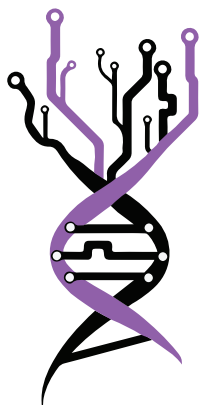


#BelBi2023 • Belgrade, Serbia

# BOOK OF ABSTRACTS



## 4th Belgrade Bioinformatics Conference

**HYBRID • 19 - 23 JUNE 2023**

EDITORS

**Dr. Ivana Morić**

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ISBN: 978-86-82679-14-1

[belbi.bg.ac.rs](http://belbi.bg.ac.rs)

<b>Title</b>	4 <sup>th</sup> Belgrade Bioinformatics Conference BOOK OF ABSTRACTS
<b>Publisher</b>	Institute of Molecular Genetics and Genetic Engineering, University of Belgrade Vojvode Stepe 444a, Belgrade, Serbia <a href="https://www.imgge.bg.ac.rs/">https://www.imgge.bg.ac.rs/</a>
<b>Editors</b>	dr. Ivana Morić dr. Valentina Đorđević
<b>Technical editor</b>	Dušan Radojević
<b>ISBN</b>	<b>978-86-82679-14-1</b>
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# FOREWORD

Dear colleagues and friends,

The 4th Belgrade Bioinformatics Conference - BelBi2023, where many high-quality scientific contributions were presented, has just ended. With great thanks to all participants, we now proudly present a book of abstracts that both reflects the scientific abundance and diversity of the conference and serves as a reminder of a memorable event.

Several research institutions, faculties, and scientific societies from Serbia joined forces in organizing this international conference, which covered numerous topics in computational biology, bioinformatics, and biomedical and health informatics. The main goal of BelBi2023 was to foster contact between scientists, both early stage career and senior researchers, allowing them to share experiences and latest advances in their fields. We sincerely hope that BelBi2023 has served as a platform for researchers from around the world to meet, initiate new collaborations, and expand professional contacts, and that all of you would become a part of the growing BelBi community.

We are grateful and proud to have welcomed more than 250 researchers from 21 countries. We have had 28 scientific sessions, consisting of more than 60 lectures (including eight Keynote talks), 47 presented posters, as well as three workshops and one satellite event – COST action. We have also organized seven industry lectures, including the NGS Challenge,

two Meet the Expert Sessions, and one Business Coffee Break where ten start-up companies took part. And finally, the future BIO4 campus was presented and first panel on Serbia's resources for storage and analyses of genetic data was organized.

We would like to thank all the members of the International Advisory Board and the International Program Committee for their efforts and help in making this event a success. We are very grateful to the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, SAIGE project, and UNDP-Serbia for their support. Finally, the Local Organizing Committee is very grateful to all the sponsors of the conference - BGI, Illumina & Elta'90MS, PacBio & East Diagnostics, ThermoFisher Scientific & Vivogen, Huawei, Labena, DSP Chromatography, RNIDS, Telekom Srbija, Alfa Genetics, Kefo and Superlab, hoping that they will stay with us for many years to come.

Looking forward to seeing you again at the 5<sup>th</sup> Belgrade Bioinformatics Conference.

Belgrade, July 2023

*Dr. Valentina Đorđević*  
& *Dr. Ivana Morić,*  
On behalf of BelBi2023  
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## Semantic unification and search of bioinformatics databases

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Analyzing biological data from various sources offers a comprehensive perspective of a domain, facilitating the identification of patterns that would otherwise be challenging or impossible to observe when focusing solely on individual biological entities. The process of linking data from different databases can present challenges due to inconsistencies in properties and identifiers assigned to the same entity across databases. Although certain databases include a range of identifiers from multiple sources, the search capabilities are restricted to exact property matching, preventing the execution of complex queries involving multiple metadata attributes.

We designed a novel data framework that aims to address these challenges by facilitating the linkage and retrieval of information from diverse interconnected biological data sources. To evaluate the effectiveness of the model, we conducted tests and created a knowledge graph using metadata extracted from five separate public datasets: DisProt, HGNC, Tantigen 2.0, IEDB, and DisGeNET. The resulting graph establishes connections between more than 17 million nodes, comprising 2.5 million distinct biological entity objects, and encompasses over 4 million relationships.

Additionally, we designed and implemented a general-purpose procedure for extracting new relationships based on semantic similarity from data transformed into the BioGraph data model.

**Keywords:** Bioinformatics database, semantic search, unification, BioGraph





ISBN: 978-86-82679-14-1