



*DOCTORAL INPhINIT FELLOWSHIPS PROGRAMME – INCOMING FRAME  
INFORMATION CALL 2020*

**PhD POSITION OFFER FORM**

**Position**

1. Project Title/ Job Position title: Tropical palaeo-atmospheric dynamics in near-future climates
2. Area of Knowledge: **(choose one option)**
  - PHYSICAL SCIENCES, MATHEMATICS AND ENGINEERING
3. Group of disciplines: **(choose one option)**

LIFE SCIENCES

Medicine, Public Health, Sport Sciences, Nutrition, Clinical Psychology, Health Management
Animal, Plant, Environmental Biology, Physiology, Ecology and Conservation
Human Biology, Microbiology, Molecular Biology, Genetics, Cellular Biology, Genomics and Proteomics, Biochemistry
Agriculture, Veterinary Science, Animal Production, Forestry
Biotechnology, Bioinformatics, Pharmacy, Food Technology

PHYSICAL SCIENCES, MATHEMATICS AND ENGINEERING

Theoretical and Applied Mathematics, Computer Sciences
Physics
Geology, <b>Earth Sciences, Environmental and Atmosphere Sciences</b> , Mines, Geological Engineering, <b>Oceanography</b> , Hydrology



Civil and Construction Engineering, Energy, Nuclear Energy and Renewable Energy Engineering
<b>Chemistry</b> and Chemical Engineering
Telecommunications, Electronics, Robotics, Biomedical Engineering, Automation Engineering, ICT
Industrial Engineering, Mechanical Engineering, Metallurgy, Materials, Nanotechnology, Aeronautical, Naval and Aerospace Engineering

4. Research project/ Research Group description (max. 2.000 characters)

The project will be undertaken in the framework of the European Research Council funded PALADYN project.

The tropics play a major role in driving global climate variability across a range of timescales. They span half of the Earth's surface, and are changing rapidly with major implications for the resilience of natural environments, societies and economies in one of the most populous parts of the world. Some of these changes arise from alterations in tropical atmospheric circulation probably in response to a warmer climate system, driven by a combination of natural and anthropogenic factors, whose relative roles are still unclear.

The project's aim is to provide a new understanding of the baseline dynamics of the Tropical Atmospheric Circulation using information from past climates. As the few existing proxy approaches provide spatially sparse and incomplete information on atmospheric circulation, we will develop a new methodology that relies on exploiting an untapped but widespread material in the oceans' sediments: pyrogenic carbon from savannah fires. The South Atlantic will be the main test bed of the new approach as it is adjacent to the continents which have the most extensive and regular fire regimes worldwide. We will undertake the spatial geochemical and isotopic characterization of pyrogenic carbon along with the analysis of mineral dust in modern and past sediments, and the development of a biogeochemical pyrogenic carbon model to provide new constraints on the natural variability of the Tropical Atmospheric Circulation in contrasting climates.

The success of the project relies in the combination of cutting-edge geochemical methodologies and the in-depth interdisciplinary palaeoclimatic study of marine sediments. We will provide new important datasets of windborne deep-sea pyrogenic carbon for testing and refining prediction models of atmospheric circulation, carbon cycle, precipitation and wildfires, issues which are of paramount global importance from scientific as well as societal standpoints.

5. Job position description (max. 2.000 characters)



The research work will involve the study of windborne organic and mineral matter in the deep ocean from African and South American sources. The main study region will be in the Tropical Atlantic. Consequently, the student should be willing to participate in oceanographic research cruises to undertake the required fieldwork to sample the water column and surface sediments. The marine samples will be characterized using advanced instrumental analytical and preparative techniques, and integrate results with oceanographic and remote sensing data. Due to the interdisciplinary nature of the research, the student will need to spend some time in laboratories in Australia, France and Germany, and liaise with collaborators in the USA for the modelling aspects of the project.

Acquired research core skills will be on advanced analytical instrumentation (isotopic ratio mass spectrometry) and associated laboratory procedures, interpretation of chemical data in recent and ancient environments, statistical processing of data, data-modelling comparison and interpretation of data in a climate/environmental context. The nature of the project will require that the student acquires good interpersonal communication skills with collaborators outside the institute, and capacity to integrate and interpret data from multiple sources.

The key conditions to undertake the project is having a keen interest in interdisciplinary research in the environmental/Earth Sciences. The research will bridge different classical scientific disciplines (including chemistry, biology, geology and physics) and more holistic ones such as environmental sciences, geography and Earth System science. So, training in any one of these fields is a prerequisite.

### **Group Leader**

1. Title: Professor
2. Full name: Antoni Rosell-Melé
3. Email: [Antoni.rosell@uab.cat](mailto:Antoni.rosell@uab.cat)
4. Research project/ Research Group website (Url):  
<https://www.icrea.cat/Web/ScientificStaff/Antoni-Rosell-i-Mele-132>
5. Website description:

### **Additional website (optional, max. 5 websites)**

1. Url:
2. Website description: