# Preface

The recent advancements and innovations in technology and engineering have significantly transformed various scientific currents and industrial domains. This special edition presents a comprehensive exploration of key topics in modern materials science and engineering, covering functional nanostructures, nanomechanics, alloys, building materials, construction mechanics, and engineering design. The collected articles highlight emerging trends, and offer practical applications of received research results, making this edition an invaluable resource for researchers and engineers alike.

Chapter 1, "Functional Nanostructures", delves into the properties and synthesis of nanostructured materials for specialised applications such as sensing and membrane technologies, emphasizing their transformative impact on modern engineering.

Chapter 2, "Nanomechanics", investigates the mechanical behaviour of nanoscale materials and structures. It examines theoretical and experimental approaches to understanding nanoscale forces, deformation mechanisms, and their implications for nanotechnology applications.

Chapter 3, "Alloys", discusses the modelling of structure and properties and corrosion performance of some alloys used in various industrial sectors. The investigations are based on computational materials science and numerical analysis.

Chapter 4, "Building Materials", focuses on researching properties of innovative and sustainable materials for construction, emphasizing their role in enhancing durability, energy efficiency, and environmental sustainability in the built environment.

Chapter 5, "Construction Mechanics", examines the principles of structural integrity, load distribution, and materials and structural elements' behaviour in construction using modern computational methods and analytical models that aid in designing efficient structures.

Chapter 6, "Engineering Design", provides research results using methodologies and principles of modern design engineering for investigation of the effect of auxiliary leaf springs on the operation of trucks and analyses the potential of triply periodic minimal surface structures in lightweight engineering and impact protection systems requiring synergistic mechanical performance.

This special edition is structured to provide a well-rounded perspective on contemporary challenges and advancements in engineering and will serve as a valuable reference in academic research.