

INPHINIT INCOMING ICM-CSIC POSITIONS

1. Disentangling the impact of climate change through a historical and paleoecological reconstruction of the Eastern Mediterranean marine food webs

PI: Dr. Maria Bas (mbas@icm.csic.es)

Project description

Climate warming severely affects marine ecosystems, with food-web simplification and a general decline of marine animal biomass negatively affecting human societies worldwide. Yet, the mechanisms behind these changes remain unclear, mainly because most studies use modern data to form their initial baselines and hypotheses, which are already affected by post-industrial climate change and human activities, and lack future data to validate their predictive models. The geological past holds periods when the climate changed in ways similar to those taking place at present, which can be used as analogues, to predict the impact of climate warming on marine ecosystems. This project aims to evaluate and enhance our understanding of the long-term impact of climate change on the marine fauna of the Eastern Mediterranean Sea using paleo- and historical ecology perspectives. The Eastern Mediterranean Sea is one of the hotspot areas of the world exhibiting high increases in the sea surface temperature and extreme events. Present-day marine ecosystems are affected by multiple stressors, such as environmental changes and human impacts, which are difficult to disentangle. Human exploitation of marine resources has been documented in the Mediterranean since prehistoric times. Looking to the even deeper past, during the Early-Middle Pleistocene Transition, the climate system shifted to its modern state of 100-kyr glacial-interglacial cycles. During that time, modern humans did not exist, and the marine ecosystems were only affected by the natural variability of climatic oscillations, with warming periods that can be used as analogues of current and forecasted climate warming. Therefore, a comparative study of the modern and ancient marine ecosystems can allow us to isolate the relative contributions of the environmental stressors in the Eastern Mediterranean today and provide meaningful recommendations for the management and conservation of the marine resources in the region.

Job position description

The ICM-CSIC, as a Severo Ochoa Center of Excellence, offers institutional support to the ICM researchers throughout the life cycle of the project to ensure research viability and scientific excellence. The ICM-CSIC offers support for researchers such as scientific and economic follow-up of projects, training programs, and implementation of the project dissemination and communication. The PhD student will be supervised by Dr. Maria Bas (Juan de la Cierva postdoctoral researcher at ICM-CSIC with expertise in applied paleoecology), Dr. Konstantina Agiadi (Elise Richter Senior Postdoc at the Conservation

Paleobiology and Historical Ecology group, University of Vienna) and Dr. Marta Coll (senior researcher at ICM-CSIC with food web modelling expertise). The PhD student will be primarily based at the Department of Renewable Marine Resources, but is also expected to interact with other researchers at the ICM-CSIC from the Department of Biology and Oceanography, and the Department of Marine Geosciences. The PhD student will join the “Integrated Marine Ecosystem Assessments (iMARES)” Research Group of Consolidated Quality (supported by the Autonomous Government of Catalunya). The principal aim of the Dr. Marta Coll research group is to explore the effects of stressors and forcing processes on marine ecosystems with particular attention to marine living resources and human activities. This group has grown steadily by training PhD students and holders of prestigious grants such as Ramon y Cajal, Marie Curie, and Juan de la Cierva. Today, the group is highly multidisciplinary in terms of research activities, but also in technical aspects, especially in food web ecology and marine ecosystem modelling, and publishes high-quality scientific papers and informative reports. The PhD student will visit the University of Vienna regularly to be trained by Dr. Agiadi, a palaeontologist with extensive expertise in ancient Eastern Mediterranean marine ecosystems.

Research project / Research group website

<https://martacollmarine.science/>

On this website, you will find information about current projects, researchers from the group and the most important interests of the group members. You can also find publications, events and news from the group. The major aim of the group is to understand patterns and processes that have and will characterise marine ecosystems. We study community and food-web dynamics linked with human activities (such as fisheries, eutrophication, invasive species and climate change), and how these translate into changes in ecosystem structure and functioning, and into services that humans obtain from the ocean.

2. Looking for stable multipolar three-dimensional vortices: fluid and quantum mechanics approaches

PI: Dr. Álvaro Viúdez Lomba (aviudez@cmima.csic.es)

Project description

Recent advances in observational, numerical, and theoretical geophysical fluid dynamics, and in physical oceanography in particular, have shown intriguing similarities between physical processes occurring at the spatial and time scales of geophysical flows described by classical fluid dynamics with those occurring at atomic and subatomic scales described by quantum mechanics. These processes include the spontaneous emission of small-amplitude inertia-gravity waves in geophysical flows which shows some conceptual resemblance with the spontaneous emission of electromagnetic wave packets by excited atoms, the similarity between some vortex-vortex geophysical interactions and particle-particle interactions at atomic scales, the Larmor precession of electrons which is conceptually similar to the precession of geophysical vortices rotating around a vertically-oriented axis, the existence of a speed limit for the propagation of geophysical dipoles which resembles the speed limit of light, the principle of superposition of the pure or modal states which is common to the quantum mechanics and to the nonlinear fluid mechanics, and the existence of interaction mechanisms between vortices which makes possible the structural stability of symmetric arrangements of many co-rotating tripole arrays. The researcher A. Viúdez is having a leading role in this research which fundamentally aims at the development of a fluidic theory of matter, and basically consists in the modelisation of atomic and subatomic particles as vortex flows in a fluid. However, besides the theoretical development, it is equally important to prove that some vortex flows, defined from an initial vorticity distribution, remain stable to the addition of small perturbations. This is a difficult problems of nonlinear stability that can only be solved by means of 3D numerical simulations of the fluid equations. It is expected that the fellow will carry theoretical and numerical work to find stable 3D solutions.

Job position description

The particular role of the fellow will be to find the appropriate initial conditions for the vorticity field (that is, the initial vortex configurations) that, besides be solutions to both the fluid mechanics vorticity equation and the Schrödinger quantum mechanics equation, must remain stable to the addition of small perturbations. This task requires having skills in the theory of classical continuum fluid mechanics and quantum field theory, as well as in 3D high-resolution parallel numerical modelling. To carry out the theoretical work the fellow will have at his/her disposal the exact three-dimensional modal solutions in spherical and cylindrical geometry in terms of which the initial conditions for the vorticity field must be constructed. In order to master these solutions is required a good knowledge of 3D vector and tensor calculus and algebra, the theory leading to the 3D vorticity equation, spherical and cylindrical Bessel functions, and vector spherical harmonic functions. To investigate



Pg. Marítim de la Barceloneta, 37-49
08032 Barcelona
+34 932 309 500
www.icm.csic.es

the nonlinear stability of these solutions the fellow will have at his/her disposal the different numerical programs developed in our group that integrates in time the fluid mechanics equations of motion from a given initial vorticity field. The use of these numerical codes requires a basic knowledge of computational fluid dynamics, as well as the use of operating systems as Linux, programming language FORTRAN, and the use of 3D Fast Fourier Transform code. Knowledge of Wolfram Mathematica and LaTeX software for document writing is also recommendable.

Research project / Research group website

<https://www.icm.csic.es/en/research-group/physical-and-technological-oceanography>

Group website.

3. Monitoring the contemporary biodiversity crisis in the Mediterranean Sea using digital data from recreational fishing

PI: Dr. Valerio Sbragaglia (sbragaglia@icm.csic.es)

Project description

The goal of this PhD project is to monitor and advance understanding of the contemporary biodiversity crisis in the Mediterranean Sea using digital data from recreational fishing. The Mediterranean Sea is a global marine biodiversity hotspot, which is facing a biodiversity crisis. Many aspects of such crisis remain unsolved because of the lack of the necessary ecological and socio-economic information to guide decision-makers. The project will provide an unprecedented volume of data to advance monitoring and research on biodiversity conservation from an ecological and human-dimension perspective. Recreational fishers play a central role for two main reasons. First, the impact of recreational fishing on marine ecosystems is not well understood due to constraints in monitoring activity. Second, recreational fishing has an underexplored potential for monitoring marine ecosystems, and their catches constitute a widespread spatio-temporal network of samples that - if properly analysed - can provide an unprecedented body of information, especially for marine environments where sampling is constrained across time and space. The overarching goal is to create an innovative cost-effective monitoring tool that will reconstruct recreational fishing catches and it will remain functional after the end of the project. This is expected to have a tremendous impact in areas where resources for monitoring are scarce. Digital data will be mined from several sources such as webpages, video-sharing platforms and social networks, and validated against independent datasets. The specific objectives at the Mediterranean level are: (i) monitoring of recreational fisheries based on target species and human dimension indicators, (ii) assess the effects of climate change and biological invasions on geographical redistribution of biodiversity including fishers' attitudes, and (iii) analysis of population trends of species at risk and data deficient including fishers' attitudes towards them.

Job position description

The project will be developed in a vibrant international network of early career researchers across several European countries (Spain, France, Finland, Portugal, Germany), and it is expected to have a tremendous impact on the future career of the student. The student will join a research group aiming to approach complex problems with an integrative approach, and will be introduced to the emerging research approaches of conservation culturomics and iEcology (i.e., the use digital data to study human-nature interactions and ecological patterns). Research activity will be developed at the Institute of Marine Sciences in Barcelona, as a Severo Ochoa Center of Excellence, offers institutional support to researchers throughout their career to ensure research viability and scientific excellence. The main responsibilities of the student will be related to: (i) mining digital data in R with a

script that has been recently developed; (ii) contribute to the development and refinement of a machine learning algorithm for video analysis; (iii) analyse quantitative data about ecological and social aspects of recreational fisheries (iv) interpret results and write scientific papers; (v) participate in international activities by visiting other European research groups. The project is partially open to be adjusted to meet specific expectations and support career goals of the student. The Institute of Marine Science is a unique and vibrant international community and offers support for career and talent development of young researchers in a safe and equitable environment. “Ideal” student is nice-to-having a strong proactive attitude, experience about R, digital data and platforms, and English language (All are encouraged to apply even without such experience!).

Research project / Research group website

<https://valeriosbra.wixsite.com/valesbra>

Personal website.

See also:

- <https://www.i-ecology.org/>
- <http://www.conservationculturomics.com/>

4. Interdisciplinary study of crustal fluid flow in orogenic systems

PI: Dr. Jonas Ruh (jruh@icm.csic.es)

Project description

The proposed project investigates deep fluid flow evolution of the Greater Caucasus and neighbouring mountain belts related to the closure of the northern part of the Neo-Tethys during Cenozoic times. The PhD student undertakes a multi-disciplinary study including multi-proxy analysis of crustal fluid flow (U-Pb dating, clumped isotopes, fluid inclusion, analysis, oxygen geochemistry of quartz and calcite veins) and orogen-scale numerical modelling with a rock-fluid two-phase flow thermo-mechanical code. U-Pb dating of calcite and clumped isotope analysis will be performed at ETH Zürich, fluid inclusion and geochemistry at the University of Barcelona, and numerical modelling at the Institute of Marine Sciences, Barcelona. Identification and a better understanding of crustal fluid flow provides key insight for detecting mineral resources and geo-engineering. The main supervisor, Jonas Ruh, has experience in both the geochemical analytical part and numerical modelling, providing the necessary codes. Dr. David Cruset (Geosciences Barcelona, CSIC) provides further insight in state-of-the-art fluid flow geochemistry. The PhD thesis includes fieldwork in the Great Caucasus (Georgia) and the Lesser Caucasus (Georgia, Armenia) and research stays at the ETH Zürich in Switzerland, to provide the best condition for a successful thesis.

Job position description

The proposed PhD position combines field geology, geochemistry, and mechanical numerical modelling to investigate the thermo-dynamic evolution of the Great Caucasus and its role within the Arabia-Eurasia collision zone.

The PhD student will be hosted by the Institute of Marine Sciences, CSIC, Barcelona, one of the leading research institutes in marine geoscience. The PhD thesis will be conducted in collaboration with Geosciences Barcelona (CSIC), University of Barcelona, and ETH Zürich, Switzerland.

The PhD student will conduct field work in the Greater Caucasus region (Georgia, Armenia), sampling veins mineralization and host rocks for geochemical analyses such as U-Pb dating, clumped isotopes, oxygen geochemistry, and fluid inclusions, to investigate the temporal, thermal, and chemical conditions of fluid flow and vein precipitation to reconstruct the evolution of a sedimentary basin and its consequent uplift and exhumation.

Furthermore, the student will develop and conduct geodynamic numerical modelling to reproduce the obtained natural conditions to better understand the tectonic, i.e. spatio-temporal evolution of the Greater Caucasus and other orogens.



Pg. Marítim de la Barceloneta, 37-49
08032 Barcelona
+34 932 309 500
www.icm.csic.es

At the ICM, the student will find a dynamic and young research group with an ample expertise in various topics of geoscience, providing the ideal environment to conduct a successful PhD thesis.

Research project / Research group website

<https://www.icm.csic.es/en/research-group/barcelona-center-subsurface-imaging>

Group website.

5. Evolutionary history of dinoflagellates: from benthos to plankton

PI: Dr. Albert Reñé (albertrene@icm.csic.es)

Project description

Dinoflagellates are highly abundant microeukaryotes inhabiting aquatic environments. They show a high morphological diversity and include many lifestyles. This morphological diversity arises high interest in their evolutionary adaptations. Despite their ecological significance, current phylogenetic reconstructions based on rRNA genes provide limited resolution to determine the relationships of dinoflagellates at high taxonomic level, hampering the exploration of their evolutionary origin.

The DNA content range of dinoflagellates, higher than in most eukaryotic algae, hinders the genomic approach to unravel dinoflagellates genome complexity. Alternatively, transcriptomics has been proved as an appropriate tool to obtain the molecular information on these organisms. Phylogeny studies using this approach have been conducted to determine the monophyly of most major dinoflagellate groups. The paraphyly and basal position of naked dinoflagellates and the monophyly of thecate ones evidenced a single origin of theca.

Sand-dwelling benthic dinoflagellates represent a 10% of known species. Their unusual plate pattern is intermediate to those of planktonic orders, and some morphological features suggest convergent evolution. Many cases of putative benthic ancestors in planktonic clades can be found, but most evolutionary relationships are dubious and not well supported based on ribosomal gene phylogenies. Additionally, many genera of benthic dinoflagellates cluster unrelated to any other dinoflagellates based on ribosomal genes.

Given the previous examples, we hypothesize that planktonic dinoflagellate lineages evolved from benthic ancestors, and those of unknown affiliation are remnants of early evolution lineages. To test this hypothesis, phylotranscriptomics will be employed on selected benthic dinoflagellates occupying a basal position in planktonic clades, and planktonic representatives of the clades to elucidate their evolutionary relationships and taxonomic affiliation.

Job position description

The PhD candidate will gain skills and formation to ensure a successful development of the project. The formation will be obtained in-house or through external courses and abroad short-stays with experienced collaborators. Consequently, the candidate should be interested, and possess background knowledge in the following aspects:

- Taxonomy and identification of protists, specifically on dinoflagellates using microscopy.

- Cell culturing and single-cell isolations.
- Molecular procedures, including nucleic acids extractions, PCR, library preparations and high-throughput sequencing.
- Bioinformatics and R programming.
- Phylogenomics procedures.
- Scientific writing.

The PhD candidate will be integrated into the PBL (Littoral Biological Processes) research group from the ICM (CSIC), located in Barcelona (Spain) and recognized as a research center of excellence 'Severo Ochoa'. The PBL team includes researchers, laboratory technicians, bioinformaticians, and graduate students that will contribute in conducting the different tasks and will provide expertise on dinoflagellates identification, molecular and bioinformatics analyses. ICM provides access to all material and logistics needed for sampling. Light microscopes are available for samples observation and manipulation, and a molecular laboratory is accessible to conduct molecular procedures. Bioinformatic analyses will be performed at MARBITS platform (ICM-CSIC). External collaborators will provide cells of target taxa from Germany, France, Australia, Russia, or Japan, and cultures will be obtained from culture collections when possible. The UNICELL Platform (CNRS-France) will provide assessment on transcriptomic procedures.

Research project / Research group website

<https://www.icm.csic.es/en/research-group/littoral-biological-processes>

Group website.

6. The UN Ocean Decade and the EU Mission Oceans and Waters as opportunities for building a new relation with and for people and the ocean

PI: Prof. Josep L. Pelegrí (pelegri@icm.csic.es)

Project description

The last revolutions, industrial and digital, have taken humankind to the verge of collapse. The effect of the one-and-a-half century old but still ongoing industrial revolution is twofold. On one hand, it degrades terrestrial and marine ecosystems, which leads to a major loss of biodiversity and to regional and global health major impacts. On the other hand, it has introduced so much greenhouse gases into the atmosphere that in a few years our planet will have surpassed the thresholds for a non-return climatic change, with major impacts on the most vulnerable populations. The digital revolution is taking far too many individuals, particularly from the highly industrialized countries, into a growing spiral of action whose outcome is fatigue, discouragement and occupational burnout. In these societies, technology turns into an objective rather than a pathway for enhanced inner wellness.

Humankind desperately needs a new revolution, a collaborative transformation with and for people and nature. This collaborative revolution implies feeling and acting as part of nature rather than its owner, building a real collaboration among people and with nature, with the ocean as a main participant. The collaborative revolution needs expanded cognition – transformative blue education that blends intellectual knowledge and sensory experiences into deep and lasting connections.

The Institut de Ciències del Mar (ICM-CSIC) is deeply committed into building this collaborative revolution, with marine sciences and technologies as key building blocks towards a sustainable society and planet. Marine Social Sciences researchers at ICM-CSIC are participating in national and international projects that are developing tools, methods and strategies for a new relationship with the ocean, from scientific quantitative knowledge into artistic and emotional lasting sustainable connections.

Job position description

It is very encouraging to realize that our society – represented by international bodies and a significant fraction of its population – is experiencing a progressive awareness of the incommensurable value of healthy marine ecosystems. The UN Ocean Decade and the EU Mission Oceans and Waters are clear examples that the current biodiversity, climatic and social crisis can turn into opportunities towards individual and collective transformation and resilience. In order to attain this transformation, humankind urgently needs a revolution based on a deep-awareness of the human-nature connection: this is the collaborative revolution, with and for people and nature, with the ocean as an essential participant.

Intellectual cognition of the functioning and importance of the ocean in our lives – from its role on global health and climate to the concepts of life as a process and the living Earth – is necessary but not sufficient. To establish lasting connections, we require expanded



cognition: improved knowledge of the ocean system has to come together with a continued sensory experience of the oceans. This can be attained with seagoing activities and aided through the innovative combination of arts and sciences.

The challenge is to develop enactive interfaces – methods, tools and strategies – that can translate this expanded cognition to society, particularly to the school system, the youth networks and stakeholders. The proposed position will explore how to blend scientific, artistic, philosophical and social methodologies towards strong and lasting connections with and for people and the oceans. The candidate should be a highly motivated individual that accepts the risk of the unique challenge of blending marine and social cognitive and sensory knowledge to build these transformative enactive interfaces.

Research project / Research group website

<https://prep4blue.eu/>

Prep4Blue is the coordinating and supporting action aimed at preparing the research & innovation core for the EU Mission Ocean, Seas & Waters.



7. Design of advanced instruments for marine and ocean observation based on participatory technologies

PI: Dr. Jaume Piera (jpiera@icm.csic.es)

Project description

The research project will be focused on improving the observational capabilities to monitor our seas and oceans. The main focus of the project will be the development and improvement of new low-cost instruments, designed to provide information about the water quality, measuring optical properties of the water (such as transparency or changes in water colour). The project will be based on the outcomes from finished projects (CITCLOPS, <http://www.citclops.eu/> and MONOCLE <https://monocle-h2020.eu/>) and activities in ongoing projects, such MINKE (<https://minke.eu/>)

Job position description

Data quality is the key element in Ocean & Coastal Observing Systems to provide reliable measurements for developing evidence-based environmental policies. The European project MINKE (<https://minke.eu>) doesn't just address data quality but also focuses on all data quality dimensions. The project proposes a new vision in the design of marine monitoring networks, integrating two dimensions of data quality, namely accuracy and completeness, as the driving components of quality in data acquisition. In particular, completeness dimension in data quality tries to maximize the number of observations per temporal and spatial unit. To achieve the highest completeness in marine and ocean observation, the research group promotes the involvement of the society using low-cost devices to retrieve information about the status of the ocean and seas. At present, the group has developed different instruments for monitoring water quality based on water transparency measurements. The proposed PhD will be focussed on developing the new generation of this instruments based on open systems (hardware and software). The instruments will be designed to improve their performances, in terms of cost an accuracy, their connectivity (including dual systems to connect with the smartphones or transmit directly the data through IoT based technologies). As a reference of existing results from the group, the candidates could consult the following references: "Estimating the Underwater Diffuse Attenuation Coefficient with a Low-Cost Instrument: The KdUINO DIY Buoy" (<https://www.mdpi.com/1424-8220/16/3/373>); "New Radiometric Approaches to Compute Underwater Irradiances: Potential Applications for High-Resolution and Citizen Science-Based Water Quality Monitoring Programs" (<https://www.mdpi.com/1424-8220/21/16/5537>) and "Operational monitoring of water quality with a Do-It-Yourself modular instrument" (<https://www.frontiersin.org/articles/10.3389/fmars.2022.1004159>)



Pg. Marítim de la Barceloneta, 37-49
08032 Barcelona
+34 932 309 500
www.icm.csic.es

Research project / Research group website

<https://minke.eu/>

Website to the MINKE European project (that we coordinate).

<https://www.icm.csic.es/es/grupo-investigacion/environmental-and-sustainability-participatory-information-systems>

This website corresponds to the description of our research group.



8. Ocean microbiome analyses using computational flow cytometry

PI: Prof. Josep M Gasol (pepgasol@icm.csic.es)

Project description

Microbes are extremely relevant in the ocean, both in terms of activity and biomass share. They include viruses, bacteria, archaea, fungi and small protists. All of them can be enumerated and analysed using flow cytometry and their characteristic size, DNA and pigment composition. In addition, recent developments in computational flow cytometry allow extracting high level data from the flow cytograms, as for example diversity and size distribution.

In recent years we have participated in two large-scale oceanographic sampling campaigns: Mission Microbiome in the Atlantic Ocean and Tara Trek in Europe: Research vessel Tara has been sampling sites for a combined omics and imaging view of the plankton. We will contribute to this effort by running the flow cytometry samples, calculating diversity and size structure and integrating these datasets with the molecular ones. Additional cruises will be designed to test specific equipment or bioinformatics pipelines to automatize our protocols.

The candidate will collaborate with many European groups (those participating in Tara Trek) and many South American ones (those participating in Mission Microbiome. He/she will be in contact with Omics and oceanography experts and will be able to develop a career combining molecular, environmental and microbiological expertise. He/she will have the opportunity to embark in international cruises, too.

Job position description

This work can only be developed in an internationally-well connected group and institute. It bridges two worlds: the environmental (and marine) and the molecular and microbiological. We expect the student to have some bioinformatics skills (or at least not to be afraid of them), to be able to participate in oceanographic cruises, and to have some microbiological skills.

The fellow will refine the project to suit his/her expertise, will define with us a learning path including courses needed to master the tools, and will develop and apply the needed tools. Once the data will be obtained we expect the fellow to develop ecological hypotheses that can be tested with the data and collaborate with the other groups that participated in the cruise in order to develop useful science to define the health of the marine ecosystem and the changes that the marine environment is currently facing because of the ongoing global change. If successful, the tools developed will allow a faster and better monitoring of the marine environment.



Pg. Marítim de la Barceloneta, 37-49
08032 Barcelona
+34 932 309 500
www.icm.csic.es

Research project / Research group website

<https://emm.icm.csic.es/>

Website of the Group of Ecology of Marine Microbes at the ICM-CSIC.

9. ASSESSING PLASTICS DEBRIS AS A DISPERSAL VECTOR OF MARINE INVASIVE SPECIES, HARMFUL ALGAE AND PATHOGENS

PI: Dr. Blanca Figuerola Balañá (figuerola@icm.csic.es)

Project description

Since the mid-XX century, production and disposal of plastic has increased dramatically, and nowadays plastic debris is ubiquitous in the marine environment. While its impact on marine wildlife through ingestion, entanglement and suffocation is well documented, as it is the release of organic pollutants and heavy metals, its role as dispersal vector for invasive species, harmful algae and pathogens has received less attention. In particular, when plastic debris enter aquatic environments, these artificial substrates rapidly become colonized by organisms ranging from bacteria, single-celled algae and fungi and macro-organisms. They thus provide long-lasting substrates, allowing diversity of organisms to potentially widening their original distributional ranges, and become invasive species. The proliferation of invasive species is considered a major threat to local biodiversity and may lead to a decline or extinction of native species, as well as economic loss. However, only a few studies have identified the fouling organisms to species level, and even less have characterized the plastics on which these organisms were attached. In addition, colonization and biofouling of low-density floating plastic debris may decrease its buoyancy causing it to sink. This may be particularly important as benthic plastic debris substrates may have the potential to change biodiversity and structure of benthic communities. The aim of the research project is to assess plastics as dispersal vectors of marine invasive species, harmful algae and pathogens. It will use an integrated morphological and molecular approach combining different techniques and using citizen science platforms. It will also establish a baseline to evaluate the use of citizen science platforms to early detect invasive species on plastic debris. Finally, it will provide new information on community succession on different plastic types which will be relevant for predicting future spread of non-native species.

Job position description

The research project will be developed at the Institute of Marine Sciences, recognized as the institution's leadership in the field of marine research in Spain (Severo Ochoa Excellence centre), with a leading role in Southern Europe and the Mediterranean region. The PhD proposal will be undertaken with the supervision of Dr. Blanca Figuerola (ICM-CSIC) and Dr. Anna Sanchez-Vidal (University of Barcelona) and in collaboration with Dr. Esther Garcés (ICM-CSIC). Dr. Figuerola is a member of the research group MEDRECOVER, which is recognized as a consolidated research group by the Generalitat de Catalunya. This group is devoted to marine conservation in the global change context and has extensive experience in training PhD students and postdocs. Dr. Figuerola is currently applying an original and interdisciplinary approach including ecology, microbiology and experimental ecology as PI of different projects. Dr. Sanchez, expert on plastic marine pollution, is an



associate professor in the UB and a member of the UB's Marine Geosciences Consolidated Research Group. Dr. Sanchez is leading the citizen science project "Surfing for Science", a pioneering initiative to assess the level of microplastic pollution in shoreline waters (asensio.com/surfingforscience/en). Dr. Garcés is an expert in the ecology of marine phytoplankton, especially in toxic and harmful species for human health.

The candidate will develop the PhD thesis within the Doctoral program in Marine Sciences of the UB, which has obtained the Mention towards Excellence from the Ministry of Education. The candidate will be in charge of sampling, laboratory work, data processing and integration, management of the citizen science volunteers, data presentation in conferences and publication of the results. The PhD candidate will learn a range of methods for sampling plastic debris, gain taxonomic skills and molecular techniques and learn methods to chemically characterize plastics and get training in citizen science.

Research project / Research group website

<https://medrecover.org/>

Research group website.

10. Assessing integrated impacts of cumulative pressures in marine ecosystems

PI: Dr. Marta Coll (mcoll@icm.csic.es)

Project description

Coastal and marine waters are vital for the natural balance of planet Earth and for Human societies. All coastal and marine ecosystem goods and services heavily depend on the level of human and environmental pressures, and their cumulative effects. Ensuring that Good Environmental Status (GES) is achieved in marine ecosystems and support policies at national, European and global levels, is a great societal and policy challenge. Scientific advances are needed to inform and guide marine governance in minimizing human pressures and their impacts on marine biodiversity and ecosystem functioning, while maintaining the sustainable delivery of ecosystem services. This research project will be developed within a big EU project recently started (1st of September 2022), Ges4Seas, and aims at developing an understanding of the mechanisms that determine the cumulative impacts of human activities and climate change. For that, we aim at developing the conceptual framework and the methodologies needed

1. to assess the capacity of marine ecosystems to deliver ecosystem services and how this is linked to GES,
2. to test tipping point and thresholds associated with multiple human activities, and
3. to investigate effects of management measures on mitigating cumulative impacts, while accounting for climate change.

During this project we will work with spatial-temporal datasets of physical, biogeochemical, ecological and socio-economic information to apply advanced marine ecosystem modelling approaches and quantify, assess and forecast the consequences of anthropogenic perturbations on marine life. The project will involve frequent collaboration with international scientific institutions, the participation to highly specialized modelling and data science courses and the attendance to international workshops, conferences and congresses.

Job position description

We are looking for a highly motivated fellow to join our research group located at the Institute of Marine Science (Institut de Ciències del Mar, ICM-CSIC) in Barcelona, Spain (website: <https://martacollmarine.science>).

The fellow should have knowledge in the fields of marine sciences, biological sciences, environmental sciences or similar, with a strong background in quantitative ecology. Experience with GIS, statistical analyses and programming with R is recommended. The fellow work will include gaining experience with marine ecosystem models (with particular attention to Ecopath with Ecosim (EwE) and Ecospace food web modelling approach) and learning how to deal with big datasets of physical, biogeochemical, ecological and socio-economic information. The possibility to participate in fieldwork and develop novel analytical



Pg. Marítim de la Barceloneta, 37-49
08032 Barcelona
+34 932 309 500
www.icm.csic.es

analyses (stable isotope analyses, metabarcoding environmental DNA analyses, and satellite or radar product analyses) is also available.

The Institute of Marine Science (ICM-CSIC), the fourth largest research institute of the Spanish National Research Council (CSIC) and the largest dedicated to marine research. Under the motto “Ocean Science for a Healthy Planet,” the ICM-CSIC conducts frontier research and foster both knowledge and technology transfer on topics related to ocean and climate interactions, conservation and sustainable use of marine life and ecosystems, and impact mitigation of natural and anthropogenic hazards. In-depth knowledge, determined action, and coordinated management are essential to confronting these global challenges, thereby driving sustainable development of humankind.

Research project / Research group website

<https://martacollmarine.science/>

Web of our research group at ICM-CSIC.

INCOMING INPHINIT Fellowship Programme 2024:

30 fellowships for early-stage researchers of any nationality to pursue their PhD studies in the best Spanish and Portuguese research centres and units with excellence distinction. This frame is addressed exclusively to PhD research projects on STEM disciplines: technology, engineering, physics, mathematics, health and life sciences.

- *STEM disciplines (technology, engineering, physics, mathematics, health and life sciences).*
 - *Maximum duration: 4 years.*
 - *Funding to cover labour costs, research costs and doctoral tuition fees.*
 - *On-site training programme in multidisciplinary skills.*
-

You can find more information and all details for apply [here](#) in the programme website. All applications should be made through the mentioned platform before 24 January 2024, at 2 pm Peninsular Spain.
