ACADEMIC POSITIONS

JOB DESCRIPTION

- **JOB TITLE/PROFILE**
  PhD: Understanding and predicting connectivity traits and productivity in warmer seas for hundreds of animal species: temporal collections of zooplankton, metabarcoding, aquarium experiments and dispersal simulations.

- **RESEARCH FIELD(S)**[1]

Natural Sciences, Environmental Sciences, Physical sciences

- **JOB DESCRIPTION**

The Ocean Sciences Institute with A*midex is funding a 3years PhD position.

Knowledge of the temporal dynamics of zooplankton species (that include larvae of nearly all benthic animals) is very scarce and imprecise because organisms are tiny and also because larval morphology does not allow distinguishing many species. By collecting high frequency temporal plankton samples and identifying which species are present using the rigorous metabarcoding protocol we developed at IMBE, we will establish reproduction seasons for several hundreds of marine species precisely identified. This innovative approach is several orders of magnitude (200-2000x) more efficient than traditional approaches. The advantages of such novel data are multiple. (1) They allow testing long-standing questions in ecology and evolution (example of simplified questions: can we predict larval traits based on other life history traits of species, correcting for phylogenetic relatedness? Which natural selection pressures explain species larval traits? Is there a trade-off between adult and larval dispersal?). (2) Planktonic larvae are the dispersing stage for the majority of benthic marine animals. Using these novel data on biological traits, biophysics models will be precisely parameterized to establish connectivity among habitats for each species. Environmental triggers of spawning and larval behavior will be deduced from the spatial (depth in the water column) and temporal patterns (season, and day /night). Such data will thus be very useful for biodiversity conservation related to connectivity (restauration, MPA network design) and for predicting changes in connectivity caused by global change. (3) Improvement of models of marine trophic networks which are at present limited by the zooplankton compartment knowledge gap.

The PhD candidate will have a variety of tasks (depending on years) and therefore will gain a great set of skills (field work, literature review, molecular biology

[1] **Social Sciences** - Law, Education, Economics, Social Science, Psychology - **Political Science** - Political Science - **Computational Sciences** - Computer Science, Mathematics - **Engineering** - Architecture and Design, Engineering - **Natural Sciences** - Biology, Chemistry - **Physical Sciences** - Physics, Space Science - **Environmental Sciences** - Agricultural Science, Geosciences - **Humanities** - Theology, Philosophy, Literature, Linguistics, History, Anthropology, Arts and Culture - **Medical Sciences** - Medicine

(metabarcoding), aquarium experiments, (bio-)informatics & simulations, with related statistical analyses) at the issue of the PhD: weekly collections of zooplankton (year 1), review of the literature and meta-analysis (year 1), metabarcoding (molecular biology lab and bioinformatics, year2), statistical analyses (mostly years 2-3), and in collaboration with other teams, aquarium experiments to predict the consequences of sea warming and acidification on larval behavior and connectivity (year 2 or 3), or biophysics simulations to predict consequences of trait changes on connectivity (year 3), writing scientific publications (year 1-3) and PhD thesis (based on his articles, year 3).
The PhD student will participate to the following dissemination actions: give a presentation once a year, acknowledge the Institute of Ocean sciences, give 1-hour seminar for master students, post in Ocean social media, text and results summary for the web site.

- **QUALIFICATIONS/SKILLS/EDUCATION & RESEARCH REQUIREMENTS**

The ideal candidate will have a masters in ecology and evolution or in marine biology with knowledge and taste for ecology and evolution, ability to code (at least in the language R) and appetence for theory (life history traits) in general. Both a good ability for English scientific reading and a very good sense of organization are essential for this PhD. The candidate will have to carry out a weekly sampling collection by sea-kayak close to the lab (or organize his replacement) and to ensure that all other sampling surveys are carried out and processed. An ability to work in the sea (scuba diving) would be appreciated. An interest in species identification (from planktonic samples) will be considered as a plus, as well as in molecular biology or in biophysics modeling (but not mandatory).

- **APPLICATION DEADLINE**

1st of May 2024. International candidates are encouraged to apply

- **STARTING DATE**

The position is available for 10 months ideally starting in October 2024.

- **JOB LOCATION**
- **Marseille.** Collaboration with Banyuls-sur-mer, Institut Océanographique Paul Ricard, ECOCEAN, CSIL.

- **REQUESTED DOCUMENTS OF APPLICATION**

Letter of motivation, CV and 2 reference letters.

- **CONTACT TO APPLY**

yoan.furtado@osupytheas.fr
virgnie.sanial@univ-tln.fr

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