

Job Offer

Job Summary

Title, Job Position	Post doc for applying machine learning on plankton images to identify ecological features
Research Field	Machine learning, imaging, plankton, data science
Employer	Sorbonne Université, Institut des sciences du calcul et des données
Location:	Villefranche-sur-Mer, France
Application Deadline / Timezone	24-03-2020 11:00AM Paris (GMT+01 :00)
Salary	Depending on skills and experience
Type of Contract	Temporary (fixed term) 12 months (with potential extension depending on funding availability).
Job Status	Full-time
Envisaged Starting Date	25-05-2020

Hiring Organization

Organisation

Sorbonne Université (SU) was created on January 1st, 2018 from the merger of Paris-Sorbonne and Pierre and Marie Curie (UPMC) universities. As a public institution, it fulfills the public service calling of French higher education, research and innovation. SU is a multidisciplinary and research-intensive university with world-famous origins. 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

Departments

Institut des sciences du calcul et des données, FED 3

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 visualization to solve problems in biology, mathematics, computer science, chemistry, medicine, and the digital humanities. The ISCD hosts the FORMAL junior team gathering oceanographers, mathematicians, and computer scientists, to study the dynamics of life in the ocean (<http://iscd.sorbonne-universite.fr/research/sponsored-junior-teams/formal-2/>)

Laboratoire d'Océanographie de Villefranche (LOV)

The **Laboratory of Oceanography of Villefranche-sur-mer** (LOV; <http://lov.obs-vlfr.fr/>) is located close to Nice, on the French Riviera. It belongs to one of the three marine stations of Sorbonne Université. With about 80 permanent staff, the LOV generates and analyses a large quantity of marine data, including imaging and satellite data to study the ocean.

The COMPLEX (COMPUtational PLankton Ecology) team gathers 24 to 30 members studying marine plankton using numerical methods (modeling, statistics, machine learning) and quantitative imaging instruments or experiments. Plankton encompasses all organisms roaming with marine currents. Those organisms are responsible for producing half the oxygen we breathe, storing the carbon we emit, feeding the fish we eat; plankton is therefore a major building block of Earth's ecosystem. COMPLEX strongly interacts with the **Quantitative Imaging Platform of Villefranche** (PIQv;

<https://sites.google.com/view/piqv>), which oversees the operation of tools that the team develops. Those tools include imaging sensors, such as the Underwater Vision Profiler or the ZooScan, and software packages, such as ZooProcess or the **EcoTaxa web application** (<https://ecotaxa.obs-vlfr.fr/>) that uses machine learning to assist taxonomists into sorting plankton images. We also have a long experience in interacting with computer scientists, in academia (e.g. I3S in Nice, ENSTA in Paris, MIP in Kiel) but also in the private sector (e.g. Google Brain lab in Paris).

Offer Description

Description

The post-doc will be recruited by ISCD/FORMAL at the LOV to apply machine learning algorithms for extracting ecologically-relevant information from **images of individual** planktonic organisms. More specifically, she/he will develop or apply existing techniques **to extract morphological features** related to life strategies: reserve stores, defense structures, offspring protection, gut content, pigmentation, etc. This may involve intelligent image pre-processing, semantic segmentation, regression networks, etc. The work of the recruited person will go all the way to the interpretation of the results and the publication of scientific article(s). She/he will benefit from the millions of taxonomically labelled **plankton images** available in EcoTaxa. She/he will work in close interactions with the marine ecologists of the FORMAL and COMPLEX teams, both in Paris and in Villefranche-sur-Mer, as well as their existing partners (described above) but also benefit from interactions with other data scientists from ISCD in Paris.

Faculty sponsors

ISCD/FORMAL: Sakina-Dorothee AYATA, sakina@obs-vlfr.fr, <http://www.normalesup.org/~ayata/>
LOV/COMPLEX: Jean-Olivier IRISSON, irisson@obs-vlfr.fr, <https://www.obs-vlfr.fr/~irisson/>

Appointment Term

One-year appointment starting as soon as possible with the possibility of a further extension based on performance and available funding.

Keywords: *Machine learning, feature recognition, fully automated quantitative data analysis.*

Profile Requirements

Required Education Level

Expertise in image processing, computer vision and machine/deep-learning algorithms.

Skills / Qualifications

- Applicants **must hold or be close to completion a Ph.D.** or have at least 3 years of experience since his/her engineering degree in Computer Science, Data Science, or related fields, demonstrating relevant experience and specialist knowledge in machine learning and image analysis, **ideally at the interface with an other discipline** (e.g., medicine, biology, ecology, ...)
- Proficiency in **programming for image processing, machine learning and data mining**, using R, Python, C, or MATLAB.
- Applicants should be comfortable **handling datasets with millions of records** and interacting with the database that hosts them, all in a Unix environment.
- Applicants should have **excellent writing and communication skills** necessary to write technical and scientific reports, publications, and deliver scientific presentations, seminars, meetings and/or teaching lectures to a non-specialist audience. At least one publication in a relevant field as first author would be a plus.
- Experience **collaborating effectively with a team of scientists of diverse backgrounds**, and communication skills to closely interact with an interdisciplinary team (including computer scientists, biologists and oceanographers).

Specific Requirements

- This position involves a significant amount of computer code development. Therefore, the candidate will have prior scientific programming experience (as mentioned above) but also a

certain enthusiasm for coding.

- The main goal of this position is to apply machine learning to plankton imaging data in order to shed a new light on the ecology of planktonic organisms. The applicant should have this goal at heart and strive to communicate with ecologists and oceanographers to understand their questions and provide appropriate answers.

Required Languages

Scientific and technical English (B2 level for written and oral). French would be a plus, but it is not mandatory.

Required Research Experience

No experience after the completion of the latest appropriate degree is required.

Work Location

Institute

Institut des sciences du calcul et des données. Project-Team FORMAL.

Laboratoire d'Océanographie de Villefranche sur mer (LOV), near Nice in the southern part of France. COMPLEX Team.

Country: France

Location: LOV, 181 Chemin du Lazaret, 06230 Villefranche-sur-Mer, France.

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:
Sakina-Dorothee AYATA (sakina@obs-vlfr.fr); Jean-Olivier IRISSON (irisson@obs-vlfr.fr)
- Submit the required application materials to:
Pascal Frey, Agnieszka Miskiewicz (iscd@sorbonne-universite.fr),
with the title "ISCD Fellowship Application - FORMAL data scientist"

Selection Procedure

Selection process

The Institute's selection process is based on an email submission. Candidates are evaluated by faculty reviewers, both 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.