


## Company Description

BCAM is the Research Center on Applied Mathematics created with the support of the Basque Government and the University of the Basque Country, which aims to strengthen the Basque science and technology system, by performing interdisciplinary research in the frontiers of mathematics, talented scientists' training and attraction, so the excellence of our results are recognized by the Society

## Information

 **Deadline:** 2022-09-23  
 **Category:** Business  
 **Province:** Bizkaia

 **Country:** Basque Country  
 **City:** Bilbao

## Company

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## Main functions, requisites & benefits

### Main functions

Mesososcopic 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 interacting with complex viscoelastic and thixoplastic suspending media and 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. 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)

### Requisites

Promising young researchers. Applicants must have their PhD completed before the contract starts. PhD degree preferable in Physics, Applied Mathematics, Chemical/Mechanical Engineering 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.

### Benefits

The gross annual salary of the Fellowship will be 28.000 - 34.000€ according to experience. Contract: 1 + 1 year 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: 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). 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