Dipl.-Ing. Dr.techn. **Katalin Fazekas**

Coordinates & Personal Data

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Research Interests

- **Automated reasoning**, incremental decision procedures for SAT, SMT and QBF.
- **Optimization problems**, with pseudo-Boolean objective functions.
- **Formal verification**, model checking, verifying unbounded distributed protocols.

Education

2015 – 2020:	Ph.D., Computer Science, Johannes Kepler University Linz, Austria
	Thesis: **On SAT-based Solution Methods for Computational Problems**
	Supervisor: Armin Biere
2012 – 2015:	M.Sc., Software Engineering, Johannes Kepler University Linz, Austria
	Thesis: **EUF-Proofs for SMT4J**
	Supervisor: Armin Biere & Martina Seidl
2007 – 2011:	B.Sc., Software Information Technology, Eötvös Loránd University, Hungary
	Thesis: **Implementation of Resolution Refutation**
	Supervisor: Tibor Gregorics

Research Visits

March – May 2023:	University of California, Berkeley
	Simons Institute for the Theory of Computing
	Extended Reunion: Satisfiability
April – June 2018:	Albert-Ludwigs-Universität Freiburg, Germany
	Collaboration with Christoph Scholl
	Incremental SAT Reasoning
Febr – April 2017:	University of Toronto, Canada
	Collaboration with Fahiem Bacchus
	Implicit Hitting Set Algorithms for **Maximum Satisfiability Modulo Theories**

Professional Experience

Since Oct 2021:	**Hertha Firnberg Fellow**, TU Wien (FWF) Incremental SAT and SMT Reasoning for Scalable Verification Co-PI: Georg Weissenbacher
Febr 2021 – June 2021:	**Research Fellow**, Simons Institute for the Theory of Computing, UC Berkeley Program: Satisfiability: Theory, Practice, and Beyond Collaboration with Karem Sakallah (University of Michigan) Symmetries of Quantified SMT Problems in Distributed Protocol Verification
Aug 2020 – Febr 2021:	**Postdoctoral Researcher**, TU Wien Collaboration with Georg Weissenbacher and TTTech Formal Verification for Software of Automotive Systems
Nov 2015 – March 2020:	**Project Assistant**, JKU Linz Institute for Formal Models and Verification
2018WS, 2019SS:	**Lecturer**, JKU Linz **Formal Models**: Mandatory exercise courses for 150+ Bachelor students Special Topics - **Software Verification**: Advanced M.Sc course, responsible for exercises and tool demonstrations.

Honours, Awards

2023:	**Highlighted paper of SAT**, Alghero, Italy 26th International Conference on Theory and Applications of Satisfiability Testing The main conference of the SAT research community
2022:	**Shortlisted for the Hedy Lamarr Preis** of the City of Vienna Annual award for outstanding achievements by women in information technology.
2021:	**Hertha Firnberg Grant** 3-years long post-doc fellowship, Austrian Science Fund (FWF)
2020:	**Simons-Berkeley Research Fellowship for Spring 2021**, UC Berkeley, USA Program of Satisfiability: Theory, Practice, and Beyond
2019:	**Best Student Paper Award**, Lisbon, Portugal 22nd International Conference on Theory and Applications of Satisfiability Testing (SAT) The main conference of the SAT research community.

Outreach

May 2019:	Falter Heureka / Jungforscherinnen, Austria `https://www.falter.at/heureka/20190522/logik-fur-das-digitale-zeitalter/182b118072`

Invited Talks and Invited Tutorials

June 2024: Incremental SAT Solving via IPASIR and IPASIR-UP
Invited lecturer at "SAT/SMT/AR Summer School" in Nancy, France

Sept 2023: Incremental Reasoning in Embedded SAT Solvers
The 14th International Symposium on Frontiers of Combining Systems

Aug 2023: IPASIR-UP: User Propagators for CDCL
Knowledge Representation and Reasoning Group, University of Potsdam, Germany (online)

April 2023: IPASIR-UP: User Propagators for CDCL
SAT Reunion Workshop, Simons Institute, UC Berkeley, USA
CENTAUR group meeting, Stanford, USA

Nov 2022: Incremental Inprocessing in SAT Solving
Joint workshop of LogiCS + UnRAVeL, Vienna

Nov 2020: Incremental Inprocessing in SAT Solving
Workshop on Formal Methods in Computer Science, Eger, Hungary (online)

July 2019: Implicit Hitting Set Algorithms for Maximum Satisfiability Modulo Theories
Workshop on Logic and Search (LaSh 2019), Lisbon, Portugal

Publication Related Service

POS: Pragmatics of SAT International Workshop
Co-Chair: | 2024
PC member | 2022, 2023

SAT: Conference on Theory and Applications of Satisfiability Testing
PC member | 2024
Subreviewer | 2018, 2022

LPAR: International Conference on Logic for Programming, Artificial Intelligence and Reasoning
PC member | 2024

SMT: International Workshop on Satisfiability Modulo Theories
PC member | 2023, 2024

CICM: Conference on Intelligent Computer Mathematics
PC member | 2024
Women in Formal Methods Workshop PC member | 2024

CompAI: Workshop on Composite AI
PC member | 2024

IWIL: International Workshop on the Implementation of Logics
PC member | 2023, 2024

SBMF: Brazilian Symposium on Formal Methods
PC member | 2023, 2024

ATVA: International Symposium on Automated Technology for Verification and Analysis
PC member of Artifact Evaluation | 2024

FMCAD: Formal Methods in Computer-Aided Design
Subreviewer | 2017, 2022, 2024
Student Forum PC member | 2023, 2024

IJCAR: International Joint Conference on Automated Reasoning
PC member | 2022

SYNASC: International Symposium on Symbolic and Numeric Algorithms for Scientific Computing
PC member | 2022

PxTP: Workshop on Proof eXchange for Theorem Proving
PC member | 2021

TACAS: Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems
Subreviewer | 2017, 2020, 2022

CAV: International Conference on Computer-Aided Verification
Subreviewer | 2017

KR: International Conference on Knowledge Representation and Reasoning
Subreviewer | 2024

JAIR: Journal of Artificial Intelligence Research
Reviewer | 2021, 2022, 2023

JSAT: Journal on Satisfiability, Boolean Modeling, and Computation
Reviewer | 2018

QBF: International Workshop on Quantified Boolean Formulas
Subreviewer | 2017

Publications

International Conferences/Workshops – Peer Reviewed

[1] Armin Biere, Tobias Faller, Katalin Fazekas, Mathias Fleury, Nils Froleyks, Florian Pollitt:
CaDiCaL 2.0
International Conference on Computer Aided Verification (CAV), 2024

[2] Armin Biere, Katalin Fazekas, Mathias Fleury and Nils Froleyks:
Clausal Congruence Closure

International Conference on Theory and Applications of Satisfiability Testing (SAT), 2024

[3] Katalin Fazekas, Florian Pollitt, Mathias Fleury, Armin Biere:
Certifying Incremental Satisfiability
Int. Conf. on Logic for Programming, Artificial Intelligence and Reasoning (LPAR), 2024

[4] Katalin Fazekas, Florian Pollitt, Mathias Fleury, Armin Biere:
Incremental Proofs for Bounded Model Checking
Workshop on Methods and Description Languages for Modelling and Verification of Circuits and Systems (MBMV), 2024

[5] Katalin Fazekas, Aina Niemetz, Mathias Preiner, Markus Kirchweger, Stefan Szeider, Armin Biere:
IPASIR-UP: User Propagators for CDCL.
Theory and Applications of Satisfiability Testing (SAT), 2023

[6] Nikolaj Bjørner, Katalin Fazekas:
On Incremental Pre-processing for SMT.
International Conference on Automated Deduction (CADE), 2023

[7] Katalin Fazekas, Aman Goel, Karem A. Sakallah:
SAT-Based Quantified Symmetric Minimization of the Reachable States of Distributed Protocols.
Formal Methods in Computer Aided Design (FMCAD), 2023

[8] Timothee Durand, Katalin Fazekas, Georg Weissenbacher, Jakob Zwirchmayr:
Model Checking AUTOSAR Components with CBMC.
Formal Methods in Computer-Aided Design (FMCAD), 2021

[9] Katalin Fazekas, Markus Sinnl, Armin Biere, Sophie N. Parragh:
Duplex Encoding of Staircase At-Most-One Constraints for the Antibandwidth Problem.
Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR), 2020

[10] Katalin Fazekas, Armin Biere, Christoph Scholl:
Incremental Inprocessing in SAT Solving.
Theory and Applications of Satisfiability Testing (SAT), 2019

[11] Katalin Fazekas, Fahiem Bacchus, Armin Biere:
Implicit Hitting Set Algorithms for Maximum Satisfiability Modulo Theories.
International Joint Conference on Automated Reasoning (IJCAR), 2018

[12] Katalin Fazekas, Marijn J. H. Heule, Martina Seidl, Armin Biere:
Skolem Function Continuation for Quantified Boolean Formulas.
International Conference on Tests and Proofs (TAP), 2017

[13] Katalin Fazekas, Martina Seidl, Armin Biere:
A Duality-Aware Calculus for Quantified Boolean Formulas.
International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC), 2016

Technical Reports

[14] Armin Biere, Katalin Fazekas, Mathias Fleury, Maximillian Heisinger:
CaDiCaL, Kissat, Paracooba, Plingeling and Treengeling Entering the SAT Competition 2020.
Proceedings of SAT Competition 2020 – Solver and Benchmark Descriptions (SAT-COMP), 2020

[15] Katalin Fazekas, Markus Sinnl, Armin Biere, Sophie N. Parragh:
Duplex Encoding of Antibandwidth Feasibility Formulas Submitted to the SAT Competition 2020.
Proceedings of SAT Competition 2020 – Solver and Benchmark Descriptions (SAT-COMP), 2020