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Biological Network Analysis and Synthesis for Symmetry

Guest Editors:

Prof. Dr. Katsumi Sakata
Department of Life Science and Informatics, Maebashi Institute of Technology, Maebashi 371-0816, Japan

Prof. Dr. Ning Zhong
Department of Life Science and Informatics, Maebashi Institute of Technology, Gunma, Japan

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Message from the Guest Editors

Dear Colleagues,

The biological phenomena related to the term symmetry—or asymmetry—should stimulate researcher interest. These phenomena are observed in various fields. Schrödinger suggested that a life system takes orderliness from its environment and sustains itself at a fairly high level of orderliness. First, the environment which is the world of nature itself changes irreversibly, paraphrased as asymmetrically in time. Topics of interest can be exemplified as the following. Plants exhibit a reversible or irreversible response according to environmental stresses. Signal transmission from an animal eye to a visual cortex eventually became symmetric during the process of evolution and is easily modified (i.e., becomes asymmetric) due to an environmental perturbation. Rooney et al. suggested structural asymmetry enhances the stability of diverse food webs. Gardner et al. developed a genetic toggle switch with a symmetric network structure in *Escherichia coli*. The last example demonstrates that symmetry should be a design target in synthetic biology...

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Editor-in-Chief

Prof. Dr. Sergei Odintsov
ICREA, 08010 Barcelona and Institute of Space Sciences (IEEC-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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Contact Us

Symmetry Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
www.mdpi.com

mdpi.com/journal/symmetry
symmetry@mdpi.com
𝕏@Symmetry_MDPI