basque center for applied mathematics

**IC2019_AI BCAM International Call**

# Postdoctoral Fellowship in Simulation of Wave Propagation (SIWP)

| Job Offer | |
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| Topics: | In the framework of the BCAM "*Maths & Artificial Intelligence*" strategy, a series of projects in this field will be launched in different areas of Applied Mathematics. This project entitled "***Deep Learning Based Inversion with Energy Applications***" deals with:<br>Solving inverse problems in computational mechanics using deep learning algorithms with applications to geophysics. |
| PI in charge: | Ikerbasque Research Professor David Pardo |
| Salary and conditions: | **The gross annual salary of the Fellowship will be 28.000 - 32.000€.**<br><br>It will then be on your own responsibility to make your yearly income declaration at the Bizkaia Treasury Agency.<br>There is a moving allowance for those researchers that come from a research institution outside the Basque Country from EUR 1.000 to EUR 2.000 gross.<br><br>*Free access to the Public Health System in Spain is provided to all employees.* |
| No Positions offered: | **#1** |
| Contract and offer: | **14 months (starting in November 2019)** |
| Deadline: | **September 13th 2019, 14:00 CET (UTC+1)** |
| How to apply: | Applications must be submitted on-line at:<br>http://www.bcamath.org/en/research/job |

| Scientific Profile Requested | |
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| Requirements: | • Promising young researchers.<br>• Applicants must have their PhD preferable in Applied Mathematics, Engineering, Computer Sciences, or related fields. |
| Skills and track-record: | • Good interpersonal skills.<br>• A proven track record in quality research, as evidenced by research publications in top scientific journals and conferences.<br>• Demonstrated ability to work independently and as part of a collaborative research team. |

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| | • Ability to present and publish research outcomes in spoken (talks) and written (articles) form.<br>• Ability to effectively communicate and present research ideas to researchers and stakeholders with different backgrounds.<br>• Fluency in spoken and written English. |
| Scientific Profile: | The preferred candidate will work in one of the following research areas (depending upon the candidate's scientific profile):<br>Research Area 1 (RA1): Development of Deep Learning Algorithms for Real-Time Inversion. The postdoctoral fellow working on RA1 will be trained on solving inverse problems using Deep Neural Networks (DNNs). Specifically, he/she will improve an existing encoder-decoder Deep Convolutional Neural Network (DCNN) by adding residual blocks with a boosting strategy. The implementation will be based on TensorFlow 2.0. The results will be applied geophysical problems.<br><br>Research Area 2 (RA2): Development of Finite Element Methods for generating a training database for Deep Learning algorithms. The postdoctoral fellow working on RA2 will explore various numerical methods such as Proper Generalized Decomposition (PGD), Fourier based strategies, multiscale methods, and Finite Element Methods. Then, starting from our existing *in-house* finite element simulators, the objective is to develop a numerical method that solves one million two-dimensional (2D) forward problems in eight hours on a computer equipped with four quad-core CPUs. |

| Application and Selection Process | |
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| Formal Requirements: | The selected candidate must have applied before the application deadline online at the webpage http://www.bcamath.org/en/research/job<br><br>The candidates that do not fulfil the mandatory requirements will not be evaluated with respect to their scientific profile. |
| Application: | Required documents:<br>▪ CV<br>▪ Letter of interest<br>▪ 2 recommendation letters<br>▪ Statement of past and proposed future research (2-3 pages) |
| Evaluation: | Based on the provided application documents of each |

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| | candidate, the evaluation committee will evaluate qualitatively: the adaption of the previous training and career to the profile offered, the recommendation letters, the main results achieved (papers, proceedings, etc.), the statement of past and proposed future research and other merits; taking in account the alignment of these items to the topic offered. |

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| **Incorporation:** | **November 2019 or as soon as possible thereafter**<br><br>*The BCAM postdoctoral contract will start when the selected candidate has finished the PhD, i.e. after dissertation defence.* |

EUSKO JAURLARITZA
GOBIERNO VASCO