



Introduction to the Special Collection from the International Conference on Tests and Proofs (TAP) 2020 and 2021

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CCS Concepts: • **Software and its engineering** → **Software testing and debugging**; **Formal software verification**;

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Testing and formal proving are two core methods for ensuring high software quality, with testing being a dynamic and proving a static analysis technique. The *TAP* (Tests and Proofs) conference series promotes research in verification and formal methods that targets the interplay of proofs and testing: the advancement of techniques of each kind and their combination, with the ultimate goal of improving software and system dependability. This special issue contains selected papers of the 14th and 15th edition of TAP in 2020 and 2021, respectively. Out of the 16 papers accepted for TAP 2020 and 2021, published by Springer in their LNCS series, 7 papers were invited for this special issue and 3 finally were accepted.

The papers cover combinations of fuzzing, runtime assertion checking, automata learning (specifically an evaluation of different learning and testing algorithms), and program transformation:

- “[JMLKelinci+: Detecting Semantic Bugs and Covering Branches with Valid Inputs Using Coverage-Guided Fuzzing and Runtime Assertion Checking](#)” by Amirfarhad Nilizadeh, Gary T. Leavens, Corina S. Păsăreanu, and Yannic Noller,
- “[Benchmarking Combinations of Learning and Testing Algorithms for Automata Learning](#)” by Bernhard K. Aichernig, Martin Tappler, and Felix Wallner, and
- “[Sound Runtime Assertion Checking for Memory Properties via Program Transformation](#)” by Dara Ly, Nikolai Kosmatov, Frédéric Loulergue, and Julien Signoles.

This special issue has three co-editors. One of us, Frédéric Loulergue, had two roles in the coming about of the special issue, as co-editor and as co-author of one of the papers. The reason for this

Wolfgang Ahrendt Co-Chair TAP 2020.

Frédéric Loulergue Co-Chair TAP 2021.

Heike Wehrheim Co-Chair TAP 2020.

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is as follows. As co-PC chair of TAP 2021, Frédéric was responsible for the selection of best papers from TAP 2021, and for the review process of the submitted extended versions. Heike Wehrheim and Wolfgang Ahrendt did the same with papers from TAP 2020. One of the papers deemed best from TAP 2020, according to the PC of that conference, was co-authored by Frédéric. Heike and Wolfgang decided to invite the authors of that paper to submit an extended version to this special issue. To ensure integrity of the reviewing process, Frédéric was entirely excluded from the reviewing process of the paper he co-authored. For that, we used a separate account in the editorial system, inaccessible to Frédéric. All steps were closely coordinated with, and approved by, the editor-in-chief of the journal, Jim Woodcock.

We are grateful to *Formal Aspects of Computing* and the ACM Digital Library for allowing us to publish this collection of articles, particularly Jim Woodcock for his invitation to organize this special issue, and all of the editorial support, and John Cooke for the help to assemble the issue. We are also grateful to all program committee members of TAP 2020 and TAP 2021 and the reviewers involved in selecting and reviewing the papers included in this special issue. Their thorough reviews and guidance have helped improve the quality of the papers published here. Most importantly, we thank the authors of the contributed papers.