

# SOQUA 2007

## 4th International Workshop on Software Quality Assurance

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### ABSTRACT

SOQUA 2007 aims to bring together researchers, engineers, and practitioners to discuss and evaluate latest challenges, breakthroughs and experiences in the field of software quality assurance, and to identify open issues and future trends in this area. Among the many quality assurance topics, SOQUA 2007 puts special focus on the role that emerging self-adaptive and self-healing solutions can play in quality assurance. The program committee had the difficult task to select 17 papers out of 27 high-quality submissions from all over the world. The selected papers cover 11 countries and 5 continents, and many aspects of software quality assurance, including: self-healing and self-adaptive solutions, testing, quality assurance processes, process modeling, failure analysis and anticipation, quality of requirements, and variability modeling. These papers represent a significant contribution to the state of the art in the field. The workshop program consists of 1 keynote address given by Wilhelm Schäfer, 5 paper sessions hosting the authors' presentations, and 2 discussion sessions on hot-topics in the field.

### Categories and Subject Descriptors

D.2.0 [Software Engineering]: General

### General Terms

Algorithms, Design, Measurement, Performance, Reliability, Verification

### Keywords

Software testing; Tools, automation, metrics, processes and standards for software quality assurance; Formal methods; Self-adaptive and self-healing approaches.

## 1. INTRODUCTION

The goal of software engineering is to achieve high-quality software in a cost-effective, timely, and reproducible manner. Advances in technology are enabling reductions in costs and schedule, but their effect on software quality assurance remains often unclear. The widespread availability of interconnectivity has changed the nature of software systems

and has deeply affected both complexity and quality requirements, raising new design and quality issues that call for new approaches to quality assurance. Many modern software systems consist of large sets of heterogeneously developed components. Object-oriented design, component-based software engineering, components off the shelf (COTS), design patterns, and open source software facilitate the development tasks, but assuring the quality in scenarios that entail (combinations of) these concepts is problematic.

Self-adaptive and self-healing systems and technologies represent an emerging trend in software engineering, promising to facilitate the control in system scenarios where complexity and characteristics make both human intervention and traditional stop-debug-fix-redeploy-restart approaches impractical. Despite the many international events that address self-adaptive and self-healing research topics, the role of these new technologies in quality assurance remains scarcely understood yet.

Building on the great success of the three previous editions of SOQUA, SOQUA 2007 was proposed with the aim to discuss and evaluate latest challenges, breakthroughs and experiences in the field of software quality assurance, and identify open issues and future trends in this important area. As a special focus, SOQUA 2007 addresses the role of self-adaptive and self-healing solutions in quality assurance, aiming to pave the way towards a better understanding of the relation between these new technologies and the quality of software systems.

## 2. SUMMARY OF THE CONTRIBUTIONS

SOQUA 2007 received 27 high-quality submissions from all over the world. Each paper has been reviewed by at least 2 members of the program committee. The selection process has been highly competitive and has resulted in 17 accepted papers: 13 full research papers and 4 short position papers.

The accepted papers cover 5 continents and 11 countries: USA, Canada, UK, Sweden, Mexico, Germany, Switzerland, Italy, Israel, China. They also cover many aspects of software quality assurance, including testing, self-healing and self-adaptive solutions, quality assurance processes, process modeling, failure analysis and anticipation, quality of requirements, and variability modeling.

In the final program, 5 papers address the role of self-healing software in quality assurance, proposed as special focus topic of the workshop. Goldstein, Shehory, and Weinsberg propose a self-healing approach to cope with loitering objects, which are neither used by programs and nor dis-

carded because of existing pending referencies. Nir-Buchbinder and Ur present a self-healing based tool that support concurrency test for Java programs. Wuttke discusses a self-healing approach for failures that arise at component integration level. Lorenzoli, Tosi, Venticinque and Micillo show with a case study the quality benefits of multi-layers self-adaptive solutions. Gorla introduces the foundations of design-for-self-healing as an improvement on design-for-testability.

Then, 3 papers discuss the problem of failures and and fault identification. Schneckenburger and Mayer investigate the assumption of clustered failure patterns that is used as basis for adaptive random testing. Cotroneo, Mariani, Pastore and Pietrantuono analyze logs from workload-driven reliability testing to obtain data that can relate failures to their causes. Strecker and Memon characterize faults' contexts such as to guide the selection of testing techniques with highest fault detection ability.

Testing issues are addressed in 3 papers. Guderlei, Mayer and Schneckenburger investigate statistical hypothesis test to address correctness of non-deterministic software. Ziyuan, Changhai and Baowen propose novel algorithms to effectively generate combinatorial test suites, aiming to exercise the interactions of factors in software. Chen, Probert and Ural study a method for reducing the size of regression test suites based on dependence analysis of EFSM models.

Next, 3 papers cover empirical studies in software quality assurance. Weyuker and Ostrand empirically evaluate advantages and disadvantages of metrics for assessing the success of fault-prediction models. Counsell and Hierons perform an empirical validation of 28 refactorings for test suites; their results indicate behavioral refactorings as more suitable than structural refactorings. Ormandjieva, Hussain, and Kosseim report a large study that addresses automatic quality assessment of software requirements written in natural language.

Finally, 3 papers cover topics related to quality assurance processes. Alvaro, Almeida and Meira propose a component certification process that allows to efficiently evaluate the quality of software components. Nieto-Ariza, Ortiz-Hernández and Rodríguez-Ortiz propose a theoretical evaluation framework of techniques for business process modeling, aimed to determine which technique will deliver the highest quality. Thörn applies a generic quality framework for evaluating approaches to variability modeling of software systems.

### 3. FORMAT

SOQUA 2007 is a two-days workshop structured to encourage discussion and fostering research collaborations.

On the first day, the workshop will be introduced by a keynote address given by Wilhelm Schäfer.

There will be 5 presentation sessions. Authors of position papers will overview their position statement in 10 minutes, while the authors of technical papers will present the core contribution of the paper in 20 minutes. Ample time will be allocated to questions, discussion and exchange of viewpoints, both on the presented materials or on more general issues in software quality.

The final part of each day of the workshop will be a group-working session. The group-working sessions will be organized around *quality assurance hot-topics* selected on the basis of both submitted papers and earlier presentations, or

directly proposed by the participants. To ignite the discussion, a set of hot-topics will be advertised in advance. For each hot-topic the participants will be asked to state their viewpoint and then discuss. In the last session of the second day all participants will be given 10 minutes to present a brand new idea, and get feedback from the audience.

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