



## Journal of Software: Evolution & Process Special Issue: Search-based Software Testing Call for Articles

Search-based software testing (SBST) is a research area that focuses on the application of meta-heuristic techniques (for example, genetic algorithms) to solve problems in software testing. There exist a large number of optimization problems within the domain of SBST, including test data generation, test case prioritization, test suite minimization, oracle optimization, and real-time property validation among others. SBST is a growing field that has been proven to solve real-world problems and provides a large number of research possibilities. This special issue encourages the use of search techniques in novel aspects of software testing in combination with other aspects of the software engineering lifecycle in the context of different application domains.

### **Call for Papers**

This special issue welcomes submissions related to the domain of SBST. The goal of this Special Issue is to provide both researchers and practitioners of SBST an opportunity to collaborate, share experiences, provide directions for future research, and encourage the use of novel search techniques and practical tools in novel challenges of software testing in combination with other aspects of the software engineering lifecycle.

As such, relevant topics of this SBST special issue include, but are not limited to challenges in the software testing, verification, or validation domains, as well as combining elements of these domains with other concerns in the software engineering lifecycle. Examples of problems in the software testing/verification/validation domains include (but are not limited to):

- Generating testing data
- Fuzzing
- Prioritizing test cases
- Constructing test oracles
- Minimizing test suites
- Verifying software models
- Testing service-oriented architectures
- Constructing test suites for interaction testing
- SBST for artificial intelligence
- Machine learning techniques for SBST
- Validation of real-time properties

In all cases, the research presented should apply a meta-heuristic search strategy such as (but not limited to):

- Random search
- Local search (e.g., hill-climbing, simulated annealing, tabu search)
- Evolutionary algorithms (e.g., genetic algorithms, evolution strategies, genetic programming)
- Ant colony optimization
- Particle swarm optimization
- Multi-objective optimization
- Mathematical optimization methods (e.g., gradient descent, Bayesian optimization)

### **Important Dates**

- Submission deadline: March 1st, 2022
- First notification: June 1st, 2022
- Revised submission: September 1st, 2022
- Final notification: November 1st, 2022

### **Submission Guidelines**

Requirements for submission: In this Special Issue, we both invite extended versions of the accepted papers presented at SBST 2021, which will need to be significantly updated and extended: at least 30% new content compared to the original workshop version. Moreover, we solicit novel contributions related to SBST from both academia and industry. Original, high-quality contributions that are not yet published or that are not currently under review by other journals or peer-reviewed conferences are sought.

Articles Format. All submissions must conform to the Wiley formatting guidelines and be initiated after selecting the link “Submit an Article” available at the following URL: <https://onlinelibrary.wiley.com/journal/20477481>.

The special issue “SBST 2021 special issue” has to be selected in the drop-down list on the bottom of the "Step 1: Type, Title, & Abstract" page of the submission process.

### **Description of the Guest Editors**

**Erik Fredericks** is an Assistant Professor at Grand Valley State University in Allendale, MI, USA. He received his Ph.D. from Michigan State University in Computer Science and Engineering in 2015, focusing on search-based software engineering (including testing) and self-adaptive systems. His research interests also include cyber-physical systems, model-driven engineering, and evolutionary computation. Before joining Oakland University, he was a postdoctoral researcher at Michigan State University as well as a software engineer in the automotive industry. Erik co-chaired SBST2020 and the Natural Language Processing for Software Engineering (NL4SE) workshop in 2018, has served as publicity/social media chair for FSE 2020 and SSBSE 2018, served as web co-chair of ICSE 2013, and regularly serves as a program committee member for several conferences.

**Sebastiano Panichella** is a Computer Science Researcher at Zurich University of Applied Science (ZHAW). His main research goal is to conduct industrial research, involving both industrial and academic collaborations, to sustain the Internet of Things (IoT) vision, where future smart cities will be characterized by millions of smart systems connected over the internet, controlled by complex embedded software implemented for the cloud. His research was funded by one Swiss National Science Foundation Grant in the past.

Currently, he is the technical coordinator of H2020 and Innosuisse projects concerning DevOps for Complex Cyber-physical Systems. He authored (or co-authored) around seventy papers that appeared in International Conferences and Journals. These research studies involved industrial companies and open-source projects and received best paper awards. He has served as a program committee member of various international conferences and as a reviewer for various international journals in the fields of software engineering. He is Editorial Board Member of Journal of Software: Evolution and Process, Review Board member of the EMSE and TOSEM, and was Lead Guest Editor of special issues at EMSE and IST Journals. He was selected as one of the top-20 Most Active Early Stage Researchers Worldwide in SE. Website: <https://spanichella.github.io>.

**Alessio Gambi** is a Postdoctoral Researcher at the Chair of Software Engineering II at the University of Passau, Passau, Germany. His main research interests are in the area of Software Engineering, specifically Quality Assurance via automated testing. He targets complex application domains including self-driving cars, self-adaptive systems, cloud computing, and mobile apps. He has served as a program committee member of international conferences and workshops, and as a reviewer for various international journals including TOSEM, TSE, TAAS, and TSC. He is part of the organizing committee of SBST tool competition. In 2019, he received the Facebook Testing and Verification Research Award. Website: <https://staff.fim.uni-passau.de/~gambi/>

**Fiorella Zampetti** is a Postdoctoral Researcher at University of Sannio, Italy. She received her Ph.D. degree in Information Technologies for Engineering from the University of Sannio (Italy) in 2019. Her current research is focused on DevOps for Cyber-Physical Systems (CPSs), software maintenance and evolution, and mining software repositories. She has served as a program committee member of international conferences in the software engineering field, and she serves as a reviewer for Software Engineering journals including TOSEM, TSE, EMSE, and JSEP. She is part of the organizing committee of the SBST tool competition.

**Vincenzo Riccio** is a Postdoctoral Researcher with the Software Institute of Università della Svizzera Italiana (USI) in Lugano, Switzerland. He received his Ph.D. degree in Information Technologies and Electrical Engineering from the University of Naples Federico II (Italy) in 2019. His current research is focused on test automation for mobile and machine learning-based applications. He serves as a reviewer for Software Engineering journals including TOSEM, EMSE, and STVR. He is part of the

organizing committee of the SBST tool competition. He is Guest Editor of the EMSE journal's special issue on Software Testing in the Machine Learning Era.