

Special Issue

Sustainable Composite Materials: Multiscale Mechanical Analysis and Finite Element Optimization

Message from the Guest Editors

The mechanical behavior of composite materials is complex, spanning from microscale reinforcements to macroscale structures. This multiscale nature presents challenges for accurate modeling and predictive design. This Special Issue focuses on advanced multiscale approaches for analyzing and optimizing composite materials, emphasizing Finite Element Methods (FEMs) across scales. We welcome contributions that bridge micro-, meso-, and macroscale behaviors to simulate complex nonlinear phenomena such as damage, fracture, and buckling. Particular attention is given to FEM-based models that explore how microstructural evolution influences stiffness, strength, and toughness. While methodological advancements are the main focus, we also seek works showing how these models can promote sustainable composites (e.g., bio-based or recycled-fiber) by improving performance predictability and enabling optimal design. Computational fracture mechanics studies may be included if they advance modeling techniques for sustainable composites.

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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