

# Preface

This special edition presents contemporary research contributions and engineering solutions that address fundamental and applied challenges in applied thermodynamics and materials for energy storage and energy conversion technologies. The articles collectively reflect the growing importance of advanced numerical modelling tools and innovative materials in achieving higher efficiency, reliability, and environmental responsibility in modern engineering systems.

Chapter 1 presents numerical investigations of heat and mass transfer processes, emphasising advanced mathematical modelling and computational methods for analysing complex thermodynamic and mass transport systems across engineering applications.

Chapter 2 focuses on sustainable energy materials, addressing materials design, their performance optimisation, durability, and environmental considerations in energy storage and conversion technologies.

The special edition provides a multidisciplinary perspective that integrates computational modelling with theoretical approaches and experimental validation to address pressing engineering and technological challenges, offering valuable insights for researchers and practitioners.