SFF 2024 Addendum

Changes to the Program from July 26 – August 8, 2024

All changes occurring after August 8, 2024, will only be reflected on the session sheets outside of each room

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Cancellations

Design of Lattices and Cellular Structures
Monday 4:20 PM Room 404
Manufacturability-Driven Inverse Design of Architected Soft Materials using Multi-Modulus Chemistry: *Daniel Revier,* Northeastern University

Special Session: Wire-Fed AM I
Monday 5:00 PM Room: 400/402
Wire-Arc DED of Porous Rafts for Self-Releasing Parts: Impact on Thermal History and Material Properties: *Bemnet Molla*, Virginia Polytechnic Institute and State University

Modeling Methods, Metrology, and Applications
Tuesday 10:00 AM Room: 417AB
Front Assaulting an Impregnable Monge-Ampere Strong Explicit Solution for Non-Axially Symmetrical Freeform Surfaces with Prescribed Bivariate Curvature Tensor Extending Over a Complete R3 Riemann Sphere: *BenZion Inditsky*, Visual Photonics Ltd

Lattice Performance Prediction and Verification
Tuesday 10:40 AM Room: 404
Toward Fatigue Life Prediction of Multi-lattice Structures: *Jiangce Chen,* Carnegie Mellon University

Process Development: Direct Energy Deposition
Tuesday 1:30 PM Room: 416 AB
EHLA: Introducing High-speed Directed Energy Deposition: *Josh Barras*, TWI Ltd

Other AM Processes and Applications II
Tuesday 1:50 PM Room: 404
Study of Sodium Ion based Battery Components based on a High Resolution 3D Printing DLP Technology: *Sina Bakhtar Chavari,* Youngstown State University

Topology Optimization for AM
Tuesday 2:50 PM Room: 417 AB
Improving Binder Jetting Part Strength via a Binder Infill Strategy Guided by Topology Optimization: *Amanda Wei,* Virginia Polytechnic Institute and State University

Materials: Metals IV
Wednesday 9:00 AM Room: Salon B
Accelerated Recyclability Assessment of 316L using Laser Powder Bed Fusion and Ultrasonic Atomisation in a Revert Loop: *Edward Palmer,* University

AM of Composites and Other Materials III
Wednesday 9:00 AM Room: Salon A
Development of Lithium-Based Solid-State Electrolytes Using Direct-Ink Write Process: *John Obielodan*; University of Wisconsin-Platteville

10:00 AM Room: Salon A
Microstructure, Mechanical Properties, and Oxidation Resistance of NiCoCrAlFe High Entropy Alloy Manufactured via Laser Directed Energy Deposition: *Fan Zhou*; West Virginia University

Materials: Metals V
Wednesday 9:00 AM Room: 602
Prediction of the Spreadability of Metal Powders: The Last Developments: *Filip Francqui*, Granu Tools

Applications: Biomedical
Wednesday 11:20 AM Room: 417 AB
Numerical Modeling of Hydrodynamic Shear in Extrusion 3D Bioprinting: *Srikanthan Ramesh;* Oklahoma State University

Process Development: Material Extrusion
Wednesday 11:40 AM Room: 615 AB
Strengthening Polylactic Acid and Thermoplastic Elastomer Blends through Thermoforming to Reorient Extrusion Paths: *Pamela Campos Valles,* The University of Texas at El Paso

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Author Additions/Speaker Changes

Development of Universal Gating System Tool for Sand Casting Industry: Speaker changed from Jake Officer to *Ismail Fidan*[1]; [1]Tennessee Technological University

Process Development and Control for Sensor-informed Hybrid-Additive Manufacturing: Speaker changed from Dan Davie to *Louis Masters*, University of Leeds

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Session Chairs

Process Modeling: Tuesday morning, 615 AB – Emmanuel Ekoi, University of Texas at Austin

Data, Economics, and Education I: Tuesday morning, Salon G – Yash Parikh, EOS North America

Process Development: Wire Arc AM: Wednesday, 415AB – Joe Beaman, University of Texas at Austin

Process Development: Powder Bed Fusion V: Wednesday, 416AB – Emmanuel Ekoi, University of Texas at Austin

Materials: Metals IV: Wednesday, Salon B – Mahemaa Rajasekaran, EOS North America

Materials: Metals V: Wednesday, 602 - Yash Parikh, EOS North America

Process Development: Vat Polymerization: Wednesday, 616 AB – David Bourell, University of Texas

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Abstract or Title Changes

NEW Title -from **Reproducibility of the Effectiveness of Particle Dampers Produced in the PBF-LB Process with Thin and Flat Cavities with Regard to Variances in Industrial AM Processes** to **On the Effectiveness of PBF-LB Particle Dampers with Thin and Flat Cavities Considering Industrial Process Variances**

NEW - Process Development: Powder Bed Fusion III – 3:10 PM – 3:30 PM, 415 AB
Laser Beam Sources and their Influence on Tailored Microstructure, Mechanical Properties, and Increased Productivity in Laser Powder Bed Fusion Additive Manufacturing: *Cesar Terrazas*[1]; [1]AconityUS, Inc.

Recent advances in laser powder bed fusion (L-PBF) additive manufacturing of metals involve the use of lasers with tuneable intensity profiles enabling the control of the energy distribution and hence of the thermal gradients and the solidification pathway during the material deposition process. In this work, we present current developments involving the use of various laser sources applied in a L-PBF platform from Aconity3D GmbH. Several case studies will be presented to showcase tailoring microstructural features and mechanical performances of components built using both traditional laser sources with a Gaussian intensity distribution and those in which the emission profile is controlled (i.e. ring beam or top hat) at discretion while shifting the productivity to the next level. Results are presented for several materials of interest in the fields of aerospace, automotive and medical, and to the larger additive manufacturing community.

NEW - Poster Session
4:00 PM, Salon JK
Thermal Emission-Based Geometric Mapping of Specular Glass Surfaces: *Delaney Reynolds*[1]; Edward Kinzel[2]; Robert Landers[1]; [1]University of Notre Dame; [2]Univ. of Notre Dame

Traditional line scanners used in 3D printing rely on diffuse reflection of light to determine form, and therefore it is difficult to produce accurate models of specular surfaces, such as glass. To overcome this

challenge, geometry can be resolved by thermal emission. Using a mid-IR CO2 laser, morphology can be determined through emission detection via a thermal camera. To calibrate this method for accuracy, resolution can be tested with an optical flat, which is flat on the order of a nanometer. Changes in the height of the flat due to noise can be calculated by trigonometry from the angle of incidence of the laser and the movement of the flat with a motorized stage. After filtering, the surface of the flat displays approximately 60-micron resolution, with hope for future improvement.

NEW - Poster Session
4:00 PM, Salon JK
Measurement and Control in Digital Glass Forming (DGF): *Cindy Huang*[1]; Balark Tiwari[1]; Nishan Khadka[2]; Timothy Welch[1]; Robert Landers[1]; Edward Kinzel[3]; [1]University of Notre Dame; [2]Unviersity of Notre Dame; [3]Univ. of Notre Dame

Digital Glass Forming uses a fiber laser to heat a glass filament at its intersection with the workpiece, enabling deformation through thermal diffusion. This method allows the glass filament to wet the glass substrate and form continuous structures. However, increased laser power risks excessive temperatures, causing vaporization and bubble formation, limiting deposition rates. This research explores glass deposition in horizontal, vertical, and diagonal orientations using the fiber laser and feedback from thermal and machine vision cameras. The aim is to achieve precision, repeatability, and automation in the process. Additionally, the research addresses the "tailing" phenomenon, where the end of the glass structure becomes pointed. By partially reheating the glass tail and allowing it to reflow, the process aims to produce smooth ends without vaporizing the glass or damaging the structure. The strength of joints between glass structures will be evaluated through shear, cantilever, and 3-point bending tests.

NEW - Poster Session
4:00 PM, Salon JK
Elucidating Microstructural Evolution Mechanisms in Tungsten via Layerwise Rolling in Additive Manufacturing: An Integrated Simulation and Experimental Approach: Sadman Durlov[1]; Aditya Krishna Ganesh Ram[1]; Hamidreza Hekmatjou[1]; Md Najmus Salehin[1]; *Nora Ameri*[1]; [1]University of Texas at Arlington
In additive manufacturing, tungsten is recognized for its exceptional high-temperature resistance, making it suitable for extreme conditions. However, its brittleness and susceptibility to thermal cracking pose significant challenges. This study examines the microstructural evolution of tungsten processed through an innovative technique: rolling in laser powder bed fusion additive manufacturing. By combining advanced simulations with empirical research, we focus on understanding plastic deformation and microstructural transformations, particularly grain size dynamics, boundary evolution, and phase distribution. The integration of simulation and experimental data allows us to identify key mechanisms driving microstructural changes during the rolling process, enhancing our understanding of tungsten's behavior in additive manufacturing. These insights not only expand theoretical knowledge but also offer practical strategies for improving the mechanical properties of tungsten components. Our approach provides a robust framework for developing durable materials for challenging environments, optimizing additive manufacturing techniques, and broadening the application of tungsten in demanding sectors.

Additional NSF Awardees

Vivekanand Naikwadi ; Tennessee Tech

Stevens Griffin Hill Jr; Georgia Southern University

Michael Geuy; Pennsylvania State University