



MARIE Skłodowska-CURIE INNOVATIVE TRAINING NETWORK

OPEN CALL – PhD position



Swansea University
Prifysgol Abertawe

SIEMENS



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

Host (recruiting) organisation

Swansea University, Swansea, United Kingdom

Project Title: Fast Design Prototyping of MRI Scanners

Supervisory team

Primary academic institution Dr. Antonio J. Gil, Dr. Paul D. Ledger Swansea University	Industrial institution Dr. Mike Mallett Siemens Magnet Technology
Secondary academic institution Prof. Antonio Huerta, Dr. Sergio Zlotnik Universitat Politècnica de Catalunya · BarcelonaTech	

Project description

The ability to simulate engineering outputs in an industrially relevant time scale is of critical importance. Often, industry requires an understanding of how specified output measures change under the variation of problem parameters. However, performing parameter sweeps is often computational prohibitive, particularly in an industrial design environment and when considering three-dimensional problems. To address this issue there is considerable academic and industrial interest in the provision of fast and computationally inexpensive reduced order models, which can be certified with credibility bounds to ensure reliability in the predictions.

In this PhD project the chosen application of interest is a clinical MRI system. Siemens Magnet Technology are interested in understanding the coupled electro-magneto-mechanical response of the conducting components making up an MRI scanner and the effects that changes in its design have on its performance and vibrations. To do this, the coupled set of elasticity equations, for describing the mechanical response, and Maxwell equations, for electromagnetic response, must be solved.

The PhD will first develop a computational framework based on advanced finite element technology and efficient algorithms for the solution of the resulting non-linear equation system. Given the physics involved and the complexity of the problem at hand, this tool will then be used for generating solution “snapshots” for certain designs. The PhD will then develop a low-fidelity reduced order modelling technique capable of rapidly producing simulation outputs for new design parameters of a realistic three-dimensional configuration. The resulting algorithm will then be transferred to Siemens Magnet Technology for use in an industrial context. The PhD will become a member of an active research group working on the development and application of computational techniques in coupled problems.



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Benefits

- Doctorate degree from both Swansea University and UPC·BarcelonaTech
- 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 C++

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 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

March 31, 2016

How to apply

www.lacan.upc.edu/AdMoRe

Questions

admoredmore@upc.edu