

Black-Box Discrete Optimization Benchmarking (BB-DOB@PPSN)

Workshop @ 15th International Conference on Parallel Problem Solving from Nature

September 8-9, 2018 in Coimbra, Portugal
<http://iao.hfuu.edu.cn/bbdob-ppsn18>

The Black-Box Discrete Optimization Benchmarking Workshop (BB-DOB@PPSN), a part of the Fifteenth International Conference on Parallel Problem Solving from Nature (PPSN XV), is cordially inviting the submission of original and unpublished research papers.

The Black-Box-Optimization Benchmarking (BBOB) methodology introduced by the long-standing and successful BBOB-GECCO workshops series has become a well-established standard for benchmarking continuous optimization algorithms. **The aim of this workshop is to develop a similar standard methodology for the benchmarking of black-box optimization algorithms for discrete and combinatorial domains.** We want to produce:

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

This second installment of the new BB-DOB workshop series focuses on a debate regarding which functions should be included in the benchmarking testbed. These benchmark functions should capture the difficulties of combinatorial optimization problems in practice, but at the same time be comprehensible so that the resulting algorithm behaviors can be understood or interpreted. In this way, the mutual advantages and disadvantages of algorithms can be analyzed in depth. Gaining such insights is vital for the design of improved algorithms. The sought benchmark functions should ideally be scalable with the problem size and non-trivial in the black-box optimization sense, i.e., allow for shifting the optimum to any point. This workshop wants to provide a common forum to bring together experts on benchmarking of optimization algorithms. **Interested participants are encouraged to submit papers related to black-box optimization benchmarking of discrete optimizers in the widest sense.** In particular if they suggest,

- 1) function classes that should be included in the function collection and motivate the reasons for inclusion,
- 2) benchmark function properties that allow to capture difficulties which occur in real-world applications (e.g., deception, separability, etc.)
- 3) which classes of standard combinatorial optimization problems should be included and how to select significant instances,
- 4) which classes of toy problems should be included and motivate why
- 5) issues concerning any other aspect of benchmarking methodology for discrete optimizers such as design of experiments, performance measures, presentation methods, etc.

The accepted papers in this workshop will not be included in the Proceedings of the Fifteenth International Conference on Parallel Problem Solving from Nature (PPSN XV). Authors of selected full papers will be invited to submit extended versions of these papers to the *Special Issue on Benchmarking of Computational Intelligence Algorithms* appearing in the *Applied Soft Computing* journal by Elsevier B.V., indexed by EI and SCIE (see later in this CfP and <http://iao.hfuu.edu.cn/bocia-asoc-si>).

Paper Submission Deadline: 26 June 2018
Notification of Acceptance: 2 July 2018
Conference Presentation: 8-9 September 2018

Organizers:

Pietro S. Oliveto, University of Sheffield, UK
Markus Wagner, University of Adelaide, Australia
Thomas Weise, Hefei University, China
Borys Wróbel, Adam Mickiewicz University, Poland
Aleš Zamuda, University of Maribor, Slovenia

This workshop is organized as part of the ImAppNIO Cost Action 15140.
For more information please contact Pietro S. Oliveto at p.oliveto@sheffield.ac.uk.

Disclaimer: Two BB-DOB workshops will take place in 2018, i.e., the first edition as BB-DOB@GECCO and the second edition as BB-DOB@PPSN. Both are independent events of the same series.



Chairs

- Pietro S. Oliveto, University of Sheffield, UK
- Markus Wagner, University of Adelaide, Australia
- Thomas Weise, Institute of Applied Optimization, Hefei University, Hefei, China
- Borys Wróbel, Adam Mickiewicz University, Poland
- Aleš Zamuda, University of Maribor, Slovenia

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- Markus Wagner, University of Adelaide, Australia
- Thomas Weise, Institute of Applied Optimization, Hefei University, Hefei, China
- Carsten Witt, Technical University of Denmark, Denmark
- Borys Wróbel, Adam Mickiewicz University, Poland
- Zijun Wu, Institute of Applied Optimization, Hefei University, Hefei, China
- Yang Yu, Nanjing University, Nanjing, China
- Aleš Zamuda, University of Maribor, Slovenia
- Xingyi Zhang, Anhui University, Hefei, China

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Chair Biographies



Pietro S. Oliveto is a Senior Lecturer and an EPSRC Early Career Fellow at the University of Sheffield, UK. He received the Laurea degree in computer science from the University of Catania, Italy in 2005 and the PhD degree from the University of Birmingham, UK in 2009. He has been EPSRC PhD+ Fellow (2009-2010) and EPSRC Postdoctoral Fellow (2010-2013) at Birmingham and Vice-Chancellor's Fellow at Sheffield (2013-2016). His main research interest is the performance analysis of bio-inspired computation techniques including evolutionary algorithms, genetic programming, artificial immune systems and hyperheuristics. He has won best paper awards at GECCO 2008, ICARIS 2011, and GECCO 2014. He is part of the Steering Committee of the annual workshop on Theory of Randomized Search Heuristics (ThRaSH), Associate Editor of the IEEE Transactions on Evolutionary Computation,

Chair of the IEEE CIS Task Force on Theoretical Foundations of Bio-inspired Computation, Leader of the ImAppNIO Cost Action Working Group on Benchmarking and member of the EPSRC Peer Review College. Dr. Oliveto has given tutorials on the runtime complexity analysis of EAs regularly at CEC, GECCO, WCCI, SSCI and PPSN since 2012.



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.



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 is member of the Editorial Board of the Applied Soft Computing journal and has acted as reviewer, editor, or program committee member at 70 different venues.



Borys Wróbel's background is biology and computer science, and he works at the intersection between the two fields. His current research interest are computational properties of biologically-inspired models of computation (artificial gene regulatory networks and spiking neural networks), which involves building artificial life software platforms that use high performance computing and neuromorphic hardware. Borys graduated from the University of Gdansk (Poland) in 1997, was a Fulbright Visiting Researcher in the Salk Institute for Biological Studies in San Diego, CA, and later FEBS and EMBO Fellow at the Hebrew University of Jerusalem (Israel), Marie Curie Postdoctoral Fellow at the University of Valencia, and Sciex Fellow in the Institute of Neuroinformatics at the University of Zurich and ETHZ (Switzerland). He is a member of the Global Young Academy, Intelligent Systems Applications Technical Committee of the

Institute of Electrical and Electronics Engineers Computational Intelligence Society (since 2012), and Association for Computing Machinery Special Interest Group for Genetic and Evolutionary Computation.



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 Young Professionals Chair for Slovenia Section, 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=3.893). His areas of computer science applications include ecosystems, evolutionary algorithms, multicriterion optimization, artificial life,

and computer animation; currently yielding h-index 16, 38 publications, and 742 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 40 journals and 65 conferences.

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Instructions for Authors

Two types of submissions are welcome:

- 1) An abstract describing the contents of a talk to be presented at the workshop
- 2) A full paper with 10 page limit in Springer LNCS style.

Abstracts and papers should be submitted as PDF files via email to the workshop chair Pietro Oliveto at p.oliveto@sheffield.ac.uk with copy to wrobel@evosys.org, ales.zamuda@um.si, twaise@hfuu.edu.cn, and markus.wagner@adelaide.edu.au.

The accepted papers in this workshop will **not** be included in the Proceedings of the Fifteenth International Conference on Parallel Problem Solving from Nature (PPSN XV). However, the accepted papers will be listed in the official conference programme. Submitted full paper will be considered for an invitation to submit an extended version to the Special Issue on Benchmarking of Computational Intelligence Algorithms appearing in the Applied Soft Computing journal by Elsevier B.V. indexed by EI and SCIE. Only full paper submissions can be considered for inclusion in the special issue.

Hosting Event

Fifteenth International Conference on Parallel Problem Solving from Nature (PPSN XV)
September 8-12, 2018, in Coimbra, Portugal
<http://ppsn2018.dei.uc.pt/>

The Fifteenth International Conference on Parallel Problem Solving from Nature (PPSN XV) will be held in Coimbra, Portugal on 8-12 September 2018. The conference will take place at the Campus of the University of Coimbra, recognized by UNESCO as world heritage site, due to its relevance in the dissemination of knowledge throughout the fields of arts, sciences, law, architecture, urban planning and landscape. The venue includes a set of buildings and rooms of historical relevance, thus giving the participants the opportunity to visit the different areas of the university and experience the feeling of studying and working in Coimbra.

This biennial meeting brings together researchers and practitioners in the field of Natural Computing. Natural Computing is the study of computational systems which use ideas and get inspiration from natural systems, including biological, ecological, physical, chemical, and social systems. It is a fast-growing interdisciplinary field in which a range of techniques and methods are studied for dealing with large, complex, and dynamic problems with various sources of potential uncertainties.

PPSN XV will be a showcase of a wide range of topics in Natural Computing including, but not restricted to: Evolutionary Computation, Neural Computation, Molecular Computation, Quantum Computation, Artificial Life, Swarm Intelligence, Artificial Ant Systems, Artificial Immune Systems, Self-Organizing Systems, Emergent Behaviors, and Applications to Real-World Problems. PPSN XV will also feature workshops and tutorials covering advanced and fundamental topics in the field of Natural Computing.

Following the PPSN tradition, all accepted papers will be presented during poster sessions and will be included in the proceedings, to be published in the Series Lecture Notes in Computer Science (LNCS) by Springer. Prospective authors are invited to contribute their high-quality original results in the field of Natural Computing.

<http://ppsn2018.dei.uc.pt/>

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Black-Box Discrete Optimization Benchmarking (BB-DOB@GECCO) Workshop @ 2018 Genetic and Evolutionary Computation Conference (GECCO 2018)

July 15-19, 2018, in Kyoto, Japan
<http://iao.hfuu.edu.cn/bbdob-gecco18>

The Black-Box Discrete Optimization Benchmarking Workshop (BB-DOB@GECCO), a part of the Genetic and Evolutionary Computation Conference (GECCO) 2018, is cordially inviting the submission of original and unpublished research papers.

The Black-Box-Optimization Benchmarking (BBOB) methodology introduced by the long-standing and successful BBOB-GECCO workshops series has become a well-established standard for benchmarking continuous optimization algorithms. **The aim of this workshop is to develop a similar standard methodology for the benchmarking of black-box optimization algorithms for discrete and combinatorial domains.** We want to produce:

- (5) a well-motivated benchmark function testbed,
- (6) a standardized experimental set-up,
- (7) rules for measuring and the generation of data output, and
- (8) standardized post-processing and presentations for the results in graphs and tables.

This first installment of the new BB-DOB workshop series focuses on a debate regarding which functions should be included in the benchmarking testbed. These benchmark functions should capture the difficulties of combinatorial optimization problems in practice, but at the same time be comprehensible so that the resulting algorithm behaviors can be understood or interpreted. In this way, the mutual advantages and disadvantages of algorithms can be analyzed in depth. Gaining such insights is vital for the design of improved algorithms. The sought benchmark functions should ideally be scalable with the problem size and non-trivial in the black-box optimization sense, i.e., allow for shifting the optimum to any point. This workshop wants to provide a common forum to bring together experts on benchmarking of optimization algorithms. **Interested participants are encouraged to submit papers related to black-box optimization benchmarking of discrete optimizers in the widest sense.** In particular if they suggest,

- 6) function classes that should be included in the function collection and motivate the reasons for inclusion,
- 7) benchmark function properties that allow to capture difficulties which occur in real-world applications (e.g., deception, separability, etc.)
- 8) which classes of standard combinatorial optimization problems should be included and how to select significant instances,
- 9) which classes of toy problems should be included and motivate why
- 10) issues concerning any other aspect of benchmarking methodology for discrete optimizers such as design of experiments, performance measures, presentation methods, etc.

All accepted papers in this workshop will be included in the Companion Material Proceedings of the Genetic and Evolutionary Computation Conference 2018 published by ACM and indexed by EI.

Paper Submission Opens:	27 February	2018
Paper Submission Deadline:	6 April	2018
Notification of Acceptance:	11 April	2018
Camera-Ready Copy Due:	24 April	2018
Conference Presentation:	15-19 July	2018

Organizers:

Pietro S. Oliveto, University of Sheffield, UK
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This workshop is organized as part of the ImAppNIO Cost Action 15140.

For more information please contact Pietro S. Oliveto at p.oliveto@sheffield.ac.uk.

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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 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
 - 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, CC to markus.wagner@adelaide.edu.au.

Important Dates

Virtual Special Issue Start: July 2018

Final Deadline for Submissions: 14th April 2019

Notification at most 12 weeks after submission.

Up to 2 rounds of revisions.

Publication immediately after receipt of accepted final version.



International Workshop on Benchmarking of Computational Intelligence Algorithms (BOCIA)

Tenth International Conference on Advanced Computational Intelligence (ICACI 2018)

March 29-31, 2018 in Xiamen, China ~~Extended Deadline: December 1, 2017~~

<http://iao.hfuu.edu.cn/bocia18>

BOCIA, the International Workshop on Benchmarking of Computational Intelligence Algorithms, a part of the Tenth International Conference on Advanced Computational Intelligence (ICACI 2018), is cordially inviting the submission of original and unpublished research papers.

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 workshop wants to bring together experts on benchmarking of optimization and machine learning algorithms. It provides a common forum for them to exchange findings, to explore new paradigms for performance comparison, and to discuss issues such as

- 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
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- automatic algorithm configuration
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 - 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
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All accepted papers in this workshop will be included in the Proceedings of the IEEE ICACI 2018 published by IEEE Press and indexed by EI. Authors of selected papers will be invited to submit extended versions of these papers to the *Special Issue on Benchmarking of Computational Intelligence Algorithms* appearing in the *Applied Soft Computing* journal by Elsevier B.V., indexed by EI and SCIE (see <http://iao.hfuu.edu.cn/bocia-asoc-sj>).

