# Position Offered: UNIVERSITY GRADUATE

# Project: InteliMetal: Artificial Intelligence and machine learning for applications in metallurgy

**Technological and scientific fields:** Artificial Intelligence, Massive Data and Information Processing Technologies, High Performance Computing, 3D Printing and Additive Manufacturing, New Materials

Location: Madrid, Comunidad de Madrid, CENIM-CSIC, https://www.cenim.csic.es/

**Research Group/PI:** Grupo Materalia, Isaac Toda Caraballo, <u>https://www.cenim.csic.es/group-members</u>

### PROJECT SUMMARY

The scientific objective of the project is the development of a computational methodology based on Artificial Intelligence (AI) and Machine Learning (ML) techniques for the calculation of thermal profiles in metal parts manufactured with 3D printing (Additive Manufacturing). This will allow the establishment of a broad knowledge of computational techniques at CENIM, such as ML, massive calculation processes, optimisation techniques, statistical analysis and data mining, in conjunction with thermodynamic simulations, which will serve the Digital Laboratory of Physical Metallurgy. The specific objectives of the project are:

1) To develop computational procedures to build a methodology to optimise geometries and printing parameters, with the aim of improving the microstructure and properties of material produced by additive manufacturing.

2) To establish a broad knowledge of digital tools and ML that will bring these methods to a wide range of researchers in the centre.

3) To train qualified personnel to be assigned to the new Digital Laboratory and the Scientific and Technical Service aimed at promoting digital technologies at the centre.

### PROFESSIONAL PROFILE

#### Minimum requirements:

Master Degree in scientific areas (Physics, Mathematics, Chemistry), Materials Engineering, Industrial Engineering or Computer Science.

Good level of English.

Knowledge of calculus, mathematics or computing techniques and programming languages: essential Python.

#### Merits to be considered:

Desirable knowledge of Matlab, standard machine learning library packages and operating systems.

## WHAT IS OFFERED

The contract has a duration of 4 years, and the project will provide professional and personal development in the field of the use of AI and ML techniques applied to physical problems, currently in high demand, such as 3D printing. The competences will be developed during the project, where an important training activity will be carried out, both technical and for the development of the research career, which will be completed with several stays in international research centres. All together, this will correspond to 240 ECTS.

#### Contract conditions:

Indefinite contract for a University Graduate associated with the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary  $(37.000 \in -41.000 \in)$ .

## Start of contract: before 31 December 2024

## PRINCIPAL INVESTIGATOR CONTACT

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