

Time (CEST)		Programme: Tuesday 21 st September 2021	
12:50 – 13:00	Meeting opening for connection		
13:00 – 13:05	Welcome address: Richard Leach, euspen Vice President		
13:05 – 13:15	Welcome address by meeting chair: John Taylor, University of North Carolina at Charlotte, US		
13:15 – 13:45	Keynote 1: Next generation design for additive manufacturing and how the technologies need to adapt <i>Bernhard Mueller, Fraunhofer IWU, DE</i>		
13:45 – 14:45	Session 1: Industrial application & process optimization		
CHAIR	John Taylor		
	13:45	Printing miniature valves by micro-SLA for soft robotics <i>Florent Boudoire, CSEM, CH</i>	
	14:00	Influence of the CNC behaviour on the laser spot trajectory in LPBF process <i>Kévin Godineau, ENS Paris-Saclay, FR</i>	
	14:15	Toward specification of complex additive manufactured metal surfaces for optimum heat transfer <i>Kuldeep Mandloi, University of North Carolina at Charlotte, US</i>	
	14:30	Surface topography process signatures in nickel superalloy 625 additive manufacturing <i>Jason Fox, National Institute of Standards and Technology, US; Angela Allen, UNC Charlotte, US; Brigid Mullany, UNC Charlotte, US; Edward Morse, UNC Charlotte, US; Romaine Isaac, Zeiss, US; Marc Lata, UNC Charlotte, US; Aarush Sood, UNC Charlotte, US; Chris Evans, UNC Charlotte & NIST, US</i>	
14:45 – 15:05	Coffee and debate on Industrial application & process optimization		
15:05 – 15:20	Coffee break		
15:20 – 15:50	Keynote 2: Transforming the supply chain of metal components for industrial gas turbines through the new possibilities of additive manufacturing <i>Marco Salvisberg, GF Casting Solutions, CH</i>		
15:50 – 16:35	Session 2: Integration of AM into a holistic manufacturing process		
CHAIR	Geoff McFarland		
	15:50	Improving additive manufactured surfaces properties with post processing techniques <i>Matthieu Rauch, Centrale Nantes, FR</i>	
	16:05	Computer vision based zero point estimation for hybrid builds in metal additive manufacturing <i>Jakob Wilm, University of Southern Denmark, DK</i>	
	16:20	Accuracy and microstructure of additively manufactured and post-machined parts <i>Hans-Christian Moehring, Institute for Machine Tools – University of Stuttgart, DE</i>	
16:35 – 16:55	Coffee and debate on Integration of AM into a holistic manufacturing process		

Time (CEST)	Programme: Wednesday 22 nd September 2021
09:00 – 09:25	SOTA: Precision engineering challenges in micro/nanoscale additive manufacturing <i>Michael A. Cullinan, University of Texas at Austin, US</i>
09:25 – 09:55	Session 3: Focus on micro-nano
CHAIR	Michael A Cullinan
09:25	Insights into challenges and potentials of two-photon lithography <i>Stefan Kühne, TU Berlin, DE</i>
09:40	Characterizing shrinkage and quality of ceramic two-photon printed microstructures <i>John Cortes Gutierrez, Lawrence Livermore National Laboratory, US</i>
09:55 – 10:10	Coffee and debate on Focus on micro-nano
10:10 – 10:40	Session 4: Focus on lattice structures (Part 1)
CHAIR	Filippo Zanini
10:10	Direct additive manufactured beam shape defect identification from computed tomography and modal decomposition <i>Marc-Antoine de Pastre, LURPA, ENS Paris-Saclay, FR</i>
10:25	A two step modelling approach to limit the exploitable AM parameter space and optimized parameter selection for finest lattice structures using LPBF <i>Hannes Korn, Fraunhofer Institute for Machine Tools and Forming Technology IWU, DE</i>
10:40 – 11:00	Coffee break
11:00 – 11:45	Session 4: Focus on lattice structures (Part 2)
11:00	Influence of the processing parameters on the dimensional accuracy of In625 lattice structures made by laser powder bed fusion <i>Lucas Fournet-Fayard, LNE, FR</i>
11:15	Design and measurement strategy of additive manufacturing lattice benchmark artefact <i>Mohamed Younes Chahid, University of Huddersfield, UK</i>
11:30	Testing the similarity conditions in the CT measurement of additively manufactured lattice structures <i>Maxwell Praniewicz, National Institute of Standards and Technology, US</i>
11:45 – 12:10	Coffee and debate on Focus on lattice structures
12:10 – 12:45	Lunch break
12:45 – 13:00	Commercial Session <ul style="list-style-type: none"> • Renishaw • Taraz Metrology • GrindoSonic BV

13:00 – 14:00 Poster Session

CHAIR Adam Thompson

Surface irregularities of metal SLM part with different surface inclinations and their impact on surface texture characterization

Shubhavardhan Ramadurga Narasimharaju, EPSRC Future Metrology Hub – University of Huddersfield, UK

Topology optimization for additive manufacturing

Didier Talamona, Nazarbayev University, KZ

Precise additive methods applications in micro and nano – parts manufacturing – a review

Adam Ruszaj, Cracow University of Technology, PL

Prediction of dimensional accuracy and warpage of additive manufactured parts using finite element model

Daniyar Syrlybayev, Nazarbayev University, KZ

Micro-replication of high precision optically enhanced moulds fabricated by multiphoton polymerization

Sara Maria Vidal Álvarez, AIMEN, ES

High-resolution X-ray computed tomography for additive manufacturing: Towards traceable porosity defect measurements using digital twins

Benjamin A. Bircher, Federal Institute of Metrology METAS, CH

Impulse excitation technique for improved inspection in additive manufacturing

Juan Jose Bustos, Grindosonic, BE

Dimensional accuracy of an artifact for rapid casting

Muslim Mukhtarkhanov, Nazarbayev University, School of Eng and Digital sciences, KZ

Enhancing surface finish consistency by novel ECM process on SLM AM components

Ahmed Tawfik, Huddersfield University, UK

Application of metal additive manufacturing material extrusion in the production of tool inserts for polymer profile extrusion die surface roughness investigation

Martin Kain, Technical University of Denmark, DK

14:00 – 14:25 **SOTA: In-process measurement methods for defect identification in metal powder bed fusion**

Afaf Remani, University of Nottingham, UK

14:25 – 14:55 **Session 5: In-process metrology and data fusion (Part 1)**

CHAIR Richard Leach

14:25 Smart machines for fused filament fabrication based on multi-sensor data fusion, digital twins and machine learning

Arianna Rossi, University of Perugia, IT

14:40 Fast measurement of metal laser powder bed fusion layer surfaces using light scattering and principal component analysis

Mingyu Liu, University of Nottingham, UK

14:55 – 15:15 **Coffee break**

15:15 Stereo camera based in-situ monitoring of L-PBF process stability by spatter detection

Daniel Brummerloh, Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT, DE

15:30 Design of a multi-sensor measurement system for in-situ defect identification in metal additive manufacturing

Afaf Remani, University of Nottingham, UK

15:45 Establishing an analytical framework of fringe projection with enhanced measurement performance specifically for powder bed fusion additive manufacturing process

Yubo Xiong, University of Pittsburgh, US

16:00 – 16:30 Coffee and debate on In-process metrology and data fusion

Time (CEST)

Programme: Thursday 23rd September 2021

09:00 – 09:30 **Keynote 3: Evaluation of hybrid AM technology chains considering process accuracies for the integration into industrial production**
Martin Schaefer, Siemens AG, DE

09:30 – 09:55 **SOTA: Machine learning for precision engineering**
Joe Eastwood, University of Nottingham, UK

09:55 – 10:25 **Session 6: Metrology (Part 1)**

CHAIR **Liam Blunt**

09:55 **Direct part density inspection in laser powder bed fusion using eddy current**
Adriaan Spierings, Inspire AG – innovation centre for additive manufacturing, CH

10:10 **Analysis of metal powder geometrical characteristics influencing the quality of additively manufactured parts**
Filippo Zanini, University of Padova, IT

10:25 – 10:45 **Coffee break**

10:45 – 11:45 **Session 6: Metrology (Part 2)**

10:45 **Comparison of dimensional measurements from images acquired by synchrotron tomography with VGSTUDIO MAX and ImageJ**
Charles Cayron, LNE, FR

11:00 **Quantifying the influence of local porosity on the colour differences of dyed laser sintered polyamide-12 with X-ray CT**
Simon Bellens, Materialise NV, BE

11:15 **Characterisation of high speed sintering surface topography with re-entrant open surface pores using 3D surface texture parameters and material ratio curve**
Shan Lou, Future Metrology Hub, University of Huddersfield, UK

11:30 **Exploratory research on the correlation of probability of detection and image quality during the tomographic characterisation of additive manufacturing defects**
Mirko Sinico, KU Leuven, BE

11:45 – 12:15 **Coffee and debate on Metrology**

12:15 – 12:35 **Closing remarks** by Richard Leach, University of Nottingham & John Taylor, University of North Carolina at Charlotte, US

Event sponsor:

GrindoSonic
THE IMPULSE EXCITATION TECHNIQUE

 **TARAZ**
metrology

RENISHAW
apply innovation™

 American Society for
Precision Engineering

 **euspén**