



## Advanced Manufacturing and Nondestructive Testing Techniques

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### Message from the Guest Editor

Metallic additive manufacturing (AM) is gaining in popularity in the industry and in the medical sector, particularly the powder bed fusion and the directed energy deposition categories of processes. In such critical sectors, the integrity and geometrical conformity to the numerical design of the manufactured parts need to be demonstrated.

First, to limit the defects and deviations from the numerical design, the implementation of digital twins of the AM process chain is a solution. Second, to limit the defects during the AM process, the monitoring of the process, coupled with a feedback loop, involving artificial intelligence, is a solution. Third, to detect defects and deviations in the post-process AM parts, non-destructive testing (NDT) and metrology are required. However, the complexity in shape enabled by AM poses a challenge to the quality control of AM parts. X-ray Computed Tomography, implementing cone beam or synchrotron radiation, is the most performing NDT method. However, linear and nonlinear Resonant Ultrasound Spectroscopy, swept sine methods and Impulse Excitation Method, are alternative very performing methods for NDT.





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## Message from the Editor-in-Chief

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