

Special Issue

Mathematical Modeling of Neurons and Brain Networks: Fundamental Principles and Special Applications

Message from the Guest Editor

Understanding brain dynamics and function is one of the most relevant topics nowadays. Coupling between brain subsystems and the impact of different cell types and synapses was reported by many groups all over the world and these phenomena need to be summarized as mathematical models since adequate mathematical modeling has been always considered as a significant step in understanding phenomena of nature. Though many models have been already constructed, they are still far from covering most observed phenomena. This Special Issue is devoted to answering the following specific questions:

- Models of neurons and synapses, including new models, comparison of existing ones, computational issues, fitting models to data, etc.
- Models of brain subsystems, i.e. limbic system, thalamocortical system, etc.
- Models of sleep and wakefulness and the transitions between them.
- Memory models.
- Models of disorders and disease, including epilepsy, Parkinsonism, thalamocortical dysrhythmia, Alzheimer's disease, etc.
- Approaches to model (re)construction from experimental data.

Submissions on any other topics related to the general subject of this Special Issue are also welcome.

Guest Editor

Prof. Dr. Ilya V. Sysoev

1. Department of Nano- and Biomedical Technologies, Saratov State University, 410012 Saratov, Russia
2. Saratov Branch of Kotelnikov Institute of Radioengineering and Electronics of Russian Academy of Sciences, 410019 Saratov, Russia

Deadline for manuscript submissions

closed (31 May 2023)



Mathematics

an Open Access Journal
by MDPI

Impact Factor 2.2
CiteScore 4.6



mdpi.com/si/89889

Mathematics
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
mathematics@mdpi.com

[mdpi.com/journal/
mathematics](https://mdpi.com/journal/mathematics)





Mathematics

an Open Access Journal
by MDPI

Impact Factor 2.2
CiteScore 4.6



[mdpi.com/journal/
mathematics](https://mdpi.com/journal/mathematics)



About the Journal

Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

Editor-in-Chief

Prof. Dr. Francisco Chiclana

School of Computer Science and Informatics, De Montfort University,
The Gateway, Leicester LE1 9BH, UK

Author Benefits

High Visibility:

indexed within Scopus, SCIE (Web of Science), RePEc, and other databases.

Journal Rank:

JCR - Q1 (Mathematics) / CiteScore - Q1 (General Mathematics)

Rapid Publication:

manuscripts are peer-reviewed and a first decision is provided to authors approximately 18.4 days after submission; acceptance to publication is undertaken in 2.4 days (median values for papers published in this journal in the first half of 2025).