

Special Session on Benchmarking of Evolutionary Algorithms for Discrete Optimization (BEADO)

<http://beado.feri.um.si>

IEEE World Congress on Computational Intelligence (WCCI) 2020
2020 IEEE Congress on Evolutionary Computation (IEEE CEC 2020)
19 - 24th July, 2020, Glasgow (UK)



BEADO, the Special Session on Benchmarking of Evolutionary Algorithms for Discrete Optimization, a part of the IEEE Congress on Evolutionary Computation (IEEE CEC) at IEEE World Congress on Computational Intelligence (WCCI) 2020, is cordially inviting the submission of original and unpublished research papers.

Evolutionary Computation (EC) is a huge and expanding field, attracting more and more interests from both academia and industry. It includes a wide and ever-growing variety of optimization algorithms, which, in turn, are applied to an even wider and faster growing range of different problem domains, including discrete optimization. For the discrete domain and application scenarios, we want to pick the best algorithms. Actually, we aim to do more, **we want to improve upon the best algorithm**. This **requires a deep understanding** of the problem at hand, the performance of the algorithms we have for that problem, the features that make instances of the problem hard for these algorithms, and the parameter settings for which the algorithms perform the best. Such knowledge can only be obtained empirically, by collecting data from experiments, by analyzing this data statistically, and by mining new information from it. Benchmarking is the engine driving research in the fields of EAs for decades, while its potential has not been fully explored. **Benchmarking the algorithms of Evolutionary Computation (EC) is an application of EC itself!**

The goal of this special session is to solicit original works on the research in benchmarking, i.e., works which contribute to the domain of benchmarking discrete EC algorithms by adding new theoretical or practical knowledge. Papers which only apply benchmarking or execute only in continuous domain, are not in the scope of the special session.

This special session wants to bring together experts on benchmarking, evolutionary computation algorithms, and **discrete optimization**. It provides a common forum for them to exchange findings, to explore new paradigms for performance comparison, and to discuss issues such as

- modelling of algorithm behaviors and performance
- visualizations of algorithm behaviors and performance
- statistics for performance comparison (robust statistics, PCA, ANOVA, statistical tests, ROC)
- evaluation of real-world goals such as algorithm robustness, and reliability
- theoretical results for algorithm performance comparison
- comparison of theoretical and empirical results
- new benchmark problems
- the comparison of algorithms in “non-traditional” scenarios such as
 - o multi- or many-objective domains
 - o parallel implementations, e.g., using GPUs, MPI, CUDA, clusters, or running in clouds
 - o large-scale problems or problems where objective function evaluations are costly
 - o dynamic problems or where the objective functions involve randomized simulations or noise
- comparative surveys with new ideas on
 - o dos and don'ts, i.e., best and worst practices, for algorithm performance comparison
 - o tools for experiment execution, result collection, and algorithm comparison
 - o benchmark sets for certain problem domains and their mutual advantages and weaknesses

Paper Submission Deadline:	15 January 2020
Notification of Acceptance:	15 March 2020
Camera-Ready Copy Due:	15 April 2020
Author Registration:	15 April 2020
Conference Presentation:	19-24 June 2020

For more information, contact Ales Zamuda <ales.zamuda@um.si> with carbon-copy (CC:) to Tome Eftimov <tome.eftimov@ijs.si> and Stjepan Picek <stjepan@computer.org, s.picek@tudelft.nl>.

Instructions for Authors

LaTeX and Word Templates

To help ensure correct formatting, please use the IEEE style files for conference proceedings as a template for your submission. These include LaTeX and Word style files.

Violations of any of the above paper specifications may result in rejection of your paper.

[LaTeX Template Instructions](#) (PDF, 63 KB) [Be sure to use the template's **conference** mode.]

[Template](#) (ZIP, 700 KB)

[LaTeX Bibliography Files](#) (ZIP, 309 KB)

Microsoft Word

[US letter](#) (DOC, 62 KB)

[A4](#) (DOC, 56 KB)

More information regarding the submission process can be found at the conference website <https://wcci2020.org/submissions/>.

Chairs

- Ales Zamuda, University of Maribor, Slovenia
- Tome Eftimov, Jožef Stefan Institute, Ljubljana, Slovenia
- Stjepan Picek, Delft University of Technology, Netherlands

International Program Committee

- Ales Zamuda, University of Maribor, Slovenia
- Tome Eftimov, Jožef Stefan Institute, Ljubljana, Slovenia
- Stjepan Picek, Delft University of Technology, Netherlands
- TBA...



Chair Biographies



Ales Zamuda is an Assistant Professor and Researcher at University of Maribor (UM), Slovenia. He received Ph.D. (2012), M.Sc. (2008), and B.Sc. (2006) degrees in computer science from UM. His roles also include management committee (MC) membership for Slovenia at European Cooperation in Science (COST), actions CA15140 (ImAppNIO - Improving Applicability of Nature-Inspired Optimisation by Joining Theory and Practice) and IC1406 (cHiPSet - High-Performance Modelling and Simulation for Big Data Applications). He is IEEE Senior Member, IEEE CIS Slovenia Section Chair, IEEE Young Professionals Chair for Slovenia Section, ACM SIGEVO member, ImAppNIO Benchmarks working group vice-chair, and editorial

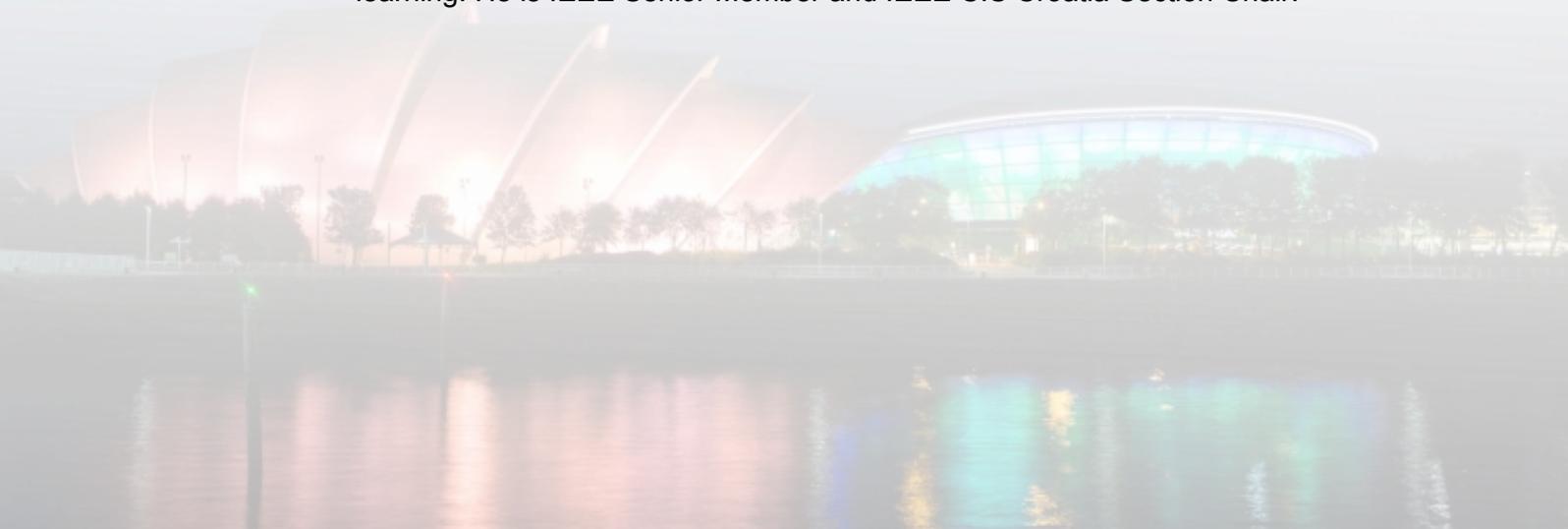
board member (associate editor) for *Swarm and Evolutionary Computation* (2018 IF=6.330). His areas of computer science applications include evolutionary algorithms, multicriterion optimization, artificial life, ecosystems, and computer animation; currently yielding h-index 18, 52 publications, and 1107 citations on Scopus. He won IEEE R8 SPC 2007 award, IEEE CEC 2009 ECiDUE, 2016 Danubius Young Scientist Award, and 1% top reviewer at 2017 Publons Peer Review Awards, including reviews for research projects, 45 journals, and 80 conferences. He was general conference chair of SEMCCO & FANCCO, and co-organizer of BEADO alike at GECCO, PPSN, and CEC.



Tome Eftimov is a researcher at Jozef Stefan Institute, Ljubljana, Slovenia. He worked as a postdoctoral researcher at Stanford University, where in parallel was also a research associate at University of California, San Francisco. His main areas of research include statistics, heuristic optimization, natural language processing, knowledge representation, and machine learning. He was awarded his PhD degree from the Jozef Stefan International Postgraduate School, Ljubljana, Slovenia, in 2018. He is involved in courses on probability and statistics, and statistical data analysis. His work related to Deep Statistical Comparison for benchmarking stochastic optimization algorithms was presented as tutorial (i.e. IJCCI 2018, IEEE SSCI 2019) or invited lecture to several international conferences and universities. In 2019, he was awarded as the best young scientist from the president of North Macedonia. In 2018 and 2019, his work related to benchmarking was selected as Hot-Off-the-Press track at GECCO.



Stjepan Picsek is assistant professor in the Cyber Security research group of the Faculty of Electrical Engineering, Mathematics and Computer Science at Delft University of Technology, The Netherlands. In July 2015, he completed his PhD at Radboud University Nijmegen, The Netherlands and Faculty of Electrical Engineering and Computing, Zagreb, Croatia. After that, he first worked as a postdoctoral researcher at KU Leuven, Belgium and after that, at CSAIL/MIT, USA. Stjepan also worked for a number of years in industry. His main research interests are at the intersection of cryptography, evolutionary computation, and machine learning. He is IEEE Senior Member and IEEE CIS Croatia Section Chair.



Hosting Event

IEEE World Congress on Computational Intelligence (WCCI) 2020

19 - 24th July, 2020, Glasgow (UK)

<https://wcci2020.org/>

The bi-annual IEEE World Congress on Computational Intelligence (IEEE WCCI) is the largest technical event in the field of computational intelligence. The IEEE WCCI 2020 will host three conferences: The 2020 International Joint Conference on Neural Networks (IJCNN 2020 – cosponsored by International Neural Network Society – INNS), the 2020 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2020), and the 2020 IEEE Congress on Evolutionary Computation (IEEE CEC 2020) under one roof. It encourages cross-fertilization of ideas among the three big areas and provides a forum for intellectuals from all over the world to discuss and present their research findings on computational intelligence.

IEEE CEC brings together researchers and practitioners in the field of evolutionary computation and computational intelligence from around the globe. Technical exchanges within the research community will encompass keynote lectures, regular and special sessions, tutorials, and competitions, as well as poster presentations. In addition, participants will be treated to a series of social functions, receptions, and networking events to establish new connections and foster everlasting friendship among fellow counterparts. IEEE CEC covers all topics in evolutionary computation including, but not limited to the following areas:

- Algorithms
 - Ant colony optimization
 - Artificial immune systems
 - Coevolutionary systems
 - Cultural algorithms
 - Differential evolution
 - Estimation of distribution algorithms
 - Evolutionary programming
 - Evolution strategies
 - Genetic algorithms
 - Genetic programming
 - Heuristics, metaheuristics and hyper-heuristics
 - Interactive evolutionary computation
 - Learning classifier systems
 - Memetic, multi-meme and hybrid algorithms
 - Molecular and quantum computing
 - Multi-objective evolutionary algorithms
 - Parallel and distributed algorithms
 - Particle swarm optimization
- Theory and Implementation
 - Adaptive dynamic programming and reinforcement learning
 - Autonomous mental development
 - Coevolution and collective behavior
 - Convergence, scalability and complexity analysis
 - Evolutionary computation theory
 - Representation and operators
 - Self-adaptation in evolutionary computation
- Optimization
 - Numerical optimization
 - Discrete and combinatorial optimization
 - Multiobjective optimization
- Handling of Various Aspects
 - Large-scale problems
 - Preference handling
 - Evolutionary simulation-based optimization
 - Meta-modeling and surrogate models
 - Dynamic and uncertain environments
 - Constraint and uncertainty handling
- Hybrid Systems of Computational Intelligence
 - Evolved neural networks
 - Evolutionary fuzzy systems
 - Evolved neuro-fuzzy systems
- Related Areas and Applications
 - Art and music
 - Artificial ecology and artificial life
 - Autonomous mental and behavior development
 - Biometrics, bioinformatics and biomedical applications
 - Classification, clustering and data analysis
 - Data mining
 - Defense and cyber security
 - Evolutionary games and multi-agent systems
 - Evolvable hardware and software
 - Evolutionary Robotics
 - Engineering applications
 - Emergent technologies
 - Finance and economics
 - Games
 - Intelligent systems applications
 - Robotics
 - Real-world applications
 - Emerging areas