

CAV 2017, Heidelberg

29th International Conference on Computer Aided Verification

Location: Heidelberg Stadthalle

Kongresshaus Stadthalle Heidelberg
Neckarstaden 24, 69117 Heidelberg, Germany

Conference Program

Monday, July 24: Tutorials

(The program of the David Dill @ 60 Workshop, which takes place on the same day, is presented on the next page.)

13:30 Tutorial (Chair: Thomas Wahl)

The Power of Symbolic Automata and Transducers.

Loris D'Antoni

15:00 Coffee break

16:00 Tutorial (Chair: Georg Weissenbacher)

*Maximum Satisfiability in Software Analysis:
Applications and Techniques*

Mayur Naik

18:00 Reception in Heidelberg Stadthalle

Monday, July 24: David Dill @ 60 Workshop

Organizers: Somesh Jha, Rajeev Alur, Sanjit Seshia, Clark Barrett, Vijay Ganesh.

Location: Heidelberg Stadthalle

09:00 David Dill @ 60 Workshop - Morning Session

Venue: Main Hall

09:00 - 09:30 *Sound and Complete Mutation-Based Program Repair*

Orna Grumberg

09:30 - 10:00 *The Quest for Average Response Time*

Tom Henzinger

10:00 - 10:30 Coffee Break

10:30 - 11:00 *A Perspective on Formal Verification*

Ken McMillan

11:00 - 11:30 *Syntax-Guided Synthesis*

Rajeev Alur

11:30 - 12:00 *Twenty Years of Decision Procedures*

Clark Barrett

12:00 - 14:00 Lunch

14:00 David Dill @ 60 Workshop - Afternoon Session

Venue: Ballroom, next to Main Hall

14:00 - 14:30 *On the Unreasonable Effectiveness of SAT Solvers*

Vijay Ganesh

14:30 - 15:00 *David Dill: Real World Impact*

Alan Hu

15:00 - 15:30 *Perspectives*

David Dill

15:30 - 16:00 Coffee Break

16:00 - 17:00 *Comments on Dave*

Tuesday, July 25 - morning

08:45 Welcome by Conference Program Chairs

09:00 Invited Talk (Chair: Viktor Kuncak)

Fast Verification of Fast Cryptography for Secure Sockets
Chris Hawblitzel

10:00 Coffee break

10:30 Probabilistic Systems (Chair: Hana Chockler)

10:30 – 10:50

Reluplex: An Efficient SMT Solver for Verifying Deep Neural Networks
Guy Katz, Clark Barrett, David Dill, Kyle Julian, Mykel Kochenderfer.

10:50 – 11:10

Automated Recurrence Analysis for Almost-Linear Expected-Runtime Bounds
Krishnendu Chatterjee, Hongfei Fu, Aniket Murhekar.

11:10 – 11:30

Markov Automata with Multiple Objectives
Tim Quatmann, Sebastian Junges, Joost-Pieter Katoen.

11:30 – 11:50

Ensuring the Reliability of Your Model Checker: Interval Iteration for Markov Decision Processes
Christel Baier, Joachim Klein, Linda Leuschner, David Parker, Sascha Wunderlich.

11:50 – 12:10

Repairing Decision-Making Programs under Uncertainty
Aws Albarghouthi, Loris D'Antoni, Samuel Drews.

12:10 – 12:30

Value Iteration for Long-Run Average Reward in Markov Decision Processes
Pranav Ashok, Krishnendu Chatterjee, Przemyslaw Daca, Jan Křetínský, Tobias Meggendorfer.

12:30 Lunch

Tuesday, July 25 - afternoon

14:00 Data Driven Techniques (Chair: Daniel Kroening)

14:00 – 14:10 *STLInspector: STL Validation with Guarantees* [Tool paper]

Hendrik Röhm, Thomas Heinz, Eva Charlotte Mayer

14:10 – 14:30 *Learning a Static Analyzer from Data*

Pavol Bielik, Veselin Raychev, Martin Vechev.

14:30 – 14:50 *Synthesis with Abstract Examples*

Dana Drachler Cohen, Sharon Shoham, Eran Yahav.

14:50 – 15:10 *Data-Driven Synthesis of Full Probabilistic Programs*

Sarah Chasins, Phitchaya Mangpo Phothilimthana.

15:10 – 15:30 *Logical Clustering and Learning for Time-Series Data*

Marcell Vazquez-Chanlatte, Jyotirmoy Deshmukh, Xiaoqing Jin, Sanjit A. Seshia.

15:30 – 15:40 **Results of Synthesis Competitions**

Dana Fisman, Swen Jacobs

15:40 Coffee break

16:00 Runtime Verification and New Applications (Chair: Anna Slobodova)

16:00 – 16:10 *Montre: A Tool for Monitoring Timed Regular Expressions* [Tool paper]

Dogan Ulus

16:10 – 16:30 *Runtime Monitoring with Recovery of the SENT Communication Protocol*

Konstantin Selyunin, Stefan Jaksic, Thang Nguyen, Christian Reidl, Udo Hafner, Ezio Bartocci, Dejan Nickovic, Radu Grosu.

16:30 – 16:50 *Runtime Verification of Temporal Properties over
Out-of-order Data Streams*

David Basin, Felix Klaedtke, Eugen Zalinescu.

16:50 – 17:10 *Verified Compilation of Space-Efficient Reversible Circuits*

Matthew Amy, Martin Roetteler, Krysta Svore.

17:10 – 17:30 *Ascertaining Uncertainty for Efficient Exact Cache Analysis*

Claire Maiza, David Monniaux, Jan Reineke, Valentin Touzeau.

Wednesday, July 26 - morning

09:00 Invited Talk (Chair: Aarti Gupta)

Safety Verification of Deep Neural Networks
Marta Kwiatkowska

10:00 Coffee break

10:30 Cyber-physical Systems (Chair: Pavithra Prabhakar)

10:30 – 10:50

Lagrangian Reachability

Jacek Cyranka, Md Ariful Islam, Greg Byrne, Paul L. Jones, Scott A. Smolka, Radu Grosu.

10:50 – 11:10

Simulation-Equivalent Reachability of Large Linear Systems with Inputs

Stanley Bak, Parasara Sridhar Duggirala.

11:10 – 11:30

MightyL: A Compositional Translation from MITL to Timed Automata

Thomas Brihaye, Gilles Geeraerts, Hsi-Ming Ho, Benjamin Monmege.

11:30 – 11:50

DryVR: Data-Driven Verification and Compositional Reasoning for Automotive Systems

Chuchu Fan, Bolun Qi, Sayan Mitra, Mahesh Viswanathan.

11:50 – 12:10

Automated Formal Synthesis of Digital Controllers for State-Space Physical Plants

Alessandro Abate, Iury Bessa, Dario Cattaruzza, Lucas Cordeiro, Cristina David, Pascal Kesseli, Daniel Kroening, Elizabeth Polgreen.

12:10 – 12:30

Classification and coverage-based falsification for embedded control systems

Arvind S Adimoolam, Thao Dang, Alexandre Donze, James Kapinski, Xiaoqing Jin.

12:30 Lunch

Wednesday, July 26 - afternoon

14:00 Concurrency (Chair: Andrey Rybalchenko)

14:00 – 14:20 *GPUDrano: Detecting Uncoalesced Accesses in GPU Programs*
Rajeev Alur, Joseph Devietti, Omar S. Navarro Leija, Nimit Singhania.

14:20 – 14:40 *Context-Sensitive Dynamic Partial Order Reduction*
Elvira Albert, Puri Arenas, Maria Garcia de la Banda, Miguel Gomez-Zamalloa, Peter Stuckey.

14:40 – 15:00 *Starling: Lightweight Concurrency Verification With Views*
Matthew Windsor, Mike Dodds, Matthew J Parkinson, Ben Simner.

15:00 – 15:20 *Compositional Model Checking with
Incremental Counter-Example Construction*
Anton Wijs, Thomas Neele.

15:20 – 15:30 *Pithya: A Parallel Tool for Parameter Synthesis of
Piecewise Multi-Affine Dynamical Systems* [Tool paper]
Nikola Beneš, Luboš Brim, Martin Demko, Samuel Pastva, David Šafránek.

15:30 Coffee break

16:00 Analysis of Software and Hardware (Chair: Zvonimir Rakamaric)

16:00 – 16:20 *Non-polynomial Worst-Case Analysis of Recursive Programs*
Krishnendu Chatterjee, Hongfei Fu, Amir Kafshdar Goharshady.

16:20 – 16:40 *Automated Resource Analysis with Coq Proof Objects*
Quentin Carbonneaux, Jan Hoffmann, Thomas Reps, Zhong Shao.

16:40 – 17:00 *Look for the Proof to Find the Program:
Decorated-Component-Based Program Synthesis.*
Adria Gascon, Ashish Tiwari, Brent Carmer, Umang Mathur

17:00 – 17:20 *E-QED: Electrical Bug Localization During Post-Silicon Validation
Enabled by Quick Error Detection and Formal Methods*
Eshan Singh, Clark Barrett, Subhasish Mitra.

17:20 – 17:30 *SMTCoq: A plug-in for integrating SMT solvers into Coq* [Tool paper]
Burak Ekici, Alain Mebsout, Cesare Tinelli, Chantal Keller, Guy Katz, Andrew Reynolds, Clark Barrett.

17:30 Business Meeting

Thursday, July 27 - morning

09:00 Winner of the CAV Award (Chair: Orna Grumberg)

CAV Award Talk

10:00 Coffee break

10:30 Foundations (Chair: Wei-Ngan Chin)

10:30 – 10:50

Efficient Parallel Strategy Improvement for Parity Games

John Fearnley.

10:50 – 11:10

Model-Checking Linear-Time Properties of Parametrized Asynchronous Shared-Memory Pushdown Systems

Marie Fortin, Anca Muscholl, Igor Walukiewicz.

11:10 – 11:30

Minimization of Symbolic Transducers

Olli Saarikivi, Margus Veanes.

11:30 – 11:50

Abstract Interpretation with Unfoldings

Marcelo Sousa, César Rodríguez, Vijay D'Silva, Daniel Kroening.

11:50 – 12:10

Cutoff Bounds for Consensus Algorithms

Ognjen Maric, Christoph Sprenger, David Basin.

12:10 – 12:30

Towards Verifying Nonlinear Integer Arithmetic

Vincent Liew, Paul Beame.

12:30 Lunch

Thursday, July 27 - afternoon

14:00 Networked and Distributed Systems (Chair: Bow-Yaw Wang)

14:00 – 14:20

Network-wide Configuration Synthesis

Ahmed El-Hassany, Petar Tsankov, Laurent Vanbever, Martin Vechev.

14:20 – 14:40

Verifying Equivalence of Spark Programs

Shelly Grossman, Sara Cohen, Shachar Itzhaky, Noam Rinetzky, Mooly Sagiv.

14:40 – 15:00

Synchronization Synthesis for Network Programs

Jedidiah McClurg, Hossein Hojjat, Pavol Cerny.

15:00 Coffee break

15:30 Synthesis (Chair: Roopsha Samanta)

15:30 – 15:40

BoSy: An experimentation framework for Bounded Synthesis [Tool paper]

Peter Faymonville, Bernd Finkbeiner, Leander Tentrup.

15:40 – 16:00

*Bounded Synthesis for Streett, Rabin, and CTL**

Ayrat Khalimov, Roderick Bloem.

16:00 – 16:20

Quantitative Assume Guarantee Synthesis

Shaull Almagor, Orna Kupferman, Jan Oliver Ringert, Yaron Velner.

16:20 – 16:40

Syntax-Guided Optimal Synthesis for Chemical Reaction Networks

Luca Cardelli, Milan Ceska, Martin Franzle, Marta Kwiatkowska, Luca Laurenti, Nicola Paoletti, Max Whitby.

17:00 Public Lecture (Chair: Roderick Bloem)

Social Dynamics in the Post-Truth Society:

How the Confirmation Bias is Changing the Public Discourse

Fabiana Zollo

19:00 Banquet: Heidelberg castle (take conference bus or Bergbahn from Kornmarkt)

Friday, July 28 - morning

09:00 Invited Talk (Chair: Rupak Majumdar)

*Program Verification Under Weak Memory Consistency
Using Separation Logic*
Viktor Vafeiadis

10:00 Coffee break

10:30 Decision Procedures and their Applications (Chair: Damien Zufferey)

10:30 – 10:50

Model Counting for Recursively-Defined Strings
Minh-Thai Trinh, Duc-Hiep Chu, Joxan Jaffar.

10:50 – 11:10

A Three-tier Strategy for Reasoning about Floating-Point Numbers in SMT
Sylvain Conchon, Mohamed Iguernlala, Kailiang Ji, Guillaume Melquiond, Clément Fumex.

11:10 – 11:30

A Correct-by-Decision Solution for Simultaneous Place and Route
Alexander Nadel.

11:30 – 11:50

Scaling Up DPLL(T) String Solvers using Context-Dependent Simplification
Andrew Reynolds, Maverick Woo, Clark Barrett, David Brumley, Tianyi Liang, Cesare Tinelli.

11:50 – 12:10

On Expansion and Resolution in CEGAR Based QBF Solving
Leander Tentrup.

12:10 – 12:30

A Decidable Fragment in Separation Logic with Inductive Predicates and Arithmetic
Quang Loc Le, Tatsuta Makoto, Jun Sun, Wei-Ngan Chin.

12:30 Lunch

Friday, July 28 - afternoon

14:00 Software Analysis (Chair: Aws Albarghouthi)

14:00 – 14:20

Finding Fix Locations for CFL-Reachability Analyses via Minimum Cuts

Andrei Marian Dan, Manu Sridharan, Satish Chandra, Jean-Baptiste Jeannin, Martin Vechev.

14:20 – 14:40

Proving linearizability using forward simulations

Ahmed Bouajjani, Michael Emmi, Constantin Enea, Suha Orhun Mutluergil.

14:40 – 14:50

EAHyper: Satisfiability, Implication, and Equivalence Checking of Hyperproperties

[Tool paper]

Bernd Finkbeiner, Christopher Hahn, Marvin Stenger.

14:50 – 15:10

Automating Induction for Solving Horn Clauses

Hiroshi Unno, Sho Torii, Hiroki Sakamoto.

15:10 – 15:20

*A **Storm** is Coming: A Modern Probabilistic Model Checker* [Tool paper]

Christian Dehnert, Sebastian Junges, Joost-Pieter Katoen, Matthias Volk.

15:20 – 15:40

On Multiphase-Linear Ranking Functions

Amir M. Ben-Amram, Samir Genaim.

15:40 End of the conference