September 8–13, 2019, Dagstuhl Seminar 19371
Deduction Beyond Satisfiability

Monday, 09.09.19

09:00 Session 1: Welcome & Introductions
Chair: Carsten Fuhs
Welcome
The organisers
Introductions
All participants

10:30 Tea/Coffee Break

11:00 Session 2: Proof Reconstruction
Chair: Cesare Tinelli
Proofs in SMT
Haniel Barbosa, Jasmin Blanchette, Pascal Fontaine, Hans-Jörg Schurr
Proof reconstruction in conflict-driven satisfiability
Maria Paola Bonacina, Stéphane Graham-Lengrand, Natarajan Shankar

12:15 Lunch

14:00 Session 3: Program Analysis
Chair: Carsten Fuhs
Abstract Execution
Reiner Hähnle, Dominic Steinhöfel
Code commutation
Albert Rubio
Loop Acceleration for Under-Approximating Program Analysis
Florian Frohn, Jürgen Giesl, Marc Brockschmidt, Matthias Naaf

15:30 Tea/Coffee + Cake

16:15 Session 4: HO Proofs & Programs, Generic Reasoning
Chair: Renate Schmidt
Proof Checking in Zipperposition
Alexander Bentkamp, Simon Cruanes
A Fixpoint Logic and Dependent Effects for Temporal Property Verification
Yoji Nanjo, Hiroshi Unno, Eric Koskinen, Tachio Terauchi
Saturation Theorem Proving: From Inference Rules to Provers
Uwe Waldmann, Sophie Taurret, Simon Robillard, Jasmin Blanchette

18:00 Dinner
Tuesday, 10.09.19

09:00  **Session 5: QBF**  
Chair: Joao Marques-Silva
- Tractable QBF and model counting via Knowledge Compilation  
  *Florent Capelli*
- Proof Systems for Quantified Boolean Formulas  
  *Martina Seidl*

10:00  **Tea/Coffee Break**

10:30  **Session 6: Applications**  
Chair: Reiner Hähnle
- Network Verification at Hyperscale: Challenges and Opportunities  
  *Andrey Rybalchenko*
- Correct-by-Decision Solving and Applications  
  *Alexander Nadel*
- The Logical ECU  
  *Christoph Weidenbach*

12:15  **Lunch**

14:00  **Session 7: Proof analysis, induction**  
Chair: Laura Kovács
- Algorithmic Analysis of Proofs via CERES  
  *Alexander Leitsch*
- Inductive Inference with Recursion Analysis in Separation Logic  
  *Quang Loc Le*
- Efficient Validation of FOLID Cyclic Induction Reasoning  
  *Sorin Stratulat*

15:30  **Tea/Coffee + Cake**

16:15  **Session 8: Description Logics, Abduction, Forgetting**  
Chair: Andrzej Szalas
- Forgetting-Based Abductive Reasoning and Inductive Learning in Ontologies  
  *Warren Del-Pinto, Renate A. Schmidt*
- Abduction in DL by translation to FOL  
  *Sophie Tourret, Patrick Koopmann, Christoph Weidenbach*
- Forgetting for Computing Snap-Shots of Ontologies: Progress and Challenges  
  *Renate Schmidt*

18:00  **Dinner**
Wednesday, 11.09.19

09:00 Session 9: Constrained Horn Clauses & Induction Chair: Pascal Fontaine
Spacer on Jupyter
Arie Gurfinkel
Induction in saturation-based proof search
Andrei Voronkov

10:00 Tea/Coffee Break

10:30 Session 10: Probabilities & Loops Chair: Jürgen Giesl
Rule-Based Nonmonotonic Reasoning with Probabilities
Andrzej Szalas
Reasoning about Expected Runtimes of Probabilistic Programs
Benjamin Kaminski
Loop Detection by Logically Constrained Rewriting
Sarah Winkler, Naoki Nishida

12:15 Lunch

13:30 Excursion to Saarschleife, Cloefpath walk and Brewery tour with Dinner in Mettlach
Thursday, 12.09.19

09:00 Session 11: SAT, MaxSAT & Temporal Specifications Chair: Martina Seidl
Efficient SAT-Based Reasoning Beyond NP
João Marques-Silva
Reactive Synthesis beyond Realizability
Rayna Dimitrova

10:00 Tea/Coffee Break

10:30 Session 12: Program Abstraction & Separation Logic Chair: Ruzica Piskac
Cell morphing: from array programs to array-free Horn clauses
Julien Braine, Laure Gonnord, David Monniaux
Probabilistic Symbolic Execution using Separation Logic
Quoc Sang Phan
Local Reasoning for Global Graph Properties
Siddharth Krishna, Alexander Summers, Thomas Wies

12:15 Lunch

14:00 Session 13: SMT, Decomposition & Bit-Vectors Chair: Philipp Rümmer
Ultimate Automizer and the Search for the Perfect Proof
Matthias Heizmann
Safe Decomposition of Timing Requirements: Verification and Synthesis
Alessandro Cimatti, Luca Geatti, Alberto Griggio, Stefano Tonetta
Logically Constrained Rewriting over Bit Vectors
Naoki Nishida

15:30 Tea/Coffee + Cake

16:15 Session 14: Complexity, Neural Networks & Repair Chair: Benjamin Kaminski
Decision Procedures Beyond Satisfiability
Jürgen Giesl, Florian Frohn, Peter Giesl, Marcel Hark
NeuroCore: Guiding CDCL Solvers with Unsat-Core Predictions
Nikolaj S. Bjørner, Daniel Selsam
Using SMT solvers to reason about firewalls
Ruzica Piskac

18:00 Dinner
Friday, 13.09.19

09:00  Session 15: Runtime Complexity & Symbol Elimination  Chair: Sarah Winkler
From Derivational Complexity to Runtime Complexity of Term Rewriting
Carsten Fuhs
On Hierarchical Symbol Elimination and Applications
Viorica Sofronie-Stokkermans

10:00  Tea/Coffee Break

10:30  Session 16: Preferences, Interpolation & Abduction  Chair: David Monniaux
A Resolution Calculus for Preferential Logic
Claudia Nalon, Dirk Pattinson
Bit-Vector Interpolation and Quantifier Elimination by Lazy Reduction
Peter Backeman, Philipp Rümmel, Aleksandar Zeljic
From Syntax-Guided Synthesis to Abduction: Explorations in CVC4
Cesare Tinelli

12:15  Lunch

14:00  Departure