

# Software Engineering Position

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A permanent software engineering position (IE-BAP E) is open at **Observatoire Midi-Pyrénées**, Toulouse.

The software engineering engineer will participate to the development of software platforms allowing the massive use of remote sensing data for monitoring ecosystems. In particular, he/she will contribute to the open source software **Iota2** used to produce the French national land-use/cover map distributed by Theia (<https://www.theia-land.fr/en/ceslist/land-cover-sec/>). Iota2 is dedicated to producing, on a large scale (country, continent), data cartographic such as land use or variables of the biodiversity, using automatic algorithms from physics and artificial intelligence.

He/She will also be involved in projects related to the mapping of continental surfaces, proposed by the various OSU OMP laboratories.

## 1 Activities

- Develop and implement algorithms in the Iota2 processing chain;
- Optimize chains on HPC and/or GPGPU architectures;
- Validate algorithms on large-scale real data;
- Produce spatial information on ecosystems (Land use/cover mapping, Ecosystem services estimation);
- Support user needs, particularly in the context of Theia data center;
- Maintain and document software, organize training,
- Map and monitor the dynamics of land use at National Observation Services (SNO) of the OMP such as CATCH, M-Tropics or HYBAMet for the study of different processes such as links between the degradation of water quality and the evolution of land cover.
- Optimize the characterization of inputs and mixed pixels in ECOSG (Ecoclimap Second Generation) using high-resolution satellite data spatial.

## 2 Skills

The recruit will have good knowledge and experience in software development and scientific computing, particularly applied to satellite images.

He/She will have strong skills in:

- Development in Python (object-oriented programming, functional and/or technical tests, static code analysis)
- Knowledge of the python ecosystem for data sciences (numpy, pandas, scikit-learn, pytorch...)
- Packaging (Conda)
- Software documentation (docstrings, sphinx),
- Distributed version management (git).

Knowledge of machine learning, remote sensing, geographic information science or spatial databases will be appreciated. She must demonstrate the ability to work in a team and have a taste for applied research.

### 3 Context

The OMP is a Federative research structure made up of nine Units Joint Research Units (UMR) and a Research Support Unit (UAR), distributed on four geographical sites (Toulouse, Perpignan, Tarbes, Lannemezan and the Pic du Midi).

The engineer will be assigned to UAR831. Part of its activity will benefit the units attached to the OMP and particularly the CESBIO.

The OMP has recognized expertise in processing remote sensing data. The researchers and engineers of its units have developed and perfected chains allowing large quantities of data to be processed in a manner effective. The Iota2 platform is advanced and benefits from developments carried out for several years.

OMP laboratories carry out activities to improve understanding of different processes linked to water and carbon cycles. These laboratories use remote sensing for a better description of the states of surfaces. Using Iota2 or other tools is essential to allow us to have products adapted to the needs of scientists.

The engineer will participate in IOTA-2 software development. He/She will participate also to the development of multi-laboratory land use maps as part of the UAR digital center.

Remote working is possible (maximum two days).