

#BelBi2023 • Belgrade, Serbia

BOOK OF ABSTRACTS



4th Belgrade Bioinformatics Conference

HYBRID • 19 - 23 JUNE 2023

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ISBN: 978-86-82679-14-1

belbi.bg.ac.rs

Title	4 th Belgrade Bioinformatics Conference BOOK OF ABSTRACTS
Publisher	Institute of Molecular Genetics and Genetic Engineering, University of Belgrade Vojvode Stepe 444a, Belgrade, Serbia https://www.imgge.bg.ac.rs/
Editors	dr. Ivana Morić dr. Valentina Đorđević
Technical editor	Dušan Radojević
ISBN	978-86-82679-14-1
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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 5th Belgrade Bioinformatics Conference.

Belgrade, July 2023

Dr. Valentina Đorđević
& *Dr. Ivana Morić,*
On behalf of BelBi2023
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Computational bioengineering for heart disease

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In silico clinical trials are a new paradigm for development of a new drug and medical device. SILICOFCM project is multiscale modeling of familial cardiomyopathy which considers a comprehensive list of patient specific features as genetic, biological, pharmacologic, clinical, imaging and cellular aspects.

The 3D deformable-body represents the left and right ventricle of the heart. Blood flow is modeled during the filling phase by applying the fluid-solid interaction method. The ventricle wall is modeled by 3D brick 8-node solid elements, with fibers that have three-dimensional direction. The Navier-Stokes equations are solved using the ALE formulation for fluid with large displacements of the boundary. The ventricle wall model is simulated by the muscle material model. Muscle fiber orientation is defined by direction vector in 3D prescribed through input data. The outlet blood pressure is used as the boundary condition. At the same time, the wall muscle fibers are activated according to the activation function taken from specific patient measurements.

Computational Platform for Multiscale Modelling in biomedical engineering is results of SGABU project that is served as an educational tool for students and researchers. The platform integrates already developed solutions and various datasets related to cancer, cardiovascular, bone disorders and tissue engineering into one multiscale platform. This will enable further validation and parameterization of models, creation of environment for future trends, e.g. *in silico* clinical trials, virtual surgery, development of prediction models. InSilc project is devoted to *in silico* mechanical stent testing within ISO 25539 standards and *in silico* stent deployment for metallic and biodegradable material.

In-silico projects will connect basic experimental research with clinical study and bioinformatics, data mining and image processing tools using very advanced computer models for drug, stent and patient database in order to reduce animal and clinical studies.

Keywords: bioinformatics, *in silico* clinical trials, data mining, cardiovascular disease

Acknowledgement: This paper is supported by the projects that have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952603 (SGABU project). This paper reflects only the author's view. The Commission is not responsible for any use that may be made of the information it contains.



ISBN: 978-86-82679-14-1