EUROMAT 2019 / Area C: Processing

SYMPOSIUM: C5

Title: Additive Manufacturing of Composites and Complex Materials IV		
Organizer	**Institution**	**Contact email**
Dirk Lehmhus	Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Bremen, Germany, or Fraunhofer IFAM	lehmhus@uni-bremen.de
Nikhil Gupta	New York Universit	ngupta@nyu.edu
Jonathan Spowart	Air Force Research Lab	jonathan.spowart@us.af.mil
Eric Jaegle	Max-Planck-Institut für Eisenforschung	e.jaegle@mpie.de
Abstract		

The emergence of additive manufacturing (AM) has enabled several new and exciting developments in the field of net shaped processing. New, material specific processes are rapidly being developed. The present symposium is co-sponsored by the TMS Composite Materials Committee and builds on the success of its predecessors at MS&T'16 thru MS&T'18. We concentrate on advanced AM materials and processes in research and industry, aiming to create strong links between research communities in the US and Europe.

The thematic focus remains on AM techniques for realizing composites and other complex materials, with 3D materials science as the vision. We consider AM a versatile tool for complete spatial control of local material compositions, microstructures and properties, thereby enabling the transformation of integrated computational materials engineering (ICME) and design of materials concepts into physical materials and products.

Suggested topics include:
- homogeneous composites, via processing of pre-mixed materials or in-process combination of constituents
- homogeneous multi-phase materials, as above
- functionally graded materials (FGMs) of both the above types
- materials tailored towards locally different compositions and/or microstructures
- material integration of 3D structures, such as conductive paths, to endow components with added functionality, including e.g. sensor and electronics integration

The symposium encompasses all matrix materials – metals, polymers, ceramics – and all AM techniques. It is not limited to material synthesis, but also include

- modeling and simulation of material performance, particularly for optimized design of materials
- modeling and simulation of processes linked to material microstructure, properties, etc. supporting concurrent design of materials and processes to achieve specific performance goals
- product-level development tools (CAD, simulation, optimization) that support implementation of complex material AM technology
- structural, mechanical and functional performance characterization.

Contributions that highlight specific applications for additively-manufactured composites and complex materials are also invited, both at the prototype and commercial level.

We intend to organize a special issue of a suitable scientific journal to allow selected authors to publish their work.