

CURRICULUM VITAE

DR. **STEFAN MITSCH**

ASSOCIATE PROFESSOR
PROGRAM CHAIR OF COMPUTER SCIENCE

DePaul University
School of Computing
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PERSONAL INFORMATION

Citizenship:	Austrian	Date of Birth:	October 18 th , 1979
	US Permanent Resident	Birth name:	Stefan Schmid

RESEARCH PROFILE

Research Focus

Cyber-physical Systems	Trustworthy Reinforcement Learning	Railway, Road, Aviation Systems
Formal Methods	Neurosymbolic AI	Industrial Manufacturing
Theorem Proving	LLM-assisted Automated Reasoning	Public Infrastructure Safety

Impact

Developed KeYmaera X theorem prover; Verified controllers in rail/road/aviation domains; Secured \$1.2M+ in NSF/FRA/FWF/industry funding; Mentored 6 PhD graduates.

EDUCATION

SCHOOL EDUCATION

09/1986–07/1990	Primary Level:	Volksschule Frankenmarkt, Austria
09/1990–07/1994	Secondary Level:	Realgymnasium Vöcklabruck, Austria
09/1994–07/1999	Third Level:	Secondary Technical College Braunau, Osternbergerstraße 55 A-5280 Braunau am Inn, Austria
1999 June	Graduation Diploma:	Electronics, communications engineering and computer science WITH DISTINCTION

ACADEMIC EDUCATION

Doctoral Studies

10/2006–12/2011	DR. TECHN. COMPUTER SCIENCE	Johannes Kepler University Linz, Austria TOWARDS QUALITATIVE PREDICTION OF SITUATION EVOLUTION IN DYNAMIC SPATIAL SYSTEMS ADVISERS: a.Univ.-Prof. Mag. Dr. Werner Retschitzegger Assoc.-Prof. Mag. Dr. Wieland Schwinger, MSc WITH DISTINCTION PROMOTIO SUB AUSPICIIIS PRAESIDENTIS REI PUBLICAE
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Diploma Studies

10/2000–07/2004	DI (FH) SOFTWARE ENGINEERING	Upper Austria University of Applied Sciences, Hagenberg Campus WITH DISTINCTION REALTIME REMOTE PROFILING JAVA APPLICATIONS ON MOBILE DEVICES ADVISER: FH-Prof. DI Dr. Werner Christian Kurschl
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ACADEMIC POSITIONS

ASSOCIATE PROFESSOR (TENURED)	7/2023-present	School of Computing DePaul University 243 S. Wabash Avenue Chicago, IL 60604-2301, USA
PROGRAM CHAIR OF COMPUTER SCIENCE (8 PROGRAMS): BS-CS (CONCENTRATIONS AI, SW, GAMES), BS- CS+X (ANIMATION, ECONOMICS, GEOGRAPHY, HISTORY, WRITING), MATH+CS, MS-CS	9/2023-present	School of Computing DePaul University 243 S. Wabash Avenue Chicago, IL 60604-2301, USA
ADJUNCT FACULTY	8/2023-7/2025	Computer Science Department Carnegie Mellon University 5000 Forbes Ave Pittsburgh, PA 15213, USA
OFFER (DECLINED): UNIVERSITY PROFESSOR FOR FORMAL METHODS	5/2023	Johannes Kepler University Linz Altenberger Str. 69 4040 Linz, Austria
OFFER (DECLINED): W3- PROFESSOR FOR RESILIENT CYBER- PHYSICAL SYSTEMS	3/2023	Fachbereich Informatik TU Darmstadt Karolinenplatz 5 64289 Darmstadt, Germany
OFFER (DECLINED): ASSOCIATE PROFESSOR	3/2023	Department of Computer Science University of Cincinnati
SENIOR SYSTEMS SCIENTIST (RANK OF ASSOCIATE PROFESSOR)	7/2022-7/2023	Computer Science Department Carnegie Mellon University 5000 Forbes Ave Pittsburgh, PA 15213, USA
SYSTEMS SCIENTIST (RANK OF ASSISTANT PROFESSOR)	5/2016-6/2022	Computer Science Department Carnegie Mellon University 5000 Forbes Ave Pittsburgh, PA 15213, USA
MARIE CURIE FELLOW	2/2014-1/2015 5/2015-4/2016	Computer Science Department, Carnegie Mellon University, and Institute of Telecooperation, Dep. of Cooperative Information Systems, Johannes Kepler University
POSTDOCTORAL FELLOW	11/2012-1/2014 2/2015-4/2015	Computer Science Department Carnegie Mellon University 5000 Forbes Avenue Pittsburgh, PA 15213, USA
POSTDOCTORAL FELLOW	1/2012–10/2012	Institute of Telecooperation, Dep. of Cooperative Information Systems, Johannes Kepler University Linz Altenberger Straße 69 4040 Linz, AUSTRIA
PHD CANDIDATE	4/2009–12/2011	Institute of Telecooperation, Dep. of Cooperative Information Systems, Johannes Kepler University Linz Altenberger Straße 69, 4040 Linz, AUSTRIA
MARSHALL PLAN SCHOLAR	7/2011–10/2011	Computer Science Department Carnegie Mellon University 5000 Forbes Avenue, Pittsburgh, PA 15213, USA
LECTURER	3/2005–6/2012	Upper Austria University of Applied Sciences, Hagenberg Campus Softwarepark 11,

RESEARCHER	8/2004–3/2009	4232 Hagenberg, AUSTRIA Upper Austria University of Applied Sciences R&D, Hagenberg Campus Softwarepark 11, 4232 Hagenberg, AUSTRIA
INTERN	12/2003–6/2004	Siemens AG Corporate Technology—Software and Engineering II Otto-Hahn-Ring 6, Munich, GERMANY
INTERN	8/2003–11/2003	S.C. Art-Net SRL Cluj Napoca, ROMANIA
SOCIAL SERVICE	9/1999–9/2000	Lebenshilfe OÖ, Werkstätte Vöcklamarkt

TEACHING EXPERIENCE

UNIVERSITY LECTURES

CONCEPTS OF PROGRAMMING LANGUAGES Functional programming, algebraic datatypes, object-oriented programming	4 credits	DePaul University 2023 fall CSC347, CSC447 2024 winter,spring,fall CSC347, CSC447 2025 winter,spring,fall CSC347, CSC447 2026 winter,spring,fall CSC347
OBJECT-ORIENTED SW DEVELOPMENT Design patterns	4 credits	DePaul University 2024 winter SE350
LOGICAL FOUNDATIONS OF CYBER- PHYSICAL SYSTEMS Logical foundations, hybrid systems, hybrid games, theorem proving	12 credits	Carnegie Mellon University 2022 fall LFCPS 15-424/624/824
SPECIAL TOPICS IN COMPUTER SCIENCE: SEMANTIC TECHNOLOGIES IN SITUATION AWARENESS APPLICATIONS Situation Awareness, Qualitative Reasoning, Planning, and Verification in Dynamic Spatial Systems	3 ECTS	Johannes Kepler University Linz 2011/12 winter 1 group
SOFTWARE ENGINEERING 5 Java Web application development, J2EE design patterns, database access	5 ECTS	Upper Austria University of Applied Sciences, Hagenberg Campus, degree program Bioinformatics 2011/12 winter 2 groups 2010/11 winter 1 group 2009/10 winter 1 group 2008/09 winter 1 group
MOBILE AND UBIQUITOUS SYSTEMS Speech synthesis and recognition, wireless sensor networks (nesC, Sentilla JCreate), gesture control (Kinect)	1.5 ECTS	Upper Austria University of Applied Sciences, Hagenberg Campus, degree program Software Engineering, and Information Engineering & Management 2012 summer 2 groups 2011 summer 1 group 2010 summer 2 groups 2009 summer 2 groups 2008 summer 2 groups 2007 summer 2 groups
SOFTWARE ENGINEERING 4 Programming in Java, design patterns	3 ECTS	Upper Austria University of Applied Sciences, Hagenberg Campus, degree program Bioinformatics (since 2011: Medical and Bioinformatics) 2012 summer 2 groups 2011 summer 2 groups 2010 summer 1 group 2009 summer 1 group 2008 summer 1 group 2007 summer 1 group 2006 summer 1 group
SOFTWARE ENGINEERING 3 Programming in C++, object- oriented programming	3 ECTS	Upper Austria University of Applied Sciences, Hagenberg Campus, degree program Bioinformatics 2009/10 winter 1 group 2008/09 winter 1 group 2007/08 winter 1 group 2006/07 winter 1 group 2005/06 winter 1 group
PROJECT ENGINEERING STUDENT PROJECT (MENTOR)	2 ECTS	Upper Austria University of Applied Sciences, Hagenberg Campus, degree program Software Engineering 2008 summer 1 group

		2007/08	winter	1 group
DATA ENGINEERING	2 ECTS	Upper Austria University of Applied Sciences, Hagenberg		
UML 2.0 and XML		Campus, degree program Bioinformatics		
		2005	summer	2 groups

SUMMER SCHOOLS

- Foundations of Cyber-Physical Systems (Summer School on Formal Methods) 2019 Institute of Software, Chinese Academy of Sciences, Beijing, China
- Foundations of Cyber-Physical Systems (Summer School on Formal Methods) 2018 Institute of Software, Chinese Academy of Sciences, Beijing, China

PHD THESES COMMITTEE SERVICE AND MENTORING

- Verified Control Envelope Synthesis Graduated 2026 Aditi Kabra
- Deductive Verification for Ordinary Differential Equations: Safety, Liveness, and Stability 2022 Yong Kiam Tan
- Practical end-to-end Verification of Cyber-physical Systems 2021 Rose Bohrer
- Verifiably Safe Autonomy for Cyber-physical Systems 2018 Nathan Fulton
- Component-based Deductive Verification of Cyber-physical Systems 2017 Andreas Müller
- Differential Refinement Logic 2016 Sarah Loos

BACHELOR AND MASTERS THESES MENTORING

- Formal-assisted reinforcement learning in the Gymnasium environment (Master's thesis) 07/2025-present Thuan Cao
- Formal Verification of the Winning Strategies of Pursuit-Evasion Games (Master's thesis) 5/2022-7/2023 Weihan Li
- Transfer of Safety Guarantees from Differential Dynamic Logic Proofs to Neural Network based Controller Systems (Master's thesis) 1/2022-7/2022 Samuel Teuber
- Safety Analysis of Communicating Hybrid Components (Master's thesis, ongoing collaboration) 2/2021-present Marvin Brieger
- Formal Verification of Collision Avoidance for Controllers of Robotic Ground Vehicles (Bachelor's thesis) 5/2014-8/2014 David Vogelbacher
- Profiling Users in Social Networks (Master's thesis) 10/2011-06/2012 Martin Fleck
- Conceptualization, Software Design, and Automated Testing of an Eclipse-based Modeling Environment for Hybrid Systems (Master's thesis) 10/2012-06/2013 Ralph Mayr
- Information Extraction from Social Web Sites (Master's thesis) 10/2011-06/2012 Matthias Popp
- Floating Car Data (Bachelor's thesis) 10/2011-3/2012 Harald Weiner/Markus Niederkofler
- Action planning within the scope of the CSI project (Bachelor's thesis) 10/2011-3/2012 Gerald Madlsperger
- Ereignisvorhersage im Verkehrsmanagement (Master's thesis) 10/2011-8/2012 Christoph Hubl
- Textual and Graphical Multi-View Modeling of Critical Situation Types (Bachelor's thesis) 10/2010-06/2011 Ralph Mayr

UNDERGRADUATE AND MASTERS RESEARCH MENTORING

- Formalization of Flight Dynamics of Quadcopter and Flapper Drones 09/2026-present Aleksander Shavachuk-Baranovskyj

▪ LLM-assisted quantifier elimination	09/2025-present	Nishma Marur Nagendra
▪ Safety monitoring for industrial gripper arms, Agentic LLM-based theorem proving	02/2026-present	Caileigh Edstrom
▪ Safety monitoring for industrial gripper arms	02/2026-04-2026	Azizbek Shokosimov
▪ Stability control and monitoring of quadcopter swarms	01/2025-09/2025	Sam Sami
▪ A Visual Studio Code Extension for differential dynamic logic and KeYmaera X	05/2024-07/2025	Hari Hara Sudhan Kannan
▪ Proof-replay of SMT proofs in differential dynamic logic	06/2024-05/2025	Ismail Patel
▪ Code Synthesis for ROS	01/2025-04/2025	Mohammed Qubaisuddin
▪ Model validation by falsification in differential dynamic logic	05/2024-11/2025	Tessa Hall
▪ Benchmarking of and SMT-Lib frontend for verified real-arithmetic decision procedures	05/2024-02/2025	Jakub Zywicki
▪ Formal modeling of chemical reaction networks	05/2024-08/2024	Keegen Vogel
▪ Compositional verification of industrial control systems	1/2023-7/2023	Cynthia Wang
▪ Translate proof terms to KeYmaera X proof tactics	5/2022-8/2022	Emily Song
▪ Quantitative ModelPlex semantics for reinforcement learning, practical verified virtual substitution for real arithmetic	5/2022-5/2023	Qianfan Luo
▪ Safety proofs as control boundaries for learning recovery control, formal methods assisted reward shaping	5/2022-7/2023	Marian Qian
▪ Replay SMT proofs in KeYmaera X	5/2022-7/2023	Liam Hower
▪ Performance optimization of verified virtual substitution	5/2022-8/2022	Ziqi Liu
▪ Minimizing Sequents to Find Modeling Errors	1/2022-present	Myra Dotzel
▪ Formal verification of the responsibility-sensitive safety model for self-driving cars, tests and proofs	09/2021-7/2023	Megan Strauss
▪ Implicit definitions in KeYmaera X	02/2021-6/2022	James Gallicchio
▪ Abstraction and CEGAR for verification and explanations of neural networks	01/2019-1/2022	David Bayani
▪ Hybrid program falsification	09/2021-12/2021	Zhongyi Cao
▪ Modeling and verification of ground robots with learned controllers	01/2020-05/2020	Naveen Pai
▪ Unit measures and unit conversion in KeYmaera X models, Airborne collision avoidance proofs in KeYmaera X game logic (CMU SCS Alumni Award for Undergraduate Excellence 2021, CRA Outstanding Researcher Award Honorable Mention 2021)	09/2018-05/2021	Rachel Cleaveland
▪ Formal modeling of train controllers, generation, and verification of robust invariants for differential equations	01/2018-08/2018	Yiyang Guo
▪ Simulation of cyber-physical systems models and train braking controllers	08/2017-04/2018	Vaidehi Srinivas
▪ Simulation of hybrid programs in Mathematica	10/2012-06/2013	Il Suk Lyu

RESEARCH EXPERIENCE

FORMAL STACK FOR PLCs (PI, \$450K)	10/2022-present (NSF FMitF)	Formal verification and implementation stack for programmable logic controllers RESEARCH FOCUS: • Verified (de-)compilation between PLC code and hybrid programs • Formal CPS security analysis
PROOF-PRODUCING CONVERSATIONS (PI, \$5K)	09/2025-present (NVIDIA Academic Grant Program)	LLM-assisted quantifier elimination
SAFERAILS (PI, \$50K)	05/2024-04/2026 (NSF I-Corps)	Customer discovery for safety monitoring in autonomous robotic systems; conducted 120+ interviews with industry stakeholders
ENSURING SAFETY IN AI-ENHANCED PTC SYSTEMS (PI, \$670K)	09/2020-02/2024 (FRA, Industry collaboration with Siemens Research)	Formal guarantees for learning-enabled railroad safety control RESEARCH FOCUS: • Automation for verified monitoring and model validation • Verification of machine learning in railroad control
HOLONIC MANUFACTURING (SYSTEMS SCIENTIST)	06/2019-12/2020 (Industry collaboration with Siemens Research)	Formal guarantees for learning-enabled industrial automation
AA-EXACT (SYSTEMS SCIENTIST)	07/2018-01/2023 (DARPA)	Formal guarantees for AI-enabled cyber-physical systems and control RESEARCH FOCUS: • Monitoring of and constraints for learning algorithms • Safety metrics for dynamic assurance case assessment
FORMAL METHODS IN ANALYSIS (SYSTEMS SCIENTIST)	2/2018-7/2022 (AFOSR)	Formal methods in analysis, real arithmetic, theorem prover integration RESEARCH FOCUS: • Formalization of dL in Lean • Sound real arithmetic in the KeYmaera X core
PROVABLY SECURE CPS (SYSTEMS SCIENTIST)	2/2017-7/2023 (AFOSR)	Differential dynamic game logic for adversarial behavior analysis RESEARCH FOCUS: • Safety in adversarial settings, attacks with physical consequences • Develop uniform substitution calculus of hybrid games
PROOF-AWARE ^{CPS} (PI, EUR 237K)	8/2015-7/2020 (Austrian Science Fund FWF)	Component-based, incremental development and verification of cyber-physical systems [FWF P28187-N31] RESEARCH FOCUS: • Component-based development of hybrid system models and proofs • Refactoring and refinement of hybrid system models and proofs • Code synthesis and runtime verification
PTC (SYSTEMS SCIENTIST)	2/2017-12/2017, 5/2018-11/2018, 1/2019-12/2019 (Industry collaboration with Siemens Research)	Train control and safety of braking maneuvers RESEARCH FOCUS: • Models and proofs of train braking maneuvers • Verified runtime model validation and its application to testing
SPHINX (POSTDOC)	2/2014-1/2015, 5/2015-4/2016 (European Research Council ERC)	Marie Curie International Outgoing Fellowship [PIOF-GA-2012-328378-Sphinx] RESEARCH FOCUS: • Refactoring and refinement of hybrid system models and proofs • Model-driven development environment for cyber-physical systems
LFCPS	2/2015-4/2015	Logical Foundations of cyber-physical systems [NSF CNS-1054246]

(POSTDOC)	(NSF)	RESEARCH FOCUS: Hybrid system theorem proving (KeYmaera X)
HACMS (POSTDOC)	11/2012–1/2014 5/2016–1/2017 (DARPA)	Construction of high-assurance cyber-physical systems [DARPA HACMS AFRL FA8750-12-2-0291] RESEARCH FOCUS: - Safe collision avoidance for autonomous robotic ground vehicles - Hybrid system runtime verification - Hybrid system theorem proving
GOALI ARCHCPS (POSTDOC)	11/2012–4/2015 (NSF)	Collaboration on architectural considerations in formal verification techniques for cyber-physical systems [NSF CNS-1035800] RESEARCH FOCUS: Architecture and modeling of cyber-physical systems
UTC T-SET (POSTDOC)	11/2012–4/2015	Collaboration on modeling and verification techniques for smart transportation systems (vehicle-to-infrastructure communication, autonomous ground vehicles) RESEARCH FOCUS: Formal verification of smart transportation systems
CSI (POSTDOC)	10/2011–1/2014 (Austrian Research Promotion Agency FFG)	Collaborative situation awareness for multi-modal traffic management [FFG FIT-IT 829598], http://www.situation-awareness.net RESEARCH FOCUS: Collaborative situation awareness with a focus on qualitative traffic models and situation projection
PROFLOW (POSTDOC)	1/2011–12/2012 (Austrian Research Promotion Agency FFG)	Detection of and adaptation to critical situations that arise during the execution of multiple parallel workflows. RESEARCH FOCUS: Semantic and situation-aware workflow adaptation
THEHIDDEN U (PHD CANDIDATE)	9/2010–12/2012 (Austrian Research Promotion Agency FFG)	Uniform integrated view of social media profiles with demonstration of data and behavior profiling [FFG FIT-IT 825070], http://www.social-nexus.net RESEARCH FOCUS: Social content integration and profiling with semantic technology
BEAWARE! (PHD CANDIDATE)	4/2009–3/2011 (Austrian Research Promotion Agency FFG)	Situation awareness for road traffic management [FFG FIT-IT 819577], http://www.situation-awareness.net RESEARCH FOCUS: Situation awareness with a focus on situation projection using Colored Petri nets, development of a situation awareness prototype back-end (Lisp, Prolog, OWL)
TELE- HOMECARE (RESEARCH ASSOCIATE)	1/2008–3/2009 (Upper Austria Local Fund)	Telepresence and signal processing for assisted living RESEARCH FOCUS: Evaluation of pervasive healthcare approaches, development of wireless-sensor-network-based signal processing components (necC, Java JCreate, Java SE), development of a platform-independent modeling tool for pervasive healthcare applications (Eclipse Modeling)
PLANT SAFETY SYSTEM (RESEARCH ASSOCIATE)	3/2007–12/2007 (Austrian K-plus)	Personnel and asset tracking during safety incidents in industrial environments http://forte.fh-hagenberg.at/project-homepages/pss RESEARCH FOCUS: Positioning systems in industrial environments based on wireless sensor networks (necC, TinyOS)
GULLIVER (RESEARCH ASSOCIATE)	9/2005–9/2007 (Austrian FHplus)	Multi-modal user interfaces for TV broadcasting journalists (search while commenting during sports broadcasts) http://forte.fh-hagenberg.at/project-homepages/gulliver/index.shtml RESEARCH FOCUS: Speech recognition on mobile devices, multi-modal user interface

		components, speech-based article search system (MS Speech Server)
MOSES (RESEARCH ASSOCIATE)	8/2004–8/2005 (Austrian FHplus)	Safety of industry maintenance personnel with a ubiquitous maintenance tracking system RESEARCH FOCUS: ▪ Ubiquitous plant component identification, industrial maintenance enforcement (planning, guidance, and progress tracking)

HONORS

- EMSOFT 2022 Best Paper Award Finalist
- HSCC 2022 Best Paper Award and Best Repeatability Evaluation Award
- ARCH 2021 Competition Best Result Award
- FM 2019 Best Tool Paper Award
- ICCPS 2019 Best Paper Award Finalist
- RV 2014 Best Paper Award Finalist
- MARIE CURIE INTERNATIONAL OUTGOING FELLOWSHIP 2013
- RESEARCH AWARD OF THE AUSTRIAN FEDERAL MINISTRY OF SCIENCE AND RESEARCH 2012
- PROMOTIO SUB AUSPICIIS PRAESIDENTIS REI PUBLICAE 2012
- BEST ACADEMIC TEACHER AWARD (2008/09), 2nd Place, Upper Austria University of Applied Sciences, Hagenberg Campus (Bioinformatics department)

COMMUNITY SERVICE

- JOURNAL EDITORIAL BOARD MEMBERSHIP:
 - Science of Computer Programming (SCP 2022-present)
 - IEEE Transactions on Dependable and Secure Computing (TDSC 2022-2025)
- DEPARTMENT SERVICE
 - CMU PhD Admissions 2021, 2022
 - Program Chair of Computer Science 2023-present
 - DePaul PhD Committee and Financial Awards Committee 2023-present
- PROPOSAL PANELS/REVIEWS:
 - Dutch Research Council
 - Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)
 - Agence National de la Recherche (ANR, French National Research Agency)
 - NSF CPS, SAS
 - European Research Council ERC
 - Israel Science Foundation
- PROGRAM COMMITTEE MEMBER:
 - Int. Conference on Hybrid Systems: Computation and Control (HSCC 2023-2026)
 - Int. Conference on Embedded Software (EMSOFT 2023)
 - Int. Conference on Runtime Verification (RV 2023-2026)
 - Int. Colloquium on Theoretical Aspects of Computing (ICTAC 2023)
 - Int. Conference on Engineering of Complex Computer Systems (ICECCS 2023)
 - Int. Conference on Formal Methods for Industrial Critical Systems (FMICS 2020,2023-2026)
 - Int. Symposium on Formal Methods (FM 2024)
 - Int. Conference on Rigorous State-Based Methods (ABZ 2020-2021,2023)
 - Symposium on Dependable Software Engineering (SETTA 2020-2022)
 - NASA Formal Methods Symposium (NFM 2019-2021,2023-2026)
 - Int. Conf. on Formal Methods and Models for System Design (MEMOCODE 2021-2023)
 - Workshop on Formal Integrated Development Environment (F-IDE 2015-2022)
 - Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2019-2022)
 - Workshop on Models for Formal Analysis of Real Systems (MARS 2022)

- Workshop on Explainability of Real-Time Systems and their Analysis (ERSA 2022)
- Int. Conference on Formal Aspects of Software Engineering (FASE 2020-2021)
- Topics in Theoretical Computer Science (TTCS 2020)
- 3rd Workshop on Automated Reasoning: Challenges, Applications, Directions, Exemplary Achievements (ARCADE 2021)
- Int. Workshop on Dynamic Logic: New Trends and Applications (DaLi 2019-2020,2025)
- 5th Workshop on Symbolic-Numeric Methods for Reasoning about CPS and IoT (SNR 2019)
- 12th Int. Symposium on Frontiers of Combining Systems (FroCoS 2019)
- Workshop on Model-Based Design of Cyber Physical Systems (CyPhy 2018-2019)
- 2nd Workshop on Safe Control of Connected & Autonomous Vehicles (SCAV 2018)
- 13th Int. Conference on integrated Formal Methods (iFM 2017)
- Invited Seminars and Summer Schools
 - Dagstuhl Seminar Specification Formalisms for Modern Cyber-Physical Systems (2019)
 - Dagstuhl Seminar Analysis of Auton. Mobile Collectives in Complex Physical Environments (2019)
 - Summer School on Formal Methods (2018, 2019, course: Foundations of Cyber-Physical Systems)
- JOURNAL REVIEWS:
 - Formal Aspects of Computing (FAOC)
 - Software Tools for Technology Transfer (STTT)
 - Science of Computer Programming (SCP)
 - Embedded Systems Letters
 - Robotics and Autonomous Systems
 - Systems and Software
 - Transactions on Automatic Control (TAC)
 - Transactions on Cyber-physical Systems (TCPS)
 - Transactions on Cybernetics
 - Logical and Algebraic Methods in Programming
 - Internet Services and Applications
 - Computer Science and Technology (JCST)
 - Software: Practice and Experience (SPE)
 - ACM Computing Surveys
- CONFERENCE REVIEWS (IN ADDITION TO PC SERVICE):
 - 38th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2023, 2025, 2026)
 - 25th Symposium on Formal Methods (FM 2023)
 - International Conference on Robotics and Automation (ICRA 2014, 2015, 2019, 2021, 2024)
 - IEEE Computer Security Foundations Symposium (CSF 2020)
 - 2020 International Conference on Cyber-Physical Systems (ICCPS 2020)
 - 2020 Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2020)
 - 2019 Symposium on Principles of Programming Languages (POPL 2019)
 - 2018 International Joint Conference on Artificial Intelligence and European Conference on Artificial Intelligence (IJCAI-ECAI 2018)
 - Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2017, 2018)
 - 2018 American Control Conference (ACC 2018)
 - International Conference on Intelligent Robots (IROS 2017)
 - 13th International Symposium on Automated Technology for Verification and Analysis (ATVA 2015)
 - 6th International NASA Formal Methods Symposium (NFM 2014)
 - 40th International Colloquium on Automata, Languages and Programming (ICALP 2013)
 - 4th Analytic Virtual Integration of Cyber-Physical Systems Workshop (AVICPS 2013)
 - International Conference on Information Technology: New Generations (ITNG 2013)

BOOK CHAPTERS

- [1] Stefan Mitsch, André Platzer. *A Retrospective on Developing Hybrid System Provers in the KeYmaera Family - A Tale of Three Provers*. In Wolfgang Ahrendt et al., editors, *Deductive Software Verification: Future Perspectives*, volume 12345 of LNCS: pp. 21-64, Springer 2020.
- [2] Werner Kurschl, Stefan Mitsch, and Johannes Schönböck. *Model-Driven Prototyping Support for Pervasive Healthcare Applications, in Pervasive and Smart Technologies for Healthcare*, IGI Global, 2010.
- [3] Wolfgang Beer, Bernhard Moser, Werner Kurschl, Stefan Mitsch, Florian Matussek, and Stephan Sutor. *Application Development and Management of Smart Camera Networks*, in *Smart Cameras*. SPRINGER, 2009.

JOURNAL PUBLICATIONS

- [4] Marvin Brieger, Stefan Mitsch, André Platzer. *Complete Dynamic Logic of Communicating Hybrid Programs*. *Journal of Automated Reasoning (JAR)*, 2026 (to appear).
- [5] Rachel Cleaveland, Stefan Mitsch, André Platzer. *Formally Verified Next-Generation Airborne Collision Avoidance Games in ACAS X*. *ACM Transactions on Embedded Computing Systems*, 2023.
- [6] Alessandro Abate, Matthias Althoff, Lei Bu, Gidon Ernst, Goran Frehse, Luca Geretti, Taylor T. Johnson, Claudio Menghi, Stefan Mitsch, Stefan Schupp, Sadegh Soudjani. *The ARCH-COMP Friendly Verification Competition for Continuous and Hybrid Systems*. *TOOLympics@ETAPS 2023*: pp. 1-37, 2023.
- [7] Aditi Kabra, Stefan Mitsch, André Platzer. *Verified train controllers for the Federal Railroad Administration train kinematics model: Balancing competing brake and track forces*. *IEEE Trans. Comput. Aided Des. Integr. Circuits Syst.* Special issue for EMSOFT 2022. **Best paper finalist**
- [8] Eduard Kamburjan, Stefan Mitsch, Reiner Hähnle. *A Hybrid Programming Language for Formal Modeling and Verification of Hybrid Systems*. *Leibniz Transactions on Embedded Systems*. 8(2), pp. 04:1-04:34, 2022.
- [9] Qin Lin, Stefan Mitsch, André Platzer, John Dolan. *Safe and Resilient Practical Waypoint-following for Autonomous Vehicles*. *IEEE Control Systems Letters*. 6, pp. 1574-1579, 2022.
- [10] Andrew Sogokon, Stefan Mitsch, Yong Kiam Tan, Katherine Cordwell, André Platzer. *Pegasus: Sound continuous invariant generation*. *FMSD*, 2021. Special issue for selected papers from FM'19.
- [11] Rose Bohrer, Yong Kiam Tan, Stefan Mitsch, Andrew Sogokon, André Platzer. *A formal safety net for waypoint following in ground robots*. *IEEE Robotics and Automation Letters*. 4(3), pp. 2910-2917, 2019.
- [12] Andreas Müller, Stefan Mitsch, Werner Retschitzegger, Wieland Schwinger, and André Platzer. *Tactical Contract Composition for Hybrid System Component Verification*, *STTT*, 20(6), pp. 615-643, 2018 (special issue for selected papers from FASE'17).
- [13] Stefan Mitsch, Khalil Ghorbal, David Vogelbacher, and André Platzer. *Formal verification of obstacle avoidance and navigation of ground robots*. *International Journal of Robotics Research*, 36(12), pp. 1312-1340. 2017.
- [14] Franz Franchetti, Tze Meng Low, Stefan Mitsch, Juan Paolo Mendoza, Liangyan Gui, Amarín Phaosawasdi, David Padua, Soumya Kar, José M. F. Moura, Mike Franusich, Jeremy Johnson, André Platzer and Manuela Veloso. *High-Assurance SPIRAL: End-to-end guarantees for robot and car control*. *IEEE Control Systems Magazine*, 2017.
- [15] Jean-Baptiste Jeannin, Khalil Ghorbal, Yanni Kouskoulas, Aurora Schmidt, Ryan Gardner, Stefan Mitsch, and André Platzer. *A formally verified hybrid system for safe advisories in the next-generation airborne collision avoidance system*. *STTT*, 2016. Special issue for selected papers from TACAS'15.
- [16] Stefan Mitsch, André Platzer. *ModelPlex: Verified runtime validation of verified cyber-physical system models*. *FORMAL METHODS IN SYSTEM DESIGN*, 49(1), pp. 33-74. 2016. Special issue for selected papers from RV'14. Originally published at RV'14 and as tech report CMU-CS-14-121.
- [17] Stefan Mitsch, André Platzer, Werner Retschitzegger, and Wieland Schwinger. *Logic-Based Modeling Approaches for Qualitative and Hybrid Reasoning in Dynamic Spatial Systems*. *ACM COMPUTING SURVEYS*, 2015.
- [18] Jan-David Quesel, Stefan Mitsch, Sarah Loos, Nikos Aréchiga, and André Platzer. *How to model and prove hybrid systems with KeYmaera: A tutorial on safety*. *INTERNATIONAL JOURNAL ON SOFTWARE TOOLS FOR TECHNOLOGY TRANSFER*, Springer, 2015.
- [19] Norbert Baumgartner, Stefan Mitsch, Andreas Müller, Werner Retschitzegger, Andrea Salfinger, and Wieland Schwinger. *A Tour of BeAware! A Situation-Awareness Framework for Control Centers*. *JOURNAL OF INFORMATION FUSION*, Elsevier. 20:155–173, November 2014.
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INVITED TALKS AND TUTORIALS

- [1] Stefan Mitsch. Verification-Driven Engineering of Autonomous Cyber-Physical Systems. GCASR 2024
- [2] Stefan Mitsch. Verification of ACAS X. National Robotics Engineering Center. Feb. 2023.
- [3] Stefan Mitsch. Logic-Based Safety of Cyber-Physical Systems: Simultaneous Model Validation and Proof Transfer. SETTA 2022, **Keynote**.

- [4] Stefan Mitsch. Real Proofs for Real Cyber-Physical Systems – Theorem Proving and Verified Runtime Monitoring. University of Thessaloniki, Mar. 2022.
- [5] Stefan Mitsch. Modular Verification of Cyber-Physical Systems in KeYmaera X: Theorem Proving and Verified Runtime Monitoring. Dagstuhl, Oct. 2019.
- [6] Andre Platzer, Stefan Mitsch. Modular Formal Verification of Cyber-Physical Systems with KeYmaera X. FM 2019
- [7] Stefan Mitsch. KeYmaera X. FM 2019 Tool Exhibition
- [8] Stefan Mitsch. *Foundations of Cyber-Physical Systems*. Summer School on Formal Methods, Institute of Software, Chinese Academy of Sciences, Beijing, China, Aug. 2019.
- [9] Stefan Mitsch. *Monitor Specification and Verified Runtime Monitoring of Component Models in Differential Dynamic Logic*. MT-CPS Workshop@CPSWeek 2019. April 2019.
- [10] Stefan Mitsch. *Formal Verification of Cyber-Physical Systems*. Research Overview for NSA. April 2019.
- [11] Stefan Mitsch. *Formal Verification of Cyber-Physical Systems*. Research Overview for Boeing. March 2019.
- [12] Stefan Mitsch, KeYmaera X: Real Proofs for Real Systems. Research Overview for Mitsubishi Heavy Industries, 2018.
- [13] Stefan Mitsch. *Foundations of Cyber-Physical Systems*. Summer School on Formal Methods, Institute of Software, Chinese Academy of Sciences, Beijing, China, Aug. 2018.
- [14] Stefan Mitsch. KeYmaera X: Real Proofs for Real Systems. Johns Hopkins University Applied Physics Lab, Laurel, MD, May 2018.
- [15] Stefan Mitsch. *The KeYmaera X Theorem Prover: Hybrid Systems Verification and Verified Runtime Validation*. High-Confidence Software and Systems Conference (HCSS 2018), Annapolis, MD, May 2018.
- [16] Stefan Mitsch. *Provable Runtime Safety through Formal Verification and Verified Model Validation*. Bosch, Schwieberdingen, Germany, December 2017.
- [17] Stefan Mitsch. *Formal Verification of Cyber-Physical Systems*. Research Overview for Qualcomm. July 2017.
- [18] Stefan Mitsch. *ModelPlex: Verified Runtime Monitors and Verified Test Oracles for Safety of Cyber-Physical Systems*. CPS V&V I&F Workshop 2017. May 2017.
- [19] Stefan Mitsch. *Formal Verification of Cyber-Physical Systems with KeYmaera X*. Tutorial at TARDEC as part of the HACMS technology transfer effort, May 2017.
- [20] Stefan Mitsch. *Formal Verification of Cyber-Physical Systems*. Research Overview for Northrop Grumman, April 2017.
- [21] Stefan Mitsch. *Hybrid Systems Model Validation*. MT-CPS Workshop@CPSWeek 2017, April 2017.
- [22] Stefan Mitsch. *Hybrid Systems Verification and Verified Runtime Validation with KeYmaera X*, Talk at Princeton University, Princeton, NJ, November 2016.
- [23] Stefan Mitsch. *Hybrid Systems Verification – Verified Runtime Validation and its Application to Test Design*, Siemens Test Engineering Conference 2016, Princeton, NJ, November 2016, **Keynote**.
- [24] Stefan Mitsch, Nathan Fulton, and André Platzer. *KeYmaera X – Tactics and Proofs for Cyber-Physical Systems*. Tutorial at FM 2016, Limassol, Cyprus, November 2016.
- [25] Stefan Mitsch. *Cyber-physical Systems: Differential Equations, Runtime Validation, and Refactoring*. Guest lecture at JKU, November 2016.
- [26] Stefan Mitsch. *KeYmaera X: Tactics and Proof-by-Pointing*, Talk at 15th KeY Symposium, Manigod, France, July 2016.
- [27] Nathan Fulton, Stefan Mitsch, and André Platzer. *From Idea to Provably Safe Implementation – Modeling, Proving, Simulation, and Synthesis in KeYmaera X*. Tutorial at CPSWeek 2016, Vienna, Austria, April 2016.
- [28] Stefan Mitsch. *Verified Runtime Validation and Proof-Aware Refactoring for Hybrid Systems*. Talk at 14th KeY Symposium, Gothenburg, July 2015.
- [29] Stefan Mitsch. *Theorem Proving for CPS*. Talk at the Toyota Summit on Industrial Cyber-Physical Systems. Los Angeles, CA, USA, December 2014.
- [30] Stefan Mitsch. *Hybrid Systems Engineering – Verified Runtime Validation and Proof-Aware Refactoring*, Talk at McMaster University, Hamilton, ON, Canada, September 2014.

PATENTS AND INVENTION DISCLOSURES

- [1] Verified Runtime Validation of Verified Cyber-Physical System Models (U.S. Patent No. 10,872,187)
- [2] Verified Runtime Model Validation for Partially Observable Hybrid Systems (U.S. Patent No. 11,204,838)
- [3] Systems and Methods for Verifying Train Controllers (U.S. PCT/US22/48651)
- [4] Verified Train Controllers for Track Grade and Curvature with the Davis Equation. CMU CTTEC No. 2022-089
- [5] Active Learning by Proof for Logical Foundations of Cyber-Physical Systems. CMU CTTEC No. 2021-084
- [6] Fanoos: Multi-Resolution, Multi-Strength, Interactive Explanations for Learned Systems. CMU CTTEC No. 2021-023
- [7] Pegasus: A framework for sound continuous invariant generation. CMU CTTEC No. 2020-107
- [8] Verified Runtime Model Validation for Partially Observable Hybrid Systems CMU CTTEC No. 2019-097
- [9] VeriPhy: Verified Controller Executables from Verified Cyber-Physical System Models. CMU CTTEC No. 2019-027

- [10] KeYmaera X Kernel – Hybrid System Theorem Prover Core. CMU CTTEC No. 2015-444
- [11] KeYmaera X – Hybrid System Theorem Prover. CMU CTTEC No. 2015-138
- [12] ModelPlex – High-Assurance Runtime Safety for Cyber-Physical Systems. CMU CTTEC No. 2014-029

SOFTWARE ARTIFACTS

- [13] KeYmaera X Hybrid Systems Theorem Prover (<https://keymaerax.org>)
- [14] VSCode-kyx (<https://github.com/ProVE-Lab/vscode-kyx>)
- [15] Sphinx Eclipse Modeling Toolkit for Hybrid Systems Models (<https://facweb.cdm.depaul.edu/smitsch/tools.html#sphinx>)
- [16] Pegasus Continuous Invariant Generator (<http://pegasus.keymaerax.org/>)
- [17] VeriPhy Verified Compilation Pipeline (<https://www.ls.cs.cmu.edu/VeriPhy>)

REFERENCES

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