Contact

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Department of Computer Science
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Research Interests

Formal methods, Safe artificial intelligence, Cyber-physical and software systems, Symbolic analysis of quantum circuits, Model and parameter synthesis

Research Path

Aalborg University, Aalborg, Denmark
Assistant professor (tenure track) — Since Oct. 2021

Member of DIREC bridge project *Verifiable and Safe AI for Autonomous Systems*

University of Konstanz, Konstanz, Germany
Interim professor for "Cyber-Physical Systems" (Vertretungsprofessor) — Oct. 2020 – Sept. 2021

ISTA, Klosterneuburg, Austria
Postdoctoral fellow (ISTplus program) — Oct. 2018 – Sept. 2020

Group of Thomas A. Henzinger

University of Freiburg, Freiburg, Germany
Ph.D. student (Doktorand) — Nov. 2013 – Sept. 2018

Group of Andreas Podelski

Thesis: *Fundamental techniques for the scalable analysis of systems*
Awarded with distinction (summa cum laude)

Grants

- Sapere Aude starting grant (Independent Research Fund Denmark) May 2024 – Apr. 2028
  Safe control systems with neural networks. Total budget: 6,192,000 DKK (3 positions).
- STORM_SAFE (Interreg North Sea, EU project) (co-applicant) Jan. 2024 – Dec. 2027
  Software reliability for critical infrastructures. 11 partners. Total budget: 7,409,302 €. Partner budget: 357,100 € (postdoc position).
- ISTplus postdoc fellowship Oct. 2018 – Sept. 2020
  Supported by the European Union's Horizon 2020 research and innovation programme "Marie Skłodowska-Curie"

Training

- Department's selection for the TECH faculty's first talent development course 2024

Education

University of Freiburg, Freiburg, Germany

- Master of Science Oct. 2011 – Sept. 2013
- Bachelor of Science Oct. 2008 – Sept. 2011

Service

Organization

- 7th Symposium on AI Verification (SAIV) 2024 (founding member and co-organizer)
- 29th International Symposium on Model Checking Software (SPIN) 2023 (co-chair)
- 1st-3rd Wolverine (workshop on open problems in learning and verification of neural networks) 2023 (co-located with CAV), 2022 (co-located with FLoC), 2021 (co-located with ATVA) (founding member and co-organizer)
- JuliaReach & JuliaIntervals Days 2021 (co-organizer)
- Set propagation methods in Julia: techniques and applications (minisymposium at JuliaCon 2021) ⟨→ video⟩ (co-organizer)
- 25th Static Analysis Symposium (SAS) 2018 (organization committee)

Steering committee member

- AAU quantum steering group (since 2023)
- SPIN (since 2023)

Program committee member

- FSEN 2025, ARCH 2024, SAIV 2024, HCVS 2024, SPIN 2024, IJCAI 2024, AAAI 2024, SPIN 2023, IJCAI 2023 (**distinguished reviewer**), AAAI 2023, FORMATS 2022, SPIN 2022, HSCC 2022, Principles of Systems Design 2022, VSTTE 2020

Reviewer

- LICS 2024, SCP (2023), TSE (2023), JuliaCon Proceedings (2023), (A)ISoLA 2023, ATVA 2023, CONCUR 2023, COLA (2022), ATVA 2022, STTT (2022), TECS (2022), TACAS 2022, SoSyM (2021), RTSS 2021, Inf. Comput. (2020), TACAS 2020, ICCPS 2020, DARS 2019, FORMATS 2019, TACAS 2018, EMSOFT 2018, VMCAI 2017, SV-COMP 2017, PLDI 2017, SAS 2017, FORMATS 2017, VMCAI 2016, HSCC 2016, CAV 2016, ATVA 2016, POPL 2014, HSCC 2014, FSTTCS 2014

Program committee member (artifact evaluation)

- TAP 2021, TAP 2020, VMCAI 2020, TAP 2019, ECOOP 2019, HSCC 2019, HSCC 2018, CAV 2017, HSCC 2017

Invited Talks

- Danish Digitalization, Data Science and AI (D^3A) 2024
- DIREC Workshop on Verifiable and Robust AI 2023
- AAU Quantum workshop 2023
- Memorial session at FORMATS 2023
- Software and Systems Engineering group at the University of Konstanz (2023)
- Minisymposium at SIAM CSE 2023
- Workshop at the DIREC Seminar 2022
- Institute for Risk and Uncertainty in Liverpool (2022) ⟨→ video⟩
- Algorithmics group at TU Delft (2022)
- MIT Julia Lab (2021)
- Workshop at JuliaCon 2021 ⟨→ video⟩
- RiSE Seminar at ISTA (2015)

Invitations

- (A)ISoLA 2024
- Dagstuhl Seminar (*Artificial Intelligence and Formal Methods Join Forces for Reliable Autonomy*) (2024)
- (A)ISoLA 2023

Supervision

- Asger H. Brorholt (PhD student). Topic: *Shielded artificial intelligence* since 2023
  Co-supervision with Kim G. Larsen

Tools

- *JuliaReach* (framework for analysis of cyber-physical systems) [Julia]
  Won "ARCH 2020 Best Result" and "ARCH 2018 Best Friendly Competition Result" awards. ⟨→ video of workshop presentation⟩
  Notable packages:
  - *LazySets.jl* (scalable symbolic-numeric set computations)
  - *ReachabilityAnalysis.jl* (reachability analysis of cyber-physical systems)
  - *ClosedLoopReachability.jl* (closed-loop systems with neural-network controllers)
  - *RangeEnclosures.jl* (range enclosures of real-valued functions)
- Tools for synthesis of cyber-physical systems from time-series data
  - *HySynthParametric* (parametric linear hybrid automata) [Julia]
  - *HySynth* (hybrid automata with constant/affine continuous dynamics) [Python/Julia]
- Tools for monitoring of neural networks [Python]
  - *Into the Unknown (extended)* (active monitoring of neural networks w/ online learning)
  - *Into the Unknown* (active monitoring of neural networks)
  - *Outside the Box* (novelty detection for neural networks)
- *ULTIMATE* (framework for program analysis), particularly the *ULTIMATE Automata library* ⟨link to web interface⟩ [Java]
- *HyST Stateflow Converter* (conversion from hybrid-automaton models to Simulink / Stateflow models), now part of *HyST* [Matlab/Java]
- *AdaptiveMomentClosure* (parameter synthesis for chemical reaction networks) [Matlab]
- *Hydentify* (robustness verification and parameter synthesis for multiaffine systems), based on RoVerGeNe [Matlab/C++]

Teaching

Aalborg University, Aalborg, Denmark

- Course: Models and Tools for Cyber-physical Systems (co-advisor) (given both in Aalborg and Copenhagen) — Spring term 2024
- Course: Industrial Test and Verification — Fall term 2023
- Seminar: Specialization Course in Semantics and Verification (co-advisor) — Fall term 2023
- PhD course: Quantum Information and Computing (co-advisor) — August 2023
- Course: Models and Tools for Cyber-physical Systems (co-advisor) (given both in Aalborg and Copenhagen) — Spring term 2023
- Seminar: Specialization Course in Machine Intelligence (co-advisor) — Fall term 2022
- Tutorial: Algorithms and Data Structures (teaching assistant) — Spring term 2022

University of Konstanz, Konstanz, Germany

- Course: Software Project (Software-Projekt) — Summer term 2021
- Seminar: Automata Theory — Summer term 2021
- Course: Analysis of Dynamical and Cyber-physical Systems — Winter term 2020/21
- Course: Program Verification — Winter term 2020/21
- Seminar: Machine Learning and Formal Verification (co-advisor) — Winter term 2020/21

ISTA, Klosterneuburg, Austria

- Seminar: Formal Methods for Learned Systems (co-advisor) — Spring term 2020
- Workshop: Scientific Writing in Computer Science (co-advisor) — Fall term 2019

University of Freiburg, Freiburg, Germany (Teaching assistant)

- Course: Software Engineering — Summer term 2018
- Seminar: Automata Theory — Summer term 2018
- Course: Theoretical Computer Science (Theoretische Informatik) — Winter term 2017/18
- Seminar: Automata Theory — Winter term 2017/18
- Seminar: Program Analysis & Software Testing — Winter term 2017/18
- Course: Program Verification — Summer term 2017
- Course: Cyber-Physical Systems - Hybrid Models — Summer term 2017
- Seminar: Automata Theory — Summer term 2017
- Seminar: Program Analysis & Software Testing — Summer term 2017
- Course: Cyber-Physical Systems - Discrete Models — Winter term 2016/17
- Seminar: Automata Theory — Winter term 2016/17
- Seminar: Program Analysis & Software Testing — Winter term 2016/17
- Course: Cyber-Physical Systems - Hybrid Models — Summer term 2016
- Seminar: Automata Theory — Summer term 2016
- Seminar: Program Analysis & Software Testing — Summer term 2016
- Seminar: Automata Theory — Winter term 2015/16
- Seminar: Program Analysis & Software Testing — Winter term 2015/16
- Seminar: Automata Theory — Summer term 2015
- Seminar: Program Analysis — Summer term 2015
- Course: Theoretical Computer Science (Theoretische Informatik) — Winter term 2014/15
- Seminar: Introduction to Automata Theory (Einführung in die Automatentheorie) — Winter term 2014/15
- Tutorial: Computer Science Theory — Summer term 2014
- Seminar: Automata Theory — Summer term 2014
- Course: Theoretical Computer Science (Theoretische Informatik) — Winter term 2013/14

Student Advising

Aalborg University, Aalborg, Denmark

- C. B. Larsen & S. B. Olsen. Neural contraction heuristics for tensor networks. Master thesis — In progress
- R. Vedel. Low-dimensional novelty detection. Master thesis — In progress
- Supervision of student projects (8 students) — Spring term 2024
- Supervision of student projects (20 students) — Fall term 2023
- J. H. Bennedsgaard & J. M. C. Kabita. Indoor navigation for autonomous robots based on PPO and ROS. Master thesis — 2023
- J. Ø. Hansen & A. I. Kristensen. Framework for synthesis of hybrid automata from time series with time- or state-dependent switching conditions. Master thesis — 2023
- K. Nguyen. Curiosity-driven planning with reinforcement learning. Master thesis — 2023

- M. Samim. Goal-conditioned reinforcement learning with transformer architectures and intrinsic reward design. Master thesis 2023
- Supervision of student projects (17 students) Spring term 2023
- Supervision of student projects (21 students) Fall term 2022
- L. Ferranti. Reachability with sparse polynomial zonotopes. JSoC/GSoC project 2022
- Supervision of student projects (32 students) Spring term 2022

University of Konstanz, Konstanz, Germany

- F. Obergfell. Implementation of cryptographic functions to a central control system for satellite command and control. Bachelor project and thesis (in collaboration with Airbus Defence and Space) 2021
- F. Hartmann. Implementation of cryptographic functions to a central control system for satellite command and control. Bachelor project and thesis (in collaboration with Airbus Defence and Space) 2021

ISTA, Klosterneuburg, Austria

- Z. Di. Set-based backpropagation to explain decisions of neural networks. Scientific intern project 2020
- S. Guadalupe. Verification of neural networks. JSoC/GSoC project 2020

University of Freiburg, Freiburg, Germany

- N. Mansur. Static Error Trace Analysis Using Aberrant Trace Elements. Master thesis 2018
- N. Mansur. Static Fault Localization for Simple Bugs. Master project 2017
- D. Wadehn. Implementierung eines Delta-Debugging-Frameworks für Werkzeuge zur Analyse von C-Programmen. Bachelor thesis 2016
- D. Tischner. Minimization of Büchi Nested Word Automata. Master project 2016
- N. Mansur. Flow-Sensitive Fault Localization. Master laboratory 2016
- J. Stimpfle. A Max-Horn-SAT-Based Approach to Minimization of Visibly Pushdown Automata. Bachelor thesis 2016
- A. Heinz. Extending Nonlinear Decision Procedures to Automata Networks. Bachelor thesis 2015
- L. Franke. Parallel Execution of Minimization Algorithms. Bachelor thesis 2015
- D. Tischner. Generation and Minimization of Random Deterministic Finite Automata. Bachelor project 2015
- B. Hagemeister. Vergleich aktueller Minimierungsalgorithmen für deterministische endliche Automaten. Bachelor thesis 2014

Publications

In computer science, conference publications are considered more prestigious. In my main subfield, authors are usually listed in alphabetic order.

Links to online archives

DBLP (bibliography)

Scholar (bibliography incl. citation count)

ORCID (open researcher and contributor ID)

arXiv (open-access publication archive)

Edited proceedings

[1] Georgiana Caltais and Christian Schilling. Model Checking Software - 29th International Symposium, SPIN 2023. [DOI] [BIB].

Peer-reviewed book chapters

[2] Kim G. Larsen, Christian Schilling, and Jiří Srba. Simulation relations and applications in formal methods. Principles of Systems Design (2022). [DOI] [PDF] [BIB].

Peer-reviewed conference publications

[3] Christian Schilling, Anna Lukina, Emir Demirović, and Kim G. Larsen. Safety verification of decision-tree policies in continuous time. NeurIPS 2023 (rank A*, acceptance: 26%). **Spotlight (top 3%)**. [PDF] [BIB]. [open review]. [poster].

[4] Asger H. Brorholt, Peter G. Jensen, Kim G. Larsen, Florian Lorber, and Christian Schilling. Shielded reinforcement learning for hybrid systems. (A)ISoLA 2023. [DOI] [PDF] [BIB].

[5] Marcelo Forets and Christian Schilling. The inverse problem for neural networks. (A)ISoLA 2023. [DOI] [PDF] [BIB].

[6] Niklas Kochdumper, Christian Schilling, Matthias Althoff, and Stanley Bak. Open- and closed-loop neural network verification using polynomial zonotopes. NFM 2023 (acceptance: 39%). [DOI] [PDF] [BIB].

[7] Fabian Bauer-Marquart, Stefan Leue, and Christian Schilling. symQV: Automated symbolic verification of quantum programs. FM 2023 (rank A, acceptance: 29%). [DOI] [PDF] [BIB].

[8] Miriam García Soto, Thomas A. Henzinger, and Christian Schilling. Synthesis of parametric hybrid automata from time series. ATVA 2022 (rank B, acceptance: 32%). [DOI] [PDF] [BIB].

[9] Fabian Bauer-Marquart, David Boetius, Stefan Leue, and Christian Schilling. SpecRepair: Counter-example guided safety repair for deep neural networks. SPIN 2022 (acceptance: 72%). [DOI] [PDF] [BIB].

[10] Marcelo Forets and Christian Schilling. Conservative time discretization: A comparative study. iFM 2022 (rank B, acceptance: 35%). [DOI] [PDF] [BIB].

[11] Christian Schilling, Marcelo Forets, and Sebastián Guadalupe. Verification of neural-network control systems by integrating Taylor models and zonotopes. AAAI 2022 (rank A*, acceptance: 15%). [DOI] [PDF] [BIB].

[12] Marcelo Forets and Christian Schilling. Reachability of weakly nonlinear systems using Carleman linearization. RP 2021 (acceptance: 46%). [DOI] [PDF] [BIB].

[13] Anna Lukina, Christian Schilling, and Thomas A. Henzinger. Into the unknown: Active monitoring of neural networks. RV 2021 (rank B, acceptance: 45%). [DOI] [PDF] [BIB].

[14] Miriam García Soto, Thomas A. Henzinger, and Christian Schilling. Synthesis of hybrid automata with affine dynamics from time-series data. HSCC 2021 (acceptance: 35%). [DOI] [BIB] [extended version].

[15] Marcelo Forets, Daniel Freire, and Christian Schilling. Efficient reachability analysis of parametric linear hybrid systems with time-triggered transitions. MEMOCODE 2020 (acceptance: 53%). [DOI] [PDF] [BIB].

[16] Thomas A. Henzinger, Anna Lukina, and Christian Schilling. Outside the box: Abstraction-based monitoring of neural networks. ECAI 2020 (rank A, acceptance: 27%). [DOI] [PDF] [BIB].

[17] Miriam García Soto, Thomas A. Henzinger, Christian Schilling, and Luka Zeleznik. Membership-based synthesis of linear hybrid automata. CAV 2019 (rank A*, acceptance: 26%). [DOI] [PDF] [BIB].

[18] Sergiy Bogomolov, Marcelo Forets, Goran Frehse, Kostiantyn Potomkin, and Christian Schilling. JuliaReach: A toolbox for set-based reachability. HSCC 2019 (acceptance: 30%). [DOI] [BIB] [extended version].

[19] Maria Christakis, Matthias Heizmann, Muhammad Numair Mansur, Christian Schilling, and Valentin Wüstholz. Semantic fault localization and suspiciousness ranking. TACAS 2019 (rank A, acceptance: 24%). [DOI] [BIB].

[20] Sergiy Bogomolov, Marcelo Forets, Goran Frehse, Andreas Podelski, Christian Schilling, and Frédéric Viry. Reach set approximation through decomposition with low-dimensional sets and high-dimensional matrices. HSCC 2018 (acceptance: 45%). [DOI] [BIB] [extended version].

[21] Hui Kong, Sergiy Bogomolov, Yu Jiang, Thomas A. Henzinger, and Christian Schilling. Safety verification of nonlinear hybrid systems based on invariant clusters. HSCC 2017 (acceptance: 39%). [DOI] [PDF] [BIB].

[22] Matthias Heizmann, Christian Schilling, and Daniel Tischner. Minimization of visibly pushdown automata using partial Max-SAT. TACAS 2017 (rank A, acceptance: 29%). [DOI] [BIB] [extended version].

[23] Sergiy Bogomolov, Christian Schilling, Ezio Bartocci, Grégory Batt, Hui Kong, and Radu Grosu. Abstraction-based parameter synthesis for multiaffine systems. HVC 2015 (rank B, acceptance: 53%). [DOI] [PDF] [BIB].

[24] Luan Viet Nguyen, Christian Schilling, Sergiy Bogomolov, and Taylor T. Johnson. Runtime verification for hybrid analysis tools. RV 2015 (rank C, acceptance: 47%). [DOI] [PDF] [BIB].

[25] Sergiy Bogomolov, Thomas A. Henzinger, Andreas Podelski, Jakob Ruess, and Christian Schilling. Adaptive moment closure for parameter inference of biochemical reaction networks. CMSB 2015 (acceptance: 46%). [DOI] [PDF] [BIB].

[26] Jan-Georg Smaus, Christian Schilling, and Fabian Wenzelmann. Implementations of two algorithms for the threshold synthesis problem. ISAIM 2012 (rank B). [PDF] [BIB].

Peer-reviewed journal publications

[27] Luca Ferranti, Marcelo Forets, and Christian Schilling. RangeEnclosures.jl: A framework to bound function ranges. Proceedings of the JuliaCon Conferences 2024. [DOI] [PDF]. [open review].

[28] Ander Gray, Marcelo Forets, Christian Schilling, Scott Ferson, and Luis Benet. Verified propagation of imprecise probabilities in non-linear ODEs. IJAR 2023 (impact factor: 3.9 (2022)). [DOI] [BIB].

[29] Konstantin Kueffner, Anna Lukina, Christian Schilling, and Thomas A. Henzinger. Into the unknown: Active monitoring of neural networks (extended version). STTT 2023 (impact factor: 1.5 (2022)), special issue. [DOI] [BIB].

[30] Sergiy Bogomolov, Marcelo Forets, Goran Frehse, Andreas Podelski, and Christian Schilling. Decomposing reach set computations with low-dimensional sets and high-dimensional matrices (extended version). Information and Computation 2022 (impact factor: 1.24 (2021)), special issue. [DOI] [BIB].

[31] Marcelo Forets and Christian Schilling. LazySets.jl: Scalable symbolic-numeric set computations. Proceedings of the JuliaCon Conferences 2021. [DOI] [PDF]. [open review].

[32] Sergiy Bogomolov, Marcelo Forets, Goran Frehse, Kostiantyn Potomkin, and Christian Schilling. Reachability analysis of linear hybrid systems via block decomposition. TCAD 2020 (impact factor: 2.807 (2020)), special issue for EMSOFT 2020 (rank A, acceptance: 22%). **Nominated for best paper**. [DOI] [PDF] [BIB].

[33] Stanley Bak, Omar Ali Beg, Sergiy Bogomolov, Taylor T. Johnson, Luan Nguyen, and Christian Schilling. Hybrid automata: From verification to implementation. STTT 2017 (impact factor: 1.270 (2018)). [DOI] [PDF] [BIB].

[34] Christian Schilling, Sergiy Bogomolov, Thomas A. Henzinger, Andreas Podelski, and Jakob Ruess. Adaptive moment closure for parameter inference of biochemical reaction networks. Biosystems 2016 (impact factor: 1.623 (2018)). [DOI] [BIB].

Peer-reviewed workshop & tutorial publications

[35] Luis Benet, Marcelo Forets, David P. Sanders, and Christian Schilling. `TaylorModels.jl`: Taylor models in Julia and their application to validated solutions of ODEs. SWIM 2019. [PDF] [BIB].

[36] Hui Kong, Ezio Bartocci, Sergiy Bogomolov, Radu Grosu, Thomas A. Henzinger, Yu Jiang, and Christian Schilling. Discrete abstraction of multiaffine systems. HSB 2016. [DOI] [PDF] [BIB].

[37] Parasara Sridhar Duggirala, Chuchu Fan, Matthew Potok, Bolun Qi, Sayan Mitra, Mahesh Viswanathan, Stanley Bak, Sergiy Bogomolov, Taylor T. Johnson, Luan Viet Nguyen, Christian Schilling, Andrew Sogokon, Hoang-Dung Tran, Weiming Xiang. Tutorial: Software tools for hybrid systems verification, transformation, and synthesis: C2E2, HyST, and TuLiP. CCA 2016. [DOI] [PDF] [BIB].

[38] Stanley Bak, Sergiy Bogomolov, and Christian Schilling. High-level hybrid systems analysis with Hypy. ARCH 2016. **"Best tool" award**. [DOI] [PDF] [BIB].

[39] Christian Schilling, Jan-Georg Smaus, and Fabian Wenzelmann. Implementation of two algorithms for the threshold synthesis problem. FAC 2014. [PDF].

[40] Jan-Georg Smaus, Christian Schilling, and Fabian Wenzelmann. A pretty complete combinatorial algorithm for the threshold synthesis problem. IWOCA 2013. [DOI] [PDF] [BIB].

Competitions

[41] Matthias Althoff, Marcelo Forets, Yangge Li, Sayan Mitra, Christian Schilling, Mark Wetzlinger, and Daniel Zhuang. ARCH-COMP23 category report: Continuous and hybrid systems with linear continuous dynamics. ARCH 2023. [DOI] [PDF].

[42] Luca Geretti, Julien Alexandre Dit Sandretto, Matthias Althoff, Luis Benet, Pieter Collins, Marcelo Forets, Elena Ivanova, Yangge Li, Sayan Mitra, Stefan Mitsch, Christian Schilling, Mark Wetzlinger, and Daniel Zhuang. ARCH-COMP23 category report: Continuous and hybrid systems with nonlinear dynamics. ARCH 2023. [DOI] [PDF].

[43] Diego Manzanas Lopez, Matthias Althoff, Marcelo Forets, Taylor T. Johnson, Tobias Ladner, and Christian Schilling. ARCH-COMP23 category report: Artificial intelligence and neural network control systems (AINNCS) for continuous and hybrid systems plants. ARCH 2023. [DOI] [PDF].

[44] Matthias Althoff, Marcelo Forets, Christian Schilling, and Mark Wetzlinger. ARCH-COMP22 category report: Continuous and hybrid systems with linear continuous dynamics. ARCH 2022. [DOI] [PDF].

[45] Luca Geretti, Julien Alexandre Dit Sandretto, Matthias Althoff, Luis Benet, Pieter Collins, Parasara Sridhar Duggirala, Marcelo Forets, Edward Kim, Stefan Mitsch, Christian Schilling, and Mark Wetzlinger. ARCH-COMP22 category report: Continuous and hybrid systems with nonlinear dynamics. ARCH 2022. [DOI] [PDF].

[46] Diego Manzanas Lopez, Matthias Althoff, Luis Benet, Xin Chen, Jiameng Fan, Marcelo Forets, Chao Huang, Taylor T. Johnson, Tobias Ladner, Wenchao Li, Christian Schilling, and Qi Zhu. ARCH-COMP22 category report: Artificial intelligence and neural network control systems (AINNCS) for continuous and hybrid systems plants. ARCH 2022. [DOI] [PDF].

[47] Matthias Althoff, Erika Ábrahám, Marcelo Forets, Goran Frehse, Daniel Freire, Christian Schilling, Stefan Schupp, and Mark Wetzlinger. ARCH-COMP21 category report: Continuous and hybrid systems with linear continuous dynamics. ARCH 2021. [DOI] [PDF] [BIB].

[48] Luca Geretti, Julien Alexandre Dit Sandretto, Matthias Althoff, Luis Benet, Alexandre Chapoutot, Pieter Collins, Parasara Sridhar Duggirala, Marcelo Forets, Edward Kim, Uziel Linares, David P. Sanders, Christian Schilling, and Mark Wetzlinger. ARCH-COMP21 category report: Continuous and hybrid systems with nonlinear dynamics. ARCH 2021. [DOI] [PDF] [BIB].

[49] Taylor T. Johnson, Diego Manzanas Lopez, Luis Benet, Marcelo Forets, Sebastián Guadalupe, Christian Schilling, Radoslav Ivanov, Taylor J. Carpenter, James Weimer, and Insup Lee. ARCH-COMP21 category report: Artificial intelligence and neural network control systems (AINNCS) for continuous and hybrid systems plants. ARCH 2021. [DOI] [PDF] [BIB].

[50] Matthias Althoff, Stanley Bak, Zongnan Bao, Marcelo Forets, Goran Frehse, Daniel Freire, Niklas Kochdumper, Yangge Li, Sayan Mitra, Rajarshi Ray, Christian Schilling, Stefan Schupp, and Mark Wetzlinger. ARCH-COMP20 category report: Continuous and hybrid systems with linear continuous dynamics. ARCH 2020. **"ARCH 2020 Best Result" award**. [DOI] [PDF] [BIB].

[51] Luca Geretti, Julien Alexandre Dit Sandretto, Matthias Althoff, Luis Benet, Alexandre Chapoutot, Xin Chen, Pieter Collins, Marcelo Forets, Daniel Freire, Fabian Immler, Niklas Kochdumper, David P. Sanders and Christian Schilling. ARCH-COMP20 category report: Continuous and hybrid systems with nonlinear dynamics. ARCH 2020. **"ARCH 2020 Best Result" award**. [DOI] [PDF] [BIB].

[52] Matthias Althoff, Stanley Bak, Marcelo Forets, Goran Frehse, Niklas Kochdumper, Rajarshi Ray, Christian Schilling, and Stefan Schupp. ARCH-COMP19 category report: Continuous and hybrid systems with linear continuous dynamics. ARCH 2019. [DOI] [PDF] [BIB].

[53] Fabian Immler, Matthias Althoff, Luis Benet, Alexandre Chapoutot, Xin Chen, Marcelo Forets, Luca Geretti, Niklas Kochdumper, David P. Sanders, and Christian Schilling. ARCH-COMP19 category report: Continuous and hybrid systems with nonlinear dynamics. ARCH 2019. [DOI] [PDF] [BIB].

[54] Matthias Althoff, Stanley Bak, Xin Chen, Chuchu Fan, Marcelo Forets, Goran Frehse, Niklas Kochdumper, Yangge Li, Sayan Mitra, Rajarshi Ray, Christian Schilling, and Stefan Schupp. ARCH-COMP18 category report: Continuous and hybrid systems with linear continuous dynamics. ARCH 2018. **"ARCH 2018 Best Friendly Competition Result" award**. [DOI] [BIB].

[55] Matthias Heizmann and Christian Schilling. MaxSAT evaluation 2018 (Benchmark contribution). MSE 2018. [DOI] [PDF].

[56] Matthias Heizmann, Yu-Fang Chen, Daniel Dietsch, Marius Greitschus, Jochen Hoenicke, Yong Li, Alexander Nutz, Betim Musa, Christian Schilling, Tanja Schindler, and Andreas Podelski. Ultimate Automizer and the search for perfect interpolants - (competition contribution). TACAS 2018. [DOI] [BIB].

[57] Daniel Dietsch, Marius Greitschus, Matthias Heizmann, Jochen Hoenicke, Alexander Nutz, Andreas Podelski, Christian Schilling, and Tanja Schindler. Ultimate Taipan with dynamic block encoding - (competition contribution). TACAS 2018. [DOI] [BIB].

[58] Matthias Heizmann, Yu-Wen Chen, Daniel Dietsch, Marius Greitschus, Alexander Nutz, Betim Musa, Claus Schätzle, Christian Schilling, Frank Schüssele, and Andreas Podelski. Ultimate Automizer with an on-demand construction of Floyd-Hoare automata - (competition contribution). TACAS 2017. [DOI] [BIB].

[59] Marius Greitschus, Daniel Dietsch, Matthias Heizmann, Alexander Nutz, Claus Schätzle, Christian Schilling, Frank Schüssele, and Andreas Podelski. Ultimate Taipan: Trace abstraction and abstract interpretation - (competition contribution). TACAS 2017. [DOI] [BIB].

[60] Matthias Heizmann, Jürgen Christ, Daniel Dietsch, Jochen Hoenicke, Markus Lindenmann, Betim Musa, Christian Schilling, Stefan Wissert, and Andreas Podelski. Ultimate Automizer with unsatisfiable cores - (competition contribution). TACAS 2014. [DOI] [BIB].

[61] Matthias Heizmann, Jürgen Christ, Daniel Dietsch, Evren Ermis, Jochen Hoenicke, Markus Lindenmann, Alexander Nutz, Christian Schilling, and Andreas Podelski. Ultimate Automizer with SMTInterpol - (competition contribution). TACAS 2013. [DOI] [BIB].

Peer-reviewed extended abstracts and posters

[62] Asger H. Brorholt, Peter G. Jensen, Kim G. Larsen, Florian Lorber, and Christian Schilling. Shielded reinforcement learning for hybrid systems. SYNT 2023.

[63] Ander Gray, Marcelo Forets, Christian Schilling, Luis Benet, and Scott Ferson. Rigorous time evolution of p-boxes in non-linear ODEs. ESREL 2022. [PDF] [proceedings].

[64] Luan Viet Nguyen, Christian Schilling, Sergiy Bogomolov, and Taylor T. Johnson. HyRG: A random generation tool for affine hybrid automata. HSCC 2015. [DOI] [PDF] [BIB].

Extended abstracts

[65] Anna Lukina, Christian Schilling, and Thomas A. Henzinger. Active monitoring of neural networks. BNAIC/BeneLearn 2021. [PDF] [proceedings].