TAIWAN PROGRAM 2019

EXPRESSIONS OF INTEREST

CSIC SCIENTIFIC SUPERVISOR:	
Francisca Garcia Caballero	
EMAIL: fgc@cenim.csic.es	**PHONE NUMBER: +34 915538900**
INSTITUTE/CENTER NAME: Spanish National Centre for Metals Research (CENIM-CSIC)	
ADDRESS: Avda Gregorio del Amo, 8. E-28040 Madrid (Spain)	
BRIEF DESCRITION OF THE RESEARCH GROUP: Name of the Group: Phase Transformation in Steels-MATERALIA Currently, the MATERALIA Group maintains a leadership position at the Spanish level and an important international visibility in the field of phase transformations in steels. Its main objective is to understand the relationship among the steel processing, its structure and its mechanical properties. In this regard, they investigate the transformation mechanisms, characterize the structure of the material from the micro to the nano-scale and develop simulation tools that allow describing the physics and chemistry that govern the processes of transformation of steel and its properties under real conditions of use. In addition, this Group maintains a close relationship with the metallurgical industry for the design and development of steels for highly demanding applications. This relationship with industry, especially successful in the development of nanostructured bainitic steels, has allowed them to validate many of their computational design tools and techniques.	
CENTER/RESEARCH GROUP'S WEBSITE: http://www.cenim.csic.es/index.php/presentacion-materalia	
NUMBER OF STUDENTS WILLING TO WELCOME: 1	
BRIEF DESCRITION OF THE STUDENT ACADEMIC BACKGROUND:	
Students should have a Master's degree and/or Bachelor's degree with a strong background in applied physics/ materials science/ mechanical engineering or closely related subjects. Candidates with research experience or Master degree in physical metallurgy and/or phase transformation in steels materials are strongly encouraged to apply. Effective English speaking and writing skills are essential.	

BRIEF DESCRIPTION OF THE STUDENTS TASK:

Project Title: Microstructures of steels manufactured by SLM printing (Selective Laser Melting)

Selective laser melting, known as SLM printing, is an additive manufacturing method specially developed for 3D printing of metal alloys. This process allows manufacturing pieces with complex shapes from the successive printing of layers of material starting from a digital model. It is a technique increasingly used in fields such as power generation, the aerospace industry, healthcare and the automotive transport sector. However, to enhance its progress it is necessary to study its viability in different types of alloys. In this work we propose the study of the effect of additive printing parameters by SLM in new steels. A study of phase transformations and microstructural characterization will be carried out, paying special attention to the morphological characteristics of the different phases. High-resolution dilatometry will be used for this study, along with X-ray diffraction and optical and scanning electron microscopy

The student will carry out the following research activities:

• Characterization by optical and scanning electron microscopy of steels manufactured by SLM printing.

• Quantification of phases and micro-constituents by X-ray diffraction analysis and stereological methods.

• Study of the relationship between the microstructure and the properties of these steels.

• Dissemination of research results.

€1000 FOR LIVING EXPENSES WILL BE THE FINANCIAL CONTRIBUTION FROM THE CSIC CENTER TO THE STUDENTS

Responsible Researcher: **Center Director:**

Francisca Garcia Caballero   Jose Luis Gonzalez Carrasco

ICU Manager:

Marta del Moral