



ICAM2022

ASTM INTERNATIONAL CONFERENCE ON ADDITIVE MANUFACTURING

RESEARCH TO APPLICATION THROUGH STANDARDIZATION

FULL PROGRAM AGENDA

OCTOBER 31 – NOVEMBER 4, 2022
ORLANDO, FL

JW MARRIOTT ORLANDO
BONNET CREEK RESORT & SPA

WWW.AMCOE.ORG/ICAM2022

PROGRAM OVERVIEW

Ballroom	Time	Monday	Tuesday	Wednesday	Thursday	Friday
Griffin A Level 1	A.M.	Electronics	Defense	Keynote Presentations and Panel Discussion	Non-destructive Evaluation	Non-destructive Evaluation
	P.M.	Electronics	Defense	Economics & Sustainability	Non-destructive Evaluation	Non-destructive Evaluation
Griffin B Level 1	A.M.	Polymers	Aviation	Keynote Presentations and Panel Discussion	Microstructural Aspects of AM	Microstructural Aspects of AM
	P.M.	Polymers	Aviation	Aviation	Microstructural Aspects of AM	Microstructural Aspects of AM
Griffin C Level 1	A.M.	Fatigue & Fracture	Fatigue & Fracture	Keynote Presentations and Panel Discussion	Space	Directed Energy Deposition
	P.M.	Fatigue & Fracture	Fatigue & Fracture	Fatigue & Fracture	Space	Directed Energy Deposition
Cypress Level 1	A.M.	General Topics in AM	General Topics in AM	—	Design, Modeling, and Simulation	Industry 4.0: Artificial Intelligence/Machine Learning
	P.M.	General Topics in AM	General Topics in AM	General Topics in AM	Design, Modeling, and Simulation	Design, Modeling, and Simulation
Dogwood Level 1	A.M.	Ceramics	Construction	—	Process Control/ In-Situ Monitoring	Industry 4.0: Cyber Security
	P.M.	—	Construction	Construction	Process Control/ In-Situ Monitoring	Process Control/ In-Situ Monitoring
Cardinal Level 1	A.M.	Student Presentation Competition	Medical	—	Environmental Aspects of AM	Energy/Maritime/Oil & Gas
	P.M.	Student Presentation Competition	Medical	Medical	Environmental Aspects of AM	Energy/Maritime/Oil & Gas
Ibis Level 2	A.M.	Student Presentation Competition	Mechanical Testing	—	Sinter-Based AM	—
	P.M.	Student Presentation Competition	Mechanical Testing	Mechanical Testing	Sinter-Based AM	—
Osprey Level 2	A.M.	Student Presentation Competition	Industry 4.0: Data Management	—	AM Feedstock	Transportation/ Heavy Machinery
	P.M.	Student Presentation Competition	Industry 4.0: Data Management	Robotics & Automation	AM Feedstock	AM Feedstock
Griffin D Level 1	A.M.	—	10:30 Panel: Feedstock	Keynote Presentations and Panel Discussion	10:30 Panel: Aviation	10:30 Panel: Space
	P.M.	1:30 Panel: Medical 3:30 Panel: Construction	1:30 Panel: Economics	1:30 Panel: In-Situ Monitoring 3:30 Panel: Defense	1:30 Panel: Energy	—

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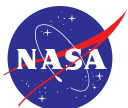
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WELCOME TO ICAM 2022

Before additively manufactured parts can be used in safety-critical applications, a clear understanding and predictive capabilities of the entire process chain and feedstock-process-structure-property-performance relationships must be established. ICAM 2022 will be the largest ASTM International scientific conference and intended to provide a forum for the exchange of ideas and to transition the research to applications, focusing on the need for industry-specific standards and design principles as well as challenges with qualification and certification.

The first event, a May 2016 workshop, was sponsored by the committee on fatigue and fracture (E08) in San Antonio, Texas. The second event, a November 2017 symposium, was sponsored by E08 committee and the committee on additive manufacturing technologies (F42) in Atlanta, Georgia. The third event in November 2018, sponsored by the F42, E08, and E07 (nondestructive testing) committees, was held in the Washington, D.C. After the creation of ASTM International Additive Manufacturing Center of Excellence (AM CoE) in 2018 and the growth of the additive manufacturing industry, the 4th event, held in Washington, D.C. area in 2019, was led by the AM CoE and dozens of involved additional technical committees. In 2020, the ASTM AM CoE decided to offer this gathering as a major conference. The ASTM International Conference on Additive Manufacturing (ICAM 2020) included 19 symposia and 10 panels, held over 5 days with 5 parallel sessions. Due to the pandemic, the ICAM 2020 was organized virtually with over 300 presentations and close to 600 participants. ICAM 2021 grew to a hybrid event held in Anaheim, CA and online, in November 2021 with over 850 participants, including 26 symposia, 11 panel discussions, and 7 keynote addresses.

This year's event, the ASTM International Conference on Additive Manufacturing (ASTM ICAM 2022), will have a broader scope related to standardization, qualification, and certification of AM products. This event will involve even more ASTM committees and external stakeholders, setting the stage to bring experts from around the world to exchange the latest developments in the field of additive and advanced manufacturing towards the 4th industrial revolution. We invite the entire community to join us for the exchange of ideas, to learn about the most recent advancements in the field, and to be a part of the journey for transitioning research to application through standardization.

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Auburn University



Mohsen Seifi
ASTM International

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Brian West
NASA, USA

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Auburn University, USA

ICAM TIMETABLE (EASTERN TIME)

OCT/NOV 2022						
S	M	T	W	T	F	S
30	31	1	2	3	4	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

ICAM Conference

Monday – 8 a.m. to 5 p.m.

Tuesday – 8 a.m. to 5 p.m.

Wednesday – 8 a.m. to 5 p.m.

Thursday – 8 a.m. to 5 p.m.

Friday – 8 a.m. to 5 p.m.

OCT/NOV 2022						
S	M	T	W	T	F	S
30	31	1	2	3	4	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Exhibit Hours

Monday – 8 a.m. to 5 p.m.

Tuesday – 8 a.m. to 6 p.m.

Wednesday – 8 a.m. to 6 p.m.

Thursday – 8 a.m. to 6 p.m.

Friday – 8 a.m. to 11 a.m.

OCT/NOV 2022						
S	M	T	W	T	F	S
30	31	1	2	3	4	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Registration Hours

Sunday – 2 p.m. to 5 p.m.

Monday – 7 a.m. to 5 p.m.

Tuesday – 7 a.m. to 5 p.m.

Wednesday – 7 a.m. to 5 p.m.

Thursday – 7 a.m. to 5 p.m.

Friday – 7 a.m. to 12 p.m.

OCT/NOV 2022						
S	M	T	W	T	F	S
30	31	1	2	3	4	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Networking Events

Tuesday

Happy Hour – 5 p.m. to 6 p.m.

Women in 3D Printing

Happy Hour – 6 p.m. to 7:30 p.m.

Wednesday

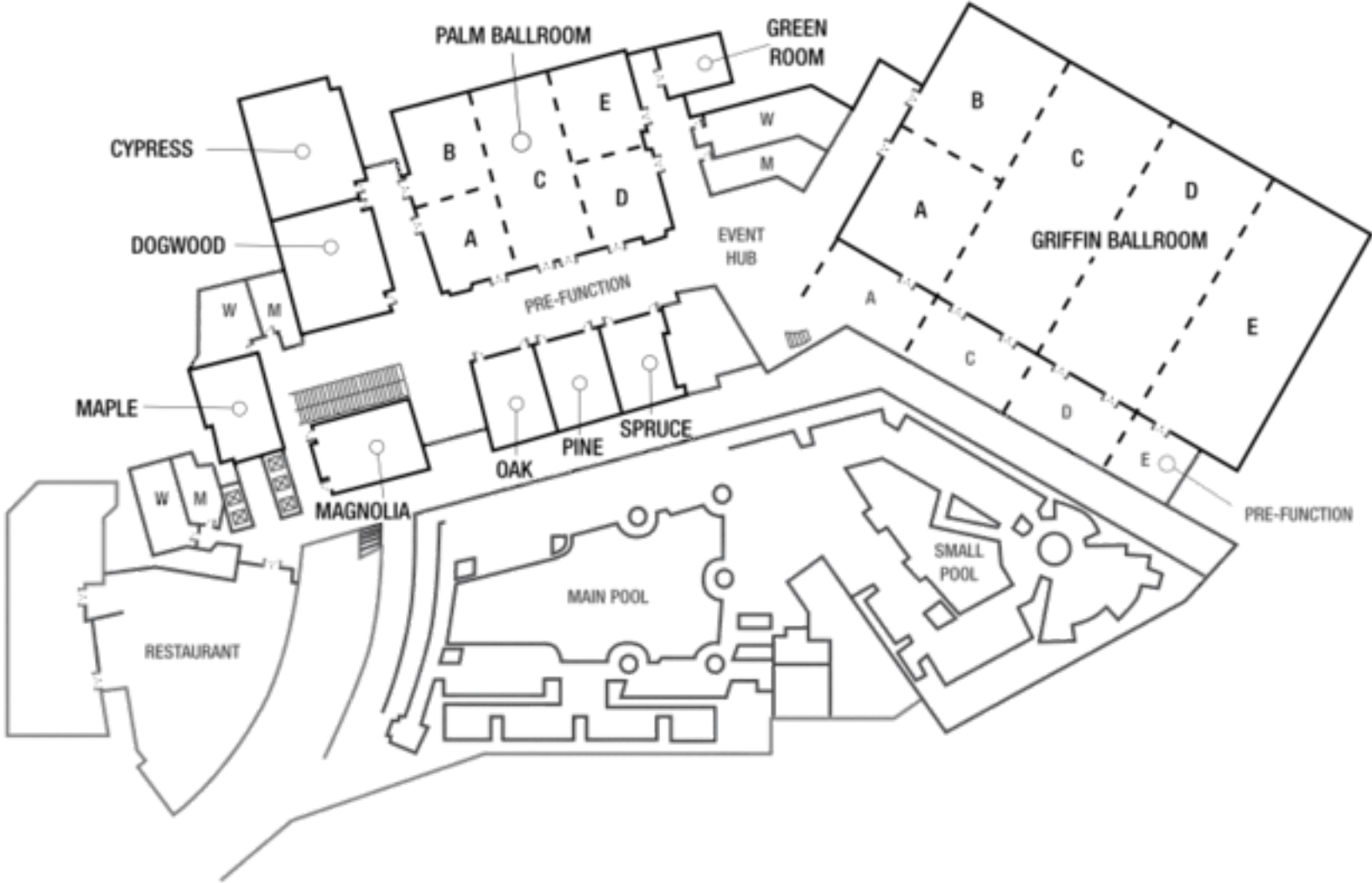
Happy Hour – 5 p.m. to 6 p.m.

ICAM 2022 Awards Ceremony
and Networking Reception –
6 p.m. to 7:30 p.m.

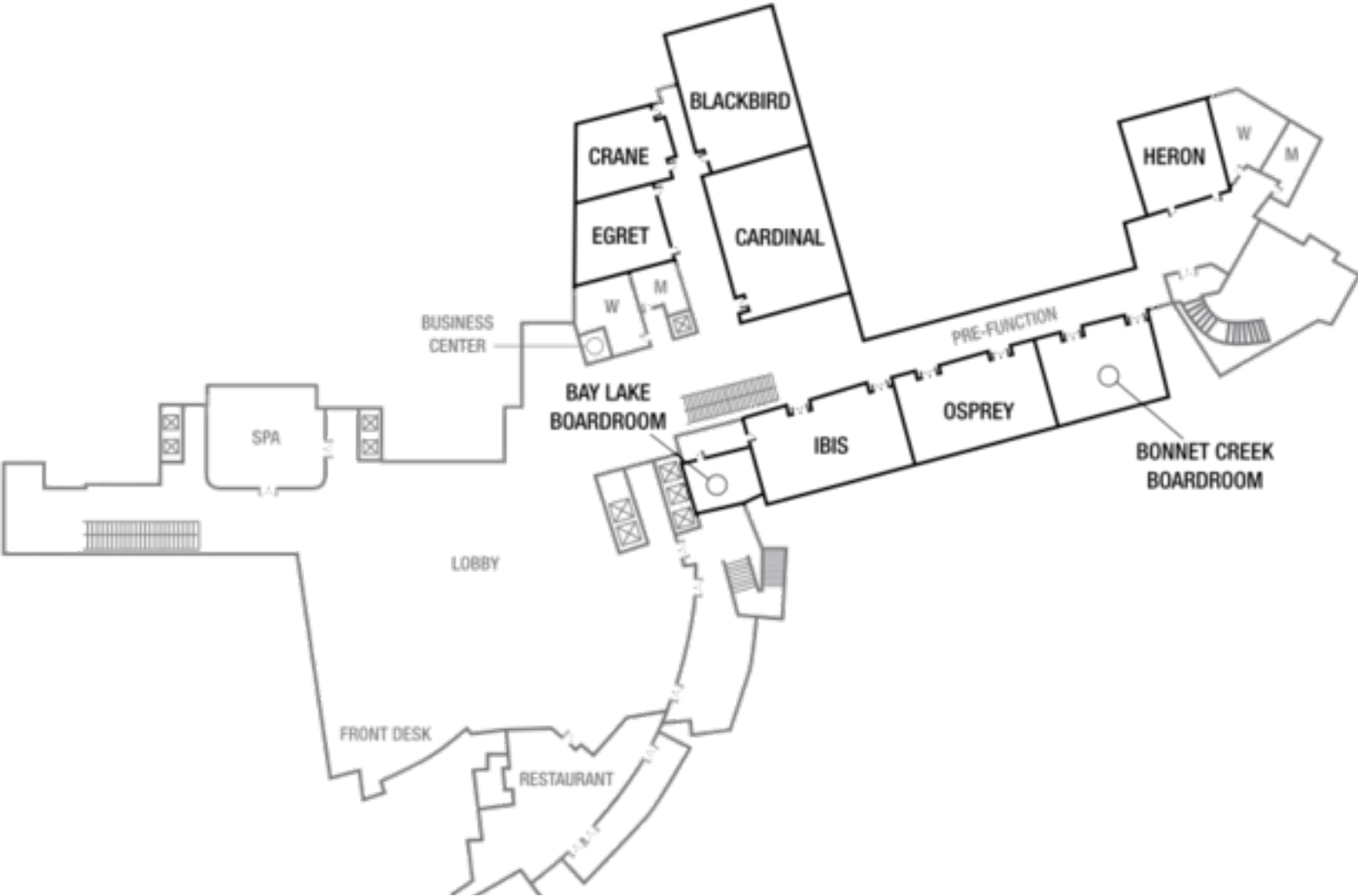
Thursday

Happy Hour – 5 p.m. to 6 p.m.

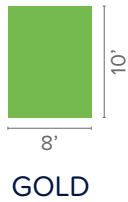
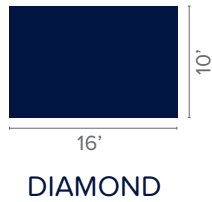
LEVEL 1



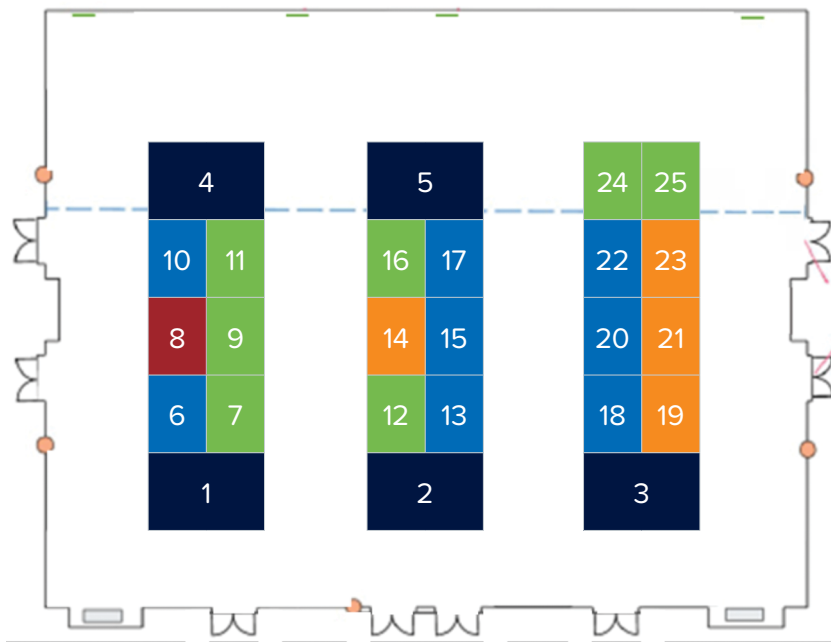
LEVEL 2



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- 1 Empirical Technologies
- 2 Sigma Additive Solutions
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- 6 Advanced Optical
- 7 Nadcap
- 8 Wohlers Associates
- 9 Trumpf
- 10 Lincoln Electric Additive Solutions
- 11 Xact Metal
- 12 Gasbarre Thermal Processing Systems
- 13 REM Surface Engineering



- 14 SME
- 15 3YOURMIND
- 16 Siemens Energy
- 17 Sandvik Additive Manufacturing
- 18 EXUM Instruments, Inc.
- 19 TCT
- 20 nScript
- 21 Formnext Mesago
- 22 Verder Scientific
- 23 ASME/Metrix
- 24 AlphaSTAR Technology Solutions
- 25 Element Materials Technology

ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



PROGRAM OVERVIEW & TIMETABLE

Click on any symposium/panel title to jump directly to the list of presentations and program schedule.

MONDAY 31 OCTOBER 2022		TUESDAY 1 NOVEMBER 2022		WEDNESDAY 2 NOVEMBER 2022		THURSDAY 3 NOVEMBER 2022		FRIDAY 4 NOVEMBER 2022	
AM PM	STUDENT PRESENTATION COMPETITION 01	AM PM	AM APPLICATIONS IN AVIATION	PM	AM APPLICATIONS IN AVIATION	AM PM	NON-DESTRUCTIVE EVALUATION METHODS FOR AM	AM PM	NON-DESTRUCTIVE EVALUATION METHODS FOR AM
AM PM	STUDENT PRESENTATION COMPETITION 02	AM PM	APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND	PM	APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND	AM PM	MICROSTRUCTURAL ASPECTS OF AM	AM PM	MICROSTRUCTURAL ASPECTS OF AM
AM PM	STUDENT PRESENTATION COMPETITION 03	AM PM	APPLICATION OF AM IN THE MEDICAL INDUSTRY	PM	APPLICATION OF AM IN THE MEDICAL INDUSTRY	AM PM	DESIGN, MODELING, AND SIMULATION METHODOLOGIES AND CONCEPTS FOR AM	PM	DESIGN, MODELING, AND SIMULATION METHODOLOGIES AND CONCEPTS FOR AM
AM PM	AM FOR ELECTRONIC APPLICATIONS	AM PM	MECHANICAL TESTING OF AM MATERIALS	PM	MECHANICAL TESTING OF AM MATERIALS	AM PM	PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM	PM	PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM
AM PM	3D PRINTED POLYMERS AND POLYMER MATRIX COMPOSITES	AM PM	AM FOR DEFENSE APPLICATIONS	PM	ECONOMICS AND SUSTAINABILITY OF AM	AM PM	AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION AND REUSE	PM	AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION AND REUSE
AM PM	AM OF CERAMICS: CHALLENGES & OPPORTUNITIES	AM PM	INDUSTRY 4.0: DATA MANAGEMENT FOR AM	PM	ROBOTICS, AUTOMATION AND ADDITIVE MANUFACTURING	AM PM	AM FOR SPACE APPLICATIONS	AM PM	DIRECTED ENERGY DEPOSITION TECHNIQUES
AM PM	FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS	AM PM	FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS	PM	FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS	AM PM	ENVIRONMENTAL EFFECTS ON AM PARTS	AM PM	APPLICATION OF AM IN ENERGY, MARITIME AND OIL & GAS
AM PM	GENERAL TOPICS IN AM: MATERIALS AND PROCESSING, POST-PROCESSING, & SAFETY	AM PM	GENERAL TOPICS IN AM: MATERIALS AND PROCESSING, POST-PROCESSING, & SAFETY	PM	GENERAL TOPICS IN AM: MATERIALS AND PROCESSING, POST-PROCESSING, & SAFETY	AM PM	SINTER-BASED AM TECHNOLOGIES	AM	INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN AM
AM	PANEL – MEDICAL [13:30 PM]	AM	PANEL – FEEDSTOCK [10:30 AM]	AM	KEYNOTES	AM	PANEL – AVIATION [10:30 AM]	AM	INDUSTRY 4.0: CYBER SECURITY ASPECTS OF AM
AM PM	PANEL – CONSTRUCTION [15:30 PM]	PM	PANEL – ECONOMICS [13:30 PM]	PM	PANEL – MONITORING [13:30 PM]	PM	PANEL – ENERGY [13:30 PM]	AM	AM APPLICATIONS FOR AUTOMOTIVE TRANSPORTATION/ HEAVY MACHINERY
-	-	-	-	PM	PANEL – DEFENSE [15:30 PM]	-	-	AM	PANEL – SPACE [10:30 AM]
-	-	-	-	-	-	-	-	-	-
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Note: This agenda features a list of accepted presenters for ICAM 2022 and their presentation timeslots. The order of presentation for each symposium is also as per the order reflected on the agenda. Please contact us at icam@astm.org if you need more information.

ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
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STUDENT PRESENTATION COMPETITION

31ST OCT 2022 (MON)
CARDINAL (LEVEL 2)

31ST OCTOBER 2022

SESSION CHAIR (AM SESSION):

Nik Hrabe, NIST

SESSION CHAIR (PM SESSION):

Joy Gockel, Colorado School of Mines

08:00 AM STUDENT **Fatigue Behavior and Modeling of Additively Manufactured IN718: The Effect of Surface Treatments and Surface Measurement Techniques**

[Seungjong Lee](#)¹; Shuai Shao¹; Douglas Wells²; Miroslav Zetek³; Miloslav Kepka³; Nima Shamsaei¹; ¹Auburn University; ²NASA - Marshall Space Flight Center (MSFC); ³University of West Bohemia

08:15 AM STUDENT **Microstructure and Mechanical Properties of Additively Manufactured Duplex Stainless Steel**

[Maxime Piras](#)¹; Anis Hor¹; Eric Charkaluk²; ¹Institut Clément Ader (ICA, CNRS UMR 5312); ²Laboratoire de Mécanique des Solides (LMS, CNRS UMR 7649)

08:30 AM STUDENT **Corrosion Performance of Additively Manufactured 316L Stainless Steel Produced by Feedstock Modification**

[Venkata Bhuvaneshwari Vukkum](#)¹; Rajeev K. Gupta¹; Jijo Christudasjustus¹; Ahmed A. Darwish¹; Furkan Ozdemir¹; Steven Storck²; ¹North Carolina State University; ²Johns Hopkins University - Applied Physics Laboratory (JHU - APL)

08:45 AM STUDENT **Influence of the L-PBF Bead Dimensions on Part Dimensional Accuracy**

[Lucas Fournet-Fayard](#)^{1,2}; Charles Cayron¹; Imade Koutiri²; Anne-Françoise Obaton¹; ¹Laboratoire National de Métrologie et d'Essais (LNE); ²Arts et Métiers ParisTech - PIMM

09:00 AM STUDENT **In-Situ Failure Analysis of Lattice Structures**

[Elliott Jost](#)¹; Christopher Saldana¹; ¹Georgia Institute of Technology

09:15 AM STUDENT **HCF and VHCF Fatigue Behavior of Additively Manufactured Inconel 718: Effects of Stress-Relieving, Surface Roughness, and Build Orientation**

[Muztahid Muhammad](#)¹; Palmer Frye²; Jutima Simsiriwong²; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University; ²University of North Florida

09:30 AM STUDENT **The Effects of Perturbation on the Energy Absorption Properties of Single and Dual-Phase Cellular Structures**

[Irving E. Ramirez-Chavez](#)¹; Dhruv Bhate¹; ¹Arizona State University

09:45 AM STUDENT **Characterization of Pure Photopolymers and Suspensions for Digital Light Processing (DLP)**

[Rajat Chaudhary](#)¹; Carlo Antonini¹; ¹Università degli Studi di Milano-Bicocca

10:00 AM BREAK

10:30 AM STUDENT **Using Machine Learning to Model the Influence of Porosity and Build Parameters on Fatigue of AM IN718**

[Alexander N. Caputo](#)¹; Rick Neu¹; Chaitanya Vallabh²; Xiayun Zhao²; ¹Georgia Institute of Technology; ²University of Pittsburgh

10:45 AM STUDENT **High Cycle Fatigue Fractographic Pattern Recognition for Additively Manufactured and Rolled Inconel 718**

[Nicole Van Handel](#)¹; Paul Paradise¹; Shenghan Guo¹; Dhruv Bhate¹; ¹Arizona State University

11:00 AM STUDENT **In Situ Process Monitoring of Powder Bed Fusion of Metals using Eddy Current Testing**

[Marvin Spurek](#)¹; Adriaan Spierings¹; Bernard Revaz²; Gilles Santi²; Marc Lany²; Jonatan Wicht²; Konrad Wegener³; ¹inspire - ETH Zürich; ²AMiQuam; ³ETH Zürich

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11:15 AM STUDENT	Field Driven Design of TPMS Cellular Structures for Energy Absorption Mandar Shinde ¹ ; Irving E. Ramirez-Chavez ¹ ; Dhruv Bhate ¹ ; ¹ Arizona State University	14:15 PM STUDENT	Alumina Microlattice/Epoxy Composites with Ultrahigh Strength and Energy Absorption Yida (Ryan) Zhao ¹ ; Zehui Du ² ; Chee Lip Gan ¹ ; ¹ Nanyang Technological University (NTU); ² Temasek Laboratories@NTU
11:30 AM STUDENT	Texture Dependent Micromechanical Anisotropy of Laser Powder Bed Fused Inconel 718 Jakob Schröder ¹ ; Jan Čapek ² ; Giovanni Bruno ¹ ; Gunther Mohr ¹ ; Itziar Serrano-Munoz ¹ ; Alexander Evans ¹ ; Efthymios Polatidis ² ; ¹ Bundesanstalt für Materialforschung und -prüfung (BAM); ² Paul Scherrer Institut (PSI)	14:30 PM STUDENT	Accelerated Creep Testing of Electron Beam Melted Ti-6Al-4V Jacob T. Pellicotte ¹ ; Md Abir Hossain ¹ ; Jaime Cano ¹ ; David Alexander ¹ ; Calvin M. Stewart ¹ ; ¹ University of Texas at El Paso
11:45 AM STUDENT	Effect of Post Processing Treatments on the Stress Corrosion Cracking Behavior of AM 7050 Aluminum Alloy Rupesh Rajendran ¹ ; Crosby T. Owens ² ; Jeffrey D. Eisenhaure ² ; David Spain ² ; Brant E. Stoner ² ; Alex H. Kinsey ² ; Preet M. Singh ¹ ; ¹ Georgia Institute of Technology; ² Northrop Grumman	14:45 PM STUDENT	The Development of a Standard Measurement Practice for the Load-Bearing Cross-Sectional Areas of Mechanical Testing Coupons Fabricated by Additive Manufacturing Sarah G. Bennett ¹ ; Jorge Ramirez Lujan ¹ ; Garrison Hommer ¹ ; Joy Gockel ¹ ; ¹ Colorado School of Mines - ADAPT
12:00 PM STUDENT	A Novel Robust Machine Learning Approach for In-Situ Detection of Complex Shape Deviations in AM Matteo Bugatti ¹ ; Bianca Maria M. Colosimo ¹ ; Marco Grasso ¹ ; ¹ Politecnico di Milano	15:00 PM	END OF DAY
12:15 PM	LUNCH		
13:30 PM STUDENT	Effects of Various Post-Processing Methods on the Fatigue Life of Laser Powder Bed Fused Ti-6Al-4V Lauren Ednie ¹ ; Robert Lancaster ¹ ; Mahesh Mani ² ; ¹ Swansea University; ² GKN Aerospace		
13:45 PM STUDENT	Relationships between Melting Behavior and Resulting Surface Roughness for Laser Powder Bed Fusion Edwin Glaubitz ¹ ; Joy Gockel ¹ ; Jason Fox ² ; Orion L. Kafka ² ; ¹ Colorado School of Mines; ² NIST		
14:00 PM STUDENT	Additive Manufactured Composite Parts with Tailored Properties in Each Layer Gary Mac ¹ ; Nikhil Gupta ¹ ; ¹ New York University - Tandon School of Engineering		

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CENTER of
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STUDENT PRESENTATION COMPETITION

31ST OCT 2022 (MON)
IBIS (LEVEL 2)

31ST OCTOBER 2022

SESSION CHAIR (AM SESSION):

Alberto Bordin, ASTM International

SESSION CHAIR (PM SESSION):

Swee Leong Sing, NUS

08:00 AM STUDENT From Lattice Sub-Unit Elements toward Fatigue-Optimized Spinal Implants

Simone Murchio¹; Raffaele De Biasi¹; Gianluca Zappini²; Damiano Pasini³; Devid Maniglio¹; Matteo Benedetti¹; ¹Università di Trento; ²Lincotek Medical; ³McGill University

08:15 AM STUDENT Crack Reduction in Selective Laser Melting Fabricated Inconel 939 with Si Addition

Huan Ding¹; Bin Zhang¹; Congyuan Zeng¹; Wen Jin Meng¹; Shengmin Guo¹; ¹Louisiana State University

08:30 AM STUDENT Heat Treatment Effects on Metallographic and Mechanical Characteristics of Additive-Manufactured Anterior Cervical Interbody Fusion Cage with Bone-like Porous Structure

Jinju Jang^{1,2}; Dohyung Lim, Sr.^{1,3}; Taeyang Kwak⁴; Young Chul Kim⁵; ¹RNX; ²Yonsei University; ³Sejong University; ⁴Ruantech; ⁵Kyungpook National University

08:45 AM STUDENT Optimizing Bending Strength of CF-PEKK for Fracture Fixation

Aliza Rabinowitz¹; ¹Drexel University

09:00 AM STUDENT Additive Manufacturing of Highly Filled Resins with Tailored Particle Size Distribution via the Digital Light Processing Technique

Antoine Delarue¹; Amy M. Peterson¹; Christopher J. Hansen¹; ¹University of Massachusetts Lowell

09:15 AM STUDENT Impact of Usage Cable Driven Parallel Robot for Large Scale Concrete 3D Printing

Suad A. Alhaj Mustafa¹; Rashid Abu Al-Rub¹; Bashar Khasawneh²; Federico Renda²; ¹Khalifa University - ADAM Center; ²Khalifa University

09:30 AM STUDENT Optimization of 3D-Printing Parameters to Minimize Shape Error in the Fabrication of Micro-Sized and Irregular Ti-6Al-4V Porous Structure for Orthopedics

Hunyeong Ban^{1,2,3}; Dohyung Lim, Sr.^{1,2}; Jong-Chul Park³; Joohee Son²; Nara Youn²; ¹RNX; ²Sejong University; ³Yonsei University

09:45 AM STUDENT Optimisation of Processing Parameters for LPBF of NdFeB Permanent Magnets for Aerospace Applications

Yong Rong Chan¹; Jerry Ying Hsi Fuh²; Heow Pueh Lee²; Sankaranarayanan Seetharaman¹; ¹A*STAR - Advanced Remanufacturing and Technology Centre (ARTC); ²National University of Singapore (NUS)

10:00 AM BREAK

10:30 AM STUDENT Effect of Microstructure Control on Mechanical Properties of 3D-Printed Zr-Cu-Al-Co Bulk Metallic Glass

Yu-Ping Wang¹; Che-Nan Kuo¹; ¹National Sun Yat-sen University

10:45 AM STUDENT Relationships between Powder Rheology and Powder Feeder Configurations in Cold Spray

Jack Grubbs¹; Bryer Sousa¹; Aurélien Neveu²; Filip Francqui²; Danielle Cote¹; ¹Worcester Polytechnic Institute; ²Granutools

11:00 AM STUDENT Design and Optimization of High Energy Absorption Ti6Al4V Alloys with Gradient Porosity Structure Fabricated by Laser Powder Bed Fusion

Yu-Yao Chan¹; Che-Nan Kuo¹; ¹National Sun Yat-sen University

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
EXCELLENCE
Research to Standards

11:15 AM STUDENT **An Investigation into the Tensile and Fatigue Behaviors of Additively Manufactured Titanium Alloys**
[Mohammad Salman Yasin](#)¹; Arash Soltani-Tehrani¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

11:30 AM STUDENT **A Comparison of Mechanical Properties for As-Built and HIP'd Additively Manufactured Stainless Steel 316L**
[Rory J. Douglas](#)¹; Robert Lancaster¹; Jack Adams²; ¹Swansea University; ²Rolls-Royce

11:45 AM STUDENT **Microstructure Evolution and Mechanical Response of 3D Printed Cu-Cr-Nb Alloys**
[Dong Han Liu](#)¹; Che-Nan Kuo¹; ¹National Sun Yat-sen University

12:00 PM STUDENT **Impact of Porosity Levels on the Mechanical Properties of Laser Powder Bed Fused Gyroid Structures**
[Bharath Bhushan Ravichander](#)¹; Sumanth Theeda¹; Shweta Hanmant Jagdale¹; Golden Kumar¹; ¹University of Texas at Dallas

12:15 PM LUNCH

13:30 PM STUDENT **Additively Manufactured Inconel 718 in Thin-Wall and Narrow Flow Channel Geometries: Effects of Post-Processing and Geometry on Tensile and Fatigue Behaviors**
[Nabeel Ahmad](#)¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

13:45 PM STUDENT **Cracking Sensitivity Reduction of Directed Energy Deposited Cobalt-Based Superalloys by a Microstructure Control**
[Thibaut Froeliger](#)¹; Louise Toualbi¹; Didier Locq¹; Thomas Elcrin²; Rémy Dendievel³; ¹ONERA (The French Aerospace Lab); ²AddUp; ³Science et Ingénierie des Matériaux et Procédés (SIMaP)

14:00 PM STUDENT **Interfacial Characterization of Stainless Steel 420 and Inconel 718 Multi-Material Structures**
[Beytullah Aydogan](#)¹; [Himanshu Sahasrabudhe](#)¹; ¹Michigan State University

14:15 PM STUDENT **Material Characterization and Reduction of Thermal Deformation of Continuous Carbon Fiber Reinforced Polyether-ether-ketone (PEEK) Parts Produced by Open Environment Fused Filament Fabrication**
[Alexander T. Prigge](#)¹; Boran (Max) Cui¹; John Mertens¹; John Rindini¹; ¹Trinity College

14:30 PM STUDENT **Submicron Manufacturing of Polymer/Nanoparticle Composites via 3D Printing**
[Dhanush Patil](#)¹; [Arunachalam Ramanathan](#)¹; Sayli Jambhulkar¹; Kenan Song¹; ¹Arizona State University

14:45 PM END OF DAY

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Research to Standards

STUDENT PRESENTATION COMPETITION

31ST OCT 2022 (MON)
OSPREE (LEVEL 2)

31ST OCTOBER 2022

SESSION CHAIR (AM SESSION):

Animesh Bose, Desktop Metal

SESSION CHAIR (PM SESSION):

Thomas Niendorf, University of Kassel

- 08:00 AM STUDENT** **Accelerating Additive Manufacturing Alloy Development Cycles through Efficient Neural Network-Based Surrogate Models**
[Jiahui Ye](#)¹; Abdelrahman Kotb¹; Raymundo Arróyave¹; Ibrahim Karaman¹; Alaa Elwany¹; ¹Texas A&M University
- 08:15 AM STUDENT** **Mechanical Characterisation of Laser Metal Deposition Produced Super-Duplex Stainless Steel**
[Sébastien Ballésio](#)^{1, 2}; Fabien Szmytka¹; Thai Le Hong¹; Cédric Doudard²; Matthieu Dhondt²; ¹ENSTA Paris (IMSIA) - Institut Polytechnique de Paris; ²ENSTA Bretagne (IRDIL)
- 08:30 AM STUDENT** **Additive Manufacturing of Recycled Carbon Fiber/Thermoset Composites**
[Chunyan Zhang](#)¹; Kun Fu¹; ¹University Of Delaware
- 08:45 AM STUDENT** **Comparison of Lattice Structures Fabricated by Additive Manufacturing Processes**
[Valerio Di Pompeo](#)¹; Stefano Spigarelli¹; Marcello Cabibbo¹; Eleonora Santecchia¹; Alberto Santoni¹; ¹Università Politecnica delle Marche (UNIVPM)
- 09:00 AM STUDENT** **Warping Control in Fused Deposition Modeling (FDM) of Thermoplastic ABS**
[Yash G. Mittal](#)¹; Neel Kamal Gupta¹; Gopal Gote¹; Pushkar Kamble¹; Avinash Kumar Mehta¹; K. P. Karunakaran¹; ¹Indian Institute of Technology Bombay (IIT Bombay)

- 09:15 AM STUDENT** **Influence of H13 Powder Properties on Laser Powder Bed Fusion Processed Parts**
[Edem Dugbenoo](#)¹; Mathieu Brochu¹; ¹McGill University
- 09:30 AM STUDENT** **Systematization and Structuring of AMC-Processes for Quality Assurance and Qualification Concepts**
[Birger Buschmann](#)¹; Tobias Ludwig¹; Daniel Talke¹; ¹Technical University of Munich
- 09:45 AM STUDENT** **3D Printed Composite Layers for Mechanical Reinforcement and Intelligent Behaviors**
[Dharneedar Ravichandran](#)¹; Kenan Song¹; ¹Arizona State University
- 10:00 AM BREAK**
- 10:30 AM STUDENT** **Comparative Study of the Passive Films of Selective Laser Melting and Wrought 316L Austenitic Stainless Steel**
[Xavier Majnoni d'Intignano](#)¹; Olivier Devos²; Mohamed El May²; Christine Labrugère Sarroste³; Sébastien Mercier¹; Nicolas Saintier²; Jean-Paul Salvétat³; ¹ONERA (The French Aerospace Lab); ²IMB Bordeaux - Institut de mécanique et d'ingénierie; ³PLACAMAT - CNRS
- 10:45 AM STUDENT** **Performance Assessment of Machine Learning Algorithms in Process Parameter Optimization of Selective Laser Melted SS 316L**
[Sumanth Theeda](#)¹; Shweta Hanmant Jagdale¹; Bharath Bhushan Ravichander¹; Golden Kumar¹; ¹University of Texas at Dallas
- 11:00 AM STUDENT** **In Situ Infrared Temperature Sensing for Real-Time Defect Detection in Additive Manufacturing**
[Rifat-E-Nur Hossain](#)¹; Jerald Lewis¹; Arden Moore¹; ¹Louisiana Tech University
- 11:15 AM STUDENT** **Control-Oriented Modeling and Continuous Melt Pool Geometry Estimation using Deep Neural Network**
[John Shim](#)¹; Xu Chen¹; ¹University of Washington

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11:30 AM STUDENT	A New Method for Spatter Monitoring in Additive Manufacturing using Artificial Intelligence (Machine Learning) Gwenaëlle Chebil ^{1,2} ; Yves Renollet ¹ ; Dimitri Bettebghor ¹ ; Pierre Lapouge ² ; Cécile Davoine ¹ ; Marc Thomas ¹ ; Véronique Favier ² ; Matthieu Schneider ² ; ¹ ONERA (The French Aerospace Lab) - DMAS; ² Arts et Métiers ParisTech - PIMM	14:30 PM STUDENT	High Cycle and Very High Cycle Fatigue Resistance of LB-PBF 17-4 Precipitation Hardening Stainless Steel Fabricated under Ar and N2 Environments Jade Welsh ¹ ; Indrajit Nandi ² ; Pooriya Dastranjy Nezhadfar ² ; Nima Shamsaei ² ; Shuai Shao ² ; Jutima Simsiriwong ¹ ; ¹ University of North Florida; ² Auburn University
11:45 AM STUDENT	Evaluation of Convolution-Based Architectures in Segmentation of AM Tomography Data Saber Nemati ¹ ; Leslie G. Butler ¹ ; Shengmin Guo ¹ ; ¹ Louisiana State University	14:45 PM	END OF DAY
12:00 PM	LUNCH		
13:30 PM STUDENT	The Impact of the Metal X Printing Infill on the Tensile Properties of Atomic Diffusion Additively Manufactured 17-4PH Stainless Steel Mahmoud M. Naim ^{1,2} ; Mahdi Chemkhi ¹ ; Akram Alhussein ² ; ¹ EPF École d'Ingénieurs; ² Université de technologie de Troyes (UTT)		
13:45 PM STUDENT	Single Alloy Metal Matrix Composites with Anisotropic Mechanical Properties and Defect Analysis through Laser Powder Bed Fusion Shweta Hanmant Jagdale ¹ ; Bharath Bhushan Ravichander ¹ ; Sumanth Theeda ¹ ; Golden Kumar ¹ ; ¹ University of Texas at Dallas		
14:00 PM STUDENT	Machine Learning-Based Framework for Defect Classification with X-Ray Computed Tomography in Laser-Powder Bed Fusion Process Jiafeng Ye ¹ ; Jia (Peter) Liu ¹ ; ¹ Auburn University		
14:15 PM STUDENT	Multivariate Statistical Process Control in PBF Metal AM Venkatavaradan Sunderarajan ¹ ; Suman Das ¹ ; ¹ Georgia Institute of Technology		

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AM FOR ELECTRONIC APPLICATIONS

CO-ORGANIZERS:

Shweta Agarwala

Aarhus University,
Denmark

Masoud Mahjouri-Samani

Auburn University, USA

Jaim Nulman

Nano Dimension,
USA

Alireza Sarraf

Divergent, USA

31ST OCT 2022 (MON)

GRIFFIN A (LEVEL 1)

31ST OCTOBER 2022

SESSION CHAIR (AM SESSION):

Alireza Sarraf, Divergent

SESSION CHAIR (PM SESSION):

Masoud Mahjouri-Samani, Auburn University

08:00 AM

INVITED

Additive Manufacturing of Embedded Electronics for Smart and Soft Robotics: Current Progress and Future Perspectives
[Konstantinos Sierros](#)¹; ¹West Virginia University

08:30 AM

INVITED

3D Printing of Nanomaterials-Based Electronics and Ingestible Robots
[Yong Lin Kong](#)¹; ¹University of Utah

09:00 AM

REGULAR

Development & Integration of Flexible & Printed Electronic Solutions for Next Generation Army Applications
[Hayley B. Katz](#)¹; Matthew Brauer¹; ¹U.S. Army Combat Capabilities Development Command - Armaments Center

09:20 AM

INVITED

Development and Testing of a Multi-Element AM Antenna
[Rudy Lopez](#)¹; Robert Maloney¹; Tara Spafford¹; ¹Northrop Grumman

09:50 AM

BREAK

10:30 AM

INVITED

Lightweight and Embedding Electronic Functionalities using Printed Electronic Materials and Processes
[Zachary J. Davis](#)¹; Torsten Lund-Olesen¹; Kasper Venstentoft¹; Anna Krzyzanowska¹; Jonas Daugaard Hulstrøm¹; ¹Danish Technological Institute

11:00 AM

INVITED

Additive Nanomanufacturing and Dry Printing of Flexible Hybrid Electronics

[Masoud Mahjouri-Samani](#)¹; Zabihollah Ahmadi¹; Seungjong Lee¹; Aarsh Patel¹; Nima Shamsaei¹; Raymond R. Unocic²; ¹Auburn University; ²Oak Ridge National Laboratory (ORNL)

11:30 AM

REGULAR

Printed Circuit Structure

[Kenneth Church](#)^{1,2}; Jason Benoit¹; Paul Deffenbaugh¹; Josh Goldfarb¹; Bryce Gray¹; Jasmine Hammonds¹; Mark Kloza¹; Sam LeBlanc¹; Nicholas Willey¹; ¹Sciperio; ²nScript

11:50 AM

LUNCH

13:30 PM

REGULAR

Beamforming Behavior of a Waveguide Fed 3D-Printed Luneburg-Style Lens in Ku and Ka Bands

[Philip Lambert](#)¹; Shawn Rogers²; ¹Fortify; ²Envistacom

13:50 PM

REGULAR

Additive Manufacturing of Energy Storage Devices based on Mxenes

[Majid Beidaghi](#)¹; Jafar (Kian) Orangi¹; Fatima Hamade¹; Virginia Davis¹; ¹Auburn University

14:10 PM

INVITED

Printed Organic Electronics for Smart Sensor Systems

[Marco Fattori](#)¹; Eugenio Cantatore¹; ¹Eindhoven University of Technology (TU/e)

14:40 PM

INVITED

Integration of Sensors and Printed Electronics into PBF-LB Parts

[Simon Vervoort](#)¹; Jonas Martin¹; ¹Fraunhofer Institute for Laser Technology ILT

15:10 PM

INVITED

Low-Cost, Low-Power Gas Detection: All-Aerosol-Jet-Printed Highly Sensitive and Selective Polyaniline-Based Ammonia Sensors

[Tolga Aytug](#)¹; Pooran Joshi¹; Christine Fisher²; Kai Li¹; ¹Oak Ridge National Laboratory (ORNL); ²City University of New York

15:40 PM

END OF DAY

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3D PRINTED POLYMERS AND POLYMER MATRIX COMPOSITES

CO-ORGANIZERS:

Rachael Andrulonis

WSU-NIAR, USA

Cindy Ashforth

FAA, USA

Carl Dekker

Met-L-Flo, USA

Jonathan Seppala

NIST, USA

31ST OCT 2022 (MON)

GRIFFIN B (LEVEL 1)

31ST OCTOBER 2022

SESSION CHAIRS (AM + PM SESSION):

Rachael Andrulonis, WSU-NIAR

Cindy Ashforth, FAA

08:00 AM
INVITED **Additive Manufacturing of Carbon Scaffold for Thermoset Composites**
[Kun \(Kelvin\) Fu](#)¹; ¹University of Delaware

08:30 AM
REGULAR **Caverna: A Microporous, FFF-Printable Material for Lightweight and Flexible Structures**
[Ben Mac Murray](#)¹; [Jonathan Farren](#)¹; [Nathan Ockwig](#)¹; [Jeffrey Cernohous](#)¹; ¹Interfacial

08:50 AM
REGULAR **Additive Manufacturing of Thermally Conductive Polymer for Lighting Fixtures**
[John Hana](#)¹; [Shahab Zekriardehani](#)¹; [Felix Tran](#)¹; [John Trublawski](#)¹; [Javed Mapkar](#)¹; [Jeremy Santiago](#)²; ¹Eaton; ²Ford Motor Company

09:10 AM
INVITED **3D Printed Membranes for Next Generation Energy and Water Applications**
[Michael Hickner](#)¹; ¹Pennsylvania State University

09:40 AM
REGULAR **Reactive Extrusion Additive Manufacturing (RX-AM™) for Volume Industrial Applications**
[Cora Leibig](#)¹; ¹Chromatic 3D Materials

10:00 AM **BREAK**

10:30 AM
REGULAR **Chemical Upcycling of PLA: From FDM 3D Printed Wastes to Fresh SLA 3D Printing Resin**
[Yu-Chung Chang](#)¹; [Lin Shao](#)¹; [Jinwen Zhang](#)¹; ¹Washington State University - Composite Materials and Engineering Center (WSU - CMEC)

10:50 AM
REGULAR **Process Uniformity and Properties of ABS Materials by Selective Thermoplastic Electrophotographic Process**
[Brian Mullen](#)¹; [Jerry A. Pickering](#)¹; [Jackson Muehlbauer](#)¹; ¹Evolve Additive Solutions

11:10 AM
REGULAR **Programmed Fiber Orientation for Improved Geometric Tolerancing in Printed Composite Tools**
[Alexander Quinn](#)¹; ¹Fortify

11:30 AM
REGULAR **Evaluation of Structural Performance of Sandwich Panels Fabricated by Vat Photopolymerization**
[Sabrina Nilufar](#)¹; [Shukantu Dev Nath](#)¹; ¹Southern Illinois University Carbondale

11:50 AM **LUNCH**

13:30 PM
INVITED **Composite Materials Handbook-17 (CMH-17) - Non-Metallic Additive Manufacturing**
[Curtis R. Davies](#)¹; [Cindy Ashforth](#)¹; [Rachael Andrulonis](#)²; ¹Federal Aviation Administration (FAA); ²Wichita State University - National Institute for Aviation Research (WSU - NIAR)

14:00 PM
INVITED **Polymer Additive Manufacturing Qualification Programs**
[Royal Lovingfoss](#)¹; [Rachael Andrulonis](#)¹; [Brian Smith](#)¹; [Joel D. White](#)¹; ¹Wichita State University - National Institute for Aviation Research (WSU - NIAR)

14:30 PM
INVITED **Development of Overtest Factors for Powder Bed Fusion Nylon 11 Parts, Allowing a Single Design Acceptance Test Taking into Account Material and Process Variability**
[Joseph Costanzo](#)¹; ¹Boeing - Commercial Airplanes

15:00 PM **BREAK**

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15:30 PM
INVITED **High Accuracy Temperature
Measurements of Polymer Additive
Manufacturing using Filament
Material Extrusion**
[Richard Cole](#)¹; Marc Genest¹; Liam
Reynolds¹; ¹National Research
Council Canada (NRC Canada)

16:00 PM
INVITED **Development of Tensile Testing
Method for Filaments Used in
Material Extrusion Based Additive
Manufacturing Process**
[Haibin Ning](#)¹; George Chambers¹;
Kirstie Snodderly²; Cody Johnson¹;
Derrick Armstrong¹; Selvam Pillay¹;
¹University of Alabama at Birmingham
(UAB); ²ASTM International

16:30 PM **END OF DAY**

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FATIGUE AND FRACTURE OF AM MATERIALS AND PARTS

CO-ORGANIZERS:

Stefano Beretta

Politecnico di
Milano, Italy

Craig McClung

Southwest Research
Institute (SwRI), USA

Thomas Niendorf

University of Kassel,
Germany

Jutima Simsiriwong

University of
North Florida, USA

Douglas Wells

NASA-MSFC, USA

**31ST OCT 2022 – 2ND NOV 2022 (MON-WED)
GRIFFIN C (LEVEL 1)**

31ST OCTOBER 2022

SESSION CHAIRS (AM SESSION):

Thomas Niendorf, University of Kassel
Jutima Simsiriwong, University of North Florida

SESSION CHAIRS (PM SESSION):

Stefano Beretta, Politecnico di Milano
Douglas Wells, NASA-MSFC

08:00 AM
INVITED **Review on Fracture-Based Fatigue Assessment for Net-Shape Metal Surfaces Manufactured by L-PBF and its Relation to Component Qualification**
[Stefano Beretta](#)¹; ¹Politecnico di Milano

08:30 AM
INVITED **Small Fatigue Crack Growth in AM Ti-6Al-4V under Axial, Torsion, and Combined Loadings**
[Ali Fatemi](#)¹; [Matthew Markham](#)¹; Reza Molaei¹; Nam Phan²; ¹University of Memphis; ²Naval Air Systems Command (NAVAIR)

09:00 AM
INVITED **Process-Structure-Property-Fatigue Performance of Additively Manufactured Metallic Materials**
[Mauro Madia](#)¹; ¹Bundesanstalt für Materialforschung und -prüfung (BAM)

09:30 AM
INVITED **Validation of Multi-Laser Printing Technology for Additive Manufacturing**
[Donald Godfrey](#)¹; [Jacky Diemann](#)¹; ¹SLM Solutions

10:00 AM **BREAK**

10:30 AM
REGULAR **Tailoring Hot Isostatic Pressing Treatments to Homogenize Process-Dependent Microstructures and Mechanical Properties of Electron Beam Melted Ti-6Al-4V Parts**
[Jake Benzing](#)¹; Magnus Ahlfors²; Chad M. Beamer²; Julius Bonini³; Nik Hrabe¹; Sara Randall³; ¹NIST; ²Quintus Technologies; ³Lucideon

10:50 AM
REGULAR **A Bayesian-Based Fatigue Characterization Sufficiency Criteria and Fatigue Life Prediction Framework for AM Applications**
[Luke C. Sheridan](#)¹; ¹Air Force Research Laboratory (AFRL)

11:10 AM
INVITED **Critical Effect of Defects on Axial Fatigue Behavior of Additively Manufactured Ti-6Al-4V**
[Shuai Shao](#)¹; Nima Shamsaei¹; ¹Auburn University

11:40 AM
REGULAR **Impact of Surface Finishing/Texture on Fatigue Performance of L-PBF GRCop-42**
[Joshua R. Boykin](#)¹; [Agustin Diaz](#)¹; [Justin Michaud](#)¹; Patrick McFadden¹; Paul R. Gradl²; Thomas Teasley²; Gabriel Demeneghi²; ¹REM Surface Engineering; ²NASA - Marshall Space Flight Center (MSFC)

12:00 PM **LUNCH**

13:30 PM
REGULAR **Defect Acceptance Criteria and Simple Assessment of AM Components**
[Stefano Beretta](#)¹; ¹Politecnico di Milano

13:50 PM
INVITED **Developing Approaches for Certification of Uninspectable Fracture Critical AM Components**
[William G. Tilson](#)¹; Douglas Wells¹; Craig McClung²; ¹NASA - Marshall Space Flight Center (MSFC); ²Southwest Research Institute (SwRI)

14:20 PM
REGULAR **Fatigue of AM Metals in the Presence of Notches under Uniaxial and Multiaxial Service Load Histories**
[Reza Molaei](#)¹; Ali Fatemi¹; ¹University of Memphis

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14:40 PM
REGULAR **The Relationship Between Microporosity and Fatigue Performance in Direct Energy Deposited (DED) Ti-6-4 for Aerospace Structural Applications**
[Daniel R. Klenosky](#)¹; [Paul R. Toivonen](#)¹; ¹Spirit AeroSystems

15:00 PM
INVITED **Process Induced Defects and their Effects on Resulting Fatigue Behavior**
[Rakish Shrestha](#)¹; Arash Soltani-Tehrani²; Jutima Simsiriwong³; Nima Shamsaei²; Mohsen Seifi⁴; Nam Phan⁵; ¹Sandia National Laboratories; ²Auburn University; ³University of North Florida; ⁴ASTM International; ⁵Naval Air Systems Command (NAVAIR)

15:30 PM **END OF DAY**

1ST NOVEMBER 2022

SESSION CHAIRS (AM SESSION):
Thomas Niendorf, University of Kassel
Douglas Wells, NASA-MSFC

SESSION CHAIRS (PM SESSION):
Stefano Beretta, Politecnico di Milano
Jutima Simsiriwong, University of North Florida

08:30 AM
INVITED **Uniform Fatigue Damage Tolerance Assessment in Additive Manufactured Metals and Structures**
[Frank Walther](#)¹; Jochen Tenkamp¹; Felix Stern¹; Mohamed Merghany¹; Mirko Teschke¹; ¹TU Dortmund University - Department of Materials Test Engineering (WPT)

09:00 AM
REGULAR **Fatigue Response up to 10⁹ Cycles of Notched Specimens Made of SLM Ti6Al4V Alloy**
[Andrea Tridello](#)¹; Filippo Berto²; Davide S. Paolino¹; ¹Politecnico di Torino - DIMEAS; ²Norwegian University of Science and Technology (NTNU)

09:20 AM
REGULAR **Stress Corrosion Cracking and Hydrogen-Metal Interactions in Additively Manufactured 17-4PH**
[James Burns](#)¹; [Trevor K. Shoemaker](#)¹; Lauren Singer¹; Zachary Harris¹; John Scully¹; ¹University of Virginia

09:40 AM
INVITED **Additive Manufacturing Microstructural Engineering for Improved Fatigue Resistance**
[Jonathan Pegues](#)¹; ¹Sandia National Laboratories

10:10 AM **BREAK**

10:30 AM
INVITED **The Role of Cyclic Strain Rate and Heat Treatment on High-Cycle and Very High-Cycle Fatigue Behavior of LB-PBF 17-4 PH Stainless Steel**
[Jutima Simsiriwong](#)¹; Pooriya Dastranjy Nezhadfar²; Jade Welsh¹; Indrajit Nandi²; Shuai Shao²; Nima Shamsaei²; ¹University of North Florida; ²Auburn University

11:00 AM
INVITED **Fatigue Response of AM Materials: A Methodology for the Statistical Analysis of the Experimental Data**
[Davide S. Paolino](#)¹; Andrea Tridello¹; ¹Politecnico di Torino - DIMEAS

11:30 AM
INVITED **Theory and Application of Probabilistic Damage Tolerance to Predict the Structural Integrity of Additively Manufactured Parts**
[James C. Sobotka](#)¹; Michael Enright¹; Craig McClung¹; ¹Southwest Research Institute (SwRI)

12:00 PM **LUNCH**

13:30 PM
REGULAR **Mechanical Performance of Cold Spray Additively Manufactured Al-6061 Deposits**
[Ahmad Nourian-Avval](#)¹; Sinan Muftu¹; ¹Northeastern University

13:50 PM
REGULAR **Qualification Method for the Process Dependent Factors and Affecting the Fatigue Behavior of Laser Powder Bed Fusion Methods for Ti6Al4V**
[Umit Aytar](#)¹; [Erdem Mermer](#)¹; ¹Turkish Aerospace

14:10 PM
REGULAR **Mechanism-Based Characterization and Modeling of Additive Manufactured Medical Implants with Tailored Functionality**
[Jochen Tenkamp](#)¹; Mirko Teschke¹; Frank Walther¹; ¹TU Dortmund University - Department of Materials Test Engineering (WPT)

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14:30 PM
INVITED **Characterization of Defects in Metal AM for Structural Integrity Assessment**
[Michael Gorelik](#)¹; ¹Federal Aviation Administration (FAA)

15:00 PM **END OF DAY**

2ND NOVEMBER 2022

SESSION CHAIRS (PM SESSION):

Jutima Simsiriwong, University of North Florida
Douglas Wells, NASA-MSFC

13:30 PM
INVITED **What is Needed to Predict the Fatigue Performance of an AM Ti-6Al-4V Component?**
[Derek Warner](#)¹; [Peipei Li](#)^{1,2}; [Terrence Moran](#)¹; ¹Cornell University - Cornell Fracture Group; ²Brown University

14:00 PM
REGULAR **Impact of Surface Roughness on Fatigue Performance in Additive Manufacturing**
[Joy Gockel](#)¹; [Rachel Evans](#)²; [Edwin Glaubitz](#)¹; [Simon Richardsen](#)¹; [Nathan Klingbeil](#)²; ¹Colorado School of Mines; ²Wright State University

14:20 PM
REGULAR **Investigation of Residual Stresses and Activation Energies in PBF-EB Ti-6Al-4V Globular Surface Layers**
[Nicholas A. Derimow](#)¹; [Thomas A. Berfield](#)²; [Keenan Hanson](#)³; [Jake T. Benzing](#)¹; [Nikolas Hrabe](#)¹; ¹NIST; ²University of Louisville; ³Stryker

14:40 PM
REGULAR **Fatigue Life and Effect of Defect for Various Engineering Alloys Made with Laser Powder Bed Fusion**
[Emiel Amsterdam](#)¹; [Enrico Scolaro](#)¹; ¹Royal NLR - Netherlands Aerospace Centre

15:00 PM
INVITED **On the Role of Powder Quality and Process Instabilities on the Fatigue Properties of Additively Manufactured Materials**
[Thomas Niendorf](#)¹; ¹University of Kassel

15:30 PM **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
EXCELLENCE
Research to Standards

GENERAL TOPICS IN AM: MATERIALS AND PROCESSING, POST-PROCESSING, QUALIFICATION & SAFETY

CO-ORGANIZERS:

Sara Bagherifard Politecnico di Milano, Italy
David Brackett The MTC, UK
Nik Hrabec NIST, USA
Jasmin Kathrin Saewe Fraunhofer ILT, Germany
Brian West NASA-MSFC, USA

**31ST OCT 2022 – 2ND NOV 2022 (MON-WED)
CYPRESS (LEVEL 1)**

31ST OCTOBER 2022

SESSION CHAIR (AM SESSION):

Richard Huff, ASTM International

SESSION CHAIR (PM SESSION):

Khalid Rafi, ASTM International

08:00 AM **AM Materials Data – Challenges and Opportunities**
INVITED Richard Huff¹; ¹ASTM International

08:30 AM **Maturation of Additive Manufactured Aerospace Alloys and Development of Mechanical and Thermophysical Properties for Space Applications**
REGULAR Paul R. Gradl¹; Seyed Reza Ghiaasiaan²; Shengmin Guo³; Colton Katsarelis¹; Omar Mireles¹; Alison Park⁴; Nima Shamsaei²; Shuai Shao²; Brian West¹; ¹NASA - Marshall Space Flight Center (MSFC); ²Auburn University; ³Louisiana State University; ⁴NASA Engineering and Safety Center (NESC)

08:50 AM **Parameter Development of High Strength Aluminium Alloys for PBF-LB**
INVITED Joseph C. Chamberlin¹; Andrew Bobel²; Nick Cruchley¹; ¹The Manufacturing Technology Centre (MTC); ²General Motors

09:20 AM **Laser Powder Bed Fusion of High Strength Aluminum Alloys using Laser Stirring Technique**
REGULAR Alber A. Sadek¹; ¹EWI

09:40 AM **Overcoming the Challenges of Changing Designs, Materials, and 3D Printers with X-Ray CT**
REGULAR Curtis L. Frederick¹; ¹ZEISS

10:00 AM **BREAK**

10:30 AM **Use of Reactive Additive Manufacturing (RAM) Techniques for New Alloy and Composite Development**
INVITED Jeremy J. Iten¹; ¹Elementum 3D

11:00 AM **Dissimilar Material Mixing in Directed Energy Deposition for Compositionally Complex Alloys**
INVITED Sarah J. Wolff¹; ¹Texas A&M University

11:30 AM **Deep Learning Image Analysis Applied to Defects in Additive Manufacturing**
INVITED Anton Du Plessis^{1,2}; ¹Object Research Systems; ²Stellenbosch University

12:00 PM **LUNCH**

13:30 PM **Predictive Process Parameter Development for Laser Powder Bed Fusion**
INVITED Priyanshu Bajaj¹; ¹m4p material solutions

14:00 PM **Process Optimisation Strategies for Laser Powder Bed Fusion and Directed Energy Deposition**
INVITED Maria L. Montero-Sistiaga¹; Marc J. de Smit¹; Ralph L. Haagsma¹; Timo Osinga¹; ¹Royal NLR - Netherlands Aerospace Centre

14:30 PM **Coaxial Monitoring and Closed-Loop Control in Directed Energy Deposition using a Photodiode Array**
INVITED Samantha A. Webster^{1,2}; Jihoon Jeong²; Alberto Castro³; Lars Jacquemetton³; Jian Cao²; ¹NIST; ²Northwestern University; ³Sigma Additive Solutions

15:00 PM **BREAK**

15:30 PM **Advantages of NeuBeam Technology to Electron Beam AM**
INVITED Robin Weston¹; Peter Hansford¹; Ian Laidler¹; ¹Wayland Additive

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
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Research to Standards

16:00 PM
INVITED Ergonomic Design of Human-AM
Machine Interface
SJ Jones¹; ¹Velo3D

16:30 PM **END OF DAY**

1ST NOVEMBER 2022

SESSION CHAIR (AM + PM SESSION):

Nik Hrabe, NIST

08:00 AM
INVITED A Design Guide for AM Post
Processing
Andrew Triantaphyllou¹; Farhan M.
Khan²; ¹The Manufacturing
Technology Centre (MTC); ²Xerox

08:30 AM
INVITED Influence of Post-Processing
Techniques on the Properties of
Laser Powder-Bed Fusion
AlSi10Mg Alloy
Mario Guagliano¹; ¹Politecnico di
Milano

09:00 AM
INVITED Strategizing with Unique Hot
Isostatic Pressing Treatments to
Increase Productivity during Post-
Processing and Take Advantage of
Microstructural Heterogeneities in
Laser-Melted Inconel 718 Parts
Jake Benzing¹; Orion L. Kafka¹; Chad
M. Beamer²; Philipp Schumacher³;
Donald Godfrey³; Nik Hrabe¹; Frank
DelRio⁴; ¹NIST; ²Quintus
Technologies; ³SLM Solutions;
⁴Sandia National Laboratories

09:30 AM
INVITED Surface Finishing for Metal AM
Chris Dalton¹; Annie Kerwin¹; Hoda
Amel¹; ¹The Manufacturing
Technology Centre (MTC)

10:00 AM **BREAK**

10:30 AM
REGULAR Understanding and Predicting
Distortion in Metal AM
Corey Wardrop¹; ¹Sintavia

10:50 AM
INVITED Tunable Fatigue Performance via
Controlled Powder Recovery for
Additively Manufactured Titanium
Alloy
Nik Hrabe¹; Nicholas Derimow¹;
Keenan Hanson²; Jake Benzing¹;
Newell Moser¹; Orion L. Kafka¹;
¹NIST; ²Stryker

11:20 AM
REGULAR Support Structure Strategy for
Optimal Removal through a
Controlled Chemical Process
Agustin Diaz¹; Justin Michaud¹;
Patrick McFadden¹; Francisco
Medina²; Bob Markley³; ¹REM
Surface Engineering; ²University of
Texas at El Paso; ³Addman
Engineering

11:40 AM
INVITED When Hybrid Manufacturing Makes
Sense
Mark Mohr¹; ¹DMG MORI Federal
Services

12:10 PM **LUNCH**

13:30 PM
INVITED 3-D Printed RF Systems Experiment
on the International Space Station
Arthur Paoletta¹; ¹L3Harris

14:00 PM
INVITED PBF-LB Process Qualification
Aaron McCandless¹; Jacob Williams¹;
Mahdi Jamshidinia¹; Mohsen Seifi¹;
¹ASTM International

14:30 PM
REGULAR Additive Manufacturing Process
Evaluation for Medical Applications
Matthew Di Prima¹; ¹U.S. Food and
Drug Administration (FDA)

14:50 PM **BREAK**

15:30 PM
INVITED Development of a Roadmap for
Computational Materials-Informed
Qualification and Certification of
Process Intensive Metallic Materials
Edward H. Glaessgen¹; Michael
Gorelik²; ¹NASA - Langley Research
Center (LaRC); ²Federal Aviation
Administration (FAA)

16:00 PM
REGULAR Standard Guide for Density
Measurement of Additively
Manufactured Parts
Mallory S. James¹; Pooriya Dastranjy
Nezhadfar²; Sean Dobson¹; ¹NASA -
Marshall Space Flight Center (MSFC);
²Auburn University

16:20 PM
REGULAR A New Set of Guidelines for
Additive Manufacturing Facility
Safety
Austin Kron¹; ¹AddUp

16:40 PM **END OF DAY**

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2ND NOVEMBER 2022

SESSION CHAIR (PM SESSION):

Nik Hrabe, NIST

13:30 PM
INVITED **LPBF Surface Roughness of Gas Turbine Alloys from Multi-Size and Multi-Laser Machines, using Standardized Coupon Geometries**
[Ramesh Subramanian](#)¹; ¹Siemens Energy

14:00 PM
INVITED **Photopolymer Additive Manufacturing: Probing the Relationship Between Print Conditions and Final Part Fidelity the First-Ever NIST-Characterized Light Engine**
[Callie I. Higgins](#)¹; Jason Killgore¹; ¹NIST

14:30 PM
REGULAR **Latest Developments in HIP and High-Pressure Heat Treatment for Additive**
[Chad M. Beamer](#)¹; James Shipley¹; ¹Quintus Technologies

14:50 PM
REGULAR **Directional Gas Flow Characterization and its Effect on Melt Pool Size in Laser Powder Bed Fusion**
[Jordan S. Weaver](#)¹; David Deisenroth¹; Shawn Moylan¹; Alec Schlenoff¹; ¹NIST

15:10 PM **BREAK**

15:30 PM
INVITED **Tensile Ductility and Fracture of AM Fabricated Inconel 718 with Voided Microstructures at High Strain Rate**
[Paul Wood](#)¹; Urvashi Gunpath¹; Pawel Platek²; ¹University of Derby - Institute for Innovation in Sustainable Engineering (IISE); ²Military University of Technology

16:00 PM
INVITED **Thickness Size Effects on Laser Powder Bed Fusion and Laser Powder Directed Energy Deposition GRCop-42 Copper Alloy**
[Gabriel Demeneghi](#)¹; Paul R. Gradl¹; Kavan Hazeli²; ¹NASA - Marshall Space Flight Center (MSFC); ²University of Arizona

16:30 PM
INVITED **Shaping Microstructures and Mindsets: The Challenge of Switching Between Different Metal Additive Manufacturing Technologies**
[Eleonora Santecchia](#)¹; Marcello Cabibbo¹; Valerio Di Pompeo¹; Alberto Santoni¹; Stefano Spigarelli¹; ¹Università Politecnica delle Marche (UNIVPM)

17:00 PM **END OF DAY**

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AM OF CERAMICS: CHALLENGES & OPPORTUNITIES

CO-ORGANIZERS:

Shawn Allan
Lithoz America, USA
Brandon Cox
Honeywell, USA
Sean Looi
Creat3D, Singapore

Jason Jones
Moog, USA
Sadaf Sobhani
Cornell University, USA

31ST OCT 2022 (MON)
DOGWOOD (LEVEL 1)

31ST OCTOBER 2022

SESSION CHAIR (AM SESSION):
Sadaf Sobhani, Cornell University

08:00 AM
INVITED **3D Printed Ceramic Structures - Properties, Performance and Applications**
[Pedro Cortes](#)¹; [Eric MacDonald](#)²; [Bharat Yelamanchi](#)¹; [Bhargavi Mummareddy](#)¹; ¹Youngstown State University; ²University of Texas at El Paso

08:30 AM
INVITED **Single and Multi-Material 3D Printing of Ceramics: Material Properties and Applications**
[Martin Schwentenwein](#)¹; [Shawn Allan](#)²; ¹Lithoz; ²Lithoz America

09:00 AM
INVITED **Influence of Post Processing Heat Treatments on the Mechanical Properties of Alumina Made via Lithography-Based Ceramic Manufacturing**
[Sarah Boardman](#)¹; [Corinne E. Packard](#)¹; ¹Colorado School of Mines

09:30 AM
INVITED **3D Printing of Transparent Ceramics: Challenges, Mitigation Approaches and Potential Applications**
[Chee Lip Gan](#)¹; [Zehui Du](#)¹; [Li Ying Liu](#)¹; [Pengcheng Ye](#)²; ¹Nanyang Technological University (NTU); ²Creat3D

10:00 AM **BREAK**

10:30 AM
INVITED **Innovative Zirconia-Based Material Shaped by SLA 3D Printing**
[Richard Gaignon](#)¹; [Christophe Chaput](#)¹; ¹3DCeram

11:00 AM
INVITED **3D Printed Geometrically-Complex Ceramic Substrates for Electronics**
[Eric MacDonald](#)¹; ¹University of Texas at El Paso

11:30 AM **END OF DAY**

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AM FOR DEFENSE APPLICATIONS

CO-ORGANIZERS:

Mark Benedict
AFRL, USA
Eric Fodran
Northrop Grumman, USA
Travis Mayberry
Raytheon Missiles
and Defense, USA
Katherine Olson
U.S. Army CCDC-
AvMC, USA

Nam Phan
NAVAIR, USA
Brandon Ribic
NCDMM, USA
Jose Hector Sandoval
Lockheed Martin
MFC, USA

1ST NOV 2022 (TUE)
GRIFFIN A (LEVEL 1)

1ST NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Jose Hector Sandoval, Lockheed Martin MFC

SESSION CHAIR (PM SESSION):

Travis Mayberry, Raytheon Missiles and Defense

08:00 AM
INVITED **Metal Additive Manufacturing for Aerospace Sustainment and Fleet Readiness at Scale**
[Kevin Holder](#)¹; [Nirup Nagabandi](#)¹; [Elisa Teipel](#)¹; ¹Essentium

08:30 AM
INVITED **Hybrid Agile Manufacturing Integration Cells for Future Armaments**
[James L. Zunino, III](#)¹; [David Sabanosh](#)¹; ¹U.S. Army Combat Capabilities Development Command - Armaments Center

09:00 AM
REGULAR **Why it is Easier Said than Done: Sustaining a Legacy Aircraft Fleet with Additive Manufacturing**
[Joseph D. Sirmans](#)¹; ¹Lockheed Martin Aeronautics

09:20 AM
REGULAR **Additive Qualification Approach for Airworthy Defense Applications**
[Lyndsay Kibler](#)¹; ¹GE Additive

09:40 AM
REGULAR **Army AM Night Vision Clip - Path to Part Qualification**
[Daniel Smith](#)¹; [Stacey L. Clark](#)¹; ¹U.S. Army Combat Capabilities Development Command - C5ISR PIF

10:00 AM **BREAK**

10:30 AM
INVITED **Challenges of Adopting Additive Manufacturing in the Industry**
[Travis L. Mayberry](#)¹; ¹Raytheon Missiles and Defense

11:00 AM
INVITED **The Additive Manufacturing Link between Defense and Aerospace**
[Elizabeth Crisler](#)¹; ¹Textron Aviation

11:30 AM
INVITED **Relevance of Additive Manufacturing Standards in Highly Leveraged Process-Structure-Property-Performance Applications**
[Tyler LeBrun](#)¹; ¹Sandia National Laboratories

12:00 PM **LUNCH**

13:30 PM
INVITED **Additive Manufacturing: Adoption and Industrialization Challenges at Lockheed Martin**
[Prabhjot Singh](#)¹; ¹Lockheed Martin Space

14:00 PM
REGULAR **Developing the Workforce of Tomorrow – COMET: A Collaborative Operationalized Manufacturing Education & Training Strategy**
[David Sabanosh](#)¹; [James L. Zunino, III](#)¹; [Samuel Gatley](#)²; ¹U.S. Army Combat Capabilities Development Command - Armaments Center; ²New Jersey Institute of Technology

14:20 PM
REGULAR **Feasibility of Using Recycled PET Water Bottle Flake as an Additive Manufacturing Feedstock at Forward Operating Bases**
[Samantha Snabes](#)¹; [Helen Little](#)¹; [Richard Heggs](#)²; [Prabhat Krishnaswamy](#)²; ¹re:3D; ²Engineering Mechanics Corporation of Columbus (Emc²)

14:40 PM
REGULAR **Additive Manufacturing of Aluminum Metal Matrix Composites for Defense and Space Applications**
[Ethan Parsons](#)¹; ¹MIT Lincoln Laboratory

15:00 PM **BREAK**

15:30 PM
INVITED **Thermal Aging Study for Additively Manufactured F357 Aluminum**
[Francisco Medina](#)¹; [Edel Arrieta](#)¹; [Mark Benedict](#)²; [Victor Medrano](#)¹; [Kevin Caballero](#)¹; ¹University of Texas at El Paso; ²Air Force Research Laboratory (AFRL)

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ICAM 2022 PROGRAM AGENDA

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CENTER of
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16:00 PM
INVITED **Effect of Geometrically Seeded Defects on the Mechanical Properties and High Cycle Fatigue Life of Stress Relieved L-PBF AISi10Mg**
[Steven M. Kraft](#)¹; Jose Hector Sandoval¹; ¹Lockheed Martin Missiles and Fire Control (MFC)

16:30 PM
INVITED **Fatigue Behavior of Additively Manufactured Ferrium C64**
[Thomas Kozmel](#)¹; Peter Jacobson¹; Jacqueline Hardin¹; Kerem Taskin¹; Chris Kantner¹; Jason Fetty²; ¹QuesTek; ²U.S. Army Combat Capabilities Development Command - Aviation & Missile Center

17:00 PM **END OF DAY**

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AM APPLICATIONS IN AVIATION

CO-ORGANIZERS:

Thomas Broderick
AFRL, USA
Jim Dobbs
Boeing, USA

Michael Gorelik
FAA, USA
Mikkel Pedersen
Oerlikon AM, Germany

1ST NOV 2022 – 2ND NOV 2022 (TUE-WED)
GRIFFIN B (LEVEL 1)

1ST NOVEMBER 2022

SESSION CHAIR (AM + PM SESSION):
Jim Dobbs, Boeing

08:00 AM
INVITED **A User and Developers Perspective on Standards in Additive Manufacturing**
[Jesse R. Boyer](#)^{1,2}; ¹Pratt & Whitney;
²Raytheon Technologies

08:30 AM
INVITED **Joint Metal Additive Database Definition (JMADD) Ti-6Al-4V Additive Manufacturing Qualification Program**
[Joel D. White](#)¹; Rachael Andrulonis¹; Royal Lovingfoss¹; ¹Wichita State University - National Institute for Aviation Research (WSU - NIAR)

09:00 AM
INVITED **Best Practice Guide on Part Family Certification for Aviation**
[Alberto Bordin](#)¹; Mahdi Jamshidinia¹; Mohsen Seifi¹; Kirstie Snodderly¹; Martin White¹; ¹ASTM International

09:30 AM
INVITED **Fatigue Data Generation, Reduction, and Presentation for Metallic Additive Manufacturing**
[Zachary Whitman](#)¹; ¹Boeing - Commercial Airplanes

10:00 AM **BREAK**

10:30 AM
REGULAR **Design Principles and Strategies for Prototyping and Large-Scale Additive Manufacturing**
[Paul R. Toivonen](#)¹; [Daniel R. Klenosky](#)¹; ¹Spirit AeroSystems

10:50 AM
INVITED **Innovative Aerospace and Space Structures Made by Additive Manufacturing**
[Christoph Leyens](#)^{1,2}; Frank Brückner^{1,3}; Elena López¹; ¹Fraunhofer Institute for Material and Beam Technology IWS; ²Technische Universität Dresden - Institute of Materials Research; ³Luleå University of Technology

11:20 AM
REGULAR **AM Developments within the Nadcap Program**
[Richard Freeman](#)¹; ¹Performance Review Institute (PRI)

11:40 AM **LUNCH**

13:30 PM
INVITED **A Novel Approach for Evaluating Multiple Machine Platforms in Ti6Al4V Laser Powder Bed Fusion**
[Cory Cunningham](#)¹; Jim Dobbs¹; Elaine MacDonald¹; Andrew Steevens¹; Zachary Whitman¹; ¹Boeing

14:00 PM
REGULAR **Photo-Curing 3D Printing of Sacrificial Tooling for Fabricating Hollow Lightweight Composites**
[Baoming Zhao](#)¹; Yu-Chung Chang¹; Cheng Hao¹; Jinwen Zhang¹; ¹Washington State University - Composite Materials and Engineering Center (WSU - CMEC)

14:20 PM
REGULAR **Effect of Processing Parameters on Defect Populations and Fatigue Behavior for AM Aerospace Applications**
[Robert K. Rhein](#)¹; Kathleen Chou¹; Jacob Kallivayalil¹; Harsha Phukan¹; Niloofar Sanaei¹; ¹Eaton

14:40 PM
REGULAR **Manufacturing Process Route Simplification: HIP Removal**
[Guillaume Fallot](#)¹; Johannes Siegart¹; Andreas Neumann¹; ¹Airbus Helicopters

15:00 PM **BREAK**

15:30 PM
INVITED **Volumetric Defects in Laser Beam Powder Bed Fused Ti-6Al-4V: Geometric Features, Classification, and Impacts on Short Crack Growth**
[Jia \(Peter\) Liu](#)¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

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16:00 PM
INVITED **L-DED Process Monitoring & Control Development**
[Daniel Driemeyer¹](#); Baily Thomas¹;
¹Boeing Research & Technology

16:30 PM **END OF DAY**

2ND NOVEMBER 2022

SESSION CHAIR (PM SESSION):
Thomas Broderick, AFRL

13:30 PM
REGULAR **From Composites to AM: The Relationship Between Specifications and Material Data**
[Cindy Ashforth¹](#); Larry Ilcewicz¹;
¹Federal Aviation Administration (FAA)

13:50 PM
REGULAR **Progress Towards a Standard for Rapid Qualification of Additively Manufactured Materials Based on Defect Structures**
[Krzysztof Stopka¹](#); Andrew Desrosiers²; Tyler Nicodemus²; Amber Andreaco²; Michael D. Sangid¹;
¹Purdue University; ²GE Additive

14:10 PM
INVITED **Part Classifications for Aviation**
[Chul \(Charles\) Park¹](#); ¹Supernal

14:40 PM
INVITED **The Challenges of AM Qualification and Certification in Aerospace**
[Marko Bosman¹](#); ¹GKN Aerospace

15:10 PM **BREAK**

15:30 PM
REGULAR **Combining Forging and Arc Direct Energy Deposition (DED) Techniques to Produce Dissimilar Titanium Alloy Aerospace Components**
[Misael Pimentel Espirindio e Silva^{1,2}](#); [Calum Hicks^{1,2}](#); Scott McKegney²; Giribaskar Sivaswamy¹; Saeed Tamimi¹; Stephen Fitzpatrick²;
¹University of Strathclyde - Advanced Forming Research Centre (AFRC);
²National Manufacturing Institute Scotland (NMIS)

15:50 PM
INVITED **Digital Additive Manufacturing at Boeing**
[Nicholas Mulé¹](#); Wentao Fu¹; ¹Boeing

16:20 PM **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

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Research to Standards

APPLICATION OF AM IN CONSTRUCTION ON EARTH AND BEYOND

CO-ORGANIZERS:

Michael Fiske
NASA-JSEG, USA
Giada Gasparini
University of
Bologna, Italy
Ali Kazemian
Louisiana State
University, USA

Stephan Mansour
ASTM International, USA
Sam Ruben
Mighty Buildings, USA
Timothy Wangler
ETH Zürich, Switzerland

**1ST NOV 2022 – 2ND NOV 2022 (TUE-WED)
DOGWOOD (LEVEL 1)**

1ST NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Timothy Wangler, ETH Zürich

SESSION CHAIR (PM SESSION):

Michael Fiske, NASA-JSEG

08:00 AM **REGULAR** **An Overview of Additive Construction Technologies for Planetary Surface Infrastructure Development**
[Michael R. Fiske](#)¹; ¹NASA - Jacobs Space Exploration Group (JSEG)

08:20 AM **INVITED** **Performance Characterization of 3D Printed Materials for Planetary Infrastructure Construction**
[Ali Kazemian](#)¹; [Ilerioluwa Giwa](#)¹; [Hassan Ahmed](#)¹; [Dennis Duong](#)¹; [Michael R. Fiske](#)²; ¹Louisiana State University; ²NASA - Jacobs Space Exploration Group (JSEG)

08:50 AM **INVITED** **Scaleup of Microwave Powder Bed Fusion for Lunar Infrastructure Construction**
[Michael R. Effinger](#)¹; ¹NASA - Marshall Space Flight Center (MSFC)

09:20 AM **INVITED** **Geopolymer Lunar Concrete Design Utilizing a Response Surface Methodology**
[Aleksandra Radlinska](#)¹; [Peter Collins](#)¹; [Jennifer E. Edmunson](#)²; [Michael R. Fiske](#)³; ¹Pennsylvania State University; ²NASA - Marshall Space Flight Center (MSFC); ³NASA - Jacobs Space Exploration Group (JSEG)

09:50 AM **BREAK**

10:30 AM **INVITED** **Additive Manufacture at F+P: On- and Off-Earth Latest Research and Technological Advancements**
[Marina Konstantatou](#)¹; ¹Foster + Partners

11:00 AM **INVITED** **Retrofitting and Repairing Printing Defects for 3D Printed Terrestrial and Planetary Structures**
[Hongyu \(Nick\) Zhou](#)¹; [Reese Sorgenfrei](#)¹; [Michael R. Fiske](#)²; ¹University of Tennessee, Knoxville; ²NASA - Jacobs Space Exploration Group (JSEG)

11:30 AM **INVITED** **NASA's Moon-to-Mars Planetary Autonomous Construction Technology (MMPACT) Project: Additive Construction for Lunar Infrastructure**
[Raymond G. Clinton, Jr.](#)¹; [Michael R. Fiske](#)²; [Jason Ballard](#)³; [Jennifer E. Edmunson](#)¹; [Michael R. Effinger](#)¹; [Evan Jensen](#)³; ¹NASA - Marshall Space Flight Center (MSFC); ²NASA - Jacobs Space Exploration Group (JSEG); ³ICON

12:00 PM **LUNCH**

13:30 PM **INVITED** **Additive Construction of Concrete Structures: A Research Roadmap**
[Jose P. Duarte](#)¹; [Sven Bilén](#)¹; [Nathan Brown](#)¹; [Ali Memari](#)¹; [Shadi Nazarian](#)¹; [Aleksandra Radlinska](#)¹; ¹Pennsylvania State University

14:00 PM **REGULAR** **Achieving Urban and Infrastructural Resilience through Large-Scale Additive Construction**
[Michael R. Fiske](#)¹; [Melodie Yashar](#)²; ¹NASA - Jacobs Space Exploration Group (JSEG); ²ICON

14:20 PM **REGULAR** **Just How Sustainable is 3D Concrete Printing? A Focus on Durability**
[Timothy Wangler](#)¹; ¹ETH Zürich

14:40 PM **REGULAR** **Functional Cementitious Composites for Large-Scale Concrete 3D Printing**
[Hongyu \(Nick\) Zhou](#)¹; [Yucen Li](#)¹; [Adam Brooks](#)²; ¹University of Tennessee, Knoxville; ²Oak Ridge National Laboratory (ORNL)

15:00 PM **BREAK**

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
EXCELLENCE
Research to Standards

15:30 PM
INVITED **Additive Manufacturing: A Key Technology Towards Sustainable Construction**
[Harald Kloft](#)¹; [Norman Hack](#)¹; [Vittoria Laghi](#)²; ¹Technische Universität Braunschweig - Institute of Structural Design; ²University of Bologna – DICAM

16:00 PM
INVITED **3D Concrete Printing – Are We There Yet?**
[Ming-Jen Tan](#)^{1,2}; Mingyang Li¹; Teck Neng Wong¹; Yi Wei Daniel Tay^{1,2}; ¹Nanyang Technological University (NTU); ²Singapore Centre for 3D Printing (SC3DP)

16:30 PM **END OF DAY**

2ND NOVEMBER 2022

SESSION CHAIR (PM SESSION):
Michael Fiske, NASA-JSEG

13:30 PM
INVITED **Next Level - Construction 4.0**
[Lambertus Nicolaas \(Berry\) Hendriks](#)¹; ¹CyBe Construction

14:00 PM
REGULAR **3D Printable Translucent Concrete**
[Yi Wei Daniel Tay](#)^{1,2}; [Ming-Jen Tan](#)¹; ²Khalid Mosalam³; [Paulo Monteiro](#)⁴; ¹Nanyang Technological University (NTU); ²Singapore Centre for 3D Printing (SC3DP); ³University of California, Berkeley - Pacific Earthquake Engineering Research Center; ⁴University of California, Berkeley

14:20 PM
REGULAR **Optimizing the Rheology of 3D Printable Micro-Concrete**
[Gary M. Boon](#)¹; [Didier Lootens](#)¹; [Sree Nanukuttan](#)²; [Marios Soutsos](#)²; ¹Sika; ²Queen's University Belfast

14:40 PM
REGULAR **Experimental and Numerical Results on Three-Point-Bending Tests of Wire-and-Arc Additively Manufactured Stainless Steel Bars**
[Vittoria Laghi](#)¹; [Giada Gasparini](#)¹; [Michele Palermo](#)¹; [Tomaso Trombetti](#)¹; ¹University of Bologna - DICAM

15:00 PM **BREAK**

15:30 PM
INVITED **Code Adoption for 3D Printed Concrete Structures (AC509 and Alternative Approaches)**
[Babak Zareiyani](#)¹; [George Perry](#)²; ¹Emergent 3D; ²Black Buffalo 3D

16:00 PM
REGULAR **Moment Rotation Characterization for Beam-to-Column WAAM Steel Joint for Structural Engineering Applications**
[Zeina AL-Nabulsi](#)¹; ¹University of Warwick

16:20 PM
INVITED **Additive Construction Concepts and Development with Bridge and Building Applications**
[Atorod Azizinamini](#)¹; ¹Florida International University (FIU)

16:50 PM **END OF DAY**

Note: This agenda features a list of accepted presenters for ICAM 2022 and their presentation timeslots. The order of presentation for each symposium is also as per the order reflected on the agenda. Please contact us at icam@astm.org if you need more information.

ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



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Research to Standards

APPLICATION OF AM IN THE MEDICAL INDUSTRY

CO-ORGANIZERS:

Matthew Di Prima

FDA, USA

David Heard

Stryker, USA

Eddie Kavanagh

Johnson & Johnson,
Ireland

Guha Manogharan

Pennsylvania State
University, USA

Michael Roach

University of Mississippi
Medical Center, USA

**1ST NOV 2022 – 2ND NOV 2022 (TUE-WED)
CARDINAL (LEVEL 2)**

1ST NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Matthew Di Prima, FDA

SESSION CHAIR (PM SESSION)

Michael Roach, UMMC

08:30 AM
INVITED The Development and Evaluation of
AM Medical Devices for Total Joint
Arthroplasty

Mark L. Morrison¹; ¹Smith+Nephew

09:00 AM
INVITED How Do We Make Personalization
Scalable in Orthopedics?

Cambre Kelly¹; ¹restor3d

09:30 AM
REGULAR 3D Printed Polymers for Pelvic
Organ Prolapse (POP) Treatment

Kenan Song¹; Yuxiang Zhu¹; ¹Arizona
State University

09:50 AM **BREAK**

10:30 AM
REGULAR Biomedical Applications of 3D
Printing

Bianmei Cao^{1,2}; Ramanathan (Ram)
Kadirvel¹; David Kallmes¹; Nureddin
Ashammakhi³; ¹Mayo Clinic;
²National Institutes for Food and Drug
Control (NIFDC); ³University of
California, Los Angeles (UCLA)

10:50 AM
INVITED Visible Light 3D Printed Hybrid-
Hydrogel Scaffolds for Tissue
Engineering

Maryam Tilton¹; Maria Astudillo
Potes¹; Emily Camilleri¹; Lichun Lu¹;
¹Mayo Clinic

11:20 AM
REGULAR A Scalable 3D Printed Bioreactor
for the Expansion of Anchorage-
Dependent Stem Cells

Kreg Zimmer¹; Jian Ling¹;
¹Southwest Research Institute

11:40 AM **LUNCH**

13:30 PM
INVITED Melt Electrowriting as a High-
Resolution Additive Manufacturing
Technology

Paul D. Dalton¹; Naomi Paxton¹;
¹University of Oregon

14:00 PM
REGULAR Practical Examples of the
Utilization of Industrial Computed
Tomography in Metal Medical
Device Additive Manufacturing

Ryan S. Kircher¹; Pradeep Bhattad²;
¹rms Company; ²ZEISS

14:20 PM
REGULAR Patient-Matched Cranial Plate
Manufacturing with FDM Printing of
PEEK. Introduction of an End-to-
End-Solution Including Regulatory
Data, Cost-Saving Opportunities
and Reduction of Waste

Martin Herzmann¹; ¹Kumovis

14:40 PM
INVITED Technical Challenges of Point of
Care Additive Manufacturing – The
Veterans Health Care Perspective

Beth A. Ripley¹; Dmitry Levin¹;
¹Veterans Health Administration

15:10 PM **END OF DAY**

2ND NOVEMBER 2022

SESSION CHAIR (PM SESSION):

Kenan Song, Arizona State University

13:30 PM
INVITED Influence of Topology Optimization
Parameters on the Mechanical
Response of an Additively
Manufactured Test Structure

Daniel Porter¹; Myung Kyun Sung²;
¹U.S. Food and Drug Administration
(FDA); ²Oak Ridge Institute for
Science and Education (ORISE)

14:00 PM
INVITED Build Parameter Influence on Strut
Thickness and Mechanical
Response in AM Titanium Lattices

Matthew Di Prima¹; ¹U.S. Food and
Drug Administration (FDA)

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Research to Standards

- 14:30 PM**
INVITED **Overcoming Orthopedic Implants Limitations using Additive Manufacturing**
[Swee Leong Sing](#)¹; ¹National University of Singapore (NUS)
- 15:00 PM** **BREAK**
- 15:30 PM**
INVITED **Amorphous Alloys – The Transition from Scientific Innovation to Validated Medical Application**
[Valeska Melde](#)¹; [Jürgen Wachter](#)¹;
¹Heraeus AMLOY
- 16:00 PM**
INVITED **Magnesium Alloy Design for Additive Manufacturing of Biodegradable Implants**
[Mert Celikin](#)¹; Eoin O'Cearbhaill¹;
¹University College Dublin
- 16:30 PM**
INVITED **Advances in Bio-Additive Manufacturing for Biomimetic Engineered Tissue Design**
[Rohan Shirwaiker](#)¹; ¹North Carolina State University
- 17:00 PM** **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

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Research to Standards

MECHANICAL TESTING OF AM MATERIALS

CO-ORGANIZERS:

Joy Gockel
Colorado School
of Mines, USA
Edward Herderick
Ohio State
University, USA
Robert Lancaster
Swansea
University, UK

Jason Jyi Sheuan Ten
A*STAR-SIMTech,
Singapore
Phuong (Jonathan) Tran
RMIT University,
Australia

1ST NOV 2022 – 2ND NOV 2022 (TUE-WED)
IBIS (LEVEL 2)

1ST NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Joy Gockel, Colorado School of Mines

SESSION CHAIR (PM SESSION):

Jason Jyi Sheuan Ten, A*STAR-SIMTech

08:00 AM
INVITED **Surface Features and their Impact upon High Cycle Fatigue Behavior of Laser Powder Bed Fusion IN718**
[Orion L. Kafka](#)¹; Chad M. Beamer²; Jake Benzing¹; Donald Godfrey³; Nikolas Hrabe¹; Philipp Schumacher³; ¹NIST; ²Quintus Technologies; ³SLM Solutions

08:30 AM
INVITED **Mechanical Polishing & Inspection of LPBF Surfaces to Achieve Bulk Material Properties for Nuclear Plant Components**
[Thomas S. Jones](#)¹; ¹Rolls-Royce Submarines

09:00 AM
INVITED **Influence of Precipitates on Fatigue Behavior In Wire Arc Additive Manufactured Nickel-Aluminum-Bronze**
[Ariel D. Murphy-Leonard](#)¹; Veronika Mazanova¹; ¹Ohio State University

09:30 AM
INVITED **Criticality of Defect Features in Failure of Additively Manufactured Components**
[Christopher J. Saldaña](#)¹; Elliott Jost¹; Caroline Massey¹; John Miers¹; David Moore²; ¹Georgia Institute of Technology; ²Sandia National Laboratories

10:00 AM **BREAK**

10:30 AM
REGULAR **Influence of Artificial Defects on Quasi-Static and Fatigue Tensile Testing of Additively Manufactured Ti6Al4V**
[Anton Du Plessis](#)^{1,2}; ¹Object Research Systems; ²Stellenbosch University

10:50 AM
REGULAR **Mechanical Testing of Net-Shape Specimens from Powder Bed Fusion-Laser Beam Manufactured Superalloy Hastelloy X**
[Håkan S. Brodin](#)¹; ¹Siemens Energy

11:10 AM
REGULAR **The Effect of Porosity on Profilometry-Based Indentation Plastometry (PIP), A Technique to Measure Stress-Strain Curves from Indentation**
[Jimmy E. Campbell](#)¹; Rebecca Reiff-Musgrove¹; John Reidy²; Aadithya Chitrapur²; Animesh Bose²; Bill Clyne¹; ¹Plastometrex; ²Desktop Metal

11:30 AM
INVITED **Developments of Mechanical Testing of AM Materials within High Pressure Heat Exchanger Design & Manufacture**
[William Sexton](#)¹; Tom Halhead¹; ¹HiETA Technologies

12:00 PM **LUNCH**

13:30 PM
REGULAR **Specimen Geometry and Shielding Gas Effects on the Fatigue Behavior of LB-PBF 17-4PH Stainless Steel in the High Cycle and Very High Cycle Fatigue Regimes**
[Jutima Simsiriwong](#)¹; Pooriya Dastranjy Nezhadfar²; Jade Welsh¹; Indrajit Nandi²; Shuai Shao²; Nima Shamsaei²; ¹University of North Florida; ²Auburn University

13:50 PM
REGULAR **Mechanical Behavior of 7050 Aluminum AM Lattice Structures**
[Ben DiMarco](#)¹; [Jeremy Seidt](#)¹; Noah Gula¹; Edward Herderick¹; ¹Ohio State University

14:10 PM
INVITED **AlSi10Mg and A205 Aluminum Alloys: Processing Route (Casting and Laser Powder Bed Fusion), Microstructure, and Mechanical Properties**
[Meysam Haghshenas](#)¹; ¹University of Toledo

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14:40 PM
INVITED
A Comparative Study on Tensile Properties of Additively Manufactured Ni-Base Superalloys from Cryogenic to Elevated Temperatures
[Seyed Reza Ghiaasiaan](#)¹; Paul R. Gradl²; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University; ²NASA - Marshall Space Flight Center (MSFC)

15:10 PM **END OF DAY**

2ND NOVEMBER 2022

SESSION CHAIR (PM SESSION):
Ben DiMarco, Ohio State University

13:30 PM
INVITED
As-Printed Additive Manufacturing Miniature Tensile Specimen with 25 mm Total Length
[Jason Jyi Sheuan Ten](#)¹; Ming Quan Zheng²; Wen Jie Goh²; Chen Heng Lee²; ¹A*STAR - Singapore Institute of Manufacturing Technology (SIMTech); ²Professional Testing Services

14:00 PM
REGULAR
Investigation of Tensile Specimen Out-of-Gage Failures in Additively Manufactured Polymers
[Christopher J. Murphy](#)¹; Britt Helten¹; ¹University of Maine - Advanced Structures & Composites Center (ASCC)

14:20 PM
REGULAR
Section Area and Archimedes Density Estimation for Thin Wall Laser Powder Bed Fusion Mechanical Test Specimens
[Dhruv Bhate](#)¹; Daniel Bruce¹; Paul Paradise¹; ¹Arizona State University

14:40 PM
INVITED
Translating Fatigue Testing of Subtractive Parts to Additive Manufactured Parts (Medical Devices): Lessons Learned
[Dawn Lissy](#)¹; [Stacey Barber](#)¹; ¹Empirical Technologies

15:10 PM **BREAK**

15:30 PM
INVITED
Development and Mechanical Characterisation of Additively Manufactured Cellular Metamaterials at Different Strain Rates
[Nejc Novak](#)¹; Oraib Al-Ketan²; Matej Vesenjak¹; Zoran Ren¹; ¹University of Maribor; ²New York University Abu Dhabi

16:00 PM
INVITED
Qualification of Low-Criticality AM Components in an Expeditionary Environment
[Jonathan Torres](#)¹; Jacob Aljundi²; Zach Heinkel²; Sam Pratt²; ¹Bucknell University; ²Naval Surface Warfare Center (NSWC) - Carderock Division

16:30 PM **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

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INDUSTRY 4.0: DATA MANAGEMENT FOR AM

CO-ORGANIZERS:

Amber Andreaco
GE Additive, USA
Matthew Jacobsen
AFRL, USA
Alex Kitt
EWI, USA

Yan Lu
NIST, USA
Nick Parry
Additive Flow, UK

1ST NOV 2022 (TUE)
OSPNEY (LEVEL 2)

1ST NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Amber Andreaco, GE Additive

SESSION CHAIR (PM SESSION):

Yan Lu, NIST

08:00 AM
INVITED **Semantic Models for Accelerating AM Process Parameter Development and Data Sharing**

[Kareem S. Aggour](#)¹; [Amber Andreaco](#)²; [Vipul K. Gupta](#)¹; ¹GE Research; ²GE Additive

08:30 AM
INVITED **The Benefits of Making Additive Data Findable, Accessible, Interoperable, and Reusable**
[Francis Raymundo](#)¹; [Hunter Macdonald](#)¹; [Matthew Jacobsen](#)²; ¹Hexagon Manufacturing Intelligence; ²Air Force Research Laboratory (AFRL)

09:00 AM
INVITED **Additively Manufactured Material Databases**
[Rachael M. Andrulonis](#)¹; ¹Wichita State University - National Institute for Aviation Research (WSU - NIAR)

09:30 AM
INVITED **Additive Manufacturing Data Integration and Metadata Management for Continuous Process Improvement**
[Yan Lu](#)¹; [Milica Perisic](#)¹; ¹NIST

10:00 AM **BREAK**

10:30 AM
INVITED **Increased Process Stability by Transforming Data into Useful Knowledge**

[Peter Lindecke](#)¹; ¹Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT

11:00 AM
INVITED **Delivering Repeatability and Sustainability through Digital Rule Enforcement**

[Celina Gratton](#)¹; ¹Authentise

11:30 AM
INVITED **AM Data Management for MMPDS – An Aerospace Approach**

[Doug Hall](#)¹; [Jana Rubadue](#)¹; [Carinne Shannon](#)¹; ¹Battelle Memorial Institute

12:00 PM **LUNCH**

13:30 PM
INVITED **An Extensible File Format to Describe Multi-Source Powder Bed Fusion Build Plans**

[David Toledano](#)¹; [Christopher Immer](#)¹; [Edwin Schwalbach](#)²; [Adam Hicks](#)²; ¹GE Research; ²Air Force Research Laboratory (AFRL)

14:00 PM
REGULAR **Making a Case for Data Continuity in Additive Manufacturing**

[Alexandre Donnadiu](#)¹; [Devin Culham](#)¹; ¹YOURMIND

14:20 PM
REGULAR **Technical and Intellectual Property Authentication and Protection for Additive Manufacturing**

[Jérémie Farret](#)^{1,2}; [Zbigniew Sagan](#)³; ¹Inmind Technologies; ²Mind in a Box; ³Advanced Track & Trace

14:40 PM
REGULAR **Ensuring Quality of Additive Manufacturing Process via Trusted Traceable Records on the Blockchain**

[Juan Carlos Flores](#)¹; [Mikhail Gladikh](#)¹; [Carlo De Bernardi](#)²; [Jack Harvey](#)¹; [Faisal Iqbal](#)¹; [Maria Onufrow](#)³; [Hernan Rincon](#)²; [Enzo Savino](#)²; ¹Baker Hughes; ²ConocoPhillips; ³Data Gumbo

15:00 PM
INVITED **An Intelligent Data Infrastructure for Additive Manufacturing**
[Shengyen Li](#)¹; ¹Southwest Research Institute (SwRI)

15:30 PM **END OF DAY**

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Research to Standards

ECONOMICS AND SUSTAINABILITY OF AM

CO-ORGANIZERS:

Olaf Diegel
University of Auckland,
New Zealand

Gary Ng
A*STAR-ARTC, Singapore

Behrang Poorganji
Morf3D, USA
Nicolas Sabo
General Electric, USA

2ND NOV 2022 (WED)
GRIFFIN A (LEVEL 1)

2ND NOVEMBER 2022

SESSION CHAIR (PM SESSION):

Behrang Poorganji, Morf3D

13:30 PM
REGULAR **Financial Analysis of Additive Manufacturing in the Department of Defense: Governing and Heuristic Equations**
[Stephen Kuhn-Hendricks](#)¹; Ernesto Ureta¹; William Peterson¹; Timothy Vorakoumane¹; ¹NAVSUP Weapon Systems Support (NAVSUP WSS) - Navy Price Fighters

13:50 PM
INVITED **Is the Notion of Sustainably Going to Cost My Organization More Money with Additive Manufacturing?**
[Greg Kline](#)¹; Eric Bono¹; ¹6K Additive

14:20 PM
REGULAR **Decarbonization: A Framework to Assess Sustainability of Additive Manufacturing on the Supply Chain**
[Jie Lun Tan](#)¹; [Joshua Padeti](#)²; Aditya Bose²; ¹ShipParts.com; ²American Bureau of Shipping (ABS)

14:40 PM
REGULAR **Life Cycle Assessment for Laser Powder Bed Fusion**
[Jasmin Saewe](#)¹; [Simon Vervoort](#)¹; Christian Weiß¹; Daniel Heußen¹; ¹Fraunhofer Institute for Laser Technology ILT

15:00 PM **BREAK**

15:30 PM
REGULAR **Comparative Life Cycle Environmental Assessment of Aluminium, Titanium and Steel Components Manufactured by Wire Arc Additive Manufacturing**
[Filomeno Martina](#)¹; Emanuele Pagone²; ¹WAAM3D; ²Cranfield University

15:50 PM
REGULAR **Decoupling Resolution and Throughput: How to Achieve Faster Build Rates through Large Area LPBF**
[James DeMuth](#)¹; ¹Seurat

16:10 PM
REGULAR **Recyclability of Metal Powder in Direct Energy Deposition: A Case of Manufacturing Multi Material Rocket Nozzle**
[Jongwon Lim](#)¹; Jihyun Jang¹; Seokjin Shin¹; ¹InssTek

16:30 PM **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

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ROBOTICS, AUTOMATION AND ADDITIVE MANUFACTURING

CO-ORGANIZERS:

Mike Bearman

Vecna Robotics,
USA

Joseph Falco

NIST, USA

Philip L. Freeman

Boeing, USA

Adam Norton

University of Massachusetts
Lowell, USA

Aaron Prather

ASTM International, USA

2ND NOV 2022 (WED)

OSPREY (LEVEL 2)

2ND NOVEMBER 2022

SESSION CHAIRS (PM SESSION):

Mike Bearman, Vecna Robotics

Joseph Falco, NIST

13:30 PM
INVITED **Industrialization of AM through Digitalization**
[Tim Bell](#)¹; ¹Siemens Digital Industries

14:00 PM
INVITED **Improving Additive Manufacturing with Robots and Artificial Intelligence**
[Satyandra K. Gupta](#)¹; ¹University of Southern California

14:30 PM
REGULAR **The Journey to Serial Production – Automation as Key Success Factor for Increasing Productivity and Safety**
[Mario Schafnitzel](#)¹; Oliver Elbert¹; Frédéric Erben¹; ¹Grenzbach Maschinenbau

14:50 PM
INVITED **Influence of Automation and Digitization on OEE KPIs of Additive Manufacturing Production Facilities**
[Marius Lakomic](#)¹; ¹EOS

15:20 PM **BREAK**

15:30 PM
REGULAR **Developing Processes for Integrating Hybrid Advanced Manufacturing Equipment for Streamlining the Production of DoD Commodity Items**
[Matthew Brauer](#)¹; Hayley Katz¹; David Sabanosh¹; Tim Swaszek²; James Zunino¹; ¹U.S. Army Combat Capabilities Development Command - Armaments Center; ²AURA

15:50 PM
INVITED **Quality and Energy Efficiency in Robotic Additive Manufacturing: From Single to Multi-Robot Systems**
[Azadeh Haghighi](#)¹; ¹University of Illinois Chicago

16:20 PM
REGULAR **Laser Line Scanner Benchmarking and Automation of Laser Scanning**
[Bhupesh Verma](#)¹; [Carsten Putz](#)¹; Jan Bremer²; Stefan Reich¹; Johannes Henrich Schleifenbaum¹; ¹RWTH Aachen University - Digital Additive Production DAP; ²BCT Steuerungs- und DV-SystemeS

16:40 PM
REGULAR **Mechanical Evaluation of Topology- and Toolpath-Optimized Composite Structures Manufactured via Multi-Axis Material Extrusion**
[Joseph R. Kubalak](#)¹; Christopher B. Williams¹; ¹Virginia Tech - DREAMS Lab

17:00 PM
INVITED **Closed-Loop Additive Manufacturing (AM) with Automated Metrology**
[Mingu Kang](#)¹; ¹ARIS Technology

17:30 PM **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



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NON-DESTRUCTIVE EVALUATION METHODS FOR AM

CO-ORGANIZERS:

Alphons Antonysamy

GKN Aerospace, UK

Anton Du Plessis

Stellenbosch University,

South Africa / Object

Research Systems, Canada

Ben Dutton

The MTC, UK

Patrick Howard

GE Aviation, USA

3RD NOV 2022 – 4TH NOV 2022 (THU-FRI)

GRIFFIN A (LEVEL 1)

3RD NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Patrick Howard, GE Aviation

SESSION CHAIRS (PM SESSION):

Anton Du Plessis, Stellenbosch University / Object

Research Systems

Ben Dutton, The MTC

08:00 AM
INVITED 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)

08:30 AM
INVITED Enabling CT for AM: ASTM E07.01 – Overview of Subcommittee on Radiology (X and Gamma) Method
[Cliff Bueno](#)¹; [Trey Gordon](#)²; ¹Blue Origin; ²PNW Digital X-Ray Consulting

09:00 AM
REGULAR Quality in Additive Manufacturing – Challenges, Opportunities and Progressions for NDE
[Wilson Vesga Rivera](#)¹; [Ben Dutton](#)¹; ¹The Manufacturing Technology Centre (MTC)

09:20 AM
INVITED Novel Approaches for Quality Control and Strength Estimation of AM Fatigue Properties
[Simone Romano](#)¹; ¹Avio Aero

09:50 AM **BREAK**

10:30 AM
REGULAR Evaluation of the Influence of Additive Manufacturing Process Parameters on Parts' Porosity using X-Ray Computed Tomography
[Shengkai Yu](#)¹; Huiyuan Qu¹; Shihua Wang¹; ¹A*STAR - National Metrology Centre (NMC)

10:50 AM
REGULAR X-Ray Computed Tomography of Directed Energy Deposition Builds: New Mathematical Techniques to Analyze 3D Pore Morphology
[Orion L. Kafka](#)¹; Jian Cao²; Edward Garboczi¹; Samantha Webster²; Newell Moser¹; ¹NIST; ²Northwestern University

11:10 AM
INVITED Developing X-Ray Computed Tomography Phantom and Data with Controlled Flaws
[Felix H. Kim](#)¹; Edward J. Garboczi¹; Nikolai N. Klimov¹; Adam L. Pinter¹; Sarah M. Robinson¹; John Henry J. Scott¹; ¹NIST

11:40 AM
REGULAR Probability of Detection and Validation of X-Ray Computed Tomography of Additively Manufactured Ti-6Al-4V and AF-9628 Alloys
[Griffin Jones](#)¹; Rachel Reed²; Veeraraghavan Sundar²; Jayme Keist¹; ¹Pennsylvania State University - Applied Research Laboratory (PSU - ARL); ²UES

12:00 PM **LUNCH**

13:30 PM
REGULAR Inspection Simulation to Enhance the Reliability and Validity of Automated X-Ray Data Analysis
[Robert A. Culver](#)¹; [Ben Dutton](#)¹; ¹The Manufacturing Technology Centre (MTC)

13:50 PM
INVITED Quality and NDE in Metal Powder Bed Fusion
[Martin White](#)¹; Paul Bates¹; Shane Collins¹; Steve James²; Youping Gao²; ¹ASTM International; ²Castheon

14:20 PM
REGULAR Approaches for Assessing the Capability of X-Ray Computed Tomography for Anomaly Detection in Additive Manufacturing
[Anjali Singhal](#)¹; Patrick Howard¹; ¹GE Aviation

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
EXCELLENCE
Research to Standards

14:40 PM
REGULAR **Measuring the Fidelity of Additively Manufactured Parts: X-Ray Tomography and the Principal Axes of Inertia**
[Edward Garboczi](#)¹; Hajar Afarani²; Joseph Biernacki²; Ebrahim Esfahani²; Newell Moser¹; ¹NIST; ²Tennessee Technological University

15:00 PM **BREAK**

15:30 PM
INVITED **X-Ray Based Inspection Routines for Additively Manufactured Parts**
[Nils Achilles](#)¹; ¹YXLON

16:00 PM
REGULAR **Considerations for Inspection of Additively-Manufactured Parts with Ultrasonic Testing (UT) and the Total Focusing Method (TFM)**
[George D. Connolly](#)¹; John P. Shingledecker¹; Anand Kulkarni²; Alex Bridges¹; Jeffrey L. Crandall³; ¹Electric Power Research Institute (EPRI); ²Siemens Energy; ³Connecticut Center for Advanced Technology (CCAT)

16:20 PM
INVITED **NDT for Emerging New Applications**
[Ben Dutton](#)¹; Wilson Vesga¹; Sandra Cabeza²; Ranggi Ramadhan²; Julian Wright³; ¹The Manufacturing Technology Centre (MTC); ²Institut Laue-Langevin (ILL); ³Theta Technologies

16:50 PM **END OF DAY**

4TH NOVEMBER 2022

SESSION CHAIRS (AM SESSION):

Anton Du Plessis, Stellenbosch University / Object Research Systems
Patrick Howard, GE Aviation

SESSION CHAIR (PM SESSION):

Ben Dutton, The MTC

08:00 AM
INVITED **Process Compensated Resonance Testing for Reduction of Mechanical Testing Burden in AM Process Qualification, Monitoring and Control**
[Eric Biedermann](#)¹; Julianne Heffernan¹; Ira Widmayer²; Niklas Höhn¹; Martin Bach²; Leanne Jauriqui¹; Thomas Köhler¹; ¹Vibrant; ²Airbus Helicopters

08:30 AM
REGULAR **CT Based Geometrical Analysis of Process Induced Defects in Thin Lattice Struts**
[Philipp Sugg](#)¹; Philip Sperling¹; Frederik Coppens²; Moritz Ellenberger³; Guillaume Meyer³; Christian Mittelstedt³; Damiano Pasini⁴; ¹Volume Graphics; ²TESCAN XRE; ³Technical University of Darmstadt; ⁴McGill University

08:50 AM
REGULAR **Automated Laser Ultrasonic Phased Arrays for the Rapid Defect Detection within As-Deposited AM Components**
[Don M. Pieris](#)¹; Geo Davis¹; Peter Lukacs¹; Panagiotis Kamintzis¹; Theodosia Stratoudaki¹; Charles N. MacLeod¹; Stephen G. ssPierce¹; Adam T. Clare²; Stewart Williams³; ¹University of Strathclyde; ²University of Nottingham; ³Cranfield University

09:10 AM
INVITED **In-Situ Monitoring for Additive Manufacturing: Towards Qualify-as-you-Build**
[Paul Hooper](#)¹; ¹Imperial College London

09:40 AM
REGULAR **Towards Building and Inspecting Larger AM Parts In Situ via Hybrid Manufacturing**
[Jason B. Jones](#)¹; ¹Hybrid Manufacturing Technologies

10:00 AM **BREAK**

10:30 AM
INVITED **Use of a Modified IQI Standard – A Way Forward in NDI of Metallic AM Parts?**
[Josef Spachtholz](#)¹; [Andreas Fischersworring-Bunk](#)¹; Stefan Neuhäusler¹; Josef Spachtholz¹; ¹MTU Aero Engines

11:00 AM
INVITED **Resonance-Based Acoustic/Ultrasonic Testing for AM Quality Control**
[Parisa Shokouhi](#)¹; ¹Pennsylvania State University

11:30 AM
INVITED **Inconel 625 L-PBF Part Categorization by Process Parameters using Resonant Ultrasound Spectroscopy**
[Anne-Françoise Obaton](#)¹; Gregory Weaver²; Lucas Fournet-Fayard¹; Charles Cayron¹; Florian Montagner³; Olivier Burnet⁴; Alex Van den Bossche⁴; ¹Laboratoire National de Métrologie et d'Essais (LNE); ²WeaverNDT; ³Baker Hughes Digital Solutions; ⁴GrindoSonic

12:00 PM **LUNCH**

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ICAM 2022 PROGRAM AGENDA

Updated as of 28th October 2022



CENTER of
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Research to Standards

- 13:30 PM**
INVITED **Additive Manufactured Metals:
Execution of Non-Destructive Testing
in Production**
Philip Riegler¹; ¹Norsk Titanium
- 14:00 PM**
INVITED **Application of In Situ X-Ray Imaging
of Metal Powders, Powder Bed Fusion
Process, and its Manufactured
Components**
Chu Lun Alex Leung¹; Yuze Huang¹;
Samuel J. Clark²; David Rees¹; Samy
Hocine¹; Sebastian Marussi¹; Marta
Majkut³; Alexander Rack³; Peter D. Lee¹;
¹University College London (UCL);
²Argonne National Laboratory (ANL);
³European Synchrotron Radiation
Facility (ESRF)
- 14:30 PM**
INVITED **Developments of In-Process NDE
Techniques for Wire + Arc Additive
Manufacture at University of
Strathclyde**
Stephen G. Pierce¹; Charles N.
MacLeod¹; Ehsan Mohseni¹; Randika
Wathavana Vithanage¹; Theodosia
Stratoudaki¹; Yashar Javadi¹; Rastislav
Zimmermann¹; Euan Foster¹; Momchil
Vasilev¹; Charalampos Loukas¹; David
Lines¹; Peter Lukacs¹; Geo Davis¹; Don
Pieris¹; Panagiotis Kamintzis¹;
Muhammad Rizwan¹; Anthony
Gachagan¹; Stephen Fitzpatrick^{1,2};
Misael Pimentel Espirindio e Silva^{1,2};
Scott McKegney^{1,2}; Kenneth Burnham¹;
²; William Kerr^{1,2}; ¹University of
Strathclyde; ²National Manufacturing
Institute Scotland (NMIS)
- 15:00 PM**
INVITED **In-Process Monitoring and
Nondestructive Testing of AM:
Lessons Learned from ASTM
WK73289**
Brandon M. Lane¹; Surendra Singh²;
Darren P. Beckett³; Lars Jacquemetton³;
Scott Gold⁴; Erin L. Lanigan⁵; Steve
James⁶; Abdalla R. Nassar⁷; ¹NIST;
²Honeywell; ³Sigma Additive Solutions;
⁴GE Aviation; ⁵NASA - Marshall Space
Flight Center (MSFC); ⁶Castheon; ⁷John
Deere
- 15:30 PM** **END OF DAY**

Note: This agenda features a list of accepted presenters for ICAM 2022 and their presentation timeslots. The order of presentation for each symposium is also as per the order reflected on the agenda. Please contact us at icam@astm.org if you need more information.

ICAM 2022 PROGRAM AGENDA

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MICROSTRUCTURAL ASPECTS OF AM

CO-ORGANIZERS:

Jonathan Pegues
Sandia National
Laboratories, USA
Shuai Shao
Auburn University,
USA

Swee Leong Sing
National University of
Singapore (NUS), Singapore
Chantal Sudbrack
National Energy Technology
Laboratory (NETL), USA

3RD NOV 2022 – 4TH NOV 2022 (THU-FRI)
GRIFFIN B (LEVEL 1)

3RD NOVEMBER 2022

SESSION CHAIRS (AM SESSION):

Jonathan Pegues, Sandia National Laboratories
Shuai Shao, Auburn University

SESSION CHAIRS (PM SESSION):

Swee Leong Sing, NUS
Chantal Sudbrack, NETL

08:00 AM
INVITED

In-Situ Microstructural Characterization of Additively Manufactured Lattice Structures
[Donald W. Brown](#)¹; Nathan S. Johnson²; Maria Strantz³; Jenny Wang³; Manyibo Matthews³; Jun-Sang Park⁴; Peter Kenesei⁴; ¹Los Alamos National Laboratory (LANL); ²SLAC National Accelerator Laboratory; ³Lawrence Livermore National Laboratory (LLNL); ⁴Argonne National Laboratory (ANL)

08:30 AM
INVITED

Advanced Materials and Manufacturing Development for Heat Exchanger Applications: Microstructural Comparison of Solid State and Liquid State Additive Manufacturing
[Isabella J. van Rooyen](#)¹; Saumyadeep Jana¹; Luis Nunez²; ¹Pacific Northwest National Laboratory (PNNL); ²Idaho National Laboratory

09:00 AM
INVITED

Crystallographic Texture of DED AM Ti64 Revealed by Large-Area Quantitative Polarized-Light Microscopy
[Brian G. Hoover](#)¹; Jonathan W. Pegues²; Cesar H. Ornelas-Rascon¹; Andrew B. Kustas²; ¹Advanced Optical Technologies (AOT); ²Sandia National Laboratories

09:30 AM
INVITED

2D & 3D In-Situ Characterization of Metal AM Microstructure using SEM and X-Ray Diffraction Contrast Tomography
[Pradeep Bhattad](#)¹; Curtis Frederick¹; ¹ZEISS

10:00 AM

BREAK

10:30 AM
REGULAR

Melt Pool Analysis on PBF-LB/M Produced Stepped Samples Dependent on the Exposure Order
[Lisa Kersting](#)¹; Johannes Henrich Schleifenbaum²; Adrian Jacob³; ¹Siemens Energy; ²RWTH Aachen University - Digital Additive Production DAP; ³Technische Universität Berlin

10:50 AM
REGULAR

Microstructure of Extra Fine Feature Copper Alloy Parts Additively Manufactured through a High-Resolution Laser Powder Bed Fusion System
[Jason Jyi Sheuan Ten](#)¹; Junwei Tan¹; Fern Lan Ng¹; Hang Li Seet¹; Mui Ling Sharon Nai¹; ¹A*STAR - Singapore Institute of Manufacturing Technology (SIMTech)

11:10 AM
INVITED

Micromechanical Modeling of Porosity Defects in Additively Manufactured Alloys
[Krzysztof Stopka](#)¹; Michael D. Sangid¹; ¹Purdue University

11:40 AM
INVITED

Simulating Additive Manufacturing with SPPARKS – Process Modeling for Realistic 3D Microstructures
[Theron M. Rodgers](#)¹; Fadi Abdeljawad²; Joseph E. Bishop¹; Judith A. Brown¹; Kyle Johnson¹; Hojun Lim¹; Jonathan D. Madison¹; John A. Mitchell¹; Daniel Moser¹; Veena Tikare¹; Jeremy Trageser¹; ¹Sandia National Laboratories; ²Clemson University

12:10 PM

LUNCH

13:30 PM
INVITED

Microstructural Control of Functional Structural Materials through Innovations in Additive Manufacturing
[Changquan Lai](#)¹; ¹Nanyang Technological University (NTU)

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ICAM 2022 PROGRAM AGENDA

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- 14:00 PM**
INVITED **Materials-by-Design Approach for Steels Tailored Towards Additive Manufacturing**
[Amit Behera](#)¹; Greg Olson¹; Abhinav Saboo¹; ¹QuesTek
- 14:30 PM**
INVITED **Leveraging Microstructure-Informed Design to Mitigate Manufacturing Risk**
[Amberlee Haselhuhn](#)¹; David Hicks¹; ¹LIFT
- 15:00 PM** **BREAK**
- 15:30 PM**
INVITED **Development of Advanced 3D Printed Light Metal Structural Materials Assisted by AI/MGI**
[Che-Nan Kuo](#)¹; ¹National Sun Yat-sen University
- 16:00 PM**
INVITED **Initial Microstructure-Property Evaluation of Additively Manufactured IN625 for IGT Combustor Applications**
[Chantal K. Sudbrack](#)¹; Kyle Rozman²; Kristin Tippey²; Rui Feng²; Martin Detrouis¹; Lucas Teeter²; Omer Dogan¹; ¹National Energy Technology Laboratory (NETL); ²NETL Support Contractor
- 16:30 PM** **END OF DAY**

4TH NOVEMBER 2022

SESSION CHAIRS (AM SESSION):
Jonathan Pegues, Sandia National Laboratories
Shuai Shao, Auburn University

SESSION CHAIRS (PM SESSION):
Swee Leong Sing, NUS
Chantal Sudbrack, NETL

- 08:00 AM**
INVITED **Machine-to-Machine and Parameter Effects on Tensile Properties of 316L Stainless Steel Produced using Laser Powder Bed Fusion**
[Joy Gockel](#)¹; Simon Richardsen¹; Garrison Hommer¹; Jorge Ramirez¹; Steve Midson¹; Craig Brice¹; ¹Colorado School of Mines
- 08:30 AM**
INVITED **Revealing the Influence of Microstructure and Morphology on the Mechanical Behavior of Thin Wall Laser Powder Bed Fusion Structures**
[Dhruv Bhate](#)¹; Paul Paradise¹; Tyler D. Smith¹; ¹Arizona State University

- 09:00 AM**
INVITED **Experimental and Computational Characterization of the Effect of Process Parameters on Strength and Porosity of AISi10Mg by L-PBF**
[Rashid Miraj](#)¹; Vasyi Harik¹; Qixiang Luo²; Mallikharjun Marrey¹; Timothy Simpson²; Allison Beese²; Frank Abdi¹; ¹AlphaSTAR; ²Pennsylvania State University
- 09:30 AM**
REGULAR **Effect of Heat Treatment on Micro-Machinability of Laser Powder Bed Fused AISi10Mg**
[Basil Kuriachen](#)¹; Jino Joshy¹; Mohit Godara¹; Jose Mathew¹; ¹National Institute of Technology Calicut
- 09:50 AM**
REGULAR **Microstructural Studies of Heat-Treated Alloy 625 Fabricated by Laser Powder Bed Fusion**
[Karen T. Henry](#)¹; Steven A. Attanasio¹; Stephen M. Sabol¹; John A. Sutliff¹; Robert A. Morris¹; ¹Naval Nuclear Laboratory (NNL)
- 10:10 AM** **BREAK**
- 10:30 AM**
INVITED **Laser Additive Manufacturing of Fe-Co and Fe-Si Soft Magnetic Alloys**
[Andrew Kustas](#)¹; Erin Barrick¹; Jonathan Pegues¹; Mark Wilson¹; Kyle Johnson¹; Eric Theisen²; Frank DelRio¹; Todd Monson¹; Don Susan¹; ¹Sandia National Laboratories; ²Metglas

11:00 AM
INVITED **Combined Effect of Defects and Stress State on Fracture of Additively Manufactured Metals**
[Allison M. Beese](#)¹; ¹Pennsylvania State University

11:30 AM
INVITED **Chemistry-Processing-Microstructure Relationships in Materials for Advanced Manufacturing**
[Eric A. Lass](#)¹; ¹University of Tennessee, Knoxville

12:00 PM **LUNCH**

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ICAM 2022 PROGRAM AGENDA

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Research to Standards

13:30 PM
INVITED **In-Situ Formation of Titanium Metal Matrix Composites Exploiting Invariant Reactions by Laser Powder Bed Fusion**

[William R. Hixson](#)¹; James A. Coakley¹; Dieter Isheim²; Jonathan D. Poplawsky³; Howard J. Stone⁴;
¹University of Miami; ²Northwestern University; ³Oak Ridge National Laboratory (ORNL); ⁴University of Cambridge

14:00 PM
REGULAR **Microtextured Composites of Additively Manufactured Molybdenum**

[Christopher Ledford](#)¹; Patxi Fernandez-Zelaia¹; Seokpum Kim¹; Quinn Campbell¹; Julio Ortega Rojas¹; Andres M. Rossy¹; Michael Kirka¹;
¹Oak Ridge National Laboratory (ORNL)

14:20 PM
REGULAR **Additive Manufacturing of 2000 Series Aluminum Alloys: Crack Mitigation, Microstructure and Mechanical Properties**

[Graham Matheson](#)^{1,2}; Alper Evirgen¹;
¹Oerlikon AM; ²Technical University of Munich

14:40 PM
INVITED **Microstructure and Properties of Additively Manufactured High Temperature Metals**

[Patxi Fernandez-Zelaia](#)¹; Christopher Ledford¹; Michael Kirka¹; ¹Oak Ridge National Laboratory (ORNL)

15:10 PM **END OF DAY**

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ICAM 2022 PROGRAM AGENDA

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AM FOR SPACE APPLICATIONS

CO-ORGANIZERS:

Faith Oehlerking
Beehive3D, USA
Rick Russell
NASA, USA

Kiley Versluys
Relativity Space, USA
John Vickers
NASA, USA

3RD NOV 2022 (THU)
GRIFFIN C (LEVEL 1)

3RD NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Rick Russell, NASA

SESSION CHAIR (PM SESSION):

Faith Oehlerking, Beehive3D

- 08:00 AM**
INVITED **Additive Manufacturing: Moving Beyond Parts to Production Systems for Space Applications**
[Behrang Poorganji](#)¹; Ivan Madera¹;
¹Morf3D
- 08:30 AM**
INVITED **Having a Come-Apart: Lessons Learned from Additively Manufactured Hardware Failures**
[Paul R. Gradl](#)¹; Gabriel Demeneghi¹; David Ellis²; Colton Katsarelis¹; Alison Park³; William G. Tilson¹; Brian West¹; Benjamin B. Williams¹; ¹NASA - Marshall Space Flight Center (MSFC); ²NASA - Glenn Research Center; ³NASA Engineering and Safety Center (NESC)
- 09:00 AM**
INVITED **Combining Laser Metal Fusion with Laser Metal Deposition to Open the Door to Space**
[Eliana Fu](#)¹; Adam Simons¹; Zeke Sudbury¹; ¹TRUMPF
- 09:30 AM**
INVITED **A Trial in Additive Manufacturing Certification for Human Space Flight, RS-25 POGO**
[Alan Fung](#)¹; Dan Matejczyk¹; Bryan Webb¹; ¹Aerojet Rocketdyne
- 10:00 AM** **BREAK**
- 10:30 AM**
INVITED **Indian AM Space Program – Design, Development, Qualification and Challenges**
[Ankit Sahu](#)¹; ¹Objectify Technologies

11:00 AM
REGULAR **Internal Channel Polishing and Controlled Orifice Geometry Modification via Chemical Polishing for Liquid Rocket Engine Fuel Injector Optimization**
[Justin Michaud](#)¹; [Agustin Diaz](#)¹; Patrick McFadden¹; Paul R. Gradl²; Thomas Teasley²; ¹REM Surface Engineering; ²NASA - Marshall Space Flight Center (MSFC)

11:20 AM
REGULAR **Material Properties and Manufacturing Feasibility of Cold Spray Additive Manufactured (CSAM) Launcher Propulsion System Components**
[Markus Brotsack](#)¹; Jan Kondas¹; Reeti Singh¹; Max Meinicke¹; Mario Guagliano²; Sara Bagherifard²; Ondrej Kovarik³; Jan Cizek⁴; ¹Impact Innovations; ²Politecnico di Milano; ³Czech Technical University in Prague; ⁴Institute of Plasma Physics of the Czech Academy of Sciences

11:40 AM
REGULAR **The Effect of Post-Processing on Tensile and Fatigue Behaviors of Additively Manufactured Haynes 282 Superalloy at Cryogenic and Elevated Temperatures**
[Seyed Reza Ghiaasiaan](#)¹; Paul R. Gradl²; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University; ²NASA - Marshall Space Flight Center (MSFC)

12:00 PM **LUNCH**

13:30 PM
INVITED **Additive Manufacturing for On Earth, In Orbit and On Planet Space Applications**
[Andrew Norman](#)¹; Thomas Rohr¹; Tommaso Ghidini¹; ¹European Space Agency

14:00 PM
INVITED **Challenges in Processing Alloy 718 using Cold Spray Additive Manufacturing**
[Philipp Kindermann](#)¹; Martin Wunderer¹; Ismail Ünsal¹; Christian Seidel^{1,2}; Georg Schlick¹; ¹Fraunhofer Institute for Casting, Composite and Processing Technology IGCV; ²HM Hochschule München University of Applied Sciences

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14:30 PM
INVITED **AM of Ceramics - Opportunities and Challenges**
[Alicia Carey](#)¹; [Brandon Kirkland](#)¹;
¹Redwire Space

15:00 PM **BREAK**

15:30 PM
REGULAR **Success of Nickel Alloys 939 and 282 in Space Applications**
[Scott Volk](#)¹; ¹Keselowski Advanced Manufacturing

15:50 PM
INVITED **Production vs Performance: Manufacturing Heritage Designs with A.M.**
[Tim Berry](#)¹; ¹Launcher

16:20 PM
INVITED **Total Cost Factors Associated with L-PBF Manufacturing**
[Kiley Versluys](#)¹; ¹Relativity Space

16:50 AM
INVITED **Additive Manufacturing Probabilistic Methods for Aviation Applications**
[Martin White](#)¹; Alberto Bordin¹; Mahdi Jamshidinia¹; Mohsen Seifi¹; Kirstie Snodderly¹; ¹ASTM International

17:20 PM **END OF DAY**

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DESIGN, MODELING, AND SIMULATION METHODOLOGIES AND CONCEPTS FOR AM

CO-ORGANIZERS:

Eujin Pei

Brunel University
London, UK

David Rosen

Georgia Institute of
Technology, USA

Albert To

University of
Pittsburgh, USA

Andrew Triantaphyllou

The MTC, UK

**3RD NOV 2022 – 4TH NOV 2022 (THU-FRI)
CYPRESS (LEVEL 1)**

3RD NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Andrew Triantaphyllou, The MTC

SESSION CHAIR (PM SESSION):

David Rosen, Georgia Institute of Technology

**08:00 AM
INVITED**

The Support of Bio-Inspired Multi-Functional and Multi-Scale Design through Function-Based Heterogeneous Lattice Modeling Approach

[Yaoyao Fiona Zhao](#)¹; Nikita Letov¹; Pavan Velivela¹; ¹McGill University - Additive Design and Manufacturing Laboratory (ADML)

**08:30 AM
REGULAR**

Application of Multi-Scale Mesh-Refinement in Abaqus for Increased Efficiency of Metallic Additive Manufacturing Process Simulations

[Johnathan Tran](#)¹; Elliot Haag¹; David Najera¹; Marc Russell¹; ¹ATA Engineering

**08:50 AM
REGULAR**

Bio-Inspired Design of Architected Materials

[Alexander Grishin](#)¹; [Dhrub Bhate](#)²; Yash Mistry²; Swapnil Morankar³; Athul Rajeev²; Grace Cope⁴; Alexander Potts²; Clint Penick⁴; Nikhilesh Chawla³; ¹Phoenix Analysis & Design Technologies (PADT); ²Arizona State University; ³Purdue University; ⁴Kennesaw State University

**09:10 AM
REGULAR**

Design for Additive Manufacturing of Fiber-Reinforced Polymer Composites: Review and Status

[David W. Rosen](#)¹; [Janet Wong](#)¹; [Abdulmajeed Altassan](#)¹; ¹Georgia Institute of Technology

**09:30 AM
INVITED**

The Impact of Multi-Axis Continuous Fiber AM on the Design Process

[Ian Campbell](#)¹; ¹Wohlers Associates

**10:00 AM
BREAK**

**10:30 AM
REGULAR**

Digital Foam: The Padding Revolution

[Jon Walker](#)¹; ¹EOS North America

**10:50 AM
REGULAR**

How the Full Digital Thread Improves the Value and Validity of Additive Manufacturing

[Chris Robinson](#)¹; ¹Ansys

**11:10 AM
REGULAR**

A Novel Multi-Spatial-Temporal Resolution Concurrent FE Model for Melt Pool and Residual Stress Prediction in Laser Power Bed Fusing Additive Manufacturing

[Jiahao Cheng](#)¹; Xiaohua Hu¹; Yang Huo²; Mei Li²; Xin Sun¹; ¹Oak Ridge National Laboratory (ORNL); ²Ford Motor Company

**11:30 AM
INVITED**

Multi-Scale Modeling of Thermal/Residual Stress in Additive Manufacturing Across Grain-, Track- and Part-Scales

[Wentao Yan](#)¹; Fan Chen¹; Daijun Hu¹; ¹National University of Singapore (NUS)

**12:00 PM
LUNCH**

**13:30 PM
REGULAR**

A Residual Stress Investigation of Large-Scale Additively Manufactured Parts: Process Modeling and Validation

[George Scarlat](#)¹; Kyle Warren¹; Robert Grout¹; ¹University of Maine - Advanced Structures and Composites Center

**13:50 PM
REGULAR**

Numerical Quantification of DED Closed-Loop Melt Pool Temperature Control on Thermal History and Residual Stresses of Thin-Wall Structures

[Zoé Jardon](#)¹; Jorge Sanchez Medina¹; Julien Ertveldt¹; Patrick Guillaume¹; Lincy Pyl¹; ¹Vrije Universiteit Brussel

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14:10 PM
REGULAR **An Extended Goldak Heat Source Model for FE Simulation of Both Conduction Mode and Keyhole Model Melt Pool in Laser Powder Bed Fusion Additive Manufacturing**
[Jiahao Cheng](#)¹; Patxi Fernandez-Zelaia¹; Xiaohua Hu¹; Yang Huo²; Mei Li²; Xin Sun¹; ¹Oak Ridge National Laboratory (ORNL); ²Ford Motor Company

14:30 PM
INVITED **Aluminum Heat Exchangers: A Case Study of Advancing Additive Manufacturing in a Skeptical Environment**
[Caleb Martin](#)¹; Roddy Rodriguez¹; ¹Northrop Grumman Mission Systems

15:00 PM **BREAK**

15:30 PM
INVITED **Accelerating Materials Design for Additive Manufacturing through Graded Alloy Deposition Techniques**
[Wei Xiong](#)¹; ¹University of Pittsburgh

16:00 PM
REGULAR **Overheating in Ti6Al4V Laser Powder Bed Fusion Components: Properties, Prediction and Prevention**
[Tim Koenis](#)¹; Emiel Amsterdam¹; Marc J. de Smit¹; Maria L. Montero-Sistiaga¹; ¹Royal NLR - Netherlands Aerospace Centre

16:20 PM
REGULAR **Structural Mechanical Simulation of Additively Manufactured Parts with Internal Defects Based on Computed Tomography Data**
[Philipp Sugg](#)¹; ¹Volume Graphics

16:40 PM
REGULAR **Computational Modeling and Identification of Nanoparticles Dispersion Mechanism in 316L Matrix Additively Manufactured By Hybrid Process of Ink Jetting and Laser Powder Bed Fusion**
[Somayeh Pasebani](#)¹; Milad Ghayoor¹; Omid Sadeghi¹; Bryce Cox¹; Joshua Gess¹; ¹Oregon State University

17:00 PM **END OF DAY**

4TH NOVEMBER 2022

SESSION CHAIR (PM SESSION):
Richard Huff, ASTM International

13:30 PM
REGULAR **Fatigue Crack Initiation Behavior of Laser Beam Powder Bed Fused IN718**
[Shuai Shao](#)¹; Nima Shamsaei¹; ¹Auburn University

13:50 PM
REGULAR **Fatigue and Fracture Control Plan for AM AISi10Mg Alloy**
[Rashid Miraj](#)¹; Amirhossein Eftekharian¹; Frank Abdi¹; ¹AlphaSTAR

14:10 PM
INVITED **Integrating Ceramic AM Piece Parts into Products: Weibull Mechanics**
[Kurtis R. Ford](#)¹; Dale Cillessen¹; Daniel Kammler¹; Elizabeth D. Smith¹; ¹Sandia National Laboratories

14:40 PM
REGULAR **Model-Based Quantification of Uncertainties in Metal Additive Manufacturing**
[Daniel Moser](#)¹; Michael Heiden¹; Scott Jensen¹; Kyle Johnson¹; Mario Martinez¹; Theron M. Rodgers¹; Michael Stender¹; ¹Sandia National Laboratories

15:00 PM **BREAK**

15:30 PM
REGULAR **Assessment of Residual Stresses in Cold Spray Additive Manufacturing: Experiments and Thermo-Mechanical Modeling with Geometry Evolution**
[Chaitanya Vundru](#)¹; Chaitanya Vundru¹; Sinan Muftu¹; Sohayb Batwa¹; Samuel Boese¹; Ozan C. Ozdemir¹; Enqiang Lin²; ¹Northeastern University; ²VulcanForms

15:50 PM
REGULAR **Simulation of Wire Arc Additive Manufacturing in the Reinforcement of a Half-Cylinder Shell Geometry**
[Xiao Fan Zhao](#)¹; Avelino Zapata¹; Michael F. Záh¹; ¹Technical University of Munich - Institute for Machine Tools and Industrial Management (TUM - iwb)

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ICAM 2022 PROGRAM AGENDA

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CENTER of
EXCELLENCE
Research to Standards

16:10 PM **Comparison of Methods of**
REGULAR **Modeling Additive Manufacturing**
 with ABAQUS and Sierra
 Elton L. Freeman¹; Ivan P. Beckman¹;
 Guillermo A. Riveros¹; Matthew
 Ireland²; Tomas Mondragon¹; Daniel
 Mosser³; Christine M. Lozano¹; James
 T. Stinson¹; ¹U.S. Army Engineer
 Research and Development Center
 (ERDC); ²University of Maine; ³Sandia
 National Laboratories

16:30 PM **END OF DAY**

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Research to Standards

PROCESS CONTROL AND IN-SITU MONITORING TECHNIQUES IN AM

CO-ORGANIZERS:

Darren Beckett **Abdalla Nassar**
Sigma Additive John Deere, USA
Solutions, USA **Tuan Tran**
Ajay Krishnan Nanyang Technological
EWI, USA University (NTU), Singapore

3RD NOV 2022 – 4TH NOV 2022 (THU-FRI)
DOGWOOD (LEVEL 1)

3RD NOVEMBER 2022

SESSION CHAIR (AM + PM SESSION):
Darren Beckett, Sigma Additive Solutions

08:00 AM **The In-Situ Project: Correlating In-**
INVITED **Situ Monitoring Data and Non-**
 Destructive Evaluation (NDE)
 Methods to Characterize Defect
 Populations in Laser Powder Bed
 Fusion (L-PBF) Material
 Delphine Duquette¹; Erin L. Lanigan¹;
 James Mavo¹; Isabelle Sadowksi¹;
 ¹NASA

08:30 AM **A Closed-Loop Feedback Control**
REGULAR **System for In-Situ Defect**
 Monitoring and Correction in Laser
 Powder Bed Fusion Process
 Michael Sealy¹; Jingfu Liu²; Ziyu Liu²;
 Behrooz Jalalahmadi²; Michael
 Presley³; Michael Schwartz³; Tom
 Houle⁴; Ian Palmer⁵; Jason Fetty⁵;
 ¹Purdue University; ²Sentient
 Science; ³Johns Hopkins University -
 Applied Physics Laboratory (JHU -
 APL); ⁴Matsuura; ⁵U.S. Army Combat
 Capabilities Development Command -
 Aviation & Missile Center

08:50 AM **Machine Learning Based In-Situ**
INVITED **Sensor Evaluation and Defect**
 Detection for Laser Powder Bed
 Fusion
 Brian A. Fisher¹; Luke Scime²;
 Zackary Snow²; ¹Raytheon
 Technologies Research Center; ²Oak
 Ridge National Laboratory (ORNL)

09:20 AM **Automated Defect Detection and**
REGULAR **Validation for Laser Powder Bed**
 Additive Manufacturing
 Wentao Fu¹; Robert Grube¹; Asya
 Lou¹; ¹Boeing

09:40 AM **Monitoring and Prediction of**
REGULAR **Porosity in Laser Powder Bed**
 Fusion using Physics-Informed
 Meltpool Signatures and Machine
 Learning
 James Craig¹; Prahalada K. Rao²;
 Ziyad Smoqi²; Benjamin Bevans²;
 Aniruddha Gaikwad²; Alonso Peralta³;
 Alan Abul-Haj⁴; ¹Stratronics;
 ²University of Nebraska-Lincoln;
 ³Honeywell; ⁴ARA Engineering

10:00 AM **BREAK**

10:30 AM **Process Optimization in Metal**
INVITED **Additive Manufacturing using In-**
 Situ Diagnostics and Machine
 Learning
 Nicholas P. Calta¹; Manyalibo
 Matthews¹; Jean-Baptiste Forien¹;
 Gabriel M. Guss¹; ¹Lawrence
 Livermore National Laboratory (LLNL)

11:00 AM **Towards a Quality Continuum of**
INVITED **Monitoring and Analytics that**
 Enables AM Part Qualification
 Alex Benham¹; Darren P. Beckett¹;
 ¹Sigma Additive Solutions

11:30 AM **Process Monitoring for Pore**
REGULAR **Detection using In Situ X-Ray**
 Imaging and Pyrometry Signal
 Sanam Gorgannejad¹; Nicholas P.
 Calta¹; Jean-Baptiste Forien¹; Sen
 Liu²; Aiden Martin¹; Peiyu Quan²;
 Maria Strantz¹; Christopher J.
 Tassone²; Vivek Thampy²; Jenny
 Wang¹; ¹Lawrence Livermore
 National Laboratory (LLNL); ²SLAC
 National Accelerator Laboratory

11:50 AM **LUNCH**

13:30 PM **Two Approaches for Multi**
REGULAR **Measurand In-Situ Monitoring of**
 the L-PBF Process – Bicolor- and
 RGB-Optical Tomography
 Tina Becker¹; Simon J. Altenburg¹;
 Christian Metz²; Philipp P. Breese¹;
 Simon Oster¹; Christiane Maierhofer¹;
 ¹Bundesanstalt für Materialforschung
 und -prüfung (BAM); ²THETASCAN

13:50 PM **Effects of Process Byproducts on**
INVITED **In-Situ Thermography and Laser**
 Coupling Measurements of a LPBF
 Process
 David Deisenroth¹; ¹NIST

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Research to Standards

14:20 PM
REGULAR **A New Instrument for In-Situ X-Ray Characterization for Inoculation Treatment of Laser Additive Manufacturing**
[Peiyu Quan](#)¹; [Sen Liu](#)¹; [Vivek Thampy](#)¹; [Christopher J. Tassone](#)¹;
¹SLAC National Accelerator Laboratory

15:20 PM **END OF DAY**

14:40 PM
REGULAR **Track-by-Track Shape Evolution of Cold Spray Deposits**
[Scott E. Julien](#)¹; [Nathaniel Hanson](#)¹; [Joseph Lynch](#)¹; [Ozan C. Ozdemir](#)¹; [Taskin Padir](#)¹; [Sinan Muftu](#)¹;
¹Northeastern University

15:00 PM **END OF DAY**

4TH NOVEMBER 2022

SESSION CHAIR (PM SESSION):
[Ajay Krishnan](#), [EWI](#)

13:30 PM
INVITED **Microstructure Homogenization in LPBF Builds via Feed-Forward Process Control of Thermal History**
[Ajay V. Krishnan](#)¹; [Alex R. Riensche](#)²; [Benjamin Bevans](#)²; [Pralhada K. Rao](#)²; ¹EWI; ²University of Nebraska-Lincoln

14:00 PM
REGULAR **Spatter Characterization and Control in Metal LPBF**
[David Maass](#)¹; ¹Flightware

14:20 PM
REGULAR **In-Situ X-Ray Characterization for Printable Aluminum Alloy Design**
[Sen Liu](#)¹; [Vivek Thampy](#)¹; [Peiyu Quan](#)¹; [Christopher J. Tassone](#)¹;
¹SLAC National Accelerator Laboratory

14:40 PM
REGULAR **X-Ray Monitoring to Detect Porosity in Directed Energy Deposition**
[Sarah J. Wolff](#)¹; ¹Texas A&M University

15:00 PM
REGULAR **Closed-Loop Control of Meltpool Temperature in Directed Energy Deposition**
[Pralhada K. Rao](#)¹; [Ziyad Smoqi](#)¹; [Benjamin Bevans](#)¹; [James Craig](#)²; [Aniruddha Gaikwad](#)¹; [Alan Abul-Haj](#)³; [Jeffrey E. Shield](#)¹; ¹University of Nebraska-Lincoln; ²Stratronics; ³ARA Engineering

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Research to Standards

ENVIRONMENTAL EFFECTS ON AM PARTS

CO-ORGANIZERS:

James Burns

University of Virginia, USA

Jiadong Gong

QuesTek, USA

Michael Melia

Sandia National

Laboratories, USA

3RD NOV 2022 (THU)
CARDINAL (LEVEL 2)

3RD NOVEMBER 2022

SESSION CHAIR (AM + PM SESSION):

James Burns, University of Virginia

08:00 AM
INVITED **Environmental Fracture and Fatigue in Additively Manufactured Ti-6Al-4V as a Function of Build Direction**

[Allison Akman](#)¹; Matthew McMahon¹; Eric Dau¹; Nicholas Pizzolato¹; Elissa Trueman¹; ¹Naval Surface Warfare Center (NSWC) - Carderock Division

08:30 AM
INVITED **Comparing the Environmental Cracking Behavior of Additively Manufactured and Wrought 316L Stainless Steel through a Matched Yield Strength Approach**

[James Burns](#)¹; Michael P. Roach¹; ¹University of Virginia

09:00 AM
INVITED **Hydrogen Trapping and Transport at Grain Boundaries and Dislocation Structures in Additively-Manufactured Stainless Steel 316L Evaluated via SIMS/EBSD**

[Kaila Bertsch](#)¹; Peter Weber¹; Shohini Sen-Britain¹; Thomas Voisin¹; Chris San Marchi²; Brandon Wood¹; ¹Lawrence Livermore National Laboratory (LLNL); ²Sandia National Laboratories

09:30 AM
INVITED **A Computational Framework for Probabilistic Quantification of Stress Corrosion Cracking and its Application to Metal Additive Manufacturing**

[Lei Chen](#)¹; Karnpiwat Tantratrian¹; ¹University of Michigan-Dearborn

10:00 AM **BREAK**

10:30 AM
INVITED

Feedstock Modification to Improve Corrosion Performance of 316L Stainless Steel Produced by Laser Powder Bed Fusion

[Rajeev K. Gupta](#)¹; Venkata Bhuvaneswari Vukkum¹; Ahmed A. Dariwsh¹; Jijo Christudasjustus¹; Steven Storck²; ¹North Carolina State University; ²Johns Hopkins University - Applied Physics Laboratory (JHU - APL)

11:00 AM
INVITED

Interstitial Oxygen Created via Laser Powder Bed Fusion

[Xiaolei Guo](#)¹; Gerald S. Frankel¹; Hsien-Lien Huang¹; Menglin Zhu¹; Karthikeyan Hariharan¹; Szu-Chia Chien¹; Ngan Huynh¹; Jinwoo Hwang¹; Wolfgang Windl¹; Christopher Taylor¹; Eric Schindelholz¹; ¹Ohio State University

11:30 AM
INVITED

High Strength Austenite for Additive Manufacturing

[Andreas Mohr](#)¹; Janosch Conrads¹; Horst Hill¹; Karlheinz Hoeren¹; ¹Deutsche Edelstahlwerke Specialty Steel

12:00 PM

LUNCH

13:30 PM
INVITED

Mechanisms of Selective Corrosion in Laser Powder Bed Fusion and Direct Energy Deposition 316L

[Robert G. Kelly](#)¹; Duane A. Macatangay¹; ¹University of Virginia

14:00 PM
REGULAR

Corrosion Behavior of 2507 Super Duplex Stainless Steel Produced by Additive Manufacturing Processes such as SLM and DED in Saline Environment

[Matthieu Dhondt](#)¹; Chloé Comas¹; Sébastien Ballésio^{1,2}; Fabien Szmytka²; Cédric Doudard¹; ¹ENSTA Bretagne; ²ENSTA Paris - Institut Polytechnique de Paris

14:20 PM
INVITED

Corrosion Performance Comparison of Additively Manufactured (AM) and Wrought Alloy 625 in Organic and In-Organic Acids

[Suresh Divi](#)¹; Adam Rowe¹; Matthew Sanders¹; ¹Stress Engineering Services

14:50 PM

END OF DAY

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SINTER-BASED AM TECHNOLOGIES

CO-ORGANIZERS:

Usama Attia
The MTC, UK
Animesh Bose
Desktop Metal, USA

Amy Elliot
ORNL, USA
Benoit Verquin
CETIM, France

3RD NOV 2022 (THU)
IBIS (LEVEL 2)

3RD NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Animesh Bose, Desktop Metal

SESSION CHAIR (PM SESSION):

Amy Elliot, ORNL

- 08:00 AM**
INVITED **Digital Additive Production with Metal Binder Jetting**
[Simon Hoeges](#)¹; ¹GKN Additive
- 08:30 AM**
INVITED **Recent Progress in Solvent Jetting on Granules 3D Printing**
[Efrain Carreño-Morelli](#)¹; Mikel Rodriguez-Arbaizar¹; ¹University of Applied Sciences and Arts Western Switzerland (HES-SO)
- 09:00 AM**
REGULAR **Printing and Consolidation Strategies for Niche-Materials in Binder Jet Additive Manufacturing**
[Amy A. Elliott](#)¹; ¹Oak Ridge National Laboratory (ORNL)
- 09:20 AM**
REGULAR **Process-Integrated Production of Functional Graded WC-Co Structures by Binder Jetting**
[Maja Lehmann](#)¹; Cara Kolb¹; Josef Gschlößl¹; Michael F. Zäh¹; ¹Technical University of Munich - Institute for Machine Tools and Industrial Management (TUM - iwmb)
- 09:40 AM**
REGULAR **Introducing a New Green Part Manufacturing Approach with Increased Repeatability and Robustness**
[Ben Arnold](#)¹; Ohad Dolev¹; ¹Tritone Technologies
- 10:00 AM** **BREAK**

- 10:30 AM**
INVITED **Tailored Binder in Binder Jetting for Tooling**
[Tomonori Saito](#)¹; Dustin Gilmer²; Sungjin Kim¹; Peeyush Nandwana¹; Amy A. Elliott¹; ¹Oak Ridge National Laboratory (ORNL); ²University of Tennessee, Knoxville
- 11:00 AM**
REGULAR **Supersolidus Liquid Phase Sintering of Binder Jet AM H13: Densification and Microstructure Evolution**
[Peeyush Nandwana](#)¹; Arun Devaraj²; Rangasayee Kannan¹; Jia Liu²; Tingkun Liu²; Dalong Zhang²; ¹Oak Ridge National Laboratory (ORNL); ²Pacific Northwest National Laboratory (PNNL)
- 11:20 AM**
REGULAR **Crossing the Manufacturing Chasm in Additive Manufacturing (AM)**
[Charles Bibas](#)¹; ¹Technica
- 11:40 AM**
REGULAR **Metal Binder Jet Printing – Where to Find Success**
[Eric Johnson](#)¹; ¹Eaton
- 12:00 PM** **LUNCH**
- 13:30 PM**
INVITED **As-Printed and Sintered Microstructure of Binder Jetted Structural and Functional Materials**
[Markus Chmielus](#)¹; ¹University of Pittsburgh
- 14:00 PM**
INVITED **Sintering Mechanisms and Microstructural Evolution in Binder Jetting Additive Manufacturing**
[Iñigo Iturriza](#)¹; Carmen Luno-Bilbao¹; Nerea Ordás¹; Beatriz Pérez¹; Shandra Sainz¹; Angela Veiga¹; ¹Ceit - Technology Center
- 14:30 PM**
INVITED **Material Parameter Development for Sintering Models of Binderjet Printed Materials**
[Paul Prichard](#)¹; Tyler Mealy¹; Zhuqing Wang¹; ¹Kennametal
- 15:00 PM** **BREAK**
- 15:30 PM**
REGULAR **Methodology to Determine Sintering Simulation Material Properties**
[Jeff Robertson](#)¹; ¹Hexagon Manufacturing Intelligence - Simufact

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15:50 PM
INVITED **Sintering Simulation and Distortion
Compensation of Metal AM Parts**
[Andrew Roberts](#)¹; Animesh Bose¹;
Artyom Djanikian¹; Christian Gomez¹;
¹Desktop Metal

16:20 PM
INVITED **Sinter Based Additive
Manufacturing of Copper via
Material Extrusion Process**
[Carrie Barber](#)¹; [Kameswara Pavan
Kumar Ajjarapu](#)²; Luke Malone²; Mark
Barr¹; Sundar Atre²; Kunal Kate²;
¹Kymera International; ²University of
Louisville

16:50 PM **END OF DAY**

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AM FEEDSTOCK: CHARACTERIZATION, SPECIFICATION AND REUSE

CO-ORGANIZERS:

Ben Ferrar

Carpenter Additive, USA

Edward Garboczi

NIST, USA

Steven Hall

The MTC, UK

Tony Thornton

Micromeritics, USA

Frank Venskytis

Consultant, USA

**3RD NOV 2022 – 4TH NOV 2022 (THU-FRI)
OSPNEY (LEVEL 2)**

3RD NOVEMBER 2022

SESSION CHAIRS (AM SESSION):

Edward Garboczi, NIST

Tony Thornton, Micromeritics

SESSION CHAIR (PM SESSION):

Steven Hall, The MTC

**08:00 AM
INVITED**

Comparing the Particle Size Distribution, Morphology, and Rheology of Several Metal Additive Manufacturing Powders

[Justin Whiting](#)^{1,2}; Vipin Tondare¹; Shawn Moylan¹; Edward Garboczi¹; Alkan Donmez¹; ¹NIST; ²Georgetown University

**08:30 AM
REGULAR**

Imaging Particle Analysis Advances for Laboratory and Online Applications in Additive Manufacturing

[Thomas Canty](#)¹; Matthew Spink¹; Ethan Schrod¹; ¹Canty

**08:50 AM
INVITED**

Cold Spray Additive Manufacturing: The Importance of Powder Feedstock Size and Shape

[Edward Garboczi](#)¹; Newell Moser¹; Shawn Moylan¹; Sinan Muftu²; Ozan C. Ozdemir²; ¹NIST; ²Northeastern University

**09:20 AM
REGULAR**

Evaluation of Triboelectric Charging of Additive Manufacturing Metal Powders

[Eileen Ross L. Espiritu](#)¹; Camila Gutiérrez¹; Kamran Azari²; José A. Muñiz Lerma²; Martin Conlon²; Mathieu Brochu¹; ¹McGill University; ²Equispheres

**09:40 AM
REGULAR**

Thermogravimetric Analysis of Ti-6Al-4V Powders in Different Gaseous Environments

[Nicholas A. Derimow](#)¹; Elisabeth Mansfield¹; Nikolas Hrabec¹; ¹NIST

**10:00 AM
BREAK**

**10:30 AM
INVITED**

A Round Robin on μ XCT Inspection of Metal Powders

[Roger Pelletier](#)¹; Philippe Émile²; Salah-Eddine Brika³; Mahdi Habibnejad⁴; ¹National Research Council Canada (NRC Canada); ²Airbus; ³École de technologie supérieure (ÉTS); ⁴GE Additive

**11:00 AM
REGULAR**

Rapid, High-Sensitivity Elemental Characterization of Feedstock Powders

[Jeffrey Williams](#)¹; Jonathan C. Putman¹; Ellen S. Williams¹; Peyton Willis¹; ¹Exum Instruments

**11:20 AM
REGULAR**

Multimaterial Fiber Spinning for Potential 3D Printing Applications

[Kenan Song](#)¹; Weiheng Xu¹; ¹Arizona State University

**11:40 AM
INVITED**

How the Rheology of Powder Affects its Spreadability?

[Filip Francqui](#)¹; Aurélien Neveu¹; Geoffroy Lumay²; Salvatore Pillitteri¹; ¹Granutools; ²University of Liège

**12:10 PM
LUNCH**

**13:30 PM
INVITED**

Comparing the Spreadability of Polymer and Metal Powders using Counter-Rotating Roller and Fixed Plate Recoater Geometry at Various Roller and Spreading Speeds

[Greg Martiska](#)¹; ¹Mercury Scientific

**14:00 PM
REGULAR**

An Equipment for Powder Bed Density Measurement

[Roger Pelletier](#)¹; Louis-Philippe Lefebvre¹; Nicolas Sauriol²; ¹National Research Council Canada (NRC Canada); ²Sautech

**14:20 PM
REGULAR**

Improving Material Conveyance of Pellet and Granulated Flake Feedstocks in Material Extrusion Additive Manufacturing

[Douglas M. Sassaman](#)¹; Helen Little²; Oliver L. Uitz¹; Carolyn Seepersad¹; Samantha Snabes²; Matthew Fiedler²; ¹University of Texas at Austin; ²re:3D

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14:40 PM
INVITED Novel Tool for Evaluating Powder Feedstock Suitability for AM Spreading Processes
[Tony Thornton](#)¹; [Jamie Clayton](#)²; [Amalia Thomas](#)²; ¹Micromeritics; ²Freeman Technology

15:10 PM **BREAK**

15:30 PM
INVITED From Requirements to Qualified Parts – Selecting the Right Powder for AM
[Amir Nobari](#)¹; ¹Tekna

16:00 PM
REGULAR Contamination Detection in Metal Powder Feedstock used in AM
[Aneta Chrostek-Mroz](#)¹; [Steven Hall](#)¹; ¹The Manufacturing Technology Centre (MTC)

16:20 PM
REGULAR Evaluating the Influence of Storage and Preparation on AM Feedstocks
[Tony Thornton](#)¹; [Yun Bai](#)²; [Animesh Bose](#)²; [Jamie Clayton](#)³; [Christopher Craven](#)²; [Michael A. Gibson](#)²; [Steve Hudelson](#)²; [John P. Reidy](#)²; [Gavin A. Winter](#)²; ¹Micromeritics; ²Desktop Metal; ³Freeman Technology

16:40 PM
INVITED Effect of Moisture on Additive Manufacturing Powder Feedstocks
[Louis-Philippe Lefebvre](#)¹; [Anatolie Timercan](#)¹; [Pelle Mellin](#)²; [Mylène Trublet](#)³; [Annika Talus](#)³; [Olivier Rigo](#)⁴; ¹National Research Council Canada (NRC Canada); ²Swerim; ³RISE KIMAB; ⁴Sirris

17:10 PM **END OF DAY**

14:20 PM
INVITED AM Powder from Re-Cycled Feedstocks; Maintaining Quality while Reducing Environmental Impact and Cost
[Xinjiang Hao](#)¹; [James L. Ashby](#)¹; ¹LIBERTY Powder Metals

14:50 PM
REGULAR Comprehensive Evaluation on the Impact of Aluminum Powder Properties on Feedstock Reusability in Laser Powder Bed Fusion Process
[José A. Muñoz-Lerma](#)¹; [Mathieu Brochu](#)²; [Evan Butler-Jones](#)¹; [Martin Conlon](#)¹; [Eileen Ross L. Espiritu](#)²; [Grant Nixon](#)³; [Justin Valenti](#)³; ¹Equispheres; ²McGill University; ³Mohawk College

15:10 PM
REGULAR A Framework for Powder Evaluation with Reuse in Laser Powder Bed Fusion Additive Manufacturing
[Chinmay Phutela](#)¹; [Nesma Aboulkhair](#)¹; ¹Technology Innovation Institute

15:30 PM
REGULAR Rapid Characterization of Additively Manufactured Aerospace Heat Exchangers
[John B. Yorston](#)¹; ¹Thermo Fisher Scientific

15:50 PM **END OF DAY**

4TH NOVEMBER 2022

SESSION CHAIR (PM SESSION):
[Frank Venskytis](#), Consultant

13:30 PM
REGULAR Driving Additive Manufacturing Cost Reduction through Metal Powder Feedstock Reuse
[Joseph Murphy](#)¹; [Zach Loftus](#)¹; [Jose Hector Sandoval](#)¹; ¹Lockheed Martin

13:50 PM
INVITED Developing Powder Feedstock Re-Use Strategies
[Steven Hall](#)¹; [Aneta Chrostek-Mroz](#)¹; ¹The Manufacturing Technology Centre (MTC)

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DIRECTED ENERGY DEPOSITION TECHNIQUES

CO-ORGANIZERS:

Jean-Luc Belon
GKN Aerospace, UK
Paul Gradl
NASA-MSFC, USA

Filomeno Martina
WAAM3D, UK
Badri Narayanan
Lincoln Electric, USA

4TH NOV 2022 (FRI)
GRIFFIN C (LEVEL 1)

4TH NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Filomeno Martina, WAAM3D

SESSION CHAIR (PM SESSION):

Paul Gradl, NASA-MSFC

08:00 AM
INVITED **Qualification of Large Components
Produced by Wire Arc Welding**
[Teresa Melfi](#)¹; J. Ben Schaeffer¹;
¹Lincoln Electric

08:30 AM
INVITED **Making & Breaking the Rules for
DED Design**
[Laura L. Ely](#)¹; [Paul R. Gradl](#)²; ¹The
Barnes Global Advisors; ²NASA -
Marshall Space Flight Center (MSFC)

09:00 AM
INVITED **Fundamentals of Rapid Alloy
Development with Laser Powder
Directed Energy Deposition (LP-
DED)**
[Melanie Lang](#)¹; [Jeff Riemann](#)¹;
¹FormAlloy

09:30 AM
INVITED **The Case for an End-to-End
Software-Hardware Stack in Wire
Arc Additive Manufacturing**
[Filomeno Martina](#)¹; Jialuo Ding¹;
Stewart Williams¹; ¹WAAM3D

10:00 AM **BREAK**

10:30 AM
REGULAR **Approach for a Quality Assurance
System using Tolerance Bands in
Wire and Arc Additive
Manufacturing**
[Daniel Baier](#)¹; Tobias Weckenmann¹;
Siegfried Bähr¹; Michael F. Zäh¹;
¹Technical University of Munich -
Institute for Machine Tools and
Industrial Management (TUM - iwmb)

10:50 AM
REGULAR **Method for Improving DED
Simulation through the Use of
Deposition Path Modeling**
[Chris Robinson](#)¹; ¹Ansys

11:10 AM
INVITED **Large Scale Metal Additive
Manufacturing for Space Industry
using Laser-Powder DED Process**
[Bhaskar Dutta](#)¹; Farhad Ghadamli¹;
¹DM3D

11:40 AM
REGULAR **Grading Inconel 625 to Copper
Alloys via Hybrid Wire-Powder
Directed Energy Deposition: Design
Methodology and Validation
towards Defect Free Graded Alloys**
[Somayeh Pasebani](#)¹; Jakub Preis¹;
Sriram Manoharan¹; Ryan Doyle¹;
Zhengming Wang¹; Brian Paul¹;
Donghua Xu¹; ¹Oregon State
University

12:00 PM **LUNCH**

13:30 PM
INVITED **Exploring High Temperature
Functionally Graded Alloys for Site-
Specific Property Response**
[Soumya Nag](#)¹; Brian Jordan¹; Ke An¹;
Chuan Zhang²; Fan Zhang²; Raymond
R. Unocic¹; Jonathan D. Poplawsky¹;
Jaimie Tiley¹; ¹Oak Ridge National
Laboratory (ORNL); ²CompuTherm

14:00 PM
INVITED **Performance Responses of Wire-
Arc Additively Manufactured Fe-
Based Structural Materials to Post-
Print Heat Treatments**
[Yukinori Yamamoto](#)¹; Peeyush
Nandwana¹; Wei Tang¹; Andrzej
Nycz¹; Mark W. Noakes¹; Ben B.
Schaeffer²; Badri Narayanan²; ¹Oak
Ridge National Laboratory (ORNL);
²Lincoln Electric

14:30 PM
INVITED **High Pressure Cold Spray in
Advanced Metal Additive
Manufacturing Applications**
[Marius D. Ellingsen](#)¹; Bharat Jasthi²;
¹VRC Metal Systems; ²South Dakota
School of Mines & Technology

15:00 PM **BREAK**

15:30 PM
REGULAR **Potentials and Challenges of
Extreme High-Speed DED-LB
Technology: Additive
Manufacturing, Coating and
Material Development**
[Tobias Stittgen](#)¹; ¹ponticon

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- 15:50 PM**
REGULAR **Dynamic Tensile Deformation of Stainless Steel Processed by Laser-Based Directed Energy Deposition – Contribution to Crash-Safe Components**
Niklas Sommer¹; Stefan Böhm¹;
Christian Wolf¹; ¹University of Kassel
- 16:10 PM**
REGULAR **Availability and Cost Efficiency by Digitalization of Metal Spare Parts Manufacturing – Integration of Qualified WAAM Parts in the Industrial Supply Chain**
Edward Peterson¹; Colin Clark²;
Tobias Krümborg²; ¹Laser Welding Solutions; ²GEFERTEC
- 16:30 PM**
INVITED **An Overview: Prediction and Control of Part Distortion and Residual Stress for Large-Scale Metal Additive Manufacturing**
Yousub Lee¹; Andrzej Nycz¹; Srdjan Simunovic¹; Luke Meyer¹; Chris Masuo¹; William Carter¹; ¹Oak Ridge National Laboratory (ORNL)
- 17:00 PM** **END OF DAY**

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INDUSTRY 4.0: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN AM

CO-ORGANIZERS:

Kareem Aggour
GE Research, USA
Shaw Feng
NIST, USA

Branden Kappes
Contextualize, USA
Jia (Peter) Liu
Auburn University, USA

4TH NOV 2022 (FRI)
CYPRESS (LEVEL 1)

4TH NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Branden Kappes, Contextualize

08:00 AM
INVITED **Networked Attribute Learning of Manufacturing Defect Ontology with Limited Measurements**
[Hui Wang](#)¹; [Tsegai Yhdego](#)¹; An-Tsun Wei¹; ¹Florida A&M University - Florida State University (FAMU-FSU) College of Engineering

08:30 AM
REGULAR **Defects Classification via Hierarchical Graph Convolutional Network in L-PBF Additive Manufacturing**
[Jia \(Peter\) Liu](#)¹; Anyi Li¹; Shuai Shao¹; Nima Shamsaei¹; ¹Auburn University

08:50 AM
INVITED **Uncovering the Truth behind Defect Formations through Feature Reclassification**
[Michelle Daya](#)¹; Briana Ugarte²; Matthew Miller¹; Brayant Lopez²; Hunter Taylor²; Ryan Wicker²; Branden Kappes¹; ¹Contextualize; ²University of Texas at El Paso

09:20 AM
INVITED **Improved Process Parameter Optimization using Machine Learning**
[Annie Wang](#)¹; ¹Senvol

09:50 AM **BREAK**

10:30 AM
REGULAR **Residual Stress and Microstructure Data Alignment for Additive Manufacturing Data Registration for Data Analytics**
[Shaw Feng](#)¹; ¹NIST

10:50 AM
INVITED **In-Situ Microstructural Phase Monitoring for Metal Additive Manufacturing via Machine Learning**
[Xiaoli Zhang](#)¹; Sen Liu²; Noopur Jamnikar³; Qiaojie (Grant) Zheng¹; Craig Brice¹; ¹Colorado School of Mines; ²Stanford University; ³University of Michigan-Ann Arbor

11:20 AM
INVITED **Digitally Twinned Additive Manufacturing: Real-Time Detection of Flaws in Laser Powder Bed Fusion by Combining Thermal Simulations with In-Situ Meltpool Sensor Data**
[Pralhada K. Rao](#)¹; [Alex R. Riensche](#)¹; Reza Yavari¹; Emine Tekerek²; Lars Jacquemeton³; Harold Scott Halliday⁴; Vignesh Perumal²; Ziyad Smoqi¹; Antonios Kontsos²; ¹University of Nebraska-Lincoln; ²Drexel University; ³Sigma Additive Solutions; ⁴Navajo Technical University

11:50 AM **END OF DAY**

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INDUSTRY 4.0: CYBER SECURITY ASPECTS OF AM

CO-ORGANIZERS:

Chris Adkins
Identify3D, USA
Nikhil Gupta
New York University
(NYU), USA

Mark Yampolskiy,
Auburn University, USA

4TH NOV 2022 (FRI)
DOGWOOD (LEVEL 1)

4TH NOVEMBER 2022

SESSION CHAIR (AM SESSION):
Mark Yampolskiy, Auburn University

- 08:00 AM** **Who Would Attack My 3D Printer?**
INVITED **Gary Pike¹**; Kristian Dehaan¹; Grant Parker¹; John D. Sprunger¹; Mark Yampolskiy¹; Theo Zinner¹; ¹Auburn University
- 08:30 AM** **Using Non-Intrusive Physical Emissions to Transmit Metadata Stored in Additive Manufacturing Toolpaths for Enhanced Security and Traceability**
INVITED **Logan D. Sturm¹**; Nathan Raeker-Jordan²; Christopher B. Williams²; ¹Oak Ridge National Laboratory (ORNL); ²Virginia Tech - DREAMS Lab
- 09:00 AM** **Streaming as Enabler of Secure AM Supply Chains**
REGULAR **Moritz Kolter¹**; Johannes Henrich Schleifenbaum¹; ¹RWTH Aachen University - Digital Additive Production DAP
- 09:20 AM** **Crime Scripts and Cost/Security Balance Guide the Choice of Cyber-Physical Trust Anchor for Linkage to Blockchain**
REGULAR **Michele Maasberg¹**; **Ian Taylor²**; Leslie G. Butler³; ¹United States Naval Academy (USNA); ²SIMBA Chain; ³Louisiana State University
- 09:40 AM** **Developing Common Criteria Based 3D Printing Equipment Cyber Security Certification**
REGULAR **Alan Sukert¹**; Paul D. Tykodi¹; ¹IEEE-ISTO - Printer Working Group (IPP Workgroup)

- 10:00 AM** **BREAK**
- 10:30 AM** **On Leveraging Blockchain to Secure the AM Digital Thread**
INVITED **Pramita Mitra¹**; Ellen Lee¹; ¹Ford Motor Company
- 11:00 AM** **Data Ownership and Privacy Issues in the AM Workflow**
INVITED **Chris Adkins¹**; Stephan Thomas¹; ¹Identify3D
- 11:30 AM** **Myths and Misconceptions in AM Security**
INVITED **Mark Yampolskiy¹**; ¹Auburn University
- 12:00 PM** **END OF DAY**

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APPLICATION OF AM IN ENERGY, MARITIME AND OIL & GAS

CO-ORGANIZERS:

Ole Geisen
Siemens Energy, Germany
Matt Sanders
Stress Engineering
Services, USA

Valeria Tirelli
AIDRO, Italy
Lakshmi Vendra
Baker Hughes, USA

4TH NOV 2022 (FRI)
CARDINAL (LEVEL 2)

4TH NOVEMBER 2022

SESSION CHAIR (AM + PM SESSION):
Matt Sanders, Stress Engineering Services

08:00 AM
INVITED **Thin-Walled Dual Coolant Heat Exchanger for Fusion Energy Applications**
[James W. Paterson](#)¹; Ole Geisen²; Timo Heitmann²; Bernd Koos²; Frank Schoofs¹; ¹United Kingdom Atomic Energy Authority; ²Siemens Energy

08:30 AM
REGULAR **Utilization of Additive Manufacturing for Pump Impellers in Cryogenic Applications**
[Derrick T. Bauer](#)¹; [Jan de Roos](#)²; ¹Elliott Group; ²Shell

08:50 AM
INVITED **API and ASME Qualification of a 3D Printed Pressure Component for Oil & Gas Service**
[Robert Rettew](#)¹; Matthew Sanders²; Teresa Melfi³; ¹Chevron; ²Stress Engineering Services; ³Lincoln Electric

09:20 AM
REGULAR **Qualification of Additive Manufacturing Technology for Oil and Gas Applications**
[Stephen Freitas](#)¹; ¹IMI CCI

09:40 AM
INVITED **Unlocking the Potential of Additive Manufacturing in Energy, Oil & Gas and Maritime Applications through Standardised Qualification & Certification Framework**
[Sastry Y. Kandukuri](#)¹; [Serkan Yildiz](#)²; Stian Gurrik¹; Onno Ponfoort³; Gisle Rørvik⁴; ¹DNV; ²BMT Aerospace; ³Berenschot; ⁴Equinor

10:10 AM **BREAK**

10:30 AM
INVITED **Industrialization of 3D Printed Gas Turbine Vanes, an End to End View in Opportunities and Challenges**
[Magnus Hallberg](#)¹; [Martin Lindbäck](#)¹; Ilya Fedorov¹; Dikran Barhanko¹; ¹Siemens Energy

11:00 AM
REGULAR **New Metal AM Materials for Oil and Gas Industry – High Strength, Corrosion Resistant Steels**
[Priyanshu Bajaj](#)¹; Andreas Pelz¹; Bastian Kallenbach¹; ¹m4p material solutions

11:20 AM
REGULAR **Industrial Application of Leak Repair Clamp Produced by Wire Arc Additive Manufacturing**
[Angeline Goh](#)¹; [Danny Steel](#)²; [Olivier Tartar](#)³; Heather Gower¹; Gonghyun Jung¹; Alfred Kruijer¹; Sam McFarland¹; Archana Pathiraj¹; ¹Shell; ²TEAM; ³Vallourec

11:40 AM
REGULAR **Spare Parts on Demand by Additive Manufacturing**
[Tad Steinberg](#)¹; Kevin Sheehan¹; ¹Siemens Energy

12:00 PM **LUNCH**

13:30 PM
INVITED **Exploring a Novel Approach for Support Optimization Aiming Reduction of Fabrication Costs and Print Job Failure Rates**
[Alexandre Hiricoiu](#)¹; [Timo Heitmann](#)²; Enrique Escobar de Obaldia¹; ¹Ansys; ²Siemens Energy

14:00 PM
REGULAR **Drop Tests of Multiple 3D-Printed Container Models in Calm Water**
[Vincent Xiaochuan Yu](#)¹; ¹University of New Orleans

14:20 PM
INVITED **Enabling Distributed Supply Chains through Additive Manufacturing**
[Roberto Esposito](#)¹; ¹Velo3D

14:50 PM
INVITED **Additively Manufactured Polymeric Gaskets for Oil & Gas Digital Inventory Solutions**
[Luisa Elena Mondora](#)¹; ¹Valland

15:20 PM **END OF DAY**

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AM APPLICATIONS FOR AUTOMOTIVE TRANSPORTATION/HEAVY MACHINERY

CO-ORGANIZERS:

Eric Johnson

Eaton, USA

Aaron Lalonde

U.S. Army CCDC-

GVSC, USA

Ante Lausic

General Motors, USA

Simon Pun

Divergent, USA

4TH NOV 2022 (FRI)
OSPREY (LEVEL 2)

4TH NOVEMBER 2022

SESSION CHAIR (AM SESSION):

Simon Pun, Divergent

08:00 AM
INVITED **Enabling Vehicle Scale Metal Additive Manufacturing**
[Aaron D. LaLonde¹](#); ¹U.S. Army Combat Capabilities Development Command - Ground Vehicles Systems Center (GVSC)

08:30 AM
REGULAR **Opportunities & Challenges with Laser Powder Bed Fusion for Automotive Applications**
[Whitney Poling¹](#); [Ante Lausic¹](#); Md Ashabul Anam¹; Andrew Bobel¹; Tyson Brown¹; Anil Sachdev¹; Mark Smith¹; ¹General Motors

08:50 AM
REGULAR **Challenges and Strategies for Implementing Additive Manufacturing in Heavy Industries - Lessons Learned from Aerospace & Defense**
[Abdalla R. Nassar¹](#); ¹John Deere

09:10 AM
REGULAR **Additive Manufacturing for SNCF Réseau: An Industrial Ambition**
[Pascal De Guio¹](#); [Philippe Kuchly¹](#); [Véronique Vidal¹](#); ¹SNCF Réseau

09:30 AM
INVITED **Metal Binder Jetting Additive Manufacturing of Transmission Shift Knob Component for Automotive Application**
[Cody Cochran¹](#); [Mattia Forgiarini¹](#); ¹Azoth

10:00 AM **BREAK**

10:30 AM
REGULAR **Enhancement of Heat Exchanger Performance using Additive Manufacturing of Gyroid Lattice Structures**
[Mostafa Yakout¹](#); Shekhar Rammohan Singh Tandel²; Dalia Mahmoud³; Mohamed Abdelaziz Elbestawi²; Fabrizio Mattiello⁴; Stefano Paradiso⁵; Chan Ching²; Mohammed Zaher⁶; Mohamed Abdelnabi²; ¹University of Alberta; ²McMaster University; ³Alexandria University; ⁴Centro Ricerche Fiat (CRF); ⁵Stellantis; ⁶University of Toronto

10:50 AM
REGULAR **Algorithm-Aided-Design: Parametric Modeling and Automated Design Generation of 3D Winding Designs of Hairpin Stators (E-Machines) for Additive Manufacturing**
[Carsten Putz¹](#); Johannes Henrich Schleifenbaum¹; ¹RWTH Aachen University - Digital Additive Production DAP

11:10 AM **END OF DAY**

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PANEL DISCUSSIONS

31ST OCT 2022 (MON)

GRIFFIN D (LEVEL 1)

13:30 PM **AM AT THE POINT OF CARE: NEXT STEPS**

PANEL 01

MODERATOR:

Laura Gilmour,
LG Strategies

PANELISTS:

- Matthew Di Prima, U.S. FDA
- Martin Herzmann, Kumovis/3D Systems
- Dawn Lissy, Empirical Technologies
- Mark Morrison, Smith+Nephew
- Beth Ripley, VHA

15:30 PM **ADDITIVE CONSTRUCTION – CURRENT STATE, GAPS, FUTURE DEVELOPMENT**

PANEL 02

MODERATOR:

Stephan Mansour,
ASTM International

PANELISTS:

- Berry Hendriks, CyBe Construction
- Marina Konstantatou, Foster + Partners
- Matteo Pietrobelli, DeSimone Consulting Engineers
- Bruno Silva, Defining Humanity

PANEL DISCUSSIONS

1ST NOV 2022 (TUE)

GRIFFIN D (LEVEL 1)

10:30 AM **STATUS OF FEEDSTOCK MANAGEMENT IN METAL ADDITIVE MANUFACTURING**

PANEL 03

MODERATOR:

Tony Thornton,
Micromeritics

PANELISTS:

- Steven Hall, The MTC
- Xinjiang Hao, Liberty Powder Metals
- Amir Nobari, Tekna
- Roger Pelletier, NRC Canada

13:30 PM **WHEN DOES AM MAKE SENSE – ECONOMIC CONSIDERATIONS IN MANUFACTURING WITH AM**

PANEL 04

MODERATOR:

Joseph Kowen,
Wohlers Associates

PANELISTS:

- Ben Arnold, Tritone Technologies
- James DeMuth, Seurat Technologies
- Roberto Esposito, Velo3D
- Greg Hyatt, DMG MORI Advanced Solutions

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PANEL DISCUSSIONS

2ND NOV 2022 (WED)

GRIFFIN D (LEVEL 1)

13:30 PM

PANEL 05

PROGRESS, IMPACT, AND FUTURE OF IN-SITU MONITORING IN AM

MODERATOR:

Abdalla Nassar,
John Deere

PANELISTS:

- Darren Beckett, Sigma Additive Solutions
- Brandon Lane, NIST
- Nicholas Mulé, Boeing
- Prahalada Rao, Virginia Tech
- Sarah J. Wolff, Ohio State University

15:30 PM

PANEL 06

CERTIFICATION CHALLENGES AND OPPORTUNITIES FOR AM DEFENSE APPLICATIONS

MODERATOR:

Brandon Ribic,
NCDMM

PANELISTS:

- Mark Benedict, AFRL
- Derrick Lamm, Lockheed Martin
- Rashid Miraj, AlphaSTAR
- Venkat Vedula, Raytheon Technologies
- Cindy Waters, NSWCCD
- Doug Wells, NASA

PANEL DISCUSSIONS

3RD NOV 2022 (THU)

GRIFFIN D (LEVEL 1)

10:30 AM

PANEL 07

ADVANCED QUALIFICATION AND CERTIFICATION FOR AVIATION THROUGH SIMULATION AND MODELING

MODERATOR:

Martin White,
ASTM International

PANELISTS:

- Jesse Boyer, Pratt & Whitney
- Jim Dobbs, Boeing
- Michael Gorelik, FAA
- Jeff Robertson, Hexagon

13:30 PM

PANEL 08

INDUSTRIALIZATION OF AM IN THE ENERGY SECTOR: OPPORTUNITIES AND CHALLENGES

MODERATOR:

Andy Medla,
Siemens Energy

PANELISTS:

- Tim Bell, Siemens Digital Industries
- Angeline Goh, Shell
- Sherri Monroe, AMGTA
- Alan Pearce, FasTech
- Soeren Wiener, Westinghouse

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PANEL DISCUSSIONS

4TH NOV 2022 (FRI)

GRIFFIN D (LEVEL 1)

10:30 AM

PANEL 10

THE PATH TO PRODUCTION FOR SPACE EXPLORATION FOR AM

MODERATOR:

Paul Gradl,
NASA-MSFC

PANELISTS:

- Tim Berry, Launcher
- Alan Fung, Aerojet Rocketdyne
- Elena López, Fraunhofer IWS
- Alison Park, NASA-NESC

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KEYNOTES

2ND NOV 2022 (WED)

GRIFFIN CD (LEVEL 1)

08:15 AM WELCOME ADDRESS

08:30 AM AGILE, SUSTAINABLE STRUCTURES: INDUSTRIALISING AM FOR DEFENSE
KEYNOTE 01 APPLICATIONS

KEYNOTE SPEAKER:

David Bond, GKN Aerospace

09:00 AM OPPORTUNITIES AND CHALLENGES FOR METAL ADDITIVE MANUFACTURING IN THE
KEYNOTE 02 AUTOMOTIVE INDUSTRY

KEYNOTE SPEAKER:

Anil Sachdev, General Motors

09:30 AM NATIONAL SCIENCE FOUNDATION AND ADDITIVE MANUFACTURING: OVERVIEW,
KEYNOTE 03 FUNDAMENTAL RESEARCH AND FUNDING OPPORTUNITIES

KEYNOTE SPEAKER:

Kevin Chou, National Science Foundation

10:00 AM BREAK

10:30 AM HOW RECENT CHANGES ARE IMPACTING THE FUTURE OF AM
KEYNOTE 04

KEYNOTE SPEAKER:

Terry Wohlers, Wohlers Associates

11:00 AM HOW AM IS SHAPING THE 4TH INDUSTRIAL REVOLUTION – FROM RESEARCH TO
KEYNOTE PANEL COMMERCIALIZATION
DISCUSSION

KEYNOTE MODERATOR:

Terry Wohlers,
Wohlers Associates

KEYNOTE PANELISTS:

- David Bond, GKN Aerospace
- Kevin Chou, National Science Foundation
- Anil Sachdev, General Motors

12:00 PM END OF KEYNOTE SESSIONS

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