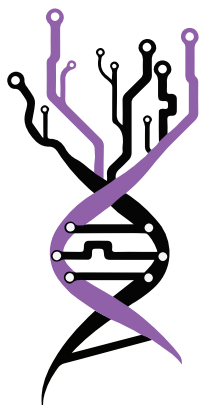


#BelBi2023 • Belgrade, Serbia

# BOOK OF ABSTRACTS



## 4th Belgrade Bioinformatics Conference

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EDITORS

**Dr. Ivana Morić**

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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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## Keynote lectures

### **Bioinformatics education course on gene networks reconstruction using online tools**

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Bioinformatics education requires the use of online computer tools for modeling protein-protein interactions, visual presentation of the networks, access to open databases. The usage of online bioinformatics tools makes it possible to reconstruct both protein and genes networks, and develop modeling skills for students. We consider the issues of computer reconstruction of gene networks - complexes of interacting macromolecules - using a list of genes associated with a particular disease, or a complex disorder based on public online bioinformatics tools - STRING-DB, GeneMANIA, Metascape, Cytoscape applications. Examples of computer reconstruction and visualization of gene networks of oncological diseases including glioma, breast cancer, as well as complex mental disorders such as Parkinson's disease, schizophrenia, were recently published in co-authorship with the students.

The use of only online bioinformatics tools is educational in nature, focused on students, both in mathematics and in natural sciences and medical disciplines, who do not have enough skills in computer science, programming, and writing their own code. Automatic construction of lists of genes associated with a disease using open databases (OMIM, GeneCards, MalaCards), computer reconstruction of gene networks, calculations of enrichment statistics for gene ontology categories have been successfully mastered by students. The educational bioinformatics materials designed for the students and with the students were tested at several universities in Russia, including courses in English for foreign students studied in Russia.

The tasks of digitalization of medicine, the development of IT technologies are in the priority. The epidemic situation that has existed in recent years and the forced transition to distance learning had accelerated the adoption of measures to change the formats of education, the emergence of new learning platforms. Note a number of qualitatively new tasks of education in the field of digital healthcare, such as the use of blockchain technologies, the use of Artificial Intelligence (AI) methods in support of medical decision-making. Overall, the educational course developed includes a theoretical part (video lessons) and a practical part - performing tasks on the use of computer programs and databases that have found a number of applications for medical problems in the reconstruction and analysis of networks of interactions of macromolecules.

**Keywords:** bioinformatics, education, data mining, computer science, gene networks





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