Workshops of CAV 2017

29th International Conference on Computer Aided Verification
Heidelberg Germany

Workshops in Crowne Plaza

Crowne Plaza Heidelberg City Centre
Kurfuerstenanlage 1, Heidelberg - 69115, Germany
Hotel Front Desk: +49-6221-9170
Email: Heidelberg@HDBGE.CrownePlaza.com

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SMT Workshop Room: TERRA

Program Chairs: Martin Brain and Liana Hadarean

Day 1, **Saturday**, July 22

09:00 - 10:00 Invited talk by Andrew Reynolds

10:00 - 10:30: *Instantiation and Pretending to be an SMT Solver with Vampire*
      Giles Reger, Martin Suda and Andrei Voronkov

10:30 - 11:00 Coffee Break

11:00 - 12:30 Session 1
- *Relational Constraint Solving in SMT*
  Baoluo Meng, Andrew Reynolds, Cesare Tinelli and Clark Barrett
- *Congruence Closure with Free Variables*
  Haniel Barbosa, Pascal Fontaine and Andrew Reynolds
- *Counterexample-Guided Model Synthesis*
  Mathias Preiner, Aina Niemetz and Armin Biere

12:30 - 14:00 Lunch

14:00 - 15:30 Session 2
- *OpenSMT2: An SMT Solver for Multi-Core and Cloud Computing*
  Antti Hyvärinen, Matteo Marescotti, Leonardo Alt, Natasha Sharygina
- Model-Based API Testing for SMT Solvers
  Aina Niemetz, Mathias Preiner and Armin Biere
- *Visualising SMT-Based Parallel Constraint Solving*
  Jelena Budakovic, Matteo Marescotti, Antti Hyvärinen, Natasha Sharygina

15:30 - 16:00 Coffee Break

16:00 - 17:00 Session 3
- *Satisfiability Modulo Transcendental Functions via Incremental Linearization*
  Alessandro Cimatti, Alberto Griggio, Ahmed Irfan, Marco Roveri
  and Roberto Sebastiani
- *Generating Optimal Scheduling for Wireless Sensor Networks by Using Optimization Modulo Theories Solvers*
  Gergely Kovásznai, Csaba Biró, and Balázs Erdélyi

http://smt-workshop.cs.uiowa.edu/2017

SMT Workshop   Room: TERRA

Program Chairs: Martin Brain and Liana Hadarean

Day 2, **Sunday**, July 23

09:00 - 10:00 Invited talk by James Davenport

10:00 - 10:30: *Real Behavior of Floating Point*
François Bobot, Zakaria Chihani and Bruno Marre

10:30 - 11:00 Coffee Break

11:00 - 12:30 Session 4
- *Subtropical Satisfiability*
Pascal Fontaine, Mizuhito Ogawa, Thomas Sturm and Xuan Tung Vu
- *LibPoly: A Library for Reasoning about Polynomials*
Dejan Jovanović and Bruno Dutertre
- *Z3str3: A String Solver with Theory-aware Branching*
Murphy Berzish, Yunhui Zheng and Vijay Ganesh

12:30 - 14:00 Lunch

14:00 - 15:00 Session 5
- *An MCSAT treatment of Bit-Vectors*
Stéphane Graham-Lengrand and Dejan Jovanović
- *Solving Constraints over Bit-Vectors with SAT-based Model Checking*
Yakir Vizel, Alexander Nadel and Sharad Malik
- *Efficient Interpolation for the Theory of Arrays*
Jochen Hoenicke and Tanja Schindler

15:00 - 15:30: *SMT-COMP'17 Report*
15:30 - 16:00 Coffee Break

16:00 - 17:00: *SMT-LIB Updates and Discussion*
17:00 - 17:30: *Business Meeting*

http://smt-workshop.cs.uiowa.edu/2017

VSTTE   Room: NATURA

Program Chairs: Andrei Paskevich and Thomas Wies

Day 1, **Saturday**, July 22

9:00-10:00 Invited talk by Santiago Zanella-Beguelin
   Everest: a verified and high-performance HTTPS stack

10:00 - 10:30 Session 1: Intermediate verification languages
   - *A Formally Verified Interpreter for a Shell-like Programming Language*
     Nicolas Jeannerod, Ralf Treinen, and Claude Marché

10:30 - 11:00 Coffee Break

11:00 - 12:30 Session 2: Program verification — Case studies
   - *A Formal Analysis of the Compact Position Reporting Algorithm*
     Aaron Dutle, Mariano Moscato, Laura Titolo, and Cesar Munoz
   - *Proving JDK's Dual Pivot Quicksort Correct*
     Bernhard Beckert, Jonas Schiffl, Peter Schmitt, and Mattias Ulbrich
   - *A Semi-Automatic Proof of Strong Connectivity*
     Ran Chen and Jean-Jacques Levy

12:30 - 14:00 Lunch

14:00 - 15:00: Invited talk by Christoph Weidenbach
   Design Principles of Automated Reasoning Systems

15:00 - 15:30 Session 3: Numeric computations I
   - *Verifying Branch-Free Assembly Code Using Why3*
     Marc Schoolderman

15:30 - 16:00 Coffee Break

16:00 - 17:00 Session 4: Numeric computations II
   - *How to Get an Efficient yet Verified Arbitrary-Precision Integer Library*
     Raphaël Rieu-Helft, Claude Marché, and Guillaume Melquiond
   - *Automating the Verification of Floating-Point Programs*
     Clément Fumex, Claude Marché, and Yannick Moy

https://vstte17.lri.fr/

VSTTE   Room: NATURA

Program Chairs: Andrei Paskevich and Thomas Wies

Day 2, **Sunday**, July 23

9:00 - 10:00 Invited talk by Jan Hoffman
Why Verification Cannot Ignore Resource Usage

10:00 - 10:30 Session 5: SAT solving for cryptographic analysis

- *Adaptive Restart and CEGAR-based Solver for Inverting Cryptographic Hash Functions*
  Saeed Nejati, Jia Liang, Catherine Gebotys, Krzysztof Czarnecki, and Vijay Ganesh

10:30 - 11:00 Coffee Break

11:00 - 12:30 Session 6: Static analysis and model checking

- *Practical Void Safety*
  Alexander Kogtenkov
- *Memory-Efficient Tactics for Randomized LTL Model Checking*
  Kim Guldstrand Larsen, Doron Peled, and Sean Sedwards
- *Reordering Control Approaches to State Explosion in Model Checking with Memory Consistency Models*
  Tatsuya Abe, Tomoharu Ugawa, and Toshiyuki Maeda

12:30 - 14:00 Lunch

14:00 - 15:00 Invited talk by Shaz Qadeer
On Refining Atomic Actions in the CIVL Program Verifier

15:00 - 15:30 Session 7: Concurrency

- *An Abstraction Technique for Describing Concurrent Program Behaviour*
  Wytse Oortwijn, Marieke Huisman, Stefan Blom, Marina Zaharieva-Stojanovski, and Dilian Gurov

https://vstte17.lri.fr/

SYNT   Room: ANIMUS **1**

Program Chairs: Dana Fisman and Swen Jacobs

Saturday, July 22

8:45-9:00 Welcome

9:00-10:00 Keynote Talk by Rupak Majumdar
    Controller Synthesis for Cyber-physical Systems

10:00-10:30 Coffee Break

10:30-12:00 Session 2
- **Invited Talk by Jan Oliver Ringert**
  Quantitative Assume Guarantee Synthesis
- *CTL* synthesis via LTL synthesis*
  Roderick Bloem, Sven Schewe and Ayrat Khalimov:
- *Symbolic vs. Bounded Synthesis for Petri Games*
  Bernd Finkbeiner, Manuel Gieseking, Jesko Hecking-Harbusch and
  Ernst-Rüdiger Olderog

12:00-13:30 Lunch

13:30-15:00 Session 3
- **Invited Talk by Sharon Shoham**
  Synthesizing Universally-Quantified Inductive Invariants
- *A Class of Control Certificates to Ensure Reach-While-Stay for Switched
  Systems*
  Hadi Ravanbakhsh and Sriram Sankaranarayanan
- *Performance Heuristics for GR(1) Synthesis and Related Algorithms*
  Elizabeth Firman, Shahar Maoz and Jan Oliver Ringert

15:00-15:30 Coffee Break

15:30-17:00 Session 4
- **Invited Talk Andrew Reynolds**
  SyGuS Techniques in the Core of an SMT Solver
- **Competition Report: SyGuS-COMP 2017**
- **Competition Report: SYNTCOMP 2017**

17:00 Business Meeting

www.react.uni-saarland.de/synt2017/

VMW   Room: ANIMUS 1

Organizers: Pavithra Prabhakar, Andrey Rybalchenko, Damien Zufferey
Sunday, July 23

8:44 – 8:45 Welcome

8:45 – 10:15 Session 1
- **Model-checking: Ken McMillan**, Microsoft Research
- **Hybrid systems: Tom Henzinger**, IST Austria

10:15 – 10:30 Coffee Break

10:30 – 12:15 Session 2
- **Probabilistic systems: Marta Kwiatkowska**, University of Oxford
- **SMT solving: Alberto Griggio**, FBK
- **Synthesis: Armando Solar-Lezama**, MIT

12:15 – 13:30 Lunch

13:30 – 15:00 Session 3
- **Liana Hadarean**, Synopsys
- **Jens Oehlerking**, Bosch
- **Jules Villard**, Facebook

15:00 – 15:30 Coffee Break

15:30 – 16:00 Session 4
- **Neha Rungta**, Amazon

16:00 – 17:00 Panel session

http://cavconference.org/2017/verification-mentoring-workshop/

NSV & Rise4CPS   Room:ANIMUS **2**

Program Chairs: Alessandro Abate, Sylvie Boldo, Ezio Bartocci

Day 1, **Saturday**, July 22

8:45 - 9:00 Welcome

9:00 - 10:00 NSV Invited Seminar 1
- **Kyoko Makino** (Michigan State University, USA)
  Verified Computations using Taylor Models and the Applications

10:00 - 10:30 Coffee Break

10:30 - 12:00 NSV Session 1: Precise Numerics
- *Formal Correctness of Comparison Algorithms between Binary64 and Decimal64 Floating-point*
  Arthur Blot, Jean-Michel Muller and Laurent Thery
- *Studying the Numerical Quality of an Industrial Computing Code: A Case Study on Code Aster*
  François Févotte and Bruno Lathuilière
- *Sound Numerical Computations in Abstract Acceleration*
  Dario Cattaruzza, Alessandro Abate, Daniel Kroening and Peter Schrammel

12:00 - 13:30 Lunch

13:30 - 15:00 RISE4CPS Tutorial 1
- **Erika Abraham** (RWTH Aachen University, Germany)
  Techniques and Tools for Hybrid Systems Reachability Analysis

15:00 - 15:30 Coffee Break

15:30 - 17:00 RISE4CPS Tutorial 2
- **Fedor Shmarov and Paolo Zuliani** (Newcastle University, UK),
  ProbReach: Probabilistic Bounded Reachability for Uncertain Hybrid Systems

http://www.cs.ox.ac.uk/conferences/NSV17/

NSV & Rise4CPS   Room:ANIMUS **2**

Program Chairs: Alessandro Abate, Sylvie Boldo, Ezio Bartocci

Day 2, **Sunday**, July 23

9:00 - 10:00 NSV Invited Seminar 2
- **Nathalie Revol** (ENS de Lyon, France)
  Introduction to the IEEE 1788-2015 Standard for Interval Arithmetic

10:00 - 10:30 Coffee Break

10:30 - 12:00 NSV Session 2: Analysis and Verification of Continuous and Hybrid Models
- *Challenges and Tool Implementation of Hybrid Rapidly-Exploring Random Trees*
  Stanley Bak, Sergiy Bogomolov, Thomas Henzinger and Aviral Kumar.
- *A Study of Model-Order Reduction Techniques for Verification*
  Yi Chou, Xin Chen and Sriram Sankaranarayanan
- *Rigorous Reachability Analysis and Domain Decomposition of Taylor Models*
  Martin Berz and Kyoko Makino

12:00 - 13:30 Lunch

13:30 - 15:00 RISE4CPS Tutorial 3
- **Sayan Mitra** (University of Illinois at Urbana Champaign, USA)
  Data-driven verification of cyber-physical systems with DryVR and C2E2

15:00 - 15:30 Coffee Break

15:30 - 17:00 RISE4CPS Tutorial 4
- **Alessandro Abate** (University of Oxford, UK)
  Counter Example Guided Synthesis of Sound Controllers for Cyber-Physical Systems with SAT Solvers

http://www.cs.ox.ac.uk/conferences/NSV17/

DARS Workshop   Room: LUX

Program Chairs: Pavithra Prabhakar and Roopsha Samanta

Saturday, July 22

8:45 - 9:00 Opening Remarks

9:00 - 10:30

- **Invited Talk by Geir E. Dullerud**
  Robustness, Mori-Zwanzig Model Reduction, and Statistical Validation of Hybrid Systems
- *A CEGAR approach for stability verification of linear hybrid systems*
  Miriam García Soto

10:30 - 11:00 Coffee Break

11:00 - 12:30

- *Robust Linear Temporal Logic*
  Paulo Tabuada and Daniel Neider
- *Stabilizing Numeric Programs against Platform Uncertainties*
  Yijia Gu and Thomas Wahl
- Discussion

12:30 - 14:00 Lunch

14:00 - 15:30

- **Invited Talk by Dimitrios Vytiniotis**
  Analyzing Neural Network Robustness with Constraints
- *Martingales for Probabilistic Termination and Safety*
  Krishnendu Chatterjee, Petr Novotný and Djordje Zikelic

15:30 - 16:00 Coffee Break

16:00 - 17:00

- *Recent Advances in Designing Robust Probabilistic Systems*
  Radu Calinescu, Milan Ceska, Simos Gerasimou, Marta Kwiatkowska and Nicola Paoletti
- Closing remarks and discussion

https://darsworkshop.github.io/dars2017/

FEVER Workshop   Room: LUX

Program Chair: Nils Jansen

Sunday, July 23

8:45 - 9:00 Welcome

9:00 - 10:00 Invited Talk Holger Hermann, Saarland University, Germany

10:00 - 10:25
- *Trace Diagnostics using Temporal Implicants,* Thomas Ferrère, Oded Maler and Dejan Nickovic

10:30 - 11:00 Coffee Break

11:00 - 12:30
- *A Framework for Comparing the Granularity of Unsatisfiable Cores, Vacuity, and Related Notions,* Viktor Schuppan
- *Reusable and Understandable Formal Verification for Cyber-Physical Systems,* Taylor T Johnson
- *JANI for Modelling and Tool Interaction,* Arnd Hartmanns
- *Inverse Reinforcement Learning to Capture Human Intent in a Shared Control Setting,* Murat Cubuktepe, Nils Jansen and Ufuk Topcu

12:30 - 14:00 Lunch

14:00 - 15:00 Invited Talk Roderick Bloem, TU Graz, Austria

15:00 - 15:25
- *Strategy Representation by Decision Trees,* Tomas Brazdil, Krishnendu Chatterjee, Jan Kretinsky and Viktor Toman

15:30 - 16:00 Coffee Break

16:00 - 17:00
- *Explainable Verification-Based Approaches in Systems Biology,* Hillel Kugler
- *Causality Analysis for Concurrent Reactive Systems,* Rayna Dimitrova, Rupak Majumdar and Vinayak Prabhu
- *Sharper and Simpler Nonlinear Interpolants for Program Verification,* Takamasa Okudono, Yuki Nishida, Kensuke Kojima, Kohei Suenaga, Kengo Kido and Ichiro Hasuo

http://www.cs.ru.nl/personal/nilsjansen/fever_workshop/

David Dill @ 60 Workshop
Location: **Heidelberg Stadthalle**

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

Monday, July 24

David Dill @ 60 Workshop Program

MORNING SESSION: MAIN HALL

Time	Speaker	Talk Titles
09:00 – 09:30 AM	Orna Grumberg	Sound and Complete Mutation-Based Program Repair
09:30 – 10:00 AM	Tom Henzinger	The Quest for Average Response Time
10:00 – 10:30 AM	COFFEE BREAK	
10:30 – 11:00 AM	Ken McMillan	A Perspective on Formal Verification
11:00 – 11:30 AM	Rajeev Alur	Syntax-guided Synthesis
11:30 – 12:00 noon	Clark Barrett	Twenty Years of Decision Procedures
12:00 – 02:00 PM	LUNCH	

AFTERNOON SESSION: BALL ROOM

Time	Speaker	Talk Titles
02:00 – 02:30 PM	Vijay Ganesh	On the Unreasonable Effectiveness of SAT Solvers
02:30 – 03:00 PM	Alan Hu	David Dill: Real World Impact
03:00 – 03:30 PM	David Dill	Perspectives
03:30 – 04:00 PM	COFFEE BREAK	
04:00 – 05:00 PM	Comments on Dave	