

CDD 10 months

Engineer / Programmer in scientific computing and mathematical modeling

BAP N° **E2E47**
GRADE **IE**

1-General information

- Workplace : Technopole de l'Arbois, Aix-en-Provence, France
- Publication date : May 2023
- Contract duration : 10 months
- Starting date : October 2023
- Workload : Full time workload
- Remuneration : according to experience
 (between 1948 € and 2318 € gross)
- Desired level of study : engineering degree or master

2-Mission

This job is proposed in the frame of the project [MICA](#) (Modelling Interactions between Climate change and Agriculture in the ancient West) funded by the French Agency for Research (ANR) for the 2023-2026 period. MICA aims to define the impact of climatic variations on the productivity of crops in the past and on the transformation of agriculture, in order to analyze which strategies ancient societies developed to adapt to these changes. MICA focuses on 4 areas distributed between Northern France and Northern Morocco. It is an interdisciplinary project gathering climatologists, archaeologists, agronomists, palaeoenvironmentalists, geochemists from France, Spain, Morocco.

This position is intended to support research of a specific task of the MICA project on climate and agricultural potential. The work will be devoted to the development of a model emulator able to simulate different crop productions (olives, grapes, wheat, peas...) during the last millennia according to climate variations and agricultural practices. An agrosystem model (LPJmL, C-coded model) and climate simulations are available. The objective is to calculate an emulator (a fast running statistical model able to mimic the full complex model) of LPJmL which will be used in a subsequent task of the MICA project as input of an agent-based model used to understand how farmers can adapt their agrosystems to long term climate changes.

3-Activities

- to adapt a code developed in R to calculate the emulator of the agrosystem model; this code uses algorithms of spatial regression, Markov Chains Monte-Carlo algorithms and other standard statistical techniques

- to do pre- and post-processing for models, e.g. writing scripts for data formatting, data analysing, visualisation
- to interact with the data providers (archeologists, climatologists, agronomists) to take into account their own constraints

4-Skills

- programming experience in C language and R platform
- familiarity with UNIX-like operating system, experience of using clusters or super computers will be a plus,
- general knowledge of mathematics, modelling techniques and algorithm development,
- good knowledge of spoken and written English,
- experience in environmental sciences is an advantage,
- to be autonomous and to appreciate the team work,
- to be able to develop personal and collaborative projects.

5-Work context

The candidate will be assigned to IMBE (Institut Méditerranéen de Biodiversité et d'Écologie marine et continentale, UMR Aix Marseille Université / CNRS 7263 / IRD 237 / Avignon Université), at the Arbois site (near Aix en Provence), and will interact mainly with Alberte Bondeau (CNRS scientist, Aix-en-Provence), Joël Guiot (CNRS research director, Aix-en-Provence) et Nicolas Bernigaud (postdoc co-leader of the MICA project, Montpellier).

6-Constraints

Subject requiring a great autonomy on the technical aspects (use of models, computing cluster, operating system, etc).

7-Contacts

Send CV, cover letter, and two reference letters to Alberte Bondeau:
alberte.bondeau@imbe.fr