

Special Issue

Optimization and Analysis of Bioprocesses in Bioreactors

Message from the Guest Editor

This Special Issue, titled “Analysis and Optimization of Bioprocesses in Bioreactors,” aims to highlight recent advances and innovative approaches in the design, modeling, monitoring, and control of bioprocesses. Contributions addressing both fundamental insights and practical applications are welcome, with particular emphasis on strategies that enhance process intensification, integration, and industrial implementations. Topics include, but are not limited to, the following:

- Modeling, simulation, and computational fluid dynamics (CFD) of bioreactor systems.
- Optimization of mass and heat transfer in microbial, enzymatic, algal (including microalgae), and mammalian cell culture processes.
- Novel bioreactor configurations and hybrid technologies.
- Genetic modifications and metabolic engineering in bioprocesses.
- Process intensification and sustainable scale-up strategies.
- Sustainable biorefineries and integration into the circular bioeconomy.
- Bioprocess monitoring, automation, and control, including AI- and machine learning-based approaches.
- Biomedical and pharmaceutical applications of bioreactors.
- Energy-efficient operations and techno-economic or life-cycle assessments.

Guest Editor

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Message from the Editor-in-Chief

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