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IC2022_07 BCAM International Call

Postdoctoral Fellowship in CFD Modelling and Simulation

Job Offer	
Topics:	**Mesoscopic flow modelling of complex particle suspensions** Applications are invited for **two postdoctoral positions** in mesoscopic modelling of complex suspensions at the CFD group (BCAM). Many numerical techniques have been developed in the past decades to target suspensions with simple Newtonian solvents, however scarce results are available in the case of non-Newtonian matrices or morphologically-complex shapes. Building upon our previous work [1,2,3], the goal of this project is to design and further develop fully-resolved **Smoothed Particle Hydrodynamics** (SPH) models of particulate systems (1) interacting with complex **viscoelastic and thixoplastic suspending media** and (2) with complex **anisotropic and highly-irregularly-shaped particles** in suspension. Focus will be on the specific particle dynamics (sedimentation etc.), as well the resulting rheological behaviour of the suspension and link to microstructure. The postdoctoral candidate will work under the supervision of Ikerbasque Prof. Marco Ellero (CFD group, BCAM) on the developments and use of novel mesoscopic particle-simulation methods to better understand the fluid dynamics and rheology of complex suspensions. Close collaborations with technological centers in the Basque Country is expected (Leartiker, Tecnalia), where experimental data will be provided to calibrated and validate the models.

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	References [1] Shear thickening of a non-colloidal suspension with a viscoelastic matrix, A Vázquez-Quesada, P Español, RI Tanner, M Ellero, *Journal of Fluid Mechanics* 880, p. 1070-1094 (2019). [2] Shear thinning of noncolloidal suspensions, A Vázquez-Quesada, RI Tanner, M Ellero, *Physical Review Letters* 117 (10), p. 108001 (2016). [3] Dynamics and rheology of a suspension of super paramagnetic chains under the combined effect of a shear flow and a rotating magnetic field, E Rossi, JA Ruiz-Lopez, A Vázquez-Quesada, M Ellero, *Soft Matter* 17, p.6006 (2021)
PI in charge:	Prof. Marco Ellero (Ikerbasque Research Professor)
Salary and conditions:	**The gross annual salary of the Fellowship will be 28.000 - 34.000€ according to experience.** It will then be on your own responsibility to make your yearly income declaration at the Bizkaia Treasury Agency. Additionally, we offer a moving allowance up to 2.000€. Should the researcher have a family at the time of recruitment: 1. 2.000€ gross in a single payment will be offered (you must be married-official register or with children and the certificate to prove it must be sent). 2. 1.200€ gross per year/per child (up to 2 children) will be offered (the certificate to prove it must be sent). *Free access to the Public Health System in Spain is provided to all employees.*
No Positions offered:	**# 2**
Contract and offer:	**1+1 year contract**
Deadline:	**September 9th 2022 14:00 CET**
How to apply:	Applications must be submitted on-line at: http://www.bcamath.org/en/research/job

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Scientific Profile Requested	
Requirements:	• Promising young researchers. • Applicants must have their PhD completed before the contract starts. • PhD degree preferable in Physics, Applied Mathematics, Chemical/Mechanical Engineering
Skills and track-record:	• Good communication and interpersonal skills. • Ability to effectively communicate and present research ideas to researchers with different background (e.g., mathematicians and 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: - background in fluid mechanics, rheology, soft matter, particulate systems or complex fluids. - Experience in modelling and simulation using particle methods such as smoothed particle hydrodynamics (SPH), dissipative particle dynamics (DPD) or molecular dynamics (MD) is required. - Knowledge of C/C++ or Fortran programming languages is required. - Experience in parallel programming for HPC is 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.
Application:	Required documents: ▪ CV ▪ Letter of interest

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	▪ 2 recommendation letters ▪ statement of past and proposed future research
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:	**November 2022 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.*

Timeframe:	- Deadline for applications: September 9th, 2022 - Evaluation: from September 2022 to October 2022 - Publication the results on website: October 2022. - Incorporation: November 2022 or as soon as possible thereafter

EUSKO JAURLARITZA
GOBIERNO VASCO
HEZKUNTZA, HIZKUNTZA POLITIKA ETA KULTURA SAILA
DEPARTAMENTO DE EDUCACIÓN, POLÍTICA LINGÜÍSTICA Y CULTURA