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Mechanics of Additive & Advanced Manufacturing, Inverse Methods and Machine Learning, Vol. 5

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Description:

Mechanics of Additive and Advanced Manufacturing, Inverse Methods and Machine Learning represents one of five volumes of technical papers presented at the 2025 SEM Annual Conference & Exposition on Experimental and Applied Mechanics organized by the Society for Experimental Mechanics and held in Milwaukee, WI, June 2-5, 2025. The complete Proceedings also includes volumes on: Dynamic Behavior of Materials; Advancement of Optical Methods & Digital Image Correlation in Experimental Mechanics; and Mechanics of Biological Systems and Materials and the Mechanics of Composite, Hybrid & Multifunctional Materials; and Fracture, Fatigue, Failure, Damage Evolution and Thermomechanics & Infrared Imaging. Mechanics of Additive and Advanced Manufacturing is an emerging area due to the unprecedented design and manufacturing possibilities offered by new and evolving advanced manufacturing processes and the rich mechanics issues that emerge. Technical interest within the Society spans several other SEM Technical Divisions such as: Composites, Hybrids and Multifunctional Materials, Dynamic Behavior of Materials, Fracture and Fatigue, Residual Stress, Time-dependent Materials,and the Research Committee.

The topic of mechanics of additive and advanced manufacturing included in this volume covers design, optimization, experiments, computations, and materials for advanced manufacturing processes (3D printing, micro- and nano-manufacturing, powder bed fusion, directed energy deposition, etc.) with particular focus on mechanics aspects (e.g. mechanical properties, residual stress, deformation, failure, rate-dependent mechanical behavior, etc.).

The topic of Inverse Methods and Machine Learning included in this volume covers the Virtual Fields Method, inverse methods for plasticity, identification for anisotropic and heterogeneous materials, optimal experimental design for inverse methods, and machine learning for mechanics with an emphasis on inverse methods.

Keywords: Nanocomposite, thermoset, electric field alignment, dynamic tests, material ductility, ductile damage