MARIE Skłodowska-CURIE INNOVATIVE TRAINING NETWORK

OPEN CALL – PhD position

Host (recruiting) organisation

University of Pavia, Pavia, Italy

Project Title:

Advanced simulation for actuation control of smart micro-fluidic valves

Supervisory team

Primary academic institution Prof. Ferdinando Auricchio Università di Pavia	**Industrial institution** Dr. Francesco Butera Dolphin Fluidics
Secondary academic institution Prof. Harald van Brummelen Eindhoven University of Technology	

Project description

Accurate and fast control on the dynamics of small valves controlled through innovative actuation systems based on active/smart materials is still today an open computational problem.

The aim of the project is to develop innovative algorithms for the control of the dynamics of the valve as well as the analysis of the fluid-structure interaction problem during the valve opening/closing. The computational model to be built should aim at (i) simulating the multi-physics of miniaturized actuators based on Shape Memory alloys (SMA), (ii) simulating the fluid-structure coupling in the control of valve closing; (iii) considering a wide range of fluid densities, from low-density to viscous fluids. The developed computational tool will accordingly be based on advanced constitutive modelling, structural modelling by finite elements, and fluid-structure interaction analysis.

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Benefits

- Doctorate degree from both University of Pavia and Eindhoven University of Technology
- Integration within the research group of a smart fluidic industry leader
- 36 month full-time employment contract
- Additional mobility and family allowances
- Research supervision and training by recognised experts in computational mechanics from academia and industry and by smart actuation and valve design experts in industry
- Access to state-of-the-art research and computing facilities
- Training in transversal skills (e.g. communication skills, entrepreneurship)

Prerequisites

- To have a strong undergraduate and MSc degree (or equivalent) in Engineering, Mathematics, Physics or a related field and a good level of English
- To have an enthusiastic attitude to conduct research, being hard-worker and critic
- To demonstrate knowledge of programming languages such as Matlab, Python, C++
- To have experience with Finite Element analysis and Computational Fluid Dynamics

Eligibility

Applicants shall, at the time of recruitment by University of Pavia, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. Full-Time Equivalent Research Experience is measured from the date when a researcher obtained the degree, which would formally entitle him/her to embark on a doctorate, irrespective of whether or not a doctorate is or was ever envisaged.

At the time of recruitment by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in ITALY for more than 12 months in the 3 years immediately prior to the reference date.

Duration of the project

The total duration of the project is 36 months.

Obligations of ESRs

- Completion of the Erasmus Mundus Joint PhD programme Simulation Engineering and Entrepreneurship Development (SEED)
- Be highly committed with quality research, training and management. The successful candidate is expected to become a future leader on the development and application of advanced computational methods for industry
- Take part of the mobility programme both in academia and industry
- Participate on the dissemination and outreach activities associated to the project
- Attend international conferences and present the research undertaken
- Contribute to the writing of articles in high impact international journals

Closing date

Until position is filled

How to apply

www.lacan.upc.edu/ProTechTion

Questions

protechtion.itn@upc.edu