

1. The Title of AM Symposia Embedded in ESIAM19

- *Topic 19: Symposium on Metal Additive Manufacturing and Engineering Structural Integrity: Part 1 – Titanium alloys*
- *Topic 20: Symposium on Metal Additive Manufacturing and Engineering Structural Integrity: Part 2 – High-Temperature Materials*

2. Introduction and Configuration of AM Symposia

These two symposia aim to provide a discussion forum for both fundamental aspects and practical applications of additively manufactured (AM) parts/components. The need for this arises from the fact that AM is moving into the production of more heavily loaded safety-critical components and improved understanding of the material performance and structural integrity assessment is essential. We endeavour to create a multi-disciplinary invited keynote, oral and poster presentations that cover the research fields ranging from AM powders production and characterisation, electron beam and laser-based AM processing and manufacturing process simulation, to AM part life prediction. These two symposia are organised in such a way as to bring together both early-career and well-established researchers who are engaged in the field of additive manufacturing and engineering structural integrity. 2 sessions per topic (#19 and #20) are allocated to the full afternoon on Monday 9th and Tuesday 10th Sept 2019. It is expected that ~30 selected conference papers will be presented. Each presenter will be given 15 minutes to present their slides as well as discussion and exchange with the audience, animated by the chair and co-chair of the session.

3. Symposia Chair and Session Co-chairs



Chair

Prof Bo Chen, EPSRC Early-Career Research Fellow, Coventry University / University of Leicester

Bio: Bo received his PhD from University of Bristol in 2011 in solid mechanics before taking two PDRA posts at Bristol and then at Manchester. He joined Coventry in 2015 as Lecturer, was promoted to a Senior Lecturer in 2017. He then moved to University of Leicester by taking a Professorship in 2019. His research on AM focuses on the microstructure and mechanical performance of electron beam melted high-performance titanium and nickel-base alloys.



Session Co-chair

Prof Xiang Zhang, Professor in Structural Integrity, Coventry University

Bio: She obtained her PhD in 1991 at the Imperial College London and continued as a PDRA until 1996. This was followed by academic appointments at Cranfield University until 2014 before joining Coventry in 2015. She received the Helmholtz International Fellow Award in 2016. Her research focus is on fatigue and fracture. Her research in the AM structural integrity has led to an invited talk at the ASTM Symposium on Structural Integrity of AM Parts.



Session Co-chair

Dr Tyler London, Team Manager, TWI Ltd.

Bio: Tyler is the Manager for Numerical Modelling and Optimisation at TWI Ltd, an international R&D and consultancy organisation focusing on materials, joining and structural integrity technologies. Tyler joined TWI in 2010 and has experience applying finite element modelling to a range of engineering disciplines including fracture mechanics, optimisation and manufacturing. In terms of AM, his manufacturing process simulations cover laser powder bed fusion, wire arc additive and direct energy deposition.



Session Co-chair

A/Prof Daniel Fabijanic, Deakin University

Bio: Daniel is a physical metallurgist and leads the surface engineering group at Deakin University. He is Chief Investigator on numerous large national projects (total ~\$15M) that focus on alloy development and novel surface engineering techniques for the mining and aerospace sectors. Specific current AM projects include the development of 3D printable high entropy alloys for high temperature applications and difficult-to-print β -Ti alloys and MMCs.

4. Invited Keynote Speakers



Dr Teresa Perez-Prado, Deputy Director at IMDEA Materials Institute

Keynote paper – Powder fabrication and characterisation of Ti-based alloys for additive manufacturing

Teresa's research on AM focuses on the design of new alloys which can lead to components with outstanding mechanical performance. Her lab has capabilities for gas atomisation, SLM, post-processing and characterisation. Alloy systems include high-strength Al alloys, Ti alloys, intermetallics and superalloys. She is a member of the advisory board of pre-eminent conferences including ICSAM, ICSMA, THERMEC and is regular keynote and invited speakers. She has published >110 peer reviewed journal papers, 1 book and has 3 patents.



Dr Thorsten Becker, Associate Professor at Stellenbosch University

Keynote paper – On the structural integrity of additive manufactured Ti6Al4V: materials, process and build attributes for part life predictions

Thorsten runs the Materials Engineering research group in the Department of Mechanical and Mechatronics Engineering at Stellenbosch. His research focuses on using novel experimental and numerical characterisation techniques to investigate the material performance for a large range of metals and alloys. He works closely with local as well as international institutions on AM, material creep and fracture mechanics. He also serves on the chairman of Rapid Product Development Association of South Africa.



Dr Tyler London, Team Manager, TWI Ltd.

Keynote paper – Additive manufacturing process simulations: from microstructure to distortion

Tyler is the Manager for Numerical Modelling and Optimisation at TWI. His main research area has been process simulations for laser powder bed fusion, wire arc additive and direct energy deposition. The focus of his models is very much about taking recent low TRL technologies and applying them in industry-relevant situations so that we can leverage emerging modelling capabilities to help achieve immediate impacts in the wider adoption and certification of AM parts. The models cover multiple scales: from part-level distortion predictions to solidification and microstructural evolution.



Prof Hongbiao Dong, Research Chair of RAEng, University of Leicester

Keynote paper – Solidification of Nb-Si-Ti alloys manufactured by laser additive manufacturing

Hongbiao is internationally renowned for his work in metal processing, manufacturing informatics, solidification and its application in casting, welding and AM of metals and alloys. The research in his team aims to bring knowledge-inspired decision making to the production routes of high value-added components that include aero-engine turbine blades. He has expertise in experimental and modelling study of structure evolution and defect formation during casting and welding. He is also the science director of EPSRC CDT in Innovative Metal Processing.

5. Symposia Organisers and Co-badge Partners

These two AM symposia are organised by Prof Bo Chen, EPSRC Early-Career Research Fellow. The symposia co-organiser is UK's Forum for Engineering Structural Integrity (FESI). The co-badged partner organisations include TWI, National Structural Integrity Research Centre (NSIRC), Manufacturing Technology Centre (MTC), Nuclear Advanced Manufacturing Research Centre (Nuclear-AMRC), and Lloyd's Register Foundation. Bo Chen acknowledges financial supports by the UK's Engineering and Physical Sciences Research Council, EPSRC (EP/P025978/1 and EP/R043973/1) for facilitating this AM research impact workshop organisation.



Forum for Engineering Structural Integrity



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MANUFACTURING**



Lloyd's Register
Foundation

6. Key Contacts

To find out more about the two symposia please contact **Prof Bo Chen:** bo.chen@leicester.ac.uk and/or **Prof Filippo Berto:** filippo.berto@ntnu.no for an informal discussion.