



THE UNIVERSITY *of* EDINBURGH

School of Engineering

IMP seminar

13:00-14:00, Thursday 6 April

Sanderson Classroom 3

Introduction to metal additive manufacturing and its sustainable recycling goals

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Abstract

Metal AM techniques are recently gaining traction owing to their ability to economically build bulk 3-D components with reasonable geometrical fidelity. On the other hand, conventional manufacturing techniques generate massive scraps in the form of swarf and other metal debris, thereby causing environmental degradation. This has aroused the keen interest of researchers and industrial players to break this barrier and enable additive manufacturing as a complementary process to conventional manufacturing methods. In this context, several attempts have been made to reuse the swarf as a feedstock material and reduce the consumption of natural resources. This presentation will cover the fundamentals of various metal AM processes, their process capabilities and their future scopes. This will be followed by how AM and other supplementary technologies will revolutionize the reusing and recycling of metal debris particulates. Then special emphasis will be placed on delivering the bottlenecks in reusing and recycling swarf materials. Finally, emerging sustainable AM techniques are highlighted.

BIO

Dr. V. Chakkravarthy, has received his PhD from Department of Metallurgical and Materials Engineering, National Institute of Technology, Tiruchirappalli, India. He acquired his postdoctoral research experience from Indian Institute of Technology Madras, India and developed an Internet of Things (IoT) based sensor technology for improving precision and positional accuracy of laser based direct energy deposition (Laser-DED) technique. Presently he is a research fellow at Cranfield University and working in the field of sustainable AM under UKRI and Boeing funded project. His main researches interest includes developing functionally graded materials, biomimetic porous scaffolds, 3-D lattice structures and high entropy alloys via digital manufacturing routes. He has acquired over 5yrs of experience in various characterization skills such as Electron backscattered Diffraction (EBSD), Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), biotribocorrosion, X-ray Photon Spectroscopy (XPS), high cycle fatigue, metal induced cytotoxicity, high temperature corrosion, tissue engineering, cell culture, and protein synthesis. He has won several best presenter awards in various international conferences. Also, he has published a wide range of top peer reviewed journals in diverse engineering domains that includes wire arc additive manufacturing, biomedical implant fabrication, hot corrosion, ultrasonic squeeze casting technology, energy engineering and robotics.

