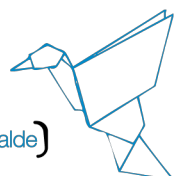# MSLMS – SIWP Joint Postdoctoral Fellowship

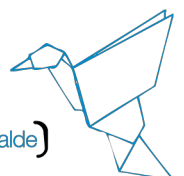| Job Offer	
Topics:	**Deep Machine Learning and Probabilistic Modelling for the Inversion of Mechanical Engineering Problems** The project is focussed on electromagnetic (EM) measurements that incorporate information about the resistivity distribution of the Earth´s subsurface. Such information can be used to determine the porosity of the rocks and the type of fluids contained within those rocks. The correct interpretation (numerical inversion) of the measurements is critical for obtaining an accurate map of the Earth´s subsurface. The main objective of this Project is to implement and analyse the new Bayesian inversion methodologies proposed in BCAM for the efficient inversion of geophysical EM resistivity measurements. Such methodologies rely on advanced importance sampling techniques and adaptive numerical schemes. The possibility to apply the new methods in machine learning algorithms will be also investigated. Keywords: Inverse Problems with Uncertainty, Geophysical Electromagnetic Resistivity Measurements, Bayesian Inference, Enhanced Sampling, Hamiltonian Monte Carlo, Importance Sampling, Deep Machine Learning
PIs in charge:	✓ Elena Akhmatskaya, Ikerbasque Professor at BCAM http://www.bcamath.org/en/people/eakhmatskaya ✓ David Pardo, Ikerbasque Professor at UPV/EHU & BCAM http://www.bcamath.org/en/people/dpardo
Salary and conditions:	**The gross annual salary of the Fellowship will be 28.000 - 32.000€.** It will then be on your own responsibility to make your yearly income declaration at the Bizkaia Treasury Agency. There is a moving allowance for those researchers that come from a research institution outside the Basque Country from EUR 1.000 to EUR 2000 gross.

	Free access to the Public Health System in Spain is provided to all employees.
No Positions offered:	**#1**
Contract and offer:	**2-year contract**
Deadline:	**February 28th 2019, 15:00 CET (UTC+1)**
How to apply:	Applications must be submitted on-line at: http://www.bcamath.org/en/research/job/

Scientific Profile Requested	
Requirements:	• Applicants must have a PhD degree completed before the contract starts. PhD degree is preferable in Applied Mathematics/Statistics/Mechanical Engineering/Computational Geophysics or Computer Sciences
Skills and track-record:	• An excellent academic record • Good communication and interpersonal skills • Ability to effectively communicate and present research ideas to researchers with different background (mathematicians, physicists, engineers) • Ability to clearly present and publish research outcomes in spoken (talks) and written (papers) form • Good command of spoken and written English
Scientific Profile:	The preferred candidate will have: - research experience and interest in Machine Learning, Bayesian Inference, Markov Chain Monte Carlo, Inverse Problems - good programming skills in C/C++, object-oriented and/or interpreted (Matlab, python) language - a taste for interdisciplinary applications. A background in Hamiltonian Monte Carlo, Importance Sampling and numerical methods for PDEs is highly desirable.

Application and Selection Process	
Formal Requirements:	The selected candidate must have applied before the application deadline online at the webpage http://www.bcamath.org/en/research/job The candidates that do not fulfil the mandatory requirements will not be evaluated with respect to their scientific profile.

(matematika mugaz bestalde)

Application:	Required documents: - CV - Letter of interest - 2 recommendation letters - statement of past and proposed future research (2-3 pages)
Evaluation:	Based on the provided application documents of each 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.

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