



Large Language Models for Bioinformatics, Biomedicine, and Intelligent Healthcare

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Dear Researchers,

It is with great enthusiasm that we invite contributions on the rapidly evolving intersection of large language models, artificial intelligence, bioinformatics, biomedical data science, and intelligent healthcare. In recent years, large language models have emerged as transformative technologies capable of understanding, generating, integrating, and reasoning over complex biomedical information. Their potential extends beyond traditional text processing and now includes clinical decision support, biomedical knowledge discovery, multimodal data analysis, drug discovery, medical imaging, workflow automation, and translational research.

1 Large Language Models in Biomedical Research

Bioinformatics and biomedical research increasingly rely on computational methods capable of processing heterogeneous and rapidly expanding datasets. Established computational approaches have contributed substantially to biological data analysis, medical data mining, and healthcare informatics.

Nevertheless, the growing volume, complexity, and diversity of biomedical information create a need for systems that can integrate multiple data sources and support interpretable and context-aware analysis.

Large language models provide potential mechanisms for connecting biomedical literature, clinical records, molecular information, medical images, biosignals, healthcare knowledge bases, and real-world evidence. They may support scientific question answering, information extraction, evidence synthesis, hypothesis generation, multimodal analysis, workflow automation, and clinical decision support.

These applications extend beyond genomics and other omics disciplines to medical imaging, pathology, pharmacology, public health, clinical informatics, and healthcare delivery. This special topic therefore seeks contributions that critically examine the development, evaluation, application, and limitations of large language models across bioinformatics and biomedicine.

2 Content and Directions

This topic welcomes original research articles, comprehensive reviews, perspectives, technical notes, benchmark studies, and real-world case studies related to large language models and artificial intelligence in bioinformatics, biomedical data science, and



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healthcare intelligence. Topics of interest include, but are not limited to:

- **Large Language Models for Biomedical Knowledge Discovery:** Studies that use LLMs for biomedical literature mining, scientific question answering, evidence synthesis, hypothesis generation, biomedical knowledge graph construction, relation extraction, and automated discovery from large-scale scientific resources.
- **Biomedical Natural Language Processing and Clinical Text Mining:** Research on LLM-based methods for electronic health records, clinical notes, medical reports, biomedical entity recognition, terminology normalization, text classification, clinical summarization, medical dialogue systems, and patient-centered communication.
- **Multimodal Foundation Models for Biomedical Applications:** Studies integrating text with medical images, pathology slides, radiology scans, biosignals, wearable data, laboratory reports, structured clinical data, molecular representations, or other biomedical data modalities for diagnosis, prediction, interpretation, and decision support.
- **LLMs for Bioinformatics Workflows and Research Automation:** Contributions focusing on LLM-assisted data analysis, code generation, database querying, pipeline construction, experimental planning, visualization, statistical interpretation, and human-in-the-loop biomedical research systems.
- **LLM Agents and Autonomous Biomedical Systems:** Research on autonomous or semi-autonomous LLM agents for literature review, data preprocessing, model selection, biomedical database interaction, experiment design, medical reasoning, and decision-making support.

3 Call for Contributions

We invite researchers, clinicians, bioinformaticians, data scientists, engineers, and industry practitioners to submit high-quality contributions that advance the development, evaluation, and application of large language models in biomedical and bioinformatics domains. We particularly encourage interdisciplinary work that bridges artificial intelligence, biomedical science, healthcare, and real-world practice.

Submissions may include original research, systematic reviews, survey articles, methodological studies, benchmark papers, applied case studies, and perspective articles. Both theoretical innovation and practical applications are welcome, especially studies that demonstrate clinical relevance, biological insight, methodological rigor, or translational potential.

4 Ethics and Reproducibility Requirements

Submissions must comply with the journal's ethical and reproducibility requirements. Studies involving human participants, patient records, clinical images, biospecimens, or other identifiable or sensitive information must report the relevant ethical approval, informed-consent arrangements, privacy protections, and data-governance procedures. The use of de-identified or publicly available data should also be clearly documented.

Authors should provide sufficient methodological detail to enable independent evaluation and, where possible, replication. This information should include data sources and selection criteria, preprocessing procedures, model names and versions, prompt templates, system configurations, training settings, evaluation protocols, baseline methods, statistical analyses, and sources of external knowledge.

Studies using proprietary models should report the model name and version, access date, relevant parameter settings, and sufficient prompting information to support independent assessment. If models, datasets, prompts, or outputs cannot be shared, the resulting reproducibility limitations should be clearly acknowledged.

Biomedical LLM evaluations should address relevant risks, including hallucination, factual inconsistency, demographic or clinical bias, data leakage, privacy exposure, domain shift, and potentially unsafe recommendations. Studies proposing clinical applications should include appropriate expert evaluation, uncertainty analysis, clinically meaningful performance measures, and external or prospective validation where feasible. LLM-based systems should not be presented as substitutes for qualified healthcare professionals without sufficient clinical evidence and regulatory consideration.

Authors are encouraged to make their code, prompts, model configurations, evaluation scripts, and appropriately governed datasets available through persistent repositories. Restrictions on data or code access should be explained. All submissions should

clearly report study limitations, potential conflicts of interest, funding sources, and the use of generative AI during the research or manuscript-preparation process.

5 Submission and Publication Information

Manuscripts should be submitted through the ICCK Journal Manuscript Workflow System:

<https://www.icck.org/author/manuscript/start?coden=jaib>

During submission, authors should select the submission type “Large Language Models for Bioinformatics and Intelligent Healthcare.” The submission deadline is 30 June 2027.

The *Journal of Artificial Intelligence in Bioinformatics* normally follows a single-blind peer-review process. Each manuscript is generally evaluated by at least two independent reviewers. The reviewers know the identities of the authors, whereas the identities of the reviewers remain confidential to the authors.

The journal’s standard article processing charge is USD 1,500 for accepted manuscripts. However, article processing charges are currently fully waived for manuscripts submitted before June 2027. Therefore, manuscripts submitted to this special topic by the stated deadline are currently eligible for a full APC waiver. Authors are advised to consult the journal’s official website before submission to confirm the latest publication policies.

Information about the journal’s previous, current, open, and closed special topics is available through the Special Topics section of the journal website:

<https://www.icck.org/jaib/topic/4d0864aedd2d>

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Conflicts of Interest

The author declares no conflicts of interest.

AI Use Statement

The author declares that ChatGPT was used for language editing and proofreading of this manuscript to improve clarity. The author has carefully reviewed, revised, and verified all AI-assisted output and takes full responsibility for the content of the manuscript.

Ethical Approval and Consent to Participate

Not applicable.



Muhammad Usman Saeed is an emerging researcher in computer science and artificial intelligence, specializing in deep learning, machine learning, computer vision, and medical image analysis. He earned his Ph.D. in Computer Science and Engineering from Central South University, China, where his doctoral research focused on spine image analysis based on multi-view feature fusion. Dr. Saeed is currently a Research Associate in AI/ML at Harbin Institute of Technology Shenzhen, China. His research interests include medical image segmentation, spine image analysis, multimodal feature fusion, lightweight deep learning models, attention mechanisms, and AI-driven healthcare applications. He has authored more than 20 scholarly publications on topics such as spine segmentation, brain tumor segmentation, cardiovascular diagnostics, anemia detection, sleep state classification, medical image reconstruction, and vision-language modeling. He has also worked as a data scientist and research assistant, gaining experience in both academic and applied AI projects. Dr. Saeed has received several academic recognitions, including the Outstanding International Graduate Award from Central South University and the Chinese Government Scholarship. His technical expertise includes Python, TensorFlow, PyTorch, Keras, OpenCV, MATLAB, SQL, LaTeX, and deep learning frameworks for computer vision and biomedical applications. (Email: usman@hit.edu.cn)