

## Job Offer

### Job Summary

<b>Title, Job Position</b>	<b>Research fellowship in ecosystems modeling</b>
<b>Research Field</b>	Applied mathematics
<b>Employer</b>	Sorbonne Université Institut des sciences du calcul et des données
<b>Location</b>	Paris, France
<b>Application Deadline / Timezone</b>	<del>03-31-2020</del> 12:00AM Paris (GMT+01:00) <b>New application deadline: May 31<sup>th</sup> 2020</b>
<b>Salary</b>	Depending on skills and experience
<b>Type of Contract</b>	Temporary (fixed term) 18 months
<b>Job Status</b>	Full-time
<b>Envisaged Starting Date</b>	09-01-2020

### Hiring Organisation

**Organisation:** Sorbonne Université was created on January 1st, 2018 from the merger of Paris-Sorbonne and Pierre and Marie Curie (UPMC) universities. Sorbonne University is a multidisciplinary and research-intensive university with world-famous origins. Continuing the humanist tradition of the Sorbonne, it is devoted to meeting the scientific challenges of the 21st century and spreading the knowledge created in its laboratories by its research teams and transmitted to its students and to society as a whole. Sorbonne University's three faculties in humanities, medicine and science each with the wide-ranging autonomy necessary to conduct its ambitious programs in both research and education. The University's 53,500 students, 3,400 professor-researchers and 3,600 administrative and technical staff members who help it run every day contribute to a University that is diverse, creative, innovative, and with a global outlook.

**Organisation Type:** Higher Education Institute

**Department:** The institute of computing and data sciences (ISCD (<http://iscd.sorbonne-universite.fr/>)) is dedicated to exploring and developing the potential of computational and data-driven research and training across science, humanities and medicine at Sorbonne Université. Our research teams use the power of algorithms and visualisation to solve problems in biology, chemistry, mathematics, computer science, medicine, and the digital humanities. Our history of supporting collaboration goes back more than 10 years when the institute was created to support areas where methods and means of approaching challenges spilled over the disciplines and were profoundly transforming research.

### Offer Description

#### Description

The post-doctoral fellow will be hired by ISCD in the junior project-team FORMAL (From ObseRving to Modeling oceAn Life), whose goal is to study life dynamics in the global ocean at various scales of time and space. He/she will be assigned the task to create more realistic models of marine life.

In the first few months, the hired person will grasp the current state-of-the-art marine ecosystems models to simulate the spatio-temporal dynamics of the different components of the plankton ecosystem (e.g. nutrients, phytoplankton, zooplankton) like the PISCES model developed at Sorbonne Université [1]. Hand in hand with the members of the team, the hired person will consider several ways of improving these models, such as a better representation of the functional responses [2], or the

organisms' stoichiometry [3]. He/she will apply these improvements in coupling this model with a simplified physical model (one dimensional) of the water column. Practically, he/she will run simulations with (or interacting with) the NEMO framework [4], developed by a European consortium for advanced modeling in ocean and climate sciences.

Following this, and depending upon the person's own experience, other possibilities of development of marine ecosystems modeling could be explored, such as:

- computational challenges related to working in 2D or 3D;
- theoretical aspects of stability and responses to perturbations;
- data assimilation taking advantage of the huge quantity of available data, especially those made available by the project-team members.

Thus, the hired person will be involved with mathematicians (Benoît Sarels, Anne-Laure Dalibard), marine ecologists (Sakina-Dorothee Ayata), and specialists of modeling and numerics (Olivier Aumont, Julien Brajard) of the project-team FORMAL:

<http://iscd.sorbonne-universite.fr/research/sponsored-junior-teams/formal-2/>

#### Faculty sponsor

FORMAL : Benoît SARELS, [benoit.sarels@sorbonne-universite.fr](mailto:benoit.sarels@sorbonne-universite.fr),

<http://www.ljll.math.upmc.fr/~sarels/>

LJLL : Anne-Laure DALIBARD, [dalibard@ljll.math.upmc.fr](mailto:dalibard@ljll.math.upmc.fr),

<https://ljll.math.upmc.fr/~dalibard/>

#### Appointment Term

One and a half-year appointment starting as soon as possible with the possibility of a further extension based on performance and the needs of the team-project.

**Keywords:** *modeling, transport-reaction-diffusion equations, numerical simulations*

*As part of your duties, you may be required to provide internal training related to your business expertise.*

## Profile Requirements

#### Required Education Level

Expertise in ordinary differential equations and partial differential equations.

#### Skills/Qualifications

- Applicants must have a recent Ph.D. in applied mathematics or a closely related field (climatology, oceanology, physics, computer science, statistics).
- Experience collaborating effectively with a team of scientists of diverse backgrounds.
- Demonstrated ability in code writing and numerical simulations.
- Applicants should be hard working, analytical and have excellent writing and communication skills necessary to author technical and scientific reports, publications, and deliver scientific presentations, seminars, meetings and/or teaching lectures.

#### Specific Requirements

- Applicants are expected to be proficient in at least one programming language. Previous experience with FORTRAN would be a valuable asset.
- This position involves a significant amount of numerical code development. Applicants are therefore expected to be committed to standard procedures of software development, and respect the good practice of open science.

#### Required Languages

English or French.

## Work Location

**Institute:** Institut des sciences du calcul et des données (ISCD), Equipe-projet FORMAL

**Country:** France

**Location :** Sorbonne Université, Campus Pierre et Marie Curie, 4, place Jussieu, Paris

## How to apply ?

### Required Application Materials

1. Cover letter with current and future research interests
2. Most recent curriculum vitae
3. Copy of first author publications
4. Names and contact for three referees

### How to submit

Interested candidates should

- contact for additional information about the offer:  
Benoît SARELS, [benoit.sarels@sorbonne-universite.fr](mailto:benoit.sarels@sorbonne-universite.fr)
- submit the required application materials to:  
Pascal Frey, Agnieszka Miskiewicz ([iscd@sorbonne-universite.fr](mailto:iscd@sorbonne-universite.fr))  
with the title "ISCD FORMAL Fellowship Application #6".

## Selection Procedure

### Selection process

The Institute's selection process is based on an email submission.

Candidates are evaluated by faculty reviewers in their own academic fields and from other disciplines. Reviewers will evaluate candidates according to their academic accomplishments and their potential for research.

The selection process is organized in four stages:

1. Eligibility check: candidate's compliance with the requirements of the offer will be checked on the basis of the information provided by the applicant.
2. Evaluation of CV: applicant's CV and research proposals will be evaluated and ranked according to their merit.
3. Interviews of candidates: **short listed** candidates will be invited for an interview conducted by the selection committee.
4. Final decision: the selected candidate will be proposed the position. A reserve list of candidates may be identified in case of withdrawal of the selected candidate.

Please note that priority in individual applicant selection will be given to first-time fellows.

### References:

- [1] Aumont, O. et al. 2015. PISCES-v2: an ocean biogeochemical model for carbon and ecosystem studies. *Geoscientific Model Development Discuss.* 8(2).
- [2] Prowe et al. 2019, Biogeography of zooplankton feeding strategy, *Limnology and Oceanography* 64, 661-678.
- [3] Ayata et al. 2013, Phytoplankton growth formulation in marine ecosystem models : should we take into account photo-acclimation and variable stoichiometry in oligotrophic areas ? *Journal of Marine Systems* 125, 29-40.
- [4] NEMO: Nucleus for European Modelling of the Ocean <https://www.nemo-ocean.eu/>