

LMS Seminars 2024 – 25

Metallurgy meets architecture: Unlocking the potential of 3D printed metamaterials

María Teresa Pérez Prado

Sustainable Metallurgy group, IMDEA Materials Institute, Spain

Date and Time: March 13, 2025 (2 – 3 pm)

Venue: Amphi 104 (Pole Meca)

Abstract

The design of architected materials has become a well-established approach for creating components with properties that far surpass those of bulk materials. The fabrication of such complex structures has been made possible by significant advancements in additive manufacturing techniques, particularly laser powder bed fusion. The resulting mechanical metamaterials are being widely applied in lightweight structural components and strength enhancement, as well as in optical and electromagnetic applications. More recently, they have also gained significant interest in the biomedical field as advanced scaffolds for tissue engineering. This seminar will first demonstrate how the strategic integration of architecture and metal microstructure enables the development of metamaterials with exceptional damage tolerance. Additionally, it will highlight how 3D-printed structures can serve as testing platforms for investigating metallurgical phenomena at the atomic scale, such as dynamic strain aging.

About the speaker

Dr. Teresa Pérez Prado, Senior Scientist, heads since 2008 the Sustainable Metallurgy group at IMDEA Materials Institute. Teresa was Division Leader between 2014 and 2017 and Deputy Director between 2017 and 2021. From 2018 to 2022 she coordinated the programme on Structural Materials at the Spanish National Science Foundation. Dr. Pérez-Prado got a PhD in Physics at the Complutense University in Madrid in 1998 and an MBA at INSEAD, France, in 2008. After a 2 year postdoctoral stay at the University of California in San Diego, USA, she joined the National Center for Metals Research (Madrid, Spain) in 2001, where she worked as a tenure-track fellow until she was granted a Tenured Scientist position in 2004. Dr. Pérez-Prado has coauthored 150 papers (h 51, \approx 10K citations (Google Scholar)), 1 book (Elsevier, 2004) and 3 patents. Teresa has been a member of the Scientific Council of the Nomaten Center of Excellence (Poland, until 2023), the IRT Jules Verne (France, until 2024), the Henry Royce Institute (UK), and the European Space Agency (ESA, until 2024).

