H2020-MSCA-ITN-ETN-2020

Project Acronym XS-Meta

MSCA Grant Agreement 956401

General description of the Project

XS-Meta is an Innovative European Training Network project with the main objective of training a new generation of researchers in concurrent material-structure design of high-technology structural systems, using functionally graded 3D-printed metamaterials.

The scientific challenge in XS-Meta is to take advantage of the metal 3D printing technology to perform a change of paradigm on how engineering structural design is performed, integrating the design of the metamaterial structure at the subscale with the engineering design of the component to develop a new generation of high-performance components. XS-Meta addresses the multiple scales of the problem, from microstructure of the material at the grain level, to the continuum-based engineering design of industrial components.

XS-Meta involves 11 partners from 7 different countries, including reference research groups in 7 leading academic institutions, one public research institute and 3 companies. XS-Meta involves different fields, from machine learning to computational and experimental materials science, manufacturing, applied mathematics, computational mechanics, and software engineering.

In the framework of this ITN, 14 early stage researchers (ESR) will be recruited with the purpose of developing research leading to a doctoral thesis. The specific profiles are listed below. The duration of each contract and of the thesis will be of 36 months. Starting date is expected between September 1st 2021 to March 1st 2022. Exact dates will be agreed between the selected candidates and the recruiting institution.

Selected candidates will be offered a fixed-term 36-month contract with the applicable benefits for the institution and country, including health coverage. Standard very competitive EU-MSCA salaries are offered (around 3270€/month gross + 600€/month mobility + 500€/month family). The salaries are slightly adjusted to each country living standards. Additional mobility and family allowances will be paid on the top of the salary.

To apply for these H2020-MSCA training positions, applicants must fulfil the following MSCA criteria:

- Mobility rule: Candidates must not have resided in the same country as the host (recruiting) institution for more than 12 months over the last 3 years before the starting date. This excludes holidays and (refugee status) asylum application. Candidates may be of any nationality.
- Applicant with already ESR status: Applicants must fulfill the requirements for enrolling in the PhD program of the hosting institution (or the associated academic institution in case of industry hosts). At the time of recruiting, an applicant who initiated a research career must be in the first four years of their research careers and cannot have been awarded a doctoral degree. These four years refer to the time since the researcher received the degree which would entitle him/her to embark on a doctorate. There is no age limit.

The consortium involves the following beneficiaries (recruiting institutions):

1. Universidad Politécnica de Madrid (UPM), School of Aeronautical Engineering and Space (ETSIAE), Spain.

2. Ecole Nationale d'Arts et Métiers (ENSAM), Paris (France)

3. National University of Ireland, Galway (NUIG), Ireland

4. Rheinisch-Westfälische Technische Hochschule – Aachen (RWTH), Aachen (Germany)

5. Centre National de la Recherche Scientifique, UMI with Georgia-Tech Lorraine, Metz (France).

6. Engineering System International (ESI); an engineering company of virtual prototyping software. Paris (France).

7. Oxmet-Technologies (Oxmet); a start-up company, spin-off from Oxford University, dedicated to 3D metal printing and alloy design for 3D printing, Oxford (United Kingdom)

8. Instituto Nacional de Técnica Aeroespacial Esteban Terradas (INTA), is a large research institution in the fields of defence and aerospace technologies. Torrejón-Madrid (Spain)

9. X-EV, S.R.L. (XEV) is a multinational start-up company manufacturing 3D-printed electric cars, Torino (Italy)

The consortium also involves the following partners (receiving seconded ESRs and giving training)

10. Georgia Tech, Atlanta (USA).

11. University of Florida (USA).

Application and selection process:

The candidates meeting any of the profiles and specific requirements below may apply until the positions are filled, and before July 15th for guaranteeing a full consideration. Strong communication skills in English are necessary for all the positions. Master of Science is not needed in all the positions, but in such cases additional credits on top of BS degree may be required as a requirement to enroll in the applicable PhD program.

Applications must contain:

- A motivation letter (maximum 1 page per position applied) which should state why the applicant wishes to pursue the specific research and why s/he thinks s/he is an ideal candidate for the position. If more than one position is pursued, include a motivation letter per position.
- A brief CV (typically 2 pages). If the applicant has developed previous work related to the position to which s/he is applying, an additional page may be included describing more in detail that work.
- For verifying MSCA requirements, in the first page of the CV there must be a separate section with title "MSCA requirements fulfilment", in which the candidates clearly indicate exact dates of (1) degree entitling to pursue a PhD, (2) positions and country of residence in the last 5 years.
- Up to 3 recommendation letters and/or contact e-mail addresses with a brief professional description (title, position, relationship with applicant) of the referring person.
- Copy of the title which allows to enroll in a PhD program in the country of employment (typically a Master of Science degree or Engineering degree).

The selection process will be performed in two phases. In the first phase, a pre-selection of possible candidates will be performed by the XSMETA Selection Committee. As a second step, a CV-video will be required to pass to the interview.

Applications should be submitted to the following e-mail address:

xsmetaitn@gmail.com

Include in the e-mail subject:

XS-META, ESR application for position ESR# (where # is the fellow number given below in the table)

Specific profiles:

Fellow: ESR9	Host: UPM
Project Title Proposal: Topology structural optimization algorithms applied to metamaterial components	
Purpose and Objectives: The objective is to develop component geometry optimization algorithms which also assures the connectivity of non-uniform metamaterial distribution within the component which can be used in conjunction to the optimisation tool developed by ESR10 to optimise the whole MM component in the dual scale (cell geometry + component geometry). ESR9 and ESR10 will work in close collaboration.	
Expected Results: Topological optimisation software code accounting for the metamaterial cell compatibility.	
Degree requirements: MS in Mechanical Engineering, Mathematics (applied), Physics or related field. **Additional skills:** Programming skills (Matlab, Fortran, C, Python, Julia, or any similar).	
Enrolment in Doctoral degree(s): UPM (Department of Aircrafts, School of Aeronautical Engineering and Space)—PhD in Engineering Science. Main UPM Supervisor: Prof. Francisco J. Montans. If all additional UF PhD requirements are met, there is also a possibility of obtaining a PhD by University of Florida (Dept. of Mechanical and Aerospace Engineering, Main UF Supervisor: Prof. Nam-Ho Kim).	

Fellow: ESR10	Host: UPM
Project Title Proposal: Non-homogeneous metamaterial optimisation for 3D printed components	
Purpose and Objectives: The purpose is to develop MM geometry optimisation tools which can be used in conjunction to the optimisation tool of ESR9 to optimise the whole metamaterial component in the dual scale (MM geometry + component geometry). ESR9 and ESR10 will work in close collaboration.	
Expected Results: Topological optimisation software code accounting for the metamaterial cell compatibility.	
Degree requirements: MS in Mechanical Engineering, Mathematics (applied), Physics or related field. **Additional skills:** Communication skills. Programming skills (Matlab, Fortran, C, Python, Julia, or any similar).	
Enrolment in Doctoral degree(s): UPM (Department of Aircrafts, School of Aeronautical Engineering and Space)—PhD in Engineering Science. Main UPM Supervisor: Prof. Francisco J. Montans. If all additional UF PhD requirements are met, there is also a possibility of obtaining a PhD by University of Florida (Dept. of Mechanical and Aerospace Engineering, Main UF Supervisor: Prof. Nam-Ho Kim).	