

MARIE Skłodowska-CURIE INNOVATIVE **TRAINING NETWORK**

OPEN CALL – PhD position





UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH



Host (recruiting) organisation

Swansea University, Swansea, United Kingdom

Towards the next generation of dynamic fracture and fragmentation solver in Engineering

Supervisory team

Primary academic institution	Industrial institution
Prof. Antonio J. Gil and Dr. C. H. Lee	Dr. Rajab Said
Swansea University	ESI Group
Secondary academic institution	
Prof. Antonio Huerta and Prof. Pedro Diez	
Universitat Politecnica de Catalunya · BarcelonaTech	

Project description

The study and prediction of the structural integrity of engineering components subjected to extreme loading scenarios, such as impact, is a fundamental problem in Industry. For instance, the damage as a result of impacts from bird strikes or other foreign objects on an aircraft structure (e.g. fuselage, airfoils) is a major concern to the Airspace Industry. From the computational modelling standpoint, the simulation of high (and hyper) velocity impact in deformable structures is still one of the most challenging problems in the field due to the large strains and the complex thermo-mechanics that arise in the process. For virtual prototyping, meshless methods are typically used due to their appeal to handle extreme scenarios. ESI Group's software PAM-SHOCK incorporates this meshless capability which is routinely used for the simulation of high velocity impact in composite aircraft structures.

Building upon very recent discoveries made by the supervisory team, the objective of this PhD is the development and computational implementation of a novel 3D meshless technique with significantly improved properties with respect to the current state of the art. Interestingly, the methodology will borrow concepts from Computational Fluid Dynamics and apply them to Computational Solid Dynamics in a way that will greatly enhance the robustness and accuracy of the simulations, with the final aim to handle complex dynamic fracture and fragmentation.

The recruited PhD candidate will become a member of an active research group working on the development and application of cutting edge computational techniques for large strain solid dynamics, fluid structure interaction and computational multi-physics.



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Benefits

- Doctorate degree from both Swansea University and UPC BarcelonaTech.
- Integration within the research group of a virtual prototyping 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
- 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 some programming languages such as Matlab and/or Fortran and/or C/C++
- To demonstrate experience with numerical (Finite Element/Volume, Meshless) methods

Eligibility

Applicants shall, at the time of recruitment by Swansea University, 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 the UNITED KINGDOM 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 to 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 with 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