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ECCB 2018

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Editorial

ECCB 2018: The 17th European Conference on Computational Biology

On behalf of the ECCB 2018 Steering Committee, Artemis G. Hatzigeorgiou (ECCB 2018 Conference Chair)[1,2], Pantelis Bagos (ECCB 2018 Conference Co-chair)[3], Panayiotis V. Benos (ECCB 2018 Programme Chair)[4], Christoforos Nikolaou (ECCB 2018 Proceedings Chair)[5], Yves Moreau (ECCB 2018 Highlights Chair)[6] and Ioannis Kavakiotis (ECCB 2018 Local Organizing Committee Co-chair)[1]

[1]DIANA-Lab, Department of Electrical & Computer Engineering, University of Thessaly, 382 21 Volos, Greece, [2]DIANA-Lab, Hellenic Pasteur Institute, 127 Vasilissis Sofias Avenue, 11521 Athens, Greece, [3]Department of Computer Science and Biomedical Informatics, University of Thessaly, Papasiopoulou 24, Lamia 35100, Greece, [4]Department of Computational and Systems Biology, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania 15260, USA, [5]Computational Genomics Group, Department of Biology, University of Crete, Herakleion 70013, Greece and [6]Department of Electrical Engineering (ESAT), STADIUS Center for Dynamical Systems, Signal Processing and Data Analytics, University of Leuven, Belgium

This volume of Bioinformatics includes the proceedings papers of the 17th European Conference in Computational Biology (ECCB), an annual international Conference for research in computational biology and bioinformatics.

The Conference is being held jointly with ISMB in the odd-numbered years and independently in the even-numbered years.

This year, the 17th ECCB (ECCB 2018) will take place in Athens, at the Stavros Niarchos Foundation Cultural Center (SNFCC), from September 8 to 12, 2018.

SNFCC, which was opened in June 2017, is a multifunctional arts, education and entertainment complex located on the edge of Faliro Bay, 4.5 km south of the center of Athens.

Information on the ECCB 2018 can be found at eccb18.org and will be later archived at www.ebi.ac.uk/eccb/2018/.

With more than 1,000 participants from academia and industry, ECCB is the leading European Conference on computational biology and bioinformatics and the second largest internationally, next to ISMB (Intelligent Systems in Molecular Biology). The work presented in ECCB is related to all domains of the field of computational biology and bioinformatics, ranging from molecular level to systems biology level. The proceedings papers present new computational methodologies and tools for addressing challenging problems in the field, including research in single cell high-throughput data, microbiome data, 3D organization of the genome, and others. The Conference also includes Highlights presentations, which showcase important papers published over the last year. Since 2016, it also features an Applications track that presents computational biology work applied in industry, clinics, governmental organizations, and other fields beyond academia.

ECCB meetings are held every year in a different European country. In odd-numbered years, ECCB is co-organized with the ISMB Conference, which is held in Europe. Previous meetings were organized in Prague, Czech Republic (Beerenwinkel and Bromberg, 2017, ISMB/ECCB 2017); The Hague, Netherlands (Heringa and Reinders, ECCB 2016); Dublin, Ireland (Moreau and Beerenwinkel, 2015, ISMB/ECCB 2015); Strasbourg, France (Devignes and Moreau, 2014, ECCB 2014); Berlin, Germany (Ben-Tal, 2013, ISMB/ECCB 2013); Basel, Switzerland (Schwede and Iber, 2012, ECCB 2012); Vienna, Austria (Gaasterland and Vingron, 2011, ISMB/ECCB 2011); Ghent, Belgium (Moreau and Heringa, 2010, ECCB 2010); Stockholm, Sweden (Gusfield and Tramontano, 2009, ISMB/ECCB 2009); Cagliari, Italy (Tramontano, 2008, ECCB 2008); Vienna, Austria (Lengauer et al., 2009, ISMB/ECCB 2007); Eilat, Israel (Wolfson and Safer, 2006, ECCB 2006); Madrid, Spain (Guigo et al., 2005, ECCB 2005); Glasgow, United Kingdom (Thornton et al., 2004, ISMB/ECCB 2004); Paris, France (Lenhof and Sagot, 2003, ECCB 2003); and Saarbrücken, Germany (Lengauer, 2002).

ECCB 2018 continues the 16-year tradition and is held under the auspices of the Hellenic Society for Computational Biology and Bioinformatics (HSCBB; www.hscbb.gr), which promotes bioinformatics research and training in Greece since 2009.

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HSCBB organizes an annual conference in a different Greek city each time (*e.g.*, Athens, Thessaloniki, Alexandroupolis, Patras, Lamia, Heraklion), aiming to provide exposure to new field developments to graduate students and researchers. The broad participation in the annual HSCBB conferences (more than 130 participants each year) show that the bioinformatics community in Greek universities and research centers has now matured significantly. HSCBB has also a strong international presence in the field of computational biology. It is an observer in the Greek ELIXIR consortium and is affiliated with the International Society for Computational Biology (ISCB) and Global Organization for Bioinformatics Learning, Education & Training (GOBLET). The organization of ECCB 2018, along with the European Student Council Symposium 2018 (see below), inspired the formation this year of the Greek chapter of the ISCB Student Council.

ECCB 2018 received a record high number of 280 applications for proceedings talks from institutions from 48 countries. The submissions were organized in five themes, according to their topic: (1) Data (organization, integration, knowledge discovery, multi-scale modeling), (2) Genes (expression, function, editing, geno/phenotype), (3) Genome (sequence analysis, evolution, phylogeny, microbiome), (4) Proteins and Structural Biology (structure, function, alterations, drug design), and (5) Systems (molecular pathways, signaling, metabolomics). All proceedings submissions were subjected to a rigorous peer-review process (2-4 reviews per paper), organized by the members of the Programme Committees of the corresponding theme. The Programme Committees consisted of a Theme Chair (Michael Krauthammer, Roderic Guigo, Martin Vingron, Ivet Bahar, Alfonso Valencia, respectively) and two to four co-chairs (depending on the number of submissions assigned to this Theme). For the review, the EasyChair system (www.easychair.org) was used by 398 reviewers, recruited by the Programme Committees. Reviewers evaluated the impact and reproducibility of the presented research, as well as its suitability for the ECCB audience. Once the review was completed, the committee chairs and co-chairs selected 48 papers to be included in the ECCB 2018 proceedings (acceptance rate: 17%), with the number of papers accepted in each being proportional to the number of submissions initially assigned to this Theme. These papers required minor revisions and the authors had two weeks to modify them accordingly. All Proceedings Track papers and any supplementary files accompanying them are freely available in the electronic form of Oxford University Press journal *Bioinformatics*, as a special issue of September 2018.

Together with the Proceedings track ECCB 2018 features 24 Highlights talks about scientific work already published in high impact science journals. They are coordinately presented and managed across the five themes with the proceeding presentations.

We continued with newly established Application and ELIXIR tracks with 15 Applications talks, and 12 ELIXIR talks, all of which were selected after review. The aim of the Application track is to give a voice to those who apply computational biology in industry, clinics, governmental organizations, and other fields beyond academia. The aim of the ELIXIR Track is to showcase to the community the latest outputs and services from across the initiative. The presentations focus on developments relating to services and infrastructure within ELIXIR.

ECCB 2018 also features a Poster Track, with 617 accepted posters, in which researchers present their latest findings in the corresponding thematic areas (Data, Genes, Genome, Proteins and Structural Biology, Systems).

Seven distinguished keynote speakers will present their work: Prof. Bonnie Berger from the Massachusetts Institute of Technology (MIT), Prof. Christos Davatzikos from University of Pennsylvania, Prof. John Ioannidis from Stanford University, Prof. Manolis Kellis from MIT, Prof. Jose Onuchic from Rice University, Dr. Janet Thornton, Director Emeritus of the European Bioinformatics Institute (EMBL-EBI), and Dr. Eleftheria Zeggini from the German Research Center for Environmental Health (GmbH). Furthermore, ECCB 2018 is hosting for the first time three special invited talks before the lunch breaks and a joint keynote talk. The invited speakers will present the funding opportunities of the European Research Council (ERC) funding mechanisms (Dr. Maria Siomos) and a talk on the ISCB Student Council Internship Program (Farzana Rahman). The joint keynote will be about ELIXIR: A Common European Infrastructure for Bioinformatics Research presented by the ELIXIR director Dr. Niklas Blomberg. For the first time in ECCB 2018, ELIXIR organizes eight short workshops, namely ELIXIR TeSS Usability Study, Beacons, BioSchemas, Galaxy, OpenEbench Fnd Bio.tools, Research under the GDPR, Implementation of DMPs and Data Stewardship in practice, Secure access to your services using ELIXIR AAI.

The 5th European Student Council Symposium (ESCS) is taking place before the main conference organized by the Student Council of the ISCB (chair Daniele Parisi from KU Leuven and co-chair Yvonne Saara Gladbach from Rostock University). ESCS highlights will be published in F1000Research via the ISCB Student Council channel. For the first time the ISCB Student Council will present also an invited talk as stated above. We are really thankful to the ISCB Student Council for their enthusiasm, hard work and genuine scientific interest, which has made the ESCS an inseparable part of ECCB.

During the ECCB 2018, ten exhibitor booths of all sizes will be set up on the Exhibit Hall floor, next to the central Conference venue and close to the Poster session and lunch area, namely: ELIXIR, BioExcel, EMBL-EBI, ERC, ISCB and ISCB Student Council, Goblet, Oxford University Press, Cambridge University Press, Peer Community In. The booths will be grouped together in a way that provides an enhanced networking environment for our exhibitors and delegates. Exhibitors will showcase the latest trends in computational biology and bioinformatics technology, in scientific literature, as well as in modelling and simulation.

We invite participants to visit the exhibition area and support these community-minded organizations, who deliver a strong message in supporting the Computational Biology and Bioinformatics scientific field.

The weekend before the conference 8 workshops (including two from Special Interest Groups – SIGs) and 13 Tutorials will take place. The aim of workshops is to provide participants the opportunity to discuss different perspectives on the cutting edge of a selected research field, through presenting technical issues, exchanging research ideas and sharing practical experiences. The two SIGs and six workshops preceding the ECCB 2018 main conference were selected out of a total of 12 applications, running all but one for a single day:

- (SIG-1) BioExcel 2nd SIG Meeting: Advanced Simulations for Biomolecular Research organized by Rossen Apostolov (KTH Royal Institute of Technology in Stockholm, Sweden), Zoe Cournia (Biomedical Research Foundation of the Academy of Athens, Greece), Vera Matser, (EMBL-EBI, UK), Anastas Mishev (UKIM Saints Cyril and Methodius University of Skopje, Republic of Macedonia), Hrachya Astsatryan (Institute for Informatics and Automation Problems, Armenia), Adam Carter (EPCC, UK)
- (SIG-2): Intrinsically disordered proteins: advances and state-of-the-art of the field organized by Silvio Tosatto (University of

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Padua, Italy), Zsuzsanna Dosztanyi (Eötvös Loránd University, Hungary), Norman Davey (University College Dublin, Ireland), Damiano Piovesan (University of Padua, Italy)

- (W1) Computational Epigenomics a two-day workshop organized by Yassen Assenov (German Cancer Research Center, Germany), Guido Sanguinetti (University of Edinburgh, UK), Jordana Bell (King's College London, UK), Jörn Walter (Saarland University, Germany), Christoph Bock (CeMM Research Center for Molecular Medicine of the Austrian Academy of Sciences, Austria) and Verena Wolf (Saarland University, Germany)
- (W2) BioNetVisA 2018 workshop: From biological network reconstruction to data visualization and analysis in molecular biology and medicine organized by Inna Kuperstein (Institut Curie, France), Emmanuel Barillot (Institut Curie, France), Andrei Zinovyev (Institut Curie, France), Luis Cristobal Monraz Gomez (Institut Curie, France), Hioraki Kitano (RIKEN Center for Integrative Medical Sciences, Japan), Minoru Kanehisa (Institute for Chemical Research, Kyoto University, Japan), Samik Ghosh (Systems Biology Institute, Tokyo, Japan), Nicolas Le Novère (Babraham Institute, UK), Robin Haw (Ontario Institute for Cancer Research, Canada), Alfonso Valencia (Spanish National Bioinformatics Institute, Madrid, Spain), Lodewyk Wessels (Netherlands Cancer Institute, Amsterdam, Netherlands), Patrick Kemmeren (Princess Maxima Center for Pediatric Oncology, Utrecht, Netherlands)
- (W3) CPW2018: Computational Pathology Workshop—second edition organized by Yves Sucaet (Vrije Universiteit Brussel, Belgium), Jeroen Van der Laak (UMC Radboud, Netherlands), Zev Leifer (New York College of Podiatric Medicine, USA), Yukako Yagi (Memorial Sloan Kettering Cancer Center, USA), Raphaël Marée (Université de Liège, Belgium), David Ameisen (IRIF, CNRS and Université Paris Diderot, France), Paul Van Diest (UMC Utrecht, Netherlands), Jeffrey Fine (Magee-Womens Hospital of UPMC)
- (W4) Interactive visualizations to guide health diagnostics and personalized medicine organized by Dimitrios Tzovaras, Konstantinos Votis and Kostas Stamatopoulos (all at Information Technologies Institute of the Center for Research and Technology Hellas, Greece)
- (W5) Logical modelling of cellular networks organized by Anna Niarakis (Univ Evry, Université Paris-Saclay, France) and Denis Thieffry (Ecole Normale Supérieure, Paris, France).
- (W6) Recent Computational Advances in Metagenomics organized by Valentin Loux, Mahendra Mariadassou, Pierre Peterlongo and Sophie Schbath (all at INRA, France)
- The purpose of the ECCB tutorial program is to provide participants with lectures and hands-on training to the most important and emerging topics in bioinformatics and computational biology research. The tutorials offer skills ranging from early and basic steps of computational analysis in recently introduced topics to advanced computational skills in important established topics. A total of thirteen ECCB 2018 tutorials running for half or a full day will be held at ECCB 2018. These were selected out of sixteen applications:
- (T1) Automated Machine Learning for Bioinformatics and Computational Biology organized by Ioannis Tsamardinos (University of Crete, Greece; Gnosis Data Analysis, Greece), Kleio Maria Verrou (University of Crete, Greece) and Vincenzo Lagani (Ilia State University, Georgia; Gnosis Data Analysis, Greece)
- (T2) Computational Mass Spectrometry with OpenMS—From Algorithms to Integrated Workflows organized by Julianus Pfeuffer (Freie Universität Berlin, Germany) and Timo Sachsenberg (Universität Tübingen, Germany)
- (T3)—Write your own R script to jointly analyze RNA-, ATAC-seq, DNA methylation, SNPs and find drug targets in signal transduction networks using TRANSFAC® organized by Philip Stegmaier (geneXplain GmbH, Germany), Olga Kel-Margoulis (geneXplain GmbH, Germany), Alexander Kel (geneXplain GmbH, Germany; Institute of Systems Biology, Russia)
- (T4) Deep learning for predicting protein–DNA and –RNA binding organized by Yaron Orenstein (Ben-Gurion University, Israel)
- (T5) Delving into non-coding RNA with RNAcentral and Rfam. Organized by Anton Petrov and Ioanna Kalvari (both at EMBL-EBI, UK)
- (T6) DIANA Tools and Databases: In silico investigation of miRNA functions organized by Artemis Hatzigeorgiou, Spyros Tastsoglou, Dimitra Karagkouni, Nikos Perdikopanis, Giorgos Skoufos, Ioannis Kavakiotis (all at University of Thessaly, Greece)
- (T7) Exploring programmatic access to Protein sequence, function and structure with UniProt and PDBe organized by Andrew Nightingale and Mihaly Varadi (both at EMBL-EBI, UK)
- (T8) Fifth International Hands-on Tutorial on Logical Modelling: Exploring the dynamics of biological systems organized by Tomas Helikar (University of Nebraska, USA) and Juilee Thakar (University of Rochester Medical Center, USA)
- (T9) From an application to a fully integrated workflow—Comprehensive software engineering with SeqAn organized by René Rahn and Hannes Hauswedell (both at Freie Universität Berlin, Germany)
- (T10) Hands-on on Protein Function Prediction with Machine Learning and Interactive Analytics organized by Rabie Saidi and Tunca Dogan (EMBL-EBI, UK)
- (T11) Single-cell RNA-Seq Data Analysis organized by Panagiotis Papasaikas (Friedrich Miescher Institute for Biomedical Research (FMI), Basel, Switzerland; Swiss Institute of Bioinformatics, Switzerland) and Atul Sethi (Friedrich Miescher Institute for Biomedical Research (FMI), Basel, Switzerland; University Hospital Basel, University of Basel, Switzerland; Swiss Institute of Bioinformatics, Switzerland)
- (T12) Modern and scalable tools for efficient analysis of very large metagenomic datasets organized by Alexander Sczyrba (Bielefeld University, Germany), Christian Henke (Bielefeld University, Germany), Clovis Galiez (MPI for Biophysical Chemistry, Germany), Milot Mirdita (PI for Biophysical Chemistry, Germany) and Johannes Soeding (MPI for Biophysical Chemistry, Germany)
- (T13) User Experience Design for Computational Biologists organized by Nikiforos Karamanis and Xavier Watkins (both at EMBL-EBI, UK)

Finally, following the tradition of ECCB, a number of travel fellowships, sponsored by ISCB, were given to young participants. We received 103 applications from scientists from 31 countries. After careful review and consideration, we awarded 14 travel fellowships, mainly to PhD students from nine countries that had an accepted proceedings paper. Volunteering is another important way for young scientists to visit and support the conference, as well as connect with other young scientists. The skills, talent and dedication of

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the volunteers are expected to largely contribute to the overall quality of the Conference. We made our best to accept all 91 applicants from 16 countries who were eligible to attend the Conference at a very low registration fee.

Next to the volunteers, we would like to thank all the people who helped through their work to make this Conference a success. The Theme Chairs and Co-chairs as well all the reviewers who have been the heart of the Conference and helped selecting excellent papers, making thus this Conference a success. We are truly indebted to them.

We are also grateful to the ECCB Steering Committee for their advice and continuous support, during the various phases of the organization of ECCB 2018.

This conference would not be possible at all without the real support from Anna Tramontano (Chair Steering Committee until 2017 and Chair ECCB 2009). She encouraged our application and gave extended advice about how to make a realistic financial planning of such big event. She was just there when needed despite her busy program. It was our honor to meet and get inspired by her passion for science with openness to dialogue. Her loss in 2017 left a huge void. Thank you, Anna, you will be always in our mind and in our heart.

During the one year of the conference preparation, the support of Torsten Schwede (Chair Steering Committee Chair ECCB 2012), Jaap Heringa (2016) (Chair ECCB 2016), and Yves Moreau (Chair ECCB 2010, Co-chair ECCB 2014) was invaluable. Thank you Jaap, Yves and Torsten for your continuous and prompt availability! We are also grateful to the ISCB (International Society for Computational Biology) for their cooperation and constant support, in advertizing ECCB 2018 at the international level and for offering student fellowships.

This Conference would not be possible without the unwavering support of our contributors and generous sponsors. ELIXIR provided Platinum level sponsorship and BioExcel Project was our Silver level sponsor. EBI-EBL, GOBLET, Cambridge University Press, Oxford University Press, PCI-Peer Community and WeeGreened were bronze sponsors. ISCB, the Student Council of the ISCB, and ERC who registered as exhibitors at ECCB 2018 also provided critical support. A big thank to all for their support, and for helping to make ECCB 2018 such an exciting, productive and rewarding Conference.

A number of people contributed to the local organization of ECCB 2018. They worked beyond their call of duty for making this conference really happen. Maria Pagona, a financial economist, worked as organizing manager. She was responsible for the sponsors, the budgeting, the venue place, the branding collaterals and much more. Chryssoula Pantaki was responsible for catering and accomodation. Panagiotis Vlastaridis was responsible for the technical support of the registration site. Dr. Margaritha Theodoropoulou organized the volunteers. Many members of the DIANA group supported also this conference: Spyros Tastsoglou, Dimitra Karagkouni, Athanasios Alexiou, Nikolaos Perdikopanis, Dimitrios Zisis, Georgios Skoufos. Finally, if the backbone of a conference is its presentations, the conference exists for its participants. We thank all of you for joining us to ECCB 2018. We hope you will enjoy the science, lively discussions, and social events in the city of Athens, the city where democracy, philosophy and dialectics were born.

Conflict of Interest: none declared.

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