

Preface

Advances in materials science are constantly reshaping and transforming engineering practice, driving innovation from the nanoscale to full structural systems. This special edition contains research results that reflect this broad spectrum of changes — from functional nanomaterials and plasma-based technologies to the mechanics governing material behaviour and structural integrity. The presented studies highlight the interdisciplinary approaches that are defining the next level of engineering solutions.

Chapter 1: Functional Nanomaterials explores materials engineered at the nanoscale to achieve unique optical, electrical or mechanical properties. The research presented here demonstrates how controlled nanostructures enable breakthroughs in modern technologies.

Chapter 2: Engineering Applications of the Plasma State examines the use of plasma processes across industrial and scientific fields. This chapter discusses plasma state modelling, plasma-wall interaction, and other related topics, emphasising how plasma–matter interactions can enable high-performance technological applications.

Chapter 3: Mechanics of Materials and Structural Mechanics focuses on the behaviour of materials and structural elements under various loading and environmental conditions. It highlights analytical, numerical, and experimental approaches that support safer, more efficient, and optimised engineering designs across industries.

The edition illustrates how modern materials science, plasma engineering, and structural mechanics contribute to the development of contemporary engineering capabilities. This special edition aims to provide valuable insights for researchers, engineers, and students working at the forefront of materials innovation.