# Special Issue

# Green and Scalable Bioprocess Engineering: Enzymatic Systems, Process Intensification and Sustainable Applications

## Message from the Guest Editors

The transition towards a bio-based and sustainable economy requires the development of efficient, scalable, and environmentally conscious bioprocesses. Recent advances in enzymatic systems, process intensification, and upstream–downstream integration are enabling the development of greener and more robust bioprocesses. These innovations support both industrial and bio-pharmaceutical sectors, offering new pathways for the synthesis of therapeutic proteins, secondary metabolites, and specialty chemicals with reduced environmental impact. Topics include, but are not limited to:

- Enzymatic biocatalysis for pharmaceutical and industrial applications
- Process intensification in fermentation and bioconversion systems
- Integration of upstream and downstream operations in continuous or semi-continuous modes
- Bioprocess scale-up and pilot-to-industrial implementation
- Green chemistry principles in bioprocess design and synthesis routes
- Valorization of renewable resources and biomass in the context of the bioeconomy
- Design of eco-efficient unit operations and bioreactor systems
- Application of sustainable solvents and low-impact raw materials

#### **Guest Editors**

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mdpi.com/si/239019

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