basque center for applied mathematics

BCAM Internship Position Announcement

The following BCAM Internship position is open at BCAM – Basque Center for Applied Mathematics, an interdisciplinary research center located in Bilbao, Basque Country – Spain. The interested applicants can apply via the following webpage: http://www.bcamath.org/en/research/internships. It is strongly recommended to apply at least 3 months before the expected starting date.

INTERNSHIP DATA	
Research topic title:	Nonlocal problems and applications
Research topic description:	Nonlocal operators like the fractional Laplacian are known to be important in applications and they have been a "hot topic" for research in the last decade. In this project we are interested in understanding and studying nonlocal diffusion operators whose properties vary in different parts of the domain. We intend to consider the problem from both a theoretical point of view (studying the properties of the operators and corresponding boundary value problems (BVP)) and a numerical one (finding numerical approximations of the operator and the BVP). The proposed plan for the project is as follows: 1. the study of existing literature on classical nonlocal operators and nonlocal BVP; 2. the understanding of when these operators with varying nonlocality are well defined from a theoretical standpoint; 3. the development of suitable discretizations of the operators considered. --- Depending on the background and interests of the applicant different aspects of the proposed plan could be more thoroughly investigated. Examples include: a. studying the well-posedness of BVP with these operators; b. investigation of modelling applications of the considered operators; c. proving convergence of the operator discretizations; d. numerical implementation of the proposed discretizations and testing of their accuracy.
Keywords:	Fractional Laplacian, Nonlocal operators, Boundary value problem, Applications to diffusion in heterogeneous structures.

Required knowledge and skills:	The applicant should have a strong background in mathematics as well a basic programming skills in Matlab. Basic knowledge on numerical analysis and/or partial differential equations is desirable but not mandatory.
Required language skills[1]:	English
Duration and dates:	From 4 to 6 months depending on the candidate, starting as early as possible in 2019.
Covered expenses:	Accommodation and travel (if necessary) and/or basic allowance.
Application deadline:	Until the position is filled

SUPERVISOR DATA	
Supervisor:	Nicole Cusimano & Félix del Teso
Research line:	Mathematical Modelling in Biosciences & Linear and Non-Linear Waves
Email:	ncusimano@bcamath.org & fdelteso@bcamath.org

[1] Note that English is the official language at BCAM.