Special Issue

Symmetry in Advanced Marine Technologies: Energy Harvesting, Autonomous Systems, and Smart Ocean Exploration

Message from the Guest Editors

The sustainable exploration and utilization of marine resources have become critical in addressing global energy demands, environmental monitoring, and underwater infrastructure development. Recent advancements in marine vehicles (e.g., ROVs, AUVs), wave/ocean current energy harvesting, and triboelectric nanogenerators (TENGs) exhibit symmetry-driven design principles—from the hydrodynamic symmetry of underwater vehicle propulsion to geometric symmetry optimization in energy converters for maximal efficiency. Meanwhile, Artificial Intelligence (AI) and the Marine Internet of Things (MIoT) leverage symmetrical data architectures and self-similar control algorithms to enhance underwater navigation and real-time decision-making. This Special Issue seeks cutting-edge reviews, and case studies exploring symmetry-aware approaches in advanced marine technologies—particularly in energy harvesting, autonomous systems, and smart ocean exploration. We aim to foster interdisciplinary collaboration across engineering, materials science, computer science, and oceanography.

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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.

Editor-in-Chief

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