

Nobuko Yoshida (Ed.)

Programming Languages and Systems

**30th European Symposium on Programming, ESOP 2021
Held as Part of the European Joint Conferences
on Theory and Practice of Software, ETAPS 2021
Luxembourg City, Luxembourg, March 27 – April 1, 2021
Proceedings**



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Editor
Nobuko Yoshida 
Imperial College
London, UK



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ETAPS Foreword

Welcome to the 24th ETAPS! ETAPS 2021 was originally planned to take place in Luxembourg in its beautiful capital Luxembourg City. Because of the Covid-19 pandemic, this was changed to an online event.

ETAPS 2021 was the 24th instance of the European Joint Conferences on Theory and Practice of Software. ETAPS is an annual federated conference established in 1998, and consists of four conferences: ESOP, FASE, FoSSaCS, and TACAS. Each conference has its own Program Committee (PC) and its own Steering Committee (SC). The conferences cover various aspects of software systems, ranging from theoretical computer science to foundations of programming languages, analysis tools, and formal approaches to software engineering. Organising these conferences in a coherent, highly synchronised conference programme enables researchers to participate in an exciting event, having the possibility to meet many colleagues working in different directions in the field, and to easily attend talks of different conferences. On the weekend before the main conference, numerous satellite workshops take place that attract many researchers from all over the globe.

ETAPS 2021 received 260 submissions in total, 115 of which were accepted, yielding an overall acceptance rate of 44.2%. I thank all the authors for their interest in ETAPS, all the reviewers for their 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 2021 featured the unifying invited speakers Scott Smolka (Stony Brook University) and Jane Hillston (University of Edinburgh) and the conference-specific invited speakers Işıl Dillig (University of Texas at Austin) for ESOP and Willem Visser (Stellenbosch University) for FASE. Invited tutorials were provided by Erika Ábrahám (RWTH Aachen University) on analysis of hybrid systems and Madhusudan Parthasarathy (University of Illinois at Urbana-Champaign) on combining machine learning and formal methods.

ETAPS 2021 was originally supposed to take place in Luxembourg City, Luxembourg organized by the SnT - Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg. University of Luxembourg was founded in 2003. The university is one of the best and most international young universities with 6,700 students from 129 countries and 1,331 academics from all over the globe. The local organisation team consisted of Peter Y.A. Ryan (general chair), Peter B. Roenne (organisation chair), Joaquin Garcia-Alfaro (workshop chair), Magali Martin (event manager), David Mestel (publicity chair), and Alfredo Rial (local proceedings chair).

ETAPS 2021 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 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 Holger Hermanns (Saarbrücken), Marieke Huisman (Twente, chair), Jan Kofron (Prague), Barbara König (Duisburg), Gerald Lüttgen (Bamberg), Caterina Urban (INRIA), Tarmo Uustalu (Reykjavik and Tallinn), and Lenore Zuck (Chicago).

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I'd like to take this opportunity to thank all the authors, attendees, organizers of the satellite workshops, and Springer-Verlag GmbH for their support. I hope you all enjoyed ETAPS 2021.

Finally, a big thanks to Peter, Peter, Magali and their local organisation team for all their enormous efforts to make ETAPS a fantastic online event. I hope there will be a next opportunity to host ETAPS in Luxembourg.

February 2021

Marieke Huisman
ETAPS SC Chair
ETAPS e.V. President

Preface

Welcome to the 30th European Symposium on Programming! ESOP 2021 was originally planned to take place in Luxembourg. Because of the COVID-19 pandemic, this was changed to an online event. ESOP is one of the European Joint Conferences on Theory and Practice of Software (ETAPS). It is devoted to fundamental issues in the specification, design, analysis, and implementation of programming languages and systems.

This volume contains 24 papers, which the program committee selected among 79 submissions. Each submission received between three and five reviews. After an author response period, the papers were discussed electronically among the 25 PC members and 98 external reviewers. The nine papers for which the PC chair had a conflict of interest (11% of the total submissions) were kindly handled by Patrick Eugster.

The quality of the submissions for ESOP 2021 was astonishing, and very sadly, we had to reject many strong papers. I would like to thank all the authors who submitted their papers to ESOP 2021.

Finally, I truly thank the members of the program committee. I am very impressed by their insightful and constructive reviews – every PC member has contributed very actively to the online discussions under this difficult COVID-19 situation, and supported Patrick and me. It was a real pleasure to work with all of you! I am also grateful to the nearly 100 external reviewers, who provided their expert opinions.

I would like to thank the ESOP 2020 chair Peter Müller for his instant help and guidance on many occasions. I thank all who contributed to the organisation of ESOP – the ESOP steering committee and its chair Peter Thiemann as well as the ETAPS steering committee and its chair Marieke Huisman, who provided help and guidance. I would also like to thank Alfredo Rial Duran, Barbara König, and Francisco Ferreira for their help with the proceedings.

January 2021

Nobuko Yoshida

In the originally published version of the ESOP 2021 preface, in the last sentence, there was an error in the name of “Barbara König”. This has now been corrected.

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Contents

The Decidability of Verification under PS 2.0.	1
<i>Parosh Aziz Abdulla, Mohamed Faouzi Atig, Adwait Godbole, S. Krishna, and Viktor Vafeiadis</i>	
Data Flow Analysis of Asynchronous Systems using Infinite Abstract Domains	30
<i>Snigdha Athaiya, Raghavan Komondoor, and K. Narayan Kumar</i>	
Types for Complexity of Parallel Computation in Pi-Calculus.	59
<i>Patrick Baillot and Alexis Ghyselen</i>	
Checking Robustness Between Weak Transactional Consistency Models	87
<i>Sidi Mohamed Beillahi, Ahmed Bouajjani, and Constantin Enea</i>	
Verified Software Units	118
<i>Lennart Beringer</i>	
An Automated Deductive Verification Framework for Circuit-building Quantum Programs	148
<i>Christophe Charetton, Sébastien Bardin, François Bobot, Valentin Perrelle, and Benoît Valiron</i>	
Nested Session Types	178
<i>Ankush Das, Henry DeYoung, Andreia Mordido, and Frank Pfenning</i>	
Coupled Relational Symbolic Execution for Differential Privacy	207
<i>Gian Pietro Farina, Stephen Chong, and Marco Gaboardi</i>	
Graded Hoare Logic and its Categorical Semantics	234
<i>Marco Gaboardi, Shin-ya Katsumata, Dominic Orchard, and Tetsuya Sato</i>	
Do Judge a Test by its Cover: Combining Combinatorial and Property-Based Testing	264
<i>Harrison Goldstein, John Hughes, Leonidas Lampropoulos, and Benjamin C. Pierce</i>	
For a Few Dollars More: Verified Fine-Grained Algorithm Analysis Down to LLVM.	292
<i>Maximilian P. L. Haslbeck and Peter Lammich</i>	
Run-time Complexity Bounds Using Squeezers.	320
<i>Oren Ish-Shalom, Shachar Itzhaky, Noam Rinetzky, and Sharon Shoham</i>	

Complete trace models of state and control	348
<i>Guilhem Jaber and Andrzej S. Murawski</i>	
Session Coalgebras: A Coalgebraic View on Session Types and Communication Protocols	375
<i>Alex C. Keizer, Henning Basold, and Jorge A. Pérez</i>	
Correctness of Sequential Monte Carlo Inference for Probabilistic Programming Languages	404
<i>Daniel Lundén, Johannes Borgström, and David Broman</i>	
Densities of Almost Surely Terminating Probabilistic Programs are Differentiable Almost Everywhere	432
<i>Carol Mak, C.-H. Luke Ong, Hugo Paquet, and Dominik Wagner</i>	
Graded Modal Dependent Type Theory	462
<i>Benjamin Moon, Harley Eades III, and Dominic Orchard</i>	
Automated Termination Analysis of Polynomial Probabilistic Programs	491
<i>Marcel Moosbrugger, Ezio Bartocci, Joost-Pieter Katoen, and Laura Kovács</i>	
Bayesian strategies: probabilistic programs as generalised graphical models.	519
<i>Hugo Paquet</i>	
Temporal Refinements for Guarded Recursive Types.	548
<i>Guilhem Jaber and Colin Riba</i>	
Query Lifting: Language-integrated query for heterogeneous nested collections	579
<i>Wilmer Ricciotti and James Cheney</i>	
Reverse AD at Higher Types: Pure, Principled and Denotationally Correct. . .	607
<i>Matthijs Vákár</i>	
Sound and Complete Concolic Testing for Higher-order Functions	635
<i>Shu-Hung You, Robert Bruce Findler, and Christos Dimoulas</i>	
Strong-Separation Logic.	664
<i>Jens Pagel and Florian Zuleger</i>	
Author Index	693