

PhD fellowship in marine protist ecology and evolution

We are offering a **4-year PhD position**, starting in early 2024, to work on marine microbial ecology in the framework of the project *EPIC: Ecological characterization of Picozoa, an abundant and enigmatic protistan group* (Ref: PID2022-137508NB-I00). The PhD candidate will work at the Institute of Marine Sciences in Barcelona, under the supervision of Ramon Massana (emm.icm.csic.es/ramon-massana).

Research topic

Molecular surveys of microbial diversity have been transformative for the smallest protists in the ocean, revealing the existence of a large phylogenetic diversity and the presence of unsuspected novel groups. One of such novel groups discovered in the seminal studies is the Picozoa. These small heterotrophic protists are abundant in marine photic waters, and despite fragmentary data acquired in the last two decades, there is still a very poor knowledge on the cell biology, biogeography, and ecological role of these uncultured eukaryotic taxa. The project EPIC aims to shed light on the cell biology, ecology and evolution of picozoans.

Proposed work for this PhD position

The PhD candidate will use diverse and complementary methodologies to study the ecology and genomics of picozoans, including analysis of existing and newly prepared metabarcoding datasets, FISH probe design and semi-automatic microscopy, experiments to define the trophic mode of picozoans (phagotrophy versus osmotrophy), single cell genomics, and meta-omics analyses to search for the presence and expression of picozoan genes in natural assemblages.

Candidate profile

We are seeking highly motivated candidates with a Master degree in biology, microbiology, biochemistry, marine sciences, bioinformatics or related disciplines. Excellent command of oral and written English is a key requisite, as well a high capacity to work and learn in a team. A good academic record will be highly considered, as well as proved expertise in laboratory work (microscopy and molecular) and in computer skills (R, python and bioinformatic routines).

Working team

The candidate will join the Ecology of Marine Microbes research group (EMM) (<https://emm.icm.csic.es>) of the Institute of Marine Sciences (<http://www.icm.csic.es>). The EMM has near 40 members including principal investigators, postdocs, PhD students and laboratory technicians and is currently involved in many research projects on diverse and complementary topics. The group maintains a firm commitment

in training its students to ensure maximum learning benefit, including participation in courses and conferences, stays in other laboratories, seminars and other training strategies. The group maintains close contact with national and international researchers in the fields of microbial ecology, protist cell biology, oceanography, biogeochemistry and genomics.

The Principal Investigator

Ramon Massana is a Research Scientist at the ICM-CSIC with a wide experience in marine microbial ecology, with special focus on protist ecology and evolution. His broad research line is the study of the phylogenetic and functional diversity of marine microbes. This exploration is conducted using diverse tools, such as sequencing of environmental rDNA genes, metagenomics, single cell genomics, transcriptomics, FISH specific counts and experiments. He is particularly interested in opening the black box of heterotrophic flagellates and exploring the role of these unpigmented protists in marine food webs as bacterial grazers and nutrient remineralizers. He has published 170 scientific papers (H index of 67), actively participates in international meetings and has been the lead of several international and Spanish research projects.

Wilken, S., C.C.M. Yung, C. Poirier, R. Massana, V. Jimenez, and A.Z. Worden. 2023. Choanoflagellates alongside diverse uncultured predatory protists consume the abundant open-ocean cyanobacterium Prochlorococcus. Proc. Natl. Acad. Sci USA 120:e2302388120.

Obiol, A., D. López-Escardó, E.D. Salomaki, M.M. Wiśniewska, I. Forn, E. Sarà, D. Vaqué, M. Kolisko, and R. Massana. 2023. Gene expression dynamics of natural assemblages of heterotrophic flagellates during bacterivory. Microbiome 11:134.

Rodríguez-Martínez, R., D. Vaqué, I. Forn, and R. Massana. 2022. Dominant marine heterotrophic flagellates are adapted to natural planktonic bacterial abundances. Environ. Microbiol. 24:2421-2434.

Massana, R., and D. López-Escardó. 2022. Metagenome assembled genomes are for eukaryotes too. Cell Genomics 2:100130.

Obiol, A., I. Muhovic, and R. Massana. 2021. Oceanic heterotrophic flagellates are dominated by a few widespread taxa. Limnol. Oceanogr. 66:4240-4253.

Massana, R., A. Labarre, D. López-Escardó, A. Obiol, F. Bucchini, T. Hackl, M.G. Fischer, K. Vandepoele, D.V. Tikhonenkov, F. Husnik, and P.J. Keeling. 2021. Gene expression during bacterivorous growth of a widespread marine heterotrophic flagellate. ISME J. 15:154–167.

Application procedure

If you are interested please send your CV, the academic transcripts of your bachelor's and master's degrees (in Spanish or English), and a short motivation letter (less than 1 page) directly to Ramon Massana (ramonm@icm.csic.es) before **30th of September 2023**. Recommendation letters are optional. Informal pre-contact is also welcome.