



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

2019 IEEE Congress on Evolutionary Computation (CEC'19)

June 10-13, 2019 in Wellington, New Zealand

<http://iao.hfuu.edu.cn/beado19>

The Special Session on Benchmarking of Evolutionary Algorithms for Discrete Optimization (BEADO), a part of the 2019 IEEE Congress on Evolutionary Computation, is cordially inviting the submission of original and unpublished research papers.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 want 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.

**The goal of this special session is to solicit original works on the research in benchmarking: Works which contribute to the domain of benchmarking of discrete algorithms from the field of Evolutionary Computation, by adding new theoretical or practical knowledge. Papers which only *apply* benchmarking 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 GGPUs, 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:** 31 January 2019 11:59pm US pacific time (extended)

Notification of Acceptance: 7 March 2019

Camera-Ready Copy Due: 31 March 2019 11:59pm US pacific time

Author Registration: 31 March 2019 11:59pm US pacific time

Conference Presentation: 10-13 June 2019 (15min presentation + 4min Q&A)

For more information, contact Markus Wagner at [markus.wagner@adelaide.edu.au](mailto:markus.wagner@adelaide.edu.au) with CC to [tweise@hfuu.edu.cn](mailto:tweise@hfuu.edu.cn) and [ales.zamuda@um.si](mailto:ales.zamuda@um.si).





## Instructions for Authors

More information regarding the submission process can be found at the conference website <http://cec2019.org/papers.html#templates>. Papers can be submitted via <https://ieee-cis.org/conferences/cec2019/upload.php>.

- When submitting your paper, make sure to select “CEC-74. Special Session on Benchmarking of Evolutionary Algorithms for Discrete Optimization” as main research topic!

Main  
research  
topic\*:

CEC-74. Special Session on Benchmarking of Evolutionary Algorithms for Discrete Optimization

- Please use the style files for U.S. Letter as template for your submission.
- If you are using the Latex template, please do not include keywords in your paper.
- Only papers prepared in PDF format will be accepted.
- Paper Length: up to 8 pages, including figures, tables and references.
- Paper Formatting: double column, single spaced, #10 point Times Roman font.
- No page numbers please. We will insert the page numbers for you.
- Violations of any of the above paper specifications may result in rejection of your paper.

At least one author from each accepted paper must register at the conference, pay the conference fee, and be present at the conference to give an oral presentation. Each presentation has 1 minute preparation time + 15 minutes presentation + 4 minutes Q&A. A session room will provide an overhead projector and screen for the presenters. Authors must bring their own laptop and check that their slides work properly with the audio visual system in the room before the start of the session.

## International Program Committee

- Abhishek Awasthi, University of Applied Sciences Zittau/Görlitz, Görlitz, Germany
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- Josu Ceberio Uribe, University of the Basque Country, Bilbao, Spain
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- Markus Wagner, University of Adelaide, Adelaide, SA, Australia
- Hao Wang, Leiden University, Leiden, The Netherlands
- Thomas Weise, Institute of Applied Optimization, Hefei University, Hefei, China
- Borys Wróbel, Adam Mickiewicz University, Poland
- Yuezhong Wu, University of New South Wales (UNSW), Sydney, Australia
- Zhize Wu, Institute of Applied Optimization, Hefei University, Hefei, China
- Furong Ye, Leiden University, Leiden, The Netherlands
- Aleš Zamuda, University of Maribor, Slovenia
- Xingyi Zhang, Anhui University, Hefei, China





## Chairs and Chair Biographies



**Dr. Markus Wagner** is a Senior Lecturer at the School of Computer Science, University of Adelaide, Australia. He has done his PhD studies at the Max Planck Institute for Informatics in Saarbrücken, Germany and at the University of Adelaide, Australia. His research topics range from mathematical runtime analysis of heuristic optimization algorithms and theory-guided algorithm design to applications of heuristic methods to renewable energy production, professional team cycling and software engineering. So far, he has been a program committee member 30 times, and he has written over 70 articles with over 70 different co-authors. He has chaired several education-related committees within the IEEE CIS, is Co-Chair of ACALCI 2017 and General Chair of ACALCI 2018.



**Prof. Dr. Thomas Weise** obtained the MSc in Computer Science in 2005 from the Chemnitz University of Technology and his PhD from the University of Kassel in 2009. He then joined the University of Science and Technology of China (USTC) as PostDoc and subsequently became Associate Professor at the USTC-Birmingham Joint Research Institute in Intelligent Computation and Its Applications (UBRI) at USTC. In 2016, he joined Hefei University as Full Professor to found the Institute of Applied Optimization at the Faculty of Computer Science and Technology. Prof. Weise has more than seven years of experience as a full time researcher in China, having contributed significantly both to fundamental as well as applied research. He has more than 80 scientific publications in international peer reviewed journals and conferences. His book “Global Optimization Algorithms – Theory and Application” has been cited more than 730 times. He has acted as reviewer, editor, or program committee member at 70 different venues.



**Dr. Aleš 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. He is management committee (MC) member 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 Slovenia Section Vice Chairman and Young Professionals Chairman, IEEE CIS member, ACM SIGEVO member, ImAppNIO Benchmarks working group vice-chair, and editorial board member (associate editor) for Swarm and Evolutionary Computation (2017 IF=3.818). His areas of computer science applications include ecosystems, evolutionary algorithms, multicriterion optimization, artificial life, and computer animation; currently yielding h-index 18, 41 publications, and 883 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 and 2018 Publons Peer Review Awards, including reviews for over 40 journals and 85 conferences.





## Hosting Event

**The 2019 IEEE Congress on Evolutionary Computation (CEC 2019)**  
**Wellington, New Zealand, June 10-13, 2019**

<http://cec2019.org/>

The annual IEEE Congress on Evolutionary Computation is one of the leading events in the area of evolutionary computation. It covers all topics in evolutionary computation including, but not limited to the following areas:

- Artificial life
- Agent-based systems
- Artificial immune systems
- Bioinformatics and bioengineering
- Coevolution and collective behavior
- Combinatorial and numerical optimization
- Constraint and uncertainty handling
- Cognitive systems and applications
- Computational finance and economics
- Estimation of distribution algorithms
- Evolvable adaptive hardware and systems
- Evolutionary data mining
- Evolutionary design
- Evolutionary learning systems
- Evolutionary game theory
- Evolutionary multi-objective optimization
- Evolutionary scheduling
- Industrial applications of EC
- Particle Swarm Optimization
- Representation and operators

IEEE CEC 2019 is a world-class conference that 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.



# Special Issue on Benchmarking of Computational Intelligence Algorithms

Applied Soft Computing, Elsevier B.V.

<http://iao.hfuu.edu.cn/bocia-asoc-si>

Computational Intelligence (CI) is a huge and expanding field which is rapidly gaining importance, attracting more and more interests from both academia and industry. It includes a wide and ever-growing variety of optimization and machine learning algorithms, which, in turn, are applied to an even wider and faster growing range of different problem domains. For all of these domains and application scenarios, we want to pick the best algorithms. Actually, we want 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 optimization and machine learning for decades, while its potential has not been fully explored. **Benchmarking the algorithms of Computational Intelligence is an application of Computational Intelligence itself!** This virtual special issue of the EI/SCIE-indexed *Applied Soft Computing* journal published by Elsevier solicits novel contributions from this domain according to the topics listed below.

## Topics of Interest

- mining of higher-level information from experimental results
- 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, reliability, and implementation issues
- theoretical results for algorithm performance comparison
- comparison of theoretical and empirical results
- new benchmark problems
- automatic algorithm configuration and selection
- the comparison of algorithms in "non-traditional" scenarios such as
  - o multi- or many-objective domains
  - o parallel implementations, e.g., using GPGUs, 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
  - o deep learning and big data setups
- 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
- survey and review of benchmarking, algorithm performance statistics, and performance-related theorems
- performance indicators, objective (problem) reduction

The focus of this special issue is the methodology of exploring, comparing, and understanding algorithm performance. Submissions on this topic in the fields of optimization, machine learning, metaheuristics, decision making, operational research, business logic, fuzzy logic, fuzzy information processing are welcome. The goal of this special issue is *not* to introduce new optimization algorithms or new real-world problems.

## Submission Process

The *Applied Soft Computing* journal subscribes to the concept of *Virtual Special Issues* (VSIs). In a VSI, submissions are made through the editorial system <http://ees.elsevier.com/asoc/> at any time until the final submission deadline. They go through the normal editorial process (managed by the guest editors), and, if accepted, are published immediately after acceptance. Accepted papers can appear at different times, but are bundled to the VSI.

**IMPORTANT: Please choose "VSI: Benchmarking CI" when specifying the Article Type.**

Please send any inquiries to T. Weise at [tweise@hfuu.edu.cn](mailto:tweise@hfuu.edu.cn), CC to [markus.wagner@adelaide.edu.au](mailto:markus.wagner@adelaide.edu.au).

## Important Dates

Virtual Special Issue Start: July 2018

Final Deadline for Submissions: 14<sup>th</sup> April 2019

Review notification about 12 weeks after submission.

Up to 2 rounds of revisions.

Publication immediately after receipt of accepted final version.







## Black Box Discrete Optimization Benchmarking (BB-DOB)

The Genetic and Evolutionary Computation Conference (GECCO 2019)

July 13-17, 2019, Prague, Czech Republic

<http://iao.hfuu.edu.cn/bbdob-gecco19>

The Black-Box Discrete Optimization Benchmarking (BB-DOB) Workshop, a part of the Genetic and Evolutionary Computation Conference (GECCO) 2019, is cordially inviting the submission of original and unpublished research papers.

The Black-Box-Optimization Benchmarking (BBOB) methodology associated to the BBOB-GECCO workshops has become a well-established standard for benchmarking stochastic and deterministic continuous optimization algorithms. The aim of the BB-DOB workshop series is to set up a process that will allow to achieve a similar standard methodology for the benchmarking of black box optimization algorithms in discrete and combinatorial search spaces.

The long term aim of our workshop series is to produce, for the domain of discrete optimization:

- (1) a well-motivated benchmark function testbed,
- (2) an experimental set-up,
- (3) generation of data output for post-processing and
- (4) presentation of the results in graphs and tables.

The aims of this GECCO 2019 BB-DOB workshop are to finalize the benchmarking testbed for discrete optimization and to promote a discussion of which performance measures should be used.

The benchmark functions should capture the difficulties of combinatorial optimization problems in practice. They also should be comprehensible so that algorithm behaviors can be understood or interpreted according to the performance on a given benchmark problem. The goal is that a desired search behavior can be pictured and algorithm deficiencies can be understood in depth. This understanding will lead to the design of improved algorithms. Ideally, we would like the benchmark functions to be scalable with the problem size and non-trivial in the black box optimization sense (the function may be shifted such that the global optimum may be any point). Achieving this goal would help greatly in bridging the gap between theoreticians and experimentalists.

We also wish to investigate which measures should be used to compare algorithm performance, which statistical tests should be run to compare algorithms, and how to deal with unsuccessful runs.

This workshop wants to bring together experts on benchmarking of optimization algorithms. It will provide a common forum for discussions and exchange of opinions. Interested participants are encouraged to submit a paper related to black-box optimization benchmarking of discrete optimizers. The topics of interesting especially include papers that

- suggest functions to be included in the benchmark and motivate the reasons for inclusion,
- suggest benchmark function properties that allow to capture difficulties which occur in real-world applications (e.g., deception, separability, etc.),
- suggest which classes of standard combinatorial optimization problems should be included and how to select significant instances,
- suggest which classes of toy problems should be included and motivate why,
- suggest which performance measures should be used to analyze and compare algorithms and comment/suggestions on related issues, and/or
- tackle any other aspect of benchmarking methodology for discrete optimizers such as design of experiments, presentation methods, benchmarking frameworks, etc.
- conduct performance comparisons, landscape analysis, discussion of selected benchmark problems and/or provided statistics of IOHprofiler (<https://github.com/IOHprofiler>), a ready-to-use software for the empirical analysis of iterative optimization heuristics

Paper Submission Opening: 27 February 2019

**Paper Submission Deadline: 3 April 2019**

Decisions Due: 17 April 2019

Camera-Ready Material due: 24 April 2019

Author Registration Deadline: 24 April 2019

Conference Presentation: 13-14 July 2019

For more information please contact

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This workshop is organized as part of ImAppNIO Cost Action 15140.

