Special Issue

Intelligent Metal Forming: AI Modeling, Simulation, and Digital Twins

Message from the Guest Editors

Modern metal forming involves nonlinear thermo-mechanical behaviour, evolving tribology, and complex microstructure–property links. Industry demands high-throughput, low-carbon, and first-time-right quality, yet traditional modelling, with simplifying assumptions and limited state variables, is computationally intensive and often overlooks critical phenomena. Integrating AI with finite element (FE) modelling offers higher predictive accuracy, deeper process insights, direct use of industrial data, and faster simulations. This Special Issue focuses on the role of AI in modern metal forming: where it augments physics-based models and how to deploy it reliably with generalisation, uncertainty quantification, physical consistency, and shop-floor integration. We welcome contributions on AI-enabled predictive modelling, physics-informed ML, digital twins, in situ sensing and data fusion, defect and forming-limit prediction, friction/lubrication and tool wear, and multiscale process–microstructure–property links, including industrial case studies and open benchmarks.

Guest Editors

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Message from the Editor-in-Chief

As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal *Applied Sciences* has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

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