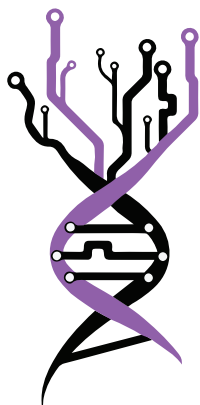


#BelBi2023 • Belgrade, Serbia

BOOK OF ABSTRACTS



4th Belgrade Bioinformatics Conference

HYBRID • 19 - 23 JUNE 2023

EDITORS

Dr. Ivana Morić

Dr. Valentina Đorđević

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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Application of classification algorithms for hip implant surface topographies

Aleksandra Vulović^{*1,2}, Tijana Geroski^{1,2}, and Nenad Filipović^{1,2}

¹ Faculty of Engineering University of Kragujevac,
Sestre Janjić 6, 34000 Kragujevac, Serbia

² Bioengineering Research and Development Center (BioIRC),
Prvoslava Stojanovića 6, 34000 Kragujevac, Serbia
aleksandra.vulovic@kg.ac.rs

Experimental studies have shown that lower shear stress values lead to better femoral bone – hip implant connection. Numerical simulations have provided option to reduce the number of experimental studies through analysis of different hip implant surface topographies. However, this approach takes time as there are different model parameters that should be considered in order to understand how they affect the obtained shear stress values. The use of classification algorithms is an approach that could reduce the time required for simulation by providing information about models with biggest potential. Eleven model parameters related to model and surface topography were considered in combination with four classification algorithms - Support Vector Machines (SVM), K - Nearest Neighbor (KNN), Decision Tree (DT), and Random Forest (RF). The considered parameters were: Number of half-cylinders lengthwise (>0); Number of half-cylinder rows (≥ 0); Half cylinders added or removed from the surface (0 – removed; 1 - added); Distance between half-cylinders lengthwise (≥ 0); Distance between half-cylinders widthwise (≥ 0); Number of different radius values (1 or 2); Radius 1 value (>0); Radius 2 value (≥ 0); Distance from the edge where loading is located (≥ 0); Distance from the other edge of the model (≥ 0); Model includes trabecular bone (0 – not included; 1 - included). The aim was to apply previously mentioned algorithms to obtain information if the maximum shear stress value was above or below user-defined threshold. The obtained results show that this approach can be useful to obtain preliminary information about models that should be numerically analyzed.

Keywords: classification, finite element analysis, hip implant, surface topographies

Acknowledgement: This research is supported by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 952603 - SGABU. This article reflects only the author's The Commission is not responsible for any use that may be made of the information it contains. Authors also acknowledge the funding by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, contract number [451-03-47/2023-01/200107 (Faculty of Engineering, University of Kragujevac)].



ISBN: 978-86-82679-14-1