

#BelBi2023 • Belgrade, Serbia

# BOOK OF ABSTRACTS



## 4th Belgrade Bioinformatics Conference

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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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## Newest Advances on the FeatureCloud Platform for Federated Learning in Biomedicine

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AI in biomedicine has been a central research topic in recent years. Although there are many different techniques and strategies, the majority rely on data that is of both high quality and quantity. Despite the steady growth in the amount of data generated for patients, it is frequently difficult to make that data useful for research because of strong restrictions through privacy regulations such as the GDPR. Through federated learning (FL), we are able to use distributed data for machine learning while keeping patient data inside the respective hospital. Instead of sharing the patient data, like in traditional machine learning, each participant trains an individual machine learning model and shares the model parameters and weights. Existing FL frameworks, however, frequently have restrictions on certain algorithms or application domains, and they frequently call for programming knowledge.

With FeatureCloud, we addressed these limitations and provided a user-friendly solution for both developers and end-users. FeatureCloud greatly simplifies the complexity of developing federated applications and executing FL analyses in multi-institutional settings. Additionally, it provides an app store that makes it easy for the community to publish and reuse federated algorithms. Apps can be chained together to form pipelines and executed without programming knowledge, making them ideal for flexible clinical applications. Apps on FeatureCloud can receive certification from both internal and external reviewers to guarantee safety. FeatureCloud effectively separates local components from sensitive data systems by utilizing containerization technology, making it robust to execute in any system environment and guaranteeing data security. To further ensure the privacy of data, FeatureCloud incorporates privacy-enhancing technologies and complies with strict data privacy regulations, such as GDPR.

**Keywords:** federated learning, biomedicine, privacy-preserving machine learning, patient privacy

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