Preface

This volume contains the papers presented at TASE 2017: 11th International Symposium on Theoretical Aspects of Software Engineering held on September 13-15th in Sophia Antipolis, France. This event was organized with the technical co-sponsorship of IEEE Technical Council on Software Engineering and the support of the IEEE Computer Society.

TASE 2017 is the 11th Symposium on Theoretical Aspects of Software Engineering, a series of symposia started in 2007 with the aim to bring together researchers and developers from academia and industry with interest in the theoretical aspects of software engineering. TASE symposia have been previously held in Shanghai, Nanjing, Tianjing, Taipei, Xi’an, Beijing, Birmingham, Changsha, and Nanjing. On its 11th anniversary TASE, we brought TASE in Europe, in Sophia Antipolis, France, from September 13th to 15th 2017.

TASE addresses the challenges raised by the modern society that is increasingly dependent on software systems, which then become larger and more complex. The development of such systems challenges the current software engineering methodologies that need to be enhanced using modern results from theoretical computer science. Theoretical computer science has been most effective on developing abstract models of computation and associated analysis methods, and studying the limitations of such models. But more emphasis is necessary for models and techniques supporting modern software engineering concepts. On the other hand, software engineering methods require complex software solutions that are only possible by applying specification, modeling and validation techniques developed in theoretical computer science.

The conference was held during three days focusing on the link between theoretical computer science and industrial practices. Each day the opening sessions were lectured by keynote speakers who have been active over the last two decades in research activities related to industry applications:

- Marie-Claude Gaudel from University Paris-Sud, who is a recipient of the CNRS Bronze medal, is most known for her work in the area of software testing based on formal specifications, but also on random software testing and approximate model-checking. She told us about the importance of the basic assumptions before testing.

- Jean-Louis Coaçon from Ansys/Esterel-Technologies who is one of the main designers of the Scade 6 language and its certified compiler KCG. He spoke about the design decisions that transformed the academic language Lustre into Scade, a large industrial success and a unique solution for the design of safety critical applications. He also spoke about the impact of other synchronous languages, like Esterel, SyncCharts, LucidSynchrone in the advent of Scade 6.

- Patrice Godefroy from Microsoft Research, Redmond, who has greatly contributed to verification, in particular 3-valued model-checking and security testing. He described the tremendous effort of Microsoft that has invested in testing to leverage state-of-the-art testing techniques and powerful clusters of machines to eradicate the bugs and memory violations in quite complex systems. He gave us concrete examples of very large piece of codes that were successfully tested, including Microsoft’s well-known
operating system, for which they fought to get rid of the (in)famous blue screen but also in its Office suite that impact millions of users.

Overall, there were 15 presentations of long papers from the 48 submissions (31%), plus one short paper and one tool paper. Each submission was reviewed by at least 3, and on the average 3.6, program committee members.

The final program was organized in 6 sessions: three on the first day, two on the second day, and one on the last day.

The first session focused on transition systems and bisimulations addressing the problem of software upgrade with conditional transition systems and then of dealing with uncertain behaviors with probabilistic bisimulation and fuzzy transition systems.

The second session was about Satisfiability problems (SAT) and Satisfiability-Modulo Theory-based (SMT) solutions. We addressed questions on how to optimize the SAT process, how to combine efficiently SMT solutions with theorem provers and how to apply SMT to the verification of assembly programs.

The third session elaborated on event systems with or without real-time properties at different levels: requirement level with time patterns and an efficient model-checking framework, for securing time-sensitive information with Timed Event-B or to generate test with a good code coverage.

The fourth session was about program analysis and testing, with language to express security properties and a theory for reversible liveness.

The fifth session focused on system modeling, with applications to safety-critical embedded systems with applications to avionics and autonomous cars.

Finally, on the last day, we concluded the conference by a tool presentation that provides visual graphical assistance to explore proof trees and help navigates through proof assistants.

We would like to thank the members of the local organizing committee and the steering committee for their help in organizing this event. We also gratefully acknowledge the support of INRIA, I3S Laboratory, Université Côte d’Azur, CNRS GDR GPL. The use of EasyChair as conference system has been very helpful. We would also like to thank all the members of the Program Committee and the external referees for their great effort in selecting the papers for this volume. Our warmest thanks go to the authors for the quality of their contributions.

September 23rd, 2017
Sophia Antipolis

Frederic Mallet (Program co-chair)
Min Zhang (Program co-chair)
Eric Madelaine (General Chair)