



MARIE Skłodowska-CURIE INNOVATIVE TRAINING NETWORK

OPEN CALL – PhD position



Host (recruiting) organisation

Airbus Group SAS, Paris, France

Project Title: Fast Simulation-Assisted Shape Correction after Machining

Supervisory team

Primary academic institution Prof Francisco Chinesta Ecole Centrale de Nantes	Industrial institution Dominique Deloison Airbus Group Innovations
Secondary academic institution Prof Antonio Huerta and Prof Pedro Díez Universitat Politecnica de Catalunya, BarcelonaTech	

Project description

Large and thick aeronautical structural parts frequently exhibit significant distortions after machining because of the residual stresses due to previous steps (heat treatment). A Post-machining shape correction phase, based on successive mechanical operations (for example, 3-point bending) has to be applied. This process is long and costly and cannot be standardized because distortions vary from one part to the other (non reproducibility). The reshaping process relies entirely on the know-how and experience of the operator. There is a need to introduce numerical simulation in order to assist the operator and propose the optimal shape correction sequence.

The aim of this project is to demonstrate the feasibility of such an approach.

Two challenging issues have to be tackled:

- The building of a Reduced Order Model able to reproduce the results of the thermo-mechanical simulation (heat treatment, machining, reshaping).
- The identification of the uncertain parameters (material properties, boundary conditions), using the ROM, through the comparison of the response of the real part to the few 1st reshaping operations with the predicted behaviour.

A virtual demonstration of this approach will be performed where the "real" part will be a simulation, which uncertain parameters will be supposed not to be known.



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Benefits

- Research supervision and training by recognised experts in computational mechanics from **industry** and **academia**
- Doctorate degree from both Ecole Centrale de Nantes and UPC·BarcelonaTECH
- 36 month full-time employment contract
- Additional mobility and family allowances
- Integration within a research group of leading aeronautic company
- Training in transversal skills

Prerequisites

- To have a strong undergraduate and MSc degree (or equivalent) in Structure Engineering, Mathematics, 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 Fortran
- To have some experience with Finite Element analysis

Eligibility

Applicants shall, at the time of recruitment by Airbus Group, 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 FRANCE 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

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