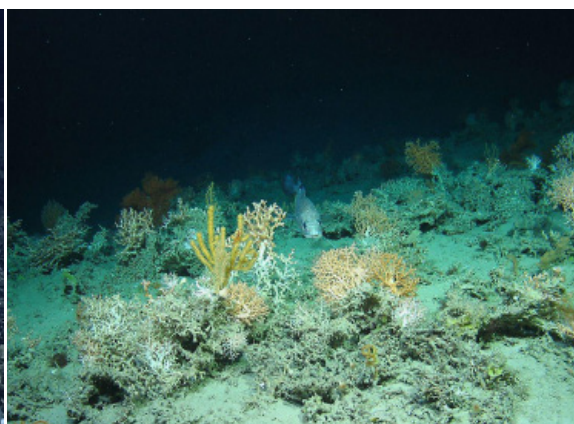
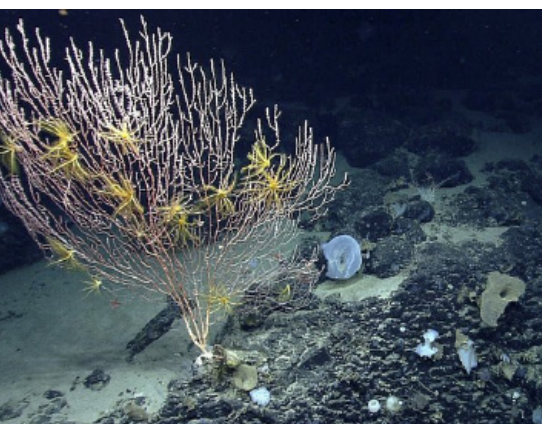
Law Of The Sea

(LEGE)

Blue Biotechnology and
Ecotoxicology

WEBSITE

coral.ciimar.up.pt





MARINFO: INTEGRATED PLATFORM FOR MARINE DATA ACQUISITION AND ANALYSIS

PRINCIPAL INVESTIGATOR AT CIIMAR

Luísa Bastos

LEADER INSTITUTION

ICETA – Instituto de Ciências,
Tecnologias e Agroambiente da
Universidade do Porto

PARTICIPANT TEAMS AT CIIMAR

(COD)

Coastal and Ocean Dynamics

(BIOCOST)

Coastal Biodiversity

(LOS)

Law of the Sea Research Group

(AEE)

Aquatic Ecology and Evolution

(LECOF)

Ecophysiology

(EG)

Evolutionary Genomics

(AGE)

Animal Genetics and Evolution

(BBE)

Blue Biotechnology and

Ecotoxicology

(ECOBIOTEC)

Bioremediation and

Ecosystems Functioning

WEBSITE

www.marinfo.lsts.pt



PROGRAMA OPERACIONAL REGIONAL DO NORTE



UNÃO EUROPEIA

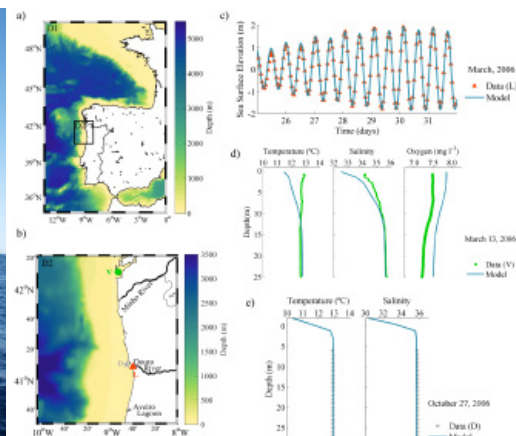
Fundo Europeu de
Desenvolvimento Regional

MarInfo is a project where CIBIO/InBio (ICETA), CIIMAR, SYSTEC and LSTS (FEUP) collaborate to implement an Integrated Platform for Marine Data Acquisition and Analysis, aiming to collect, mobilize, store, synthesize, and ultimately provide both physical and biological data gathered from the marine environment.

MarInfo takes an interdisciplinary approach involving a technological push, driven by experts in engineering and automation, and an application pull, driven by oceanographers and marine biologists. It comprises two distinct, complementary research lines. The first focuses on the development of technology to ease the acquisition of data in the marine environment. Its main objective is to integrate observation and communication technologies to assess specific information such as physical/environmental data or species diversity and behavior, considering the particular regional Atlantic Ocean conditions and dynamics. Autonomous vehicles will be used to overcome limitations to the sustained (systematic) collection of data in the vast and harsh marine environment, and cheap miniaturized loggers will be developed and deployed, at fixed sites or attached to large marine animals, to obtain information on several physical parameters of interest.

The second line focusses on the integration of large volumes of already available data and of newly acquired physical, chemical and biological information into a cohesive framework. Oceanographic data from multiple sources (fixed stations, autonomous vehicles, large predators, benthic sensors) shall be coupled with remote sensing data and fed into regional oceanographic models, allowing forecasts of climate-induced environmental changes and assessment of regional dynamics. New bioinformatic tools will be designed and implemented to generate biological diversity datasets (using metabarcoding/NGS technology) and energetics and trophodynamics datasets, to integrate knowledge at the ecosystems level.

The data acquired and derived information will allow a deeper understanding of the mechanisms coupling oceanographic and biogeochemical processes, unraveling interactions between them and, therefore, supporting decisions towards a sustained use of the marine resources.



MARINER: ENHANCING HNS PREPAREDNESS THROUGH TRAINING AND EXERCISING



Maritime transportation of chemicals (e.g. through tankers, bulk carriers or container ship) has grown considerably in the last few decades; worldwide approximately 2,000 different chemicals are transported by sea. Incidents involving the release of Hazardous and Noxious Substances (HNS) have occurred in European waters. The HNS incidents can present different and often more severe impacts than oil spillages. The nature of many of the chemicals transported means that any incident can have potentially severe public health impacts as well as environmental and societal impacts. HNS spills can be particularly challenging due to the complexity of the identification and assessment of the cargo and associated risks and hazards, and the lack of knowledge on HNS behaviour in the marine environment. Parties signed up to the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) HNS protocol are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries. Under this protocol, HNS contingency arrangements and response mechanisms have to be implemented by the signatory countries and associated authorities in charge of response at the different territorial levels. The key to effective contingency planning is to provide ready access to relevant information, knowledge and resources to facilitate regular training and exercises. While a number of EU R&D projects and organisations have examined this issue, research outputs and guidance is often fragmented and inaccessible. This can present a considerable challenge when interpreting, translating and applying project results to a maritime response and within the training environment. The MARINER project intends to address these issues, focusing on improving planning, preparedness and response to HNS spills in Europe by:

- Capitalizing and translating relevant HNS R&D outcomes into operational resources applicable by planners and responders;
- Improving training and exercise capabilities;
- Upgrading and/or improving tools to support decision making and response;
- Increasing awareness and encouraging information exchange.
- The MARINER project is divided into 6 tasks:
- Coordination and management of the project.
- Knowledge compilation and facilitation.
- Modelling and environmental impact.
- Response protocols.
- Training.
- Project communication.

Concluding, in the framework of the Mariner project, CIIMAR is focussed mainly in improving ecological risk assessment of HNS and implementing at operational level (i.e. in the integration of the outputs obtained into an operation level). For example, the members of CIIMAR have been strongly engaged in the development and update of tools (e.g. databases, guidelines) to address the toxicological risk of priority HNS, as a step towards improving preparedness and response to accidental spills.

PRINCIPAL INVESTIGATOR AT CIIMAR
Miguel Santos

LEADER INSTITUTION
CETMAR - Centro Tecnológico
Del Mar

**PARTICIPANT TEAMS AT CIIMAR
(EDEC)**
Endocrine Disruptors and
Emergent Contaminants

WEBSITE
mariner-project.eu



Funded by
European Union
Civil Protection and
Humanitarian Aid





MARINAQUA4ALGAE : IMPROVING BIO - UTILISATION OF MARINE ALGAE AS SUSTAINABLE FEED INGREDIENTS TO INCREASE EFFICIENCY AND QUALITY OF AQUACULTURE PRODUCTION

PRINCIPAL INVESTIGATOR AT CIIMAR

Luísa M. P. Valente

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(LANUCE)

Laboratory of nutrition, growth
and quality of fish

(SHSSC)

Safety and Healthy Seafood
and Sustainable Consumption

WEBSITE

marinalgae4aqua.ciimar.up.pt



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

I. Culturing marine algae under optimized technological processes to remove organic compounds and minerals from fish farm effluents, and producing high value products for aquafeeds while recycling nutrients; thus improving the water body quality and reducing the environmental impact.

II. Identifying novel feed additives to improve fish digestive capacity and nutrient metabolism upon using the selected algae.

III. Improving fish growth and end product quality, reducing time to slaughter and providing a safe and healthy food item with wide consumer acceptance.

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



RASORGMAT: DEVELOPING WATER TREATMENT TECHNOLOGY FOR LAND-BASED CLOSED CONTAINMENT SYSTEMS (LBCC-RAS) TO INCREASE EFFICIENCY BY REDUCING THE NEGATIVE EFFECTS OF ORGANIC MATTER

This project aims to develop strategies and water treatment technology for removal of particulate organic matter (POM) in land-based closed containment recirculation systems for aquaculture (LBCC-RAS). This will increase efficiency by reducing waste products, off-flavour compounds and carrying capacity of bacteria. Removal of POM is the key to improve the production and product quality of fish produced in LBCC-RAS. Organic matter is the determining factor of the amount of heterotrophic bacteria that can be sustained in the LBCC-RAS. Nitrification efficiency of the bio-filter is affected by the competition for space and oxygen with heterotrophic bacteria. In addition, high amounts of organic matter reduces the efficiency of both UV and ozone disinfection. Heterotrophic bacterial degradation affect the consumption of O₂, the production of CO₂ and ammonia, contribute to water colour and bacteria producing off-flavour compounds, eventually reducing the value of fish and caviar. The effects of high and low removal efficiency of organic matter on the effects on dissolved CO₂, bacteria and off-flavour prevalence will be investigated. Both tank dynamics and water treatment in the RAS loop will be used to obtain high removal efficiency. Multiple drains with optimized geometry and hydraulics will be designed for early particles collection and to be used as a strategy in combination with techniques such as advanced membrane filtration. The effectiveness of a membrane is dependent on several ambient conditions and fouling is a challenge for membrane performance. We will aim to adapt the membrane technology, optimize the operation and maintenance in a LBCC-RAS. A close collaboration with fish-producing companies safeguard that the project is applicable for commercial aquaculture.

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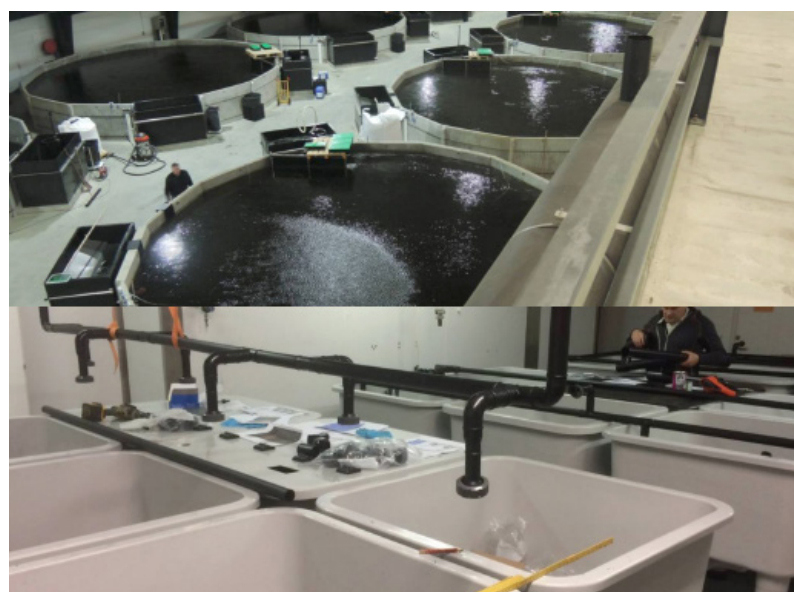
WEBSITE
www.rasorgmat.com

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MARINEYE: A PROTOTYPE FOR MULTITROPHIC OCEANIC MONITORING

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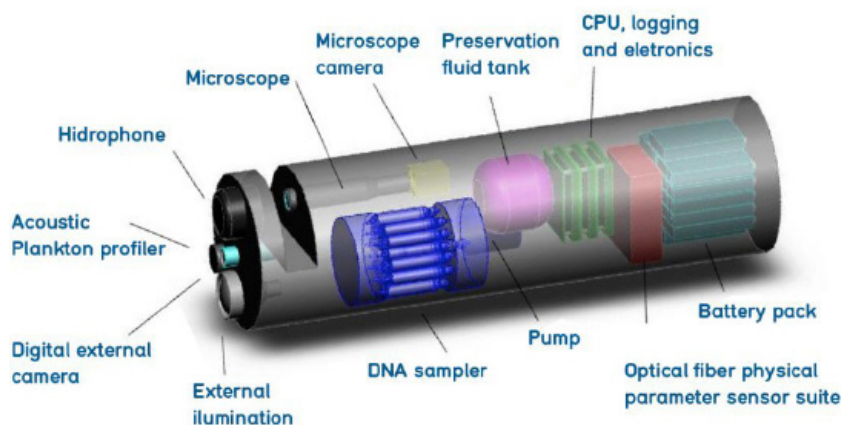
Coastal Biodiversity

WEBSITE

marineye.ciimar.up.pt



Increasing our understanding of the complex exchange among processes throughout ocean basins is severely limited by the paucity of infrastructures able to support sustained and interactive observations of the biological, chemical, physical, atmospheric and geological processes. Because all these processes interact in the ocean in complex ways, promoting a more fundamental scientific understanding of these relationships requires new and transformational approaches to ocean observation. In this project we are developing an autonomous system for integrated marine chemical, physical and biological monitoring – MarinEye. This system combine high-resolution imaging, acoustic, sonar, fraction filtration systems and sensors in a modular, compact system that can be deployed on fixed and mobile platforms. Thus, the autonomous monitoring system that is being developed combines a range of technologies capable of providing data that gives an integrated view of the different compartments of the ocean (physical, chemical, biological) at different levels of knowledge (from genomics to biogeochemistry and from micro to macro community dynamics) but synchronized in time and space. The capability to simultaneously monitor biological, chemical and physical data provides the ability to answer questions about how organisms interact with their environment and with each other, and how these interactions influence the overall ecosystem stability. MarinEye also includes a centralized data base infra-structure that will aggregate all the diverse data sources (physical, chemical, biological) collected by the different modules. This data base feeds a platform of data visualization and summarization that can provide synthetic summaries of the main events of the system in order to simplify data analysis. Moreover, the platform also implements several modelling tools that have as main goal to uncover unsuspected and useful patterns that may exist on the physico-chemical and biological data sets generated. This device will increase oceanic knowledge, complementing the already existent ocean observatories by providing novel integrative data not currently supplied. Marineye will give an extremely important contribution for the consolidation of infrastructures dedicated to the observation of the marine environment.



EPHEMARE: ECOTOXICOLOGICAL EFFECTS OF MICROPLASTICS IN MARINE ECOSYSTEMS



Plastics, synthetic polymers virtually unknown prior to their broad commercialization in the 1950s, are nowadays ubiquitous in the environment, and their global production continues to rise. They are not biodegradable, but undergo weathering that renders their fragments more fragile, and combined to hydrodynamics produce increasingly small particles termed microplastics (MPs), within the micron to mm range, readily taken up by suspension and sediment feeders, and incorporated into the trophic webs. MPs can be toxic per se due to additives used by industry as colorants, plasticizers, flame retardants, etc. In addition, they concentrate hydrophobic chemicals, persistent pollutants (PPs), found in extremely low concentrations in seawater. The present proposal, EPHEMARE, targets (1) the uptake, tissue distribution, final fate and effects of MPs in organisms representative of pelagic and benthic ecosystems, and (2) the potential role of MPs as vectors of model PPs that readily adsorb to their surfaces. The ecotoxicological work relies on an initial study on the equilibrium kinetics of PPs on MPs conducted by a reference analytical laboratory at European level that will provide rigor and assure environmental relevance to the subsequent experimental setups. The consortium, of true trans-European composition (16 partners from 10 countries, 540 person-months), thus includes experts in biological effects of marine pollutants at molecular, cellular, physiological and organismic levels, up to-date singular facilities for aquatic toxicity testing under strict QA/QC conditions, and some of the world leading teams in MPs research. The EPHEMARE multidisciplinary consortium will allow identification of operational biomarkers with potential for MP detection in the environment, as well as omics approaches to elucidate molecular pathways causing biological effects. The composition and capacities of the partnership allow in-depth studies on fundamental mechanisms underlying these effects across the main phyla of marine organisms from bacteria to fish covering most of the trophic levels. In addition to experimental exposures, field validation studies will be performed in four areas representative of coastal ecosystems submitted to different degrees of anthropogenic pressure, thus linking the ecotoxicological findings from laboratory studies to the environmental scale. The communication and connection with private and public stakeholders, which involves 67 person-months from 14 partners, is one of the priorities of EPHEMARE in order to facilitate public awareness, pre-normative research, and implementation of European Directives.

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bip.up.pt



The BIP – Business Ignition Programme is a hands-on technology acceleration programme designed to support the validation of business models for technologies developed in academia. The programme has three main objectives:

- Identify market opportunities for potential products/services resulting from research;
- Provide the participants with the necessary skills for the valorisation and commercialisation of technologies;
- Support the development of valorisation plans, including the creation of new technology-based companies.

BIP participants will have access to:

- Support and follow-up by one element, with business skills, who will apply their skills, experience and networking to the development of the project, as a member of the team.
- Immersive sessions in technology commercialisation according to the Business Model Canvas and Customer Development methodologies.
- In-class sessions and seminars where experienced tutors will share their experiences and strategies for delineating and validating business models.
- Meetings with mentors who will follow the evolution of teams and facilitate the validation of business models.

During the programme, Customer Development process, developed by Steve Blank, and the Business Model Canvas methodology, created by Alexander Osterwalder, will be applied to help the teams approach the market and find product/market fit. Sonae will be BIP's business partner providing mentorship to ideas and projects with application in the retail sector.



CYANOTOX – ASSESSMENT OF CYANOBACTERIAL TOXINS IN AQUATIC SYSTEMS: ENVIRONMENTAL IMPACTS AND DEVELOPMENT OF NEW METHODOLOGIES FOR THEIR EARLY DETECTION

Harmful algal blooms are a global threat to the aquatic ecosystems worldwide. Besides diminishing the water quality the release of toxic bioactive compounds (cyanotoxins) that are produced by those algal blooms seriously affect the human and animal welfare that depend on those water systems. With several reports on the morbidity and mortality in both humans as well as animals documented worldwide its repercussions on the environmental health is also another great impact that these compounds carry. With different modes of action cyanotoxins are known to target and harm specific organs and can be classified as hepatotoxic, neurotoxic and dermatotoxic. Hepatotoxins act on the liver and include the microcystins, cylindrospermopsin and nodularin. Meanwhile neurotoxins act on the nervous system and include the anatoxins and saxitoxins. Finally the dermatotoxins act on the skin and include aplysiatoxin and lyngbyatoxin-a. Currently the available methodologies allow together the identification and quantification of the existing cyanotoxins as well as the species or genera that are producing them in any given environment. Though analytical methods are those that allow the toxic evaluation in any given environment through its quantification it is with the molecular screening that the presence of potentially toxic cyanobacteria species indicates the capability of at any given moment the occurrence of toxicity in that same environment. In this sense these latter constitute with no doubt until now a valuable tool in the first assessment of the toxic potential in any given sample being currently well established in the reports of cyanotoxins globally. As a result we propose to develop new tools (primers) that will optimize the implementation of these methods in a direct environmental assessment of cyanotoxicity with the simultaneous detection of the organism involved. To achieve this several water systems throughout Portugal (Rio Tâmega, Parque da Cidade do Porto, Lagoa da Vela and Lagoa de Mira) will serve as a working area where the application of these new tools will be evaluated. Their validation by comparison with the analytical methods aims in its future use in both research and environmental assessment.

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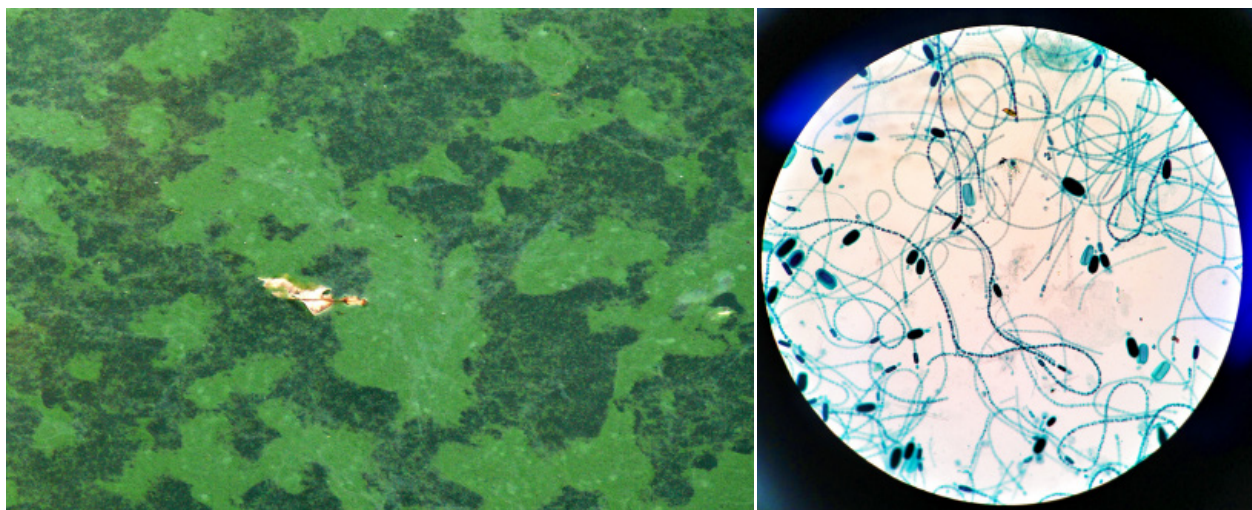
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COMPETE 2020

PORTUGAL 2020

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EXCELENCIA – INOVAÇÃO E TECNOLOGIA



ANIMAL SENSORY DIVERSITY: INNOVATIVE GENOMIC SOLUTIONS TO ENHANCE PERCEPTION OF ENVIRONMENTAL STIMULI

PRINCIPAL INVESTIGATOR AT CIIMAR

Agostinho Antunes

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PARTICIPANT TEAMS AT CIIMAR

(EGB)

Evolutionary Genomics and
Bioinformatics

COMPETE
2020

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Animals are equipped with specialized sensory organs fundamental to their interactions with a rich multisensory world through the perception of chemical (smell and taste) and physical (mechanical, sound, vision and temperature) stimuli. These systems diversified over more than a half billion years to produce an array of sense organs with multiple functions. By contrast, disruption of sensory genes can have serious repercussions (e.g. winter depression due to disturbance in circadian clock regulation, varied sensitivity to sweetness and obesity, and photoreceptor degeneration associated with visual disorders). In this project, an omics approach will be used to assess the molecular mechanisms underlying animal sensory perception including associated genetic malfunctions. This may lead to a wide range of applications with relevance for environmental and biomedical research.



OVERCOMING ENVIRONMENTAL PROBLEMS ASSOCIATED WITH ANTIFOULING AGENTS: SYNTHESIS OF NATURE-INSPIRED NONTOXIC BIOCIDES AND IMMOBILIZATION IN POLYMERIC COATINGS

We currently do not have a viable option for widespread replacement of copper in antifouling paints. Marine Environment Protection Committee (MEPC) alerted to the severe ecological consequences when no acceptable alternatives exist, namely, acceleration of green house and acid rain effects, due to higher heavy oil consumption, and trans-global contamination of ecosystems with exotic organisms. So, there is a practical and urgent need of identifying innovative environmentally friendly and nontoxic technologies to combat biofouling. Marine natural products have been considered as one of the most promising sources of antifouling compounds in recent years. For example, zosteric acid, which is a p-sulfated cinnamic acid derived from the marine angiosperm *Zostera marina*, has received much attention as a potential natural product antifoulant. Zosteric acid is fully biodegradable and possesses a half-life in seawater of a few days but the compound has high water solubility and its release from conventional antifouling paints is difficult to control. The team of this project developed a technology to synthesize innovative zosteric acid-inspired compounds, and a new immobilization technology to incorporate them in polymeric coatings. The combination of these two technologies can provide an important contribution to overcome the current limitations on biofouling control.

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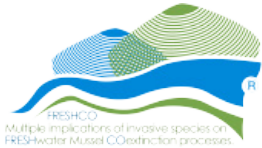
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(MEDCHEM)

Medicinal Chemistry: Drug Discovery and Drug Design (BBE)

Blue Biotechnology and Ecotoxicology Group





MULTIPLE IMPLICATIONS OF INVASIVE SPECIES ON FRESHWATER MUSSEL CO-EXTINCTION PROCESSES

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Aquatic Ecology and Evolution



Freshwater ecosystems are one of the most endangered global habitats, with biodiversity declines far greater than those on marine and terrestrial realms. This is especially true for freshwater mussels (FM: Bivalvia: Unionoida) which are responsible for important ecological functions and services and are among the most threatened faunistic groups worldwide. FM depend on fish to complete their life cycle, where mussel larvae (glochidia) use a specific range of fish hosts. This trait makes them particularly threatened by invasive alien species (IAS) since changes on the host fish populations may eventually lead to the decline or coextinction of the dependent species. However, it is extremely difficult to disentangle the real impact of IAS from other disturbing factors such as habitat loss and fragmentation, pollution, climate change and overexploitation. The Iberian Peninsula holds a high level of spatially restricted species and endemism as well as a large number of threatened freshwater species, including fish and mussels. Furthermore, Iberian freshwater systems have suffered a long history of habitat degradation being also among the most heavily invaded ecosystems in the world. These facts turn the Iberian Peninsula in an excellent case study to assess the impacts of IAS on local threatened freshwater fauna. Under those considerations, the present proposal aims to estimate the direct and indirect impacts of selected highly IAS belonging to distinct functional groups (from plants to vertebrates) on the native Iberian FM and its fish host fauna. Our approach is novel and will use a combination of classical ecological approaches as well as cutting edge environmental isotope analysis, modelling and molecular techniques.



DINOFLAGELLATES FOR SUSTAINED SUPPLY OF ACTIVE COMPOUNDS IN OPTIMIZED PHOTOBIOREACTORS

The long lasting interest on dinoflagellate microalgae for their being sources of marine biotoxins affecting seafood safety, has boomed in recent years due to their unexpected application as pharmacological drugs. This is the case of *Karlodinium* genus, exhibiting the unique feature of synthesizing karlotoxins (with chemical structures recently resolved) with a noteworthy medical potential. Karlotoxins trigger formation of pores in cholesterol-containing cell membranes, thus disrupting osmotic balance and causing lysis; besides their obvious role as hypocholesterolemic pharmacore, karlotoxins may be used as antitumor agents. Therefore, our model biocatalyst and metabolite are well-defined – but productivity of the latter is far from acceptable, thus constraining clinical testing and industrial production.

Large-scale chemical synthesis of karlotoxins is exceedingly complex; and the genome of their source dinoflagellates is unusually long and complex, thus hampering genetic and metabolic engineering. Culture in photobioreactors is thus the only realistic option to obtain significant quantities of those compounds. However, said microalgae are fragile and grow slowly, so classical (closed) photobioreactor configurations and operating conditions are not appropriate at all. Building on the somewhat scattered information on lab-scale cultivation of other dinoflagellates, novel photobioreactors will be designed, and operating conditions will be tuned – thus constituting the core innovation of this proposal.

In view of their great contribution to global processing costs in blue biotechnology, downstream separation techniques will also be addressed – toward novel solutions, or optimization of classical methods of harvesting, dehydration and disruption of biomass, extraction and purification of karlotoxins leached, and polishing of final commercial product. We will expand on the existing portfolio of post-reactional handling methodologies – so as to develop dedicated techniques, suitable and optimized for a new class of compounds with pharmaceutical interest; and will assess the overall environmental impact and economic feasibility, after tentative scale up.

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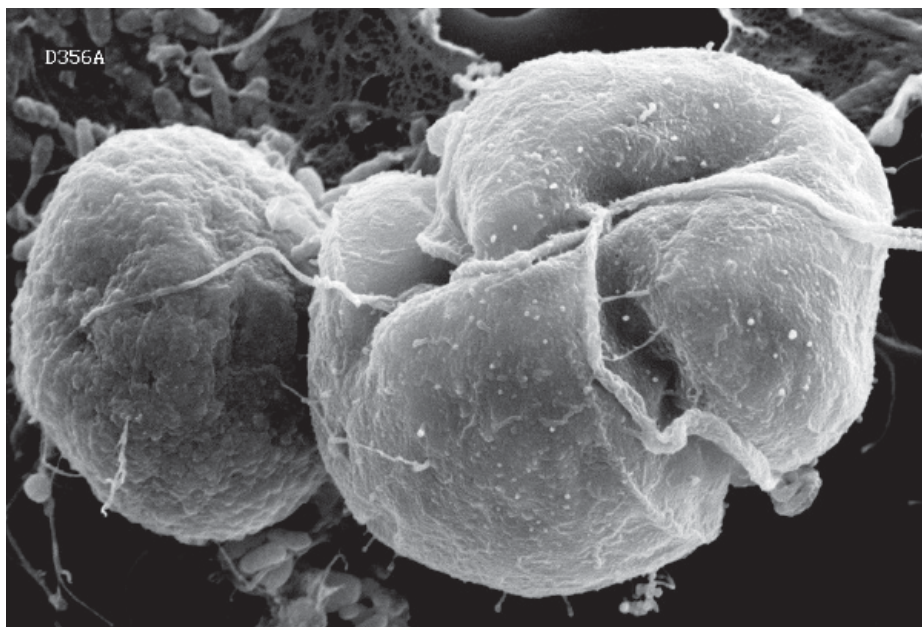
Coastal Biodiversity

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FROM ZEBRAFISH TO MEAGRE: USE OF MACRO- AND MICROALGAE AS FUNCTIONAL FEEDS

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(BIOCOST)

Coastal Biodiversity

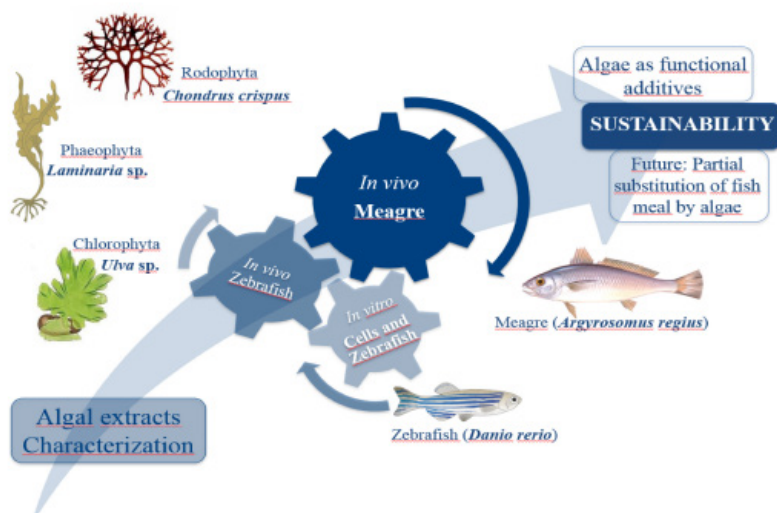


The project undertakes multidisciplinary research in order to contribute to the development of sustainable aquaculture in Portugal. The diversification in aquaculture species is essential for development of a competitive industry, and meagre has become one of the most attractive candidates for diversification, due to its excellent biological characteristics, high rates of growth, feed conversion and fertility.

The increasing of intensive culture of meagre is at risk from a range of common disease agents, such as bacterial, that impact on other species production. During the last years, attention has been focused on marine organisms as a source of substances of therapeutic interest for the prevention and prophylaxis of farmed fish diseases, reducing the use of antibiotics.

The main objective of the present project is combining the advantages of macro- and microalgae bioactive compounds for inclusion as functional feeds in fish diet. Several autochthonous macro- and microalgae extracts are characterized in terms of bioactivity and their effects on fish growth and health are explored, in order to serve as a basis for further research on the use of selected algae biomass as functional ingredients in fish feed formulations and, ultimately for product commercial development.

Thus, the project is divided in two main research lines: production and characterization of macro- and microalgae, as well as the study of their biological activities *in vitro*, using cell cultures; and, on the other hand, evaluation of the effect of the diet algae incorporation on growth performance and immune status of meagre, taking advantages of zebrafish as experimental animal model. Validation of zebrafish as model in fish nutrition trials allows more cost-effective and less time consuming studies, contributing to future research. In addition, it is expected to gain a great deal of information on meagre genomics, a resource that will be useful for future studies with this valuable species.



POISONING THE HEART WITH ANTICANCER DRUGS: IS METABOLIC BIOACTIVATION OR AGING PROMOTION THE LINK TO THE CARDIOTOXICITY OF ANTICANCER DRUGS?

Anticancer therapy should be considered a cardiovascular risk. The number of cancer survivors is hugely increasing, as well as chemotherapy-related long term cardiotoxicity, namely heart failure (HF). HF strongly impacts on the life of quality and life-expectancy of cancer treated patients and it is a heavy burden to the health care systems. The prosecution of early cardio-protective therapy is critical for the success of cardiac treatment. However, available biomarkers of cardiotoxicity are poor predictors of early cardiotoxicity or very challenging and costly. Anthracyclines [e.g. doxorubicin (DOX)], cyclophosphamide (CTX), and mitoxantrone (MTX)] are first hand clinical weapons on cancer (MTX and CTX also have other clinical uses). They are major causes of chemotherapy-related HF and overall cardiotoxicity, which can reach up to 30% of patients. The cardiotoxicity mechanisms of anticancer drugs are largely unknown at this point and the discovery of early biomarkers of anticancer drugs-induced cardiotoxicity will be of great clinical value. Drug metabolism of aging may be potential biomarkers of early cardiotoxicity. Although a link between cardiotoxicity and drug metabolism has not been yet established for most drugs, the metabolites of DOX and CTX may be involved in their cardiotoxicity. MTX-metabolism increased the drug's cytotoxicity. On the other hand, aging and HF share some characteristics and MTX increased markers of cardiac aging, namely impaired proteasome activity, increased protein carbonylation and fibrosis.

In this project we aim to answer to the following questions: Is anticancer drug metabolism a crucial factor for the development of cardiotoxicity? Are anticancer drugs promoters of cardiac aging? Drug metabolism profile and cardiac aging markers can be very valuable candidates for early detection of cardiotoxicity, allowing early clinical intervention and therefore increasing patient's quality of life.

To answer to the proposed questions and find new early cardiac biomarkers, 7 tasks are planned with a broad team and multidisciplinary techniques.

We expect to clarify the role of drug metabolism on the cardiotoxicity of anticancer drugs thus finding which are the most cardiotoxic metabolites; and determine if anticancer drugs promote cardiac aging. Plasma/cardiac drug levels or their metabolites, as well as aging markers can be valuable biomarkers to determine early cardiotoxicity of anticancer drugs, allowing effective cardio-protective measures.

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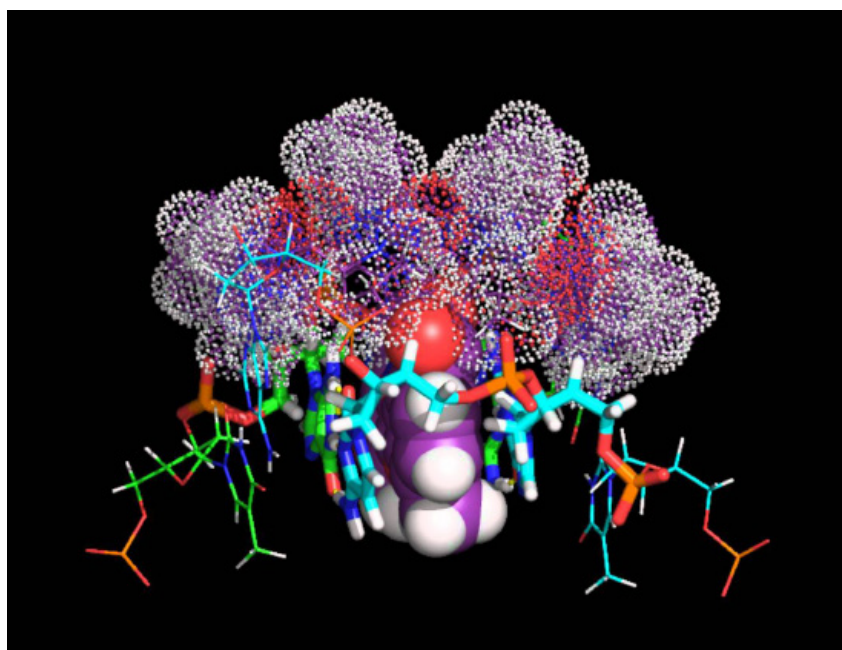
LEADER INSTITUTION

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Medicinal Chemistry: Drug Discovery and Drug Design



ACTONP53: TARGETING P53 FAMILY PROTEINS ON THE ROUTE TO NEW ANTICANCER AGENTS

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(MEDCHEM)

Drug Discovery and Drug Design

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2020

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Cancer is among the leading causes of morbidity and mortality worldwide. The efficacy of the available anticancer chemotherapy remains quite limited, and generally associated with increasing drug resistance and severe side effects. The discovery of new anticancer agents is therefore a major medical priority. The p53, p63 and p73 tumor suppressors are key therapeutic targets in cancer. Inactivation of these p53 family proteins by interaction with MDM2 and MDMX, and mutation of p53 are common events in human tumors, leading to two major anticancer therapeutic strategies: inhibition of the MDMs interaction with p53 family proteins, and mutant (mut) p53 reactivation. To date, most of the pharmacological efforts have been focused on the p53-MDM2 interaction, with only one small molecule inhibitor of p53-MDMX interaction and three p53-MDM2/MDMX dual interaction inhibitors reported. Inhibitors of p63/p73-MDMs interaction are still mostly unknown. The identification of reactivators of mut p53 brought new expectations to the therapy of tumors expressing mut p53. Moreover, the discovery of mut p53 oncogenic gain-of-function (GOF), mainly through interaction with transcriptionally active p53 family proteins, led to a new promising anticancer strategy.

In previous works, we developed innovative targeted screening assays, combining yeast and human tumor cells, which led to the identification of hit small molecule activators of p53 family proteins.

With this proposal, we aim at fully developing the potentials of our approach and recent results. Particularly, we intend to:

1. Gain knowledge into mut p53 biology in the context of its gof
2. Develop anticancer drug candidates activators of p53 family proteins
3. Design effective combination therapies with conventional chemotherapeutic drugs
4. Develop a targeted drug delivery nanosystem for efficient and selective delivery of our drug candidates into tumor cells
5. Validate the antitumor properties of our anticancer drug candidates in genetically-characterized patient-derived xenograft (pdx) models

Collectively, relevant advances in anticancer therapy are expected to emerge from this project.



JELLYFISHERIES: TOWARDS AN INTEGRATED APPROACH TO ENHANCE PREDICTIVE ACCURACY OF JELLYFISH IMPACT ON COASTAL MARINE ECOSYSTEMS

Climate change and overfishing promote marine ecosystem instability, thereby fostering low-economic value species with rapid- turnover, such as jellyfish (i.e. cnidarian medusae and ctenophores). Ubiquitous in marine food webs, frequent proliferations of jellyfish are acknowledged as indicators of marine ecosystem change. Increased jellyfish outbursts concomitant with global anthropogenic changes are of current concern due to their harmful impact on fish stock and tourist industry.

JELLYFISHERIES aims to unveil the underlying mechanisms through which global antropogenic changes interact with jellyfish populations in Portuguese coastal ecosystems, namely by: (1) providing an overview of the current state of jellyfish, both native and invasive species; (2) quantifying the effects of jellyfish blooms on the ecosystem; (3) assessing jellyfish blooms expansion; (4) evaluating consequences of jellyfish blooms for tourism, industry and fisheries, and (5) contributing and develop synergies with similar scientific programs dealing with ecosystem responses to Global Change.

Ultimately, this project will suit Portugal with a coastal alert system for the occurrence of marine threats (e.g. jellyfish blooms), evaluating marine productivity and predicting ecosystems responses, as well as the recruitment of commercially important fish stocks (e.g. sardine).

JELLYFISHERIES consists of a multidisciplinary team with researchers from different Portuguese institutions – IPLeiria, IPMA, CIIMAR and CCMAR, complemented with two international partners, from the Gothenburg University (Sweden) and the GEOMAR (Germany).

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Evolutionary Genomics and Bioinformatics



EFFECT OF FATTY ACID SOURCE (N-6 VS. N-3) ON THE EICOSANOID CASCADE AND INTESTINE INFLAMMATION IN GILTHEAD SEA BREAM (*Sparus aurata*)

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(NUTRIMU)

Nutrition and Immunobiology

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Sustainable development of intensive aquaculture depends on dietary fishmeal (FM) and fish oil (FO) replacement by plant feedstuffs. Though replacement of diet FM poses practical problems most of them are being overcome by the application of judicious nutritional strategies. Replacement of FO by vegetable oils (VO) is more striking, namely by marine fish having absolute requirements of n-3 Long-Chain Polyunsaturated Fatty Acids (LC-PUFA) which are not present in VO. Thus, in practical aquafeeds for marine fish FO cannot be completely replaced by alternative oil sources. FO has however been partially replaced with success in marine fish diets without negative consequences on fish performance. Nevertheless, even partial replacement of FO by VO in aquafeeds drastically alters dietary FA profile and the n-3/n-6 FA ratio, and this may have negative consequences in fish immune status.

This study intends to investigate the effect of dietary FA, and the interaction of dietary FA with dietary carbohydrates, on lipid metabolism, eicosanoid cascade, and the immune status of an important aquaculture species: gilthead seabream (*Sparus aurata*), aiming to potentiate the use of VO in aquafeeds for marine species, aiming to promote a healthy sustainability of aquaculture industry. Data of this study is expected to be extrapolated to other marine fish species, and to contribute for a better understanding of the importance of n-3 FA in farmed animals and humans.



NAVIGATING THROUGH MARINE DERIVED FUNGI: BIOPROSPECTION AND SYNTHESIS OF BIOACTIVE SECONDARY METABOLITES AND ANALOGUES AS CHEMOTHERAPIC AGENTS

The need for a continued search for new anti-infective and anticancer drugs is universally considered of great importance since many of the current drugs are insufficiently effective, highly toxic, and resistances may be developed. Two alkaloids, being eurochevalierine a potent inhibitor of the growth of human tumor cell lines, were isolated from the soil fungus *Neosartorya pseudofischeri*, and neofiscalin A from the soil and marine fungus *N. siamensis* with potent antibacterial activity. *Neofiscalin A* exhibited also antibiofilm activity in both reference and multidrug-resistant isolates, and is currently in the patent filing process. These compounds and their derivatives are under study in order to obtain quantities as well as for more biological assays. On the other hand, marine fungi derived xanthenes, particularly yicathins and isomers were considered promising as chemotherapeutic agents. So, *eurochevalierine*, *neofiscalin A* and *yicathins* can be considered very interesting models to discover new anti-infective and anticancer drugs to overcome drug-resistance that could represent innovative drug candidates. However, their availability to proceed to further investigations and their complex structures could limit their future as drug candidates. Our goal is not only to continue with the search for innovative marine-derived compounds but also to obtain derivatives/ formulations of the most promising compounds to obtain more efficient analogues and more effective delivery systems.



PRINCIPAL INVESTIGATOR AT CIIMAR
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LEADER INSTITUTION
CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR
(CBAMNP)
Chemistry and Biological
Activity of Marine Natural
Products
(MEDCHEM)
Medicinal Chemistry: Drug
Discovery and Drug Design

COMPETE
2020

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INCLUSION OF MICROALGAE IN SEA BASS DIETS: BOOSTING IMMUNITY THROUGH NUTRITION

PRINCIPAL INVESTIGATOR AT CIIMAR

Ana Couto

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CIIMAR-UP

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(NUTRIMU)

Nutrition and Immunobiology



The aquaculture feed industry requires suitable and sustainable ingredients alternative to fishmeal and fish oil. Microalgae are potential candidates, particularly because of their long-chain polyunsaturated fatty acids (namely omega-3 fatty acids) and other bioactive compounds with immunostimulant, antioxidant or probiotic function.

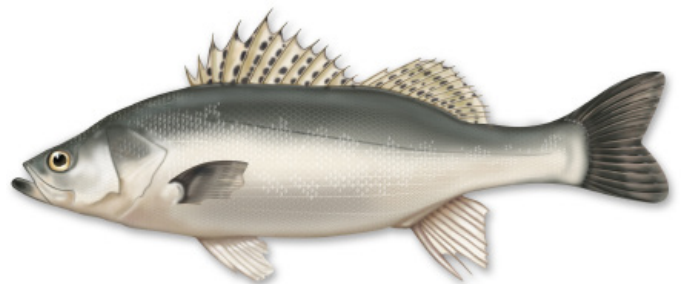
Microalgae already being produced in a Portuguese biorefinery will be tested for their nutritional value as ingredients in sea bass diets. Sea bass is an important aquaculture species largely exploited in the Mediterranean countries.

Microalgae will be tested as functional ingredient in marine fish aquafeeds, and its putative beneficial effect in fish health and welfare evaluated. Animal health and welfare is a pressing issue in animals reared in captivity, since healthy and stress-free animals are less prone to diseases. In aquaculture the high rearing densities together with the aquatic medium surrounding fish, facilitates the propagation of diseases. Thus, nowadays, aquafeeds are expected to deliver not only the required nutrients for maximization of fish performance, but also functional ingredients that guarantee fish health and welfare.

Since fish are claimed to be beneficial for human health due to their fatty acid profile, namely omega-3 fatty acids, known for their effects in cardiovascular diseases prevention, AlgaFish will evaluate if the valuable components of microalgae are being incorporated in fish flesh.

In conclusion, the use of microalgae is expected to contribute towards more cost-effective and eco-friendly aquaculture. Both outcomes are in line with the Portuguese and European strategies for sustainable development of aquaculture.

Aquafeeds of the future are expected to impart dual benefits of good growth and health to the farmed organism, and preventive health care through nutritional means is certainly a strategy to ensure sustainability in aquaculture.



MYTAG: INTEGRATING NATURAL AND ARTIFICIAL TAGS TO RECONSTRUCT FISH MIGRATIONS AND ONTOGENETIC NICHE SHIFTS

Fish migrations are a fundamental concern in marine biology, still triggering scientific curiosity and technological challenges. Reconstructing migration pathways throughout fishes' life cycle is fundamental to understand population dynamics, fishes' resilience to harvest and ultimately design effective management and conservation plans. Despite multiple efforts in the last decades combining innovative techniques and approaches, studying individual fish movements remains a challenge, and is a new and exciting field of application of technological innovation to marine sciences.

MYTAG will use state of the art techniques to integrate natural and artificial markers to study fish reproductive migrations, estuarine colonization and nursery habitat use of a model species, the European flounder (*Platichthys flesus*). Flounder is a species that migrates along the river-estuary-sea continuum throughout its life-history, with adults migrating offshore to spawn and early life-stages as larvae and juveniles migrating into coastal or estuarine habitats. The innovative aspect of this project is the integration of both natural and artificial tags, and the development and application of new technological solutions for tracking marine fish populations using autonomous surface vehicles (ASVs). The project starts by a preliminary experimental work in the laboratory and in the field to test the effects of acoustic markers and external tags on fish behaviour, condition and survival. A strategically designed field work approach will reconstruct life-history migrations using natural markers, as otoliths and gonads. New technological approaches for direct tracking of fish movements over the river-estuary-sea continuum will be firstly developed on laboratory trials, and later in the final marine tracking experiment. Selected artificial tags will be applied to fish, including external tags for mark-and-recapture experience and acoustic tags to be tracked by ASVs to disclosure the species' major life-history events, as spawning migrations, estuarine nursery colonization and differential habitat use. MYTAG implements a new multi-tag approach and innovative techniques applicable to many species worldwide, improving the efficacy of management and conservation strategies, allowing also for the opportunity of new technological innovation.

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Sandra Ramos

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(EcoBioTec)

Bioremediation and
Ecosystems Functioning
(EEBI)

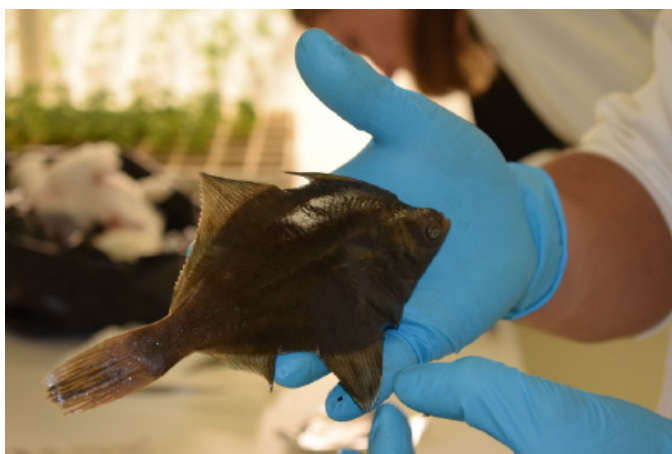
Estuarine Ecology and
Biological Invasions

(METOX)

Coastal and Marine
Environmental Toxicology

FACEBOOK

facebook.com/MytagProject/



PLASTICGLOBAL: ASSESSMENT OF PLASTIC-MEDIATED CHEMICALS TRANSFER AND EFFECTS IN FOOD WEBS OF DEEP, COASTAL AND ESTUARINE ECOSYSTEMS UNDER GLOBAL CHANGE SCENARIOS

PRINCIPAL INVESTIGATOR AT CIIMAR

Lúcia Guilhermino

LEADER INSTITUTION

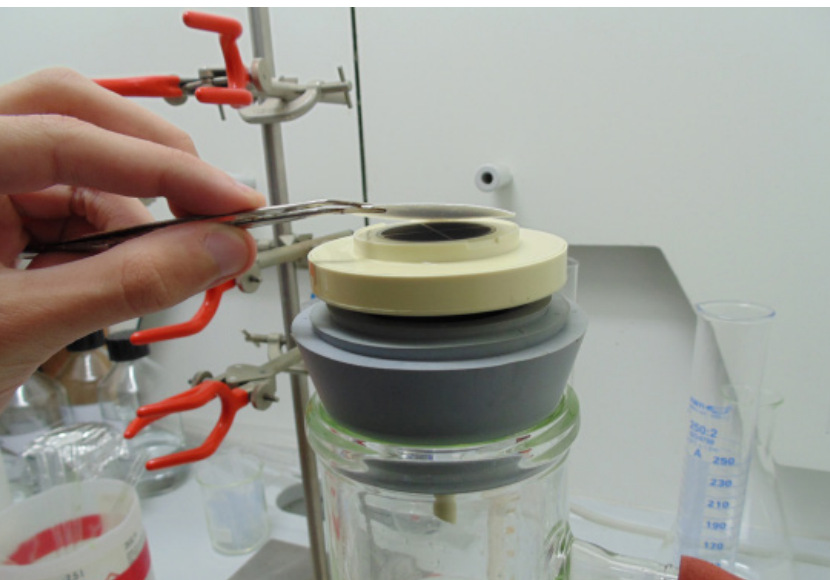
CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR (ECOTOX)

Ecotoxicology, Stress Ecology
and Environmental Health
Contaminant Pathways and
Interactions with Marine
Organisms
Soil/Water Interactions
(EEBI)
Estuarine Ecology and
Biological Invasions



The marine environment contamination by debris of several types is a global scale paradigm of difficult solution. Thus, marine litter is now an international priority topic of research and is included in the European Marine Strategy Framework Directive (MSFD) as a key Descriptor (D) – D10. Plastics are a major component of marine litter. Plastic particles under 5 mm of size, known as microplastics (MP), have been found worldwide and are able to cause physical and chemical adverse effects on wild animal species often leading to death. Thus, a high concern relatively to the adverse effects of these particles and the chemicals that they may contain (MP-chemicals) on environmental and human health exists, especially after their introduction into marine food webs. The MP-mediated chemicals transfer and its effects are poorly documented, further knowledge being urgently needed to assess environmental risks (ERA) and to guarantee the safe consumption of marine species by humans. The main goal of PLASTICGLOBAL is to assess the MP-mediated chemicals transfer in marine food webs and its effects on the biota under climate change scenarios. The first part of the project aims to document the MP (types, size classes,...) and MT-chemicals in the water column, sediment and biota of 3 ecosystem types: deep sea (Madeira Island Region), Continental (Portuguese) waters, and estuary (Minho River, included in Nature 2000) and their biological effects. The second part of the project refers to experimental data in support of models representing the transfer of MP-chemicals to organisms and through food webs, and their effects. Plastic properties (size, type, environmental aging), and trace elements microdistribution on the MP surface will be considered. The effects induced by MP and MP-chemicals (single & multi-stressors exposures) on selected species representative of at least 3 trophic levels (food chain models) of marine/estuarine ecosystems will be studied in relation to climate changes. Finally, a preliminary ERA of temperature rise on the MP-chemicals transfer and its effects will be done and the implications for human food safety will be established.



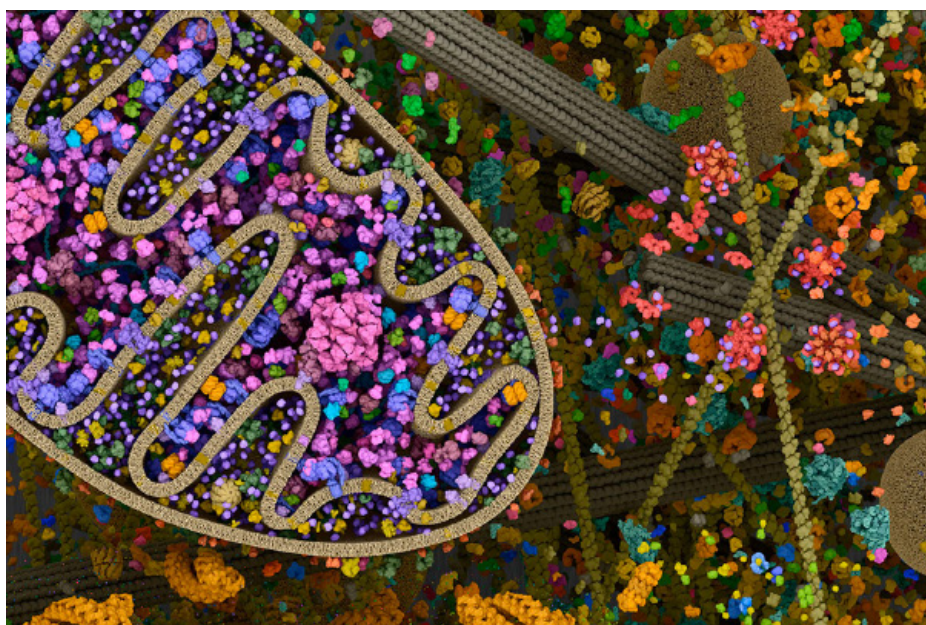
TARGETING HUNTINGTIN PROTEOSTASIS AND MITOCHONDRIA TO PREVENT NEURONAL DYSFUNCTION IN HUNTINGTON'S DISEASE

The major aim of this project is to address the involvement of mitochondria in Huntington's disease. CIIMAR has been involved in the molecular tasks of the project, in particular in the study of the affected molecular pathway following exposure to pharmaceuticals impacting normal mitochondria functions.

PRINCIPAL INVESTIGATOR AT CIIMAR
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LEADER INSTITUTION
ICETA-UP

PARTICIPANT TEAMS AT CIIMAR
(EDEC)
Endocrine Disruptors and
Emergent Contaminants



COMPETE
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REEuse: RECOVERY VERSUS ENVIRONMENTAL IMPACTS OF RARE EARTH ELEMENTS DERIVED FROM HUMAN ACTIVITIES

PRINCIPAL INVESTIGATOR AT CIIMAR

Carlos Vale

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

Contaminant Pathways and
Interactions with Marine
Organisms

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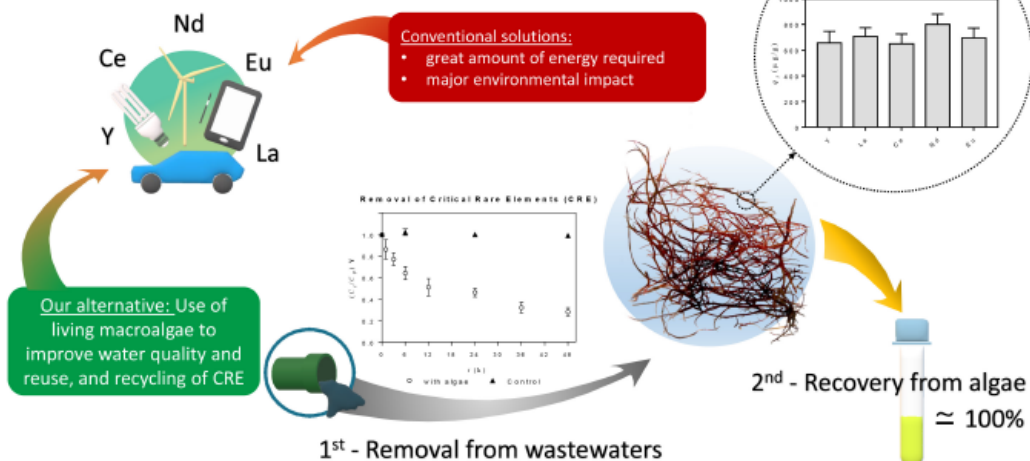
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CENTRO DE INVESTIGACAO E INOVACAO

The European Union has classified rare earth elements as Critical Metals because of its low abundance in Nature and the fact that mining is carried out almost exclusively by the People's Republic of China. This may lead to a bottleneck in the world's economy and hamper the implementation of the EU's Energy and Technology Strategic Plan. Rare earth elements have been considered important raw material for industry and are also essential in new technologies in electronics, pharmaceuticals, industrial products and innovative technologies for environmental protection. The duality between the mining monopoly and the increasing application of rare earth elements creates ideal conditions to develop recycling and reuse processes of these elements. However, the massive use of rare earth elements in the industry also leads to their rejection through sewage and waste and are therefore considered as emerging contaminants. Studies of the cycle of these elements in the environment are few and therefore their potential impact on aquatic ecosystems is not known.

In order to address this problem, the objective established for the project is to obtain know-how to improve the recycling process of rare earth elements and, consequently, to reduce the emissions of these elements to the aquatic environment. The project aims to select chemical methodologies or biological processes with conventional or alternative application to remove rare earth elements from urban and industrial sewage. This scientific knowledge will support the recycling and later reuse of these elements in industrial processes. The project will also assess the benefits of reducing emissions of these elements to the environment. The design of this project is also innovative from the environmental point of view because the recycling and reuse process of these contaminants has a positive environmental impact.

- **Problem:** Increasing need of critical rare elements for technological applications, while their levels in environment raise – new emerging contaminants



PEIXEROL: GLYCEROL AS AN ALTERNATIVE INGREDIENT FOR FISH FEED AND ITS POTENTIAL FOR AQUACULTURE

Aquaculture remains highly dependent on fishmeal protein and its supply contingent on the exploitation of wild fisheries. Any reduction in its utilization by farmed fish would reduce the ecological burden of aquaculture and improve its sustainability. For the intensive farming of fish species, the provision of alternative ingredients that reduce dependence on fishmeal protein yields yet other significant environmental benefit: decreasing the dietary protein nitrogen catabolism and consequently effluent ammonia produced by fish farms. This could mitigate the impact of this industry on the ecosystems which are particularly vital in Portugal, since most fish farms are installed in transitional waters.

Glycerol, a by-product of biodiesel, is an abundant and widely available material. It has been successfully used as alternative ingredient for the swine and poultry industry. However, its potential as an alternative ingredient for fish feed has been generally overlooked. This project will investigate the metabolic utilization of dietary glycerol and its effect on fish performance, digestibility and ammonia excretion, which will allow a better understanding of the underlying biochemistry of glycerol utilization, particularly in carnivorous fish species. In liver, the excess of dietary amino acids appears to be largely directed to the intermediary metabolism and the synthesis of glucose, converting their nitrogen moieties into ammonia. In carnivorous fish, gluconeogenic catabolism of amino acids accounts for essentially all endogenous glucose production. The provisions of an alternative non-nitrogenous substrate such as glycerol in commercial diets, could either directly or indirectly attenuate amino acid utilization.

The environmental and economical benefits of feeding carnivorous fish glycerol-supplemented diets are clear. Fishmeal could be partially replaced by a less expensive, non-nitrogenous ingredient readily available on the global market, therefore reducing feed costs, a major contributor to the operational budget of any fish farm.

PRINCIPAL INVESTIGATOR AT CIIMAR

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LEADER INSTITUTION

Centro de Neurociências e Biologia Celular (CNBC/UC) - Universidade de Coimbra

PARTICIPANT TEAMS AT CIIMAR

(LANUCE)

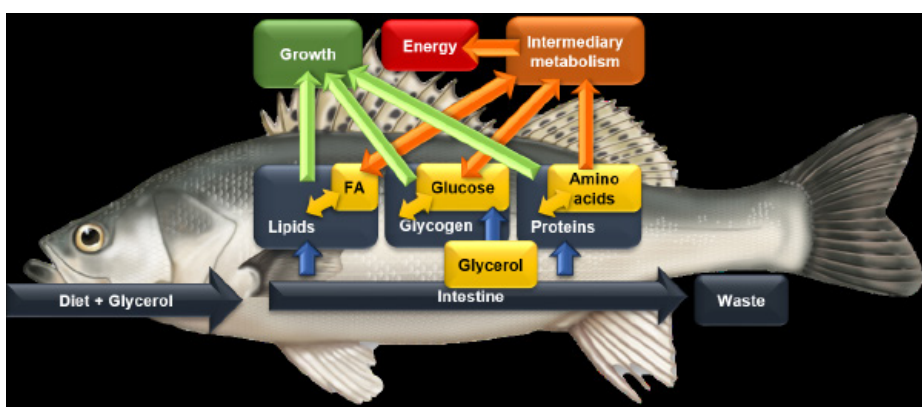
Nutrition, Growth and Quality of Fish

COMPETE
2020

PORTUGAL
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NANOBINDER: BIOGENIC POLYMERIC NANOPARTICLES FUNCTIONALIZED TO BIND METALS FOR ECO- FRIENDLY APPLICATIONS: BIOREMEDIATION AND BIOSENSORS

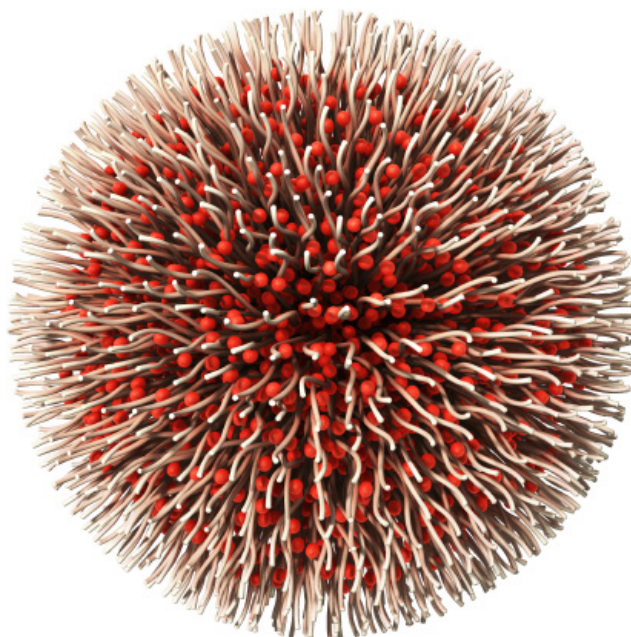
PRINCIPAL INVESTIGATOR AT CIIMAR
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Soil/Water Interactions



The exploration of uranium in Portugal from 1908 to 2001 resulted in huge hotspots of metal exposure. Despite the overall success of conventional remediation works to counteract the associated risks, there are still mine effluents and/or nonpoint discharges (leaching/runoff events) jeopardizing adjacent aquatic systems. Bioremediation has been an excellent alternative, being primarily focused on microbial potential. But the direct use of living organisms may fail to succeed due to their reduced tolerance ranges. As such, the NANOBINDERS project will address the creation of biogenic, biodegradable and non-toxic polymeric nanobeads with high potential for metal biosorption in water - the NANOBINDERS. These nanobeads will be self-tailored inside engineered bacteria, being the biosynthesis optimized through the use of low-cost carbon sources obtained from waste recycling. The bioremediation potential of NANOBINDERS will be validated in small-scale systems set under laboratorial conditions. The NANOBINDERS will be further explored as biosensing elements for the monitoring of bioremediation efficiency, as well as metal exposure in water. In order to accomplish these goals, the project will bring academia and industry together, by gathering experts from different scientific areas and the company EDM (Empresa de Desenvolvimento Mineiro, SA).



BIOLOGICAL PRODUCERS OF NATURAL FLUORINATED COMPOUNDS AS A NOVEL SOURCE OF RELEVANT DEGRADING MICROORGANISMS AND BIOSYNTHETIC MECHANISMS

Fluoroorganic compounds are finding increasing uses in several applications, thriving in virtually all areas of our society. As a consequence of their diverse uses, these compounds are becoming widespread environmental pollutants and, thus, studying their biodegradation is essential in order to assess their fate in the environment and also to understand their biotransformation mechanisms.

In contrast to this abundance of man-made fluorinated structures, there are very few natural fluorinated compounds with a biological origin. Far as is known, these structures resume to a few monofluorinated compounds that are produced by some tropical and subtropical plants and by a handful of actinomycetes species, with fluoroacetate (FA) constituting the most common produced natural fluorinated compound. This dearth of biogenic fluoroorganics makes the research in this area highly fascinating and extremely attractive for the scientific community, offering an excellent opportunity to find new fluorinated structures or biochemical mechanisms commercially important. There are some evidences suggesting that these natural producers of fluoroorganic molecules, especially FA producing plants, may constitute a good source of microorganisms capable of degrading and/or producing fluorinated compounds. In this context, the present project aims to explore biological producers of fluorinated compounds in order to find efficient fluoroorganics biodegrading activities, namely for compounds structurally related with FA, and, at the same time, to search for potential microbial producers of these compounds.

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PARTICIPANT TEAMS AT CIIMAR

(EcoBioTec)

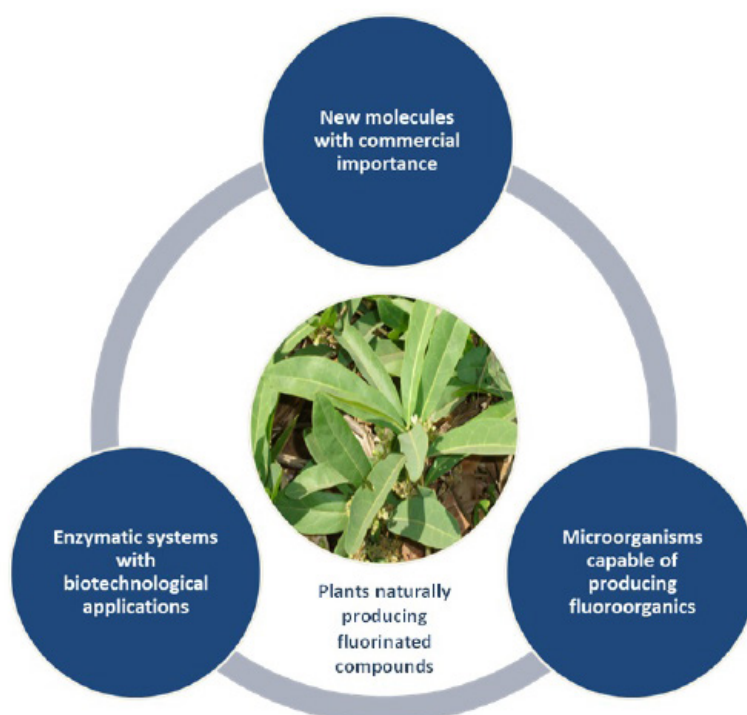
Bioremediation and Ecosystems Functioning

COMPETE
2020

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EFFECTS OF DIETARY COMPONENTS AND HOLDING CONDITIONS ON ENERGY USE AND OXIDATIVE STRESS IN FISH

PRINCIPAL INVESTIGATOR AT CIIMAR

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LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(LANUCE)

Nutrition, Growth and Fish
Quality Laboratory

(CBAMNP)

Chemistry and Biological
Activity of Marine Natural
Products

(LECOF)

Ecophysiology

(MEDCHEM)

Medicinal Chemistry

COMPETE
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Fish may be exposed to changes in holding conditions (e.g. variations in salinity, water circulation, dissolved oxygen levels), which have impact on several productive parameters in aquaculture. Such changes may act as stressors, enhancing the generation of reactive oxygen species (ROS) in the mitochondria of several tissues, with a subsequent risk of oxidative damage. There is a clear interest in the fish farming sector for maximizing growth, while minimizing the potential negative effects of holding conditions on fish performance and welfare. Nutritional manipulation has been advocated as a means to decrease oxidative stress in health and disease, particularly in mammals. However the implementation of this practical approach has not been investigated until now in fish in spite of the possible application in the aquaculture industry.

Seaweeds (SW) have been found to contain compounds with scavenging effects which decrease ROS formation in animal tissues. The addition of small quantities of SW and/or their extracts in fish diets may affect metabolic fuel utilization in the tissues and could prove to increase antioxidant defenses protecting against the negative effects of ROS formation, improving welfare and resulting in better economic performance. On the other hand, the degree of unsaturation of fatty acids (FA) included in the diet may also affect ROS generation in fish tissues.

This project investigates the possible modulatory effects that several experimental diets (supplemented with SW or including FA with different degree of unsaturation) have on the energy use and oxidative stress response of fish by investigating responses to a number of potential stressors related to changes in holding conditions.



BIOMETORE: BIODIVERSITY IN SEAMOUNTS, THE MADEIRA-TORE AND GREAT METEOR



In Portuguese marine waters, at great distance from the continental Portuguese shore, from Azores and Madeira Islands, there are two important assemblies of submarine reliefs, the submarine archipelago Great Meteor and the complex Madeira-Tore.

The project BIOMETORE established a unique consortia that evolves all the main institutions of marine research from Portugal with the goal of studying the biodiversity and increasing knowledge about these important biotopes. In the scope of this project, eight campaigns of scientific research were programmed between 2015 and 2016 to these two submarine territories to acquire physical, chemical and biological data.

The data collection, coordinated by multidisciplinary teams from all the institutions in the consortia, aimed to contribute for the biodiversity characterization and mapping of these oceanic areas. The BIOMETORE project also proposes to design a sustainability and management plan for the marine areas under study and to support the evaluation of the good environmental state in the scope of the Marine Strategy Framework Directive (MSFD).

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LEADER INSTITUTION

Instituto Português do Mar e da Atmosfera

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(BioCost)

Coastal Biodiversity

(EcoBioTec)

Bioremediation and

Ecosystems Functioning

WEBSITE

www.biometore.pt





BIOMAR PT: APRENDER A CONHECER O AMBIENTE MARINHO DE PORTUGAL

PRINCIPAL INVESTIGATOR AT CIIMAR

Isabel Sousa Pinto

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CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(BIOCOST)

Coastal Biodiversity

WEBSITE

www.biomarpt.ipma.pt



'BioMar PT – Aprender a conhecer o ambiente marinho de Portugal' project intended to contribute to the increase of technical competencies in order to ensure the full implementation of the 'Diretiva-Quadro "Estratégia Marinha"' in Portugal. Therefore it provided training and qualification involving multidisciplinary marine monitoring; technical skills acquisition for sampling collecting as well as data analysis and dissemination. Several indoor and outdoor courses were lectured at CIIMAR, IPMA and EMEPC in theme areas such as: sampling and identification of biological communities; data sorting and analysis; molecular techniques; instrumental methods of analysis; and marine monitoring by satellites, which resulted in 26 technical manuals made available online. Other online resources were also made available such as an online course on molecular data analysis and 8 practical videos encompassing: sampling methodologies in the rocky shores and soft bottom intertidal; elaboration of an invertebrate collection; trophic webs: from theory to practice; macroalgae identification and preservation; sampling and identification of marine parasites; sampling and molecular analysis techniques; and cetacean monitoring.



BIODIVERSIDADE DO NOSSO MAR: CONHECER E PRESERVAR

'Biodiversidade do nosso Mar: conhecer e preservar' worked with elementary and secondary schools from northern Portugal so as to increase the awareness about marine biodiversity. The activities involved an active participation of school students supervised by the CBL team and included: monitoring the intertidal biodiversity of a rocky shore; laboratory classes assessing the invertebrates biodiversity associated with macroalgae; and seminars presented by the BioCost team concerning marine biodiversity. On the project website were developed digital challenges (quizzes) related to the presented concepts in 'Literacia do Oceano 2013-2016 Ciência Viva' website. All the developed activities were advertised in the Facebook page of the project.

For each rocky shore, monitoring of the intertidal was performed in spring and autumn following the MOBIDIC (www.mobidic.pt) protocol and all the collected data were added to the MOBIDIC website. Additionally samples of macroalgae from the low-shore were collected during one of those fieldwork events and taken to the school for the laboratory activity. The presented seminars included subjects such as: Marine Forests (Kelps); Whales and Dolphins of Macaronesia; Invasive Macroalgae Species; Monitoring the Intertidal; and Biodiversity, Ecology and Applications of Macroalgae.

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IPMA- Instituto Português do Mar e da Atmosfera

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(BioCost)

Coastal Biodiversity

WEBSITE

www.ciimar.up.pt/biodiversidadenonossomar/

FACEBOOK

[/BiodiversidadenossoMar](https://www.facebook.com/BiodiversidadenossoMar)





OCEAN POLLUTION: GLOBAL THREAT, LOCAL ACTION

PRINCIPAL INVESTIGATOR AT CIIMAR

José Teixeira

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(SciCom)

Science Communication and
Outreach Office

(EcoBioTec)

Bioremediation and
Ecosystems Functioning

WEBSITE

www.oceanaction.pt

FACEBOOK

[www.facebook.com/
OceanActionPortugal/](https://www.facebook.com/OceanActionPortugal/)



Pollution and marine litter are serious problems to be addressed in order to ensure the Good Environmental Status of the Ocean. This project financed by EEA Grants aims to promote the Ocean Literacy and to raise awareness of school community and general public about the problem of pollution and marine plastic debris.

Numerous hand-on laboratorial activities, lectures and beach cleaning actions were conducted in several partner schools. Initiatives were directed for students of different levels of education to be held both in the classroom and outdoors, and in a context of non-formal education. An itinerant exhibition "Plastic Sea" was produced with a combination of art objects, sensory areas (plastic corridor), multimedia (animation videos) and roll-up panels mostly with graphic contents (infographics and illustration).

A national student's contest was organized with four categories of participation: awareness panel, recyclart, photography and infography.

The use different educational approaches and products were used in a complementary way to raise awareness among younger generations and the problem of Ocean pollution and the need for adoption of responsible individual behavior.



PLASTIC SEA

More than 8 million tons of plastic reach annually the ocean, causing very significant negative impacts on marine life, economic activities and human health (accumulation of contaminants in marine food).

Plastic Sea project is part of the Ocean Action Campaign and invested in different communication tools to address and raise awareness of school community and general public about the problem of marine debris, particularly plastic waste in the ocean.

The exhibition "A Plastic Ocean" spread three large sculptures constructed in partnership with ESAP (Artistic School of Oporto) with plastic discarded throughout different public noble spaces of Porto, Matosinhos and Gondomar cities. The sculptures depict different consequences of plastic debris on marine life and human health. An original theatre piece "Pearl in Plastic Sea" was developed to explore the marine litter problem and its consequences for biodiversity and the marine ecosystem by recreating the story of the little mermaid, an adventure fraught with danger due to the ever increasing garbage that reaches the sea.

Plastic Sea project, financed by the EEA Grants, also included more conventional hands-on science activities and lectures in schools, beach cleaning activities and the translation and production of educational videos.

All different communication methods aimed to encourage the critical reflection about this environmental problem of great importance and scientific complexity and the need to adopt environmentally responsible behavior by the population through the use of complementary, artistic and innovative approaches.

PRINCIPAL INVESTIGATOR AT CIIMAR

José Teixeira

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(SciCom)

Science Communication and Outreach Office

(EcoBioTec)

Bioremediation and Ecosystems Functioning

WEBSITE

<http://oceanaction.pt>

FACBOOK

www.facebook.com/OceanActionPortugal/





CADEIAS TRÓFICAS MARINHAS: CONHECER PARA COMUNICAR

PRINCIPAL INVESTIGATOR AT CIIMAR
Joana Saiote

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CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR
(SciCom)
Science Communication and
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(AEE)
Aquatic Ecology and Evolution

WEBSITE
[www.ciimar.up.pt/
cadeiastroficasmarinhas/](http://www.ciimar.up.pt/cadeiastroficasmarinhas/)

FACEBOOK
[www.facebook.com/
cadeiastroficasmarinhas](https://www.facebook.com/cadeiastroficasmarinhas)



The trophic relationships between the organisms are usually complex food webs but can be broken in simpler food chains and represented as food pyramids that represent the energy and biomass flux throughout the system.

The "Marine Food Chains: a knowledge to share" is a science communication project financed by EEA Grants that aims to raise awareness of general public and children from several schools in Porto metropolitan area about sea food chains.

A variety of science communication products were implemented along the project, including the development of mini science communication projects performed at schools. Though a new distinguished approach that involve to "Acquire" (informal science talks about the marine food chains); "Do it" (visits to the CIIMAR labs to perform lab activities) "Recognize" (a science communication workshop of new tools and practices) and "Share" (science communication presentations and artistic representations of marine organisms) about 250 students were able to understand the complex sea food chains theme and share it to their colleagues and teachers using new science communication tools based on multimedia and art performances.

The artistic representations of the different organisms were based on previous research about Portuguese native marine species and in most of the cases the schools were very creative in the use of the materials and very faithful to the organism's physical characteristics, predator-prey relationships and diversity. The free format communications used by the students included videos, interviews, plays, Power-point presentations, Prezi presentations and animated stories. The results of the mini science communication projects were also integrated to the project exhibition in a 3D food pyramid along with a dynamic and interactive informative panel.

In addition to the project objectives, the collaboration with students from a public artistic school of Oporto resulted in the development of six didactic toys related with the marine food chains subject and addressed several concepts as biomass, energy, balance, cannibalism, predation and food chains.



OCEANLAB: PROTEGENDO OS OCEANOS. VEM AO LABORATÓRIO FAZER CONNOSCO!



Ocean protection is a global priority and crucial for Portugal, a country with extensive coast and notable Exclusive Economic Zone. This protection can only be achieved by increasing knowledge and integrated discussion on the great interaction existing between the ocean and humans, as well as on initiatives such as the Marine Strategy Framework Directive and its descriptors of Good Environmental Status (GES). OceanLab proposes the creation of a specific experimental laboratory (the OceanLab) to receive young people, their teachers and family members at CIIMAR, leading them in a holistic approach to increase their Ocean Literacy. The program is dedicated to perform hands-on scientific experiments, putting young people into practice, in a laboratory context. Experiments are related to integrated management of the marine environment and maintenance of GES. OceanLab also organises science in the holidays weeks and open science events to the general public. OceanLab is supported by the "CIIMAR na Escola" programme and its associated Science Blog.

PRINCIPAL INVESTIGATOR AT CIIMAR

Laura Guimarães and Marisa Almeida

LEADER INSTITUTION

CIIMAR-UP

PARTICIPANT TEAMS AT CIIMAR

(EcoBioTec)

Bioremediation and
Ecosystems Functioning
(BBE)

Blue Biotechnology and
Ecotoxicology

(SciCom)

Science Communication and
Outreach Office

(METOX)

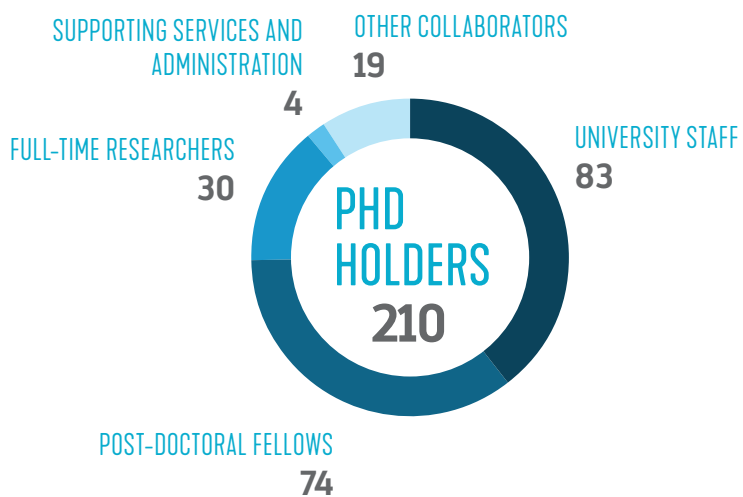
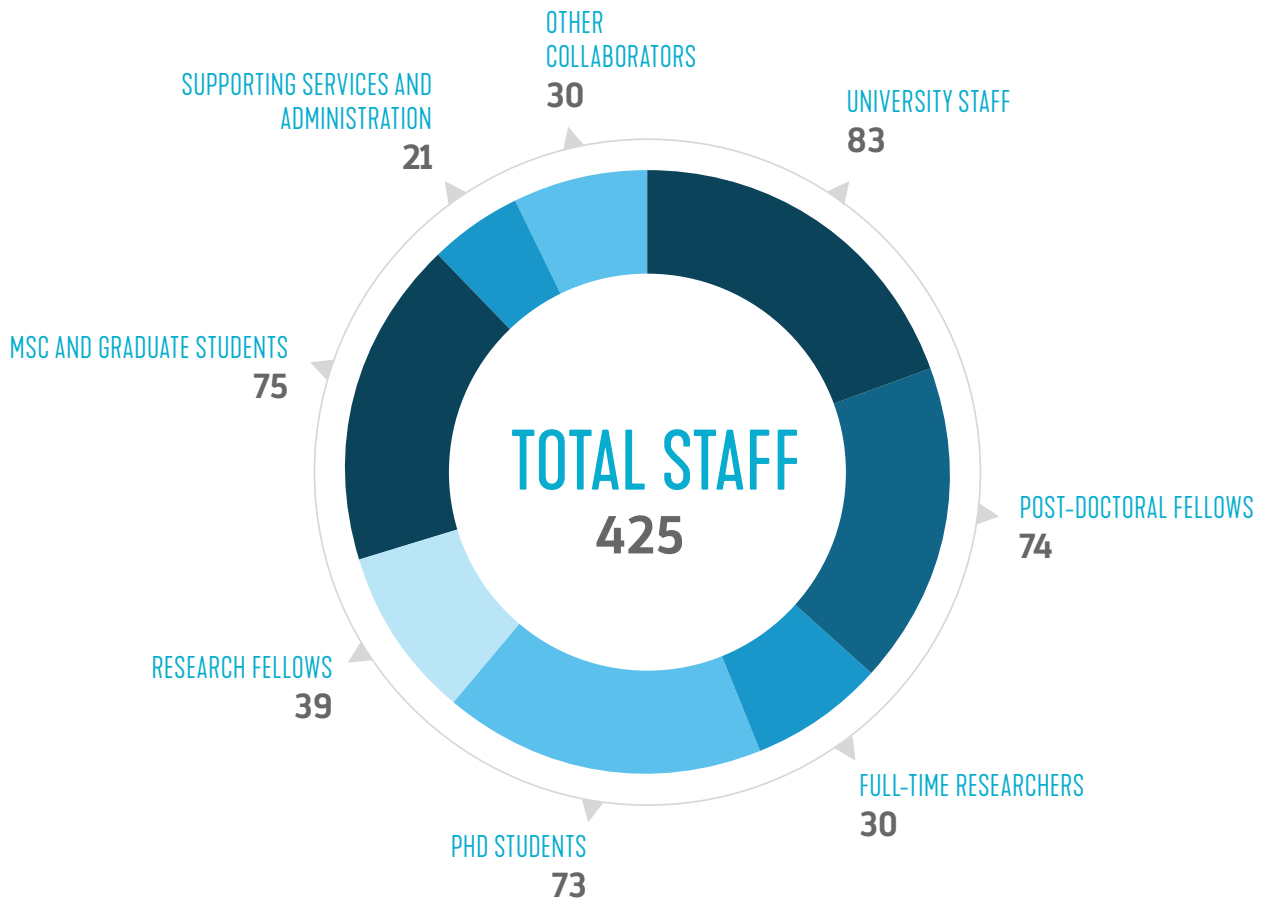
Coastal and Marine
Environmental Toxicology

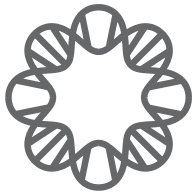




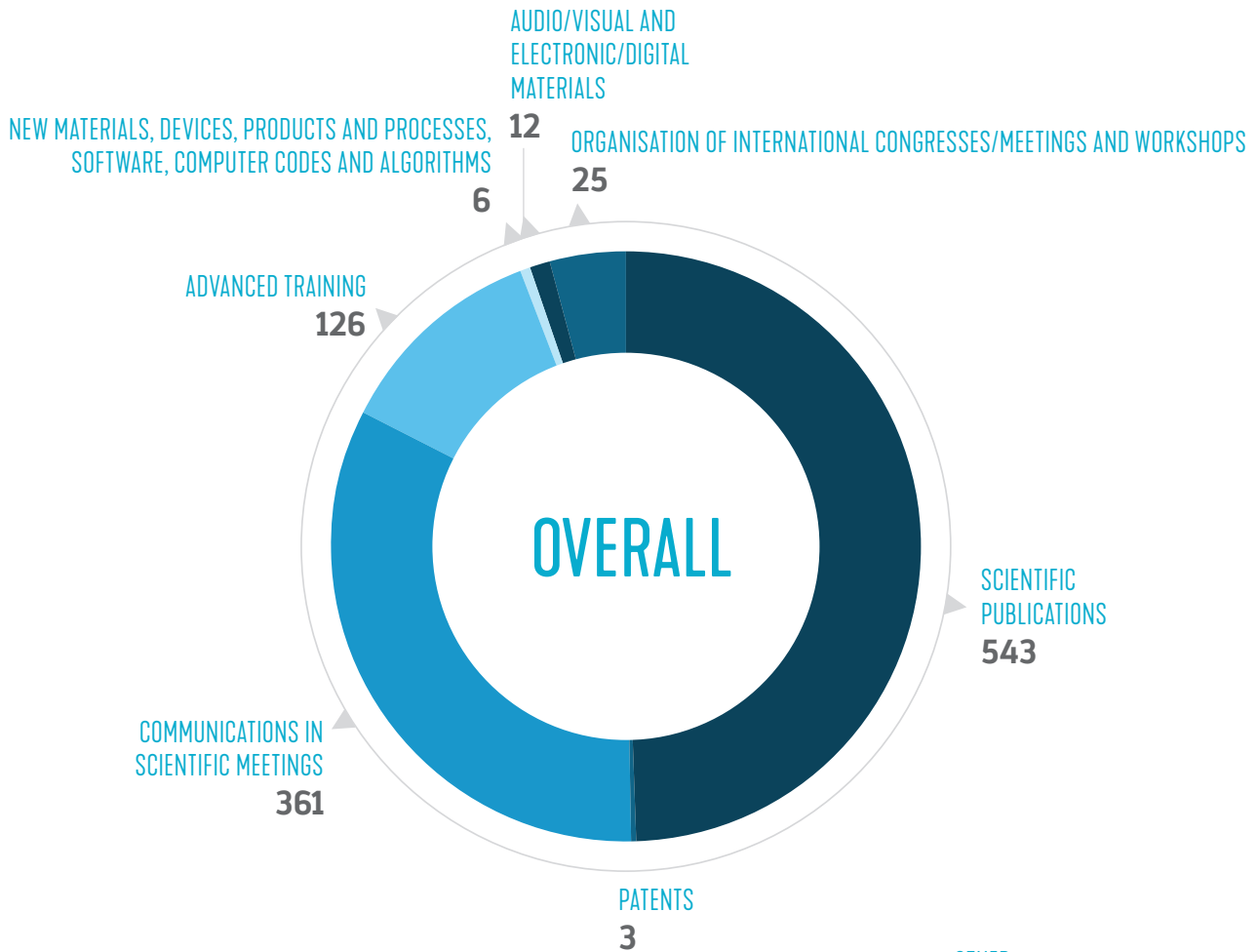


TEAM

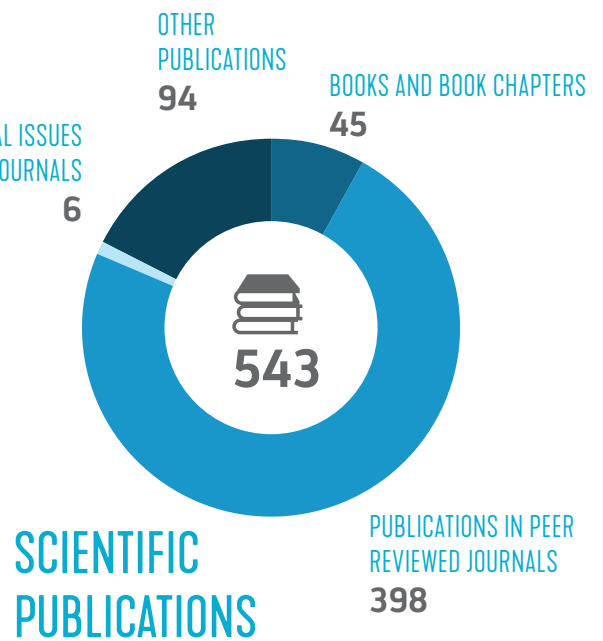
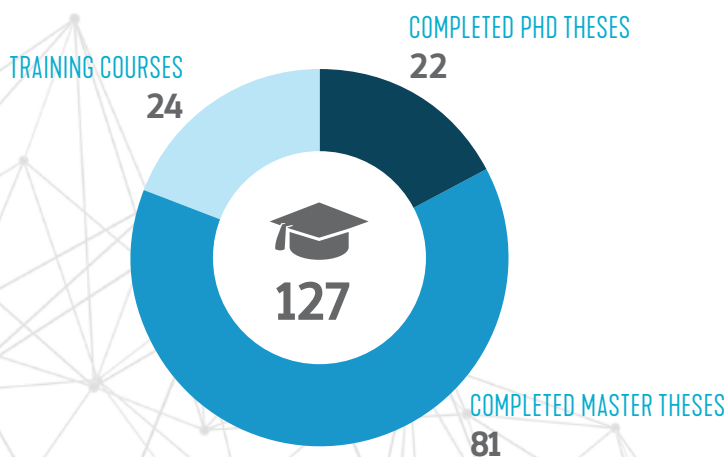




SCIENTIFIC PRODUCTIVITY



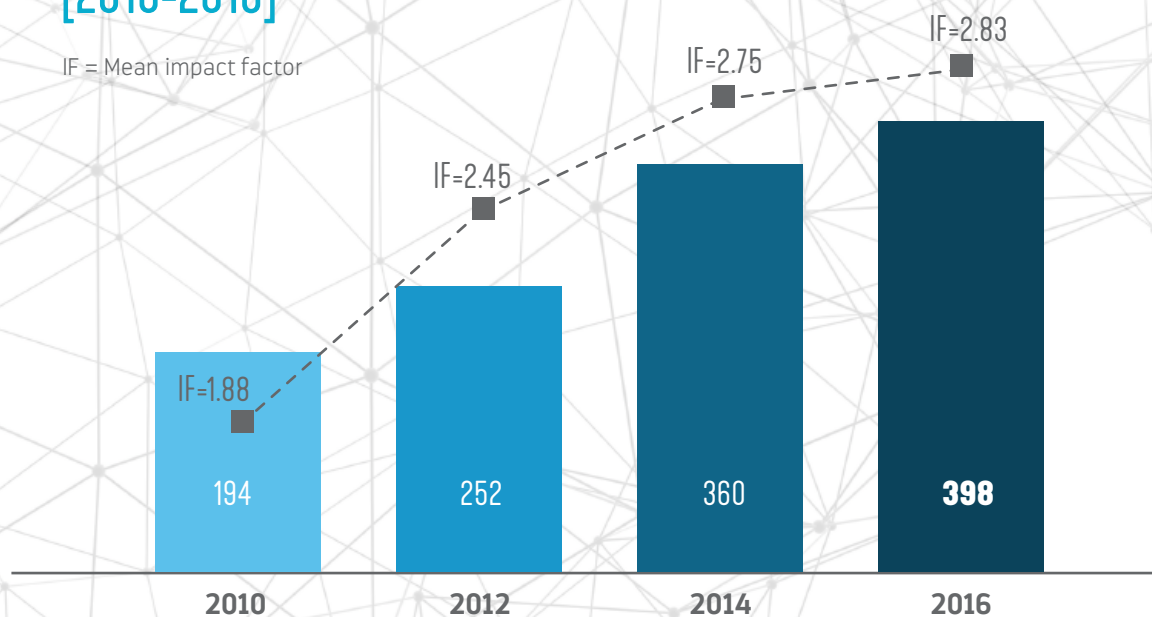
ADVANCED TRAINING





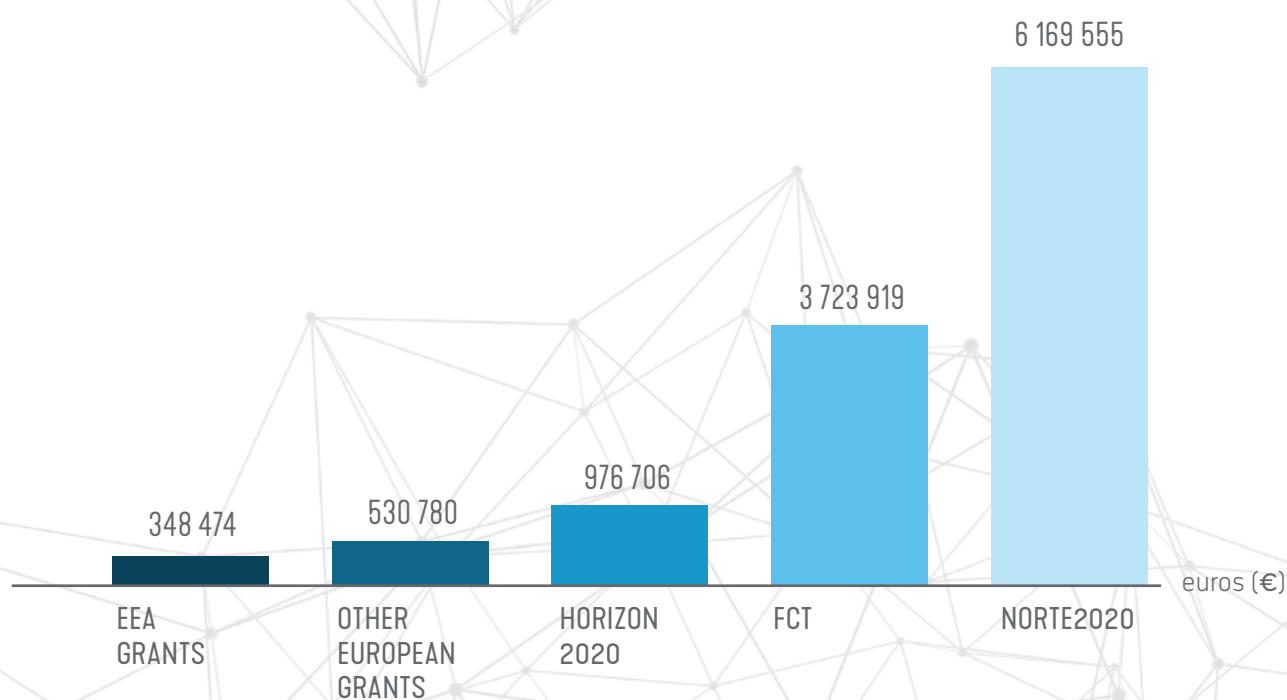
NR OF PUBLICATIONS IN PEER REVIEWED JOURNALS [2010-2016]

IF = Mean impact factor



COMPETITIVE R&D PROJECT FUNDING

Total competitive funding attributed to CIIMAR in R&D projects in execution during 2016

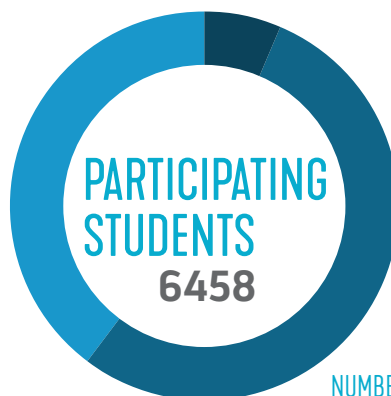




OUTREACH ACTIVITIES

NUMBER OF STUDENTS THAT
VISITED CIIMAR
415

NUMBER OF STUDENTS THAT
CARRIED OUT PRACTICAL
ACTIVITIES
2551



NUMBER OF STUDENTS THAT
ATTENDED CIIMAR LECTURES
3492

EXHIBITIONS **3** VISITS TO CIIMAR **11**

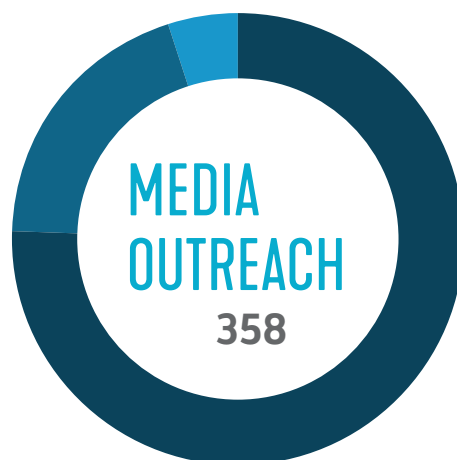
PRACTICAL
ACTIVITIES
113



LECTURES
112

TELEVISION
17

NEWSPAPERS
70



WEB NEWS
271

• Total number of published news in 2016 - 358



SCIENTIFIC OUTPUT

Description	Total
1. Publications	
11 Books and book chapters	45
12 Publications in peer reviewed journals	398
13 Edited special issues of journals (with substantial research input of researcher)	6
14 Other publications	94
2. Patents	3
3. Communications in scientific meetings	361
4. Advanced Training	
41 Completed PhD theses under the supervision of integrated members	22
4.2 Completed Master theses under the supervision of integrated members	81
4.3 Training courses	24
5. New materials, devices, products and processes, software, computer codes and algorithms	6
6. Audio/visual and electronic/digital materials	12
7. Organisation of international congresses/meetings and workshops	25

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EDITED SPECIAL ISSUES OF JOURNALS

Freitas, V., Sousa, M.E. (2016) Special Issue: Selected papers from the 11th National Meeting of Organic Chemistry and 4th Meeting of Therapeutic Chemistry in Portugal, MDPI: Basel, Switzerland.

Kijjoa, A., Sripanidkulchai, B., Sousa, M.E. (2016) Special Issue: Selected Papers from the 6th International Conference on Natural Products for Health and Beauty (NATPRO 6), Molecules.

Lage, O., Øvreås, L., Zehr, J.P. (2016) Research Topic: Epibacterial communities on macroalgae in the section Aquatic Microbiology, Frontiers in Microbiology.

Pinto, M.M.M., Sousa, M. E., Correia-da-Silva M. (2016) Special Issue: Grand Celebration: 100th Anniversary of the Discovery of Heparin, Pharmaceuticals Open Access Journal, MDPI: Basel, Switzerland.

Sousa, M.E. (2016) Special Issue: Can Membrane Transporters Contribute to Drug Discovery?, MDPI: Basel, Switzerland.

Vasconcelos, V., Leão, P. (2016) Special Issue: Bioactivity and Toxicity in Marine Cyanobacteria - Marine and Freshwater Toxins, Toxins.

PATENTS

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

International Patent Application (PCT) - WO 2016207869 A1 2016/06/27.

Title: Antimalarial agent(s) and methods to obtain them.

Institutions: Interdisciplinary Centre of Marine and Environmental Research (CIIMAR); University of Porto, Portuguese Institute of Hygiene and Tropical Medicine (IHMT–UNL) and Polytechnic Institute of Porto (IPP).

Inventors: Kijjoa, A., Bessa, L., Martins da Costa, P., Buttachon, S., Dethoup, T. and Vasconcelos, V. International Patent Application (PCT) - WO 2016207830 A1 2016/06/23.

Title: Pyrazinoquinazolinone derivatives with antibacterial activity against gram-positive bacteria.

Institutions: Interdisciplinary Centre of Marine and Environmental Research (CIIMAR) and University of Porto

Inventors: Gaudêncio, S., Sobral, R.G., Sanches, I., Pereira, M.F., Almeida, J.R., Cunha, I., Vasconcelos, V.

Portuguese Patent Application (PPP) No. 109756 2016/11/23

Title: The use of marine natural products in antifouling paints and coatings/Utilização de produtos naturais marinhos em tintas e revestimentos anti-incrustantes.

Institutions: Faculdade de Ciências da Universidade Nova de Lisboa, Instituto Politécnico de Setúbal, CIIMAR, Universidade do Porto.

ADVANCED TRAINING

Completed PhD theses

Name: **Abdunaser Abdueilmola**

Thesis title: High resolution satellite image analysis and DSM extraction for urban change detection

Doctoral Programme/Doctoral Degree: PhD in Surveying Engineering

Faculty/University: FCUP, University of Porto

Supervisor: Luísa Bastos, FCUP/CIIMAR

Co-Supervisor: José Alberto Gonçalves, FCUP/CIIMAR

Date: July 2016

Name: **Ana André**

Thesis title: Impact of endocrine disrupting chemicals in nuclear receptor signaling in marine organisms: invertebrate insights.

Doctoral Programme/Doctoral Degree: PhD in Marine and Environmental Sciences

Faculty/University: ICBAS/FCUP, University of Porto

Supervisor: Miguel Santos, FCUP/CIIMAR

Co-supervisor(s): Filipe Castro, CIIMAR

Date: June 2016

Name: **Aurora Raquel Barros Barbosa**

Thesis title: Purinergic modulation of neurotransmitter transporters in human meso-temporal lobe epilepsy (MTLE)

Doctoral Programme/Doctoral Degree: PhD in Biomedical Sciences

Faculty/University: ICBAS, University of Porto

Supervisor: João Miguel da Silva Cordeiro, CIIMAR

Co-supervisor(s): Paulo Correia de Sá

Date: May 2016

Name: **Carla Sofia Gomes Pereira**

Thesis title: Phage Therapy - A New Technology for Depuration of Bivalves

Doctoral Programme/Doctoral Degree: PhD in Biology

Faculty/University: University of Aveiro

Supervisor: Adelaide Almeida, CESAM

Co-supervisor(s): Carla Sofia Santos Ferreira, CESAM; Maria Leonor Nunes, CIIMAR

Date: July 2016

Name: **Carolina Oliveira Castro**

Thesis title: Effect on lipid metabolism of vegetable lipid interaction with carbohydrate; a comparative study with two important marine aquaculture species, Gilthead sea bream (*Sparus aurata*) and European sea bass (*Dicentrarchus labrax*)

Doctoral Programme/Doctoral Degree: PhD in Biology

Faculty/University: FCUP, University of Porto

Supervisor: Aires Oliva Teles, FCUP/CIIMAR

Co-supervisor(s): Geneviève Corraze and Stéphane Panserat, INRA-NuMeA (Nutrition Metabolisme Aquaculture).

Date: June 2016

Name: **Catarina da Rocha Cruzeiro**

Thesis title: Environmental monitoring and molecular mechanistic insights on pesticides in water and in the bivalve *Scrobicularia plana*, from Mondego and Tagus estuaries and Ria Formosa Lagoon

Doctoral Programme/Doctoral Degree: PhD in Biomedical Sciences

Faculty/University: ICBAS, University of Porto

Supervisor: Eduardo Rocha, ICBAS/CIIMAR

Date: June 2016

Name: **Catarina de Lourdes Araújo Silva**

Thesis title: Taxonomy, systematics, morphological and molecular phylogeny of the order tanaidacea (crustacea: peracarida), from the antarctic, Atlantic and pacific oceans

Doctoral Programme/Doctoral

Degree: PhD in Biomedical Sciences

Faculty/University: ICBAS, University of Porto

Supervisor: Kim Larsen

Co-supervisor(s): Elsa Froufe; João Coimbra, CIIMAR

Date: June 2016

Name: **Cristiana Andreia Valente Oliveira**

Thesis title: May pollution restrict the invasive behaviour of the non – indigenous species *Corbicula fluminea*?

Doctoral Programme/Doctoral Degree: PhD in Biomedical Sciences

Faculty/University: ICBAS, University of Porto, and European Doctor Degree

Supervisor: Lúcia Guilhermino, ICBAS/CIIMAR

Co-supervisor(s): Ionan Marigómez Allende, University of the

Basque Country
Date: July 2016

Name: **Diogo Ferreira Martins**

Thesis title: Osmoregulation in the marine lamprey,
Petromyzon marinus
Doctoral Programme/Doctoral Degree: Doctoral Programme
in Animal Science
Faculty/University: ICBAS, University of Porto
Supervisor: Jonathan Mark Wilson, CIIMAR
Co-supervisor(s): João Coimbra, CIIMAR
Date: December 2016

Name: **Guilherme Moura Paredes**

Thesis title: Study of Mooring Systems for Offshore Wave
Energy Converters
Doctoral Programme/Doctoral Degree: Doctoral Programme
in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Francisco Taveira-Pinto, FEUP/CIIMAR
Co-supervisor(s): Luís Manuel de Carvalho Gato, FEUP
Date: September 2016

Name: **Inês Maria dos Santos Guerreiro**

Thesis title: Prebiotics in fish production: effect on fish
physiology and intestinal microbiota profile
Doctoral Programme/Doctoral Degree: PhD in Biology
Faculty/University: FCUP, University of Porto
Supervisor: Aires Oliva Teles, FCUP/CIIMAR
Co-supervisor(s): Simon Davies, Daniel Merrifield, School of
Biomedical & Biological Sciences - University of Plymouth,
UK
Date: June 2016

Name: **Joana Martins**

Thesis title: Cyanobactins and other Bioactive Compounds
from Cyanobacteria
Doctoral Programme/Doctoral Degree: PhD in Biology
Faculty/University: FCUP, University of Porto
Supervisor: Vitor Vasconcelos, FCUP/CIIMAR
Co-supervisor(s): Alexandre Campos, CIIMAR
Date: December 2016

Name: **Jorge do Livramento Brito Neves**

Thesis title: Análise de conotoxinas em gastrópodes
venenosos do género *Conus* endémicos do arquipélago de
Cabo Verde
Doctoral Programme/Doctoral Degree: PhD in Environmental
Sciences and Technology
Faculty/University: FCUP, University of Porto
Supervisor: Vitor Vasconcelos, FCUP/CIIMAR
Co-supervisor(s): Agostinho Antunes, FCUP/CIIMAR
Date: June 2016

Name: **Luis Filipe da Cunha Melo Silva Rangel**

Thesis title: Myxozoa parasites from annelids and
aquaculture fishes
Doctoral Programme/Doctoral Degree: PhD in Biology
Faculty/University: FCUP, University of Porto
Supervisor: Maria João Santos, FCUP/CIIMAR
Date: June 2016

Name: **Mahmoud Abd El Aziz Mabrok**

Thesis title: The host/pathogen interaction during
experimental infection of Senegalese sole (*Solea
senegalensis*) by *Tenacibaculum maritimum*
Doctoral Programme/Doctoral Degree: Doctoral Programme
in Animal Science
Faculty/University: ICBAS, University of Porto
Supervisor: Benjamín Costas, CIIMAR
Co-supervisor(s): António Afonso, Luísa Valente, ICBAS/
CIIMAR
Date: June 2016

Name: **Mário Enrique Moreno Castiblanco**

Thesis title: Experimental study of local scour around
complex bridge piers
Doctoral Programme/Doctoral Degree: Doctoral Programme
in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Rodrigo Maia, FEUP/CIIMAR
Co-supervisor(s): Lúcia Teixeira Couto
Date: July 2016

Name: **Sofia Garcia dos Santos**

Thesis title: Mechanisms of cadmium toxicity in fish:
osmoregulatory responses
Doctoral Programme/Doctoral Degree: PhD in Chemical and
Biological Sciences
Faculty/University: University of Trás-os-Montes e Alto Douro
Supervisor: Jonathan Mark Wilson, CIIMAR
Co-supervisor(s): António Fontainhas Fernandes, UTAD
Date: April 2016

Name: **Sónia Batista**

Thesis title: Use of probiotics in sole (*Solea senegalensis*)
diets: effects on growth performance, host defense,
morphology and ecology of the digestive tract
Doctoral Programme/Doctoral Degree: PhD in Animal Science
Faculty/University: ICBAS, University of Porto
Supervisor: Rodrigo Ozório, CIIMAR
Co-supervisor(s): Luisa Valente, ICBAS/CIIMAR, Jorge Manuel
Fernandes
Date: July 2016

Name: **Sonia Rodriguez**

Thesis title: Biodiversity and Productivity relationships:
experimental approaches using intertidal macroalgal

assemblages

Doctoral Programme/Doctoral Degree: PhD in Biology

Faculty/University: FCUP, University of Porto

Supervisor: Francisco Arenas, CIIMAR

Co-supervisor(s): Isabel Sousa Pinto, FCUP/ICBAS

Date: May 2016

Name: **Tiago Zanella**

Thesis title: A proteção do ambiente marinho e os limites à liberdade de navegação: contributo para a análise das restrições à navegação marítima internacional criadas para a proteção do meio ambiente marinho

Doctoral Programme/Doctoral Degree: PhD in International and European Law

Faculty/University: University of Lisbon, Law School

Supervisor: Fernando Loureiro Bastos, UL/CIIMAR

Name: **Vanessa Sofia Lopes Rodrigues**

Thesis title: Understanding P-glycoprotein Mediated Multidrug Resistance in Cancer: New Potential Targets, Biomarkers and Molecular Inhibitors

Doctoral Programme/Doctoral Degree: PhD program in Pathology and Molecular Genetics

Faculty/University: ICBAS, University of Porto

Supervisor: Maria Helena da Silva, FFUP

Co-supervisor(s): Vasconcelos Meehan, FFUP; Maria Emília Sousa, FFUP/CIIMAR

Date: December 2016

Name: **Virginia Cunha**

Thesis title: Chemosensitization assessment of emergent and organic pollutants using zebrafish (*Danio rerio*) embryo tests

Doctoral Programme/Doctoral Degree: PhD in Biomedical Sciences

Faculty/University: ICBAS, University of Porto

Supervisor: Marta Ferreira, CIIMAR

Co-supervisor(s): Pedro Moradas-Ferreira, ICBAS, Miguel Santos, FCUP/CIIMAR

Date: July 2016

Completed Master theses

Name: **Alexandre Pacheco Lopes**

Thesis title: Ecotoxicological effects of gold nanoparticles and microplastics in *Daphnia magna*

Master Degree: Integrated Master of Bioengineering

Faculty/University: FEUP and ICBAS, University of Porto

Supervisor: Lúcia Guilhermino, ICBAS/CIIMAR

Date: March 2016

Name: **Alfredo Ferreira**

Thesis title: Aplicação e otimização da bomba de ariete para

elevação de água em meios rurais de Timor Leste

Master Degree: Integrated Master in Civil Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Cristina Maria Monteiro dos Santos

Co-supervisor(s): Paulo Rosa Santos, FEUP/CIIMAR

Date: July 2016

Name: **Ana Carolina Cassoni**

Thesis title: Tratamento de efluentes salinos em Leitos de Macrófitas: o efeito de três espécies de plantas na remoção de nutrientes e sal

Master Degree: MSc in Ecology, Environment and Territory

Faculty/University: FCUP, University of Porto

Supervisor: Maria Teresa Borges, FCUP/CIIMAR

Co-supervisor(s): António Fiuza

Date: November 2016

Name: **Ana Catarina Barros Lopes**

Thesis title: Small Chiral Molecules Modulators of P-gp: Synthesis and Studies of Enantioselectivity

Master Degree: MSc in Analytical, Clinical and Forensic Toxicology

Faculty/University: FFUP, University of Porto

Supervisor: Carla Sofia Garcia Fernandes, FFUP/CIIMAR

Date: November 2016

Name: **Ana Cristina Fernandes Lages**

Thesis title: Caracterização ecológica de duas espécies de peixes exóticas predadoras no Rio

Minho: perca-sol (*Lepomis gibbosus*) e achigã (*Micropterus salmoides*).

Master Degree: MSc in Ecology

Faculty/University: University of Minho

Supervisor: Fernanda Cássio

Co-supervisor(s): Carlos Antunes, CIIMAR

Date: January 2016

Name: **Ana Filipe Basto**

Thesis title: Evaluation of the Potential of Prepupae Meal of Black Soldier Fly (*Hermetia illucens*) as Potential Ingredient for Rainbow Trout (*Oncorhynchus mykiss*): Effect on Flesh Quality

Master Degree: MSc in Biological Aquatic Resources

Faculty/University: FCUP, University of Porto

Supervisor: Helena Peres, CIIMAR

Co-supervisor(s): Giuliana Parisi

Date: December 2016

Name: **Ana Gabriela Barros**

Thesis title: Caracterização das fontes de matéria orgânica que suportam a produção de ictioplâncton no estuário do Rio Minho

Master Degree: MSc Ecology

Faculty/University: University of Minho – School of Sciences

Supervisor: Fernanda Cássio
Co-supervisor(s): Ester Dias, CIIMAR
Date: January 2016

Name: **Ana Margarida Gorito Gonçalves**

Thesis title: Coupling constructed wetlands and advanced oxidation processes

Master Degree: MSc in Environmental Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Adrián Manuel Tavares da Silva

Co-supervisor(s): Marisa Almeida, CIIMAR

Date: July 2016

Name: **Ana Rita Monteiro Almeida**

Thesis title: Avaliação da comunidade de artrópodes edáficos no separador central da Estrada da Circunvalação (distrito do Porto)

Master Degree: MSc in Ecology, Environment and Territory

Faculty/University: FCUP, University of Porto

Supervisor: Sara Cristina Ferreira Marques Antunes, CIIMAR

Co-supervisor(s): Rubim Manuel Almeida da Silva

Date: November 2016

Name: **Ana Rita Monteiro Ysenbout Mogas**

Thesis title: A combinação simultânea de peixes larvários com pesticidas como uma estratégia de controlo de vetores da malária - Um estudo experimental com *Poecilia reticulata* e três pesticidas

Master Degree: MSc in Marine Sciences-Marine Resources

Faculty/University: ICBAS, University of Porto

Supervisor: Eduardo Rocha, ICBAS/CIIMAR

Co-supervisor(s): Maria João Rocha, ICBAS/CIIMAR

Date: December 2016

Name: **Ana Rita Silva Martins**

Thesis title: Avaliação da hidrodinâmica e dos níveis de galgamento na Praia do Furadouro. Análise comparativa da situação atual e com a construção de quebramares destacados

Master Degree: Integrated Master in Civil Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Francisco Taveira Pinto, FEUP/CIIMAR

Co-supervisor(s): Conceição Juana Espinosa Morais Fortes

Date: July 2016

Name: **Ana Rute Soares Teixeira**

Thesis title: Remoção simultânea de contaminantes inorgânicos em águas salinas pela macroalga viva *Ulva lactuca*.

Master Degree: MSc in Chemistry

Faculty/University: University of Aveiro

Supervisor: Eduarda Pereira

Co-supervisor(s): Bruno Henriques and Carlos Vale, CIIMAR

Date: 2016

Name: **André Belazaima Gonçalves Fernandes**

Thesis title: Novos Sistemas de Observação Geodésica de Barragens

Master Degree: MSc in Surveillance Engineering

Faculty/University: FCUP, University of Porto

Supervisor: José Alberto Álvares Pereira Gonçalves, FCUP/CIIMAR

Co-supervisor(s): Elisa Almeida, EDP

Date: October 2016

Name: **André Filipe Jacinto Pinto**

Thesis title: Explorando a razão de bactérias do meio aquático não serem afetadas por microcistinas: sistema antioxidante vs. Degradação

Master Degree: MSc in Human Biology and Environment

Faculty/University: FCUL

Supervisor: Elisabete Valério, CIIMAR

Co-supervisor(s): Maria Teresa Rebelo

Date: 2016

Name: **Andreia Filipa Dinis Ferreira de Sousa**

Thesis title: Modelação tridimensional de dados geofísicos

Master Degree: MSc in Surveillance Engineering

Faculty/University: FCUP, University of Porto

Supervisor: José Alberto Álvares Pereira Gonçalves, FCUP/CIIMAR

Co-supervisor(s): Bruno Sameiro Pereira, Sinergeo

Date: December 2016

Name: **Angela Maria Nieves de Freitas**

Thesis title: Clínica e manejo de fauna selvagem em centros de recuperação [Wildlife clinic and management in recovery centers]

Master Degree: MSc in Veterinary Medicine

Faculty/University: University of Trás-os-Montes e Alto Douro

Supervisor: José Manuel Almeida, UTAD/CIIMAR

Date: July 2016

Name: **Anna Alfeus**

Thesis title: Cyanobacteria as a source of compounds with cosmetic potential

Master Degree: MSc in Environmental Contamination and Toxicology

Faculty/University: ICBAS, FCUP, University of Porto

Supervisor: Rosario Martins, ESS-IPP/CIIMAR

Co-supervisor(s): Ralph Urbatzka, CIIMAR; Vitor Vasconcelos, FCUP/CIIMAR

Date: June 2016

Name: **Antónia Lopes Moutinho**

Thesis title: Serra da Estrela: Caracterização Ecológica de Lagoas Naturais Visualizar Publicação

Master Degree: MSc in Ecology, Environment and Territory

Faculty/University: FCUP, University of Porto
Supervisor: Sara Cristina Ferreira Marques Antunes, CIIMAR
Co-supervisor(s): Jorge Manuel Espinha Marques
Date: December 2016

Name: **Beatriz Margarida de Oliveira Queiros**
Thesis title: Estudo de Dimensionamento de Cabeças de Quebramares Portuários. Aplicação ao Porto de Leixões
Master Degree: Integrated Master in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Francisco Taveira Pinto, FEUP/CIIMAR
Co-supervisor(s): Paulo Rosa Santos, FEUP/CIIMAR
Date: July 2016

Name: **Benbernou Fatima Zohra Batoul**
Thesis title: Phosphorus in Fish Farms-Quantification in marine, freshwater and fish feed
Master Degree: MSc in Marine Sciences-Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Maria Antónia Salgado, ICBAS/CIIMAR
Date: July 2016

Name: **Carlos Alberto Magalhães Leite**
Thesis title: Domain Oriented Biclustering
Master Degree: MSc in Computer Sciences
Faculty/University: FCUP, University of Porto
Supervisor: Luís Torgo
Co-supervisor(s): Catarina Magalhães, CIIMAR
Date: December 2016

Name: **Cátia Alexandra Jesus Castro**
Thesis title: Desenvolvimento de métodos moleculares para identificação de peixes transgénicos
Master Degree: MSc in Forensic Genetics
Faculty/University: FCUP, University of Porto
Supervisor: Filipe Pereira, CIIMAR
Date: December 2016

Name: **Cátia Sofia Rodrigues Silva**
Thesis title: HPLC enantioseparation of Tramadol and its metabolites: method validation and application to environmental samples
Master Degree: MSc in Quality Control
Faculty/University: FFUP, University of Porto
Supervisor: Carlos Manuel Magalhães Afonso, FFUP/CIIMAR
Co-supervisor(s): Maria Elizabeth Tiritan, CESPU/CIIMAR
Date: November 2016

Name: **Cristiana Isabel Coelho da Silva**
Thesis title: Otimização de métodos de extração para a análise de antibióticos em farinhas de aves e mamíferos
Master Degree: MSc in Chemistry
Faculty/University: FCUP, University of Porto
Supervisor: Clara Basto, FCUP/CIIMAR

Co-supervisor(s): Marisa Almeida, CIIMAR
Date: October 2016

Name: **Cristiano Fortuna Soares**
Thesis title: Assessing the ecotoxicity of NiO nanomaterial and acetaminophen to barley and the beneficial effects of SiO₂ nanomaterial co-application
Master Degree: MSc in Cell and Molecular Biology
Faculty/University: FCUP, University of Porto
Supervisor: Fernanda Fidalgo
Co-supervisor(s): Ruth Pereira, FCUP/CIIMAR
Date: December 2016

Name: **Daniela de Fátima Ferraz Barbosa.**
Thesis title: Estudo das Comunidades de Anfíbios da Cidade do Porto. Fatores condicionantes da distribuição e medidas de conservação.
Master Degree: MSc in Ecology, Environment and Territory. Faculdade de Ciências da Universidade do Porto.
Faculty/University: FCUP, University of Porto
Supervisor: José Teixeira, CIIMAR
Co-supervisor(s): Ana Ferreira, CIIMAR
Date: December 2016

Name: **Daniela Filipa Ferreira Dinis**
Thesis title: Simulação Laboratorial de Dispositivos para a Atenuação de Erosões Localizadas ("Scour Apron") em Estruturas de Defesa Costeira em Cilindros Geossintéticos
Master Degree: MSc in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Fernando Veloso Gomes, FEUP/CIIMAR
Date: July 2016

Name: **Daniela Raquel Pontes Loureiro**
Thesis title: Synthesis of marine xanthenes: tracking yicathins B and C
Master Degree: Master in Industrial Pharmaceutical Chemistry
Faculty/University: University of Coimbra, Faculty of Pharmacy
Supervisor: Jorge António Ribeiro Salvador
Co-supervisor(s): Carlos Manuel Magalhães Afonso, FFUP/CIIMAR
Date: October 2016

Name: **Daniela Sofia Barbosa Rodrigues**
Thesis title: Combined effects of increased temperature and exposure to the progestin levonorgestrel on zebrafish (Danio rerio) fitness and breeding
Master Degree: MSc in Environmental Contamination and Toxicology
Faculty/University: ICBAS, FCUP, University of Porto
Supervisor: Eduardo Rocha, ICBAS/CIIMAR
Co-supervisor(s): Patrícia Cardoso Teixeira, CIIMAR
Date: November 2016

Name: **Diana Bastos Serrano de Almeida**

Thesis title: Gonad Differentiation in Guppy Fish and Testing Strategies for the Production of Sterile and All-Female Offspring

Master Degree: MSc in Marine Sciences-Marine Resources

Faculty/University: ICBAS, University of Porto

Supervisor: Eduardo Rocha, ICBAS/CIIMAR

Co-supervisor(s): Maria João Rocha, ICBAS/CIIMAR

Date: December 2016

Name: **Diana Manuela Ribeiro Duarte**

Thesis title: Avaliação da Toxicidade de Lamas de ETAR

Master Degree: MSc in Biology and Water Quality Management

Faculty/University: FCUP, University of Porto

Supervisor: Ruth Pereira, FCUP/CIIMAR

Date: October 2016

Name: **Diogo Alves da Mota Alexandrino**

Thesis title: Biodegradation of fluorinated compounds widely used in agro-industrial applications

Master Degree: MSc in Environmental Contamination and Toxicology

Faculty/University: University of Porto

Supervisor: Fátima Carvalho, CIIMAR

Co-supervisor(s): Ana Paula Mucha, CIIMAR

Date: November 2016

Name: **Fábio Gabriel Pereira Bernardo**

Thesis title: Avaliação da Ecoeficiência do Sistema de Gestão do Ciclo Urbano da Água da Empresa Águas do Porto, E.M.

Master Degree: Integrated Master in Environmental Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Rodrigo Maia, FEUP/CIIMAR

Date: July 2016

Name: **Filipa Alexandra Marracho Diniz**

Thesis title: Propriedades sensoriais, características texturais e perfil nutricional de tainha de cultivo e selvagem.

Master Degree: MSc in Aquaculture and Fisheries

Faculty/University: Faculty of Sciences and Technology, University of Algarve

Co-supervisor(s): Amparo Gonçalves, IPMA/CIIMAR

Date: December 2016

Name: **Gisela Almeida Castro**

Thesis title: Antiparasitic potential of natural marine compounds

Master Degree: MSc in Biology and Water Quality Management

Faculty/University: FCUP, University of Porto

Supervisor: Rosário Martins, ESS-IPP/CIIMAR

Co-supervisor(s): Sandra Gomes Pereira, ESS-IPP

Date: November 2016

Name: **Gonçalo Mesquita Guimarães Oliveira Braga**

Thesis title: Desenvolvimento de tecnologia para produção de energia a partir do movimento de plataformas flutuantes offshore multifuncionais

Master Degree: Integrated Master in Civil Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Paulo Rosa Santos, FEUP/CIIMAR

Co-supervisor(s): Francisco Taveira Pinto, FEUP/CIIMAR

Date: September 2016

Name: **Inês Rafaela Nunes dos Santos**

Thesis title: Intervenção médico-veterinária na conservação ex-situ em parques zoológicos [Veterinary intervention in ex-situ conservation in zoos]

Master Degree: MSc in Veterinary Medicine

Faculty/University: University of Trás-os-Montes e Alto Douro

Supervisor: José Manuel Almeida, UTAD/CIIMAR

Date: October 2016

Name: **Ingrid Peperstraete**

Thesis title: Effets de la temperature sur la survie et la croissance de la crevette grise, Crangon crangon, dans sa limite sud de repartition

Master Degree: Master 2 SED-PAL

Faculty/University: Université de Bordeaux

Supervisor: Joana Campos, CIIMAR

Date: 2016

Name: **Iolanda Lourinha**

Thesis title: Potential of constructed wetlands for the removal of antibiotics and antibiotic-resistant bacteria

Master Degree: MSc in Environmental Contamination and Toxicology

Faculty/University: ICBAS, FCUP, University of Porto

Supervisor: Ana Paula Mucha, CIIMAR

Co-supervisor(s): Marisa Almeida, CIIMAR

Date: December 2016

Name: **Joana Luísa Ferreira Gomes Alves Costa**

Thesis title: Avaliação multiparamétrica da aclimação de juvenis de truta-fário (Salmo trutta f. fario) para estudos experimentais

Master Degree: MSc in Marine Sciences-Marine Resources

Faculty/University: ICBAS, University of Porto

Supervisor: Eduardo Rocha, ICBAS/CIIMAR

Co-supervisor(s): Tânia Vieira Madureira, CIIMAR

Date: December 2016

Name: **Joana Rodrigues Neves Ferreira**

Thesis title: Anticancer activity against glioblastoma cell lines by compounds present in algae, alone and in

combination with anticancer drugs
Master Degree: MSc in Environmental Contamination and Toxicology
Faculty/University: ICBAS, FCUP, University of Porto
Supervisor: Alice Abreu Ramos, CIIMAR
Co-supervisor(s): Eduardo Rocha, ICBAS/CIIMAR
Date: December 2016

Name: **João Filipe Rodrigues Pereira Santos**
Thesis title: Salinity as a key selector on the activity and diversity of ammonia oxidizers in estuarine systems
Visualizar Publicação
Master Degree: MSc in Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Catarina Magalhães, CIIMAR
Date: December 2016

Name: **José Diogo Castro Fernandes de Carvalho**
Thesis title: Estruturas Destacadas de Defesa Costeira. Aplicações com Cilindros Geossintéticos
Master Degree: Integrated Master in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Fernando Veloso Gomes, FEUP/CIIMAR
Date: July 2016

Name: **José Miguel Leite Guimarães de Oliveira**
Thesis title: Monitorização do comportamento de estruturas de defesa costeira em cilindros de geossintéticos executados em Moledo do Minho e na praia de Ofir
Master Degree: Integrated Master in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Fernando Veloso Gomes, FEUP/CIIMAR
Co-supervisor(s): Luciana Paiva das Neves
Date: July 2016

Name: **Justine Doherty**
Thesis title: A Missing Link in the Ionoregulatory Strategy of Larval Sea Lamprey (*Petromyzon marinus*) and African Lungfish (*Protopterus annectens*): A Closer Look into the Role of the Non-gastric H⁺/K⁺-ATPase
Master Degree: MSc in Integrative Biology
Faculty/University: Wilfrid Laurier University, Waterloo, Ontario Canada
Supervisor: Jonathan M. Wilson, CIIMAR
Date: 2016

Name: **Katia Rodrigues Batista de Oliveira**
Thesis title: Atividade das enzimas digestivas intestinais de juvenis de *Piaractus mesopotamicus* alimentados com diferentes níveis de DDGS
Master Degree: MSc in Animal Science
Faculty/University: Faculdade de Zootecnia e Engenharia de Alimentos (FZEA-USP), Pirassununga, Brasil
Supervisor: **Elisabete Maria Macedo Viegas**

Co-supervisor(s): Helena Peres, CIIMAR
Date: February 2016
Name: Kelly de Oliveira Duro
Thesis title: Energy content of shore crab *Carcinus maenas* from a temperate estuary in Portugal.
Master Degree: MSc in Biological Aquatic Resources
Faculty/University: FCUP, University of Porto
Supervisor: Joana Campos, CIIMAR
Co-supervisor(s): Henk Van der Veer (NIOZ)
Date: July 2016

Name: **Lia Gomes da Silva Henriques**
Thesis title: Induction of Gonadal Growth/Maturation in the Ornamental Fishes *Epalzeorhynchos bicolor* and *Carassius auratus* and Stereological Validation in *C. auratus* of Histological Grading Systems for Assessing the Ovary and Testis Statuses
Master Degree: MSc in Marine Sciences-Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Eduardo Rocha, ICBAS/CIIMAR
Co-supervisor(s): Maria João Rocha, ICBAS/CIIMAR
Date: December 2016

Name: **Luís Amorim**
Thesis title: Use and persistence of empty bivalve shells
Master Degree: MSc in Ecology
Faculty/University: University of Minho
Supervisor: Martina Ilarri, CIIMAR
Co-supervisor(s): Ronaldo Sousa
Date: 2016

Name: **Maria Letícia Carraro**
Thesis title: Chiral derivatives of xanthenes: synthesis, enantiomeric purity and effect on human tumor cell lines
Master Degree: MSc in Pharmaceutical Chemistry
Faculty/University: FFUP, University of Porto
Supervisor: Carla Sofia Garcia Fernandes, FFUP/CIIMAR
Co-supervisor(s): Madalena Maria de Magalhães Pinto, FFUP/CIIMAR
Date: July 2016

Name: **Mariana Nogueira Miranda**
Thesis title: Sedimentação em albufeiras: efeitos e medidas mitigadoras. O caso de estudo de Venda Nova
Master Degree: MSc in Environmental Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Rodrigo Maia, FEUP/CIIMAR
Date: July 2016

Name: **Mariana Silva**
Thesis title: Extração, caracterização e hidrólise enzimática do colagénio da pele do peixe-espada-preto
Master Degree: MSc in Food Engineering
Faculty/University: Instituto Superior de Agronomia,

University of Lisbon
Supervisor: Carla Maria Feio Pires, IPMA/CIIMAR
Co-supervisor(s): Maria Luísa Louro Martins
Date: October 2016

Name: **Marianne Felgueiras Alves**

Thesis title: Survey of parasites of Atlantic Chub Mackerel (*Scomber colias*) with economy and public health impact
Master Degree: MSc in Biological Aquatic Resources
Faculty/University: FCUP, University of Porto
Supervisor: Aurélia Saraiva, FCUP/CIIMAR
Date: November 2016

Name: **Mário Gil Capela Dias**

Thesis title: Optimization of solid state fermentation of dried distillers grains with solubles (DDGS) and its effect on performance and nutrient digestibility in European sea bass
Master Degree: MSc in Biological Aquatic Resources
Faculty/University: FCUP, University of Porto
Supervisor: Helena Peres, CIIMAR
Co-supervisor(s): Isabel Belo
Date: November 2016

Name: **Melissa Gomes Ferreira**

Thesis title: Study of anti-inflammatory bioactivity of cyanobacterial strains using murine macrophage RAW 264.7 cells
Master Degree: MSc in Environmental Contamination and Toxicology
Faculty/University: ICBAS, FCUP, University of Porto
Supervisor: Ralph Urbatzka, CIIMAR
Co-supervisor(s): Pedro Leão, CIIMAR
Date: November 2016

Name: **Micaela Pina Roque**

Thesis title: Evolutionary genomics of the eye and pigmentation development genes in the cavefish *Astyanax mexicanus*.
Master degree: MSc in Biodiversity, Genetics and Evolution
Faculty/University: FCUP, University of Porto
Supervisor: Agostinho Antunes, FCUP/CIIMAR
Co-supervisor(s): Vítor Vasconcelos, FCUP/CIIMAR
Date: June 2016

Name: **Nuno Heli Dantas de Beires Pereira da Costa**

Thesis title: Operacionalização de políticas de gestão de sedimentos a Norte do Porto de Leixões
Master Degree: Integrated Master in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Fernando Veloso Gomes, FEUP/CIIMAR
Date: March 2016

Name: **Patrícia Alexandra Soares Pinto**

Thesis title: Synthesis of Bioactive Chalcones and Their Heterocyclic Derivatives as Potential Antitumor Agents

Master Degree: MSc in Industrial Pharmaceutical Chemistry
Faculty/University: University of Coimbra, Faculty of Pharmacy
Supervisor: Jorge António Ribeiro Salvador
Co-supervisor(s): Honorina Maria de Matos Cidade, FFUP/CIIMAR
Date: October 2016

Name: **Patricia Duarte**

Thesis title: Bioremediation of pharmaceuticals by autochthonous microorganisms in aquatic environment
Master Degree: MSc in Environmental Contamination and Toxicology
Faculty/University: ICBAS, FCUP, University of Porto
Supervisor: Ana Paula Mucha, CIIMAR
Co-supervisor(s): Marisa Almeida, CIIMAR
Date: November 2016

Name: **Patrícia Gomes Ferreira**

Thesis title: Gastrointestinal diversity and function in teleosts - 2 case studies
Master Degree: MSc in Marine Sciences - Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Jonathan Mark Wilson, CIIMAR
Date: December 2016

Name: **Pedro Alexandre Ribeiro Moreira**

Thesis title: Derrames de Hidrocarbonetos no Mar: Uma Avaliação das Questões Operacionais
Master Degree: Integrated Master in Environmental Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Fernando Veloso Gomes, FEUP/CIIMAR
Date: February 2016

Name: **Pedro Miguel Azevedo Reis Moreira Campos**

Thesis title: Potential use of poultry meal in diets for gilthead seabream (*Sparus aurata*): effect on growth performance, feed utilization and digestibility
Master Degree: MSc in Biological Aquatic Resources
Faculty/University: FCUP, University of Porto
Supervisor: Helena Peres, CIIMAR
Co-supervisor(s): Tiago Aires, Soja de Portugal
Date: December 2016

Name: **Pedro Miguel Guedes Nunes Fernandes**

Thesis title: Identification and Characterization of Myxosporean Species Infecting Freshwater Fishes in a New Area of Study - Alto Rabagão Reservoir (Portugal)
Master Degree: MSc in Marine Sciences – Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Graça Maria Figueiredo Casal, ICBAS/CIIMAR
Co-supervisor(s): Sónia Raquel Oliveira Rocha
Date: December 2016

Name: **Pedro Ricardo Santos Luís**

Thesis title: Avaliação experimental de uma boia oceânica com sistema de aproveitamento de energia das ondas, do tipo coluna de água oscilante.

Master Degree: Integrated Master in Mechanical Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Mário Augusto Pires Vaz

Co-supervisor(s): Paulo Rosa Santos, FCUP/CIIMAR

Date: October 2016

Name: **Pedro Rodrigues**

Thesis title: Embryotoxicity and molecular alterations of monoamine reuptake inhibitory drugs in a teleost fish

Master Degree: MSc in Environmental Contamination and Toxicology

Faculty/University: ICBAS, FCUP, University of Porto

Supervisor: Laura Guimarães, CIIMAR

Co-supervisor(s): Marta Ferreira, CIIMAR

Date: December 2016

Name: **Rafaela Alcina Araújo dos Santos**

Thesis title: Fighting fish diseases with fish commensals: *Bacillus* and their Natural Antimicrobial Compounds (NACs)

Master Degree: MSc in Biological Aquatic Resources

Faculty/University: FCUP, University of Porto

Supervisor: Cláudia Serra, CIIMAR

Date: December 2016

Name: **Raquel Alexandra Fernandez Meneses Maciel Peixoto**

Thesis title: Modelação hidrodinâmica do estuário do Douro:

Cenários de cheia e influência dos novos molhes

Master Degree: Integrated Master in Civil Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Paulo Avilez-Valente, FEUP/CIIMAR

Co-supervisor(s): Isabel Iglesias Fernández, CIIMAR

Date: July 2016

Name: **Raquel Susana Teles Coimbra**

Thesis title: Marine by-products in Portugal: sources, actual processing and alternative valorization

Master Degree: MSc in Marine Biology

Faculty/University: University of Algarve

Supervisor: Paulo Vaz-Pires, ICBAS/CIIMAR

Co-supervisor(s): Teresa Modesto

Date: February 2016

Name: **Ricardo Rui Ferreira Alves de Sousa**

Thesis title: Assessment of diversity of edaphic communities on the verges of a urban Road (Via de Cintura Interna) in Oporto

Master Degree: MSc in Ecology, Environment and Territory

Faculty/University: FCUP, University of Porto

Supervisor: Sara Cristina Ferreira Marques Antunes, CIIMAR

Co-supervisor(s): Rubim Manuel Almeida da Silva

Date: November 2016

Name: **Rita Isabel da Silva Calisto**

Thesis title: Linking bacterial communities on grapes to biogenic amines production in musts

Master Degree: MSc in Cell and Molecular Biology

Faculty/University: FCUP, University of Porto

Supervisor: Olga Lage, FCUP/CIIMAR

Date: October 2016

Name: **Rita da Cunha Pedrosa**

Thesis title: Potential of prepupae meal of Black Soldier Fly (*Hermetia illucens*) as fish meal substitute in European sea bass juveniles (*Dicentrarchus labrax*): Implication in flesh quality

Master Degree: MSc in Biological Aquatic Resources

Faculty/University: FCUP, University of Porto

Supervisor: Helena Peres, CIIMAR

Co-supervisor(s): Giuliana Parisi

Date: December 2016

Name: **Rui Pedro Araújo Moura**

Thesis title: Analysis of Methodologies for Vulnerability and Risk Assessment on Coastal Areas

Master Degree: Integrated Master in Civil Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Francisco Taveira Pinto, FEUP/CIIMAR

Date: February 2016

Name: **Rui Pedro Santos Gaspar Ribeiro**

Thesis title: Simulação Hidrodinâmica de Condições de Exploração em Aproveitamentos. O Caso dos Reforços de Potência de Venda Nova Hidroelétricos

Master Degree: Integrated Master in Civil Engineering

Faculty/University: FEUP, University of Porto

Supervisor: Rodrigo Maia, FEUP/CIIMAR

Date: February 2016

Name: **Sara Silva Jorge**

Thesis title: Effect of microalgae in *Sparus aurata* (Gilthead seabream) diets

Master Degree: MSc in Biological Aquatic Resources

Faculty/University: FCUP, University of Porto

Supervisor: Ana Couto, CIIMAR

Date: November 2016

Name: **Sofia Cristina da Silva Oliveira**

Thesis title: Os contornos da invasão: práticas autárquicas face às espécies exóticas invasoras em Portugal.

Master Degree: MSc in Ecology, Environment and Territory

Faculty/University: FCUP, University of Porto

Supervisor: Paulo José Talhadas dos Santos, FCUP/CIIMAR

Co-supervisor(s): Ruth Maria de Oliveira Pereira, FCUP/CIIMAR

Date: December 2016

Name: **Susana Manuel Teixeira Ribeiro Figueiredo da Silva**
Thesis title: Intervenções de Alimentação Artificial de Praias.
Casos de Estudo Nacionais e Internacionais
Master Degree: Integrated Mastre in Civil Engineering
Faculty/University: FEUP, University of Porto
Supervisor: Fernando Veloso Gomes, FEUP/CIIMAR
Date: July 2016

Name: **Telmo José Anselmo Francisco**
Thesis title: Determinação dos antibióticos enrofloxacin, ciprofloxacin e norfloxacin em farinha de aves ou penas por extração assistida por micro-ondas (MAE) seguida de cromatografia líquida RPLC-DAD ou HILIC-MS/MS.
Master Degree: MSc in Food Science and Technology
Faculty/University: FCUP, University of Porto and University of Minho
Supervisor: Mafalda Baptista, CIIMAR
Co-supervisor(s): Maria Clara Basto, FCUP/CIIMAR
Date: October 2016

Name: **Teresa Patrícia Gomes dos Santos**
Thesis title: Exploração de produtos de altimetria por satélite melhorados em zonas costeiras
Master Degree: MSc in Surveillance Engineering
Faculty/University: FCUP, University of Porto
Supervisor: Maria Joana Afonso Pereira Fernandes, FCUP/CIIMAR
Date: December 2016

Name: **Tiago Manuel Marques Ventura Oliveira Luz**
Thesis title: Potential of novel probiotics isolated from fish gut microbiota for improving plant feedstuffs utilization and gut homeostasis in white sea bream (*Diplodus sargus*) juveniles
Master Degree: MSc in Biological Aquatic Resources
Faculty/University: FCUP, University of Porto
Supervisor: Paula Enes, CIIMAR
Co-supervisor(s): Ana Couto, CIIMAR
Date: December 2016

Name: **Vanessa Marina Ferreira Marujo**
Thesis title: Ensaio com os rotíferos *Brachionus plicatilis* (Müller, 1786), submetidos a diferentes dietas de crescimento
Master Degree: MSc in Marine Sciences-Marine Resources
Faculty/University: ICBAS, University of Porto
Supervisor: Carlos Andrade, CIIMAR
Co-supervisor(s): Eduardo Rocha, ICBAS/CIIMAR
Date: December 2016

Name: **Zita Diana Marinho Couto**
Thesis title: Study of the microbiome of fluoroacetate producing plants: investigation of microbial diversity and potential to produce fluorinated/bioactive compounds

Master Degree: MSc in Forensic Genetics
Faculty/University: FCUP, Univeristy of Porto
Supervisor: Maria de Fátima Carvalho, CIIMAR
Co-supervisor(s): Filipe Pereira, CIIMAR
Date: December 2016

OTHER OUTPUTS

New materials, devices, products and processes, software, computer codes and algorithms

Bastos, L. – Software for monitoring wave height changes using dual frequency GNSS integrated with MEMs inertial measurements.

Fernandes, M. J., Lázaro, C. – Computer Codes and Algorithms: GNSS-Derived Path Delay Plus (GPD+) – software for the computation of the wet tropospheric correction (WTC) of satellite altimeter missions, by spatio-temporal objective analyses of all available and intercalibrated wet path delay data sources.

Fernandes, M. J., Lázaro, C. – Products: GPD+ WTC datasets derived for 9 altimetric missions: ERS-1, ERS-2, Envisat, TOPEX/Poseidon, Jason-1, Jason-2, GFO, CryoSat-2, SARAL.

Guisande, C., Vaamonde, A., Barreiro, A. (2016) Statistical and mathematical software R: packages StatR: <http://www.ipez.es/RWizard/Downloads/Applications/Setup/StatR-manual.pdf>

Ribeiro D.C., Brito A.G., Guilhermino L. 2016. INSITOX – Platform for modeling in Ecotoxicology (June 2016, 1st model release to public access in Feb. 2017): <http://www.insitox.ciimar.up.pt>

Nobre, A.M. (2016) A nitrogen budget model with a user-friendly interface, to assess water renewal rates and nitrogen limitation in commercial macroalgae farms calibrated for *Ulva rigida*: <http://www.seaplusplus4.com/algaepanning.html>

Audio/visual and electronic/digital materials

BIOMAR PT project: Introdução à Monitorização de Cetáceos
<https://youtu.be/MzrN6yXPrTY>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/introducao-a-monitorizacao-de-cetaceos>

BIOMAR PT project: Técnicas de Amostragem e Análises Moleculares
<https://youtu.be/uiLuLEluTjY>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/tecnicas-de-amostragem-e-analises-moleculares>

BIOMAR PT project: Amostragem e Identificação de Parasitas de Organismos Marinhos
<https://youtu.be/dRyisnoy5tE>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/amostragem-e-identificacao-de-parasitas-de-organismos-marinhos>

BIOMAR PT project: Identificação de Macroalgas e Elaboração de um Algário
<https://youtu.be/WORP9nwhfWo>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/identificacao-de-macroalgas-e-elaboracao-de-um-algario>

BIOMAR PT project: Metodologias de Amostragem da Zona Intertidal Arenosa
<https://youtu.be/An70JoSHIGU>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/metodologias-de-amostragem-da-zona-intertidal-arenosa>

BIOMAR PT project: Cadeias Tróficas Marinhas - Da Teoria à Prática
<https://youtu.be/s1Kn0XqQhEQ>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/cadeias-troficas-marinhas-da-teoria-a-pratica>

BIOMAR PT project: Elaboração de uma Coleção de Invertebrados Marinhos
<https://youtu.be/KJSDUTyRldc>
<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/elaboracao-de-uma-colecao-de-invertebrados-marinhos>

BIOMAR PT project: Metodologias Amostragem na Zona Intertidal Rochosa
<https://youtu.be/0hIVFtx9Q-8>

<http://biomarpt.ipma.pt/conteudo/formacao/produtos-complementares/metodologias-amostragem-na-zona-intertidal-rochosa>

CETUS Project Official Video <https://www.youtube.com/watch?v=6b0sPxuv2rw>

Morais, J., Ramos, V., Vasconcelos, V. Blue Biotechnology and Ecotoxicology Culture Collection (LEGE-CC) <http://lege.ciimar.up.pt/>

Pereira, F. (2016) EbolaID Database Project <http://ebolaid.portugene.com/>

SeaChange - Ocean Literacy MOOC – From ABC to ABSeas: How to organize hands-on activities on Sea Food, Marine Pollution and Human Health. <http://youtu.be/pulH3O5mn9k>



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