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MODELING OF ADDITIVELY MANUFACTURED SHAPE MEMORY MATERIALS

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ABSTRACT

The rise of Additive Manufacturing (AM) has revolutionized the production of smart materials, particularly Shape Memory Materials (SMMs), unlocking new possibilities for the fabrication of intelligent, high-performance products. The versatility of 3D printing offers unparalleled flexibility in designing complex, multifunctional structures, making it an ideal platform for the integration of SMMs into smart devices and systems.

This invited session focuses on advanced numerical modeling techniques tailored to the 3D printing of Shape Memory Materials. Given the unique challenges associated with fabricating and optimizing SMM-based products, computational modeling plays a critical role in improving processability, enhancing material performance, and ensuring the reliability of these advanced structures. This could be explored using both physics-based modeling approaches and data-driven simulation tools, which provide crucial insights into the behavior and optimization of 3D-printed shape memory products.

Keywords: 3D/4D Printing; Shape Memory Alloys (SMA); Shape Memory Polymers (SMP).