1-8-2024

24 conference program - Innovative Materials & Methods for Additive Manufacturing II (IM²AM)

Daniel Schmidt
Nikhil Gupta
Eric Eastwood
Brett Compton
Gary Gladysz

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Program

Innovative Materials & Methods for Additive Manufacturing II (IM²AM)

January 8 – 13, 2024
Tomar, Portugal

Conference Chairs:

Daniel Schmidt, Luxembourg Institute of Science and Technology (LIST)
Nikhil Gupta, New York University
Eric Eastwood, KCNSC/Honeywell FM&T
Brett Compton, University of Tennessee, Knoxville
Gary Gladysz, Los Alamos National Laboratory

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Previous conferences in this series:

Innovative Materials For Additive Manufacturing (IMAM)
March 8 – 12, 2020
Santa Ana Pueblo, New Mexico
Conference Chairs:
Daniel Schmidt, Luxembourg Institute of Science and Technology
Nikhil Gupta, New York University
Chua Chee Kai, NTU, Singapore
Brett G. Compton, University of Tennessee
Monday, January 8, 2024

17:00 – 18:30  Open check-in
18:00 – 19:30  Welcome reception (with music)
19:30 – 21:30  Dinner

NOTES

- Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.

- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).

- Speakers – Please leave at least 3 minutes for questions.

- Please do not smoke at any conference functions.

- Coffee breaks and social hours are in the Lobby Bar area.

- Turn your cellular telephones to vibrate or off during technical sessions.

- After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
Tuesday, January 9, 2024

07:30 – 08:45  Breakfast Buffet

**Session 1**

08:45 – 09:30  
**Invited**  
Tailor made polymeric feedstocks for additive manufacturing using polymer science principles  
Mark Dadmun, University of Tennessee, USA

09:30 – 10:00  
Conformal and custom radiation shielding composites for human extremity protection enabled by non-planar additive manufacturing  
Nicholas Baumann, Los Alamos National Laboratories, USA

10:00 – 10:30  
Comparison of HDPE manufactured via compression molding versus selective laser sintering  
Joseph Torres, Los Alamos National Laboratories, USA

10:30 – 11:00  Coffee Break

**Session 2**

11:00 – 11:45  
**Invited**  
3D-printing liquid crystal polymers to replicate the anisotropic complexity of wood  
Kunal Masania, TU Delft, Netherlands

11:45 – 12:15  
**Invited**  
The development of high temperature organic materials for SLS at Sandia National Laboratories  
C. Garrett Campbell, Sandia National Laboratories, USA

12:15 – 12:45  
Direct ink writing of custom UV curable rubbers with radiation absorbing particles and its challenges  
Jacob Mingear, Los Alamos National Laboratories, USA

12:45 – 13:15  
Kinetic modeling of cure behavior to enable simulation of material extrusion AM of reactive thermoset polymers  
Madeline Wimmer, University of Tennessee, Knoxville, USA

13:15 – 14:30  Lunch Buffet

14:30 – 16:30  Networking

16:30 – 17:00  Afternoon Coffee

**Session 3**

17:00 – 17:45  
**Invited**  
Novel rheological measurements to understand structural stability of DIW-printed epoxy composites during thermal curing  
Stian Romberg, National Institute of Standards and Technology, USA

17:45 – 18:15  
Enabling digital manufacturing cyber-physical system for future manufacturing  
Nikhil Gupta, New York University, USA
Tuesday, January 9, 2024 (continued)

18:15 – 18:45  The thermoresponsive character of biopolymers and its impact on the scaffold performance in 3D bioprinting
Tijana Kavrakova, Ecole Centrale Nantes, France

18:45 – 19:15 Invited
Additive manufacturing of elastomer, ceramic and metal multi-functional structures
Eric MacDonald, UTEP, USA

19:30 – 21:30 Dinner followed by Social Hour in Lobby Bar area
Wednesday, January 10, 2024

07:30 – 08:45  Breakfast Buffet

**Session 4**

08:45 – 09:30  **Invited**
**Focus on some peculiar behaviors of polymers in the context of additive manufacturing processes**
René Fulchiron, Universite Claude Bernard Lyon 1, France

09:30 – 10:00  **3D and 4D printing of polypropylene having different content of copolymer**
Joamin Gonzalez-Gutierrez, Luxembourg Institute of Science and Technology, Luxembourg

10:00 – 10:30  **Understanding AM feedstock recyclability using small angle X-ray scattering**
Samantha Talley, Honeywell FM&T, USA

10:30 – 11:00  Coffee Break

**Session 5**

11:00 – 11:45  **Invited**
**4D printing of hybrid materials with material extrusion method**
Mika Salmi, Aalto University, Finland

11:45 – 12:30  **Invited**
**Material extrusion additive manufacturing of thermoset-based short fiber composites**
Brett Compton, University of Tennessee Knoxville, USA

12:30 – 13:30  Lunch Buffet

13:55  Meet at hotel entrance for excursion

14:00 – 18:00  Excursion – Guided walking Tour of Convento de Cristo

*Situated in the geographic center of Portugal, Tomar was founded by the notorious Knights Templar in 1160. The Templars were part monks, part warriors and plotted crusades from Tomar for centuries. They established the beginnings of the Convento de Cristo, Tomar’s most famous landmark, on a hill overlooking town. The Convento combines architectural styles from the 12th through 17th centuries. An ornate octagonal canopy protects the high altar of the Templo dos Templares, modeled after the Holy Sepulchre in Jerusalem, and the grounds of the convent contain eight cloisters embracing a variety of styles.*

18:00  Dinner on your own
Thursday, January 11, 2024

07:30 – 08:45  Breakfast Buffet

Session 6

08:45 – 09:30  Invited
Directed assembly of ceramic particle microstructures to realize emergent mechanical and thermal properties
Randy Erb, Northeastern University, USA

09:30 – 10:00  Binder jet additive manufacturing of functional 4D components from NiMnGa magnetic shape memory alloy powders
C. Virgil Solomon, Youngstown State University, USA

10:00 – 10:30  Lunar regolith as a feedstock for selective laser melting
Joris Kadok, Luxembourg Institute of Science and Technology, Luxembourg

10:30 – 11:00  Coffee Break

Session 7

11:00 – 11:45  Invited
3D/4D printing of high-performance nanocomposites and AI/ML strategies
Rigoberto Advincula, University of Tennessee, USA

11:45 – 12:15  Mapping the light scattering distribution in a three-phase photopolymer resin system to predict cured dimensions
Darshil Shah, University of Massachusetts Lowell, USA

12:15 – 12:45  Anchoring-based control of dissimilar material interface for multi-material laser direct energy deposition
Wookjin Lee, Pusan National University, South Korea

12:45 – 13:15  Phase evolution and high temperature compressive strength of Ti-based alloy developed by micro-plasma powder additive manufacturing
Pradyumn Kumar Arya, Indian Institute of Technology, Indore, India

13:15 – 14:30  Lunch Buffet

14:30 – 17:00  Networking

17:00 – 17:45  Afternoon Coffee Break

17:45 – 18:45  Brief Poster Talks and Discussion

CNT-free ESD DIW silicone development - Mechanical & dissipative response
Luke Urry, AWE, United Kingdom

Optimisation of pre-print processing and thermal treatment of DIW printed silicone pads
Gabrielle Davies, AWE, United Kingdom
Thursday, January 11, 2024 (continued)

Utilizing small angle X-ray scattering to understand material failures and improve material lifetime
Bethany Wilburn, Kansas City National Security Campus - Department of Energy (KCNSC), USA

19:30 – 21:30  Dinner followed by Social Hour
Friday, January 12, 2024

07:30 – 08:45  Breakfast Buffet

**Session 8**

08:45 – 09:30  
**Invited**  
*Additive manufacturing of Oxide Dispersion Strengthened (ODS) alloys*  
Christian Leinenbach, Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

09:30 – 10:00  
*From pre-ceramic polymer to high-toughness ceramic: An SLA 3D printing approach*  
Hamidreza Yazdani Sarvestani, National Research Council Canada, Canada

10:00 – 10:30  
*Multipurpose ABS composites for fused filament fabrication*  
Shelbie Legett, Los Alamos National Laboratory, USA

10:30 – 11:00  
Coffee Break

**Session 9**

11:00 – 11:45  
**Invited**  
*Field-assisted assembly and printing of functional composites*  
Matthew Begley, University of California, Santa Barbara, USA

11:45 – 12:15  
*3D printed ceramics structures - Challenges and applications*  
Pedro Cortes, Youngstown State University, USA

12:15 – 12:45  
*Enhanced thermal conductivity and fracture toughness in additive manufacturing through graphene-diamond composites*  
Shani Ligati Schleifer, Ben Gurion University of the Negev, Israel

12:45 – 13:15  
*Effect of Co-content on microstructure and phases of laser additive manufactured Co(x)(CrNi)100-x alloy*  
Poonam Deshmukh, Indian Institute of Technology, Indore, India

13:15 – 13:45  
*Tensile, fracture, and damage resistance characterization of 3D printed PLA with Morse code architectures*  
Deepesh Yadav, Indian Institute of Technology, Bombay, India

13:45 – 15:00  
Lunch

15:00 – 16:30  
Networking

16:30 – 17:00  
Afternoon Coffee Break

**Session 10**

17:00 – 17:45  
**Invited**  
*Multi-material printing of thermoplastic and highly filled resin materials*  
Christopher Hansen, University of Massachusetts Lowell, USA

17:45 – 18:15  
*Nanostructuring of an additively manufactured CoCrFeNi multi-principal element alloy using severe plastic deformation*  
Kamilla Mukhtarova, Eötvös Loránd University, Hungary
Friday, January 12, 2024 (continued)

18:15 – 18:45  Adapting new materials for SLS: A case study  
Daniel Schmidt, Luxembourg Institute of Science and Technology (LIST), Luxembourg  

18:45 – 19:15  Additive manufacturing of anisotropic graphene-based composites for thermal management applications  
Oren Regev, Ben-Gurion University of the Negev, Israel  

19:45 – 21:30  Banquet followed by Social Hour  

Saturday, January 13, 2024  

07:30 – 09:00  Breakfast  

09:00 – 10:00  Conference Summary  

10:00 – 11:30  IM²AM III Conference Planning  

12:00  Lunch and departures