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Tools and Algorithms for the Construction and Analysis of Systems

24th International Conference, TACAS 2018
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on Theory and Practice of Software, ETAPS 2018
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ETAPS Foreword

Welcome to the proceedings of ETAPS 2018! After a somewhat coldish ETAPS 2017 in Uppsala in the north, ETAPS this year took place in Thessaloniki, Greece. I am happy to announce that this is the first ETAPS with gold open access proceedings. This means that all papers are accessible by anyone for free.

ETAPS 2018 was the 21st instance of the European Joint Conferences on Theory and Practice of Software. ETAPS is an annual federated conference established in 1998, and consists of five conferences: ESOP, FASE, FoSSaCS, TACAS, and POST. Each conference has its own Program Committee (PC) and its own Steering Committee. The conferences cover various aspects of software systems, ranging from theoretical computer science to foundations to programming language developments, analysis tools, formal approaches to software engineering, and security. Organizing these conferences in a coherent, highly synchronized conference program facilitates participation in an exciting event, offering attendees the possibility to meet many researchers working in different directions in the field, and to easily attend talks of different conferences. Before and after the main conference, numerous satellite workshops take place and attract many researchers from all over the globe.

ETAPS 2018 received 479 submissions in total, 144 of which were accepted, yielding an overall acceptance rate of 30%. I thank all the authors for their interest in ETAPS, all the reviewers for their peer reviewing efforts, the PC members for their contributions, and in particular the PC (co-)chairs for their hard work in running this entire intensive process. Last but not least, my congratulations to all authors of the accepted papers!

ETAPS 2018 was enriched by the unifying invited speaker Martin Abadi (Google Brain, USA) and the conference-specific invited speakers (FASE) Pamela Zave (AT & T Labs, USA), (POST) Benjamin C. Pierce (University of Pennsylvania, USA), and (ESOP) Derek Dreyer (Max Planck Institute for Software Systems, Germany). Invited tutorials were provided by Armin Biere (Johannes Kepler University, Linz, Austria) on modern SAT solving and Fabio Somenzi (University of Colorado, Boulder, USA) on hardware verification. My sincere thanks to all these speakers for their inspiring and interesting talks!

ETAPS 2018 took place in Thessaloniki, Greece, and was organised by the Department of Informatics of the Aristotle University of Thessaloniki. The university was founded in 1925 and currently has around 75000 students; it is the largest university in Greece. ETAPS 2018 was further supported by the following associations and societies: ETAPS e.V., EATCS (European Association for Theoretical Computer Science), EAPLS (European Association for Programming Languages and Systems), and EASST (European Association of Software Science and Technology). The local organization team consisted of Panagiotis Katsaros (general chair), Ioannis Stamelos,

Lefteris Angelis, George Rahonis, Nick Bassiliades, Alexander Chatzigeorgiou, Ezio Bartocci, Simon Bliudze, Emmanouela Stachtiri, Kyriakos Georgiadis, and Petros Stratis (EasyConferences).

The overall planning for ETAPS is the main responsibility of the Steering Committee, and in particular of its Executive Board. The ETAPS Steering Committee consists of an Executive Board and representatives of the individual ETAPS conferences, as well as representatives of EATCS, EAPLS, and EASST. The Executive Board consists of Gilles Barthe (Madrid), Holger Hermanns (Saarbrücken), Joost-Pieter Katoen (chair, Aachen and Twente), Gerald Lüttgen (Bamberg), Vladimiro Sassone (Southampton), Tarmo Uustalu (Tallinn), and Lenore Zuck (Chicago). Other members of the Steering Committee are: Wil van der Aalst (Aachen), Parosh Abdulla (Uppsala), Amal Ahmed (Boston), Christel Baier (Dresden), Lujo Bauer (Pittsburgh), Dirk Beyer (Munich), Mikolaj Bojanczyk (Warsaw), Luis Caires (Lisbon), Jurriaan Hage (Utrecht), Rainer Hähnle (Darmstadt), Reiko Heckel (Leicester), Marieke Huisman (Twente), Panagiotis Katsaros (Thessaloniki), Ralf Küsters (Stuttgart), Ugo Dal Lago (Bologna), Kim G. Larsen (Aalborg), Matteo Maffei (Vienna), Tiziana Margaria (Limerick), Flemming Nielson (Copenhagen), Catuscia Palamidessi (Palaiseau), Andrew M. Pitts (Cambridge), Alessandra Russo (London), Dave Sands (Göteborg), Don Sannella (Edinburgh), Andy Schürr (Darmstadt), Alex Simpson (Ljubljana), Gabriele Taentzer (Marburg), Peter Thiemann (Freiburg), Jan Vitek (Prague), Tomas Vojnar (Brno), and Lijun Zhang (Beijing).

I would like to take this opportunity to thank all speakers, attendees, organizers of the satellite workshops, and Springer for their support. I hope you all enjoy the proceedings of ETAPS 2018. Finally, a big thanks to Panagiotis and his local organization team for all their enormous efforts that led to a fantastic ETAPS in Thessaloniki!

February 2018

Joost-Pieter Katoen

Preface

TACAS 2018 is the 24th edition of the International Conference on Tools and Algorithms for the Construction and Analysis of Systems conference series. TACAS 2018 is part of the 21st European Joint Conferences on Theory and Practice of Software (ETAPS 2018). The conference is held in the hotel Makedonia Palace in Thessaloniki, Greece, during April 16–19, 2018.

Conference Description. TACAS is a forum for researchers, developers, and users interested in rigorously based tools and algorithms for the construction and analysis of systems. The conference aims to bridge the gaps between different communities with this common interest and to support them in their quest to improve the utility, reliability, flexibility, and efficiency of tools and algorithms for building systems. TACAS solicits five types of submissions:

- Research papers, identifying and justifying a principled advance to the theoretical foundations for the construction and analysis of systems, where applicable supported by experimental validation
- Case-study papers, reporting on case studies and providing information about the system being studied, the goals of the study, the challenges the system poses to automated analysis, research methodologies and approaches used, the degree to which goals were attained, and how the results can be generalized to other problems and domains
- Regular tool papers, presenting a new tool, a new tool component, or novel extensions to an existing tool, with an emphasis on design and implementation concerns, including software architecture and core data structures, practical applicability, and experimental evaluations
- Tool-demonstration papers (6 pages), focusing on the usage aspects of tools
- Competition-contribution papers (4 pages), focusing on describing software-verification systems that participated at the International Competition on Software Verification (SV-COMP), which has been affiliated with our conference since TACAS 2012

New Items in the Call for Papers. There were three new items in the call for papers, which we briefly discuss.

- *Focus on Replicability of Research Results.* We consider that reproducibility of results is of the utmost importance for the TACAS community. Therefore, we encouraged all authors of submitted papers to include support for replicating the results of their papers.
- *Limit of 3 Submissions.* A change of the TACAS bylaws requires that each individual author is limited to a maximum of three submissions as an author or co-author. Authors of co-authored submissions are jointly responsible for respecting this policy. In case of violations, all submissions of this (co-)author would be desk-rejected.

- *Artifact Evaluation.* For the first time, TACAS 2018 included an optional artifact evaluation (AE) process for accepted papers. An artifact is any additional material (software, data sets, machine-checkable proofs, etc.) that substantiates the claims made in a paper and ideally makes them fully replicable. The evaluation and archival of artifacts improves replicability and traceability for the benefit of future research and the broader TACAS community.

Paper Selection. This year, 154 papers were submitted to TACAS, among which 115 were research papers, 6 case-study papers, 26 regular tool papers, and 7 were tool-demonstration papers. After a rigorous review process, with each paper reviewed by at least 3 program committee (PC) members, followed by an online discussion, the PC accepted 35 research papers, 2 case-study papers, 6 regular tool papers, and 2 tool-demonstration papers (45 papers in total).

Competition on Software Verification (SV-COMP). TACAS 2018 also hosted the 7th International Competition on Software Verification (SV-COMP), chaired and organized by Tomas Vojnar. The competition again had a high participation: 21 verification systems with developers from 11 countries were submitted for the systematic comparative evaluation, including two submissions from industry. This volume includes short papers describing 9 of the participating verification systems. These papers were reviewed by a separate program committee (PC); each of the papers was assessed by four reviewers. One session in the TACAS program was reserved for the presentation of the results: the summary by the SV-COMP chair and the participating tools by the developer teams.

Artifact-Evaluation Process. The authors of each of the 45 accepted papers were invited to submit an artifact immediately after the acceptance notification. An artifact evaluation committee (AEC), chaired by Arnd Hartmanns and Philipp Wendler, reviewed these artifacts, with 2 reviewers assigned to each artifact. The AEC received 33 artifact submissions, of which 24 were successfully evaluated (73% acceptance rate) and have been awarded the TACAS AEC badge, which is added to the title page of the respective paper. The AEC used a two-phase reviewing process: Reviewers first performed an initial check of whether the artifact was technically usable and whether the accompanying instructions were consistent, followed by a full evaluation of the artifact. In addition to the textual reviews, reviews also provided scores for consistency, completeness, and documentation. The main criterion for artifact acceptance was consistency with the paper, with completeness and documentation being handled in a more lenient manner as long as the artifact was useful overall. Finally, TACAS provided authors of all submitted artifacts the possibility to publish and permanently archive a “camera-ready” version of their artifact on <https://springernature.figshare.com/tacas>, with the only requirement being an open license assigned to the artifact. This possibility was used for 20 artifacts, while 2 more artifacts were archived independently by the authors.

Acknowledgments. We would like to thank all the people who helped to make TACAS 2018 successful. First, the chairs would like to thank the authors for submitting their papers to TACAS 2018. The reviewers did a great job in reviewing papers: They contributed informed and detailed reports and took part in the discussions during the virtual PC meeting. We also thank the steering committee for their advice.

Special thanks go to the general chair, Panagiotis Katsaros, and his overall organization team, to the chair of the ETAPS 2018 executive board, Joost-Pieter Katoen, who took care of the overall organization of ETAPS, to the EasyConference team for the local organization, and to the publication team at Springer for solving all the extra problems that our introduction of the new artifact-evaluation process caused.

March 2018

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