Special Issue

Mechanistic and Data-Driven Modelling Approaches for Regulatory Networks and Diseases

Message from the Guest Editor

The complexity of biological regulatory networks presents significant challenges for understanding their roles in health and disease. Unravelling the dynamics of these networks is crucial for deciphering disease mechanisms. Mechanistic modelling is a powerful tool in this field, enabling researchers to predict system behaviours, identify potential therapeutic targets, and simulate the effects of drug interventions. In addition, advances in high-throughput technologies, such as genomics, transcriptomics, proteomics, and single-cell sequencing, have generated vast datasets, offering unprecedented opportunities to develop data-driven models that uncover underlying regulatory mechanisms and provide predictive insights into disease processes. The integration of mechanistic models, which leverage established biological knowledge, with data-driven approaches, which utilize cutting-edge machine learning and AI techniques, has opened new frontiers in systems biology. I invite you to contribute research articles and review papers that highlight novel mechanistic modelling and data-driven approaches for understanding regulatory networks and discovering mechanisms for disease intervention.

Guest Editor

Dr. Tianhai Tian
School of Mathematics, Monash University, Melbourne 3800, Australia

Deadline for manuscript submissions

20 December 2025

MDPI

About the Journal

Message from the Editor-in-Chief

The International Journal of Molecular Sciences (*IJMS*, ISSN 1422-0067) is an open access journal, which was established in 2000. The journal aims to provide a forum for scholarly research on a range of topics, including biochemistry, molecular and cell biology, molecular biophysics, molecular medicine, and all aspects of molecular research in chemistry. *IJMS* publishes both original research and review articles, and regularly publishes special issues to highlight advances at the cutting edge of research. We invite you to read recent articles published in *IJMS* and consider publishing your next paper with us.

Editor-in-Chief

Prof. Dr. Maurizio Battino
Department of Odontostomatologic and Specialized Clinical Sciences, Sez-Biochimica, Faculty of Medicine, Università Politecnica delle Marche, Via Ranieri 65, 60100 Ancona, Italy

Author Benefits

Open Access:
free for readers, with article processing charges (APC) paid by authors or their institutions.

High Visibility:
indexed within Scopus, SCIE (Web of Science), PubMed, PMC, MEDLINE, Embase, CAPlus / SciFinder, and other databases.

Journal Rank:
JCR - Q1 (Biochemistry and Molecular Biology) / CiteScore - Q1 (Organic Chemistry)