

26th International Conference on Theory and Applications of Satisfiability Testing

SAT 2023, July 4–8, 2023, Alghero, Italy

Edited by

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■ Preface

This volume contains the papers presented at SAT 2023, the 26th International Conference on Theory and Applications of Satisfiability Testing, held from July 4–8, 2023 in Alghero, Sardinia, Italy. The SAT 2023 conference was hosted by the University of Sassari in its Alghero campus.

The International Conference on Theory and Applications of Satisfiability Testing (SAT) is the premier annual meeting for researchers focusing on the theory and applications of the propositional satisfiability problem, broadly construed. In addition to plain propositional satisfiability, it also includes Boolean optimization (such as MaxSAT and Pseudo-Boolean (PB) constraints), Quantified Boolean Formulas (QBF), Satisfiability Modulo Theories (SMT), Model Counting, and Constraint Programming (CP) for problems with clear connections to Boolean-level reasoning. Many hard combinatorial problems can be tackled using SAT-based techniques including problems that arise in Formal Verification, Artificial Intelligence, Operations Research, Computational Biology, Cryptography, Data Mining, Machine Learning, Mathematics, etc. Indeed, the theoretical and practical advances in SAT research over the past twenty years have contributed to making SAT technology an indispensable tool in a variety of domains.

SAT 2023 welcomed scientific contributions addressing different aspects of SAT, including (but not restricted to) theoretical advances (such as exact algorithms, proof complexity, and other complexity issues), practical search algorithms, knowledge compilation, implementation-level details of SAT solvers and SAT-based systems, problem encodings and reformulations, applications (including both novel application domains and improvements to existing approaches), as well as case studies and reports on findings based on rigorous experimentation.

A total of 67 papers, comprising 47 regular papers, 10 short papers, and 10 tool papers, were submitted to and reviewed for SAT 2023. Each submission was reviewed by (at least) three Program Committee members and their selected external reviewers. The review process included an author response period, during which the authors of submitted papers were given the opportunity to respond to the initial reviews of their submissions. To reach a final decision, a Program Committee discussion period followed the author response period. External reviewers supporting the Program Committee were also invited to participate directly in the discussions for the papers they reviewed. Finally, 30 papers were accepted, of which 21 are regular papers, 3 are short papers, and 6 are tool papers.

In addition to the presentations of the accepted papers, the scientific program of SAT included two invited talks from Albert Atserias (Universitat Politècnica de Catalunya, Barcelona, Spain) and Ryan Williams (Massachusetts Institute of Technology, USA).

The conference hosted various associated events. In particular, the following three workshops and one tutorial, affiliated with SAT 2023, were held on July 4, 2023:

- Pragmatics of SAT (PoS 2023), organized by Matti Järvisalo and Daniel Le Berre.
- The International Workshop on Counting and Sampling (MCW 2023), organized by Johannes K. Fichte, Markus Hecher, and Kuldeep Meel.
- The International Workshop on Quantified Boolean Formulas and Beyond (QBF 2023), organized by Hubie Chen, Luca Pulina, Martina Seidl, and Friedrich Slivovsky.
- A Tutorial on OptiLog, by Carlos Ansótegui.



The results of several competitive events were also announced at SAT 2023:

- The Model Counting Competition 2023 (MC 2023), organized by Markus Hecher and Johannes K. Fichte.
- The QBF Gallery 2023, organized by Luca Pulina and Martina Seidl.
- The MaxSAT Evaluation 2023, organized by Matti Järvisalo, Jeremias Berg, Ruben Martins, and Andreas Niskanen.
- The SAT Competition 2023, organized by Marijn Heule, Markus Iser, Matti Järvisalo, Martin Suda, and Tomáš Balyo.

We thank everyone who contributed to making SAT 2023 a success. In particular, we thank the Local Arrangements Committee members Luca Pulina and Laura Pandolfo; the web manager Dario Guidotti; and all the organizers of the SAT affiliated workshops and competitions. We thank the invited speakers for readily accepting our invitation and delivering insightful talks.

We are indebted to the Program Committee members and the external reviewers, who dedicated their time to review and evaluate the submissions to the conference. We thank the authors of all submitted papers for their contributions, the SAT Association for their guidance and support in organizing the conference, the EasyChair conference management system for facilitating the submission and selection of papers as well as scheduling the final program, and the staff at LIPIcs for coordinating and assisting with the assembly of these proceedings.

We sincerely thank the sponsors of SAT 2023: The Artificial Intelligence journal for providing travel support to students attending the conference, the University of Sassari for financial and organizational support, and Filuta AI and Amazon Web Services for their financial support.

July 2023

Meena Mahajan and Friedrich Slivovsky

■ Awards

At SAT 2023, several outstanding contributions and individuals within the community were acknowledged by the SAT 2023 Program Committee and the SAT Association.

- Despite the high quality of work submitted this year, no single paper distinctly stood out to warrant a **Best Paper Award**. However, three papers were highlighted for having received particular attention from the Program Committee for their noteworthy contributions. The **Highlighted Papers** are the following:
 - “Polynomial Calculus for MaxSAT”,
by Ilario Bonacina, María-Luisa Bonet, and Jordi Levy;
 - “Certified Knowledge Compilation with Application to Verified Model Counting”,
by Randal Bryant, Wojciech Nawrocki, Jeremy Avigad, and Marijn Heule;
 - “IPASIR-UP: User Propagators for CDCL”,
by Katalin Fazekas, Aina Niemetz, Mathias Preiner, Markus Kirchweger, Stefan Szeider, and Armin Biere.

We commend the authors of these papers for their valuable work.

- The **Best Student Paper Award** was presented to Benjamin Böhm for the paper titled “QCDCL vs QBF Resolution: Further Insights”.
- The **Test-of-Time Award** is given by the SAT Association for the most influential paper published in the SAT Conference 20 ± 1 years ago. This year, the award was presented to Armin Biere for the paper “Resolve and Expand”, presented at SAT 2004.
- The SAT Association conferred a **Distinguished Service Award** on John Franco in honour of his long-lasting and foundational contributions to the series of International Conferences on Theory and Applications of Satisfiability Testing (SAT), the SAT association, and the Journal on Satisfiability, Boolean Modeling and Computation (JSAT).



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