

Special Issue

Microbial Life at the Extremes: From Environmental Diversity to Functional Insights

Message from the Guest Editors

Microorganisms thriving in extreme environments, such as deep-sea hydrothermal vents, hypersaline lakes, polar regions, acidic hot springs, high-pressure ecosystems, and human-made (synthetic) extreme environments like acid mine drainage (AMD), represent some of the earliest and most resilient forms of life. Their unique metabolic and physiological adaptations provide critical insights into the limits of life on Earth and, potentially, beyond it. This Special Issue aims to explore the diversity, ecological roles, and functional adaptations of microorganisms in both natural and synthetic extreme environments, emphasizing their significance in ecosystem functioning, biogeochemical cycles, and biotechnology potential. We seek to showcase novel findings in microbial genomics, functional adaptations, biosignatures, and survival strategies under extreme conditions, with relevance to extremobiology, astrobiology, and biotechnology. We invite original research articles, reviews, and short communications focusing on microbial diversity, functional genomics, metabolic pathways, biosignatures, and biotechnological applications in natural and human-made extreme environments.

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A major strength of biological science is the diversity of approaches that biological scientists apply to their research problems. *Biology* reflects this diversity and brings together studies employing the varied experimental and theoretical approaches that are fueling biological discovery. *Biology*, the journal, is a fully peer-reviewed publication with a rapid and economical route to open access publication and is listed on PubMed. All articles are peer-reviewed and the editorial focus is on determining that the work is scientifically sound rather than trying to predict its future impact.

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