Dipl.-Ing. Dr.techn. Katalin Fazekas

Coordinates & Personal Data

TU Wien
Institute of Logic and Computation
Formal Methods in Systems Engineering 192/4
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Nationality: Hungarian

Main Areas of Research

- **Automated reasoning**, decision procedures for SAT, SMT and QBF.
- **Formal verification**, model checking and symbolic execution.
- **Optimization problems**, with pseudo-Boolean objective functions.

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**
Advisors: Armin Biere & Martina Seidl

2007 – 2011: B.Sc., in Software Information Technology, Eötvös Loránd University, Budapest, Hungary
Thesis: **Implementation of Resolution Refutation**
Advisor: Tibor Gregorics

Research Visits

April – June 2018: Albert-Ludwigs-Universität Freiburg, Freiburg, Germany
Collaboration with Christoph Scholl

Febr – April 2017: University of Toronto, Toronto, Canada
Collaboration with Fahiem Bacchus

Career History

Since Oct 2021: **Hertha Firnberg Fellow**, TU Wien
Incremental SAT and SMT reasoning for scalable verification

Febr 2021 – June 2021: **Research Fellow**, Simons Institute for the Theory of Computing, UC Berkeley
Program: Satisfiability: Theory, Practice, and Beyond
Domain symmetries in quantified SMT problems

Aug 2020 – Febr 2021: **Postdoctoral Researcher**, TU Wien
Group of Formal Methods in Systems Engineering
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.

Professional Activities

(Sub-)Referee: Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (2019);
Journal on Satisfiability, Boolean Modeling, and Computation (2018);
Conference on Theory and Applications of Satisfiability Testing (2018);
International Conference on Computer-Aided Verification (2018);
Formal Methods in Computer-Aided Design (2017);

Additional Research Achievements

Honours, Awards

2021: **Hertha Firnberg Grant**, 3-year 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)

Outreach

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

Invited Talks

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

Publications

International Conferences – Peer Reviewed

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

[2] 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

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

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

[5] 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

[6] 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

[7] 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

[8] 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