

Special Issue

Artificial Intelligence for Evolutionary Genomics: From Sequences to Systems

Message from the Guest Editors

This Special Issue, *Artificial Intelligence for Evolutionary Genomics: From Sequences to Systems*, highlights cutting-edge AI applications in genome evolution, phylogenomics, and cross-species genomic analyses. We welcome original research articles, reviews, and methodological studies that harness AI for challenges such as sequence alignment, ortholog prediction, phylogenomic inference, evolutionary dynamics, and genomic prediction. Submissions addressing critical challenges, such as model interpretability, scalability for large datasets, and multi-omics integration, are particularly encouraged. By bridging AI and bioinformatics, this Special Issue will accelerate discoveries in molecular evolution, refine comparative genomic methodologies, and pioneer innovative tools for unravelling the genetic foundations of biodiversity. Topics of interest include, but are not limited to, the following:

- AI-based methods for sequence alignment and homology detection;
- ML and DL methods for ortholog/paralog identification;
- Metrics for evaluating phylogenetic classification;
- Frameworks for comparing AI-generated trees or alignments with reference data;
- Tree reconstruction using AI-based models.

Guest Editors

Dr. Lingling Jin

Department of Computer Science, University of Saskatchewan,
Saskatoon, SK S7N 5C9, Canada

Dr. Nadia Tahiri

Department of Computer Science, University of Sherbrooke, 2500 Bd
University, Sherbrooke, QC J1K 2R1, Canada

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Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
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Prof. Dr. Paolo Bellavista
Department of Computer Science & Engineering (DISI), University of
Bologna, 40136 Bologna, Italy

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