

Message from the Chairs

There is a growing realization that optimization can be applied to many aspects of the software development process - a research area known as Search Based Software Engineering (SBSE). Search Based Software Testing - one of the largest research areas within SBSE - is the process of using search-based optimization algorithms to specifically address problems in software testing. SBST has been applied to a wide variety of testing goals including structural, functional, non-functional and state-based properties. Many approaches to testing and a wide diverse range of development domains have been addressed, including exceptions, interactions, integration, mutation, regression, and web applications.

Work in SBST has developed to the point at which it is now ripe for combination with other areas of software engineering. The common “lingua franca” that makes these combinations possible is the definition of the fitness function that guides a search algorithm. A fitness function is merely a form of a metric, and metrics exist across the entire software engineering spectrum. Therefore, the central objective of this workshop is to bring together researchers and industrial practitioners from SBST and the wider software engineering community to share experience and provide directions for future research, and to encourage the use of search techniques to combine aspects of testing with other aspects of the software engineering lifecycle.

SBST is a two-day workshop aimed at bringing testing researchers together with the broader software engineering community to discuss state-of-the-art work and set new research directions. The workshop will consist of two keynote addresses, several technical paper sessions, a tutorial and a panel discussion.

Claire Le Goues (Carnegie Mellon University) and Tim Menzies (North Carolina State University) will give keynote addresses. Following time for questions, we will ask the speakers to raise issues arising from their talk for participants to discuss. Gordon Fraser (University of Sheffield) will give a tutorial on an SBST tool, called EvoSuite. He will discuss how to use it, how to integrate it into other tools, and how to extend it.

Three types of contributions were sought after, including:

- Full papers on original research - either empirical or theoretical - in SBST, practical experience of using SBST, or SBST tools.
- Short papers that describe novel techniques, ideas and positions that have yet to be fully developed; or are a discussion of the importance of a recently published SBST result by another author in setting a direction for the SBST community, and/or the potential applicability (or not) of the result in an industrial context.
- Position papers that analyze trends in SBST and raise issues of importance. Position papers are intended to seed discussion and debate at the workshop.

Each paper was reviewed by at least three PC members and evaluated according to the criteria of relevance, novelty, soundness, and ability to spark discussion. Additionally, we have organized a tool competition where we invited researchers, students, and tool developers to design innovative new approaches to software test generation. The developers of these tools will present their techniques and results during the workshop.

The provisional program is as follows:

- **Day 1:**
 - 8:45 – 9:00am: Introduction
 - 9:00 – 10:30am: Keynote: Tim Menzies
 - 10:30 – 11:00am: *Break*
 - 11:00 – 12:30pm: Paper Session
 - “Evolutionary Testing for Crash Reproduction” Mozhan Soltani, Annibale Panichella and Arie van Deursen
 - “On the Diffusion of Test Smells in Automatically Generated Test Code: An Empirical Study” Fabio Palomba, Dario Di Nucci, Annibale Panichella, Rocco Oliveto and Andrea De Lucia
 - “A Preliminary Empirical Assessment of Similarity for Combinatorial Interaction Testing of Software Product Lines” Stefan Fischer, Roberto Erick Lopez-Herrejon, Rudolf Ramler and Alexander Egyed
 - 12:30 – 2:00pm: *Lunch*
 - 2:00 – 3:30pm: Competition Session
 - “Unit Testing Tool Competition -- Round Four” Urko Rueda, René Just, Juan Galleoti Galleoti and Tanja E. J. Vos
 - “Budget-aware Random Testing with T3: Benchmarking at the SBST2016 Testing Tool Contest” Wishnu Prasetya
 - “EvoSuite at the SBST 2016 Tool Competition” Gordon Fraser and Andrea Arcuri
 - “JTEExpert at the Fourth Unit Testing Tool Competition” Abdelilah Sakti, Gilles Pesant and Yann-Gaël Guéhéneuc
 - 3:30 – 4:00pm: *Break*
 - 4:00 – 5:30pm: Discussion Panel
- **Day 2:**
 - 9:00 – 10:30am: Keynote: Claire Le Goues
 - 10:30 – 11:00am: *Break*
 - 11:00 – 12:30pm: Paper Session
 - “Extending Search-Based Software Testing Techniques to Big Data Applications” Erik M. Fredericks and Reihaneh H. Hariri
 - “Automated Search for Good Coverage Criteria” Phil McMinn, Mark Harman, Gordon Fraser and Gregory Kapfhammer
 - “Strong Mutation-Based Test Data Generation using Hill Climbing” Francisco Carlos M. Souza, Mike Papadakis, Yves Le Traon and Marcio Eduardo Delamaro
 - “Hitchhikers Need Free Vehicles! Shared Repositories for Statistical Analysis in SBST” Gregory Kapfhammer, Phil McMinn and Chris Wright
 - 12:30 – 2:00pm: *Lunch*
 - 2:00 – 3:30pm: Tutorial: Gordon Fraser
 - 3:30 – 4:00pm: *Break*
 - 4:00 – 5:30pm: Awards and Closing Remarks

We are grateful to all authors for their submissions to SBST 2016, and to the Program and Steering Committee members for their valuable time and effort in reviewing the submitted papers. Thank you, and we hope that you enjoy this year’s workshop.

Justyna Petke and Gregory Gay
SBST 2016 Co-Chairs

SBST 2016 Organization

Organizing Committee

General / Program Co-Chairs

Justyna Petke University College London, UK
Gregory Gay University of South Carolina, USA

Tool Competition Chair

Tanja Vos Universidad Politecnica de Valencia, Spain

Steering Committee

Phil McMinn University of Sheffield, UK (Chair)
Myra Cohen University of Nebraska at Lincoln, USA
Andrea Arcuri Scienta, Norway
John Clark University of York, UK
Wasif Afzal Mälardalen University, Sweden
Simon Poulding Blekinge Institute of Technology, Sweden
Tanja Vos Universidad Politecnica de Valencia, Spain
Mark Harman University College London, UK
Gregory Gay University of South Carolina, USA
Giuliano Antoniol École Polytechnique de Montréal, Canada

Program Committee

Wasif Afzal Mälardalen University, Sweden
Rob Alexander University of York, UK
Giuliano Antoniol École Polytechnique de Montréal, Canada
Andrea Arcuri Scienta, Norway
Earl Barr University College London, UK
Mariano Ceccato Fondazione Bruno Kessler, Italy
Francisco Chicano University of Málaga, Spain
Massimiliano Di Penta University of Sannio, Italy
Robert Feldt Blekinge Institute of Technology, Sweden
Erik Fredericks Oakland University, USA
Juan Pablo Galeotti University of Buenos Aires, Argentina
Mark Harman University College London, UK
Gregory Kapfhammer Allegheny College, USA
Zheng Li University of Chemical Technology, China
Phil McMinn University of Sheffield, UK
Changhai Nie Nanjing University, China
Annibale Panichella Delft University of Technology, Netherlands
Simon Poulding Blekinge Institute of Technology, Sweden
Marc Roper University of Strathclyde, UK
Federica Sarro University College London, UK
David White University College London, UK