

Los/as beneficiarios/as son informados de que la beca, así como el plazo de implementación de cada beca pueden verse suspendidos o anulados en función de cómo se desarrollen los acontecimientos relacionados con la COVID-19, en especial respecto a las medidas que se adopten vinculadas con la declaración de Estado de alarma u otras con repercusión en la movilidad u otro tipo de derechos. Si tales circunstancias no estuvieran clarificadas en su momento, se emitiría con antelación al comienzo de la beca la o las resoluciones que correspondan procediendo a su suspensión o anulación, sin que de las mismas pueda derivar compensación alguna. Los/as beneficiarios/as tienen que tener en cuenta esta circunstancia a los efectos que correspondan.

FICHA DESCRIPTIVA JAE Intro ICU 2021

Modalidades de Becas ofertadas

Becas de Introducción a la investigación en el Institut de Ciències del Mar (ICM-CSIC)

- a. Correo electrónico de contacto: projectes-osr@icm.csic.es
- b. Plazo de presentación de solicitudes: 15 días hábiles a partir del día siguiente de la publicación de la ficha descriptiva.
- c. Número de becas: hasta 7 becas.
- d. Periodo y duración de cada beca: detallado en la tabla Anexo. En todas las becas, hay posibilidad de convenir con el/la investigador la fecha de inicio (primer día del mes) definiéndose en el documento de comunicación de inicio. La fecha de inicio preferente será el 1 de febrero de 2022.
- e. Importe de cada beca, mensualidades y dotación adicional: El importe total dependerá de la duración de cada plan de formación (ver tabla anexo):
JAEIntroICU-2021- ICM-01: 685 €; JAEIntroICU-2021- ICM-02: 685 €;
JAEIntroICU-2021- ICM-03: 600 €; JAEIntroICU-2021- ICM-04: 600 €;
JAEIntroICU-2021- ICM-05: 600 €; JAEIntroICU-2021- ICM-06: 600 €;
JAEIntroICU-2021- ICM-07: 685€
- f. Tiempo máximo semanal de dedicación de los beneficiarios de la beca: 20 horas.
- g. Requisitos específicos de los solicitantes, de los cuales podrían ser:
 1. Rama de Licenciatura o Grado: Estar cursando en el curso 2021-2022 los estudios definidos en cada plan de formación (Ver tabla Anexo) y no estar en posesión o disposición legal de obtener un título de Doctor.
 2. Nota media del expediente académico de grado: Acreditar una nota media de grado o licenciatura, igual o superior en la escala de 0-10:

JAElntroICU-2021- ICM-01: 7; JAElntroICU-2021- ICM-02: 7; JAElntroICU-2021- ICM-03: 6; JAElntroICU-2021- ICM-04: 8; JAElntroICU-2021- ICM-05: 8,5; JAElntroICU-2021- ICM-06: 8; JAElntroICU-2021- ICM-07: 6,75

3. Máster Universitario Oficial: Estar cursando en el curso académico 2021-2022 los másteres definidos en cada plan de formación (ver tabla Anexo)
- h. Planes de formación ofertados e investigadores responsables: El/la beneficiario/a podrá escoger como investigador responsable a cualquier investigador/a de los siguientes:
 1. Plan de formación 1. Código: JAElntroICU-2021- ICM-01. Common octopus trophic ecology during the challenging transition from planktonic to benthic life

Understanding marine animal life cycles is pivotal to assess their role in natural environments as well as to booster their long-term conservation. Our research team within the ICM-CSIC research group Ecology and Conservation of Marine Living Resources (<https://www.icm.csic.es/en/research-group/ecology-and-conservation-marine-living-resources>) studies the ecology and biology of cephalopod molluscs.

Currently our group is focused on the biology of early development stages on common octopus (*Octopus vulgaris*) through the project OCTOSET (<http://www.octoset.icm.csic.es/>). Octopus have the most complex behavioural repertoire among invertebrates, so they are considered as model for study the origin of intelligence in non-vertebrate animals. They are short-living and fast-growing animals with a single reproductive cycle and a maximum lifespan of 15 months. During the first two months in the plankton, they feed on zooplankton and then they become coastal benthic predators. This live-fast-die-young strategy is fuelled by their voracity as predators. Despite the importance of trophic ecology and biology for effectively managing octopus fisheries, our knowledge is biased towards the first days of life and the subadult and adult stages. A huge knowledge lagoon exists on every single biological aspect during the transition period between advanced planktonic paralarvae (<0.5 g of weight) to juveniles (0.5-5 g) and early subadults (5-20 g). The team OCTOSET is the only research team in the world studying this challenging biological stage using cutting-edge methodologies, such as molecular methods for assessing diet.

Join us and study the diet of early benthic stage common octopus using state-to-the-art stable isotopic analyses. This method will allow you to assess how their role as marine coastal predators changes with age and size. This study will have an important impact on our understanding of the life cycle of these amazing creatures.

Investigador responsable: Fernando Ángel Fernández f.a.fernandez.alvarez@gmail.com

2. Plan de formación 2. Código: JAElntroICU-2021- ICM-02. *Octopus Early Life*

At the Instituto de Ciencias del Mar we are developing studies on the ecology and conservation of marine living resources. The knowledge of the biology of the early developmental stages it is of key importance to understand the life cycle and adaptions of marine species and their relationship with the environment. In that way, our research team is studying the biology and ecology of early stages of cephalopods.

At the present we are developing the research project OCTOSET

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(<http://www.octoset.icm.csic.es/>), focused on the study of advanced larvae and juveniles of the common octopus (*Octopus vulgaris*). During the development of the project we have accumulated a considerable amount of information in the form of videos and images using SPIM (Selective Plane Illumination Microscopy) from initial stages of development of octopus and squid.

Cephalopods are extraordinary soft-bodied animals with a strikingly sophisticated nervous system, nine brains, blue blood, camera-like eyes, three hearts, and an extraordinary ability to switch the colour and texture of their skin to mimic their background in the blink of an eye. The use of this new microscopic technology allows to visualize the development structures in great detail and using this system we could observe the whole sample without destroying it via classic histologic cuts. This approach allows us to preserve the specimens for future observation. The post-treatment of the images is carried out with open image software programs, such as imageJ and Fiji.

What we encourage you to do is join us in investigating the internal morphological characteristics and development of the cephalopod larvae and juveniles through image processing. During the project, development of the organs and systems will be analyzed. A recent study using this technology analyzed the skin of the baby octopus, available at: <https://www.frontiersin.org/articles/10.3389/fmars.2021.645738/full>

The study benefits from the close collaboration with the Mesoscopic Imaging Facility (MIF) (<https://www.embl.es/services/mesoscopic-imaging-facility/>) from the European Molecular Biology Laboratory (EMBL), located at two minutes from the Instituto de Ciencias del Mar, where the SPIM facility is located.

It is expected that the results of the project will be published in high-impact scientific journals and that the candidate will be part of the list of authors of these publications.

If you have any questions related with the project, please contact the supervisor of the project, Roger Villanueva, at: roger@icm.csic.es

Investigador responsable: Roger Villanueva

3. Plan de formación 3 Código: JAEIntroICU-2021-ICM-03 *Quantification of marine parasites transmission from compartmental and agent-based models*

The “dilution effect” hypothesis suggests that diversity in ecological communities naturally reduces the spread of diseases, but the value of biodiversity as a buffer against disease transmission remains under debate. Here, we will test if a high level of diversity of the biological community offers protection from diseases, such as parasites. This hypothesis will be tested using a marine microbial community as a model system. The species interactions that link hosts and their parasites, and account for many of the behaviours of both, will be characterised and quantified. We will investigate of the biological mechanisms that govern the host-parasite transmission and will quantify parasite transmission based on empirical data, as well as on compartmental and agent-based models. New knowledge will be obtained through species identification, characterization of species lifestyles and behaviours, adding new nodes in the marine microbial network, and through quantification of the impact of parasitism on host population.

Investigadora responsable: Esther Garcés esther@icm.csic.es

4. **Plan de formación 4 Código: JAEIntroICU-2021-ICM-04: Respuestas locales a patrones globales: Impacto de los procesos climáticos globales en las respuestas locales de organismos marinos del Océano Atlántico**

La propuesta de trabajo que se presenta tiene como objetivo evaluar el impacto de procesos climáticos globales sobre patrones locales de productividad marina, y cómo estos impactos se transmiten a lo largo de las cadenas tróficas. Para ello, la persona beneficiaria de la ayuda (i) participará en la evaluación y descripción de series históricas sobre índices climáticos globales y productos de teledetección que informen sobre los patrones de productividad marina; (ii) participará en una revisión bibliográfica para identificar qué trabajos han evaluado respuestas de organismos marinos frente a patrones globales de variabilidad climática, qué tipos de respuestas se han evaluado y en qué especies, grupos taxonómicos/funcionales y áreas geográficas se han observado estas respuestas. Al combinar los resultados de la revisión bibliográfica con el análisis espacial de los datos climáticos y ambientales se pretende evaluar la congruencia espacial entre las repuestas observadas y los posibles impactos climáticos en los patrones locales de productividad marina.

A través de este proyecto se pretende que la persona beneficiaria de la ayuda adquiera un conocimiento profundo sobre el impacto de la variabilidad ambiental sobre diferentes procesos biológicos en el actual contexto de cambio climático. Desde un punto de vista metodológico, la persona beneficiaria adquirirá conocimientos y competencias en la adquisición, gestión y análisis de datos bibliográficos, climáticos y ambientales. La persona beneficiaria interactuará con otros investigadores y estudiantes involucrados en el proyecto de investigación, desarrollando así competencias transversales sobre relaciones interpersonales, trabajo en equipo y habilidades de comunicación.

Investigador responsable: Francisco Ramírez ramirez@icm.csic.e

5. **Plan de formación 5 Código: JAEIntroICU-2021-ICM-05. Prokaryotic activity associated to marine phytoplanktonic strains (PRACTIC)**

Photosynthetic microorganisms that live in the sunlit layer of marine ecosystems, are responsible for roughly half of the biosphere's annual net primary production. By converting dissolved inorganic carbon to organic carbon, these microorganisms reduce the partial pressure of carbon dioxide (CO₂) in the surface waters of the ocean and promote the uptake of atmospheric CO₂. The downward export of organic carbon, then sequesters carbon at depth, a process known as biological pump. Although phytoplankton is the main supplier of OM for water column remineralizers, the effect of phytoplankton community composition on the prokaryotic degradation of OM remains poorly studied.

Culture-based experiments are a useful tool to analyse the effect of phytoplankton composition on prokaryotic degradation of OM. They will allow to analyse if OM from different phytoplankton strains enhances growth of different prokaryotic communities with different degradation potential.

The master will be part of recently awarded project DOGMA: The role of plankton ecology in the remineralization, degradation and fate of organic matter, and within the group Ecology on Marine Microbes (<https://emm.icm.csic.es/>) in the ICM.

The student will perform a two-step experiment consisting in 1) growing different phytoplankton strains to obtain their OM after filtration 2) adding the algal-derived OM obtained to prokaryotic communities, either from the marine coast or from cultures. In this experiment, prokaryotic growth will be followed by flow cytometry and microscopy,

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and the utilization of carbon sources will be monitored with spectrophoto-and fluorimetric techniques. Metagenomics and metatranscriptomics for gene expression, especially of those involved in carbohydrate utilization, might be applied at the end of the experiment.

Investigadora responsable: Maria Montserrat Sala msala@icm.csic.es

6. *Plan de formación 6 Código: JAEIntroICU-2021-ICM-06. Prokaryotic diversity across the ocean deep chlorophyll maxima*

The student will extract the DNA of samples collected in several deep chlorophyll maxima samples taken in the Central Atlantic and Mediterranean Sea. He/she will then submit the samples to 16S rRNA gene sequencing and then analyze the sequences using various R packages to describe the distribution of prokaryotic populations across this oceanic structure in different stations. The samples were collected in distinct oceanographic areas and samples of different size fractions were separated so that we expect nice and contrasting community structures will be observed. The student will also participate in the group life, including seminars and will be guided by an experienced PhD student.

Investigador responsable: Josep Maria Gasol pepgasol@icm.csic.es

7. *Plan de formación 7 Código: JAEIntroICU-2021-ICM-07: Support to the implementation of the strategical analysis process for the ICMTransfer project*

The activity is framed in the ICMTransfer strategy the in-house tool able to convert the results of research into instruments for society, improving quality of life and sustainable use of resources by means of fostering the public and private sectors partnership with the institute.

The main goal of the project inhabit in the conceptual framework design of a potential innovation HUB about the marine knowledge transfer in Barcelona fostering an ocean-economy innovation network aligned with SDG 14 .

Tasks of the project “Support to the implementation of the strategical analysis process for the ICMTransfer”:

- Support in the vision, mission, milestones and goals definition of the ICMTransfer by means of the national and international strategies and policies concerning innovation and knowledge transfer.
- Data collection and evaluation for strategic analysis to describe the organization's socio-economic environment within which the organization operates by means of research tools, such as: steeple analysis, Swot and DMRO, one to one interviews, workshops, etc.
- Support in the ICMTransfer strategy redaction.
- Support in events to the ICMTransfer communication with assistance for the communication tools identification and production.

Investigador responsable: Valentí Sallarés vsallares@icm.csic.es



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- 1) Composición de la Comisión de Selección:
- 2) Presidente: Dirección del ICU. Josep Lluís Pelegrí Llopart
- 3) Vocales
 - i) Cèlia Marrassé
 - ii) Marta Coll Montón
 - iii) Albert Palanques Monteys
- 4) Secretaria: Maria Yubero Gómez

En Barcelona, a 15 de noviembre de 2021

Fdo. D./Dña. José Luís Pelegrí Llopart

Director/a del Instituto Institut de Ciències del Mar
