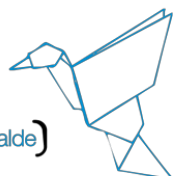


## BCAM Internship Position Announcement

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	
<b>Research topic title:</b>	Nonlocal problems and applications
<b>Research topic description:</b>	<p>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.</p> <p>In this project we are interested in understanding and studying nonlocal diffusion operators whose properties vary in different parts of the domain.</p> <p>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).</p> <p>The proposed plan for the project is as follows:</p> <ol style="list-style-type: none"> <li>1. the study of existing literature on classical nonlocal operators and nonlocal BVP;</li> <li>2. the understanding of when these operators with varying nonlocality are well defined from a theoretical standpoint;</li> <li>3. the development of suitable discretizations of the operators considered.</li> </ol> <p>-----</p> <p>Depending on the background and interests of the applicant different aspects of the proposed plan could be more thoroughly investigated. Examples include:</p> <ol style="list-style-type: none"> <li>a. studying the well-posedness of BVP with these operators;</li> <li>b. investigation of modelling applications of the considered operators;</li> <li>c. proving convergence of the operator discretizations;</li> <li>d. numerical implementation of the proposed discretizations and testing of their accuracy.</li> </ol>
<b>Keywords:</b>	Fractional Laplacian, Nonlocal operators, Boundary value problem, Applications to diffusion in heterogeneous structures.



<b>Required knowledge and skills:</b>	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.
<b>Required language skills<sup>1</sup>:</b>	English
<b>Duration and dates:</b>	From 4 to 6 months depending on the candidate, starting as early as possible in 2019.
<b>Covered expenses:</b>	Accommodation and travel (if necessary) and/or basic allowance.
<b>Application deadline:</b>	Until the position is filled

SUPERVISOR DATA	
<b>Supervisor:</b>	Nicole Cusimano & Félix del Teso
<b>Research line:</b>	Mathematical Modelling in Biosciences & Linear and Non-Linear Waves
<b>Email:</b>	<a href="mailto:ncusimano@bcamath.org">ncusimano@bcamath.org</a> & <a href="mailto:fdelteso@bcamath.org">fdelteso@bcamath.org</a>

<sup>1</sup> Note that English is the official language at BCAM.

