LaCaixa 2021 PhD Position @BCAM

Project title / Job position title:

**Mathematical Modeling**

Research Project / Research Group Description.

**PhD position in Mathematical Modeling**

- **Objective:** Development of novel theoretical and computational tools for efficient and detailed simulation of multi-scale complex systems describing real life problems in biology, medicine, public health and society.

- **Applications:** Patient-specific simulation (cardiovascular, brain, cancer), neurodegenerative diseases, drug design, self-assembly in bio-chemical processes, energy materials modeling and uncertainty quantification. Targeted at biologists, clinicians and industries.

Specific research PhD project thesis (choose one of them):

- **Employing Bayesian Statistics and Machine Learning for Modelling and Optimization of Heterogeneous Battery Materials.** Advisors: E. Akhmatskaya, M. Rincon Bonilla. The objective is to develop and implement in the massively parallel molecular dynamics package a probabilistic Bayesian framework for optimization of heterogeneous battery materials, accurately modelled at atomistic scales using Machine Learning force fields and advanced importance sampling techniques.

- **Project Thesis Title:** Algebraic Topology Data Science meets the Brain: uncovering the shape of neurodegeneration. Supervisor: Serafim Rodrigues (MCEN). This project aims to unveil the topological shape & phase transitions of brain diseases using a revolutionary data-science method (Topological Data Analysis) on multiscale multimodal, connectome data.

- **Project thesis title:** Mathematical models for animal-to-human spillover events: assessing risks of new pandemics. Advisor: Maira Aguiar. Description: Zoonotic spillover, which is the transmission of a pathogen from a vertebrate animal to a human, is a global public health concern. Mathematical models applied to spillover dynamics of a zoonotic disease will be developed. Evolutionary aspects of accidental pathogens such as virulence and transmissibility capacity will be investigated, and its implications for control of future emergent new pathogens.
Job Position description.

BCAM is a world-class research center in the field of Applied Mathematics located in Bilbao (Spain). It obtained the Severo Ochoa Center of Excellence award in 2013 and 2018 given by the Spanish Ministry of Science, Innovation and Universities. BCAM is part of the ERCOM European Research Centers on Mathematics http://www.ercom.org networks. BCAM has endorsed the Charter & Code in 2008 and has been awarded the HR Excellence in research Logo in 2016.

The candidate will be part of the Mathematical Modeling research area at BCAM.

The candidate must have solid knowledge and experience.

The research environment is international and open to national and international collaborations, the candidate must have willingness to team working and traveling.

Requirements:

- Master degree (preferable in Applied Mathematics, Physics, Engineering or Computer Science).
- Applicants must have an excellent academic record.

Skills:

- Good communication and interpersonal skills.
- Ability to effectively communicate and present research ideas to researchers with different background (e.g., mathematicians and engineers as well as employs of forest service).
- Ability to clearly present and publish research outcomes in spoken (talks) and written (papers) form.
- Good command of spoken and written English.

Additionally, in terms of transferable & complementary skills, BCAM is carrying out the Action Plan within Human Resources Strategy for Researchers (HRS4R) BCAM action plan available here https://bit.ly/2MJ1R9S; so, the fellow will benefit of this training program composed by: Leadership, Ethic and Research, Effective Communication/Teamwork, Gender Balance, Research Integrity, Citizenship Science, etc. The fellow will receive all the needed support from BCAM to be fully integrated in the group and in the center.
INPhINIT Offer, eligibility requirements, evaluation and selection process

 Incoming:  [https://obrasociallacaixa.org/en/investigacion-y-becas/programa-de-becas-de-posgrado/inphinit/incoming](https://obrasociallacaixa.org/en/investigacion-y-becas/programa-de-becas-de-posgrado/inphinit/incoming)

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How to Apply

1. Click in [https://candidate.lacaixafellowships.org/login](https://candidate.lacaixafellowships.org/login), Click in ”New Users” – Please register your application and fill in all the personal data requested by the page for the creation of a new user.

2. Once you create the profile, you will receive a confirmation email and by clicking on the link you will be redirected to a page that tells you that your user is correctly completed.
3. Once you enter the platform with your user, the following screen will appear with some of your data and to choose the mode: Incoming or retaining:

4. Afterwards, you will be shown a page with all your data previously entered, and you will have to upload your passport, ID card and contact information:
5. After hitting the Save and Continue button, the following screen will appear in which you must enter the following data, choose the position you want and accept the 3 boxes below:
6. Below, on that same page, you choose the first option of the Physical sciences, Mathematics and Engineering Panel:
7. After giving to the button Save and Continue, fill in the Statement of purpose you give to Save and Continue:

8. From there, you will have to fill in the rest of the pages: Reference Letters, CV, Bachelor Studies, Other studies (if you have them), Academic records referring to higher studies relevant to the fellowship, Language required according to the programme terms and conditions, Language certificate, etc.

9. Once you have filled in all the fields you must click on FINISH and your application will be registered.