Special Issue

AI-Driven Modeling and Monitoring Towards Advanced Additive Manufacturing

Message from the Guest Editors

Additive manufacturing (AM) represents a transformative approach to industrial production that allows for the creation of lighter, stronger parts and systems. AM technologies show rapid and wide applications in aerospace, automotive, healthcare, and other critical industries. However, the complexity of the processes involved in AM presents challenges reagarding process reliability, quality assurance, and materials properties. Artificial Intelligence (AI) emerges as a powerful ally in addressing these challenges. AI-driven modeling and monitoring can significantly enhance the capabilities of AM through more efficient process monitoring, predictive modeling, and real-time adjustments. AI models can predict the microstructural characteristics of materials, optimize mechanical properties, and adaptively control the process parameters to minimize defects and improve the quality of the final product. Integrating AI into AM for simulation or monitoring is expected to enhance understanding of the intricate dynamics of AM processes and guarantee the mechanical/material properties of AM fabricated parts.

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