# POST-DOCTORAL POSITION

## 2 YEARS CONTRACT

### From the 1st of October 2019

## STRUCTURAL ASSIGNMENT

**Institut de Recherche pour le Développement (IRD)**

IRD is a public French scientific and technological institution that has been working for 75 years in Southern countries. It is under the dual supervision of the Ministry of Higher Education and Research and the Ministry of Europe and Foreign Affairs. Its research, expertise, valorization and training activities aim at contributing to the economic, social and cultural development of the South. Nearly 40% of the Institute's staff is posted abroad and overseas.

## GEOGRAPHICAL ASSIGNMENT

**Montpellier, France**

## JOB DESCRIPTION

IRD and CIRAD, together with other international partners, have started in April 2019 a joint project, BONDS (Balancing BiOdiversity coNservation with Development in Amazonian wetlandS), funded by the Belmont Forum organization under the BiodivERsA call.

Threats to the integrity of biodiverse Amazon floodplain habitats from deforestation, dams, and climate change are increasingly severe but to date, Amazon biodiversity scenarios have not considered these critical environments. The BONDS project looks to improve characterization of Amazonian whitewater floodplain habitats and inundation dynamics, by 1) scaling up existing fish, floodplain forest, and phytoplankton biodiversity datasets, 2) evaluating the potential impacts of regional drivers such as climate, land use change, and dams on floodplain habitats, and 3) engaging at local and regional scale a large panel of stakeholders in looking for sustainable strategies for wetlands preservation. Innovative aspects of BONDS include 1) testing a remote-sensing-based approach for mapping phytoplankton biodiversity in floodplain lakes; 2) use of new satellite data to greatly increase the spatiotemporal resolution of floodplain habitat and inundation maps; 3) use of environmental eDNA metabarcoding to examine the distribution and relative abundance of phytoplankton, zooplankton, and fish in floodplain lakes; 4) individual-based modeling of fish foraging patterns across a network of oxbow lakes; and 5)designing nested-scale agent-based participatory models, using the GAMA (http://gama-platform.org), in order to develop scenarios.

This job profile concerns a post-doctoral position offered on this last aspect, which is entirely covered by WorkPackage 3 of the project.

**Missions**

In a previous project, the research team developed a role-playing game (RPG) to represent in a schematic way the socio-ecosystem of "*Lago Grande*" district, near Santarem, in the Brazilian Amazon. This tool has been used to stimulate discussions with local actors about the seasonal use of natural resources between floodplains (*várzea*) and firm land (*terra firme*). Participants of the role-playing game sessions had to make seasonal decisions on agriculture, fishing and animal husbandry, and these decisions were used as inputs of a stylized agent-based model. Using this toy-model as a starting point, a more realistic and fully autonomous agent-based model will be designed and implemented. In a second stage, the genericity of this empirically-based model will be tested in each of the sites studied by the project, to explore to what extent running agent-based simulations might provide insights about how the sites may evolve under three different management policies (no regulation, current management, management used in Jurua site).

The goal will be to offer tools for comparing them using indicators based on carbon storage, conservation of biodiversity, renewal of fish stocks, increased income, catchment, food security… indicators that may be expressed in a constraint satisfaction language on top of the simulations.

Since the knowledge used to build the models will be obtained by surveys at the level of communities (to understand the diversity of communities depending on their environment) and role-playing games at the level of people composing some of

these communities (in order to understand peoples' practices to feed the ABM), the candidate will have to interact quite often with other post-doctorate researchers in social sciences in France (Montpellier) and Brazil.

**Activities**

Design and development of ABM models on the GAMA platform.

Design and development of extensions to the GAMA platform (in Java or other suitable languages) in order to facilitate the description of indicators or goals for the simulations.

Design and development of extensions to the GAMA platform (in Java or other suitable languages) in order to facilitate the use of simulations in role-playing games.

**Environment**

The position will be located in Montpellier, in the premises of UMR Espace-Dev (Maison de la Télédétection, 500 rue Jean-François Breton, 34093 Montpellier, France). The work will be done in coordination with the other researchers working in this project. The position may imply to do some travels in Brazil and France to meet the researchers and partners present on site or participate to project meetings.

**Indicative remuneration**

Gross monthly salary: 2150€

## PROFILE

**Competences**

- Spoken and written languages: A fluent English is mandatory. French and / or Portuguese would be a plus.
- Excellent knowledge of agent-based modeling in general. Proficiency in the GAMA platform would be a plus.
- Excellent skills in programming in Java or other modern computer languages
- Skills in networking and group animation in order to build and animate participatory simulations
- Knowledge in social sciences, esp. anthropology, would be appreciated.

**Education**

- A PhD in computer science, artificial intelligence, computer modeling, or a related field.
- Some years of experience in working within international projects on models and simulation

**Skills and abilities**

- Independence and rigor
- Proven ability to work in a multilingual and multicultural environment.

## CONTACT

Send your application (CV and motivation letter) **before the 8th of July 2019,** to alexis.drogoul@ird.fr, copy to christophe.le_page@cirad.fr and marie-paule.bonnet@ird.fr. Auditions (possibly by Skype) of selected candidates will be organized between July 9th and 12th.

IRD, through its recruitment policy, promotes professional equality between men and women