Priority Research and Equipment Programme (PEPR)

ATLASea: « An Atlas of marine genomes »

Call for applications: PhD projects 2026

Call announcement: 16 April 2026
Deadline for application submission: 19 May 2026, 15h (CEST)
Contact: call-atlasea@bio.ens.psl.eu (programme manager, Coraline Chapperon)

Preamble

Sequencing technologies have developed significantly over the last two decades, opening up an unprecedented field of research for studying, protecting, and better understanding biodiversity. In this context, the ATLASea research program[1], one of the recipients of the exploratory PEPRs (Priority Research Projects and Equipment) grants funded by the French government (France 2030) over eight years, aims to create reference genomes of 4,500 eukaryotic marine species from the French EEZ (Exclusive Economic Zone). This effort will be crucial for the study of marine biodiversity, which is poorly understood, under intense anthropogenic pressure, and yet essential for maintaining the physical and biological balance of marine ecosystems.

ATLASea brings together the French R&D communities around marine genomics, fosters interdisciplinarity, boosts collaboration between various public and private stakeholders, and aims to position itself as the international leader in the acquisition of thousands of genomes and millions of genes from marine life, in collaboration with the European Reference Genome Atlas (ERGA) initiative[2] and the Earth BioGenome Project (EBP), a worldwide initiative[3].

ATLASea is also dedicated to training the next generation of scientists. To this end, in 2026, ATLASea will fund two doctoral contracts, each lasting three years (2026-2029), for thesis projects focused on themes targeted by the Programme.

[1] https://www.atlasea.fr/en/
[2] https://www.erga-biodiversity.eu/
[33] https://www.earthbiogenome.org/

Summary

1. ATLASea: context

The ATLASea programme, funded under the France 2030 plan (€41.3 million over 8 years), is jointly led by the CNRS and the CEA. Its aim is to sequence the genomes of 4,500 eukaryotic marine species in the French Exclusive Economic Zone (EEZ), the second largest in the world, both in mainland France and four overseas territories. This will be achieved through targeted phylogenetic coverage based on criteria designed to understand and analyse particularly threatened, fragile, biologically important, and economically strategic ecosystems (including molluscs, crustaceans, annelids, cnidarians, ascidians, unicellular algae and macroalgae, sponges, and fish), representing approximately one-tenth of the known marine species in mainland France and its overseas territories.

This inventory of marine biodiversity is made possible by the collaboration of key partners such as the CNRS, the CEA, the Muséum national d'Histoire naturelle (MNHN), Ifremer, and universities including Sorbonne University, Aix-Marseille University, and Paris Sciences et Lettres, which together include several marine stations.

The Program is currently structured around three components:

- *DIVE-Sea[4], responsible for specimen collection, identification, and curation*
- *SEQ-Sea[5], responsible for DNA extraction, genome sequencing, assembly and annotation*
- *BYTE-Sea[6], responsible for implementing the bioinformatics infrastructure enabling interoperability, data security, publication, visualization, annotation, and comparative analysis of ATLASea data*

These components work together with the aim of generating a large-scale, high-quality reference genomic dataset that will be deposited in openly accessible databases for the scientific community, thereby complementing global biodiversity inventories. Under the umbrella of the Earth BioGenome Project (EBP), more than 60 international initiatives are currently working toward the generation of reference genomes across the Tree of Life.

2. Call for applications : PhD projects

A. Objectives of the call

This call for application is organized by the ATLASea programme and administered by the CNRS. Its objective is to select two PhD candidates who will benefit from high-level supervision by scientific experts from the ATLASea network.

The selected candidates will participate in the analysis of marine genomics data, including data produced within the ATLASea program, in one of the described research project hereafter.

B. PhD projects Topics

Applicants must choose one PhD project from the two topics proposed in this call and must justify their motivations and qualifications in relation to the project(s) choice. Following the selection process, two doctoral contracts, will be funded.

[4] https://www.atlasea.fr/en/projects/dive-sea-project/
[5] https://www.atlasea.fr/en/projects/seq-sea-project/
[6] https://www.atlasea.fr/en/projects/byte-sea-project/

PhD Project 1: Large-scale genotype-phenotype analyses in fishes

***Acronym**: EVOLFISH*
***PhD Supervisor**: Hugues ROEST CROLLIUS*
***Contact:** hrc@bio.ens.psl.eu*
***Host Laboratory**: Dynamique et Organisation des Génomes (DYOGEN), Institut de Biologie de l'ENS (IBENS), UMR 8197, 46 rue d'Ulm, 75005 Paris*
***Doctoral School**: ED657 - Science du Vivant, Université PSL*
***ATLASea Targeted Project involved in the project :** BYTE-Sea*

Summary:

One of the major challenges of modern genomics is to understand genome evolution in order to link genotype to phenotype through the lens of species evolution and adaptation. Comparative genomics is currently benefiting from an unprecedented influx of new data, driven by large-scale biodiversity sequencing initiatives under the umbrella of the Earth BioGenome Project, of which ATLASea is a part. These large datasets provide an ideal resource for identifying genotype–phenotype relationships using both "forward" and "reverse" genomics approaches, which associate genomic signatures with phenotypic changes.

For several years, the DYOGEN team has focused in particular on teleost fish genomes, which underwent a whole-genome duplication prior to the major radiation of teleosts, giving rise to approximately 30,000 extant species. This PhD project will build on the team's expertise in bioinformatics and comparative genomics of fish to develop and apply these strategies to well-documented cases of convergent evolution in teleosts. Convergent evolution — where the same phenotype independently appears or disappears in multiple lineages — provides a particularly powerful framework for identifying genotype–phenotype relationships, as it relies on naturally replicated evolutionary events. Numerous examples have been described in fish, including:

- *The emergence of amphibious traits,*
- *The evolution of viviparity,*
- *Adaptations in osmoregulation,*
- *The emergence of endothermy,*
- *Extremely short or long lifespans,*
- *The loss of the swim bladder, stomach, scales, or fins.*

A more exploratory approach to the convergent evolution of life-history traits or morphological characters will also be investigated using data compiled from databases such as FishBase and the Encyclopedia of Life (EOL).

The approach will involve constructing reference datasets including:

- *Phylogenies of protein-coding genes,*
- *Families of conserved non-coding elements (CNEs).*

More than 600 high-quality fish genomes are currently available and will provide the basis for defining relevant subsets (gene families, multiple genome alignments, etc.).

When no specific genomic element (gene or CNE) can be directly associated with a phenotype of interest through discrete patterns of presence or absence, two complementary strategies will be implemented to broaden the range of genetic determinants considered:

- ***Extension of the biological context.*** *Functional annotations (Gene Ontology, metabolic pathways, paralogy relationships) will be used to place genes within an extended functional framework.*
- ***Analysis of continuous variation in molecular evolutionary rates.*** *Rather than relying solely on binary presence/absence patterns, continuous signals of variation in evolutionary*

rates will be measured along phylogenies in order to detect accelerations or constraints associated with the phenotypes under study.

This project offers a unique opportunity to leverage the rapidly growing collection of high-quality teleost genomes generated by ATLASea and other biodiversity sequencing initiatives, in order to explore, in an integrated manner, the genetic basis of phenotypic innovation in fishes.

Keywords: Evolution, Comparative genomics, Bioinformatics, Phenotypes, Teleostean fishes, Marine biology

Resources available in the laboratory for the PhD: The PhD student will be hosted at the Institut de Biologie de l'ENS (IBENS) in central Paris. IBENS is composed of 30 research teams covering a wide range of fields, several high-level technical platforms including a computer cluster (4000 CPU and 13 GPU). IBENS hosts a great diversity of nationalities and includes a dynamic student and post-doc association.

Skills requirements: Bioinformatics (programming), comparative genomics, knowledge in evolution.

PhD Project 2: Leveraging large-scale protist genomics to predict and enhance theculturability of protist lineages

Acronym: PROTEUS
PhD Supervisor: Fabrice NOT
Contact: fabrice.not@sb-roscoff.fr
PhD Co-supervisor: Ian PROBERT
Contact: probert@sb-roscoff.fr
PhD Co-supervisor: Samuel CHAFFRON
Contact: samuel.chaffron@cnrs.fr
Host Laboratory: Station Biologique de Roscoff, Place Georges Teissier, 29682 Roscoff
Other Host Laboratory: Laboratoire des Sciences du Numérique de Nantes (LS2N), UMR 6004, 2, chemin de la Houssinière, 44322 Nantes
Doctoral School: ED 227 - DIVersités, Origines, Natures, MNHN-SU
ATLASea Targeted Project involved in the project: DIVE-Sea, SEQ-Sea

Summary:

Protists represent the majority of eukaryotic diversity and play key roles in marine biogeochemical cycles. However, a large fraction of this diversity remains experimentally inaccessible, as most lineages are not cultivated. Even for cultured species, conditions are often suboptimal and poorly standardized, limiting our understanding of their physiology, ecological interactions, and functional roles. In this context, the project aims to leverage genomic data generated within the PEPR ATLASea to better understand and optimize protist physiology in culture, while facilitating access to new lineages. It proposes to transform genomic data and functional annotations into predictive tools to guide cultivation, thereby addressing a major methodological bottleneck identified by ATLASea.

Scientific questions:

- *What genomic and metabolic determinants govern growth in culture?*

- *Can limiting factors in current media be identified for already cultured species?*
- *To what extent can genomes and their associated functional/metabolic potentials predict optimal culture conditions (nutrients, cofactors, interactions)?*
- *Can these signatures be transferred to uncultured lineages?*

Objectives:

1. *Characterize the genomic bases of growth in culture for marine protists using ATLASEA data;*
2. *Enable exploration of metabolic pathways of interest via the Marine Genome Portal;*
3. *Compare functional potentials and metabolic networks to identify auxotrophies and dependencies;*
4. *Develop predictive models (machine learning-based) linking genome, environment, microbiome, and culturability;*
5. *Experimentally validate genome-guided cultivation strategies.*

Methodology:

The project will adopt an integrated approach based on ATLASEA resources:

- *Comparative genomics to identify determinants of culture performance;*
- *Reconstruction of metabolic networks to detect specific requirements and auxotrophies;*
- *Analysis of existing culture conditions and their relationship to genomic capacities;*
- *Statistical modeling and machine learning to predict growth (e.g., codon usage bias);*
- *Experimental validation: axenization, optimization of media (nutrients, vitamins, cofactors), adjustment of culture parameters, and co-culture experiments.*

Environmental genomics data (e.g., from Tara expeditions) will be used selectively to contextualize specific results.

Expected results and impact:

The project is expected to:

- *Identify genomic determinants of culture performance;*
- *Develop optimized and rationalized culture media;*
- *Develop predictive tools transferable to other lineages.*

In the longer term, it will contribute to:

- *Improving the efficiency and reproducibility of ex situ protist cultivation;*
- *Bridging the gap between genomic data and experimentation;*
- *Facilitating functional studies of marine biodiversity;*
- *Expanding access to lineages of interest for sequencing within ATLASea;*
- *Stimulating new biotechnological applications.*

By framing culture as a quantifiable and predictable trait, this project paves the way for a more systematic and integrated approach to protist biology.

Keywords: Marine protists; comparative genomics; metabolic networks; predictive modelling; microbial culturability.

Available resources in the host laboratories : The PhD student will be hosted at the Roscoff Biological Station, that offers a leading research environment in marine biology especially for the studies and the culture of marine protists. He.She will benefit from a direct access to specialized infrastructure for the culture of marine protists, especially to the Roscoff Culture Collection, dedicated to the culture of marine micro-organisms,and also through the platform ABIMS, co-coordinator of SEQ-Sea, for the analysis of genomic data.
In addition the PhD student, will be affiliated to LS2N (UMR 6004, CNRS / Université de Nantes), that brings a recognized expertise in bioinformatics, modeling, and machine learning. He/She will

have a dedicated workstation, a high-performance computer, and access to the computing infrastructure necessary for large-scale data processing and analysis.

Time estimated in each laboratory: 50% SBR / 50% LS2N

Skills requirements: Bioinformatics and microbiology

3. Call process

A. Timeline

This call is composed of several steps:
- Application step
- Pre-selection and selection steps
- Communication of results

The provisional timeline is as follows :

10 April 2026	Pre-announcement
16 April 2026	**Call announcement**
16 April 2026 – 18 May 2026	Applicants must contact the PhD project main supervisor (at least)
19 May 2026, 15h (CEST)	**Deadline for submission**
20 May 2026 – 26 May 2026	Pre-selection of applications
27 May 2026	Announcement of pre-selection results
4 June 2026	**Interview of pre-selected applicants**
9 June 2026	Validation of selected applicants by the ATLASea steering committee
Mid-June 2026	**Communication of decisions**
From end of June 2026	Granting process
September to October 2026	Start of the PhD project
August to October 2029	End of the PhD project

B. Application step

The call for applications is published on the ATLASea website.
We accept applications from students of all nationalities.

The complete application must be written in English and must be submitted via the dedicated online portal for this call (the address will be provided on the page call of the ATLASea website), no later than May 19, 2026, at 3:00 PM CEST (Paris time). **Any application submitted after the set submission deadline will be automatically rejected.** No further information will be accepted after the submission deadline.

A complete application must include :
- **The completed administrative form to be filled on the submission platform** which includes the institutional email addresses (no Gmail, Hotmail, Free, Orange, Yahoo, etc. addresses) of two professors or internship supervisors who know the candidate well.
- **3 mandatory PDF documents** :
  - *Curriculum vitae (max. 2 pages)*
  - *Letter of motivation for undertaking PhD studies and choice of PhD topic (max. 2 pages)*

- *Scanned copy with the highest degree and transcripts of grades and ranking (Bachelor, and if applicable Master), translated in french or in english if you graduated abroad*

Points of attention:

- *Applicants must contact (at least) the main supervisor of the chosen doctoral project before submitting their application.*
- *The candidate must hold, or be preparing during the current academic year (2025-2026), a Master's degree or equivalent qualification that entitles them to enroll in a doctoral program at a French university before the start of the PhD, in thematics related to marine ecology, marine genomics, bioinformatics, evolutionary genomics, or related disciplines.*

C. PRE-SELECTION AND SELECTION STEPS

- Complete applications submitted before the set deadline will be pre-selected by the PhD project supervisor(s).
- Pre-selected applicants will be interviewed remotely (videoconference) by a recruitment committee. Modalities of the interview will be sent to the applicants ahead of the interview.
- Following the interviews, a final and ranked list of selected applicants will be established by the recruitment committee.
- Written applications and interviews will be assessed based on the academic quality, the potential for undertaking high level research studies, and the quality of exchanges during the interview.

D. RESULTS COMMUNICATION

A list of selected applicants will be formally recommended by the ATLASea Steering Committee.
Results will be officially communicated on the ATLASea website and to individual laureates.
Selected applicants will have 14 calendar days to accept or refuse the funding.
Granting process will start with the institution in charge of the contract management following the acceptance of the ATLASea funding and confirmation of Master's degree.

4. Granting process

A. FUNDING RULES

ATLASea will provide funds to support two PhD projects.
A maximum of 150 k€ will be allocated to each PhD project, for 3 years (excl. Overhead costs).
Funds must be used exclusively to cover:

- ***The salary of the selected PhD student****, according to the current funding rates in place in France,*
- ***Operating costs, max 20k€,*** *directly allocated to the research PhD project, dedicated to support PhD student travels, trainings and other project costs.*

A detailed financial budget will constitute an annex to the PhD grant contract in compliance with the PEPR funding rules[7]*.*

B. CONTRACTUAL TERMS

- Each PhD student will benefit from a full-time contract for 3 years, according to the current funding rates in place in France, with the sole or main task of carrying out the PhD project.
- The contract must start between the 1st of September and the 31st of October 2026, at the latest.

[7] règlement financier relatif aux modalités d'attribution des aides de l'action PEPR

- Each PhD student will have an employee status and will be recruited by a French higher education or research institution accredited by the ministry responsible for higher education and research to award the national doctoral degree. The institution, partner of the ATLASea programme, will be responsible for managing the PhD grant.
- Each PhD student will be affiliated with the research unit of its main supervisor. The conditions for PhD registration are defined by the decree of May 25th, 2016[8]. Registration with a French doctoral school is mandatory and will be determined based on the research topic and the affiliation of the supervisor's research unit. PhD supervision will be conducted according to the rules in force at the affiliated doctoral school.
- Specific point: The Security and Defence Officer of the host institution will be consulted in order to validate the doctoral student's recruitment.

Specific conditions of co-supervision (applicable to PhD Project 2 - PROTEUS): the aforementioned conditions apply. In addition, a co-supervision agreement must be established between the main host institution (ATLASea partner managing the funds) and the additional host institution in case of co-supervision. The co-supervision agreement must stipulate the operational and organizational arrangements for the co-supervision of the PhD student and must include a schedule detailing the allocation of research and hosting periods between the two laboratories. In the case of co-supervision with a foreign institution, a dual degree may be considered within the co-supervision agreement.

C. COMMITMENTS

In the framework of a PhD project funded by ATLASea, the PhD student and (co)supervisors engage themselves to:

- *Publish open-access publications complying with the open science principles of the French National Research Agency (ANR)[9].*
- *Comply with the principles of the ANR's ethics and scientific integrity Charter[10]*

PhD supervisor(s) ensure that all these principles are respected within the framework of the PhD research activities carried out under their responsibility.

- *Comply with monitoring requirements of the affiliated doctoral school and participate in teaching and seminars designed to strengthen scientific culture*
- *Accept the dissemination, sharing and communication of information about the PhD project by ATLASea on its website, social media, newsletters, and any other means of communication, or during events, seminars, and training sessions. This information includes, but is not limited to: the PhD student's/supervisor's first and last names, affiliations, title, acronym, and public summary of the project.*

[8] https://www.legifrance.gouv.fr/loda/id/JORFTEXT000032587086
[9] https://anr.fr/en/anrs-role-in-research/commitments/open-science/
[10] https://anr.fr/fileadmin/documents/2019/ANR-Ethics-and-Scientific-Integrity-Charter-2019-v2.pdf