

CURRICULUM VITAE – SERGIY BOGOMOLOV

1 CONTACT INFORMATION

School of Computing
Newcastle University
Newcastle upon Tyne
United Kingdom

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2 RESEARCH INTERESTS

Cyber-physical systems, artificial intelligence, systems biology.

3 EDUCATION

Ph.D. in Computer Science

University of Freiburg, Germany, 2015

Thesis: Abstraction-based Analysis of Hybrid Automata (with distinction)

Advisor: Prof. Dr. Andreas Podelski

M.Sc. in Applied Computer Science

University of Freiburg, Germany, 2009

B.Sc. in Applied Mathematics

V. Karazin Kharkiv National University, Ukraine, 2007

4 PROFESSIONAL EMPLOYMENT

September 2019 – Present: **Lecturer / Assistant Professor**, Newcastle University, United Kingdom

October 2016 – August 2019: **Lecturer / Assistant Professor**, Australian National University, Australia

January 2015 – September 2016: **Postdoctoral Researcher**, Institute of Science and Technology Austria, Austria

October 2009 – December 2014: **Research and Teaching Assistant**, University of Freiburg, Germany

March – April 2012 and June – July 2016: **Visiting Researcher**, Verimag, Grenoble, France

October 2012 – January 2013: **Intern**, NEC Laboratories America, Princeton, NJ, USA

5 HONORS

Invited to participate as a Young Scientist at the **Annual Meeting of the New Champions**, World Economic Forum, 2017 and 2019

Best Repeatability Evaluation Package Award, 19th International Conference on Hybrid Systems: Computation and Control, 2016

Best Tool Award, 3rd International Workshop on Applied Verification for Continuous and Hybrid Systems, 2016

Selected to participate in the **3rd Heidelberg Laureate Forum**, 2015

Best Paper Award, 10th Haifa Verification Conference (HVC), 2014

Scholarship of the DAAD (German Academic Exchange Service), 2007 – 2009

Scholarship of the President of Ukraine, 2005 – 2007

First place in All-Ukrainian Collegiate Programming Olympiad, 2006

6 PUBLICATIONS

PEER-REVIEWED CONFERENCE PUBLICATIONS

- [1] Sergiy Bogomolov, Goran Frehse, Amit Gurung, Dongxu Li, Georg Martius, and Rajarshi Ray. Falsification of hybrid systems using symbolic reachability and trajectory splicing. In *22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019)*, pages 1–10. ACM, 2019.
- [2] Sergiy Bogomolov, Marcelo Forets, Goran Frehse, Kostiantyn Potomkin, and Christian Schilling. JuliaReach: a toolbox for set-based reachability. In *22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019)*, pages 39–44. ACM, 2019.
- [3] Alexander Heinz, Martin Wehrle, Sergiy Bogomolov, Daniele Magazzeni, Marius Greitschus, and Andreas Podelski. Temporal planning as refinement-based model checking. In *29th International Conference on Automated Planning and Scheduling (ICAPS 2019)*, pages 195–199. AAAI Press, 2019.
- [4] 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. In *21th International Conference on Hybrid Systems: Computation and Control (HSCC 2018)*, pages 41–50. ACM, 2018.
- [5] Dongxu Li, Enrico Scala, Patrik Haslum, and Sergiy Bogomolov. Effect-abstraction based relaxation for linear numeric planning. In *27th International Joint Conference on Artificial Intelligence (IJCAI 2018)*, pages 4787–4793. International Joint Conferences on Artificial Intelligence Organization, 2018.
- [6] Stanley Bak, Sergiy Bogomolov, and Matthias Althoff. Time-triggered conversion of guards for reachability analysis of hybrid automata. In *15th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2017)*, volume 10419 of *LNCS*, pages 133–150. Springer, 2017.
- [7] Sergiy Bogomolov, Mirco Giacobbe, Thomas A. Henzinger, and Hui Kong. Conic abstractions for hybrid systems. In *15th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2017)*, volume 10419 of *LNCS*, pages 116–132. Springer, 2017.
- [8] Sergiy Bogomolov, Goran Frehse, Mirco Giacobbe, and Thomas A. Henzinger. Counterexample-guided refinement of template polyhedra. In *23rd International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2017)*, volume 10205 of *LNCS*, pages 589–606. Springer, 2017.
- [9] Hui Kong, Sergiy Bogomolov, Christian Schilling, Yu Jiang, and Thomas Henzinger. Safety verification of nonlinear hybrid systems based on invariant clusters. In *20th International Conference on Hybrid Systems: Computation and Control (HSCC 2017)*, pages 163–172. ACM, 2017.
- [10] Amit Gurung, Arup Kumar Deka, Ezio Bartocci, Sergiy Bogomolov, Radu Grosu, and Rajarshi Ray. Parallel reachability analysis for hybrid systems. In *14th ACM-IEEE International Conference on Formal Methods and Models for System Design (MEMOCODE 2016)*, pages 12–22. ACM-IEEE, 2016.
- [11] Stanley Bak, Sergiy Bogomolov, Thomas A. Henzinger, Taylor T. Johnson, and Pradyot Prakash. Scalable static hybridization methods for analysis of nonlinear systems. In *19th International Conference on Hybrid Systems: Computation and Control (HSCC 2016)*, pages 155–164. ACM, 2016. **Best Repeatability Evaluation Package Award.**
- [12] Sergiy Bogomolov, Daniele Magazzeni, Stefano Minopoli, and Martin Wehrle. PDDL+ planning with hybrid automata: Foundations of translating must behavior. In *25th International Conference on Automated Planning and Scheduling (ICAPS 2015)*, pages 42–46. AAAI Press, 2015.
- [13] Sergiy Bogomolov, Thomas A. Henzinger, Andreas Podelski, Jakob Ruess, and Christian Schilling. Adaptive moment closure for parameter inference of biochemical reaction networks. In *13th International Conference on Computational Methods in Systems Biology (CMSB 2015)*, volume 9308 of *LNCS*, pages 77–89. Springer, 2015.

- [14] Rajarshi Ray, Amit Gurung, Binayak Das, Ezio Bartocci, Sergiy Bogomolov, and Radu Grosu. XSpeed: Accelerating reachability analysis on multi-core processors. In *11th International Haifa Verification Conference (HVC 2015)*, volume 9434 of *LNCS*, pages 3–18. Springer, 2015.
- [15] Sergiy Bogomolov, Christian Schilling, Ezio Bartocci, Grégory Batt, Hui Kong, and Radu Grosu. Abstraction-based parameter synthesis for multiaffine systems. In *11th International Haifa Verification Conference (HVC 2015)*, volume 9434 of *LNCS*, pages 19–35. Springer, 2015.
- [16] Sergiy Bogomolov, Marius Greitschus, Peter G. Jensen, Kim G. Larsen, Marius Mikucionis, Thomas Strump, and Stavros Tripakis. Co-simulation of hybrid systems with SpaceX and Uppaal. In *11th International Modelica Conference (Modelica 2015)*, Linköping Electronic Conference Proceedings, pages 159–169. Linköping University Electronic Press, Linköpings universitet, 2015.
- [17] Stanley Bak, Sergiy Bogomolov, and Taylor T. Johnson. HYST: a source transformation and translation tool for hybrid automaton models. In *18th International Conference on Hybrid Systems: Computation and Control (HSCC 2015)*, pages 128–133. ACM, 2015.
- [18] Goran Frehse, Sergiy Bogomolov, Marius Greitschus, Thomas Strump, and Andreas Podelski. Eliminating spurious transitions in reachability with support functions. In *18th International Conference on Hybrid Systems: Computation and Control (HSCC 2015)*, pages 149–158. ACM, 2015.
- [19] Luan Viet Nguyen, Christian Schilling, Sergiy Bogomolov, and Taylor T. Johnson. Runtime verification for hybrid analysis tools. In *6th International Conference on Runtime Verification (RV 2015)*, volume 9333 of *LNCS*, pages 281–286. Springer, 2015.
- [20] Sergiy Bogomolov, Daniele Magazzeni, Andreas Podelski, and Martin Wehrle. Planning as Model Checking in Hybrid Domains. In *AAAI Conference on Artificial Intelligence (AAAI 2014)*, pages 2228–2234. AAAI Press, 2014.
- [21] Sergiy Bogomolov, Goran Frehse, Marius Greitschus, Radu Grosu, Corina S. Pasareanu, Andreas Podelski, and Thomas Strump. Assume-guarantee abstraction refinement meets hybrid systems. In *Haifa Verification Conference (HVC 2014)*, volume 8855 of *LNCS*, pages 116–131. Springer, 2014. **Best Paper Award.**
- [22] Sergiy Bogomolov, Christian Herrera, Marco Muñoz, Bernd Westphal, and Andreas Podelski. Quasi-dependent variables in hybrid automata. In *17th International Conference on Hybrid Systems: Computation and Control (HSCC 2014)*, pages 93–102. ACM, 2014.
- [23] Sergiy Bogomolov, Alexandre Donzé, Goran Frehse, Radu Grosu, Taylor T. Johnson, Hamed Ladan, Andreas Podelski, and Martin Wehrle. Abstraction-based guided search for hybrid systems. In *Model Checking Software (SPIN 2013)*, volume 7976 of *LNCS*, pages 117–134. Springer, 2013.
- [24] Sergiy Bogomolov, Goran Frehse, Radu Grosu, Hamed Ladan, Andreas Podelski, and Martin Wehrle. A box-based distance between regions for guiding the reachability analysis of SpaceX. In *Computer Aided Verification (CAV 2012)*, volume 7358 of *LNCS*, pages 479–494. Springer, 2012.
- [25] Sergiy Bogomolov, Corina Mitrohin, and Andreas Podelski. Composing reachability analyses of hybrid systems for safety and stability. In *8th International Symposium on Automated Technology for Verification and Analysis (ATVA 2010)*, volume 6252 of *LNCS*, pages 67–81. Springer, 2010.
- [26] Sergiy Bogomolov, Martin Mann, Björn Voß, Andreas Podelski, and Rolf Backofen. Shape-based barrier estimation for RNAs. In *German Conference on Bioinformatics (GCB 2010)*, volume 173 of *LNI*, pages 41–50. GI, 2010.

PEER-REVIEWED JOURNAL PUBLICATIONS

- [27] Amit Gurung, Rajarshi Ray, Ezio Bartocci, Sergiy Bogomolov, and Radu Grosu. Parallel reachability analysis of hybrid systems in XSpeed. *International Journal on Software Tools for Technology Transfer (STTT)*, pages 1–23, 2018.

- [28] Stanley Bak, Omar Ali Beg, Sergiy Bogomolov, Taylor T. Johnson, Luan Viet Nguyen, and Christian Schilling. Hybrid automata: From verification to implementation. *International Journal on Software Tools for Technology Transfer (STTT)*, pages 1–18, 2017.
- [29] Christian Schilling, Sergiy Bogomolov, Thomas A. Henzinger, Andreas Podelski, and Jakob Ruess. Adaptive moment closure for parameter inference of biochemical reaction networks. *Biosystems*, 149:15 – 25, 2016.
- [30] Sergiy Bogomolov, Alexandre Donzé, Goran Frehse, Radu Grosu, Taylor T. Johnson, Hamed Ladan, Andreas Podelski, and Martin Wehrle. Guided search for hybrid systems based on coarse-grained space abstractions. *International Journal on Software Tools for Technology Transfer (STTT)*, pages 1–19, 2015.

EDITED WORKSHOP PROCEEDINGS

- [31] Erika Ábrahám and Sergiy Bogomolov, editors. *3st International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2017), Uppsala, Sweden, April 22, 2017 (collocated with ETAPS 2017)*, EPTCS, 2017.
- [32] Sergiy Bogomolov, Matthieu Martel, and Pavithra Prabhakar, editors. *9th International Workshop on Numerical Software Verification (NSV 2016), Toronto, ON, Canada, July 17-18, 2016 (collocated with CAV 2016), Revised Selected Papers*, volume 10152 of *Lecture Notes in Computer Science*. Springer, 2017.
- [33] Erika Ábrahám and Sergiy Bogomolov, editors. *2nd International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2016), Vienna, Austria, April 11, 2016 (collocated with CPSWeek 2016)*. IEEE, 2016.
- [34] Sergiy Bogomolov and Matthieu Martel, editors. *The Seventh and Eighth International Workshops on Numerical Software Verification (NSV 2014-15)*, volume 317. Elsevier, 2015.
- [35] Sergiy Bogomolov and Ashish Tiwari, editors. *1st International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2015), San Francisco, CA, USA, July 19, 2015 (collocated with CAV 2015)*, EPiC Series in Computing. EasyChair, 2015.

PEER-REVIEWED WORKSHOP PUBLICATIONS

- [36] Stanley Bak, Sergiy Bogomolov, Thomas A. Henzinger, and Aviral Kumar. Challenges and tool implementation of hybrid rapidly-exploring random trees. In *10th International Workshop on Numerical Software Verification (NSV 2017)*, volume 10381 of *LNCS*, pages 83–89. Springer, 2017.
- [37] Stanley Bak, Sergiy Bogomolov, and Christian Schilling. High-level hybrid systems analysis with hypy. In Goran Frehse and Matthias Althoff, editors, *3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2016)*, volume 43 of *EPiC Series in Computing*, pages 80–90. EasyChair, 2016. **Best Tool Award**.
- [38] Sergiy Bogomolov, Christian Herrera, and Wilfried Steiner. Verification of fault-tolerant clock synchronization algorithms. In *3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2016)*, volume 43 of *EPiC Series in Computing*, pages 36–41. EasyChair, 2016.
- [39] Hui Kong, Ezio Bartocci, Sergiy Bogomolov, Radu Grosu, Thomas A. Henzinger, Yu Jiang, and Christian Schilling. Discrete abstraction of multiaffine systems. In *5th International Workshop on Hybrid Systems Biology (HSB 2016)*, volume 9957 of *LNCS*, pages 128–144. Springer, 2016.
- [40] Stanley Bak, Sergiy Bogomolov, Marius Greitschus, and Taylor T Johnson. Benchmark generator for stratified controllers of tank networks. In *1st and 2nd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2014-15)*, volume 34 of *EPiC Series in Computer Science*, pages 73–79. EasyChair, 2015.

7 DOCTORAL STUDENTS

- Kostiantyn Potomkin, since November 2017, Dissertation Topic: Verification of Autonomous Systems

8 RESEARCH GRANTS

- Principal Investigator, Asian Office of Aerospace Research and Development, US Air Force Office of Scientific Research, *Compositional Analysis of Autonomous Systems*, 2017-2020.
- Principal Investigator, Defence Science and Technology Group, Australia, Modelling Complex Warfighting Strategic Research Investment, *Hybrid Automata for Complex Combats*, 2019.
- Principal Investigator, Defence Science and Technology Group, Australia, Competitive Evaluation Research Agreement (CERA) Program, *Safety for Autonomous Systems in Uncertain Environments*, 2017-2018.
- Principal Investigator, AAS-ANU European COST Travel Grant, *EU ICT COST Action IC1402 “Runtime Verification beyond Monitoring (ARVI)”*, 2017-2018.
- Principal Investigator, ANU Early Career Researchers Travel Grant, 2017.

9 INVITED TALKS

- *Trusted Autonomous Systems: Verification Meets Falsification*, Dagstuhl Seminar “Analysis of Autonomous Mobile Collectives in Complex Physical Environments”, Germany, October 2019
- *Trustworthy Cyber-Physical Systems: Dream or Reality?*
 - Institute of Software, Chinese Academy of Sciences, China, July 2019
 - National Institute of Informatics, Japan, June 2019
 - DENSO Corporation, Japan, June 2019
 - Northeastern University, USA, April 2019
 - Galois, USA, April 2019
- *Time-Triggered Conversion of Guards for Reachability Analysis of Hybrid Automata*
 - Verimag, France, April 2018
 - Institute of Science and Technology Austria, Austria, April 2018
 - Technical University of Vienna, Austria, April 2018
- *Verification and AI Planning for Robotics*, Australian Centre for Robotic Vision, Australia, October 2017
- *Towards Scalable Verification of Cyber-Physical Systems*
 - University of Luxembourg, Luxembourg, April 2018
 - STELaRLab, Lockheed Martin Australia, Australia, December 2017
 - United Technologies Research Center, USA, September 2017
 - Toyota InfoTechnology Center, USA, September 2017
 - Nanjing University, China, June 2017
- *Scalable Static Hybridization Methods for Analysis of Nonlinear Systems*
 - University of Pennsylvania, USA, April 2017
 - Stony Brook University, USA, April 2017
 - Technical University of Munich, Germany, January 2017
 - University of Oldenburg, Germany, December 2016
 - Dagstuhl Seminar “Symbolic-Numeric Methods for Reliable and Trustworthy Problem Solving in Cyber-Physical Domains”, December 2016
- *Cyber-Physical Systems: Challenges and Opportunities*
 - CyberCardia Project Meeting, University of Pennsylvania, USA, April 2017
 - Technical University of Kaiserslautern, Germany, December 2016
 - Taras Shevchenko National University of Kyiv, Ukraine, December 2016
 - Igor Sikorsky Kyiv Polytechnic Institute, Ukraine, December 2016
 - Siemens, Vienna, Austria, June 2016

- *Abstraction-based Parameter Synthesis for Multi-affine Systems*, UC Berkeley, USA, July 2015
- *Hybrid Systems: Guided Search, Abstractions, and Beyond*, 2nd Workshop on Model-Checking and Automated Planning (MOCHAP) collocated with ICAPS 2015, Israel, June 2015
- *Guided Search for Hybrid Systems*, Dagstuhl Seminar “Automated Planning and Model Checking”, Germany, November 2014

10 PROFESSIONAL ACTIVITIES

Program Chair/Organizer

- Repeatability Evaluation Chair, *ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2017-2020
- Publicity Chair, *5th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2018)* collocated with Cyber-Physical Systems and Internet-of-Things Week, Montreal, Canada, April 2018
- Publicity Chair, *4th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2017)* collocated with CPSWeek, Pittsburgh, PA, USA, April 2017
- Program Chair and Organizer (jointly with Erika Ábrahám), *3rd International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2017)* collocated with ETAPS, Uppsala, Sweden, April 2017
- Organizer (jointly with Martin Fränzle, Kyoko Makino and Nacim Ramdani), *Dagstuhl Seminar 16491 on Symbolic-Numeric Methods for Reliable and Trustworthy Problem Solving in Cyber-Physical Domains*, Wadern, Germany, December 2016
- Registration Chair, *Cyber-Physical Systems Week 2016*, Vienna, Austria, April 2016
- Program Chair and Organizer (jointly with Erika Ábrahám), *2nd International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2016)* collocated with CPSWeek, Vienna, Austria, April 2016
- Program Chair and Organizer (jointly with Matthieu Martel and Pavithra Prabhakar), *9th International Workshop on Numerical Software Verification (NSV 2016)* collocated with CAV, Toronto, Canada, July 2016
- Publicity Chair, *3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2016)* collocated with CPSWeek, Vienna, Austria, April 2016
- Program Chair and Organizer (jointly with Ashish Tiwari), *1st International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR)* collocated with CAV, San Francisco, USA, July 2015
- Program Chair and Organizer (jointly with Daniele Magazzeni and Martin Wehrle), *Workshop Model Checking and Automated Planning (MOCHAP 2015)* collocated with ICAPS, Jerusalem, Israel, June 2015
- Program Chair and Organizer (jointly with Matthieu Martel), *8th International Workshop on Numerical Software Verification (NSV 2015)* collocated with CPSWeek, Seattle, USA, April 2015
- Experiment and Evaluation Chair (jointly with Taylor T. Johnson), *2nd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2015)* collocated with CPSWeek, Seattle, USA, April 2015

Editor

- ACM SIGBED Review, 2017 – present

Associate Editor

- ACM SIGBED Review, 2016 – 2017

Steering Committee Member

- International Workshop on Numerical Software Verification (NSV), 2017 – present
- International Workshop on Symbolic-Numeric methods for Reasoning about CPS and IoT (SNR) – present

Program Committee Member

- 23th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2020), Sydney, Australia, April 2020
- 11th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs 2020), Sydney, Australia, April 2020
- 7th International Workshop on Hybrid Systems Biology (HSB 2020), Vienna, Austria, April 2020
- 34th AAAI Conference on Artificial Intelligence (AAAI 2020), Main + Student Abstract and Poster tracks, New York, USA, February 2020
- 32nd Australasian Joint Conference on Artificial Intelligence (AI 2019), Adelaide, Australia, December 2019
- 24rd International Conference on Engineering of Complex Computer Systems (ICECCS 2019), Hong Kong, China, November 2019
- ACM/IEEE International Conference on Embedded Software (EMSOFT 2019), New York City, USA, October 2019
- 9th Workshop on Model-Based Design of Cyber Physical Systems (CyPhy 2019) collocated with EMSOFT, New York City, USA, October 2019
- 23rd International Symposium on Formal Methods (FM 2019), Porto, Portugal, October 2019
- 17th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2019), Amsterdam, Netherlands, August 2019
- 22st Euromicro Conference on Digital System Design (DSD 2019), Special Session on Cyber-Physical Systems, Chalkidiki, Greece, August 2019
- 22th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019), Montreal, Canada, April 2019
- 6th International Workshop on Hybrid Systems Biology (HSB 2019), Prague, Czech Republic, April 2019
- 5th International Workshop on Symbolic-Numeric methods for Reasoning about CPS and IoT (SNR 2019), Montreal, Canada, April 2019
- 33nd AAAI Conference on Artificial Intelligence (AAAI 2019), Main + Student Abstract and Poster tracks, Honolulu, Hawaii, USA, February 2019
- 23rd International Conference on Engineering of Complex Computer Systems (ICECCS 2018), Melbourne, Australia, December 2018
- ACM International Conference on Embedded Software (EMSOFT 2018), Turin, Italy, October 2018
- 8th Workshop on Model-Based Design of Cyber Physical Systems (CyPhy 2018) collocated with EMSOFT, Turin, Italy, October 2018
- 10th International Conference on Advances in System Testing and Validation Lifecycle (VALID 2018), Nice, France, October 2018
- 16th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2018), Beijing, China, September 2018
- 15th International Conference on Quantitative Evaluation of Systems (QEST 2018), Beijing, China, September 2018
- 21st Euromicro Conference on Digital System Design (DSD 2018), Special Session on Cyber-Physical Systems, Prague, Czech Republic, August 2018
- 6th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS 2018), Oxford, UK, July 2018
- Artefact Evaluation for the 30th International Conference on Computer Aided Verification (CAV 2018), Oxford, UK, July 2018
- 21th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2018), Porto, Portugal, April 2018
- 4th International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2018), Thessaloniki, Greece, April 2018
- 32nd AAAI Conference on Artificial Intelligence (AAAI 2018), Main + Student Abstract and Poster tracks, New Orleans, Louisiana, USA, February 2018

- ACM International Conference on Embedded Software (EMSOFT 2017), Seoul, South Korea, October 2017
- 15th International Conference on Formal Modelling and Analysis of Timed Systems (FORMATS 2017), Berlin, Germany, September 2017
- 29th International Conference on Computer-Aided Verification (CAV 2017), Heidelberg, Germany, July 2017
- 10th International Workshop on Numerical Software Verification (NSV 2017), Heidelberg, Germany, July 2017
- 20th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2017), Pittsburgh, PA, USA, April 2017
- 31th AAAI Conference on Artificial Intelligence (AAAI 2017), Student Abstract and Poster track, San Francisco, CA, USA, February 2017
- 13th International Conference on Formal Aspects of Component Software (FACS 2016), Besançon, France, October 2016
- 4th IEEE International Conference on Cyber-Physical Systems, Networks, and Applications (CPSNA 2016), Nagoya, Japan, October 2016
- 5th International Workshop on Hybrid Systems Biology (HSB 2016), Grenoble, France, October 2016
- Repeatability Evaluation for the 19th ACM International Conference on Hybrid Systems Computation and Control (HSCC 2016), Vienna, Austria, April 2016
- 1st International Workshop on Monitoring and Testing of Cyber-Physical Systems (MT-CPS 2016) collocated with CPSWeek, Vienna, Austria, April 2016
- 30th AAAI Conference on Artificial Intelligence (AAAI) 2016, Student Abstract and Poster track, Phoenix, Arizona, USA, February 2016
- 4th International Workshop on Hybrid Systems Biology (HSB 2015) collocated with Madrid Meet, Madrid, Spain, September 2015
- Artefact Evaluation for the 27th International Conference on Computer Aided Verification (CAV 2015), San Francisco, USA, July 2015
- Repeatability Evaluation for the 17th International Conference on Hybrid Systems Computation and Control (HSCC 2014), Berlin, Germany, April 2014

Journal Reviewer

- ACM Computing Reviews, Automatica, Journal of Logical and Algebraic Methods in Programming (JLAMP), Formal Methods in System Design (FMDS), Discrete Event Dynamic Systems, ACM Transactions on Cyber-Physical Systems (TCPS), Information Systems Frontiers, Nonlinear Analysis: Hybrid Systems, Theoretical Computer Science (TCS), ACM Transactions on Software Engineering and Methodology (TOSEM), Journal of Aerospace Information Systems

11 TOOL DEVELOPMENT

1. **SpaceEx Bug Finder.** Tool based on the SpaceEx library. Finds bug in designs of cyber physical systems. Uses AI planning techniques. Related papers include [24, 23, 30].
Web: <http://swt.informatik.uni-freiburg.de/tool/spaceex/guided-search>
Development: 2012 – ongoing
2. **SpaceEx AGAR.** Tool based on SpaceEx library. Derives quality assurance guarantees for designs of cyber physical systems. Uses new technique of Assume Guarantee Abstraction Refinement. Related papers include [21].
Web: <http://swt.informatik.uni-freiburg.de/tool/spaceex/agar>
Development: 2013 – ongoing

3. **HyST**. Tool provides an automatic translation of SpaceEx models to Flow*, dReach, HyCreate and MathWorks Simulink/Stateflow, which enables efficient model analysis by different tools. Related papers include [17, 37, 28].
Web: <http://verivital.com/hyst/>
Development: 2014 – ongoing
4. **Hydentify**. Tool for parameter identification of multiaffine hybrid automata. Employs hierarchical search in the space of parameter equivalence classes. Related papers include [15].
Web: <http://swt.informatik.uni-freiburg.de/tool/spaceex/hydentify/>
Development: 2014 – ongoing

12 TEACHING EXPERIENCE

Newcastle University, UK: CSC1035 “Programming Portfolio 2” (Semester 2 2019/2020)

Australian National University, Australia: Principles of Programming Languages (Semester 2 2017, 2018)

University of Freiburg, Germany:

- Lecture Course: Software Engineering, Teaching Assistant, Summer Term 2014
- Seminar: Design and Analysis of Cyber-Physical Systems, Winter Term 2013/14
- Lecture Course: Cyber-Physical Systems – Hybrid Models, Teaching Assistant, Summer Term 2013
- Seminar: Hybrid Systems, Summer Term 2013
- Seminar: Cyber-Physical Systems, Summer Term 2011
- Lecture Course: Model Checking, Teaching Assistant, Summer Term 2011
- Seminar: Design and Analysis of Embedded Systems, Winter Term 2010/11
- Lecture Course: Theoretical Computer Science II, Teaching Assistant, Winter Term 2010/11
- Lecture Course: Informatik III – Theoretische Informatik, Teaching Assistant, Winter Term 2010/11
- Seminar: Abstraction Techniques for Hybrid Systems, Summer Term 2010
- Seminar: Design and Analysis of Cyber-Physical Systems, Winter Term 2009/2010
- Lecture Course: Model Checking, Teaching Assistant, Summer Term 2009

Supervision of Master/Bachelor theses:

- Dongxu Li, Abstraction-based Heuristics for Numeric Planning, Bachelor’s thesis (2017)
- Thomas Stump, Analysis Framework for Heterogeneous Dynamic Systems, Master’s thesis (2015)
- Alexander Heinz, Extending Non-linear Decision Procedures to Automata Networks, Bachelor’s thesis (2015)
- Christopher Dillo, Modular Abstract Interpretation for Ultimate. Bachelor’s thesis (2014)
- Multiple student team projects (2011-2015)

13 PROFESSIONAL MEMBERSHIPS

- IEEE CSS Technical Committee on Hybrid Systems
- IFAC TC 1.3 Discrete Event and Hybrid Systems
- Association for Computing Machinery (ACM SIGBED, SIGLOG)