

## Special Issue

# Fatigue and Fracture of Metals Processed by Additive Manufacturing

### Message from the Guest Editors

Additive manufacturing (AM) of metallic materials has emerged as a transformative technology, offering unparalleled design flexibility and enabling the fabrication of complex, lightweight structures. However, the long-term fatigue performance of AM metals remains a critical challenge, especially for safety-critical applications such as aerospace engines, gas turbines, and high-speed rail systems, where components are subjected to very-high-cycle fatigue (VHCF) loading ( $10^7$ – $10^{10}$  cycles). This Special Issue aims to highlight the urgent need to understand and model fatigue behavior in AM metals, particularly under long-term use. We invite contributions that explore the unique fatigue mechanisms in AM materials and propose novel experimental, theoretical, and computational approaches. Topics of interest include, but are not limited to, the following:

- Advanced characterization of defect-induced crack initiation.
- Multiscale and microstructure-sensitive modeling of fatigue behavior.
- Environmental and thermo-mechanical effects on long-life fatigue.
- Integration of machine learning and data-driven methods in fatigue life prediction.

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### Deadline for manuscript submissions

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## Metals

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## About the Journal

### Message from the Editor-in-Chief

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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### Editor-in-Chief

Prof. Dr. Yong Zhang

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