

Professor Zidong Wang awarded Horizon 2020 funding for INTEGRADDE Project

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Professor Zidong Wang from the Department of Computer Science has been awarded Horizon 2020 funding for a project entitled "Intelligent data-driven pipeline for the manufacturing of certified metal parts through Direct Energy Deposition" (INTEGRADDE). The 12.7 million Euro project conducted with 24 European partners.

Industrialisation of Additive Manufacturing (AM) which requires a holistic data management and integrated automation. INTEGRADDE aims to develop an end-to-end Digital Manufacturing solution, enabling a cybersecured bidirectional dataflow for a seamless integration across the entire AM chain. The goal is to develop a new manufacturing methodology capable of ensuring the manufacturability, reliability and quality of a target metal component from initial product design via Direct Energy Deposition (DED) technologies, implementing a zero-defect manufacturing approach ensuring robustness, stability and repeatability of the process. To achieve this aim, INTEGRADDE addresses following key innovations:

- Development of an intelligent data-driven AM pipeline.
- Combination of automatic topology optimisation algorithms for design, multi-scale process modelling, automated hardware-independent process planning, online control and distributed NDT for the

manufacturing of certified metal parts.

- A self-adaptive control is adopted focused on the implementation of non-propagation of defects strategy. Moreover, Data Analytics will provide a continuous refinement by acquiring process knowledge to assist in the manufacturing of new metal components, improving right-first-time production by adopting a mass customization approach

- Cybersecurity ensures data integrity along the AM workflow, providing a novel manufacturing methodology for the certification of metal AM parts.

INTEGRADDE implements a twofold deployment approach for the pilot lines: both in application-driven at five industrial end-users (steel, tooling, aeronautics, and construction) and open-pilot networks at RTOs already owning AM infrastructure (AIMEN, IREPA, CEA, WEST). This will allow a continuous validation and deployment of specific developments towards industrialization, boosting definitive uptake of AM in EU metalworking sector.

Dr Stasha Lauria and Professor XiaoHui Liu from the Department of Computer Science at Brunel are also Co-Investigators on the project.