JAROSLAV BENDÍK

Computer Scientist and Developer of Automated Reasoning Techniques

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WORK EXPERIENCE

Certora — Czech Republic & Israel

SMT Team Lead July 2022 – Now
Senior Researcher Jan 2022 – Now

- Certora is the leader in formal verification of Ethereum Smart Contracts.
- My goal is to improve the scalability of the Satisfiability Modulo Theory (SMT) part of our tool. I participate in the actual research and development and I also lead the whole SMT team.

Max Planck Institute for Software Systems — Germany

Postdoctoral Researcher April 2021 – December 2021

- robustness analysis of real-time systems
- satisfiability modulo theories (SMT) optimization problems

National University of Singapore — Singapore

Postdoctoral Researcher January 2021 – April 2021

- analysis of infeasible constraint systems (e.g. requirements analysis)

Automated Reasoning Group, Amazon AWS — U.S.

SDE Intern Jan 2019 – March 2019

- static analysis of Java bytecode using WALA

AWARDS AND LEADERSHIP

Rector's best Ph.D. thesis award 2022
one of the three recipients from the whole university

Dean's best Ph.D. thesis award 2021
analysis of infeasible constraint systems

Vice-Rector's best Ph.D. thesis award 2021
for outstanding publication results

Teaching computer science 2015-2020
400+ students in 15+ groups, excellent student feedback
subjects: Algorithms and data structures, Programming

Research Team Leader 2017 – Now
research team leader for 4+ scientific publications

Academic Senate of Masaryk University 2019 – 2021
One of 20 student representatives of ≈ 45k univ. students

RESEARCH IN CS

formal methods, constraint processing, SAT and SMT solving, requirements analysis, software verification, symbolic and explicit model checking, timed automata

Academic Publications

- 14 conf. papers (ranks: $3 \times A^*, 6 \times A, 5 \times B$)
- 2 journal papers accepted for publication
- invited talks at, e.g., Rice University, National University of Singapore, or University of Minnesota
- 125+ citations at Google Scholar

Research Stays

Simons Institute, UC Berkeley Spring 2021
National University of Singapore Nov. 2019
University of Minnesota November 2017

EDUCATION

Masaryk University — Brno, Czech rep.

Ph.D. in Computer Science March 2021

- Thesis: Minimal Sets over a Monotone Predicate: Enumeration and Counting

M.S. in Computer Science June 2016

B.S. in Computer Science June 2014

REFEREES

Rupak Majumdar, Scientific Director at Max Planck Institute for Software Systems
- my current supervisor, contact (click)

Ivana Černá, CS Department Head at Masaryk University
- my Ph.D. advisor, contact (click)

Kuldeep S. Meel, Presidential Young Professor at National University of Singapore
- research collaborator, contact (click)

Ebru Aydin Gol, Assistant Professor at Middle East Technical University
- research collaborator, contact (click)

Jaroslav Bendík, 28th July, 2022

TOOL CONTRIBUTION (SAMPLE)

Tamus Python

jar-ben/tamus

- A tool for a **robustness analysis** and relaxation of timed automata (a mathematical formalism for modelling **real-time systems**).
- I am the main author of the underlying algorithmic procedures.

MUST C++

jar-ben/mustool

- A tool for analysis of **infeasible constraint systems**, e.g., Boolean, SMT, or LTL formulae.
- I am the main **developer** of the tool, the **designer** of the used **data structures**, and the **author** of the underlying **algorithmic techniques**.
- **Highlight:** the tool was integrated into (and is actively used by) Honeywell's internal *Validation & Verification Manager*.

jKind Java

loonwerks/jkind

- **Industrial** SMT-based infinite-state **model checker** for safety properties of **synchronous programs**.
- I am a co-author of jKind's engine for enumeration of **minimal inductive validity cores**, i.e., human-readable explanations of mathematical proofs.

PUBLICATIONS

2021 Jaroslav Bendík. "On Decomposition of Maximal Satisfiable Subsets". In: *FMCAD (to appear)*.

Jaroslav Bendík and Kuldeep S. Meel. "Counting Minimal Unsatisfiable Subsets". In: *CAV*, pp. 313–336.

Jaroslav Bendík and Kuldeep S. Meel. "Counting Maximal Satisfiable Subsets". In: *AAAI*, pp. 3651–3660.

Jaroslav Bendík, Ahmet Sencan, Ebru Aydin Gol, and Ivana Černá. "Timed Automata Relaxation for Reachability". In: *TACAS*, pp. 291–310.

2020 Jaroslav Bendík and Kuldeep S. Meel. "Approximate Counting of Minimal Unsatisfiable Subsets". In: *CAV*, pp. 439–462.

Jaroslav Bendík and Ivana Černá. "MUST: Minimal Unsatisfiable Subsets Enumeration Tool". In: *TACAS*, pp. 135–152.

Jaroslav Bendík and Ivana Černá. "Replication-Guided Enumeration of Minimal Unsatisfiable Subsets". In: *CP*, pp. 37–54.

Jaroslav Bendík and Ivana Černá. "Rotation Based MSS/MCS Enumeration". In: *LPAR*, pp. 120–137.

2018 Jaroslav Bendík, Ivana Černá, and Nikola Beneš. "Recursive Online Enumeration of All Minimal Unsatisfiable Subsets". In: *ATVA*, pp. 143–159.

Jaroslav Bendík, Elaheh Ghassabani, Michael W. Whalen, and Ivana Černá. "Online Enumeration of All Minimal Inductive Validity Cores". In: *SEFM*, pp. 189–204.

Jaroslav Bendík and Ivana Černá. "Evaluation of Domain Agnostic Approaches for Enumeration of Minimal Unsatisfiable Subsets". In: *LPAR*, pp. 131–142.

Jaroslav Bendík, Nikola Beneš, and Ivana Černá. "Finding Regressions in Projects under Version Control Systems". In: *ICSOFT*, pp. 186–197.

2016 Jaroslav Bendík, Nikola Beneš, Jiří Barnat, and Ivana Černá. "Finding Boundary Elements in Ordered Sets with Application to Safety and Requirements Analysis". In: *SEFM*, pp. 121–136.

Jaroslav Bendík, Nikola Beneš, Ivana Černá, and Jiří Barnat. "Tunable Online MUS/MSS Enumeration". In: *FSTTCS*, 50:1–50:13.