

ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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PROGRAM OVERVIEW & TIMETABLE

Click on any symposium / keynote / panel title to jump directly to the list of presentations.

	MONDAY 30 OCTOBER 2023	TUESDAY 31 OCTOBER 2023	WEDNESDAY 1 NOVEMBER 2023	THURSDAY 2 NOVEMBER 2023	FRIDAY 3 NOVEMBER 2023
AM	<ul style="list-style-type: none"> ▶ AM FOR SPACE APPLICATIONS ▶ GENERAL TOPICS IN AM ▶ AM APPLICATIONS IN AVIATION ▶ NON-DESTRUCTIVE EVALUATION METHODS FOR AM ▶ AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION, AND REUSE ▶ MECHANICAL TESTING OF AM MATERIALS ▶ AM APPLICATIONS FOR AUTOMOTIVE TRANSPORTATION/HEAVY MACHINERY ▶ STUDENT PRESENTATION COMPETITION 01 ▶ STUDENT PRESENTATION COMPETITION 02 ▶ STUDENT PRESENTATION COMPETITION 03 ▶ STUDENT PRESENTATION COMPETITION 05 ▶ KEYNOTE 01 – AVIATION ▶ PANEL 01 – AVIATION 	<ul style="list-style-type: none"> ▶ AM FOR SPACE APPLICATIONS ▶ GENERAL TOPICS IN AM ▶ AM APPLICATIONS IN AVIATION ▶ INDUSTRY 4.0: ROBOTICS AND AUTOMATION IN AM ▶ ECONOMICS AND SUSTAINABILITY OF AM ▶ NON-DESTRUCTIVE EVALUATION METHODS FOR AM ▶ AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION, AND REUSE ▶ MECHANICAL TESTING OF AM MATERIALS ▶ DIRECTED ENERGY DEPOSITION PROCESSES AND APPLICATIONS ▶ APPLICATION OF AM IN ENERGY, MARITIME, AND OIL & GAS ▶ KEYNOTE 03 – SPACE ▶ PANEL 03 – INSPECTION ▶ PANEL 04 – I4.0 	<ul style="list-style-type: none"> ▶ FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS ▶ GENERAL TOPICS IN AM ▶ AM FOR DEFENSE APPLICATIONS ▶ MODELING, SIMULATION, AND DIGITAL TWINS FOR QUALIFICATION AND CERTIFICATION ▶ INDUSTRY 4.0: DATA MANAGEMENT FOR AM ▶ ENVIRONMENTAL EFFECTS ON AM ALLOYS AND PARTS ▶ PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM ▶ MICROSTRUCTURAL ASPECTS OF AM ▶ MECHANICAL TESTING OF AM MATERIALS ▶ DIRECTED ENERGY DEPOSITION PROCESSES AND APPLICATIONS ▶ APPLICATION OF AM IN ENERGY, MARITIME, AND OIL & GAS ▶ KEYNOTE 05 – DEFENSE ▶ PANEL 06 – ECONOMICS ▶ PANEL 07 – MEDICAL 	<ul style="list-style-type: none"> ▶ FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS ▶ APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND ▶ AM FOR DEFENSE APPLICATIONS ▶ AM OF NON-METALLIC MATERIALS ▶ INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN AM ▶ SINTER-BASED AM TECHNOLOGIES ▶ PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM ▶ MICROSTRUCTURAL ASPECTS OF AM ▶ DESIGN FOR AM ▶ INDUSTRY 4.0: SECURITY ASPECTS OF AM ▶ APPLICATION OF AM IN THE MEDICAL INDUSTRY ▶ KEYNOTE 07 – CONSTRUCTION ▶ PANEL 09 – CONSTRUCTION 	<ul style="list-style-type: none"> ▶ FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS ▶ APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND ▶ AM OF NON-METALLIC MATERIALS ▶ INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN AM ▶ SINTER-BASED AM TECHNOLOGIES ▶ MICROSTRUCTURAL ASPECTS OF AM ▶ DESIGN FOR AM ▶ APPLICATION OF AM IN THE MEDICAL INDUSTRY
PM	<ul style="list-style-type: none"> ▶ AM FOR SPACE APPLICATIONS ▶ GENERAL TOPICS IN AM ▶ AM APPLICATIONS IN AVIATION ▶ NON-DESTRUCTIVE EVALUATION METHODS FOR AM ▶ AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION, AND REUSE ▶ MECHANICAL TESTING OF AM MATERIALS ▶ STUDENT PRESENTATION COMPETITION 01 ▶ STUDENT PRESENTATION COMPETITION 02 ▶ STUDENT PRESENTATION COMPETITION 03 ▶ STUDENT PRESENTATION COMPETITION 04 ▶ STUDENT PRESENTATION COMPETITION 05 ▶ KEYNOTE 02 – TRANSPORTATION ▶ PANEL 02 – Q&C 	<ul style="list-style-type: none"> ▶ AM FOR SPACE APPLICATIONS ▶ GENERAL TOPICS IN AM ▶ AM APPLICATIONS IN AVIATION ▶ MODELING, SIMULATION, AND DIGITAL TWINS FOR QUALIFICATION AND CERTIFICATION ▶ INDUSTRY 4.0: ROBOTICS AND AUTOMATION IN AM ▶ ECONOMICS AND SUSTAINABILITY OF AM ▶ NON-DESTRUCTIVE EVALUATION METHODS FOR AM ▶ AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION, AND REUSE ▶ MECHANICAL TESTING OF AM MATERIALS ▶ DIRECTED ENERGY DEPOSITION PROCESSES AND APPLICATIONS ▶ APPLICATION OF AM IN ENERGY, MARITIME, AND OIL & GAS ▶ KEYNOTE 04 – R&A ▶ PANEL 05 – SPACE 	<ul style="list-style-type: none"> ▶ FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS ▶ GENERAL TOPICS IN AM ▶ AM FOR DEFENSE APPLICATIONS ▶ MODELING, SIMULATION, AND DIGITAL TWINS FOR QUALIFICATION AND CERTIFICATION ▶ INDUSTRY 4.0: DATA MANAGEMENT FOR AM ▶ ENVIRONMENTAL EFFECTS ON AM ALLOYS AND PARTS ▶ PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM ▶ MICROSTRUCTURAL ASPECTS OF AM ▶ DESIGN FOR AM ▶ DIRECTED ENERGY DEPOSITION PROCESSES AND APPLICATIONS ▶ APPLICATION OF AM IN THE MEDICAL INDUSTRY ▶ KEYNOTE 06 – ENERGY ▶ PANEL 08 – ENERGY 	<ul style="list-style-type: none"> ▶ FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS ▶ APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND ▶ AM OF NON-METALLIC MATERIALS ▶ INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN AM ▶ SINTER-BASED AM TECHNOLOGIES ▶ PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM ▶ MICROSTRUCTURAL ASPECTS OF AM ▶ DESIGN FOR AM ▶ APPLICATION OF AM IN THE MEDICAL INDUSTRY ▶ KEYNOTE 08 – MEDICAL ▶ PANEL 10 – DEFENSE / GOV. 	<ul style="list-style-type: none"> ▶ APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND

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STUDENT PRESENTATION COMPETITION 01

30TH OCT 2023 (MON)
CONCORD (BALLROOM LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM + PM SESSIONS):

Nik Hrabe, NIST

- 08:00 AM STUDENT** **Leveraging Quantitative Fractography to Estimate Defect Severity from the X-Ray Computed Tomography of Additively Manufactured Titanium**
[Ian J. Wietecha-Reiman](#)¹; Todd A. Palmer¹;
¹Pennsylvania State University
- 08:15 AM STUDENT** **Development of a Geopolymer Concrete Mix Design for Additive Manufacturing and Thermal Analysis of Incorporating Encapsulated Phase Change Material**
[Shawn A. Khokher](#)¹; Paola Sanguinetti²; Mario Medina¹; John Striebel¹; ¹University of Kansas
- 08:30 AM STUDENT** **Improved Evaluation of Extreme Defects in AlSi10Mg Components Realized by L-PBF by Means of AI Categorization on XCT Data**
[Giuliano Minerva](#)¹; ¹Politecnico di Milano
- 08:45 AM STUDENT** **The Role of Nano-Oxides in the Fracture of Ni-Based Alloys Fabricated by Laser-Powder Bed Fusion (LPBF)**
[Marc D. Peters](#)¹; Erin G. Brodie¹; Michael Brameld²; Lee Djumas²; Christopher Hutchinson¹; ¹Monash University; ²Woodside Energy
- 09:00 AM STUDENT** **Enabling Concurrent Reinforcement during 3D Concrete Printing (3DCP) to Create Spanning Structures using Tensile Cables**
[Ali Baghi](#)¹; Shadi Nazarian¹; Jose P. Duarte¹;
¹Pennsylvania State University
- 09:15 AM STUDENT** **Influence of PA-12 Powder Re-Use on Process-Relevant Powder Characteristics and Laser Sintered Part Properties**
[Benjamin Sanders](#)^{1,2}; Mike Jenkins¹; Edward Cant²; Hoda Amel²; ¹University of Birmingham; ²The Manufacturing Technology Centre (MTC)
- 09:30 AM STUDENT** **Site-Specific Residual Stress and Microstructure Control in 316 Stainless Steel via Laser Additive Manufacturing with Interlayer Peening**
[Abeer Mithal](#)¹; Sridhar Idapalapati¹; Niroj Maharjan²; ¹Nanyang Technological University (NTU); ²A*STAR - Advanced Remanufacturing and Technology Centre (ARTC)

- 09:45 AM STUDENT** **A Time-Dependent Rheology-Based Analysis to Understand Filament Morphology in Extrusion-Based 3D Printing of Cementitious Materials**
[Yu Jiang](#)¹; Abir Al-Tabbaa¹; Ronan Daly¹;
¹University of Cambridge
- 10:00 AM BREAK**
- 10:30 AM STUDENT** **Quantitative 3D Melt Pool Characterization using Focused Ultrasound**
[Lauren E. Katch](#)¹; Nathan J. Kizer¹; Lovejoy Mutswatiwa¹; Tao Sun²; Samuel J. Clark³; Jordan S. Lum⁴; Xiaoyu Xie⁵; Wing Kam Liu⁵; Andrea Arguelles¹; David M. Stobbe⁴; Christopher M. Kube¹; ¹Pennsylvania State University; ²University of Virginia; ³Argonne National Laboratory (ANL); ⁴Lawrence Livermore National Laboratory (LLNL); ⁵Northwestern University
- 10:45 AM STUDENT** **Tensile Behaviour of Wire Arc Additively Manufactured High Strength Steels**
[Ben Weber](#)¹; Xin Meng¹; Leroy Gardner¹;
¹Imperial College London
- 11:00 AM STUDENT** **Manufacturing of Soft Dielectric Actuators by Multi-Material Fused Filament Fabrication**
[Ivan Raguž](#)^{1,2}; Sandra Schlögl¹; Joost Brancart³; Bram Vanderborgh³; Clemens Holzer²; Michael Berer¹; ¹Polymer Competence Center Leoben (PCCL); ²University of Leoben; ³Vrije Universiteit Brussel (VUB)
- 11:15 AM STUDENT** **Potential Use of Granulated Cork as Sand Replacement in Preparing Eco-Friendly 3D Printed Lightweight Concrete**
[Hanbin Cheng](#)¹; Aleksandra Radlińska¹; Jose P. Duarte¹; Ali M. Memari¹; Sven Bilén¹; Shadi Nazarian¹; ¹Pennsylvania State University
- 11:30 AM STUDENT** **Fatigue Behavior and Impact Properties of Metal Binder Jetting 17-4 PH Stainless Steel: Effects of Heat Treatment and Build Orientation**
[Indrajit Nandi](#)¹; Pooriya Dastranjy Nezhadfar²; Driss El Khoukhi³; Christophe Reynaud³; Fabien Lefebvre³; Robin Hauteville³; Benoit Verquin³; Maxime Robert³; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University - National Center for Additive Manufacturing Excellence (NCAME); ²GE Aerospace; ³Cetim - French Technical Center for Mechanical Industries
- 11:45 AM STUDENT** **Assessing the Mechanical Behaviour of an Additive Manufactured Nickel Based Superalloy using Alternative Small Scale Test Methods**
[Phoebe E. May](#)¹; Martin White²; Richard Huff²; Alberto Bordin²; Robert J. Lancaster¹;
¹Swansea University; ²ASTM International
- 12:00 PM LUNCH**

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- 13:30 PM**
STUDENT **High-Speed X-Ray Imaging for Investigating Melt Pool Behavior in the Presence of Acoustic Fields and Acoustic Cavitation**
[Lovejoy Mutswatiwa](#)¹; Samuel J. Clark²; Jordan S. Lum³; David M. Stobbe³; Andrea P. Argüelles¹; Lauren E. Katch¹; Nathan J. Kizer¹; Christopher M. Kube¹; Tao Sun⁴;
¹Pennsylvania State University; ²Argonne National Laboratory (ANL); ³Lawrence Livermore National Laboratory (LLNL); ⁴University of Virginia
- 13:45 PM**
STUDENT **Four-Point Bending Simulation of Permanent Fracture Fixation Implant Designed with Engineered Porosity for Reduction in Stress Shielding**
[Mustafiz Shaikh](#)¹; Fadi Kahwash¹; Zhilun Lu¹; Mohammad Alkhreisat²; Islam Shyha¹;
¹Edinburgh Napier University; ²Newcastle University Hospital
- 14:00 PM**
STUDENT **FPGA Real-Time Control of Melt-Pool Temperature in Directed Energy Deposition**
[Jorge Sanchez Medina](#)¹; Zoé Jardon¹; Julien Ertveldt¹; Patrick Guillaume¹; ¹Vrije Universiteit Brussel (VUB)
- 14:15 PM** **END OF DAY**

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STUDENT PRESENTATION COMPETITION 02

30TH OCT 2023 (MON)
LEXINGTON (BALLROOM LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM + PM SESSIONS):

Aaron McCandless, ASTM International

08:00 AM STUDENT
Process Planning for Powder Bed Laser Directed Energy Deposition Employing Variable Bead Geometry
[Ashish Jacob](#)¹; [Alexander P. Belchou](#)¹; Sanjay Joshi¹; Edward (Ted) W. Reutzel¹;
¹Pennsylvania State University

08:15 AM STUDENT
Criticality of Volumetric Defects on the Fatigue Behavior of Additively Manufactured Parts
[Shaharyar Baig](#)¹; Alireza Jam¹; Nima Shamsaei¹; Shuai Shao¹; ¹Auburn University

08:30 AM STUDENT
Feasibility Investigation of Porosity Evaluation in Metallic Additive Manufactured Components using Ultrasound Thermography
[Anusuya Vellingiri](#)¹; Eshan Dehghan Niri²; Prahalada K. Rao³; Ziyad Smoqi⁴; ¹New Mexico State University; ²Arizona State University; ³Virginia Tech; ⁴University of Nebraska-Lincoln

08:45 AM STUDENT
Characterization of Porosity and Shrinkage of 3D Printed WC-10Ni by Direct Fused Granulate Fabrication
[Adam Z. Lim](#)¹; Shirin Dehghani¹; Hani Henein¹; Ahmed J. Qureshi¹; ¹University of Alberta

09:00 AM STUDENT
The Effects of Powder Recycling on the Mechanical Properties of L-PBF 316L Stainless Steel
[Rory J. Douglas](#)¹; Thomas S. Jones²; Robert J. Lancaster¹; ¹Swansea University; ²Rolls-Royce Submarines

09:15 AM STUDENT
Dynamic Compressive Behaviour of Uniform and Functionally-Graded LPBF SS316L Sheet-Based TPMS-Lattice Metamaterials
[Chukwugozie J. Ejeh](#)¹; Aliaa M. Abou-Ali¹; Rashid K. Abu Al-Rub¹; Imad Barsoum¹;
¹Khalifa University

09:30 AM STUDENT
Generative System for Structural and Toolpath Design in 3D Concrete Printing
[Gonalo F. Duarte](#)¹; Jose P. Duarte¹; Nathan Brown¹; Ali M. Memari¹; Shadi Nazarian¹; Juan P. Gevaudan¹; ¹Pennsylvania State University

09:45 AM STUDENT
On the Printability of NiTi Shape Memory Alloys using Wire Laser Additive Manufacturing
[Hediyeh Dabbaghi](#)¹; Mohammad Elahinia¹; Behrang Poorganji¹; Mohammad Pourshams¹; Mohsen Taheri Andani²; Nasrin Taheri Andani¹; Saeedeh Vanaei¹; ¹University of Toledo; ²University of Michigan

10:00 AM BREAK

10:30 AM STUDENT
Machine Learning Based Fatigue Limit Prediction of Additively Manufactured Ti-6Al-4V
[Samira Ghadar](#)¹; Reza Molaei¹; ¹University of Memphis

10:45 AM STUDENT
Discriminant Analyses for Vat Photopolymerization of Highly Filled Polymer Composites
[Tahamina Nasrin](#)¹; Farhad Pourkamali Anaraki²; Christopher J. Hansen¹; Robert E. Jensen³; Amy M. Peterson¹; ¹University of Massachusetts Lowell; ²University of Colorado Denver; ³U.S. Army Combat Capabilities Development Command - Army Research Laboratory (ARL)

11:00 AM STUDENT
Process Parameter Analysis of Large Scale Fused Granulated Fabrication of Polyetheretherketone (PEEK)
[Anish A. Philip](#)¹; Abdullah Mohiuddin¹; Ahmed J. Qureshi¹; Pierre Mertiny¹; ¹University of Alberta

11:15 AM STUDENT
Optimisation of Post-Processing Conditions for Recrystallisation in Laser Powder Bed Fused Stainless Steel 316L
[Charlie E. Bevan](#)¹; Thomas S. Jones²; Robert J. Lancaster¹; ¹Swansea University; ²Rolls-Royce Submarines

11:30 AM STUDENT
Numerical Modeling for Prediction on Residual Stress of NiTi Fabricated by Laser Powder Bed Fusion
[Shiva Mohajerani](#)¹; Fatemeh Kordizadeh¹; Mohammadjavad Abdollahzadeh¹; Hossein Abedi¹; Mohammad Elahinia¹; ¹University of Toledo

11:45 AM STUDENT
Layer-Wise Prediction of Microstructural Evolution in Laser Powder Bed Fusion Additive Manufacturing using Physics-Based Machine Learning
[Alexander R. Riensche](#)¹; [Pralhada K. Rao](#)¹; Benjamin Bevens¹; Grant King²; Ajay Krishnan³; ¹Virginia Tech; ²University of Nebraska-Lincoln; ³EWI

12:00 PM LUNCH

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13:30 PM STUDENT **Process Optimization for Wire Arc Additive Manufacturing**
[Natalia A. Saiz](#)^{1,2}; Jonathan Pegues¹; Hannah E. Sims¹; Levi D. Van Bastian¹; Shaun R. Whetten¹; ¹Sandia National Laboratories; ²New Mexico Institute of Mining and Technology

13:45 PM STUDENT **Improve PBF-LB/M by Adjusting and Controlling the Gas Atmosphere**
[Tobias Deckers](#)^{1,2}; Pierre Forêt¹; Sophie Dubiez-Le Goff¹; Gerd Witt²; ¹Linde; ²University of Duisburg-Essen

14:00 PM STUDENT **Elevated Temperature Fatigue Behavior of SS316L Stainless Steel Processed via Laser Directed Energy Deposition**
[Ritam Pal](#)¹; Amrita Basak¹; ¹Pennsylvania State University

14:15 PM STUDENT **Mechanical Behavior of Additively Manufactured Haynes 282: L-PBF vs. LP-DED at Different Test Temperatures**
[Nabeel Ahmad](#)¹; Reza Ghiaasiaan¹; Paul R. Gradl²; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University - National Center for Additive Manufacturing Excellence (NCAME); ²NASA - Marshall Space Flight Center (MSFC)

14:30 PM STUDENT **High-Throughput 3D Bioprinting of Corneal Stromal Equivalents**
[Thanh C. \(Paul\) Dinh](#)¹; Shallu Kutlehria¹; Mandip Sachdeva¹; ¹Florida A&M University

14:45 PM STUDENT **Influence of Solidification Parameters on the Microstructure of Inconel 625 Processed by Direct Energy Deposition**
[Vijay Shankar Sridharan](#)¹; Siwei Du²; Shubham Chandra¹; Varun Chaudhary³; Dong Zhili¹; ¹Nanyang Technological University (NTU); ²A*STAR - Advanced Remanufacturing and Technology Centre (ARTC); ³Chalmers University of Technology

15:00 PM BREAK

15:30 PM STUDENT **Structural Behavior of a 3D-Printed Concrete Structure considering Vertical and Horizontal Interfaces**
[Pedram Ghassemi](#)¹; Natassia Brenkus¹; ¹Ohio State University

15:45 PM STUDENT **Thermal Modelling of Laser Processing of Laminated Kraft Paper**
[Sudhanshu Dubey](#)¹; K.P. Karunakaran¹; ¹Indian Institute of Technology Bombay (IIT Bombay)

16:00 PM STUDENT **Geometric Quality Prediction in Direct Energy Deposition using Scanning Technology Based on Process Parameters**
[Jayden M. Gaydos](#)¹; [Eden Binaga Yemesegen](#)¹; ¹Pennsylvania State University

16:15 PM STUDENT **The Next Step with Additive Manufacturing of Steel and Iron Alloys**
[Rajat Gulabrao Kawalkar](#)¹; Harrsh Kumar Dubey²; Satish Lokhande²; ¹University of Massachusetts Amherst; ²Priyadarshini College of Engineering

16:30 PM STUDENT **Characterizing Uncertain Elastic Properties of Materials 3D-Printed by the Fused Filament Fabrication Method for Application in Topology Optimization**
[Zahra Kazemi](#)¹; ¹University of Toronto - Institute for Aerospace Studies (UTIAS)

16:45 PM END OF DAY

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STUDENT PRESENTATION COMPETITION 03

30TH OCT 2023 (MON)

BUNKER HILL (BALLROOM LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM + PM SESSIONS):

David Paredes, ASTM International

08:00 AM STUDENT Toward Online Sensing of Microstructure and Residual Stress in Powder Bed Fusion using Ultrasound

Nathan J. Kizer¹; Corey J. Dickman²; Abdalla R. Nassar²; Edward (Ted) W. Reutzel²; Christopher M. Kube¹; ¹Pennsylvania State University; ²Pennsylvania State University - Applied Research Laboratory (PSU - ARL)

08:15 AM STUDENT Investigating the Influence of Surface Roughness on Fatigue Strength of L-PBF Components using a Strain Field Mapping Methodology

Ritam Pal¹; Daniel Ryan²; Brandon Kemerling²; Sudhakar Bollapragada²; Amrita Basak¹; ¹Pennsylvania State University; ²Solar Turbines

08:30 AM STUDENT Effect of Drifts in Key Process Variables within Tolerance on Mechanical Properties of Additively Manufactured Ti-6Al-4V Parts

Mohammad Salman Yasin¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

08:45 AM STUDENT Detecting Failures in Laser Powder Bed Fusion Additive Manufacturing of Complex Lattice Structures using Multi-Sensor Data and Machine Learning

Benjamin Bevans¹; Prahalada K. Rao¹; Anis Assad¹; Aiden Martin²; Nicholas P. Calta²; Brian Giera²; Gabe Gauss²; Philip DePond²; ¹Virginia Tech; ²Lawrence Livermore National Laboratory (LLNL)

09:00 AM STUDENT Thermal Stability of Oxide Dispersion Strengthened Alloy 718 with Superior Mechanical Properties after Aging

Benjamin T. Stegman¹; Jack Lopez¹; Anyu Shang¹; Xinghang Zhang¹; ¹Purdue University

09:15 AM STUDENT Investigating the Factors Affecting Qualification/Certification - Surface Integrity of Additively Manufactured Ti-6Al-4V Parts

Nabeel Ahmad¹; Seungjong Lee¹; Erfan Maleki¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

09:30 AM STUDENT Self-Heating Fatigue Assessment of LPBF Fabricated NiTi

Timothée Cullaz¹; Luc Saint-Sulpice²; Laurent Pino²; Mohammad Elahinia¹; Shabnam Arbab Chirani²; ¹University of Toledo; ²Brest National School of Engineering (ENIB)

09:45 AM STUDENT Effect of Wall Thickness Variation on Fatigue Behavior of Additive Manufactured Metals using Novel Specimen Geometries

Krista Dyer¹; Reza Molaei¹; ¹University of Memphis

10:00 AM BREAK

10:30 AM STUDENT On the Failure Mechanisms and Joint Properties in Inconel 625 - GRCo42 alloys Produced by Wire-Powder Directed Energy Deposition

Jakub Preis¹; Somayeh Pasebani¹; Stephanie B. Lawson¹; ¹Oregon State University

10:45 AM STUDENT Characterizing the Process Envelope through Spectral Analysis of 2205 Duplex Stainless Steel using Wire Arc Additive Manufacturing

Khulood Alqaydi¹; Mohammad Abdullah Hashmi¹; Abdullah Mohiuddin¹; Ahmed J. Qureshi¹; ¹University of Alberta

11:00 AM STUDENT A Comparative Study between Numerical Simulation and Experimental Observations on Melt Pool Formation and Morphology in L-PBF

Niccolò Baldi^{1,2}; Daniel Iliescu³; ¹Guglielmo Marconi University; ²Baker Hughes; ³Ansys

11:15 AM STUDENT Design for Additive Manufacturing of Lightweight 3D Chiral Structures with Twisting Mechanism for High Energy Absorption

Zhuo Hong Zeng¹; Sastry Y. Kandukuri²; Da Qin Xu²; Kun Zhou¹; ¹Nanyang Technological University (NTU); ²DNV

11:30 AM STUDENT Utilizing Computational Fluid Dynamics to Develop a Multiphysics Model for NiTi Shape Memory Alloy Production via Laser Powder Bed Fusion

Mohammadjavad Abdollahzadeh¹; Hossein Abedi¹; Fatemeh Kordizadeh¹; Shiva Mohajerani¹; Mohammad Elahinia¹; ¹University of Toledo

11:45 AM STUDENT Investigating the Effect of Processing on LPBF 316L Selective Corrosion

Timothy Montoya, Jr.¹; Robert Kelly¹; ¹University of Virginia

12:00 PM LUNCH

13:30 PM STUDENT Production of Rapid Investment Casting Wax Pattern through Fused Granulated Fabrication Additive Manufacturing Process

Piyush Arora¹; Shirin Dehgahi¹; Pierre Mertiny¹; David Nobes¹; Ahmed J. Qureshi¹; ¹University of Alberta

13:45 PM STUDENT Liquid Crystal Display (LCD)-Based Computed Axial Lithography (CAL)

Salvio Tisato¹; Grace Vera¹; Dorothea Helmer¹; ¹University of Freiburg - Freiburg Materials Research Center

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14:00 PM STUDENT **From Biomorphism to Biomimetic Design: Translating Selective Nodal Decoupling in the Venus Flower Basket to Ultra-Compliant Lattices**
[Yash Mistry](#)¹; Dhruv Bhate¹; Nikhilesh Chawla²; Swapnil Morankar²; Clint A. Penick³; Oliver Weeger⁴; ¹Arizona State University; ²Purdue University; ³Kennesaw State University; ⁴Technical University of Darmstadt

14:15 PM STUDENT **Microstructure and Mechanical Properties SS316L Wire-Laser DED Samples**
[Matthew D. Engquist](#)¹; Mohsen Eshraghi¹; Amir Shakibi¹; ¹California State University, Los Angeles

14:30 PM STUDENT **Property Degradation of FFF PLA after Feedstock Recycling**
[Michael Townsend](#)¹; ¹Texas A&M University

14:45 PM STUDENT **Microstructure and Mechanical Properties of Additively Manufactured Haynes 214: A Comparative Study between L-PBF and LP-DED**
[Shaharyar Baig](#)¹; Paul R. Gradl²; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University; ²NASA - Marshall Space Flight Center (MSFC)

15:00 PM BREAK

15:30 PM STUDENT **Analysis of the Behavior of Materials in the Repair Process using Direct Energy Deposition before Replicating in an Aeronautical Part**
[Daniel A. Rojas Perilla, Sr.](#)¹; Johan S. Grass Nuñez¹; Fábio E. Mariani¹; Germán A. Barragán De Los Rios²; Reginaldo A. Teixeira Coelho¹; Eraldo A. Jannone da Silva¹; ¹University of São Paulo - São Carlos School of Engineering (USP - EESC); ²Pontifical Bolivarian University (UPB)

15:45 PM STUDENT **Surface Roughness Considerations in Design for Additive Manufacturing: A Space Industry Case Study**
[Didunoluwa Obilanade](#)¹; Peter Törlind¹; Christo Dordlofva²; ¹Luleå University of Technology; ²GKN Aerospace

16:00 PM STUDENT **Evaluating the Performance of Additive Manufactured Ti6Al4V in a Chloride Environment**
[Surinder Pal](#)¹; Sahil Kumar²; Xavier Velay¹; Waqas Saleem³; ¹Atlantic Technological University Sligo; ²Jawandsons; ³Technological University Dublin

16:15 PM STUDENT **New Z-Stitching Printing Technique For Interlayer Locking FDM Process**
[Anish A. Philip](#)¹; Ahmed E. Elsherbiny¹; Abdullah Mohiuddin¹; David Nobes¹; Pierre Mertiny¹; Ahmed J. Qureshi¹; ¹University of Alberta

16:30 PM STUDENT **Understanding Fabrication-Microstructure-Behavior Relationships of Titanium-Rich LDED Based Nitinol Having Varying Build Plan**
[Arnab Chatterjee](#)¹; Reginald F. Hamilton¹; Mique Gonzales¹; ¹Pennsylvania State University

16:45 PM END OF DAY

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ICAM 2023 FINAL PROGRAM AGENDA

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STUDENT PRESENTATION COMPETITION 04

30TH OCT 2023 (MON)
CONGRESSIONAL B (LOBBY LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (PM SESSION):

Khalid Rafi, ASTM International

13:30 PM STUDENT
In-Situ Observation of Deformation-Induced Crystallographic Reorientation in Oxide Dispersion Strengthened 718 Microlattices with Finite Element Modeling Analysis of Dimensional Accuracy
[Benjamin T. Stegman](#)¹; Phani Saketh Dasika¹; Jack Lopez¹; Anyu Shang¹; Pablo Zavattieri¹; Xinghang Zhang¹; ¹Purdue University

13:45 PM STUDENT
Rapid Materials Screening of the Creep Resistance of Additive Manufactured Ti-6Al-4V Alloy
[Jacob T. Pellicotte](#)¹; Md Abir Hossain¹; Calvin M. Stewart¹; ¹Ohio State University

14:00 PM STUDENT
Residual Stress Analysis of Inconel 625-GRCop 42 Dissimilar Joints by Concurrent Wire-Fed Powder-Fed Laser Directed Energy Deposition
[Stephanie B. Lawson](#)¹; Somayeh Pasebani¹; Brian K. Paul¹; ¹Oregon State University

14:15 PM STUDENT
Additive Manufacturing of NiTi with Binder Jetting Method
[Mohammad Pourshams](#)¹; Mohammad Elahinia¹; Behrang Poorganji¹; Amy Elliott²; ¹University of Toledo; ²Oak Ridge National Laboratory (ORNL)

14:30 PM STUDENT
A Comparative Study on Dimensional Accuracy of 17-4 PH Stainless Steel Parts Fabricated via L-PBF and MJB
[Indrajit Nandi](#)¹; Paul R. Gradl²; Quentin Charron³; Guillaume Mohara³; Benoit Verquin³; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University - National Center for Additive Manufacturing Excellence (NCAME); ²NASA - Marshall Space Flight Center (MSFC); ³Cetim - French Technical Center for Mechanical Industries

14:45 PM STUDENT
Foam Additive Manufacturing
[Andrea Lorenzo Henri Sergio Detry](#)¹; [Luca Landolfi](#)¹; Pier Luca Maffettone¹; Antonino Squillace¹; Daniele Tammaro¹; Massimiliano Maria Villone¹; ¹University of Naples Federico II

15:00 PM BREAK

15:30 PM STUDENT
Investigating the Effects of Polymer Particle Shape and Impact Orientation in Cold Spray Additive Manufacturing
[Salih Duran](#)¹; Ugur Kokal¹; Ozan C. Özdemir¹; Sinan Müftü¹; ¹Northeastern University

15:45 PM STUDENT
Mechanistic Insights into the Deformation Behavior of Additively Manufactured 316L Stainless Steel
[Michael P. Roach](#)¹; James Burns¹; ¹University of Virginia

16:00 PM STUDENT
Additively Manufactured Inconel718-Methanol Heat Pipe: Fabrication and Low Temperature Thermal Testing
[Adnen Mezghani](#)¹; Edward (Ted) W. Reutzel¹; ¹Pennsylvania State University - Applied Research Laboratory (PSU - ARL)

16:15 PM STUDENT
Internet of Things (IoT) Based Non-Destructive Testing of Concrete Pipe
[Yash Kumar Dhabhi](#)¹; Amandeep Singh²; Balvinder Singh³; ¹Louisiana Tech University; ²Université de Montréal - Polytechnique Montréal; ³Guru Gobind Singh Indraprastha University

16:30 PM STUDENT
Exploring the Effect of Printing Bed Temperature on Microstructures and its Correlation with Mechanical Properties of FDM 3D Printed Components
[Vishal J. Hawale](#)¹; [Ruchira Chakraborty](#)¹; Praseon Kumar¹; ¹National Institute of Technology, Rourkela

16:45 PM STUDENT
Interface Layer of Copper Alloy and Tooling Steel in Laser Powder Bed Fusion
[Joshua Simon](#)¹; Hakan R. Öztürk¹; ¹Helmut Schmidt University / University of the Federal Armed Forces Hamburg

17:00 PM END OF DAY

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STUDENT PRESENTATION COMPETITION 05

30TH OCT 2023 (MON)
CONGRESSIONAL CD (LOBBY LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Amir Ziabari, Oak Ridge National Laboratory (ORNL)

SESSION CHAIR (PM SESSION):

Bonnie Meyer, ASTM International

08:00 AM STUDENT **Correlating Aperiodicity, Meso-Structure and Mechanical Behavior in the In-Plane Compression Response of Honeycombs**
[Irving E. Ramirez-Chavez](#)¹; Daniel Anderson¹; Nicole Van Handel¹; Dhruv Bhate¹; ¹Arizona State University

08:15 AM STUDENT **Effect of Build Height on the Microstructure Evolution and Mechanical Properties of NiTi Shape Memory Alloy Fabricated by Additive Manufacturing**
[Saeedeh Vanaei](#)¹; Pete Rocco¹; Parisa Bayati²; Maryam Avateffazeli¹; Meysam Haghshenas¹; Mohammad Elahinia¹; ¹University of Toledo; ²Confluent Medical Technology

08:30 AM STUDENT **Argon Flow Influence on Hardness of Single Tracks of Inconel 718 Deposited on AISi304 Stainless Steel by DED-L Technique**
[Daniel A. Rojas Perilla, Sr.](#)¹; Johan S. Grass Nuñez¹; Fábio E. Mariani¹; Germán A. Barragán De Los Rios²; Eraldo A. Jannone da Silva¹; Reginaldo A. Teixeira Coelho¹; ¹University of São Paulo - São Carlos School of Engineering (USP - EESC); ²Pontifical Bolivarian University (UPB)

08:45 AM STUDENT **Unlocking New Possibilities in Metamaterial Design: Additively Manufactured Fully-Porous Structures via Design Space Approach**
[Kunal Gide](#)¹; Shaghayegh Bagheri¹; ¹George Mason University

09:00 AM STUDENT **Evaluation Of Thin-Wall AISi7Mg Alloy LPBF Coupons under Fatigue Regimes**
[Muralidharan Kumar](#)¹; Mathieu Brochu¹; ¹McGill University

09:15 AM STUDENT **Optimizing Selective Laser Melting Process Parameters and Post-Processing Treatment to Enhance Mechanical Properties and Corrosion Resistance of 17-4 PH Parts**
[Neetesh Soni](#)¹; Paola Leo¹; Gilda Renna¹; Riccardo Nobile¹; Joaquín Barreiro García²; ¹University of Salento; ²University of León

09:30 AM STUDENT **Enabling Formwork-Free 3D Printing of Spanning Roof Structures using Multi-Directional Slicing to Decrease the Printing Angle**
[Nusrat Tabassum](#)¹; Jose P. Duarte¹; Shadi Nazarian¹; ¹Pennsylvania State University

09:45 AM STUDENT **Grain Structure Formation in Laser-Processed Bi2Te3 and Metal Single-Melt Lines**
[Bengisu Şişik](#)¹; Y. Cagri Oztan¹; Saniya LeBlanc¹; ¹George Washington University

10:00 AM BREAK

10:30 AM STUDENT **Role of Customized Scan Strategies and Dwell Time in Overall Performance of 316L SS using DED Technique**
[Puskar Pathak](#)¹; Goran Majkic¹; Venkat Selvamani¹; ¹University of Houston

10:45 AM STUDENT **Attempt for a New Methodology to Control Microstructural Development and Mechanical Properties with Processing Parameters of Ti-6Al-4V through Prediction Models**
[Qi Zhang](#)¹; Mathieu Brochu¹; Nejib Chekir²; Fatih Sikan¹; ¹McGill University; ²Liburdi Automation

11:00 AM STUDENT **Additive Manufacturing Adoption in Built Environment for Reduction of GHG Emissions: A First Case-Method Review**
[Oluwale Joseph Oladunni](#)^{1,2}; Oludolapo Akanni Olanrewaju¹; Carman Ka Man Lee²; ¹Durban University of Technology; ²Hong Kong Polytechnic University

11:15 AM STUDENT **Development of a Machine Learning Model for Predicting Rework and Proposing Production Schedule in Laser Cladding Process**
[Jonghee Park](#)¹; Jinyoung Kim²; Hyounghmin Kim³; Dae-Geun Hong²; Chang-Hee Yim²; ¹Chung-Ang University; ²Pohang University of Science and Technology (POSTECH); ³H Lab

11:30 AM STUDENT **Robotic 3D Printing of Lunar Regolith/Polymer Composite through Simultaneous Localization and Additive Manufacturing**
[Mohammad Azami](#)¹; Pierre-Lucas Aubin-Fournier¹; Krzysztof Skonieczny¹; ¹Concordia University

11:45 AM STUDENT **Application of Machine Learning for Prediction of Roughness in Surface Polishing by Laser Remelting**
[Honghe Wu](#)¹; Srdjan Cvijanovic¹; Evgueni Bordatchev²; Ovidiu-Remus Tutunea-Fatan¹; ¹Western University; ²National Research Council Canada (NRC Canada)

12:00 PM LUNCH

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13:30 PM STUDENT **Remote, Volumetric, Ultrasonic Imaging of WAAM Defects in As-Deposited Ti-6Al-4V using Laser Induced Phased Arrays**
[Panagiotis Kamintzis](#)¹; Don M. Pieris¹; Peter Lukacs¹; Geo Davis¹; Charles N. MacLeod¹; Stephen G. Pierce¹; Stewart Williams²; Theodosia Stratoudaki¹; ¹University of Strathclyde; ²Cranfield University

13:45 PM STUDENT **Porous Structure Design Optimization Effects on Energy Absorption Ability**
[Yi Chao](#)¹; Che-Kuang Chang¹; Che-Nan Kuo¹; ¹National Sun Yat-Sen University

14:00 PM STUDENT **A Novel Approach to 3D Print Complex Cooling Structures by Affordable Additive Manufacturing Methods**
[Nandhini Raju](#)¹; Peter Warren¹; Ramesh Subramanian²; Abhilash M. Prasad¹; Ranajay Ghosh¹; Erik Fernandez¹; Jayanta Kapat¹; ¹University of Central Florida; ²Siemens Energy

14:15 PM STUDENT **Volumetric Defect Structures and Fatigue Behaviors of Ti-6Al-4V Specimens: A Comparison between L-PBF Platforms from Two Different Manufacturers**
[Mohammad Salman Yasin](#)¹; Patricio Carrion¹; Jia (Peter) Liu¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

14:30 PM STUDENT **Monitoring of Process Stability in Laser Wire Directed Energy Deposition using Machine Vision**
[Benjamin Bevans](#)¹; [Prahallada K. Rao](#)¹; Anis Assad¹; Jakob Hamilton²; Iris Rivero²; ¹Virginia Tech; ²Rochester Institute of Technology

14:45 PM STUDENT **Role of Scan Strategy on the Microstructure of Shape Memory Materials Fabricated by Additive Manufacturing**
[Nasrin Taheri Andani](#)¹; Mohammad Elahinia¹; Behrang Poorganji¹; Keyvan Safaei¹; ¹University of Toledo

15:00 PM BREAK

15:30 PM STUDENT **Developing Control Charts with Heterogeneous Data Input for Laser Powder Bed Fusion Metal Additive Manufacturing**
[Venkatavaradan Sunderarajan](#)¹; Suman Das¹; ¹Georgia Institute of Technology

15:45 PM STUDENT **Parametric Studies of Direct Energy Deposition Additive Manufacturing and Quality Controlling GUI Development: Real-Time 3DP**
[Eden Binaga Yemesegen](#)¹; [Ali M. Memari](#)¹; ¹Pennsylvania State University

16:00 PM STUDENT **Intelligent Quality Monitoring of Surface Roughness in CNC Machining using Internet of Things (IoT) and Artificial Intelligence (AI)**
[Jagmeet Singh](#)¹; IPS Ahuja¹; Amandeep Singh²; Harwinder Singh³; ¹Punjabi University, Patiala; ²Université de Montréal - Polytechnique Montréal; ³Guru Nanak Dev Engineering College, Ludhiana

16:15 PM STUDENT **The Use of Antimicrobial Filament in the Medical Industry**
[Dale R. Glatfelter](#)¹; [Robert A. Schneeweis, II](#)¹; ¹Robert Morris University

16:30 PM END OF DAY

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AM FOR SPACE APPLICATIONS

CO-ORGANIZERS:

Cory Cunningham
Boeing, USA

Eliana Fu
TRUMPF, USA

Andrew Norman
European Space Agency,
The Netherlands

Rick Russell
Northrop Grumman, USA

John Vickers
NASA, USA

30TH OCT 2023 (MON) – 31ST OCT 2023 (TUE)
REGENCY BR [B] (BALLROOM LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Cory Cunningham, Boeing

SESSION CHAIR (PM SESSION):

Eliana Fu, TRUMPF

08:00 AM
INVITED **Optimization of Rocket Engine Components using Multi-Metallic Additive Manufacturing**
[Paul R. Gradl](#)¹; David Ellis²; John Fikes¹; Marissa Garcia¹; Tyler Gibson¹; ¹NASA - Marshall Space Flight Center (MSFC); ²NASA - Glenn Research Center

08:30 AM
REGULAR **Overview of Thermo-Fluidic Applications of AM for Satellites and Qualification Route for Flight**
[Florence Montredon](#)¹; Martin Raynaud¹; Estelle Chouteau¹; Gilles Pommatau¹; Jean-Paul Dudon¹; Alain Chaix¹; ¹Thales Alenia Space

09:00 AM
INVITED **Additive Manufacturing for Space Applications**
[Andrew Norman](#)¹; ¹European Space Agency (ESA)

09:30 AM
INVITED **Accelerating Additive Manufacturing Certification with Model-Based Tools**
[Mallory S. James](#)¹; Somnath Ghosh²; Edward H. Glaessgen³; Anthony D. Rollett⁴; John Vickers¹; ¹NASA - Marshall Space Flight Center (MSFC); ²Johns Hopkins University; ³NASA - Langley Research Center (LaRC); ⁴Carnegie Mellon University

10:00 AM **BREAK**

10:30 AM
INVITED **Qualification Techniques for On Orbit Additively Manufactured Large Scale Structures**
[Theodore C. Lee](#)¹; Patrick Flowers¹; Riley Repogle¹; ¹Redwire Space

11:00 AM
REGULAR **High Temperature Materials Made for Additive Manufacturing**
[Ryan Fishel](#)¹; Jeph Ruppert¹; Cameron Schmidt¹; Aaron Schmitz¹; ¹3D Systems

11:20 AM
REGULAR **How 3D Printing is Enabling Unconstrained Designs in Space: Avio Case**
[Roberto Esposito](#)¹; Daniele Liuzzi²; ¹Velo3D; ²Avio

11:40 AM
REGULAR **Development of Al6061 for In-Space Manufacturing with Material Extrusion (MEX) 3D Printing**
[Kunal Kate](#)¹; Sihan Zhang¹; Kameshwara Pavan Kumar Ajjarapu¹; Sundar Atre¹; Alexander Blanchard²; Jennifer Jones²; Ray Pitts³; Christopher Roberts²; Annie Meier³; Curtis Hill²; ¹University of Louisville; ²NASA - Marshall Space Flight Center (MSFC); ³NASA - Kennedy Space Center

12:00 PM **LUNCH**

13:30 PM
INVITED **Application of Probabilistic Approaches to Model Process Escape Flaws for Challenging Applications**
[Alberto Bordin](#)¹; Martin White¹; William G. Tilson²; Aaron McCandless¹; Douglas N. Wells²; Mohsen Seifi¹; ¹ASTM International; ²NASA - Marshall Space Flight Center (MSFC)

14:00 PM
INVITED **An Overview of Properties of AM Materials for Aerospace and Defense Applications**
[Humna Khan](#)¹; Jonathan Cohen²; ¹ASTRO Mechanical Testing Laboratory; ²MIMO Technik

14:30 PM
INVITED **Printing of Copper Alloys with a Green Laser for Space Exploration**
[Frantisek Hacic](#)¹; [Marco Goebel-Leonhæuser](#)¹; Eliana Fu¹; ¹TRUMPF

15:00 PM **BREAK**

15:30 PM
INVITED **Post Process Thermal Treatments for Enhanced Mechanical Properties in AlSi10Mg**
[Allen W. Wilson](#)¹; ¹Boeing

16:00 PM
INVITED **Wire-DED Printing using Novel High Performance Welding Wire for Large-Scale Aluminum Alloy Structures**
[Nick Bagshaw](#)¹; ¹Fortius Metals

16:30 PM **END OF DAY**

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Cory Cunningham, Boeing

SESSION CHAIR (PM SESSION):

Eliana Fu, TRUMPF

08:00 AM ****No Program****
Keynote 03 (Space) at Regency BR [A]

08:50 AM
REGULAR **Additive Solutions: Revolutionizing Design for Space**
[Ross Adams](#)¹; Melissa Lavey¹; ¹Markforged

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- 09:10 AM**
REGULAR **Additive Manufacturing of Copper and Copper Alloys for Space Applications**
[Amanda Cruchley](#)¹; Chris Dalton¹; Nick Cruchley¹; ¹The Manufacturing Technology Centre (MTC)
- 09:30 AM**
INVITED **Additive Enable Materials for Elevated Temperature Space Applications**
[Jacob Rindler](#)¹; Youping Gao¹; ¹Castheon
- 10:00 AM**
BREAK
- 10:30 AM**
INVITED **Assessment of Novel High Strength Aluminium Alloys in LPBF**
[Thomas J. Wasley](#)¹; Amanda Cruchley¹; Joseph Chamberlin¹; Nick Cruchley¹; ¹The Manufacturing Technology Centre (MTC)
- 11:00 AM**
REGULAR **Microstructure and Mechanical Property Evolution of Cobalt-Based Superalloys Processed via Laser Powder Bed Fusion**
[Alex McCloskey](#)¹; Steven Floyd¹; Andrew Thompson¹; Daniel Urban¹; ¹Northrop Grumman
- 11:20 AM**
REGULAR **Evaluation of Directed Energy Deposition Ti-6Al-4V for Spacecraft Forging Replacements**
[Daniel Urban](#)¹; Courtney Pennington¹; Alex McCloskey¹; Matthew O'Brien¹; Steven Floyd¹; Andrew Thompson¹; ¹Northrop Grumman Space Systems
- 11:40 AM**
REGULAR **Densification and Microstructure of Iron-Based Shape Memory Alloy Fabricated using Laser Powder Bed Fusion for Space Application**
[Ala Qattawi](#)¹; [Anwar Algarni](#)¹; Majed Ali¹; Abdalmageed Almotari¹; ¹University of Toledo
- 12:00 PM**
LUNCH
- 13:30 PM**
INVITED **All-Metal Electrically Conductive Filament for FFF-Style Additive Manufacturing**
[Ian K. Ramsdell](#)¹; ¹Kupros
- 14:00 PM**
INVITED **Sneak Peek: Innovations in Energy Delivery Systems Drive Step Change in PBF and DED**
[Nils Niemeyer](#)¹; ¹DMG MORI Additive Solutions
- 14:30 PM**
INVITED **Nadcap Audit Criteria for Metallic Powder Manufacture for the Space Industry**
[Richard Freeman](#)¹; ¹Performance Review Institute
- 15:00 PM**
BREAK
- 15:30 PM**
****No Program****
Panel 05 (Space) at Regency BR [A]
- 16:30 PM**
END OF DAY

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GENERAL TOPICS IN AM

CO-ORGANIZERS:

Hoda Amel
The Manufacturing Technology
Centre, United Kingdom

Nik Hrabe
NIST, USA

Tyler LeBrun
Sandia National Laboratories, USA

Sara Bagherifard
Politecnico di Milano,
Italy

Tim Lantzsch
Fraunhofer ILT,
Germany

30TH OCT 2023 (MON) – 01ST NOV 2023 (WED)
REGENCY BR [CD] (BALLROOM LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):
Mark Stoudt, NIST

SESSION CHAIR (PM SESSION):
Edwin Schwalbach, Air Force Research Laboratory (AFRL)

08:00 AM
INVITED **Molten Metal Deposition as a New AM Technology: A Metal-Extrusion Single-Step Process**
[Jonas Galle](#)¹; Joon Broeckert¹; Jan De Pauw¹; Chola Elangeswaran¹; Mohsen Saadatmand¹; ¹ValCUN

08:30 AM
REGULAR **Advancing Aluminum Additive Manufacturing: Enabling LPBF-AM of 5000 Series Alloys with Reactive Additive Manufacturing (RAM)**
[Jeremy J. Iten](#)¹; Chloe Johnson¹; Benjamin Rafferty¹; ¹Elementum 3D

08:50 AM
REGULAR **Innovative Laser Configurations for Metal Additive Manufacturing: Green Laser, Blue Laser, Mixed Solutions, and More**
[John Stavridis](#)¹; Daniele Grosso¹; ¹Prima Additive

09:10 AM
REGULAR **Meltpool Manipulation to Boost Consolidation Rates in LPBF**
[Ajay Krishnan](#)¹; ¹EWI

09:30 AM
INVITED **Training in AM: Who Needs It and Why does AM Training Matter?**
[Bonnie Meyer](#)¹; Paul Bates¹; Khalid Rafi¹; Mohsen Seifi¹; ¹ASTM International

10:00 AM **BREAK**

10:30 AM
INVITED **Integrated Multi-Scale Solutions for Accelerated Additive Manufacturing Materials and Process Development and Qualification**
[Behrang Poorganji](#)¹; ¹Morf3D

11:00 AM
INVITED **3-Dimensional Microstructure Characterization of Laser Powder Bed Fusion IN625 and IN718**
[Edwin J. Schwalbach](#)¹; Michael G. Chapman¹; Megna N. Shah¹; Michael D. Uchic¹; Lyle E. Levine²; Brandon M. Lane²; Nik Hrabe²; Orion L. Kafka²; Newell H. Moser²; Robert Carson³; James Belak³; ¹Air Force Research Laboratory (AFRL); ²NIST; ³Lawrence Livermore National Laboratory (LLNL)

11:30 AM
INVITED **Connecting Rheology to Defects in Embedded 3D Printing**
[Leanne Friedrich](#)¹; Ross Gunther²; Jonathan Seppala¹; ¹NIST; ²Georgia Institute of Technology

12:00 PM **LUNCH**

13:30 PM
INVITED **Cobalt Chromium F75 - Printing, Processing, and Applications in Medical Devices**
[Jeph Ruppert](#)¹; Ryan Fishel¹; Michael Mann¹; Colton Steiner¹; ¹3D Systems

14:00 PM
REGULAR **Continuous Viral Inactivation using a 3D-Printed Gyroid Column**
[Kareem Fakhfakh](#)¹; Jon Coffman¹; Irina Ramos¹; ¹AstraZeneca

14:20 PM
REGULAR **Additive Manufacturing of a D2 Tool Steel Modified with Nickel (Ni): A Promising Material for Mould and Tooling**
[Daniel F. Ferreira, Sr.](#)¹; [Rodolfo L. Batalha](#)¹; Filipe Oliveira²; Martinho Oliveira²; ¹ISQ; ²University of Aveiro

14:40 PM
REGULAR **Enhancing the Additive Manufacturing Process with X-Ray Computed Tomography: Use Cases and Automated Solutions**
[Curtis L. Frederick](#)¹; Pradeep Bhattad¹; Edson Costa Santos¹; ¹ZEISS Industrial Quality Solutions

15:00 PM **BREAK**

15:30 PM
INVITED **Modelling of Fatigue Strength in Defective Additively Manufacture Metallic Materials through a Physics-Based Machine Learning Approach**
[Enrico Salvati](#)¹; Alessandro Tognan¹; ¹University of Udine

16:00 PM
INVITED **Rapid Inspection of Additively Manufactured Aerospace Components Utilizing PCRT**
[Brian Gockel](#)¹; Michael Reale¹; Eric Biedermann²; ¹Lockheed Martin Space; ²Vibrant

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16:30 PM
INVITED **Processing Science and In-Situ Inspection of Refractory Metals Processed Powder Bed Electron Beam Melting**
[Christopher Ledford](#)¹; Michael Kirka¹; Yutai Kato¹; Vincent C. Paquit¹; Patxi Fernandez-Zelaia¹; ¹Oak Ridge National Laboratory (ORNL)

17:00 PM **END OF DAY**

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Nik Hrabe, NIST

SESSION CHAIR (PM SESSION):

Tyler LeBrun, Sandia National Laboratories

08:00 AM
INVITED **Towards Quantum Cascade Laser Sintering of Polymer Parts - Extension of Diode Area Melting to the Mid-IR**
[Ryan Brown](#)¹; Kristian M. Groom¹; Mohammed Alsaddah¹; Sarath A. Veetil¹; Longqi Zhou¹; Alkim Aydin¹; Anqi Liang¹; Zhuoqun Zhang¹; Candice Majewski¹; Kamran Mumtaz¹; ¹University of Sheffield

08:30 AM
INVITED **Measurement Science and Qualification/Certification for Metals Additive Manufacturing**
[Shawn Moylan](#)¹; ¹NIST

09:00 AM
INVITED **Qualification of Additive Manufactured Components**
[Donald Godfrey](#)¹; ¹SLM Solutions

09:30 AM
INVITED **Modeling-Informed Qualification and Certification of Metal AM Components for the Aviation Industry**
[Lyle E. Levine](#)¹; ¹NIST

10:00 AM
REGULAR **Designing 3D Printed Electrodes Format for Optimised Performance and Controlled Disassembly of Lithium Ion Batteries**
[Dominika Gastol](#)¹; Matthew Capener²; Yongxiu Chen¹; Emma Kendrick¹; ¹University of Birmingham; ²University of Warwick

10:20 AM **BREAK**

12:00 PM **LUNCH**

13:30 PM
INVITED **Qualification of Trabecular Titanium Lattice Structure Made with Laser Powder Bed Fusion**
[Riccardo Toninato](#)¹; Giulio Cattano¹; Michele Pressacco¹; Elisa Salatin¹; ¹LimaCorporate

14:00 PM
REGULAR **The Influence of Feedstock Design on the Adoption of AM for Serial Production**
[José A. Muñoz-Lerma](#)¹; Kamran Azari¹; Evan Butler-Jones¹; Martin Conlon¹; ¹Equispheres

14:20 PM
REGULAR **Supply Chain Readiness for Consumables**
[Chris Prue](#)¹; ¹United Performance Metals Additive Solutions

14:40 PM
REGULAR **Design of New Feedstock and Post-Heat Treatment for Additive Manufacturing of High-Performance Alloys using a CALPHAD-Based ICME Framework**
[Soumya Sridar](#)¹; Daozheng Li¹; Luis Pizano¹; Borna Rafiei¹; Xavier Jimenez¹; Albert C. To¹; Wei Xiong¹; ¹University of Pittsburgh

15:00 PM **BREAK**

15:30 PM
INVITED **About the Importance and Impact of Aluminum Powder Feedstock Quality on LPBF Material Properties and Product Performance**
[Frank Palm](#)¹; ¹Airbus Central Research & Technology

16:00 PM
REGULAR **Thinking Outside the Build Volume - Ethical Case Studies in 3D Printing**
[SJ Jones](#)¹; ¹Northrop Grumman

16:20 PM
REGULAR **Optimizing Additive Manufacturing Techniques through Microscale Visualization**
[Jim P. Kilcrease](#)¹; Hugues Francois-Saint-Cyr¹; Mark Riccio¹; John Yorston¹; ¹Thermo Fisher Scientific

16:40 PM
REGULAR **Comparison of Dry and Liquid Electropolishing of Laser Powder Bed Fusion 316L Stainless Steel Surfaces**
[Peter Renner](#)¹; Erin Karasz²; Jason M. Taylor²; Kasandra Escarcega-Herrera²; Michael J. Heiden²; Shelley Williams²; Elliott Fowler²; Michael Melia²; ¹Pacific Northwest National Laboratory (PNNL); ²Sandia National Laboratories

17:00 PM **END OF DAY**

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Tyler LeBrun, Sandia National Laboratories

SESSION CHAIR (PM SESSION):

Nik Hrabe, NIST

08:00 AM
INVITED **Synergistic Effects of Post-Processing of Metal AM Components: Optimal Strategies for Heat Treatment, Surface Finishing, Mechanical Performance, and Corrosion Resistance**
[Agustin Diaz](#)¹; Chad M. Beamer²; Patrick McFadden¹; Justin Michaud¹; ¹REM Surface Engineering; ²Quintus Technologies

08:30 AM
REGULAR **Taking the Leap: From Prototypes to Production**
[Andrea Barnes](#)¹; ¹Big Metal Additive

08:50 AM
REGULAR **How Process Integration and Automation Enables the Industrialization of Selective Laser Melting: A Case Study**
[Lennart Tasche](#)¹; ¹DMG MORI

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ICAM 2023 FINAL PROGRAM AGENDA

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09:10 AM
REGULAR **Productivity, Robustness, and the Resulting Material Properties of Laser Powder Bed Fusion Parts Produced Combining Ring and Gaussian Profiles**
[Adam Springer](#)¹; Fred Carter¹; Justin Whiting¹; Hajime Yamanaka¹; ¹DMG MORI

09:30 AM
REGULAR **Leveraging Modern Hot Isostatic Pressing Technology to Improve Post-Process Efficiencies for AM**
[Chad M. Beamer](#)¹; ¹Quintus Technologies

09:50 AM **BREAK**

10:30 AM
INVITED **The Relationship Between Post-Build Stress-Relief Heat Treatment and the Performance of Additively Manufactured IN625**
[Mark R. Stoudt](#)¹; ¹NIST

11:00 AM
INVITED **Under Pressure - High Pressure Heat Treatment Development for Laser Powder Bed Fusion Ti-6Al-4V Alloy**
[Nicholas A. Derimow](#)¹; Jake Benzing¹; Chad M. Beamer²; Ryan Fishel³; Chris Hadley⁴; Mahesh Waje⁴; Nik Hrabe¹; ¹NIST; ²Quintus Technologies; ³3D Systems; ⁴Lynnntech

11:30 AM
INVITED **On the Enhancement of Mechanical Characteristics of Additive Manufactured 17-4PH Stainless Steel by Several Post-Treatment Methods**
[Mahdi Chemkhi](#)¹; [Mahmoud Naim](#)²; Akram Alhussein²; Delphine Retraint²; ¹EPF Graduate School of Engineering; ²University of Technology of Troyes (UTT)

12:00 PM **LUNCH**

13:30 PM
INVITED **Best Practices to Maximize the Value of Your Retired Metal Powder**
[Brian Morrison](#)¹; ¹6K Additive

14:00 PM
REGULAR **Additive Friction Stir Deposition for 1018 Carbon Steel Repair**
[Riyanka \(Pai\) Ribble](#)¹; Eric M. Johnson¹; Zackery McClelland²; Robert D. Moser²; Felix Tran¹; ¹Eaton; ²U.S. Army Engineer Research and Development Center (ERDC)

14:20 PM
REGULAR **Roughness Analysis of Metal AM Components using Contact vs. Non-Contact Methods**
[Lucas E. Becker](#)¹; Swathi Vunnam¹; ¹AddUp

14:40 PM
REGULAR **Oscillatory Magnetic Field-Assisted Finishing for NASA HR-1 Channel Interiors Made using Directed Energy Deposition**
[Hitomi Yamaguchi](#)¹; Justin Rietberg¹; Hiroyuki Matsumura¹; Paul R. Gradl²; ¹University of Florida; ²NASA - Marshall Space Flight Center (MSFC)

15:00 PM **BREAK**

15:30 PM
INVITED **Advanced In-Process and Post-Process Strategies for W-DED Structural Lightweight Alloys**
[Jonathan Pegues](#)¹; Hannah Sims¹; Michael Abere¹; LaRico Treadwell¹; Luis Jauregui¹; Robert Craig¹; Jessica Buckner¹; Joseph Boro¹; Shaun Whetten¹; Amber Black²; ¹Sandia National Laboratories; ²Los Alamos National Laboratory (LANL)

16:00 PM
INVITED **Build Chamber Variability of Mechanical Properties in Ti6Al4V Laser Powder Bed Fusion**
[Cory Cunningham](#)¹; James Dobbs¹; Elaine MacDonald¹; Andrew Steevens¹; Zachary Whitman¹; ¹Boeing

16:30 PM **END OF DAY**

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AM APPLICATIONS IN AVIATION

CO-ORGANIZERS:

Cindy Ashforth
Federal Aviation
Administration (FAA), USA

Jim Dobbs
Boeing, USA

Jan van Doeselaar
Airbus, France

Thomas Broderick
Air Force Research
Laboratory (AFRL), USA

Mikkel Pedersen
Oerlikon AM, Germany

30TH OCT 2023 (MON) – 31ST OCT 2023 (TUE)
REGENCY FOYER (BALLROOM LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Jim Dobbs, Boeing

SESSION CHAIR (PM SESSION):

Cindy Ashforth, Federal Aviation Administration (FAA)

- 08:00 AM** ****No Program****
Keynote 01 (Aviation) at Regency BR [A]
- 09:00 AM** ****No Program****
Panel 01 (Aviation) at Regency BR [A]
- 10:00 AM** **BREAK**
- 10:30 AM** **2023 ICAM AM Applications in Aviation**
INVITED [Anna Tomzynska](#)¹; [Eric A. Sager](#)¹; ¹Boeing
- 11:00 AM** **Structural Substantiation Approaches for AM**
INVITED [Cindy Ashforth](#)¹; [Larry Ilcewicz](#)¹; ¹Federal Aviation Administration (FAA)
- 11:30 AM** **LUNCH**
- 13:30 PM** **Properties on Demand by Multi-Theme Additive Manufacturing of Nickel-Based Superalloys for Aerospace Applications**
INVITED [Lakshmi L. Parimi](#)¹; [Thomas Ramsbottom](#)²; ¹GKN Aerospace; ²University of Bath
- 14:00 PM** **Al-Alloys in Additive Manufacturing Looking at the Applications in Aerospace Industry**
REGULAR [Priyanshu Bajaj](#)¹; ¹m4p material solutions
- 14:20 PM** **Print New Parts the First Time Right**
REGULAR [Huba Horompoly](#)¹; [Sébastien Lani](#)²; ¹Gravity Pull Systems; ²Switzerland Innovation Park Biel/Bienne - Swiss Advanced Manufacturing Center

- 14:40 PM** **Transition from Coupon to Element: PEEK Material Extrusion Prediction of Coupons & Elements for Low/No Critically Aerospace Applications**
REGULAR [Eric K. Moyer](#)¹; [Richard Wiebe](#)²; [Steven E. Pearson](#)¹; [Marco Salviato](#)²; ¹Boeing Commercial Airplanes; ²University of Washington

- 15:00 PM** **BREAK**

- 15:30 PM** **Sensor-Based Observation of Melt Pool Phenomena in Directed Energy Deposition**
INVITED [Frank Brückner](#)^{1,2}; [Elena López](#)¹; [Mirko Riede](#)¹; [Rico Henschik](#)¹; [Alexander Vinnichenko](#)¹; [Conrad Samuel](#)¹; [Torsten Werner](#)¹; [Marko Seifert](#)¹; [Benedikt Brandau](#)³; [Christoph Leyens](#)^{1,4}; ¹Fraunhofer Institute for Material and Beam Technology IWS; ²Luleå University of Technology; ³Jenoptik; ⁴Dresden University of Technology

- 16:00 PM** **Approach to Critical Engineering for the Indian Aerospace Industry through Metal L-PBF: Integrating Design Modification, Material Qualification, Post-Processing, and Certification**
INVITED [Ankit Sahu](#)¹; [Arpit Sahu](#)¹; ¹Objectify Technologies

- 16:30 PM** **END OF DAY**

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Cindy Ashforth, Federal Aviation Administration (FAA)

SESSION CHAIR (PM SESSION):

Jim Dobbs, Boeing

- 08:00 AM** **JMADD Ti-6Al-4V LPBF Qualification and Framework Expansion Efforts**
INVITED [Cole Daharsh](#)¹; [Royal Lovingfoss](#)¹; [Rachael M. Andrulonis](#)¹; ¹Wichita State University - National Institute for Aviation Research (WSU - NIAR)
- 08:30 AM** **The Meaning of Process Control for AM Qualification and Certification in Aerospace**
REGULAR [Christo Dordlova](#)¹; [Fredrik Kullenberg](#)¹; ¹GKN Aerospace
- 09:00 AM** **MMPDS Volume 2 - A Framework for Additively Manufactured Metal Material Allowables**
INVITED [Doug Hall](#)¹; [Carinne Shannon](#)¹; ¹Battelle Memorial Institute
- 09:30 AM** **Advancements in Structural Integrity for Additive Manufacturing**
INVITED [Martin White](#)¹; [Khalid Rafi](#)¹; [Traci-Ann Dennis-Quarrie](#)¹; [Mohsen Seifi](#)¹; ¹ASTM International

- 10:00 AM** **BREAK**

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ICAM 2023 FINAL PROGRAM AGENDA

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- 10:30 AM**
INVITED **High Temperature Testing of Laser Powder Bed Ti-6Al-4V**
[James Dobbs](#)¹; [Cory Cunningham](#)¹; [Zachary Whitman](#)¹; ¹Boeing
- 11:00 AM**
REGULAR **Evaluating the Effect of HIP (Hot Isostatic Pressing) on Additively Manufactured Titanium Alloy Parts**
[Jane LaGoy](#)¹; [Oscar Martinez](#)¹; ¹Bodycote
- 11:20 AM**
REGULAR **Supply Chain Qualification of AM Processes through the Nadcap Program**
[Richard Freeman](#)¹; ¹Performance Review Institute
- 11:40 AM**
INVITED **Evaluation of Anomaly Distributions from Metallic Additive Manufacturing Fatigue Specimens**
[Zachary Whitman](#)¹; ¹Boeing Commercial Airplanes
- 12:10 PM** **LUNCH**
- 13:30 PM**
INVITED **LP-DED Process Monitoring & Quality Control Procedure Verification**
[Daniel E. Driemeyer](#)¹; [Taisia T. Lou](#)¹; [Lawrence Pado](#)¹; [Baily J. Thomas](#)¹; ¹Boeing Research & Technology
- 14:00 PM**
REGULAR **Commercial Qualification of Titanium Wire Direct Energy Deposition (DED) Applications**
[Matthew J. Crill](#)¹; ¹Boeing
- 14:20 PM**
REGULAR **DED Hybrid Manufacturing with Integrated 3D Laser Scanning for Rapid, Efficient and Consistent Repair of Complex Parts**
[Kevin Stenberg](#)¹; ¹DMG MORI
- 14:40 PM**
REGULAR **AFSD of Aerospace Aluminum Alloys**
[Edward Peterson](#)¹; ¹Laser Welding Solutions
- 15:00 PM** **BREAK**
- 15:30 PM**
REGULAR **Manufacturing Process Route Simplification: HIP Removal**
[Guillaume Fallot](#)¹; [Emile Philippe](#)²; ¹Airbus Helicopters; ²Airbus Commercial Aircraft
- 15:50 PM**
INVITED **In-Situ Process Monitoring of Metal Powder Bed Fusion Process using Intelligent Data Processing**
[David Osman Busse](#)¹; [Björn Milcke](#)¹; [Carsten Brandt](#)¹; [Pascal Dinglinger](#)¹; [Jonas Holtmann](#)²; [Ulf Schnars](#)¹; [Maximilian Sprengel](#)¹; ¹Airbus; ²Testia
- 16:20 PM** **END OF DAY**

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NON-DESTRUCTIVE EVALUATION METHODS FOR AM

CO-ORGANIZERS:

Anton du Plessis
Stellenbosch University,
South Africa / Object
Research Systems, Canada

Patrick Howard
GE Aerospace, USA

Ben Dutton
The Manufacturing
Technology Centre,
United Kingdom

Philip Riegler
Norsk Titanium, USA

30TH OCT 2023 (MON) – 31ST OCT 2023 (TUE)
CAPITOL A (LOBBY LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Traci-Ann Dennis-Quarrie, ASTM International
Patrick Howard, GE Aerospace

SESSION CHAIR (PM SESSION):

Ben Dutton, The Manufacturing Technology Centre
Philip Riegler, Norsk Titanium

08:00 AM INVITED	Additive Manufacturing and the Moving NDT Target William Hayes ¹ ; Tyler Ripperger ¹ ; ¹ Waygate Technologies
08:30 AM REGULAR	Probability of Detection and its Application to Additively Manufactured Materials Ryan D. Mooers ¹ ; John Brausch ¹ ; ¹ Air Force Research Laboratory (AFRL)
08:50 AM REGULAR	Predicting Porosity Defects in Laser Powder Bed Fusion via Deep Learning of In-Situ Single-Camera Two-Wavelength Imaging Pyrometry Data Xiayun Zhao ¹ ; Haolin Zhang ¹ ; Chaitanya Vallabh ¹ ; Alexander Caputo ² ; Richard Neu ² ; ¹ University of Pittsburgh; ² Georgia Institute of Technology
09:10 AM REGULAR	Rapid Identification of Defects within Metal Additive Manufacturing using Resonance Ultrasonic Spectroscopy Xiaoliang (George) Zhao ¹ ; Bin Lin ¹ ; ¹ BlueHalo
09:30 AM INVITED	Evaluating the Influence of Image Quality on CT-Based Metrology Anjali Singhal ¹ ; ¹ GE Aerospace
10:00 AM	BREAK
10:30 AM INVITED	Application of Advanced Ultrasonic Testing and Resonance Ultrasound Spectroscopy for NDE of 316L Material from Laser Powder Bed Fusion Processes Robert O. Montgomery ¹ ; Jared J. Gillespie ¹ ; Morris S. Good ¹ ; Ryan M. Meyer ¹ ; Isabella J. van Rooyen ¹ ; ¹ Pacific Northwest National Laboratory (PNNL)

11:00 AM REGULAR	Ultrasonic Testing (UT) and the Total Focusing Method (TFM) for Additively-Manufactured Reference Standards George D. Connolly ¹ ; John Shingledecker ¹ ; Anand Kulkarni ² ; Kevin Cwiok ² ; Nichole Harless ¹ ; ¹ Electric Power Research Institute (EPRI); ² Siemens
11:20 AM REGULAR	Towards Fully Automated Quality Assured Metal Additive Manufacturing Rastislav Zimmermann ¹ ; Stephen Fitzpatrick ¹ ; David Lines ¹ ; Charles N. Macleod ¹ ; Stephen G. Pierce ¹ ; Randika Vithanage ¹ ; Stewart Williams ² ; Charalampos Loukas ¹ ; Ehsan Mohseni ¹ ; Muhammad K. Rizwan ¹ ; Momchil Vasilev ¹ ; ¹ University of Strathclyde; ² Cranfield University
11:40 AM REGULAR	Optimization of Test Method for Ultrasonic NDE of Additively Manufactured Photopolymers Amelia V. Ware ¹ ; Luz D. Sotelo ² ; Celeste A. Brown ¹ ; Diego Turo ³ ; Matthew D. Guild ¹ ; ¹ U.S. Naval Research Laboratory (NRL); ² Purdue University; ³ Catholic University of America
12:00 PM	LUNCH
13:30 PM INVITED	Computed Tomography for Additive Manufacturing: How Can Deep Learning Assist? Anton du Plessis ^{1,2} ; ¹ Object Research Systems; ² Stellenbosch University
14:00 PM REGULAR	X-Ray Computed Tomography Phantoms for Complex Additive Manufacturing Part Geometries and Flaws Felix H. Kim ¹ ; John Henry J. Scott ¹ ; Adam Pintar ¹ ; Edward Garboczi ¹ ; ¹ NIST
14:20 PM REGULAR	Generative Adversarial Network (GAN) Based X-Ray CT Reconstruction for Fast and High-Quality 3D NDE in Additive Manufacturing Amir Ziabari ¹ ; Zackary Snow ¹ ; Brian A. Fisher ² ; Luke Scime ¹ ; Vincent C. Paquit ¹ ; ¹ Oak Ridge National Laboratory (ORNL); ² Raytheon Technologies Research Center
14:40 PM REGULAR	A Comparative Analysis of Computed Tomography Characterization of Porosity in AM Ti64 using Optical Microscopy Serial Sectioning Bryce R. Jolley ¹ ; Michael G. Chapman ² ; Christine Knott ¹ ; Edwin J. Schwalbach ¹ ; Daniel Sparkman ¹ ; Michael D. Uchic ¹ ; ¹ Air Force Research Laboratory (AFRL); ² UES
15:00 PM	BREAK
15:30 PM INVITED	Scaling AM to Production: The NDT Challenge Daniel Rodríguez Sanmartín ¹ ; Julian Wright ¹ ; James Watts ¹ ; ¹ Theta Technologies

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16:00 PM
INVITED **Challenges and the Future of NDE in the Hydrogen Transition to Net-Zero**
[Wilson Vesga Rivera](#)¹; Ben Dutton¹; ¹The Manufacturing Technology Centre (MTC)

16:30 PM
INVITED **Validation of X-Ray Computed Tomography via Serial Sectioning of Additively Manufactured Ti-6Al-4V and AF-9628 Alloys**
[Griffin Jones](#)¹; Rachel Reed²; Jayme S. Keist¹; Veeraraghavan Sundar²; ¹Pennsylvania State University - Applied Research Laboratory (PSU - ARL); ²UES

17:00 PM **END OF DAY**

31ST OCTOBER 2023

SESSION CHAIR (AM + PM SESSIONS):

Ben Dutton, The Manufacturing Technology Centre
Patrick Howard, GE Aerospace

08:00 AM ****No Program****

09:00 AM ****No Program****
Panel 03 (Inspection) at Regency BR [A]

10:00 AM **BREAK**

10:30 AM
INVITED **Using In-Process NDT Inspection to Qualify WAAM Builds, Working towards Qualification for Different NDT Modalities**
[Stephen G. Pierce](#)¹; Charles N. Macleod¹; Theodosia Stratoudaki¹; Richard Pyle¹; Ehsan Mohseni¹; Randika Vithanage¹; Yashar Javadi¹; Rastislav Zimmermann¹; Momchil Vasilev¹; Charalampos Loukas¹; David Lines¹; ¹University of Strathclyde

11:00 AM
INVITED **In-Situ CT Tensile Testing of PBF-EB Additive Manufactured Ti-5553 and its Correlation to Further Material Properties**
[Elena López](#)¹; Julius Hendl²; Axel Marquardt²; Sebastian Schettler²; Lukas Stepien²; Frank Brückner¹; Christoph Leyens¹; ¹Fraunhofer Institute for Material and Beam Technology IWS; ²Dresden University of Technology

11:30 AM
REGULAR **AM Components Certified with In-Situ Monitoring for the Nuclear Energy Industry**
[Noah Mostow](#)¹; Niall O'Dowd¹; ¹Phase3D

11:50 AM
REGULAR **NDT Assessment of Inconel 718 Parts Produced by Laser Powder Bed Fusion**
[Andrea Gianneo](#)¹; Fabrizio Montagnoli¹; Gabriele Fantoni¹; ¹Leonardo Helicopters

12:10 PM **LUNCH**

13:30 PM
INVITED **Cryo-Ultrasonic Testing of Curved Components**
[Francesco Simonetti](#)¹; ¹University of Cincinnati

14:00 PM
REGULAR **A Validated Surface-Roughness-Metric Proposal to Forecast the Additive Manufacturing Fatigue Performance**
[Armando C. Coro](#)¹; ¹ITP Aero

14:20 PM
REGULAR **Resonant Methods for Nondestructive Characterization of Microtexture and Porosity in Powder Bed Fusion 9Cr1Mo Samples**
[Christopher M. Kube](#)¹; Matthew Cherry²; James Hanagan³; Nathan Leo¹; ¹Pennsylvania State University; ²Air Force Research Laboratory (AFRL); ³Texas A&M University

14:40 PM
REGULAR **Destructive and Nondestructive Evaluation of the Mechanical Properties of Additively Manufactured Polymer-Polymer Composites**
[Celeste A. Brown](#)¹; Amelia V. Ware¹; Luz D. Sotelo²; Grant Warner³; Matthew D. Guild¹; ¹U.S. Naval Research Laboratory (NRL); ²Purdue University; ³Center for Black Entrepreneurship (CBE)

15:00 PM **BREAK**

15:30 PM
INVITED **Quality of Additively Manufactured Parts**
[Anne-Françoise Obaton](#)¹; Massimiliano Ferrucci²; Brian Giera²; ¹Laboratoire National de Métrologie et d'Essais (LNE); ²Lawrence Livermore National Laboratory (LLNL)

16:00 PM
INVITED **Using Process Compensated Resonance Testing to Differentiate Laser Powder Bed Fusion Additively Manufactured Witness Coupons Produced with Varying Process Parameters**
[Andrew Gavens](#)¹; Eric Biedermann²; James Eliou¹; Garrett Gatewood²; Benjamin Palmer¹; ¹Naval Nuclear Laboratory (NNL); ²Vibrant

16:30 PM
INVITED **Operando X-Ray Tomoscopy of Laser Powder Bed Fusion**
[Paul H. Kamm](#)¹; Tillmann R. Neu¹; Christian M. Schlepütz²; Francisco García-Moreno¹; ¹Helmholtz Centre for Materials and Energy (HZB); ²Paul Scherrer Institute

17:00 PM **END OF DAY**

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AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION, AND REUSE

CO-ORGANIZERS:

Edward Garboczi
NIST, USA

Louis-Philippe Lefebvre
National Research Council
Canada, Canada

Tony Thornton
Micromeritics, USA

Frank Venskytis
Consultant, USA

Steven Hall
The Manufacturing
Technology Centre,
United Kingdom

Saritha Samudrala
A*STAR - Advanced
Remanufacturing and
Technology Centre (ARTC),
Singapore

30TH OCT 2023 (MON) – 31ST OCT 2023 (TUE)
CAPITOL B (LOBBY LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Frank Venskytis, Consultant

SESSION CHAIR (PM SESSION):

Tony Thornton, Micromeritics

08:00 AM
INVITED **Metal AM Powder Research at the National Institute of Standards and Technology**
[Edward Garboczi](#)¹; Alkan Donmez¹; Shawn Moylan¹; Vipin Tondare¹; Justin Whiting²;
¹NIST; ²DMG MORI

08:30 AM
REGULAR **Correlation between Hardness and Tensile Strength of Steels for Laser Powder Fusion Additive Manufacturing**
[Antonio Paesano](#)¹; ¹Boeing

09:00 AM
INVITED **Measuring Cohesivity in Feedstock Powders and Differentiating between Cohesive and Frictional Effects on Powder Flow Behaviour**
[Amalia L. Thomas](#)¹; ¹Freeman Technology

09:30 AM
INVITED **Investigation of the Influence of Powder Oxygen Homogeneity on the Processability and Properties of the L-PBF Processed Ti-6Al-4V**
[Mahdi Habibnejad Korayem](#)¹; ¹GE Additive - AP&C

10:00 AM
BREAK

10:30 AM
INVITED **Assessing the Impact of Moisture on Powder Based Additive Manufacturing Processes**
[Louis-Philippe Lefebvre](#)¹; Anatolie Timercan¹;
¹National Research Council Canada (NRC Canada)

11:00 AM
INVITED **Integrated Computational Materials Engineering of Powder Processing and Use**
[Rainer Hebert](#)¹; ¹University of Connecticut

11:30 AM
INVITED **On the Utilization of Artificial Intelligence to Develop Water Atomized Ferrous Powders having Rheological and Chemical Properties Suitable for LPBF**
[Denis Mutel](#)¹; [Simon Gélinas](#)¹; Carl Blais¹;
¹Laval University

12:00 PM
LUNCH

13:30 PM
INVITED **Plasma Atomized Powders with Improved Properties for Laser Powder Bed Fusion**
[Kaoutar Bensaid](#)¹; [Yevgeni Brif](#)¹; ¹Tekna

14:00 PM
REGULAR **Atomic Layer Deposition for Additive Manufacturing Feedstock Modification and Improvement**
[Chris Gump](#)¹; Joseph Gauspohl¹; Brianna Boeyink¹; Brandon Castro¹; ¹Forge Nano

14:20 PM
REGULAR **Method for Evaluating the Effect of Elevated Temperatures on the Flow Properties of AM Feedstock Powders**
[Amalia L. Thomas](#)¹; ¹Freeman Technology

14:40 PM
REGULAR **Off-Size Particle Size Utilization for Laser Powder Bed Fusion Processing of Plasma Atomized Ti-6Al-4V Powders**
[Mahdi Habibnejad Korayem](#)¹; ¹GE Additive - AP&C

15:00 PM
END OF DAY

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Edward Garboczi, NIST

SESSION CHAIR (PM SESSION):

Edward Garboczi, NIST

Louis-Philippe Lefebvre, National Research Council Canada

08:00 AM
INVITED **The Effects of Fine Particles on the Spreadability and Flowability of AM Powders and a New Method to Detect Them**
[Gregory Martiska](#)¹; ¹Mercury Scientific

08:30 AM
INVITED **Ensuring Quality in Additive Manufacturing through Material Characterization**
[Nejea I. Davis](#)¹; ¹Malvern Panalytical

09:00 AM
INVITED **Assessing Powder Spreadability of AM Metal Powders**
[Roger Pelletier](#)¹; Louis-Philippe Lefebvre¹;
¹National Research Council Canada (NRC Canada)

09:30 AM
INVITED **Predicting Powder Spreadability for Metal AM**
[Filip Francqui](#)¹; Aurélien Neveu¹; Paul Lohmuller²; Laurent Weiss²; Pascal Laheurte²; Geoffroy Lumay³; ¹Granutools; ²University of Lorraine; ³University of Liège

10:00 AM
BREAK

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10:30 AM INVITED	A Novel Testing Bench for the Assessment of Powder Spreading Behavior for Powder Bed-Based AM Applications Salah Eddine Brika ¹ ; Vladimir Brailovski ¹ ; ¹ École de technologie supérieure (ÉTS)	16:20 PM REGULAR	Recycling of Polyamide/Polyethylene Multilayer Films through Material Extrusion Additive Manufacturing Patrick Ferrell ¹ ; Douglas M. Sassaman ¹ ; Samantha Snabes ¹ ; Marc Pepi ² ; Justine Yu ³ ; ¹ re:3D; ² U.S. Army Combat Capabilities Development Command - Army Research Laboratory (ARL); ³ U.S. Army Engineer Research and Development Center - Construction Engineering Research Laboratory (ERDC - CERL)
11:00 AM REGULAR	Effect of Initial Feedstock Chemical Composition on Tensile Properties of Ti-6Al-4V Produced by Wire and Arc DED Armando E. Caballero Ramos ¹ ; Jialuo Ding ¹ ; Stewart Williams ¹ ; ¹ Cranfield University	16:40 PM REGULAR	Determining Particle Shape and Shape Distribution by Dynamic Imaging Analyzer Thomas Canty ¹ ; Paul O'Brien ¹ ; ¹ Canty
11:20 AM REGULAR	Clean and Reliable Metal Powders - A Statistical Approach Priyanshu Bajaj ¹ ; ¹ m4p material solutions	17:00 PM END OF DAY	
11:40 AM REGULAR	HAMR: Utilizing 100% Titanium Scrap Metal Anastasios (Taso) Arima ¹ ; Hyrum Lefler ¹ ; ¹ IperionX		
12:00 PM	LUNCH		
13:30 PM INVITED	Using Coarser Particle Size Distribution for Laser Powder Bed Fusion Applications: Improving Sustainability and Cost Efficiency Yevgeni Brif ¹ ; Kaoutar Bensaid ¹ ; ¹ Tekna		
14:00 PM INVITED	The Development of Sustainable Maraging & Tool Steels Suitable for Additive Manufacturing Paul A. Davies ¹ ; Eleonora A. Bettini ¹ ; ¹ Sandvik Additive Manufacturing		
14:30 PM INVITED	Extended Reusability of Metal AM Powders for L-PBF Process - A Sustainable Path for Effective Additive Manufacturing Zheng Jie Tan ¹ ; Saritha Samudrala ¹ ; Nabihah Rahman ¹ ; Nur Syafiqah Johan ¹ ; Muhammad Syafiq Azrin ¹ ; Andrew Nathaniels ¹ ; Mohamed Faizal Hussain ¹ ; Yong Rong Chan ¹ ; ¹ A*STAR - Advanced Remanufacturing and Technology Centre (ARTC)		
15:00 PM	BREAK		
15:30 PM INVITED	A Powder Reuse Methodology for Multiple Powder Handling Systems Jesse R. Boyer ¹ ; Sean Emerson ² ; Faramarz Zarandi ² ; Alex Cadar ² ; Christopher R. Do ¹ ; Christian R. Fadel ¹ ; Brian A. Fisher ² ; Joshua Norman ² ; ¹ Pratt & Whitney; ² Raytheon Technologies Research Center		
16:00 PM REGULAR	An Intuitive, Rapid Characterization Tool for Reused Powder Quality Control Ellen S. Williams ¹ ; Jonathan C. Putman ¹ ; Peyton Willis ¹ ; ¹ Exum Instruments		

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ICAM 2023 FINAL PROGRAM AGENDA

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MECHANICAL TESTING OF AM MATERIALS

CO-ORGANIZERS:

Allison Beese
Pennsylvania State
University, USA

Joy Gockel
Colorado School of Mines,
USA

Robert Lancaster
Swansea University,
United Kingdom

Jimmy Campbell
Plastometrex,
United Kingdom

Edward Herderick
NSL Analytical, USA

Jason Jyi Sheuan Ten
A*STAR - Singapore
Institute of Manufacturing
Technology (SIMTech),
Singapore

30TH OCT 2023 (MON) – 01ST NOV 2023 (WED)
CONGRESSIONAL A (LOBBY LEVEL)

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Allison Beese, Pennsylvania State University

SESSION CHAIR (PM SESSION):

Allison Beese, Pennsylvania State University
Alberto Bordin, ASTM International

08:00 AM
INVITED **A Comparative Study on Representativeness and Stochastic Efficacy of Miniature Tensile Specimen Testing**
[Sreekar Karnati](#)¹; Sriram Praneeth Isanaka²; Frank Liou²; ¹GE Research; ²Missouri University of Science and Technology

08:30 AM
INVITED **Quantifying the Effects of Build Interruptions Through In-Process Monitoring and Mechanical Testing for Nickel Alloy 718 and AlSi10Mg**
[Ben DiMarco](#)¹; Cameron Gygis¹; Emmaline Hutchinson¹; Jacob Rindler¹; Tayelor McKay²; Crosby Owens²; Kazuki Nagao³; Michael Groeber¹; Edward Herderick¹; ¹Ohio State University; ²Northrop Grumman Aeronautics Systems; ³Honda Aero

09:00 AM
INVITED **Application of Profilometry-Based Indentation Plastometry (PIP), a Technique to Measure Stress-Strain Curves from Indentation, to Additively Manufactured Metal Parts**
[Jimmy E. Campbell](#)¹; Bill Clyne¹; Chizhou Fang¹; Thomas JF Southern¹; ¹Plastometrex

09:30 AM **BREAK**

10:30 AM
INVITED **Enhanced Mechanical Assessment of Powder and Wire DED Processed Materials via Rapid Profilometry-Based Indentation Plastometry (PIP) Testing and Analysis**
[Bryer C. Sousa](#)¹; Danielle (Belsito) Cote¹; ¹Worcester Polytechnic Institute

11:00 AM
REGULAR **Oak Ridge National Laboratory Qualification Study on Tungsten Powders from 6K Additive**
[Christopher Ledford](#)¹; [Greg Kline](#)²; ¹Oak Ridge National Laboratory (ORNL); ²6K Additive

11:20 AM
REGULAR **Optimized Cross-Section of Additively Manufactured Thin-Walled Circular Shells under Compressive Loads**
[Mohsen Amraei](#)¹; Ruizhi Zhang²; Antti Salminen¹; Leroy Gardner²; ¹University of Turku; ²Imperial College London

11:40 AM **LUNCH**

13:30 PM
INVITED **Specimen Design and Tensile Behavior of AM TPMS Structures**
[Ross Brown](#)¹; ¹Marotta Controls

14:00 PM
INVITED **Framework for Designing Functionally Graded Materials Made by Additive Manufacturing**
[Allison M. Beese](#)¹; ¹Pennsylvania State University

14:30 PM
INVITED **Tailoring the Mechanical Response of Additively Manufactured Shell-Based Architected Structures by Functional Grading of PH Steel**
[Julia T. Pürstl](#)¹; Diran Apelian¹; Brandon Fields¹; Lorenzo Valdevit¹; ¹University of California, Irvine

15:00 PM **BREAK**

15:30 PM
INVITED **Use Cases of Instrumented Indentation to Characterize AM Alloys**
[Jordan S. Weaver](#)¹; ¹NIST

16:00 PM
INVITED **The Testing and Qualification Perspective on Advancement of Functionally Gradient Materials via Additive Manufacturing**
[David Scannapieco](#)¹; Edward Herderick¹; ¹NSL Analytical

16:30 PM **END OF DAY**

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ICAM 2023 FINAL PROGRAM AGENDA

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31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Jimmy Campbell, Plastometrex
Joy Gockel, Colorado School of Mines

SESSION CHAIR (PM SESSION):

Alberto Bordin, ASTM International
Joy Gockel, Colorado School of Mines

08:00 AM
INVITED **Towards Adoption of Additively Manufactured Metals for Demanding Structural Applications: Mechanical Characterization from Quasi-Static to Hydrodynamic Strain Rates**
[Charlotte L.B. Kramer](#)¹; Paul Specht¹; Colin Loeffler¹; Nathan Heckman¹; Thomas Ivanoff¹; Brian M. Fuchs¹; Nha Uyen Huynh¹; John Varga¹; Nathan Brown¹; ¹Sandia National Laboratories

08:30 AM
REGULAR **Strain-Rate-Dependent Mechanical Behavior of 17-4PH Stainless Steel in Traditional and AM Manufacturing Methods**
[Brian M. Fuchs](#)¹; Colin Loeffler¹; Nathan Heckman¹; [Charlotte L.B. Kramer](#)¹; ¹Sandia National Laboratories

09:00 AM
INVITED **Rapid Screening of Additive Manufactured Materials for Elevated Temperature Applications**
[Calvin M. Stewart](#)¹; Jacob T. Pellicotte¹; Md Abir Hossain¹; ¹Ohio State University

09:30 AM
INVITED **High Temperature Testing for Refractory Alloy Additive Manufacturing**
[Justin Milner](#)¹; [Eric Brizes](#)¹; Frank Ritzert¹; Austin Whitt¹; ¹NASA - Glenn Research Center

10:00 AM **BREAK**

10:30 AM
INVITED **Experimental Characterization of the Effect of Process Defects on the Properties of Laser Powder Bed Fusion SS316L**
[Nadia Kouraytem](#)¹; Tasrif UI Anwar¹; Patrick Merighe¹; ¹Utah State University

11:00 AM
REGULAR **Digital Twin of Multi-Part Grain Boundary Engineered LPBF Steel**
[Rashid Miraj](#)¹; Frank Abdi¹; Amirhossein Eftekharian¹; Mallikharjun Marrey¹; Veera Sundararaghavan²; ¹AlphaSTAR; ²University of Michigan-Ann Arbor

11:20 AM
REGULAR **Additively Manufactured Metallic Honeycomb Structures under Compressive Loads**
[Mohsen Amraei](#)¹; Shahriar Afkhami²; Leroy Gardner³; Antti Salminen¹; ¹University of Turku; ²Lappeenranta-Lahti University of Technology LUT; ³Imperial College London

11:40 AM **LUNCH**

13:30 PM
INVITED **Mechanical Property Reliability of Polyamide Processed using Powder Bed Fusion**
[David L. Bourell](#)¹; David Leigh²; ¹University of Texas at Austin; ²3D Systems (retired)

14:00 PM
INVITED **Tensile Property Measurement of AISi10Mg Lattice Structures - From Single Strut to Lattice Networks**
[Tony Fry](#)¹; Louise Crocker¹; Peter Woolliams¹; Matthew Poole¹; Cameron Breheny²; Abdalrhman Koko¹; Nathanael Leung³; David England³; ¹National Physical Laboratory (NPL); ²HiETA Technologies; ³University of Surrey

14:30 PM
INVITED **Mechanical Properties of Precipitate Hardenable Metals Fabricated by Laser Powder Bed Fusion**
[Ala Qattawi](#)¹; Meysam Haghshenas¹; Majed Ali¹; Abdalmegeed Almotari¹; Anwar Al-Gamal¹; ¹University of Toledo

15:00 PM **BREAK**

15:30 PM
INVITED **High Frequency Fatigue Method for Low-Cost Assessment of Additive Manufacturing Materials**
[Onome Scott-Emuakpor](#)¹; ¹Hyphen Innovations

16:00 PM
INVITED **Microstructure-Sensitive Fracture Investigation of Additively Manufactured Aluminum**
[Emine Tekerek](#)¹; Antonios Kontsos²; ¹Drexel University; ²Rowan University

16:30 PM
INVITED **Investigation of Additively Manufactured Ti-6Al-4V by Profilometry-Based Indentation Plastometry (PIP) and Computer Tomography: Influence of Porosity**
[Thomas JF Southern](#)¹; Olly J. Morris¹; Edson Costa Santos²; Julian Schulz²; ¹Plastometrex; ²ZEISS Industrial Quality Solutions

17:00 PM **END OF DAY**

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Alberto Bordin, ASTM International
Jimmy Campbell, Plastometrex

08:00 AM
INVITED **Microstructural, Mechanical, and Fatigue Performance of a Wire Arc Additive Manufactured AWS ER100S-G Steel**
[Meysam Haghshenas](#)¹; Garrett Webster¹; ¹University of Toledo

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ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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- 08:30 AM**
REGULAR **ASTM F2077 Mechanical Testing of PEEK and Silicon Nitride-PEEK Cervical Interbody Cages Produced by Fused Filament Fabrication**
[Ryan M. Bock](#)¹; Cemile Başgöl²; Paul DeSantis²; Tabitha Derr²; Hannah Spece²; Douglas Hoxworth¹; Dan MacDonald²; Aliza Rabinowitz²; Noreen J. Hickok³; Steven M. Kurtz²; ¹SINTX Technologies; ²Drexel University; ³Thomas Jefferson University
- 09:00 AM**
INVITED **Variational Autoencoders for Comprehensive Feature Identification in Fatigue Analysis**
[Sneha P. Narra](#)¹; William Frieden Templeton¹; ¹Carnegie Mellon University
- 09:30 AM**
INVITED **Unintentional Chemistry, Crystallographic Texture, and Tensile Property Variation Within Single Builds of Additively Manufactured Titanium Alloy**
[Nik Hrabe](#)¹; ¹NIST
- 10:00 AM** **BREAK**
- 10:30 AM**
REGULAR **Using Established Wrought Strength Trends to Inform Additively Manufactured Strength Trends**
[Kelsay Neely](#)¹; Paul R. Gradl¹; Colton C. Katsarelis¹; Nima Shamsaei²; Shuai Shao²; ¹NASA - Marshall Space Flight Center (MSFC); ²Auburn University
- 10:50 AM**
REGULAR **Quantifying the Relationship of Gas Flow and Delivered Laser Power to Mechanical Properties**
[Joy Gockel](#)¹; Edwin Glaubitz¹; Clayton Perbix¹; Sage Frontella¹; Claire Casey¹; Ryan Fishel²; Allan Huntington²; Jeffrey Shaffer²; ¹Colorado School of Mines; ²3D Systems
- 11:10 AM**
REGULAR **Surface Finish and Mechanical Properties of Laser Powder Bed Fusion Processed 316L Stainless Steel using Roller Spreading Technology**
[Swathi Vunnam](#)¹; ¹AddUp
- 11:30 AM** **END OF DAY**

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AM APPLICATIONS FOR AUTOMOTIVE TRANSPORTATION/HEAVY MACHINERY

CO-ORGANIZERS:

Eric Johnson
Eaton, USA

Ante Lausic
General Motors, USA

Simon Pun
Divergent, USA

Aaron Lalonde
U.S. Army Combat Capabilities
Development Command - Ground
Vehicles Systems Center, USA

Thierry Marchione
Caterpillar, USA

30TH OCT 2023 (MON)
CONGRESSIONAL B (LOBBY LEVEL)

13:30 PM ****No Program****
Keynote 02 (Transportation) at Regency BR
[A]

14:10 PM **END OF DAY**

30TH OCTOBER 2023

SESSION CHAIR (AM SESSION):

Thierry Marchione, Caterpillar
Simon Pun, Divergent

08:00 AM **Advances in Additive Friction Stir
INVITED Deposition (AFSD) at the Vehicle Scale**
[Matthew Kelly](#)¹; Aaron Lalonde¹; Martin
McDonnell¹; Ricardo Rodriguez²; ¹U.S. Army
Combat Capabilities Development Command -
Ground Vehicles Systems Center (GVSC);
²ASTRO America

08:30 AM **Heat Exchanger Application in Additive
REGULAR Manufacturing**
[Ramesh Subramanian](#)¹; Daniel Cassar¹; Ole
Geisen¹; Andrew Kappers¹; Markus Lempke¹;
¹Siemens Energy

09:00 AM **Metal Additive Manufacturing for Tooling
INVITED**
[Berne Högman](#)¹; ¹Uddeholm

09:30 AM **Fast Qualification through Equivalence
INVITED Testing - Validation of AMEC Process**
[Sarah E. Jordan](#)^{1,2}; ¹Skuld; ²Worcester
Polytechnic Institute

10:00 AM **BREAK**

10:30 AM **Crashworthy Additively Manufactured
INVITED Vehicle Structures**
[Simon Pun](#)¹; Michael Kenworthy¹; ¹Divergent

11:00 AM **A Novel Method for Producing Fully-Dense
INVITED Aluminum Parts at Volume**
[Ali Forsyth](#)¹; [Alan Lai](#)¹; Ellen Benn¹; Lyle
Cheatham¹; Nicholas Mykulowycz¹; Kevin
Simon¹; Paul Titchener¹; ¹Alloy Enterprises

11:30 AM **PBF-LB Process Parameter Development
REGULAR of High Conductivity Alloys for
Electrification**
[Thomas J. Wasley](#)¹; Chris Dalton¹; ¹The
Manufacturing Technology Centre (MTC)

11:50 AM **LUNCH**

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ICAM 2023 FINAL PROGRAM AGENDA

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INDUSTRY 4.0: ROBOTICS AND AUTOMATION IN AM

CO-ORGANIZERS:

Richard "Ritchie" Allen

Yaskawa Motoman, USA

Philip Freeman
Boeing, USA

Joseph Falco
NIST, USA

Michael Skocik
ARM (Advanced Robotics for Manufacturing) Institute, USA

31ST OCT 2023 (TUE)
LEXINGTON (BALLROOM LEVEL)

31ST OCTOBER 2023

SESSION CHAIR (AM + PM SESSIONS):

Joseph Falco, NIST
Michael Skocik, ARM Institute

08:00 AM INVITED	Advances Robotic Material Removal and Part Finishing Solution Michael Haas ¹ ; ¹ FerRobotics
08:30 AM INVITED	NIST Performance Standards for Automated--Autonomous Robotic Systems Omar Y. Aboul-Enein ¹ ; Joseph Falco ¹ ; Soocheol Yoon ^{1,2} ; ¹ NIST; ² Georgetown University
09:00 AM INVITED	Measurement Science and Standards for Robotics and Automation Craig Schlenoff ¹ ; ¹ NIST
09:30 AM INVITED	New Robotics Technologies for Advanced Manufacturing Processes Joseph A. Giampapa ¹ ; ¹ ARM (Advanced Robotics for Manufacturing) Institute
10:00 AM	BREAK
10:30 AM INVITED	No-Code and Low-Code Robot Programming for End Users Kel Guerin ¹ ; ¹ READY Robotics
11:00 AM REGULAR	Solutions Improving the Ease of Use Around Advanced Open Source Robotics Tools for Industry Matthew M. Robinson ¹ ; ¹ Southwest Research Institute (SwRI)
11:20 AM REGULAR	From Stationary Single-Robot to Mobile Multi-Robot Additive Manufacturing Azadeh Haghighi ¹ ; ¹ University of Illinois Chicago
11:40 AM REGULAR	Enabling Infrastructure Free Coordination of a Manipulator and Mobile Base Tyler Marr ¹ ; ¹ Southwest Research Institute (SwRI)
12:00 PM	LUNCH

13:30 PM	**No Program** Keynote 04 (Robotics & Automation) at Regency BR [A]
14:20 PM REGULAR	Collaborative Robotic Process Planning for Surface Treatment of Complex Components Michael Groeber ¹ ; Adam Buynak ¹ ; Adam Exley ¹ ; Erik Furterer ¹ ; ¹ Ohio State University
14:40 PM REGULAR	Fully Automated Production Process for Additive Manufacturing of Prefabricated Wall Panels Alexey Dubov ¹ ; Anton Glance ¹ ; Sergei Zolotarev ¹ ; ¹ Mighty Buildings
15:00 PM	BREAK
15:30 PM INVITED	Design and Deployment of Advanced Aerospace Manufacturing Solutions at Scale Bharath Rao ¹ ; ¹ Spirit AeroSystems
16:00 PM INVITED	Computational Design of Passive Grippers Jeffrey Lipton ¹ ; Milin Kodnongbua ² ; Ian Good ² ; Yu Lou ² ; Adriana Schulz ² ; ¹ Northeastern University; ² University of Washington
16:30 PM INVITED	After Additive, Leveraging Autonomous Technology as a Work Force Multiplier to Accommodate Vocational Scarcity in Joining and Finishing Arnold Kravitz ¹ ; ¹ BlueForge Alliance
17:00 PM	END OF DAY

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ECONOMICS AND SUSTAINABILITY OF AM

CO-ORGANIZERS:

Alexandre Donnadieu
3YOURMIND, USA

Behrang Poorganji
Morf3D, USA

Marius Lakomeic
EOS, Germany

Nicolas Sabo
General Electric, USA

31ST OCT 2023 (TUE)
BUNKER HILL (BALLROOM LEVEL)

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Behrang Poorganji, Morf3D

SESSION CHAIR (PM SESSION):

Alexandre Donnadieu, 3YOURMIND

08:00 AM INVITED	The Sustainable Industrialization of Additive Manufacturing through "The Digital Enterprise" Steve Vosmik ¹ ; ¹ Siemens
08:30 AM REGULAR	How to Manufacture 25 Tons of Metal per Year, Sustainably James DeMuth ¹ ; ¹ Seurat
08:50 AM REGULAR	Circular Materials for Sustainable Additive Manufacturing Ramona (Haniyeh) Fayazfar ¹ ; ¹ Ontario Tech University
09:10 AM REGULAR	Sustainable Feedstocks for Additive Manufacturing Antonio Paesano ¹ ; ¹ Boeing
09:30 AM INVITED	Environmental Benefits of Additive Manufacturing - A Comparative Assessment and Business Case: Binder-Jetting vs Casting Sherri Monroe ¹ ; ¹ Additive Manufacturer Green Trade Association (AMGTA)
10:00 AM	BREAK
10:30 AM INVITED	Understanding and Improving Sustainability in Additive Manufacturing Krysten Minnici ¹ ; Stephen Serpe ¹ ; ¹ Arkema
11:00 AM INVITED	Path to Increasing Productivity and Sustainability for Powder Bed Fusion based Manufacturing Oliver Elbert ¹ ; Kurt Göpflich ¹ ; ¹ Grenzebach
11:30 AM INVITED	Sustainability and Economics KPIs of Fully Automated AM Production Cells Jeffrey M. Davis ¹ ; Marius Lakomeic ¹ ; ¹ EOS
12:00 PM	LUNCH

13:30 PM INVITED	Designing for Circular Economies: Creating Impact from Local Plastic Waste using Off-Grid Containerized 3D Printers & Practice Based Learning Douglas Sassaman ¹ ; Chris Hong ² ; Sofia Valdez ² ; Yael Glazer ² ; Carolyn Seepersad ³ ; Michael Webber ² ; Charlotte Craff ¹ ; Samantha Snabes ¹ ; Aziz Ahmed ⁴ ; Leela Kempton ⁴ ; Eesha Bilal ² ; ¹ re:3D; ² University of Texas at Austin; ³ Georgia Institute of Technology; ⁴ University of Wollongong
14:00 PM REGULAR	Screening Life Cycle Assessment Results Comparing DLP-Based 3D Printing to Injection Molding for End-Use Part Application Justin W. Sokel ¹ ; Joachim Aigner ¹ ; ¹ W. L. Gore & Associates
14:20 PM REGULAR	IperionX: Developing a Low Cost, Low Carbon Titanium Supply Chain in the US Anastasios (Taso) Arima ¹ ; Hyrum Lefler ¹ ; ¹ IperionX
14:40 PM REGULAR	Can or Should? Using Monte Carlo to Estimate Break Even and Cost Avoidance for Additively Manufactured Parts Stephen Kuhn-Hendricks ¹ ; ¹ NAVSUP Weapon Systems Support (NAVSUP WSS) - Navy Price Fighters
15:00 PM	BREAK
15:30 PM INVITED	Variable Layer Thicknesses in Laser Powder-Bed Fusion for Cost Reduction of a Gas Turbine Component Tad Steinberg ¹ ; ¹ Siemens Energy
16:00 PM INVITED	Smart Fusion - How EOS Delivers on the Promise of Support-Free Printing without Compromising in Cost-Per-Part Michael Wohlfart ¹ ; ¹ EOS
16:30 PM REGULAR	Industrial Applications in the Industry: From Part Identification to Quality Mass Production Daniel Baker ¹ ; ¹ Endeavor 3D
16:50 PM INVITED	Devil is the Details: Key Factors Underpinning Successful Business Models for AM and What Sustainability Has to Do with It Thierry Rayna ¹ ; Ludmila Striukova ² ; ¹ École Polytechnique (L'X); ² SKEMA Business School
17:20 PM	END OF DAY

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DIRECTED ENERGY DEPOSITION PROCESSES AND APPLICATIONS

CO-ORGANIZERS:

Frank Brückner
Fraunhofer IWS, Germany

Paul Gradl
NASA - Marshall Space Flight Center (MSFC)

Badri Narayanan
Lincoln Electric, USA

Slade Gardner
Big Metal Additive, USA

Filomeno Martina
WAAM3D, United Kingdom

31ST OCT 2023 (TUE) – 01ST NOV 2023 (WED)
CONGRESSIONAL B (LOBBY LEVEL)

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Slade Gardner, Big Metal Additive

SESSION CHAIR (PM SESSION):

Paul Gradl, NASA - Marshall Space Flight Center (MSFC)

08:00 AM
INVITED **Additive Manufacturing of Aluminum Structures at High Build-Up Rates**
[Jörg Volpp](#)¹; Francesco Bruzzo²; Tobias Kamps³; Himani Naesstroem¹; Frank Brückner²; ¹Luleå University of Technology; ²Fraunhofer Institute for Material and Beam Technology IWS; ³Siemens

08:30 AM
REGULAR **Advancing Additively Manufactured Al-6061 RAM2 using Laser Powder Directed Energy Deposition**
[Paul R. Gradl](#)¹; David Waller²; Chloe Johnson³; Tessa Fedotowsky¹; Ben Williams¹; ¹NASA - Marshall Space Flight Center (MSFC); ²Ball Aerospace; ³Elementum 3D

08:50 AM
REGULAR **Directed Energy Deposition of CuSn10: A Study on Process Parameter Optimization and Wear Behavior**
[Sunil Raghavendra](#)¹; Sasan Amirabdollahian²; Matteo Benedetti¹; Marco Chemello³; Matteo Perini¹; ¹University of Trento; ²Trentino Sviluppo - ProM Facility; ³Sicor

09:10 AM
REGULAR **Effects of Build Envelope Size and Ultrasonic Excitation on the Microstructure and Mechanical Properties of Stainless Steel Fabricated by DED-LB/P**
[Niklas Sommer](#)¹; [Stefan Böhm](#)¹; Peter Mäkel²; Florian Stredak¹; Christian Wolf¹; ¹University of Kassel; ²isi-sys

09:30 AM
INVITED **DEEP: Progress towards Multi-Arm WAAM of Subsea Pressure Vessels Classed for Human Occupancy**
[Louise Slade](#)¹; [Harry Thompson](#)¹; [Sam Tiller](#)¹; ¹DEEP

10:00 AM **BREAK**

10:30 AM
INVITED **Rapid Prototyping of Materials using Directed Energy Deposition**
[Swee Leong Sing](#)¹; ¹National University of Singapore (NUS)

11:00 AM
REGULAR **Thin-Wall Internal Channel Geometry and Surface Enhancements for Heat Exchangers using Laser Powder Directed Energy Deposition**
[Paul R. Gradl](#)¹; Angelo Cervone²; Piero Colonna²; ¹NASA - Marshall Space Flight Center (MSFC); ²Delft University of Technology

11:20 AM
REGULAR **Multi-Axis Additive Manufacturing with Laser-Blown Powder DED for Support Less 3D-Printing**
[Rachel Mancuso](#)¹; [Bhaskar Dutta](#)¹; Farhad Ghadamli¹; ¹DM3D Technology

11:40 AM
REGULAR **Part-Level Heat Buildup and Cooling Across Directed Energy Deposition Additive Manufacturing Processes**
[Elizabeth Chang-Davidson](#)¹; Jose Loli²; Jack L. Beuth²; ¹Northeastern University; ²Carnegie Mellon University

12:00 PM **LUNCH**

13:30 PM
INVITED **Welding and Weldability Concerns for Additively Manufactured Materials**
[William C. Evans](#)¹; ¹NASA - Marshall Space Flight Center (MSFC)

14:00 PM
REGULAR **Wire-Arc Additive Manufacturing of Haynes 282 Superalloy**
[Wei Xiong](#)¹; Luis Fernando Ladinis Pizano¹; Soumya Sridar¹; Chantal K. Sudbrack²; Xin Wang¹; ¹University of Pittsburgh; ²National Energy Technology Laboratory (NETL)

14:20 PM
REGULAR **High Productivity Additive Manufacturing with Gas Metal Arc and an External Cold Wire**
[Chong Wang](#)¹; João Bento¹; Jialuo Ding¹; Gonçalo R. Pardal¹; Jun Wang¹; Stewart Williams¹; ¹Cranfield University

14:40 PM
REGULAR **Properties of Steel, Aluminium, Nickel and Titanium Alloys Printed by CWMIG® at over 10kg/h**
[Filomeno Martina](#)¹; Stewart Williams²; Jialuo Ding²; ¹WAAM3D; ²Cranfield University

15:00 PM **BREAK**

15:30 PM
INVITED **Toward Control of Part Distortion and Residual Stress for Large-Scale Metal Additive Manufacturing**
[Yousub Lee](#)¹; Andrzej Nycz¹; Srdjan Simunovic¹; Luke Meyer¹; Shuvodeep De¹; Chris Masuo¹; William Carter¹; Pei Zhang¹; Ramanan Sankaran¹; Joshua Vaughan¹; ¹Oak Ridge National Laboratory (ORNL)

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16:00 PM
INVITED **Past, Present, and Future Strategies for Directed Energy Deposition Process Control**
[Scott Nelson](#)¹; ¹Rolls-Royce

16:30 PM **END OF DAY**

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):
Frank Brückner, Fraunhofer IWS

SESSION CHAIR (PM SESSION):
Martin White, ASTM International

08:00 AM
INVITED **Large Format AM in Oil & Gas Applications, Opportunities and Challenges**
[Carlo De Bernardi](#)¹; ¹ConocoPhillips

08:30 AM
REGULAR **Marine Vessel Lightweighting through Direct Energy Deposition**
[Misael Pimentel Espirindio e Silva](#)¹; Stephen Fitzpatrick¹; Scott McKegney¹; Calum Hicks¹; Andrew Brawley¹; Chris Dunn²; Jonathan Brown²; Amber Lithgow²; Tom Goodwin³; Adam Saxty⁴; Ian McNicholl⁵; ¹National Manufacturing Institute Scotland (NMIS); ²Malin Group; ³Altair; ⁴Lloyd's Register; ⁵BAE Systems

09:10 AM
REGULAR **Processing-Performance Relationship of Metallic Structures Manufactured using a Hybrid DED System**
[Pedro Cortes](#)¹; Aayush Alok¹; John Carballo¹; Andrew Prokop¹; Brian Vuksanovich¹; Bharat Yelamanchi¹; ¹Youngstown State University

09:30 AM
INVITED **Allowables Generation for Ti-6Al-4V via the L-DED Process**
[Baily J. Thomas](#)¹; James Dobbs¹; Daniel E. Driemeyer¹; Nicholas Segobiano¹; Andrew Steevens²; Zachary Whitman²; ¹Boeing Research & Technology; ²Boeing Commercial Airplanes

10:00 AM **BREAK**

10:30 AM
INVITED **Functionally Graded Materials based on Inconel and SiC Processed via Directed Energy Deposition**
[Vladimir V. Popov](#)¹; Shir Batat¹; Noam Eliaz¹; ¹Tel Aviv University

11:00 AM
REGULAR **Replacing Long Lead Time Forgings with Directed Energy Deposition Built Components**
[William C. Evans](#)¹; Christopher Protz¹; ¹NASA - Marshall Space Flight Center (MSFC)

11:20 AM
REGULAR **Considerations for the Use of Gas Metal Arc Wire-DED Builds as Replacement Parts in the Nuclear and Pressure Vessel Industries**
[Ben B. Schaeffer](#)¹; [Teresa Melfi](#)¹; ¹Lincoln Electric

11:40 AM
REGULAR **Wire Arc Additively Manufactured TRIP Assisted Steel from Ferritic Low Carbon Steel using Interlayer Micropowder Alloying**
[Sachin Kore](#)¹; [Adarsh Prakash](#)¹; ¹Indian Institute of Technology (IIT) Goa

12:00 PM **LUNCH**

13:30 PM
INVITED **Influence of Post-Process Heat Treatments on Nickel-Based Alloy 718 Deposits Made using Wire-Arc Additive Manufacturing**
[Yukinori Yamamoto](#)¹; Andres Marquez Rossy¹; Andrzej Nycz¹; Luke Meyer¹; William Carter¹; Ben B. Schaeffer²; Badri Narayanan²; ¹Oak Ridge National Laboratory (ORNL); ²Lincoln Electric

14:00 PM
REGULAR **Achieving Product Acceptance Using a Technical Data Package Built on Specifications and Standards**
[Slade Gardner](#)¹; ¹Big Metal Additive

14:20 PM
REGULAR **Prediction Model for Direct Energy Deposition of Pure Cu Fabrication using Computational Fluid Dynamics Simulation**
[Takashi Maeshima](#)¹; Kan-ichi Tsunoda¹; Hideaki Ikehata¹; Tadashi Oshima¹; ¹Toyota Central R&D Labs

14:40 PM
REGULAR **Increased Working Lifetime of Industrial Gears using Additive Manufacturing: Material Characterization and Study of Mechanical Properties**
[Diego Montoya-Zapata](#)¹; [Igor Ortiz](#)¹; Piera Alvarez¹; Maria Angeles Montealegre²; Francisco Cordovilla³; Jose Luis Ocaña³; ¹INZU Group - Ikerdune; ²INZU Group - Talens; ³Technical University of Madrid (UPM) - Laser Center

15:00 PM **BREAK**

15:30 PM
INVITED **Laser Metal Deposition for Oil & Gas Industry with Articulated Robot or Cartesian System: A Comparative Study**
[Barbara Previtali](#)¹; ¹Politecnico di Milano

16:00 PM
REGULAR **Cold Spray: A Different DED Technique - It's Potentials and some Applications**
[Markus Brotsack](#)¹; Christian Bauer¹; Jan Kondas¹; Reeti Singh¹; ¹Impact Innovations

16:20 PM
REGULAR **Increased Process Stability and Efficiency by Digitalization in Laser-Based Additive Manufacturing**
[Elena López](#)¹; Frank Brückner¹; Mirko Riede¹; Rico Hemschik¹; Michael Mueller¹; Lukas Stepien¹; Moritz Greifzu¹; ¹Fraunhofer Institute for Material and Beam Technology IWS

16:40 PM
REGULAR **An End-to-End Framework for Ensuring Acceptance of WAAM Components in the Energy Sector**
[Filippo Gilardi](#)¹; ¹MX3D

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ICAM 2023 FINAL PROGRAM AGENDA

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17:00 PM **END OF DAY**

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APPLICATION OF AM IN ENERGY, MARITIME, AND OIL & GAS

CO-ORGANIZERS:

Håkan Brodin
Siemens Energy, Sweden

Matt Sanders
Stress Engineering Services,
USA

Isabella van Rooyen
Pacific Northwest National
Laboratory (PNNL)

Carlo De Bernardi
ConocoPhillips, USA

Valeria Tirelli
AIDRO, Italy

Mostafa Yakout
University of Alberta,
Canada

31ST OCT 2023 (TUE) – 01ST NOV 2023 (WED)
CONGRESSIONAL CD (LOBBY LEVEL)

31ST OCTOBER 2023

SESSION CHAIR (AM SESSION):

Mostafa Yakout, University of Alberta

SESSION CHAIR (PM SESSION):

Isabella van Rooyen, Pacific Northwest National Laboratory

08:00 AM
INVITED Additive Manufacturing in Oil and Gas - A Whole-System Approach through R&D and Application to Standardisation
[John G. Rafferty](#)¹; Rina Aagaard Wacker¹;
¹TechnipFMC

08:30 AM
REGULAR Identifying AM Parts in the Energy Sector: Solution to Spare Part Procurement
[Alexandre Donnadieu](#)¹; ¹YOURMIND

08:50 AM
REGULAR Digital Inventory in the Energy Industry
[Brede Lærum](#)¹; ¹Equinor

09:10 AM
REGULAR Additive Manufacturing of Components for High Temperature Use in Petrochemical Process Units: Process Development, Characterization, and Comparison with Conventional Counterparts
[Paul A. Davies](#)¹; Hans Söderberg¹; Johan Wallin¹; Mikael Schuisky¹; Ser-Hor Chong²; Thomas Copeland²; Ning Ma²; Charlie Chun²; Chee Lup Khong²; Jaspal Singh²; ¹Sandvik Additive Manufacturing; ²ExxonMobil

09:30 AM
INVITED Benefits of Additive Manufacturing Technologies for the Oil and Gas Industry
[Sami Arsan](#)¹; ¹voestalpine

10:00 AM
BREAK

10:30 AM
INVITED Mitigating Distortion and Cracking for a Large Ti6Al4V WAAM Component
[Wen Dong](#)¹; Albert C. To¹; Xavier Jimenez¹;
¹University of Pittsburgh

11:00 AM
INVITED 3D Printing for Offshore Forging Replacements
[Robert Rettew](#)¹; [Patrick Boster](#)²; ¹Chevron;
²Stress Engineering Services

11:30 AM
REGULAR Gate Valve Size 1½", Class 150, Material ASTM-F3184-S31603, Produced by AM & Certified According to European Pressure Equipment Directive (PED-2014/68/EU)
[Oscar Barcella](#)¹; Angeline Goh²; Rob Hengst²; Alfred Kruijer²; Dennis Boon²; Antonio Sonzogni¹; Marc Wilms²; ¹BFE - Bonney Forge; ²Shell

11:50 AM
LUNCH

13:30 PM
INVITED Fiber Sensor Fused Additive Manufacturing for Energy Applications
[Kevin P. Chen](#)¹; Albert C. To¹; ¹University of Pittsburgh

14:00 PM
REGULAR Microstructure Analysis of TIG Weld Joints of Ni-Based Superalloys Produced by Laser Powder Bed Fusion
[Tad Steinberg](#)¹; Ole Geisen¹; ¹Siemens Energy

14:20 PM
REGULAR Material Data and the Verification Process for Structural Components for Shipbuilding, using Wire-Arc Additive Manufacturing
[Brad Coulter](#)¹; ¹AML3D

14:40 PM
REGULAR A Research Program on Aging Behavior of Additive Manufacturing Materials for Nuclear and Hydraulic Uses
[Gaëlle Leopold](#)¹; Yang Shen¹; ¹Électricité de France (EDF)

15:00 PM
BREAK

15:30 PM
INVITED Net Zero Supply Chain in the Oil and Gas Industry with Additive Manufacturing
[Anna D'Alessio](#)¹; ¹Ivaldi

16:00 PM
INVITED Retrofitting of a Valve using Additive Manufacturing for Improved Sustainability
[Carlo Giacomo Mondora](#)¹; ¹Valland

16:30 PM
INVITED Boron Nitride Nano Additives to Enhance the Properties of Tailored Materials for 3-D in the Energy, Oil & Gas Sectors
[Phil G. Chataigneau](#)¹; ¹PPK Group

17:00 PM
END OF DAY

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Isabella van Rooyen, Pacific Northwest National Laboratory

08:00 AM
INVITED Additive Manufacturing of Next-Generation Metallic and Ceramic Materials for Applications in the Energy and Oil & Gas Industries
[Mostafa Yakout](#)¹; Hanieh Ahmadi¹; James Hogan¹; ¹University of Alberta

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ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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- 08:30 AM**
REGULAR **3D Printing of Multiple Small-Scale Ship Propellers Made of 17-4PH SS & Inconel 625 and their Corrosion Tests**
[Xiaochuan \(Vincent\) Yu](#)¹; Savannah Spivey²; Hanqi Yu¹; Erica Murray²; ¹University of New Orleans; ²Louisiana Tech University
- 08:50 AM**
REGULAR **HEAs for Nuclear Energy Applications and Potential Advanced Manufacturing Methods**
[Mohan Sai Kiran Kumar Yadav Nartu](#)¹; Isabella J. van Rooyen¹; Rajarshi Banerjee²; ¹Pacific Northwest National Laboratory (PNNL); ²University of North Texas
- 09:10 AM**
REGULAR **Automated Workflow for Support Structure Optimization in Laser Powder Bed Fusion Additive Manufacturing**
[Enrique Escobar de Obaldia](#)¹; Timo Heitmann²; Alexandre Matei¹; Christopher Robinson¹; Cynthia Wirth²; ¹Ansys; ²Siemens Energy
- 09:30 AM**
INVITED **A Model for Scaling 3D Printing in the Energy Sector**
[Edwige L. Ravry](#)¹; [Nils Knofius](#)²; [Bertrand Maillon](#)³; ¹TotalEnergies; ²Fieldmade; ³IMI Critical Engineering
- 10:00 AM** **BREAK**
- 10:30 AM**
INVITED **Coordinating Standards to Achieve Many Elements of Qualification and Acceptance**
[Slade Gardner](#)¹; ¹Big Metal Additive
- 11:00 AM**
REGULAR **A New Hybrid Manufacturing Approach to Thermal Management Applications**
[Jason B. Jones](#)¹; Peter Coates¹; Sam Holdsworth²; Peter-Jon Solomon¹; ¹Hybrid Manufacturing Technologies; ²The Welding Institute (TWI)
- 11:20 AM**
REGULAR **Arc Weldability Studies of 316L and 625 L-PBF**
[Tressa A. White](#)¹; Ryan Arblaster¹; Trevor Hicks¹; Robert Hamlin¹; ¹Naval Nuclear Laboratory (NNL)
- 11:40 AM**
REGULAR **Class Approved Propulsion Components Manufactured with WAAM in Accordance with DNV Guidelines**
[Joachim Antonissen](#)¹; [Mette Lokna Nedreberg](#)²; ¹Guaranteed; ²Kongsberg Maritime
- 12:00 PM** **LUNCH**
- 13:30 PM** ****No Program****
Keynote 06 (Energy) at Regency BR [A]
- 15:00 PM** **BREAK**
- 15:30 PM** ****No Program****
Panel 08 (Energy) at Regency BR [A]
- 16:30 PM** **END OF DAY**

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MODELING, SIMULATION, AND DIGITAL TWINS FOR QUALIFICATION AND CERTIFICATION

CO-ORGANIZERS:

Edward Glaessgen
NASA - Langley Research Center (LaRC), USA

Nicholas Mulé
Boeing, USA

James Sobotka
Southwest Research Institute (SwRI), USA

Michael Gorelik
Federal Aviation Administration (FAA), USA

Shuai Shao
Auburn University, Italy

31ST OCT 2023 (TUE) – 01ST NOV 2023 (WED)
CONCORD (BALLROOM LEVEL)

31ST OCTOBER 2023

SESSION CHAIR (PM SESSION):

Shuai Shao, Auburn University
James Sobotka, Southwest Research Institute (SwRI)

13:30 PM INVITED **A Design Digital Twin of the Metal Powder-Bed Fusion Process**
[Guglielmo Vastola](#)¹; Jakub Mikula¹; Robert Laskowski¹; Rajeev Ahluwalia¹; Yingzhi Zeng¹; Ling Dai¹; Wenjun Ding¹; Kewu Bai¹; Ramanarayan Hariharaputran¹; Sharon Nai²; Yong-Wei Zhang¹; ¹A*STAR - Institute of High Performance Computing (IHPC); ²A*STAR - Singapore Institute of Manufacturing Technology (SIMTech)

14:00 PM REGULAR **Physics-Informed Digital Twin Framework for Microstructure Tailoring in Laser Powder Bed Fusion**
[Tuğrul Özel](#)¹; Lang Yuan²; ¹Rutgers University-New Brunswick; ²University of South Carolina

14:20 PM REGULAR **Introduction to Virtual Foundry, HP's Digital Twin Software Created for its Metal Jet Technology**
[Pavan Suri](#)¹; Carlos A. Lopez¹; Alexis Burr²; Jorge A. Becerra¹; Jun Zeng¹; ¹HP; ²French Alternative Energies and Atomic Energy Commission (CEA)

14:40 PM REGULAR **Skeletal Reconstruction Device Digital Twins of Form, Function, and Fabrication for Hybrid Autonomous Point-of-Care Manufacturing**
[David D. Dean](#)¹; Ryan Eaton¹; Hany Emam¹; Michael Groeber¹; Andrew Grossbach¹; Stephen Niezgoda¹; Luis H. Olivas-Alanis¹; Ciro A. Rodriguez¹; Roman Skoracki¹; Kyle K. VanKoeveering¹; Yeoheung Yun²; ¹Ohio State University; ²North Carolina Agricultural & Technical State University

15:00 PM BREAK

15:30 PM INVITED **Integrated Computational Materials Design ICMD® Technology for Accelerated Deployment of Metallic Materials in Additive Manufacturing**
[Gary Whelan](#)¹; Keith Fritz¹; Abhinav Saboo¹; Jiadong Gong¹; ¹QuesTek Innovations

16:00 PM REGULAR **Improving the Printability of Existing Alloys for Additive Manufacturing using Machine Learning**
[Ankit Roy](#)¹; Mageshwari Komarasamy¹; Ram Devanathan¹; Isabella J. van Rooyen¹; ¹Pacific Northwest National Laboratory (PNNL)

16:20 PM END OF DAY

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Edward Glaessgen, NASA - Langley Research Center
James Sobotka, Southwest Research Institute (SwRI)

SESSION CHAIR (PM SESSION):

Edward Glaessgen, NASA - Langley Research Center
Shuai Shao, Auburn University

08:00 AM INVITED **A Pragmatic Approach to Greater Integration of Modeling and Simulation into the Qualification and Certification Activities Related to Advanced Manufacturing**
[Douglas N. Wells](#)¹; ¹NASA - Marshall Space Flight Center (MSFC)

08:30 AM REGULAR **Candidate Methods to Assess Structural Integrity of Higher-Criticality AM Components**
[James C. Sobotka](#)¹; Craig McClung¹; ¹Southwest Research Institute (SwRI)

08:50 AM REGULAR **Digital Verification of Custom Implants using Numerical Simulation**
[Jan Hertwig](#)¹; [Florian Maier](#)¹; ¹Simq

09:10 AM REGULAR **A Digital Twin of Additively Manufactured Parts for Predictive Maintenance**
[Armando C. Coro](#)¹; ¹ITP Aero

09:30 AM INVITED **Fracture Mechanics-Based Approach for Anomaly Size Acceptability of Additively Manufactured Metals**
[Andrew C. Perry](#)¹; [Simone Romano](#)²; ¹GE Aerospace; ²Avio Aero

10:00 AM BREAK

10:30 AM INVITED **The Role of Modeling vs. Testing in Fatigue and Damage Tolerance Assessment of Metallic Structures**
[Michael Gorelik](#)¹; ¹Federal Aviation Administration (FAA)

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11:00 AM
REGULAR **Competing Crack Initiation Mechanisms in Defect Insensitive Materials**
[Shuai Shao](#)¹; Nima Shamsaei¹; ¹Auburn University

11:20 AM
REGULAR **First-Time-Right Printing of Challenging Geometries in Filament Fusion using Simulation with a Semicrystalline Polymer in Amorphous Mode and Soluble Support**
[Robert McKay](#)¹; Silvia Berretta¹; ¹Victrex

11:40 AM **LUNCH**

13:30 PM
INVITED **The Role of Computational Fluid Dynamics in Digital Twins for Additive Manufacturing**
[Ibai Mugica](#)¹; Allyce Jackman¹; ¹FLOW-3D

14:00 PM
REGULAR **Exploration of TPMS Structures in High Velocity Impact Applications using Explicit Dynamics Simulations**
[Andrew Kappers](#)¹; [Daniel Cassar](#)¹; ¹Siemens Energy

14:20 PM
REGULAR **A Macroscale Finite Element Model for Predicting Residual Stress Buildup in Cold Spray Deposits**
[Scott E. Julien](#)¹; Enqiang Lin¹; Chaitanya Vundru¹; Kirstyn Roberts²; Ozan C. Özdemir¹; Sinan Müftü¹; ¹Northeastern University; ²Eaton

14:40 PM
REGULAR **Thermomechanical Distortion Studies during Laser-Blown Powder DED Process**
[Bhaskar Dutta](#)¹; Rachel Mancuso¹; Farhad Ghadamli¹; ¹DM3D Technology

15:00 PM **BREAK**

15:30 PM
INVITED **A Probabilistic Rapid Qualification Framework Applied Toward an Additively Manufactured Engine Component**
[Erin DeCarlo](#)¹; John McFarland²; Barron Bichon¹; ¹Southwest Research Institute (SwRI); ²National Renewable Energy Laboratory (NREL)

16:00 PM
INVITED **Computational Fatigue Models to Assist in Risk-Based Certification of Additively Manufactured Metallic Parts**
[Robert Tryon](#)¹; Animesh Dey¹; Michael Oja¹; ¹VEXTEC Corporation

16:30 PM
REGULAR **Developing Lean Manufacturing Processes for Small Additive Manufacturers using a Surrogate Modeling Based-Simulation Approach**
[Osama \(Sam\) Aljarrah](#)¹; Jarod Zillinger²; Elizabeth Williams²; Hunter Gladin²; Richard Graham²; ¹Kettering University; ¹Youngstown State University

16:50 PM **END OF DAY**

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FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS

CO-ORGANIZERS:

Stefano Beretta
Politecnico di Milano,
Italy

Thomas Niendorf
University of Kassel,
Germany

Douglas Wells
NASA - Marshall Space Flight
Center (MSFC), USA

Craig McClung
Southwest Research
Institute (SwRI), USA

Jutima Simsiriwong
University of North
Florida, USA

01ST NOV 2023 (WED) – 03RD NOV 2023 (FRI)
REGENCY BR [B] (BALLROOM LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Stefano Beretta, Politecnico di Milano

SESSION CHAIR (PM SESSION):

Jake Benzing, NIST

08:00 AM **Prediction of the Fatigue Limit of Additively** **INVITED** **Manufactured Metallic Materials**

[Mauro Madia](#)¹; Itziar Serrano-Munoz¹; Ilaria Roveda¹; ¹Bundesanstalt für Materialforschung und -prüfung (BAM)

08:30 AM **A Machine Learning-Based Approach for** **REGULAR** **Predicting Fatigue Behavior of Post-Processed Additive Manufactured Materials**

[Erfan Maleki](#)¹; Nima Shamsaei¹; ¹Auburn University - National Center for Additive Manufacturing Excellence (NCAME)

09:00 AM **The Influences of Cycling Frequency on** **INVITED** **Fatigue Behavior of Additively-Manufactured Metallic Materials**

[Jutima Simsiriwong](#)¹; Shuai Shao²; Nima Shamsaei²; ¹University of North Florida; ²Auburn University

09:30 AM **Micromechanical Modeling of Fatigue** **INVITED** **Behavior of Friction-Stir Hybrid Welded Joint of AISi10Mg Parts Produced by Additive Manufacturing and Casting**

[Ghazal Moeini](#)¹; Alexander Hartmaier²; Marcel Krochmal³; Aravindh Nammalvar Raja Rajan¹; Thomas Niendorf³; Thomas Wegener³; ¹Westphalian University of Applied Sciences; ²Ruhr University Bochum; ³University of Kassel

10:00 AM **BREAK**

10:30 AM **Novel Lifting Techniques for Additive** **INVITED** **Manufacturing and Aerospace Applications**

[Luke C. Sheridan](#)¹; Daniel Miller²; Ryan Kemnitz³; Ramana Grandhi³; ¹Air Force Research Laboratory (AFRL); ²United States Air Force Academy; ³Air Force Institute of Technology

11:00 AM **Fatigue Prediction of an Additive** **REGULAR** **Manufactured Gooseneck Krueger Flap Actuation Bracket through Machine Learning**

[Nicolas Lammens](#)¹; Antonio Cutolo²; Carlos Furtado³; Matthias Schulz¹; Michael Hack¹; Stefan Straesser¹; Hunor Erdélyi¹; Brecht Van Hooreweder²; ¹Siemens Industry Software; ²KU Leuven; ³ASCO Industries

11:20 AM **Applying Probabilistic Fracture Mechanics** **REGULAR** **to Additive Manufacturing Parts for Space Application**

[Xueyong \(Kevin\) Qu](#)¹; Leland Shimizu¹; Jacob Rome¹; Nikolas Nordendale¹; Vinay Goyal¹; Evgueni Todorov¹; ¹The Aerospace Corporation

11:40 AM **Surface Improvement of Laser Powder Bed** **REGULAR** **Fusion Processed Ti6Al4V for Fatigue Applications**

[Andrey Molotnikov](#)^{1,2,3}; Marten Jurg³; Alexander Medvedev^{1,2}; ¹Royal Melbourne Institute of Technology (RMIT University); ²RMIT Centre for Additive Manufacturing (RCAM); ³Additive Assurance

12:00 PM **LUNCH**

13:30 PM **Relating Fatigue Behavior to Varied** **INVITED** **Conditions for Surface Roughness and Microstructure in Laser Powder Bed Fusion**

[Joy Gockel](#)¹; Jorge Ramirez¹; Simon Richardsen¹; Garrison Hommer¹; ¹Colorado School of Mines

14:00 PM **Fatigue Threshold Estimation of As-Built** **INVITED** **Surfaces of Ti6Al4V Alloy Specimens Based on Equivalent Crack Models**

[Giovanni Meneghetti](#)¹; Daniele Rigon¹; ¹University of Padua

14:30 PM **The Fatigue Behaviour of Laser Powder** **REGULAR** **Bed Fused Stainless Steel 316L: Effects of Build Orientation and Alternative Manufacturing Systems**

[Shuai Shao](#)¹; Robert J. Lancaster²; Nicholas Barnard²; Rory J. Douglas²; Thomas S. Jones³; Nima Shamsaei¹; ¹Auburn University; ²Swansea University; ³Rolls-Royce Submarines

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14:50 PM
REGULAR **Assessing the Impact of Melt Pool Variability on Fatigue Life in Laser Powder Bed Fusion**
[Sneha P. Narra](#)¹; [Justin P. Miner](#)¹; Tharun Reddy¹; Austin Ngo²; Christian Gobert¹; John Lewandowski²; Jack L. Beuth¹; Anthony Rollett¹; ¹Carnegie Mellon University

15:10 PM **END OF DAY**

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Craig McClung, Southwest Research Institute (SwRI)

SESSION CHAIR (PM SESSION):

Thomas Niendorf, University of Kassel

08:00 AM
INVITED **About the Usage of Representative Structure Elements to Reduce the Test Effort**
[Rainer Wagoner](#)¹; ¹Fraunhofer Institute for Structural Durability and System Reliability LBF

08:30 AM
REGULAR **Establishing a Standard for Dynamic Testing of 3DP Titanium Coupons**
[Matthew A. Shomper](#)¹; [Marcus Martinez](#)²; Stacey Barber²; Grant Trautman³; ¹Not a Robot Engineering; ²Empirical Technologies; ³Marle Tangible

09:00 AM
INVITED **NDI and Fatigue Analysis of Aluminum Brackets Produced by L-PBF**
[Stefano Beretta](#)¹; Sascha Senck²; ¹Politecnico di Milano; ²University of Applied Sciences Upper Austria

09:30 AM
INVITED **Tracing the Damage Fingerprint of Laser Additively Manufactured Alloys**
[Shengchuan Wu](#)¹; [Zhengkai Wu](#)¹; [Philip J. Withers](#)²; Xiaopeng Li³; ¹Southwest Jiaotong University; ²University of Manchester; ³University of New South Wales (UNSW Sydney)

10:00 AM **BREAK**

10:30 AM
REGULAR **Characterization of Compressive Fatigue Behavior and Acoustic Emission Analysis of Ti6Al4V Cellular Lattice Materials Fabricated by Laser Powder Bed Fusion**
[Sunil Raghavendra](#)¹; Matteo Benedetti¹; Raffaele De Biasi¹; Francesca Russo¹; Emiliano Rustighi¹; Gianluca Zappini²; ¹University of Trento; ²Lincotek Medical

10:50 AM
REGULAR **Comparison of the Dwell Fatigue Crack Growth Behavior of Additively and Conventionally Manufactured Inconel 718**
[Zachary D. Harris](#)¹; Isabelle Heintz¹; Santosh Narasimhachary²; Cody Gibson³; Robert Stephens⁴; Ramesh Subramanian⁵; ¹University of Pittsburgh; ²Siemens; ³Idaho National Laboratory; ⁴University of Idaho; ⁵Siemens Energy

11:10 AM **LUNCH**

13:30 PM
INVITED **Post-Processing Strategies to Improve Fatigue and Fracture Behavior of Additively Manufactured Metals**
[Jake Benzing](#)¹; Nik Hrabe¹; Orion L. Kafka¹; Nicholas A. Derimow¹; Chad M. Beamer²; Julius Bonini³; Frank DelRio⁴; Donald Godfrey⁵; Ryan Fishel⁶; Whitney Poling⁷; Tyson Brown⁷; ¹NIST; ²Quintus Technologies; ³Lucideon; ⁴Sandia National Laboratories; ⁵SLM Solutions; ⁶3D Systems; ⁷General Motors

14:00 PM
INVITED **Effect of Laser Shock Peening (LSP) on Fatigue Behavior of Additively Manufactured Ti-6Al-4V Alloy**
[Reza Molaei](#)¹; Krista Dyer¹; Samira Ghadar¹; ¹University of Memphis

14:30 PM
INVITED **Characterization of 3D AM Anomalies into Probability Distributions for Assessments of Probabilistic Damage Tolerance**
[James C. Sobotka](#)¹; Michael P. Enright¹; Craig McClung¹; ¹Southwest Research Institute (SwRI)

15:00 PM **BREAK**

15:30 PM
INVITED **Effect of Microstructure on Creep Properties of IN738LC Witness Samples and Generic Components Manufactured with Laser Powder Bed Fusion**
[Sandra Megahed](#)¹; Matthias Oechsner¹; Karl M. Krämer¹; Christoph Heinze²; Christian Kontermann¹; Annett Udoh³; Stefan Weihe³; ¹Technical University of Darmstadt; ²Siemens Energy; ³University of Stuttgart

16:00 PM
REGULAR **Static Assessment of Flawed L-PBF Components in AISi10Mg: Methods & Verification on a Space Component**
[Stefano Beretta](#)¹; Giuliano Minerva¹; ¹Politecnico di Milano

16:20 PM **END OF DAY**

03RD NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Jutima Simsiriwong, University of North Florida

08:00 AM
INVITED **On the Fatigue Performance of Additively Manufactured Materials using Non-Standard Powders**
[Thomas Niendorf](#)¹; ¹University of Kassel

08:30 AM
REGULAR **A Robust Deterministic Methodology for the Characterization and Mitigation of Risk Arising from AM Material Flaws**
[Armando C. Coro](#)¹; ¹ITP Aero

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ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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- 09:00 AM**
INVITED **Effect of Defect Features on the Axial Fatigue Behavior of Defect-Sensitive Materials**
[Shuai Shao](#)¹; Nima Shamsaei¹; ¹Auburn University
- 09:30 AM**
INVITED **The Effect of Aging on the Cracking Mechanism and Path in Additively Manufactured 17-4PH Stainless Steel**
[James Burns](#)¹; Zachary D. Harris²; Trevor Shoemaker³; ¹University of Virginia; ²University of Pittsburgh; ³United States Air Force
- 10:00 AM** **BREAK**
- 10:30 AM**
INVITED **Fatigue Properties of Laser Powder Bed Fused Scalmalloy®: Inevitable Achilles Heel of AM or Unprecedented Opportunity?**
[David Schimbäck](#)¹; Philipp Bruckbauer¹; Frank Palm²; ¹Airbus Defence and Space; ²Airbus Central Research & Technology
- 11:00 AM**
REGULAR **Generation of Titanium Grade 23 Material Allowables Dataset**
[Ryan Fishel](#)¹; Jeph Ruppert¹; Aaron Schmitz¹; Mike Shepard¹; ¹3D Systems
- 11:20 AM**
REGULAR **Is There an Aluminum Additive Material in L-PBF that can Close the Fatigue Gap to Wrought Materials?**
[Erembert Nizery](#)¹; Ravi Shahani¹; ¹Constellium
- 11:40 AM** **END OF DAY**

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AM FOR DEFENSE APPLICATIONS

CO-ORGANIZERS:

Travis Mayberry
Raytheon Missiles and Defense, USA

Nam Phan
Naval Air Systems Command (NAVAIR), USA

Brandon Ribic
National Center for Defense Manufacturing and Machining (NCDMM), USA

Ankit Saharan
EOS, USA

Luke Sheridan
Air Force Research Laboratory (AFRL), USA

01ST NOV 2023 (WED) – 02ND NOV 2023 (THU)
REGENCY FOYER (BALLROOM LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Travis Mayberry, Raytheon Missiles and Defense

SESSION CHAIR (PM SESSION):

Brandon Ribic, NCDMM

08:00 AM ****No Program****
Keynote 05 (Defense) at Regency BR [A]

08:50 AM **REGULAR** **Barrier to Entry: Evaluating the Impacts of Certification Costs on the Additive Manufacturing Industry**
[Ernesto Ureta](#)¹; [Stephen Kuhn-Hendricks](#)²;
¹NAVSUP Weapon Systems Support (NAVSUP WSS); ²NAVSUP Weapon Systems Support (NAVSUP WSS) - Navy Price Fighters

09:10 AM **REGULAR** **Considerations on Qualified Additive Manufacturing Production for Defense Applications**
[Behrang Poorganji](#)¹; ¹Morf3D

09:30 AM **INVITED** **NAVSEA Qualification - Requirements vs. Guidance for Component Installation**
[Justin Rettaliata](#)¹; ¹Naval Sea Systems Command (NAVSEA)

10:00 AM **BREAK**

10:30 AM **INVITED** **Rapid Iteration and Zero CapEx Risk as the Innovation Engine for Defense**
[Michael Kenworthy](#)¹; ¹Divergent

11:00 AM **INVITED** **Multiphysics Informed Process-Structure-Property-Performance Tailoring for AFSD Repair Applications**
[Jim Lua](#)¹; Xuxiao Li¹; Hang Z. Yu²; Alan Timmons³; Gabriel Murray³; Nam D. Phan³;
¹Global Engineering and Materials; ²Virginia Tech; ³Naval Air Systems Command (NAVAIR)

11:30 AM **INVITED** **Rolls-Royce Submarines Strategy for AM in Production**
[Dave Poole](#)¹; ¹Rolls-Royce Submarines

12:00 PM **LUNCH**

13:30 PM **INVITED** **Strategic Opportunities for AM in Defense Casting and Forging Applications and Manufacturing Operations**
[Brandon Ribic](#)¹; ¹National Center for Defense Manufacturing and Machining (NCDMM)

14:00 PM **REGULAR** **Understanding Variation in the Additive Manufacturing Supply Chain**
[Donald Godfrey](#)¹; ¹SLM Solutions

14:20 PM **REGULAR** **Ti6Al4V Microstructure Validation of a LPBF-Manufactured Component With and Without an ML-Based Build Processor to Develop an Accelerated Qualification Workflow**
[Felix Jensch](#)¹; [Omar Fergani](#)²; Johannes Buhl¹; Katharina Eissing²; Sebastian Härtel¹;
¹Brandenburg University of Technology Cottbus-Senftenberg; ²1000 Kelvin

14:40 PM **REGULAR** **NAVAIR Additive Manufacturing Process Specification Development**
[Yooku Tachie-Menson](#)¹; Eva K. Thorn¹;
¹NAVAIR Patuxent River

15:00 PM **BREAK**

15:30 PM **INVITED** **Digital Data Management to Certify Additively Manufactured Parts with Reduced Inspection: AM Health Monitoring and Final Part Quality**
[Alexander Kitt](#)¹; Ajay Krishnan¹; Luke Mohr¹; Michael Taylor²; William Frazier³; Scott Guenther⁴; William Sobel⁵; Jim Wolbers⁶; Daniel Reed⁷; Edward Nemeth⁸; Amberlee Haselhuhn⁶; ¹EWI; ²Hexagon; ³Pilgrim Consulting; ⁴Software AG Government Solutions; ⁵Metalogi; ⁶LIFT; ⁷MxD; ⁸National Center for Defense Manufacturing and Machining (NCDMM)

16:00 PM **INVITED** **Development of Additive Manufacturing Metal Powder Production at the Point of Need**
[Christopher Eonta](#)¹; ¹MolyWorks

16:30 PM **END OF DAY**

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Ankit Saharan, EOS

08:00 AM **INVITED** **Bridging the Technological Valley of Death**
[Victor K. Champagne, Jr.](#)¹; ¹U.S. Army Combat Capabilities Development Command - Army Research Laboratory (ARL)

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08:30 AM
REGULAR **Additive Manufacturing with Post-Consumer Polyethylene Terephthalate (rPET) Pellets and Flakes for Military Applications**
[Richard Heggs](#)¹; Prabhat Krishnaswamy¹; Mahendra Dhungel²; Patrick Ferrell³; Douglas M. Sassaman³; Adam Shadd²; Samantha Snabes³; ¹Engineering Mechanics Corporation of Columbus (Emc2); ²Otterbein University; ³re:3D

08:50 AM
REGULAR **Wire Based Directed Energy Deposition for Steel Casting Replacements: Process and Post-Process Optimization**
[Jayme S. Keist](#)¹; Wesley Mitchell¹; Mala Sharma¹; Edward (Ted) W. Reutzel¹; ¹Pennsylvania State University - Applied Research Laboratory (PSU - ARL)

09:10 AM
REGULAR **Cold Spray- and Wire Direct Energy Deposition- Additive Manufacturing Developments for Defense Applications at VRC Metal Systems, LLC**
[Anastasios Gavras](#)¹; Marius D. Ellingsen¹; Aaron Nardi¹; ¹VRC Metal Systems

09:30 AM
INVITED **Using LPBF to Incorporate Cooling Channels in Safety Critical Nuclear Plant Components**
[Adam Dukes](#)¹; ¹Rolls-Royce Submarines

10:00 AM **BREAK**

10:30 AM
INVITED **Optimizing Additively Manufactured IN-718 for Sustainment Applications via Combinatory Development of Build Strategy, Thermal Treatments, and Surface Finishing Processes**
[Justin Michaud](#)¹; [Seth Craig](#)²; William L. Hooper²; William Miranda Torres²; Agustin Diaz¹; Patrick McFadden¹; ¹REM Surface Engineering; ²United States Air Force

11:00 AM
INVITED **Optimization of AM Assets: Competitive and Cost-Effective Gains**
[Simon McKown](#)¹; Luke Dee¹; Justin Wenning¹; ¹Oerlikon AM

11:30 AM
INVITED **Solid-State Metal Additive Manufacturing and Repair for Superior Mechanical Performance**
[Hang Z. Yu](#)¹; ¹Virginia Tech

12:00 PM **LUNCH**

13:30 PM ****No Program****

15:00 PM **BREAK**

15:30 PM ****No Program****
Panel 10 (Defense) at Regency BR [A]

16:30 PM **END OF DAY**

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INDUSTRY 4.0: DATA MANAGEMENT FOR AM

CO-ORGANIZERS:

Amber Andreaco
GE Additive, USA

Yan Lu
NIST, USA

Nick Parry
Additive Flow,
United Kingdom

Wentao Fu
Boeing, USA

Hunter Macdonald
Hexagon Manufacturing Intelligence,
USA

Luke Scime
Oak Ridge National Laboratory (ORNL),
USA

01ST NOV 2023 (WED)
LEXINGTON (BALLROOM LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Luke Scime, Oak Ridge National Laboratory (ORNL)

SESSION CHAIR (PM SESSION):

James Fonda, Boeing

08:00 AM
INVITED Additive Manufacturing Digital Thread and Future Needs
[James W. Fonda](#)¹; Matthew L. Scott¹; ¹Boeing

08:30 AM
REGULAR Testing in a Box: Combining AM Data Management and Quality Control
[Mike Vasquez](#)¹; ¹3Degrees

09:00 AM
INVITED Data Compression Methods in Digital Manufacturing
[Jeffrey M. Davis](#)¹; Robert Manke¹; Vincent Antoine¹; Candice Nichols¹; ¹EOS

09:30 AM
INVITED Data Reduction through Creative Hardware and Software Architectures
[Thomas G. Spears](#)¹; ¹ARCTOS - Open Additive

10:00 AM
BREAK

10:30 AM
INVITED Automation Opportunities in Process Development, Qualification, and Production with Dyndrite and ASTM CMDS
[Stephen M. Walton](#)¹; ¹Dyndrite

11:00 AM
INVITED Enabling Rapid Validation and Dynamic Standardisation of Advanced Manufactured Parts
[Gareth Tear](#)¹; James Bird¹; José Videira¹; ¹Synbiosys

11:30 AM
INVITED Machine Learning Techniques for Processing of In-Situ Monitoring Data and Correlation of Indications to Final Part
[James Mavo](#)¹; ¹NASA

12:00 PM
LUNCH

13:30 PM
INVITED Data Management in Additive Manufacturing - Best Practices and Opportunities
[Mahdi Jamshid](#)¹; Richard Huff¹; Mohsen Seifi¹; Martin White¹; ¹ASTM International

14:00 PM
INVITED Handbook for Additive Manufactured Alloys: Microstructure, Fractography, and Properties
[Colton C. Katsarelis](#)¹; Nima Shamsaei²; Paul R. Gradl¹; Alison Park³; ¹NASA - Marshall Space Flight Center (MSFC); ²Auburn University; ³NASA Engineering and Safety Center (NESC)

14:30 PM
INVITED Towards a Knowledge Management System for Additive Manufacturing
[Shengyen Li](#)¹; Yan Lu¹; ¹NIST

15:00 PM
BREAK

15:30 PM
INVITED Building and Implementing an AM Data Management System - Lessons Learned
[Mike Vasquez](#)¹; [Jim Barkley](#)¹; Matthew Jacobsen²; ¹3Degrees; ²Air Force Research Laboratory (AFRL)

16:00 PM
INVITED Workshop Results - Empowering Small and Medium Size Enterprises through Effective Additive Manufacturing Data Management
[William Frazier](#)¹; Yan Lu²; [Paul Witherell](#)²; ¹Pilgrim Consulting; ²NIST

16:30 PM
REGULAR An Example of Data Management to Improve the Additive Manufacturing Material Performance for Safety-Critical Applications
[Enrique Escobar de Obaldia](#)¹; [Armando C. Coro](#)²; ¹Ansys; ²ITP Aero

16:50 PM
END OF DAY

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ENVIRONMENTAL EFFECTS ON AM ALLOYS AND PARTS

CO-ORGANIZERS:

James Burns

University of Virginia, USA

Jiadong Gong

QuesTek Innovations, USA

Jason Trelewicz

Stony Brook University,
USA

Ole Geisen

Siemens Energy, Germany

Michael Melia

Sandia National Laboratories,
USA

01ST NOV 2023 (WED)

BUNKER HILL (BALLROOM LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

James Burns, University of Virginia

SESSION CHAIR (PM SESSION):

Michael Melia, Sandia National Laboratories

08:00 AM
INVITED **Enhanced Crevice Corrosion Resistance of Ni-Base Superalloy 625 Processed by Directed Energy Deposition**
[Eric Schindelholz¹](#); [Karthikeyan Hariharan¹](#); Todd A. Palmer²; Gerald S. Frankel¹; ¹Ohio State University

08:30 AM
REGULAR **Corrosion Performance Comparison of a Wire Arc Additively Manufactured (WAAM) and Wrought Copper-Nickel Alloy in Marine Service**
[Suresh Divi¹](#); Adam Rowe¹; Matthew Sanders¹; ¹Stress Engineering Services

09:00 AM
INVITED **Effect of Building Orientation, Surface Roughness and Finish on Corrosion of AM Ti and CoCr Alloys in Simulated Body Fluids**
[Yolanda S. Hedberg¹](#); Saman Nikpour¹; Sina Matin¹; Zheng Wei¹; ¹Western University

09:30 AM
INVITED **Understanding Differences Between Corrosion Behaviors of AM and Conventional Manufacturing Alloys**
[Abhinav Saboo¹](#); Thomas Kozmel¹; ¹QuesTek Innovations

10:00 AM
BREAK

10:30 AM
INVITED **Corrosion Mechanisms of Additively Manufactured 316L Stainless Steels in Chloride Solutions**
[Thomas Voisin¹](#); Shohini Sen-Britain¹; Shinyoung Kang¹; Yuliang Zhang¹; Zhen Qi¹; Penghao Xiao²; Seongkoo Cho¹; Yakun Zhu¹; Yinmin (Morris) Wang³; Roger Qiu¹; Brandon Wood¹; ¹Lawrence Livermore National Laboratory (LLNL); ²Dalhousie University; ³University of California, Los Angeles

11:00 AM
REGULAR **The Effect of Microstructural Surface States on the Corrosion of Additively Manufactured 316 Stainless Steel**
[Nicole Tailleart¹](#); Carlos Hangarter¹; Andrew Geltmacher¹; Patrick Callahan¹; Dillon S. Watring¹; Scott Olig¹; Graham Cheek²; ¹U.S. Naval Research Laboratory (NRL); ²United States Naval Academy (USNA)

11:20 AM
REGULAR **An Approach to Chemical and Microstructural Monitoring of Crevice Corrosion**
[Carlos Hangarter¹](#); Scott Olig¹; Patrick Callahan¹; Dillon S. Watring¹; William Kinee¹; Andrew Geltmacher¹; Nicole Tailleart¹; ¹U.S. Naval Research Laboratory (NRL)

11:40 AM
REGULAR **Environmentally Assisted Cracking of Additively Manufactured 316L Stainless Steel**
[James Burns¹](#); Michael P. Roach¹; ¹University of Virginia

12:00 PM
LUNCH

13:30 PM
INVITED **Advanced Characterization of Additive Manufactured 316L Stainless Steel**
[David Sprouster¹](#); Mingxi Ouyang¹; William (Streit) Cunningham¹; Gary Halada¹; Daniel Olds²; Ajith Pattammattel²; Hanfei Yan²; Steven Storck³; Jason Trelewicz¹; ¹Stony Brook University; ²Brookhaven National Laboratory; ³Johns Hopkins University - Applied Physics Laboratory (JHU - APL)

14:00 PM
INVITED **Multiscale and In Situ Electron Microscopy Characterization of AM Stainless Steel**
[Josh Kacher¹](#); Jahnavi Desai Choundraj¹; Mengkun Tian¹; ¹Georgia Institute of Technology

14:30 PM
REGULAR **Influence of As-Printed Surfaces on Atmospheric Corrosion on Laser Powder Bed Fusion 316L Material**
[Michael Melia¹](#); Peter Renner¹; Kasandra Escarcega-Herrera¹; Erin Karasz¹; Jason M. Taylor¹; Michael J. Heiden¹; Jeffrey Rodelas¹; ¹Sandia National Laboratories

14:50 PM
BREAK

15:30 PM
INVITED **Effect of Post-Build Processing on the Hydrogen Embrittlement Susceptibility of Additively Manufactured 316L under Ambient and Cryogenic Temperatures**
[Zachary D. Harris¹](#); Guillermo Alvarez²; Kentaro Wada³; Cristina Rodríguez⁴; Emilio Martinez-Paneda²; ¹University of Pittsburgh; ²Imperial College London; ³National Institute for Materials Science (NIMS); ⁴University of Oviedo

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16:00 PM **Corrosion Fatigue of Additively
REGULAR** **Manufactured Nickel Aluminum Bronze**
Attilio Arcari¹; Christopher V. Hoerbelt²; ¹U.S.
Naval Research Laboratory (NRL); ²Naval
Surface Warfare Center (NSWC) - Carderock
Division

16:20 PM **END OF DAY**

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PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM

CO-ORGANIZERS:

Alex Benham
Dyndrite, USA

Ajay Krishnan
EWI, USA

Abdalla Nassar
John Deere, USA

Niklas Prätzsch
Fraunhofer ILT, Germany

01ST NOV 2023 (WED) – 02ND NOV 2023 (THU)
CAPITOL A (LOBBY LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Ajay Krishnan, EWI

SESSION CHAIR (PM SESSION):

Edward (Ted) Reutzel, Pennsylvania State University

- 08:00 AM INVITED** **Linking L-PBFAM Process Monitoring to Conventional NDE**
[Edward \(Ted\) W. Reutzel](#)¹; Wesley Mitchell¹; Jan Petrich¹; Griffin Jones¹; Dongchun (Mary) Qiao²; Qing Yu²; ¹Pennsylvania State University - Applied Research Laboratory (PSU - ARL); ²American Bureau of Shipping (ABS)
- 08:30 AM REGULAR** **Role of Nondestructive Evaluation (NDE) and In Situ Process Monitoring in Managing Risk of Additive Manufactured (AM) Space Hardware**
[Erin L. Lanigan](#)¹; ¹NASA - Marshall Space Flight Center (MSFC)
- 09:00 AM INVITED** **The Development of Intermittent Control Systems for Laser Powder Bed Fusion**
[Ehsan Toyserkani](#)¹; Katayoon Taherkhani¹; Gerd Cantzler²; Christopher Eischer²; ¹University of Waterloo; ²EOS
- 09:30 AM INVITED** **Validating In Process Monitoring as Alternative to Traditional NDE for Safety Critical Nuclear Plant Components**
[Thomas S. Jones](#)¹; ¹Rolls-Royce Submarines
- 10:00 AM BREAK**
- 10:30 AM REGULAR** **Best Part Properties at Lowest Cost-Per-Part through 30 Years of Process Innovation: Outlook on How Monitoring Will Change Process Development**
[Ulrich Kleinhans](#)¹; ¹EOS
- 10:50 AM REGULAR** **Correlations of Porosity, Spatter, and Process Metrics for Powder Bed Fusion Laser Beam Metallic Additive Manufacturing**
[Samuel J.A. Hocker](#)¹; Andrew R. Kitahara²; Brodan Richter¹; Sang-Hyon Chu¹; Peter W. Spaeth¹; Joseph N. Zalameda¹; Edward H. Glaessgen¹; ¹NASA - Langley Research Center (LaRC); ²National Institute of Aerospace

- 11:10 AM REGULAR** **Improving Laser Powderbed Fusion Manufacturing Process: Detecting Flaws through Anomaly Repetition and Monitoring Interlayer Temperature with Infrared and Optical Cameras**
[Shuchi Khurana](#)¹; [Ben DiMarco](#)²; Petros Apostolou¹; Charles Babbitt¹; Michael Lander²; Kiran Mokadam²; ¹Addiguru; ²Ohio State University
- 11:30 AM REGULAR** **Laser Profilometry and Computer Vision for L-PBF Process Monitoring using Convolutional Neural Networks**
[Enrico Tosoratti](#)¹; Markus Bambach²; Dario Puccio¹; Adriaan Spierings¹; ¹inspire - Innovation Center for Additive Manufacturing Switzerland (icams); ²ETH Zürich
- 11:50 AM REGULAR** **Thermal Imaging for Wire Arc Additive Manufacturing Using an Off-the-Shelf Color Camera**
[Sneha P. Narra](#)¹; Gala C. Solis¹; Alexander J. Meyers¹; Guadalupe Quirarte¹; Mikhail Khrenov¹; Jonathan A. Malen¹; ¹Carnegie Mellon University
- 12:10 PM LUNCH**
- 13:30 PM INVITED** **Eddy Current Monitoring System for In Situ Quality Control of Metal AM**
[Bernard Revaz](#)¹; Marc Lany¹; Gilles Santi¹; Adriaan Spierings²; Marvin Spurek²; Jonatan Wicht¹; ¹AMiquam; ²inspire - ETH Zürich
- 14:00 PM REGULAR** **Measurement of Spatter and its Impacts on Powder Bed Quality and Workpiece Defects**
[Jaime Berez](#)¹; Christopher J. Saldaña²; ¹University of North Carolina at Charlotte; ²Georgia Institute of Technology
- 14:20 PM REGULAR** **Spatter Remediation through Close Loop Control**
[David Maass](#)¹; ¹Flightware
- 14:40 PM REGULAR** **In-Situ Monitoring for Faster Qualification of Novel Aluminium Metal Alloys for Laser Powder Bed Fusion Additive Manufacturing**
[Chinmay Phutela](#)¹; Giuseppe D. Guercio¹; Jide Oyeboji¹; Lewis Kindleyside¹; Federico Bosio¹; Nesma Aboulkhair¹; ¹Technology Innovation Institute
- 15:00 PM BREAK**
- 15:30 PM INVITED** **Self-Repair of Defects: The Achilles Heel for In-Process Detection of Small Pores?**
[Paul A. Hooper](#)¹; Jamie Bell¹; Harry de Winton¹; Sebastian Larsen¹; Richard Williams^{1,2}; ¹Imperial College London; ²National University of Singapore (NUS)
- 16:00 PM REGULAR** **In-Situ Monitoring of Vat Photopolymerization via Interferometry**
[Xiayun Zhao](#)¹; Yue Zhang¹; Haolin Zhang¹; ¹University of Pittsburgh

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16:20 PM
REGULAR **Challenges and Recent Technologies in In-Process Control and In-Situ Monitoring for Additive Manufacturing**
[Mirco Schöpf¹](#); ¹EOS

16:40 PM
REGULAR **Towards Multimodal Process Monitoring to Detect Defects and Other Process Anomalies during Laser Powder Bed Fusion**
[Nicholas P. Calta¹](#); Sanam Gorgannejad¹; Michael Juhasz¹; Yuchen Sun¹; Ethan Sprague¹; Gabe Guss¹; Aiden Martin¹; ¹Lawrence Livermore National Laboratory (LLNL)

17:00 PM **END OF DAY**

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Zackary Snow, Oak Ridge National Laboratory (ORNL)

SESSION CHAIR (PM SESSION):

Erin Lanigan, NASA - Marshall Space Flight Center (MSFC)

08:00 AM
INVITED **Systematic Characterization and Calibration Methods for Co-Axial Melt Pool Monitoring Photodetectors**
[Brandon M. Lane¹](#); ¹NIST

08:30 AM
REGULAR **Melt Pool-Scale Process Monitoring of Laser Powder Bed Fusion**
[Jack L. Beuth¹](#); Jonathan A. Malen¹; Conrad Tucker¹; Christian Gobert¹; David Guirguis¹; Alexander J. Myers¹; Guadalupe Quirarte¹; Syed Zia Uddin¹; ¹Carnegie Mellon University

09:00 AM
INVITED **Application of Machine Learning for Quality Assessment of Laser Powder Bed Fusion Process**
[Andrey Molotnikov^{1,2,3}](#); Marten Jurg³; ¹Royal Melbourne Institute of Technology (RMIT University); ²RMIT Centre for Additive Manufacturing (RCAM); ³Additive Assurance

09:30 AM
INVITED **A Scalable In-Situ Process Monitoring Software Stack using Artificial Intelligence**
[Luke Scime¹](#); Zackary Snow¹; William Halsey¹; Ryan R. Dehoff¹; Vincent C. Paquit¹; ¹Oak Ridge National Laboratory (ORNL)

10:00 AM **BREAK**

10:30 AM
REGULAR **Process Intelligence Tool Development and Implementation for Additive Manufacturing**
[Kyle Snyder¹](#); [Yuri Plotnikov¹](#); ¹Commonwealth Center for Advanced Manufacturing (CCAM)

10:50 AM
REGULAR **Utilization of In-Situ Monitoring Data for Thermal Control of the AM Process**
[Anja Miles¹](#); Dominik Kunz¹; Yash Parikh¹; ¹EOS

11:10 AM
REGULAR **Prediction of Thermal Profile of Melt Pool during Laser Cladding under Different Operating Conditions**
[Dae-Geun Hong¹](#); [Jonghee Park²](#); Jinyoung Kim¹; Gibeom Kim¹; Chang-Hee Yim¹; Nam-Kyu Park³; Deok-Su Yun³; Tae-Gyu Lee³; Rae-Hyung Chung³; Hyounghmin Kim⁴; ¹Pohang University of Science and Technology (POSTECH); ²Chung-Ang University; ³Sung-Wook; ⁴H Lab

11:30 AM
REGULAR **Pointwise Control using Time-Stepped Digital Command for Laser Powder Bed Fusion Additive Manufacturing Process**
[Ho Yeung¹](#); ¹NIST

11:50 AM **LUNCH**

13:30 PM
INVITED **Multisensor Melt Pool Monitoring using Ultrasonics and High-Speed Synchrotron X-Rays**
[Christopher M. Kube¹](#); Nathan Kizer¹; Lauren E. Katch¹; Tao Sun²; Samuel Clark³; Jordan Lum⁴; David Stobbe⁴; ¹Pennsylvania State University; ²University of Virginia; ³Argonne National Laboratory (ANL); ⁴Lawrence Livermore National Laboratory (LLNL)

14:00 PM
REGULAR **Closing the Loop on the Digital Thread: Integrating Ex Situ Characterization Data for In Situ Qualification of Digitally Threaded Components**
[Zackary Snow¹](#); Luke Scime¹; Amir Ziabari¹; Vincent C. Paquit¹; ¹Oak Ridge National Laboratory (ORNL)

14:20 PM
REGULAR **Usage of Anomaly Control Charts and Anomaly Solid Models Generated by LAMQC from In-Situ Data**
[Victor Morgan¹](#); [Scott Volk²](#); ¹LAMQC; ²Advanced Additive Innovations

14:40 PM
REGULAR **Aeroacoustic Monitoring in Cold Spray Additive Manufacturing**
[Ozan C. Özdemir¹](#); Ivan Arkhipov¹; Ugur Kokal¹; ¹Northeastern University

15:00 PM **BREAK**

15:30 PM
INVITED **Highspeed, In-Situ X-Ray Imaging of Powder-Blown Directed Energy Deposition using a Multi-Mode Laser**
[Samantha A. Webster¹](#); James Zuback¹; Shuheng Liao²; Anchen Tong²; Jihoon Jeong²; Rujing Zha²; Sanjana Subramaniam²; Jian Cao²; ¹NIST; ²Northwestern University

16:00 PM
REGULAR **Operando Neutron Diffraction of Wire-Arc AM, Complemented with Digital Image Correlation for Understanding In-Situ Strain Development**
[Alexander Plotkowski¹](#); James C. Haley¹; Kyle Saleeby²; Christopher Fancher¹; Ke An¹; Dunji Yu¹; ¹Oak Ridge National Laboratory (ORNL); ²Georgia Institute of Technology

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ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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16:20 PM **DED-EB Process Monitoring for Informed Post-Process Inspection**
REGULAR [Alexander Kitt](#)¹; Ronald Aman¹; Zachary Corey¹; Naresh Iyer²; Yousub Lee³; Luke Mohr¹; Daniel Ruscitto²; Aleksey Shekochikhin¹; ¹EWI; ²GE Research; ³Oak Ridge National Laboratory (ORNL)

16:40 PM **In Process Monitoring for Holistic Process Control in Laser Powder Bed Fusion**
REGULAR [Song Zhang](#)¹; Heiko Degen¹; Nicolas Schwartz¹; Biswaroop Roy¹; Julian Schulz¹; Edson Costa Santos¹; ¹ZEISS Industrial Quality Solutions

17:00 PM **END OF DAY**

ICAM 2023 FINAL PROGRAM AGENDA

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MICROSTRUCTURAL ASPECTS OF AM

CO-ORGANIZERS:

Moataz Attallah

University of Birmingham -
AMPLab, United Kingdom

Jonathan Pegues

Sandia National Laboratories,
USA

Swee Leong Sing

National University of
Singapore (NUS), Singapore

Soumya Nag

Oak Ridge National
Laboratory (ORNL), USA

Anthony Rollett

Carnegie Mellon University,
USA

01ST NOV 2023 (WED) – 03RD NOV 2023 (FRI)
CAPITOL B (LOBBY LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Jonathan Pegues, Sandia National Laboratories
Anthony Rollett, Carnegie Mellon University

SESSION CHAIR (PM SESSION):

Alberto Bordin, ASTM International
Jonathan Pegues, Sandia National Laboratories

08:00 AM
INVITED

Microstructure of As-Printed, Powder Bed Fusion, Stainless Steel Surfaces

[Michael Melia](#)¹; Frank DelRio¹; Kasandra Escarcega-Herrera¹; Michael J. Heiden¹; Erin Karasz¹; Paul Kotula¹; Peter Renner¹;
¹Sandia National Laboratories

08:30 AM
REGULAR

Crystallographic Variant Selection in Wire Arc Additive Manufactured Nickel Aluminum Bronze

[David Rowenhorst](#)¹; Dillon S. Watring¹; Richard Fonda¹; ¹U.S. Naval Research Laboratory (NRL)

08:50 AM
REGULAR

In-Situ Grain Refinement during Directed Energy Deposition of FeNi36 Alloy

[Romali Biswal](#)¹; Stewart Williams¹; Gonçalo R. Pardal¹; Jun Wang¹; ¹Cranfield University

09:10 AM
REGULAR

Development and Optimization of Additively Manufactured NASA HR-1 for Space Applications

[Colton C. Katsarelis](#)¹; Paul R. Gradl¹; Po-Shou Chen²; William M. Medders¹; ¹NASA - Marshall Space Flight Center (MSFC); ²NASA - Jacobs Space Exploration Group (JSEG)

09:30 AM
INVITED

Optimizing the Microstructure of Titanium Alloys Processed by Additive Manufacturing

[Hamish Fraser](#)¹; [Rajarshi Banerjee](#)²; ¹Ohio State University; ²University of North Texas

10:00 AM **BREAK**

10:30 AM
INVITED

Microstructure and Mechanical Properties of Nickel Superalloy 718 Produced by Renishaw's Laser Powder Bed Fusion Systems

[Ravi G. Aswathanarayan](#)¹; Benjamin Haigh¹; Nick Jones¹; ¹Renishaw

11:00 AM
INVITED

In-Process Cold-Work of Additively Manufactured Parts: Control of Microstructure, Mechanical Properties and Residual Stress

[Filomeno Martina](#)¹; Stewart Williams²; Jialuo Ding²; ¹WAAM3D; ²Cranfield University

11:30 AM
INVITED

Microstructural Characterization of an Additively Manufactured Fe-Si-B-Nb-Cu Soft Magnetic Alloy

[Erin Barrick](#)¹; Levi Van Bastian¹; Todd Monson¹; Eric Theisen²; Frank DelRio¹; Donald Susan¹; Andrew Kustas¹; ¹Sandia National Laboratories; ²Metglas

12:00 PM

LUNCH

13:30 PM
INVITED

The ExaAM Challenge Problem: AM Process Modeling at the Fidelity of the Microstructure

[James Belak](#)¹; Matt Bement²; ExaAM Team^{1, 2, 3, 4, 5, 6, 7}; ¹Lawrence Livermore National Laboratory (LLNL); ²Oak Ridge National Laboratory (ORNL); ³Los Alamos National Laboratory (LANL); ⁴NIST; ⁵Air Force Research Laboratory (AFRL); ⁶Purdue University; ⁷Pennsylvania State University

14:00 PM
REGULAR

Metastable Phase Formation in a High-Strength Aluminum Alloy Fabricated using Additive Manufacturing

[Andrew D. Iams](#)¹; Brandon M. Lane¹; Darby LaPlant²; John Martin²; Jordan Weaver¹; Fan Zhang¹; ¹NIST; ²HRL Laboratories

14:20 PM
REGULAR

Can You Please Focus?! A Study on Laser Attenuation during the Laser Powder Bed Fusion of Large Scale GRCop-42 Components

[Bjorn Tolentino](#)¹; Emily Eckert¹; ¹Sintavia

14:40 PM
REGULAR

Controlling AM Microstructures via Rapid Process Parameter Optimization and Laser Optics Development

[Kailla Bertsch](#)¹; Connor Rietema¹; Raiyan Seede¹; Thej Tumkur Umanath¹; John Roehling¹; William L. Smith¹; ¹Lawrence Livermore National Laboratory (LLNL)

15:00 PM

BREAK

15:30 PM
INVITED

Correlation of the Mechanical Properties and Precipitated/Coherent Phases of Heat-Treated 3D Printed Al-Sc Alloys

[Che-Nan Kuo](#)¹; Po-Chun Peng²; ¹National Sun Yat-Sen University; ²Metal Industries Research & Development Centre (MIRDC)

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16:00 PM
INVITED **Alloy Development for Additive Manufacturing**
[Joseph McKeown](#)¹; Joel Berry¹; Brian Gallagher¹; Saad Khairallah¹; Scott K. McCall¹; Aurélien Perron¹; Thomas Voisin¹;
¹Lawrence Livermore National Laboratory (LLNL)

16:30 PM
INVITED **Process-Microstructure-Property Relationships in AM Ti-6Al-4V**
[Anthony D. Rollett](#)¹; Rajib Halder¹; Evan Adcock¹; Sneha P. Narra¹; John Lewandowski²; Christian Gobert¹; Jack L. Beuth¹; Albert C. To³; Allaeldin Olleak³;
¹Carnegie Mellon University; ²Case Western Reserve University; ³University of Pittsburgh

17:00 PM **END OF DAY**

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Alberto Bordin, ASTM International
Swee Leong Sing, National University of Singapore (NUS)

SESSION CHAIR (PM SESSION):

Soumya Nag, Oak Ridge National Laboratory (ORNL)
Swee Leong Sing, National University of Singapore (NUS)

08:00 AM
INVITED **Large Area Orientation Imaging of Titanium Alloys using Polarized Light Microscopy**
[Ayman Salem](#)¹; Thomas Carmody¹; Patrick Fleisher¹; Jonathan Pegues²; LaRico Treadwell²; Daniel Satko¹; ¹Materials Resources (MRL); ²Sandia National Laboratories

08:30 AM
REGULAR **Lessons Learned from Benchmarking Cross-Sectional Melt Pool Geometry of Laser-Scanned Tracks and Pads**
[Jordan S. Weaver](#)¹; David Deisenroth¹; Brandon M. Lane¹; Lyle E. Levine¹; Sergey Mekhontsev¹; ¹NIIST

08:50 AM
REGULAR **In-Situ Microstructural Analysis of Additively Manufactured Al-Si10-Mg during Deformation**
[Nha Uyen Huynh](#)¹; Caroline Massey²; Thomas Ivanoff¹; Charlotte L.B. Kramer¹; ¹Sandia National Laboratories; ²Georgia Institute of Technology

09:10 AM
REGULAR **Electron Beam Powder Bed Fusion of CuCrZr: Process Optimization, Microstructure and Mechanical and Thermal Properties**
[Nerea Ordas](#)¹; Francisco J. Canillas²; Edgar Leon-Gutierrez²; Marcelo Roldan²; Evelin F. Cardozo¹; Luis Portoles³; Jose Ramon Blasco³; ¹Ceit Technology Center; ²CIEMAT; ³AIDIMME

09:30 AM
INVITED **Grading Above and Beyond: From Superalloys to Refractory Alloys**
[Soumya Nag](#)¹; Ke An¹; James C. Haley¹; Brian Jordan¹; Yousub Lee¹; Jaimie Tilely¹; ¹Oak Ridge National Laboratory (ORNL)

10:00 AM **BREAK**

10:30 AM
INVITED **Reinventing Industrial Workhorse Alloys through Additive Manufacturing with Breakthrough Performance Gain**
[Youping Gao](#)¹; Jacob Rindler¹; ¹Casttheon

11:00 AM
INVITED **Advanced Metallographic Evaluation of Anomalies in Additive Materials**
[Andrew C. Perry](#)¹; Romano Simone²; ¹GE Aerospace; ²Avio Aero

11:30 AM
INVITED **Using Process Modeling to Understand AM Microstructure Variability**
[Alexander Plotkowski](#)¹; John Coleman¹; William Halsey¹; Gerry Knapp¹; Vincent C. Paquit¹; Matt Rolchigo¹; Luke Scime¹; Zackary Snow¹; Benjamin Stump¹; ¹Oak Ridge National Laboratory (ORNL)

12:00 PM **LUNCH**

13:30 PM
INVITED **Role of Site-Specific Control of Microstructure on Qualification of AM Components**
[Sudarsanam S. Babu](#)¹; ¹University of Tennessee, Knoxville

14:00 PM
INVITED **Towards Integrated Computational Materials Engineering for Quantifying Performance Impacts of Microstructure and Defect Interactions in Powder Bed Fusion Parts**
[Brodan Richter](#)¹; Joshua D. Pribe²; Samuel Hocker¹; Saikumar R. Yeratapally²; George R. Weber¹; Vamsi R. Subraveti³; Çağlar Oskay³; Edward H. Glaessgen¹; ¹NASA - Langley Research Center (LaRC); ²National Institute of Aerospace; ³Vanderbilt University

14:30 PM
INVITED **GRX-810: A Novel Alloy for Extreme Environments, and the Role of Microstructure**
[Christopher A. Kantzos](#)¹; Timothy Smith¹; Nikolai Zarkevich²; Bryan Harder¹; Paul R. Gradl³; Aaron Thompson¹; Michael Mills⁴; Timothy Gabb¹; John Lawson²; ¹NASA - Glenn Research Center; ²NASA - Ames Research Center; ³NASA - Marshall Space Flight Center (MSFC); ⁴Ohio State University

15:00 PM **BREAK**

15:30 PM
INVITED **Laser Powder Bed Fusion (PBF-LB) Process Control for the Creation of Porous Structures**
[Amanda Cruchley](#)¹; Iain Berment-Parr¹; Cameron Blackwell¹; Chris Ellis¹; Matthew Thomas¹; ¹The Manufacturing Technology Centre (MTC)

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16:00 PM
REGULAR **Impact of Powder Composition on the Microstructure and Mechanical Behavior of L-PBF Alloy 625**

[Karen T. Henry](#)¹; Tressa A. White¹; Steven Attanasio¹; Stephen Sabol¹; Y. Y. Li¹; John Sutliff¹; Robert Morris¹; Jorge Ramos-Almeida²; ¹Naval Nuclear Laboratory (NNL); ²Bechtel Plant Machinery

16:20 PM
REGULAR **Influence of Additive Manufacturing Induced Defects on Torsional Fatigue Performance of Inconel 718**

[Sanna F. Siddiqui](#)¹; Elise Araiza¹; Sydney Wickett¹; ¹Florida Polytechnic University

16:40 PM **END OF DAY**

03RD NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Soumya Nag, Oak Ridge National Laboratory (ORNL)
Anthony Rollett, Carnegie Mellon University

08:00 AM
INVITED **Effect of Powder Conditioning and Post-Thermal Treatments on the Microstructure and Mechanical Properties of L-PBF Alloy 718**

[Raja Khan](#)¹; Alessandro Sergi¹; Sam Ward¹; Amanda Allison¹; Ehsan Rahimi²; James Redman¹; ¹The Welding Institute (TWI); ²Materials Processing Institute

08:30 AM
INVITED **A New, Faster Heat Treatment Pathway for Improved Room Temperature Fatigue Performance of IN718**

[Orion L. Kafka](#)¹; Jake Benzing¹; Nicholas A. Derimow²; Nik Hrabe¹; Philipp Schumacher²; Donald Godfrey²; Chad M. Beamer³; Christopher James⁴; Priya Pathare⁵; Jay Carroll⁵; Ping Lu⁵; Isaiah Trujillo⁵; Frank DelRio⁵; ¹NIST; ²SLM Solutions; ³Quintus Technologies; ⁴Metalex Thermal Specialties; ⁵Sandia National Laboratories

09:00 AM
INVITED **Alternate Post-Thermal Treatments for Nickel Alloy 718 Produced by Laser Powder Bed Fusion**

[Mahesh Kumar Mani](#)¹; [Lakshmi L. Parimi](#)¹; ¹GKN Aerospace

09:30 AM
INVITED **The Role of Microstructure and Defects in Additively Manufactured Ni-Based Superalloys for Industrial Power Generation Applications**

[Chantal K. Sudbrack](#)¹; ¹National Energy Technology Laboratory (NETL)

10:00 AM
REGULAR **Spatially Controlled Mesostructure Engineering from Random Powder Mixtures In Laser Powder Bed Fusion (LPBF)**

[Erin G. Brodie](#)¹; Huikai Li¹; Christopher Hutchinson¹; ¹Monash University

10:20 AM **END OF DAY**

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DESIGN FOR AM

CO-ORGANIZERS:

Ian Campbell

Wohlers Associates,
United Kingdom

Duann Scott

Wohlers Associates /
3MF Consortium, USA

Andrew Thompson

Northrop Grumman,
USA

David Rosen

A*STAR, Singapore / Georgia
Institute of Technology, USA

Timothy Simpson

Pennsylvania State University,
USA

Andrew Triantaphyllou

The Manufacturing Technology
Centre, United Kingdom

01ST NOV 2023 (WED) – 03RD NOV 2023 (FRI)
CONGRESSIONAL A (LOBBY LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (PM SESSION):

David Paredes, ASTM International
Andrew Thompson, Northrop Grumman

13:30 PM
INVITED **Design Exploration for Customization of Additively Manufactured Structures**
[Carolyn Seepersad](#)¹; ¹University of Texas at Austin

14:00 PM
INVITED **Communicating Design and Manufacturing Intent with 3MF**
[Duann Scott](#)¹; ¹3MF Consortium

14:30 PM
INVITED **Device Design Enabled by Multi-Scale, Multi-Material, and Multi-Functional Vat Photopolymerization**
[Yong Chen](#)¹; ¹University of Southern California

15:00 PM
BREAK

15:30 PM
INVITED **Internal Surface Roughness Prediction for Heat Exchangers and Gas Turbine Components, using Standardized Hollow Coupons**
[Ramesh Subramanian](#)¹; [Nicolas Lammens](#)²;
¹Siemens Energy; ²Siemens Industry Software

16:00 PM
REGULAR **Additive Manufacturing for Astronomical Telescopes and Instruments: The Benefits and Challenges**
[Younes Chahid](#)¹; Carolyn Atkins¹; James T. Wells²; Marcell Westsik³; ¹STFC - UK Astronomy Technology Centre; ²University of Sheffield; ³University of Manchester

16:20 PM
REGULAR **Design of TMAPS Structures Considering Resolution (Voxel Size) for Different AM Processes**
[Arturo Gómez-Ortega](#)¹; Christian Félix-Martínez¹; James Pérez Barrera¹; Saúl Piedra¹; ¹CONACYT - Center for Engineering and Industrial Development (CIDESI)

16:40 PM **Additive Manufacturing Applications**

REGULAR [Ayman Farrag](#)¹; [Mohammed Alsofiyan](#)²; Salman Alotaibi²; Sherif Fathy¹; ¹Obeikan Digital Solutions; ²Saudi Standards, Metrology and Quality Organization (SASO)

17:00 PM **END OF DAY**

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

David Paredes, ASTM International
David Rosen, A*STAR / Georgia Institute of Technology

SESSION CHAIR (PM SESSION):

David Paredes, ASTM International
Andrew Thompson, Northrop Grumman

08:00 AM
INVITED **Impact Damage Behavior of Composite-Metal Sandwich Panels with Additively Manufactured Triply Periodic Minimal Surface Latticed Cores**
[Rashid Abu Al-Rub](#)¹; [Chukwugozie J. Ejeh](#)¹; Aliaa M. Abou-Ali²; Imad Barsoum¹; Wesley J. Cantwell¹; ¹Khalifa University; ²Alexandria University

08:30 AM
REGULAR **Evidence-Based Roughness Specification for Product and Process Designs of Additively Manufactured Surface Topographies**
[Christopher A. Brown](#)¹; Tuğrul Özel²;
¹Worcester Polytechnic Institute; ²Rutgers University-New Brunswick

09:00 AM
INVITED **The UK DfAM Network: Objectives, Activities and an Example Outcome in "AM Manifest"**
[Jonathan M. Rowley](#)¹; Patrick Pradel²; Allan Rennie³; ¹AM Manifest; ²Loughborough University; ³Lancaster University

09:30 AM
INVITED **You Must Unlearn What You Have Learned: Establishing a DfAM Mindset in the Face of Centuries of Traditional Manufacturing**
[Nicholas A. Meisel](#)¹; ¹Pennsylvania State University

10:00 AM **BREAK**

10:30 AM
INVITED **Can't I Just CAD? The Need to Rethink the Role of Design Representations in Light of Design for Additive Manufacturing**
[Rohan Prabhu](#)¹; Madison Cass¹; ¹Lafayette College - Knowledge and Individual Differences in Design Laboratory (KIDD Lab)

11:00 AM
REGULAR **Quantification of Effectiveness of Contact-Free Supports for Laser Powder Bed Fusion Processes**
[Zheng Jie Tan](#)¹; Nigel Tan¹; Ramasamy Subramanian¹; Elias Ang¹; ¹A*STAR - Advanced Remanufacturing and Technology Centre (ARTC)

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11:20 AM
REGULAR **Design for Additive Manufacturing: Taking into Account Post-Processing, Support Structure Removal, and Surface Finishing**
[Agustin Diaz](#)¹; Seth Craig²; William L. Hooper²; Patrick McFadden¹; Tanya C. Mikulas¹; William Miranda Torres²; Justin Michaud¹; ¹REM Surface Engineering; ²United States Air Force

11:40 AM
REGULAR **Designing and Folding Chainmail in Blender using Rigid Body Simulation**
[Gabe Guss](#)¹; Steven Hoover¹; Justin Patridge¹; ¹Lawrence Livermore National Laboratory (LLNL)

12:00 PM **LUNCH**

13:30 PM
INVITED **A Decade of Applying DfAM: How Far Have We Come?**
[Timothy Simpson](#)¹; ¹Pennsylvania State University

14:00 PM
INVITED **Design for the Additive Manufacturing Process Chain**
[David Rosen](#)^{1,2,3}; ¹A*STAR - Institute of High Performance Computing (IHPC); ²A*STAR - Singapore Institute of Manufacturing Technology (SIMTech); ³Georgia Institute of Technology

14:30 PM
INVITED **(Gy)Roid Rage: Bulking up Support Strength while Decreasing Mass**
[SJ Jones](#)¹; ¹Northrop Grumman

15:00 PM
INVITED **Bio-Motifs: A Framework for Designing Architected Materials Inspired by Nature**
[Dhruv Bhat](#)¹; Yash Mistry¹; Jordan Yaple¹; Nicole Van Handel¹; ¹Arizona State University

15:30 PM **END OF DAY**

03RD NOVEMBER 2023

SESSION CHAIR (AM SESSION):

David Paredes, ASTM International

08:00 AM
INVITED **An Integrated Design to Fabrication Workflow for Optimized Structural Elements Realized with Wire-And-Arc Additive Manufacturing**
[Vittoria Laghi](#)¹; Giada Gasparini¹; Michele Palermo¹; Tomaso Trombetti¹; ¹University of Bologna

08:30 AM
INVITED **Evolved Structures: Accelerating Development of Spaceflight Structures at NASA**
[Ryan S. McClelland](#)¹; ¹NASA - Goddard Space Flight Center (GSFC)

09:00 AM
INVITED **CALPHAD-Based ICME Design for Additive Manufacturing of Functionally Graded Alloys**
[Wei Xiong](#)¹; ¹University of Pittsburgh

09:30 AM
REGULAR **Design for Additive Manufacturing through Topology Optimization Application**
[Devi K. Kalla](#)¹; ¹Metropolitan State University of Denver

09:50 AM **END OF DAY**

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APPLICATION OF AM IN THE MEDICAL INDUSTRY

CO-ORGANIZERS:

Matthew Di Prima
U.S. Food and Drug
Administration (FDA),
USA

Ryan Kircher
rms Company, USA

Michael Roach
University of Mississippi
Medical Center, USA

David Heard
Stryker, USA

Guha Manogharan
Pennsylvania State University,
USA

01ST NOV 2023 (WED) – 03RD NOV 2023 (FRI)
CONGRESSIONAL CD (LOBBY LEVEL)

01ST NOVEMBER 2023

SESSION CHAIR (PM SESSION):

Michael Roach, University of Mississippi Medical Center

10:30 AM ****No Program****
Panel 07 (Medical) at Regency BR [A]

12:00 PM **LUNCH**

13:30 PM **Additive Manufacturing of Medical Devices:**
INVITED **The FDA Perspective**
[Matthew Di Prima](#)¹; ¹U.S. Food and Drug
Administration (FDA)

14:00 PM **Hybrid Biofabrication of Scaffolds with**
INVITED **Artificial Capillary Vessels for Tissue**
Engineering
[George Zhuo Tan](#)¹; ¹Texas Tech University

14:30 PM **3D-Bioprinting for Tissue and Organ**
REGULAR **Regeneration**
[Bianmei Cao](#)^{1,2}; [Nureddin Ashammakhi](#)³;
[Ramanathan Kadirvel](#)¹; [David Kallmes](#)¹; [Katja](#)
[Schenke-Layland](#)⁴; ¹Mayo Clinic; ²National
Institutes for Food and Drug Control (NIFDC);
³University of California, Los Angeles;
⁴Eberhard Karl University of Tübingen

14:50 PM **3D Printed (FFF) PEEK Spinal Implants:**
REGULAR **Structure, Biomechanics and Biologic**
Response
[Erik M. Erbe](#)¹; [Todd Reith](#)¹; ¹Curiteva

15:10 PM **BREAK**

15:30 PM **"Right-Sizing" Quality Management for**
INVITED **Medical Additive Manufacturing at the**
Point of Care
[Beth Ripley](#)¹; ¹Veterans Health Administration

16:00 PM **Point of Care 3D Printing of PEEK for**
INVITED **Orthopaedic Applications**
[Steven M. Kurtz](#)¹; [Tabitha Derr](#)¹; [Cemile](#)
[Basgul](#)¹; [Hannah Spece](#)¹; ¹Drexel University

16:30 PM **Reducing Risk at Point-of-Care 3D Printing**
INVITED **Facilities through QMS and GMP**
Implementation
[Nicole McMinn](#)¹; [Alese Devin](#)¹; [Peter C.](#)
[Liacouras](#)¹; [Beth Ripley](#)²; ¹Walter Reed
National Military Medical Center; ²Veterans
Health Administration

17:00 PM **END OF DAY**

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

[Guha Manogharan](#), Pennsylvania State University
[Ryan Kircher](#), rms Company

SESSION CHAIR (PM SESSION):

[Matthew Di Prima](#), U.S. Food and Drug Administration (FDA)
[Ryan Kircher](#), rms Company

08:00 AM **Challenges in Titanium 3D Printing in a**
INVITED **Point-of-Care Environment**
[Sean McEligot](#)¹; ¹Mayo Clinic

08:30 AM **Continuous Reuse of Ti6Al4V ELI Powder**
REGULAR **while Replenishing with Virgin Powder in**
Laser Powder Bed Fusion
[Tyler Antesberger](#)¹; [Swathi Vunnam](#)¹; ¹AddUp

08:50 AM **Corrosion Performance of Additively**
REGULAR **Manufactured Stainless Steel**
[Shiril Sivan](#)¹; [Eric McDermott](#)¹; [Matthew Di](#)
[Prima](#)¹; ¹U.S. Food and Drug Administration
(FDA)

09:10 AM **High Resolution Three-Dimensional**
REGULAR **Printing of Piezoelectric Composites for**
Sensing
[Xiangfan Chen](#)¹; [Siyang Liu](#)¹; ¹Arizona State
University

09:30 AM **Exploring the Relationship between Quasi-**
INVITED **Static and Dynamic Mechanical Properties**
and Performance of AM Ti6Al4V Medical
Devices
[Ryan S. Kircher](#)¹; ¹rms Company

10:00 AM **BREAK**

10:30 AM **What is All The Fuss About Additive**
INVITED **Manufacturing (AM) and Hybrid**
Manufacturing? Challenges and
Opportunities for Medical Applications
[Guha Manogharan](#)¹; ¹Pennsylvania State
University

11:00 AM **Estimating the Impact of Additive**
INVITED **Manufacturing Material Variability on**
Medical Device Quasi-Static Performance
[Daniel A. Porter](#)¹; [Abigail Tetteh](#)²; [Matthew Di](#)
[Prima](#)¹; [Sean Philips](#)¹; [Jay Kadakia](#)¹; [Matthew](#)
[Schwerin](#)¹; [Snehal S. Shetye](#)¹; ¹U.S. Food
and Drug Administration (FDA); ²Oak Ridge
Institute for Science and Education (ORISE)

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ICAM 2023 FINAL PROGRAM AGENDA

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11:30 AM
REGULAR **Microscale Validation of Lattice Computational Models using Advanced Microscale Volumetric Imaging**
[Snehal S. Shetye](#)¹; Matthew Di Prima¹; Hongbing Lu²; Rebecca Pennington¹; Daniel A. Porter¹; Runyu Zhang²; ¹U.S. Food and Drug Administration (FDA); ²University of Texas at Dallas

11:50 AM **LUNCH**

13:30 PM ****No Program****
Keynote 08 (Medical) at Regency BR [A]

14:20 PM
REGULAR **Assessment of Intra-Operative Durability of Additively Manufactured Spinal Intervertebral Body Fusion Devices**
[Vivek Palepu](#)¹; Matthew Di Prima¹; David Hwang¹; Daniel A. Porter¹; ¹U.S. Food and Drug Administration (FDA)

14:40 PM
REGULAR **AM Case Study - Stacking Hip Cups with Supportless and High Productivity Printing**
[Ross Attardo](#)¹; Michael Mann¹; Jeph Ruppert¹; ¹3D Systems

15:00 PM **BREAK**

15:30 PM
INVITED **Rapid Non-Destructive 2D and 3D Evaluation of Porous Coatings with X-Ray microCT Inline with ASTM F1854 Workflow**
[Pradeep Bhattad](#)¹; Curtis L. Frederick¹; ¹ZEISS Industrial Quality Solutions

16:00 PM
INVITED **Increased Expulsion Resistance of Novel Computationally-Generated Unidirectional Sharkskin Roughness**
[Matthew A. Shomper](#)¹; ¹Not a Robot Engineering

16:30 PM **END OF DAY**

09:30 AM
INVITED **Enabling Additive Manufacturing of Novel Metallic Implants with Superior Mechanical Performance and Bactericidal Surface**
[Erfan Maleki](#)¹; Nima Shamsaei¹; ¹Auburn University - National Center for Additive Manufacturing Excellence (NCAME)

10:00 AM **BREAK**

10:30 AM
INVITED **3D Printed Ceramics for Load Bearing Bone Regeneration in Segmental Defects**
[Nicole Wake](#)¹; [Fiona Ginty](#)²; [Gautam Parthasarathy](#)²; Jeroen Eyckmans³; Christopher Chen³; Brian Davis²; Jessica Martinez²; Liz McDonough²; Chitresh Bhushan²; Steve Duclos²; Sara Peterson²; Cathleen Hoel²; Elise Morgan³; ¹GE HealthCare; ²GE Research; ³Boston University

11:00 AM
INVITED **Clean Processing During Hot Isostatic Pressing (HIP)**
[Chad M. Beamer](#)¹; Pontus Nilsson¹; Anders Magnusson¹; James Shipley¹; ¹Quintus Technologies

11:30 AM **END OF DAY**

03RD NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Matthew Di Prima, U.S. Food and Drug Administration (FDA)
Ryan Kircher, rms Company

08:00 AM
INVITED **Nanotextured Metal Powders Enable LPBF of Alloys for Medical Applications**
[Ottman A. Tertuliano](#)¹; ¹University of Pennsylvania

08:30 AM
REGULAR **Development of a Leak Verification Method for Additively Manufactured Personal Protective Equipment**
[Matthew Schwerin](#)¹; Bryan Ibarra¹; Ali Hasani¹; Suvajoti Guha¹; Daniel A. Porter¹; ¹U.S. Food and Drug Administration (FDA)

09:10 AM
REGULAR **A Scalable 3D Printed Bioreactor for the Expansion of Anchorage-Dependent Cells and Production of Viral Vectors, EVs, and iPSCs**
[Kreg Zimmern](#)¹; Nicholas P. McMahon¹; ¹Southwest Research Institute (SwRI)

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Updated as of 24th October 2023



Note: This agenda features a list of accepted presentations for ICAM 2023 and their respective timeslots. The line-up for each symposium is as per the order reflected. Please contact us at icam@astm.org if you need more information.

ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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- 09:30 AM**
INVITED **Roadmap of Advanced Technologies for the Digitalization of the Construction Industry**
[Stephan Mansour](#)¹; ¹Wohlers Associates
- 10:00 AM** **BREAK**
- 10:30 AM**
INVITED **3D Construction Printing in California - From Standardization to Permitting**
[Babak Zareian](#)¹; ¹Emergent 3D
- 11:00 AM**
INVITED **3D Printing and the Housing Crisis in Canada: Navigating Challenges in Modernizing the Construction Sector**
[Ian Arthur](#)¹; [Marcos Vinicius Gil Silveira](#)¹; ¹nidus3D
- 11:30 AM**
INVITED **Towards Systematic Test Methodologies for Mechanical Properties of 3D Printed Concrete**
[Freek P. Bos](#)¹; ¹Technical University of Munich
- 12:00 PM** **LUNCH**
- 13:30 PM**
INVITED **Towards Sustainability In Digital Fabrication with Concrete**
[Timothy Wangler](#)¹; ¹ETH Zürich
- 14:00 PM**
INVITED **Additive Construction: An Update on the Ongoing Research Roadmap at AddCon Lab and X-Hab 3D**
[Jose P. Duarte](#)^{1, 2}; [Sven Bilén](#)^{1, 2}; [Nathan Brown](#)¹; [Benay Gürsoy](#)¹; [Shadi Nazarian](#)^{1, 2}; [Aleksandra Radlińska](#)¹; ¹Pennsylvania State University; ²X-Hab 3D
- 14:30 PM**
INVITED **Ecosystems of Technologies for Success in 3D Printed Construction**
[Randal Pope](#)¹; ¹Terran Robotics
- 15:00 PM** **BREAK**
- 15:30 PM**
INVITED **Making Research Count - Collaboration of University, Industry, and Government to Enable Construction 3DP**
[Ming-Jen Tan](#)^{1, 2}; [Paulo J. Bartolo](#)^{1, 2}; [Daniel Y. Tay](#)^{1, 2}; [Teck Neng Wong](#)^{1, 2}; [Kah Fai Leong](#)^{1, 2}; [Chee Kai Chua](#)³; ¹Nanyang Technological University (NTU); ²Singapore Centre for 3D Printing (SC3DP); ³Singapore University of Technology & Design (SUTD)
- 16:00 PM**
REGULAR **Topology Optimization Based Sustainable Additive Construction**
[Islam M. Mantawy](#)¹; [Anthony M. Mackin](#)¹; [Jenna M. Migliorino](#)¹; ¹Rowan University
- 16:20 PM** **END OF DAY**

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AM OF NON-METALLIC MATERIALS

CO-ORGANIZERS:

Shweta Agarwala
Aarhus University, Denmark

Brandon Cox
Honeywell, USA

Sean Looi
Creat3D, Singapore

Jonathan Seppala
NIST, USA

Sadaf Sobhani
Cornell University, USA

02ND NOV 2023 (THU) – 03RD NOV 2023 (FRI)
CONCORD (BALLROOM LEVEL)

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Brandon Cox, Honeywell
Jonathan Seppala, NIST

SESSION CHAIR (PM SESSION):

Jonathan Seppala, NIST

08:00 AM
INVITED **Structural Stability During Thermal Post-Curing of Thermoset Composites Printed via Material Extrusion**
[Stian K. Romberg](#)¹; Jonathan Seppala¹; Anthony Kotula¹; ¹NIST

08:30 AM
REGULAR **Continuous Fiber Composite Interwoven 3D Printing**
[Remy H. Samson](#)¹; Pierre Mertiny¹; David Nobes¹; Ahmed J. Qureshi¹; ¹University of Alberta

08:50 AM
REGULAR **Additive Manufacturing of Continuously Reinforced Thermally Curable Thermosetcomposites with Rapid Interlayer Curing**
[Kun \(Kelvin\) Fu](#)¹; ¹University of Delaware

09:10 AM
REGULAR **Qualification Efforts for Continuous Fiber Reinforced Polymer MEX and Filled Polymer LPBF Material Systems**
[Royal Lovingfoss](#)¹; Rachael M. Andrulonis¹; ¹Wichita State University - National Institute for Aviation Research (WSU - NIAR)

09:30 AM
INVITED **Process Evaluations for Stereolithography Printing of Cristobalite**
[Sophie Grier](#)¹; Parker Freudenberger¹; Troy Leonard¹; ¹Honeywell Federal Manufacturing & Technologies (FM&T)

10:00 AM **BREAK**

10:30 AM
INVITED **Surface Metrology: Providing Insights on the Additive Manufacture of Ceramics by Stereolithography Processing**
[Brigid A. Mullany](#)¹; [Sarah-Margaret Andrews](#)¹; Angela Davies¹; ¹University of North Carolina at Charlotte

11:00 AM
REGULAR **Material Properties Measurements of Stereolithographic Glass-Filled Polymer Prints for Forming Tool Prototypes**
[Alexander K. Landauer](#)¹; Jonathan Seppala¹; Aaron M. Forster¹; ¹NIST

11:20 AM
REGULAR **Fatigue Behavior of Polymers: A Comparison between Additive Manufacturing and Injection Molding Techniques**
[Mohammad Amjadi](#)¹; [Reza Molaei](#)²; ¹Arkansas Tech University; ²University of Memphis

11:40 AM
REGULAR **Open Source 3D Materials in 2023**
[Taylor Hardy](#)¹; ¹ELK3D

12:00 PM **LUNCH**

13:30 PM
INVITED **Electronics Additive Manufacturing: Market Intelligence Report, Applications, and Projections**
[Ryan Hayford](#)¹; ¹Hayford Consulting

14:00 PM
REGULAR **High Speed and High-Resolution 3D Printing of Self-Healing and Ion-Conductive Hydrogels via µCLIP**
[Xiangfan Chen](#)¹; Wenbo Wang¹; ¹Arizona State University

14:20 PM
REGULAR **Application of Electrically Conductive Adhesives in the Additive Manufacturing Process**
[Paulina Latko-Duralek](#)^{1,2}; [Żaneta Górecka](#)¹; Paulina Kozera¹; Monika Wiecek-Czarnocka¹; Michał Misiak²; ¹Technology Partners Foundation; ²Warsaw University of Technology

14:40 PM
REGULAR **Additive Manufacturing of Liquid Metal-Based Microfluidic Devices for Extremely Stretchable and Flexible Electronics**
[Mohammad Abu Hasan Khondoker](#)¹; Rawan Elersawy¹; Arafater Rahman¹; Chowdhury Sakib-Uz-Zaman¹; ¹University of Regina

15:00 PM **BREAK**

15:30 PM
INVITED **Use of Electroplated Coatings to Reinforce Resin Parts Built by 3D Printing Methods**
[Sean Wise](#)¹; ¹RePliForm

16:00 PM
INVITED **New Polyurethane and Multi-Material Thermosets for 3D Printing**
[Cora Leibig](#)¹; [Brian Mullen](#)¹; ¹Chromatic 3D Materials

16:30 PM **END OF DAY**

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03RD NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Brandon Cox, Honeywell

- 08:00 AM**
INVITED **Flow Alignment of Polymer in Thermoplastic Material Extrusion**
[Jonathan Seppala](#)¹; ¹NIST
- 08:30 AM**
REGULAR **Cyclic Olefin Resins for Additive Manufacturing**
[Raymond Weitekamp](#)¹; ¹polySpectra
- 09:00 AM**
INVITED **Machine Learning Strategy for Defect Detection using In-Process Monitoring Data of 3D Printing Processes**
[Tuan Tran](#)¹; [Ngoc Vu Nguyen](#)¹; [Allen Jun Wee Hum](#)¹; ¹Nanyang Technological University (NTU)
- 09:30 AM**
INVITED **Increasing Dimensional Accuracy when Forming Ceramic Structures via Direct Ink Writing and Postprocessing Ceramic Powder Aggregates via Pressureless Sintering**
[Lynnora O. Grant](#)¹; [Russell Maier](#)¹; ¹NIST
- 10:00 AM** **BREAK**
- 10:30 AM**
REGULAR **Upcycling of Recycled Materials Utilizing Binder Jet Additive Manufacturing**
[Dustin Gilmer](#)¹; [Amy Elliott](#)²; [Alex Stiles](#)³; ¹University of Tennessee-Oak Ridge Innovation Institute (UT-ORII); ²Oak Ridge National Laboratory (ORNL); ³Vitriform3D
- 10:50 AM**
REGULAR **From Round Robin Studies to Fundamental Science: NIST's Work to Establish a Foundation for Vat Photopolymerization Standards**
[Callie I. Higgins](#)¹; [Jason Killgore](#)¹; [Thomas Kolibaba](#)¹; [Benjamin Caplins](#)¹; ¹NIST
- 11:10 AM**
REGULAR **Bridge Tooling - Advanced Rapid Manufacturing Solutions for Scaling Production**
[Madison M. Jones](#)¹; [Matthew A. Eckhart](#)¹; ¹Axle Box - Additive at Scale
- 11:30 AM** **END OF DAY**

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INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN AM

CO-ORGANIZERS:

Kareem Aggour
GE Research, USA

Gareth Conduit
Intellegens, United Kingdom

Shaw Feng
NIST, USA

Jia (Peter) Liu
Auburn University, USA

Christopher Robinson
Ansys, USA

02ND NOV 2023 (THU) – 03RD NOV 2023 (FRI)
LEXINGTON (BALLROOM LEVEL)

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Clancy Umphrey, Ansys

SESSION CHAIR (PM SESSION):

Jia (Peter) Liu, Auburn University

08:00 AM
INVITED **Physics-Informed Machine Learning Modeling for Property and Performance of L-PBF**
[Jia \(Peter\) Liu](#)¹; Nima Shamsaei¹; Shuai Shao¹; ¹Auburn University

08:30 AM
REGULAR **Deploying the First Additive Large Language Model and the Future of AI in Process Management**
[Andre Wegner](#)¹; ¹Authentise

08:50 AM
REGULAR **Predicting Power and Speed in Laser Powder Bed Fusion using a Neural Network Trained on In-Situ Monitoring Data**
[Gabe Guss](#)¹; Ava Ashby¹; Saad Khairallah¹; CE Kim¹; Amit Kumar¹; Manyalibo Matthews¹; Justin Patridge¹; ¹Lawrence Livermore National Laboratory (LLNL)

09:10 AM
REGULAR **Physics-Informed Deep Learning of Meltpool Conditions in Laser Powder Bed Fusion**
[Tuğrul Özel](#)¹; ¹Rutgers University–New Brunswick

09:30 AM
INVITED **TBA**
[Jaehyuk Kim](#)¹; Yan Lu¹; Zhuo Yang¹; ¹NIST

10:00 AM
BREAK

10:30 AM
INVITED **Application of Machine Learning to Predicting Defect Probability in Electron Beam Directed Energy Deposition Additive Manufacturing**
[Naresh Iyer](#)¹; Justin Gambone¹; Ronald Aman²; Daniel Ruscitto¹; Zachary Corey²; Noopur Jamnikar¹; Alexander Kitt²; Yousub Lee³; Luke Mohr²; Brian Rosenberger⁴; Subhrajit Roychowdhury¹; ¹GE Research; ²EWI; ³Oak Ridge National Laboratory (ORNL); ⁴Lockheed Martin

11:00 AM
REGULAR **Baker Hughes AM Edge: Use of Machine Learning to Create Credibility in AM Print Process by Detecting Defects while Printing**
[Faisal Iqbal](#)¹; [Juan C. Flores](#)¹; Amar Patel¹; ¹Baker Hughes

11:20 AM
REGULAR **Integrating Real-Time Monitoring Data into Process-Structure-Property Analytics for Additive Manufacturing using Physics-Guided Machine Learning**
[Hyunwoong Ko](#)¹; Shu Wan¹; Fatemeh Elhambakhsh¹; ¹Arizona State University

11:40 AM
REGULAR **Prediction of the Microstructure in Additive Manufactured Components by Means of Artificial Intelligence and Online Monitoring**
[Josef Spachtholz](#)¹; Lukas Angermüller¹; Andreas Fischerswöring-Bunk¹; ¹MTU Aero Engines

12:00 PM
LUNCH

13:30 PM
INVITED **Microstructure-Property Data Modeling for Additive Manufacturing Data Registration**
[Shaw Feng](#)¹; Yan Lu¹; ¹NIST

14:00 PM
REGULAR **Automated High-Throughput Characterization of Additively Manufactured Parts using Deep Learning-Based X-Ray CT Reconstruction for Industry 4.0**
[Amir Ziabari](#)¹; Singanallur Venkatakrishnan¹; Zackary Snow¹; Paul Brackman²; Curtis L. Frederick²; Aleksandr Lisovich²; Pradeep Bhattad²; Alexander Plotkowski¹; Ryan R. Dehoff¹; Vincent C. Paquit¹; ¹Oak Ridge National Laboratory (ORNL); ²ZEISS Industrial Quality Solutions

14:20 PM
REGULAR **Quality Control In Electron Beam Melting Additive Manufacturing: A Reinforcement Learning Approach**
[Michael Sprayberry](#)¹; ¹Oak Ridge National Laboratory (ORNL)

14:40 PM
REGULAR **Deep-Learning Quantitative Structural Characterization in Laser Powder Bed Fusion**
[Amra Peles](#)¹; Zackary Snow¹; Ryan R. Dehoff¹; Vincent C. Paquit¹; ¹Oak Ridge National Laboratory (ORNL)

15:00 PM
BREAK

15:30 PM
INVITED **Data Fusion for AM Process Control and Quality Management: Machine Learning Assisted Approach**
[Zhuo Yang](#)¹; Jaehyuk Kim^{2,3}; Yan Lu²; ¹Georgetown University; ²NIST; ³Pohang University of Science and Technology (POSTECH)

16:00 PM
INVITED **Using Machine Learning to Accelerate Additive Manufactured Parts to Market**
[Austin Flanary](#)¹; Freddy Moriniere¹; Toshihiko Yoshikawa¹; ¹Ansys

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ICAM 2023 FINAL PROGRAM AGENDA

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16:30 PM
INVITED **Monitoring of Single-Track Quality in Laser Powder Bed Fusion using In-Situ Thermionic Sensing**
[Prahalada K. Rao](#)¹; [Benjamin Bevans](#)¹;
Nicholas P. Calta²; Philip DePond²; Gabe Gauss²; Brian Giera²; Aiden Martin²; ¹Virginia Tech; ²Lawrence Livermore National Laboratory (LLNL)

17:00 PM **END OF DAY**

03RD NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Mahdi Jamshid, ASTM International

08:00 AM
INVITED **Deep Learning for Layer-Wise Additive Manufacturing Predictions**
[Clancy Umphrey](#)¹; Christopher Robinson¹;
Enrique Escobar de Obaldia¹; ¹Ansys

08:30 AM
INVITED **Thermal Data De-Identification for Cross-System Anomaly Detection of Metal-Based Additive Manufacturing**
[Wenmeng \(Meg\) Tian](#)¹; Mahathir Bappy¹;
Durant Fullington¹; ¹Mississippi State University

09:00 AM
REGULAR **Recycled Powder Quality Determination with (CNN) Convolutional Neural Network Based Machine Learning of Particle Images**
[Ramesh Subramanian](#)¹; [Peter Warren](#)²;
[Ranajay Ghosh](#)²; ¹Siemens Energy;
²University of Central Florida

09:20 AM
REGULAR **Machine Learning-Driven Real-Time Monitoring of Porosity Generation in Laser Powder Bed Fusion**
[Zhongshu Ren](#)¹; Tao Sun²; ¹Northwestern University; ²University of Virginia

09:40 AM
REGULAR **AI-Powered In-Situ Pore Generation and Evolution Dynamics during Laser Additive Manufacturing**
[Sen Liu](#)¹; Christopher Tassone¹; Vivek Thampy¹; Peiyu Quan¹; ¹Stanford University - SLAC National Accelerator Laboratory

10:00 AM
INVITED **Read between the Layers: Using AI for More Effective Quality Control in AM**
[Gilles Claeys](#)¹; Jan Van Espen¹; ¹Materialise

10:30 AM **END OF DAY**

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SINTER-BASED AM TECHNOLOGIES

CO-ORGANIZERS:

Animesh Bose
Desktop Metal, USA

Amy Elliot
Oak Ridge National
Laboratory (ORNL),
USA

Benoît Verquin
Cetim - French
Technical Center for
Mechanical Industries,
France

Efrain Carreño-Morelli
University of Applied Sciences
and Arts Western Switzerland
(HES-SO), Switzerland

Simon Höges
GKN Additive, Germany

02ND NOV 2023 (THU) – 03RD NOV 2023 (FRI)
BUNKER HILL (BALLROOM LEVEL)

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Efrain Carreño-Morelli, HES-SO
Amy Elliot, Oak Ridge National Laboratory (ORNL)

SESSION CHAIR (PM SESSION):

Efrain Carreño-Morelli, HES-SO
Simon Höges, GKN Additive

08:00 AM
INVITED **Applications from Several Sinter-Based Additive Manufacturing Processes**
[Animesh Bose](#)¹; ¹Optimus Alloys

08:30 AM
REGULAR **Binder Jetting, A Solution for Special Tools Development**
[Iñigo Agote](#)¹; Naiara Azurmendi¹; Asier Lores¹; ¹TECNALIA

09:00 AM
INVITED **Accelerating Process Development of Binder Jet Additive Manufacturing**
[Paul Prichard](#)¹; Matthew Bonidie¹; Zhuqing Wang¹; ¹Kennametal

09:30 AM
INVITED **High-Resolution Metal Additive Manufacturing Enabled by Lithography**
[Gerald Mitteramskogler](#)¹; György Harakály¹; Denise Mödderr¹; ¹Incus

10:00 AM
BREAK

10:30 AM
INVITED **Advanced Fatigue and Wear Resistance of Metal Binder Jetting Components**
[Simon Höges](#)¹; Patrick Köhnen¹; Dennis Wawoczny²; ¹GKN Additive; ²GKN Powder Metallurgy

11:00 AM
REGULAR **Metal Binder Jetting of Superalloy Impeller for Turbocharger Application**
[Mattia Forgiarini](#)¹; Fredrik Berg Lisse²; Chad M. Beamer³; Tim Noronha⁴; David Sponseller⁵; ¹Azoth; ²Digital Metal; ³Quintus Technologies; ⁴TURBOCAM; ⁵OMNI Metals Laboratory

11:20 AM
REGULAR **Lattice Structure-Based Copper Heatsinks via Sinter-Based Material Extrusion Additive Manufacturing**
[Kunal Kate](#)¹; Kameswara Pavan Kumar Ajjarapu¹; Julio Izquierdo¹; Saleh Khanjar¹; Bikram Bhatia¹; Sundar Atre¹; James Taylor²; Tom Pelletiers²; ¹University of Louisville; ²Kymera International

11:40 AM
REGULAR **Development of CuCrZr Process Parameters by Binder Jetting**
[Shandra Sainz](#)¹; Evelin Cardozo¹; Iñigo Iglesias¹; Iñigo Iturriza¹; Nerea Ordás¹; ¹Ceit Technology Center

12:00 PM
LUNCH

13:30 PM
INVITED **Solvent-on-Granules 3D-Printing of Soft Magnetic Materials**
[Efrain Carreño-Morelli](#)¹; ¹University of Applied Sciences and Arts Western Switzerland (HES-SO)

14:00 PM
REGULAR **Debind and Sinter Options for Sinter Based AM Technologies**
[Mark Saline](#)¹; ¹Gasbarre Thermal Processing Systems

14:20 PM
REGULAR **Advanced Product Quality Planning for Metal Binder Jetting**
[Cody Cochran](#)¹; Mattia Forgiarini¹; ¹Azoth

14:40 PM
REGULAR **Binder Jetting with Water Atomized Powder**
[Animesh Bose](#)¹; Yoshiyuki Kato²; Tomo Takahashi³; Toshinori Iwasaki⁴; ¹Optimus Alloys; ²Kato Professional Engineer Office; ³Pacific Sowa Corporation; ⁴ExOne

15:00 PM
BREAK

15:30 PM
INVITED **New Tool Steel Powder with Improved Sinterability, Toughness and Abrasive Wear Resistance Processed by Sinter Based AM**
[Iñigo Iturriza](#)¹; Shandra Sainz¹; Carmen Luno-Bilbao¹; Julia Pérez de Arriazu¹; ¹Ceit Technology Center

16:00 PM
REGULAR **Cemented Carbide, a Great Material for Additive Manufacturing**
[Paul A. Davies](#)¹; Anders Ohlsson¹; ¹Sandvik Additive Manufacturing

16:20 PM
REGULAR **Binder-Jet 3D Printing - Status Report**
[Jagadish Holla](#)¹; Mukund Nagaraj¹; ¹INDO-MIM

16:40 PM
END OF DAY

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03RD NOVEMBERS 2023

SESSION CHAIR (AM SESSION):

Animesh Bose, Optimus Alloys

08:00 AM Automation of Binder Jet Depowdering

INVITED Amy A. Elliott¹; ¹Oak Ridge National Laboratory (ORNL)

08:30 AM Advancements in Metal Binder Jetting of Copper: Automated Depowdering and Material Performance Improvements

Cody Cochran¹; Mattia Forgiarini¹; Lorenzo Marchetti²; ¹Azoth; ²Digital Metal

08:50 AM Metal Binder Jetting and Metal Material Jetting as Complementary Technologies: A User Perspective

REGULAR Mattia Forgiarini¹; Cody Cochran¹; Dror Danai²; ¹Azoth; ²XJet

09:10 AM A Physics-Based Data-Driven Distortion Compensation Model for Sintered Binder Jet Parts Considering Size Effects

REGULAR Wen Dong¹; Albert C. To¹; Basil Paudel¹; ¹University of Pittsburgh

09:30 AM END OF DAY

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ICAM 2023 FINAL PROGRAM AGENDA

Updated as of 24th October 2023

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INDUSTRY 4.0: SECURITY ASPECTS OF AM

CO-ORGANIZERS:

Chris Adkins
Identify3D, USA

Joshua Lubell
NIST, USA

Yan Wang
Georgia Institute of
Technology, USA

Mark Yampolskiy
Auburn University, USA

02ND NOV 2023 (THU)

CONGRESSIONAL B (LOBBY LEVEL)

02ND NOVEMBER 2023

SESSION CHAIR (AM SESSION):

Mark Yampolskiy, Auburn University

SESSION CHAIR (PM SESSION):

Joshua Lubell, NIST

08:00 AM
INVITED **Cyberphysical Security in Additive Manufacturing: From Metal Aircraft Parts to 3D Drug Printing**
[Sharon Flank](#)¹; ¹InfraTrac

08:30 AM
REGULAR **Developing Cyber Security Certification for the Additive Manufacturing Process**
[Alan Sukert](#)¹; Paul Tykodi²; ¹IEEE-ISTO - Printer Working Group (IPP Workgroup); ²Tykodi Consulting Services

09:00 AM
INVITED **Developing Risk-based Additive Manufacturing Security Guidance**
[Joshua Lubell](#)¹; Fahad Milaat¹; ¹NIST

09:30 AM
INVITED **Illicit Weapons Production: Assessing Gaps in Additive Manufacturing Security**
[Gregory P. Nichols](#)¹; ¹Homeland Defense and Security Information Analysis Center (HDIAC)

10:00 AM **BREAK**

10:30 AM
INVITED **Information Embedding through Additive Manufacturing Process Control**
[Jitesh Panchal](#)¹; ¹Purdue University

11:00 AM
INVITED **A Spoonful of Sugar: Extending In Situ Quality Monitoring Systems to Detect Cyber-Induced Incidents**
[Joel A. Dawson](#)¹; [Logan D. Sturm](#)¹; ¹Oak Ridge National Laboratory (ORNL)

11:30 AM
INVITED **Myths and Misconceptions in AM Security**
[Mark Yampolskiy](#)¹; ¹Auburn University

12:00 PM **LUNCH**

13:30 PM
INVITED **Securing the 'Last Mile' of Additive Manufacturing**
[Chris Adkins](#)¹; ¹Materialise

14:00 PM
REGULAR **Cyber-Physical Trust Anchors and Proof of Ownership for a Secure Supply Chain**
[Michele Maasberg](#)¹; Leslie G. Butler²; Ian Taylor³; ¹United States Naval Academy (USNA); ²Louisiana State University; ³SIMBA Chain

14:20 PM
REGULAR **Building a Secure IIoT Network at the Autodesk Technology Centers for Smart Manufacturing**
[Brian Jeong](#)¹; [Yu Sugiyama](#)¹; ¹Autodesk

14:40 PM
REGULAR **AM Is Not That Advanced without Cybersecurity**
[Stephen A. Battista](#)¹; ¹MITRE

15:00 PM
INVITED **AM&AI: Risks and Opportunities Assessment for Intellectual and Technical Property Protection**
[J  r  mie Farret](#)^{1,2}; Keivan Mokhtapour^{1,2}; ¹Inmind Technologies; ²Mind in a Box

15:30 PM **END OF DAY**

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ICAM 2023 FINAL PROGRAM AGENDA

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KEYNOTES & PANEL DISCUSSIONS REGENCY BR [A] (BALLROOM LEVEL)

30TH OCT 2023 (MON)

08:00 AM
KEYNOTE 01
AVIATION

AIRBUS AM IMPLEMENTATION - STATUS AND WHAT'S NEXT

KEYNOTE SPEAKER:
Stephane Bianco, Airbus

09:00 AM
PANEL 01
AVIATION

WHAT ARE THE CURRENT APPLICATIONS AND CHALLENGES IN AVIATION?

MODERATOR:
Jim Dobbs,
Boeing

PANELISTS:

- Cindy Ashforth, Federal Aviation Administration (FAA)
- Christo Dordlova, GKN Aerospace
- Ankit Sahu, Objectify Technologies
- Eric Sager, Boeing

13:30 PM
KEYNOTE 02
TRANSPORTATION

ACCELERATING NEXT GENERATION VEHICLE ARCHITECTURE

KEYNOTE SPEAKER:
Kevin Czinger, Divergent / Czinger Vehicles
Uwe Renz, Mercedes-AMG

15:30 PM
PANEL 02
*QUALIFICATION &
CERTIFICATION*

NOVEL AND EMERGING APPROACHES FOR QUALIFICATION AND CERTIFICATION IN ADDITIVE MANUFACTURING

MODERATOR:
Martin White,
ASTM International

PANELISTS:

- Stephane Bianco, Airbus
- Cory Cunningham, Boeing
- Tony Fry, National Physical Laboratory (NPL)
- Colton Katsarelis, NASA - Marshall Space Flight Center (MSFC)
- Mark Shaw, Wichita State University - National Institute for Aviation Research

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KEYNOTES & PANEL DISCUSSIONS REGENCY BR [A] (BALLROOM LEVEL)

31ST OCT 2023 (TUE)

08:00 AM
KEYNOTE 03
SPACE

NASA SPACE TECHNOLOGY OVERVIEW AND MANUFACTURING ON THE MOON

KEYNOTE SPEAKER:
Prasun Desai, NASA

09:00 AM
PANEL 03
INSPECTION

SENSING & MATERIALS: RELATING IN-SITU DATA TO MATERIALS TOWARDS CLOSED-LOOP CONTROL

MODERATOR:
Justin Gambone,
GE Research

PANELISTS:

- Erin Lanigan, NASA - Marshall Space Flight Center (MSFC)
- Andrey Molotnikov, Additive Assurance
- Abdalla Nassar, John Deere
- Anthony Rollett, Carnegie Mellon University
- Zackary Snow, Oak Ridge National Laboratory (ORNL)

10:30 AM
PANEL 04
INDUSTRY 4.0

REALITY OF INDUSTRY 4.0; TODAY, TOMORROW, AND BEYOND

MODERATOR:
Anna Tomzynska,
Boeing

PANELISTS:

- James Fonda, Boeing
- Victor Gerdes, Stratasys
- Yan Lu, NIST
- Behrang Poorganji, Morf3D
- Christopher Saldaña, U.S. Department of Energy

13:30 PM
KEYNOTE 04
ROBOTICS & AUTOMATION

MANUFACTURING USA: ACCELERATING INNOVATIONS IN U.S. ADVANCED MANUFACTURING

KEYNOTE SPEAKER:
Michael Molnar, NIST

15:30 PM
PANEL 05
SPACE

FEDERAL PERSPECTIVES ON THE FUTURE OF AM R&D AND EDUCATION / WORKFORCE

MODERATOR:
John Vickers,
NASA

PANELISTS:

- Quincy Brown, Office of the Vice President (The White House)
- Khershed Cooper, National Science Foundation (NSF)
- Andrew Detor, Defense Advanced Research Projects Agency (DARPA)
- Keith Devries, U.S. Department of Defense
- Kevin Jurrens, NIST

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KEYNOTES & PANEL DISCUSSIONS REGENCY BR [A] (BALLROOM LEVEL)

1ST NOV 2023 (WED)

08:00 AM
KEYNOTE 05
DEFENSE

HOW ADVANCED MANUFACTURING IS HELPING DEFINE PATHWAYS TO ADOPTION

KEYNOTE SPEAKER:

Tracy Frost, U.S. Department of Defense

09:00 AM
PANEL 06
ECONOMICS

ADVANCED MANUFACTURING COMPLIANCE TO ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) GOALS

MODERATOR:

Gregory Hayes,
EOS

PANELISTS:

- Oliver Elbert, Grenzebach
- Alaa Elwany, U.S. Department of Energy
- Sherri Monroe, Additive Manufacturer Green Trade Association (AMGTA)
- Antonio Paesano, Boeing
- Thierry Rayna, École Polytechnique (L'X)

10:30 AM
PANEL 07
MEDICAL

SECURING AND STRENGTHENING THE MEDICAL DEVICE SUPPLY CHAIN WITH AM

MODERATOR:

Laura Gilmour,
LG Strategies

PANELISTS:

- James Coburn, U.S. Food and Drug Administration (FDA)
- Eliana Fu, TRUMPF
- Ryan Kircher, rms Company
- Steve Reece, Kyocera Medical Technologies

13:30 PM
KEYNOTE 06
ENERGY

ADVANCED MANUFACTURING FOR A CLEAN, DECARBONIZED ECONOMY

KEYNOTE SPEAKER:

Christopher Saldaña, U.S. Department of Energy

15:30 PM
PANEL 08
ENERGY

HOW DOES AM FIT IN THE OIL & GAS SUPPLY CHAIN MODEL? OR IT DOESN'T?

MODERATOR:

Carlo De Bernardi,
ConocoPhillips

PANELISTS:

- Michael Corliss, Knust-Godwin
- Steve Freitas, IMI CCI
- Slade Gardner, Big Metal Additive
- Steve Humphries, Flowserve
- Mitchell Loyd, Woodside Energy

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KEYNOTES & PANEL DISCUSSIONS REGENCY BR [A] (BALLROOM LEVEL)

2ND NOV 2023 (THU)

08:00 AM
PANEL 09
CONSTRUCTION

PLANETARY ADDITIVE CONSTRUCTION: ENABLING STRATEGIES TO MAXIMIZE ISRU

MODERATOR:

Michael Fiske,
NASA - Jacobs
Space Exploration
Group (JSEG)

PANELISTS:

- Natalia Alexandrov, NASA - Langley Research Center (LaRC)
- Sven Bilén, Pennsylvania State University
- Rob Button, NASA - Glenn Research Center (GRC)
- Marina Konstantatou, Foster + Partners
- Thao Nguyen, ICON

09:00 AM
KEYNOTE 07
CONSTRUCTION

REBUILDING THE AMERICAN DREAM: 3D PRINTED HOMES

KEYNOTE SPEAKER:

Zachary Mannheimer, Alquist

13:30 PM
KEYNOTE 08
MEDICAL

3D PRINTING OF METALLIC MATERIALS FOR BIOMEDICAL IMPLANTS

KEYNOTE SPEAKER:

Ken Gall, Duke University / restor3d

15:30 PM
PANEL 10
*DEFENSE /
GOVERNMENT*

SUPPLY CHAIN RESILIENCE

MODERATOR:

Richard Huff,
ASTM International

PANELISTS:

- Glynn Adams, Lockheed Martin
- Jesse Boyer, Pratt & Whitney
- Haley Cook, Keselowski Advanced Manufacturing
- Mark Mohr, DMG MORI Federal Services
- Elisa Peters, PM2 Strategies

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