











Dr. rer. nat. Kevin Batz




Personal Information

- Born  April 21, 1994 in Grevenbroich, Germany
- Nationality  German
- Languages  German (native speaker), English (fluent)

Employment History/Scientific Career

- Sep. 2026 – present  **Juniorprofessor of Computer Science**, University of Münster, Germany
- Jan. 2025 – Aug. 2026  **Postdoctoral Associate**, Cornell University, United States
with Prof. Dr. Alexandra Silva
- Feb. 2025 – Dec. 2025  **Senior Research Fellow**, University College London, United Kingdom (concurrent appointment)
at the *Programming Principles, Logic, and Verification Group*
with Prof. Dr. Alexandra Silva
- May 2019 – Dec. 2024  **Research and Teaching Assistant**, RWTH Aachen, Germany
at the *Software Modeling and Verification Group*
headed by Prof. Dr. Ir. Dr. h. c. Joost-Pieter Katoen
- Nov. 2018 – Feb. 2019  **Student Teaching Assistant**, RWTH Aachen, Germany
at the *Software Modeling and Verification Group*
headed by Prof. Dr. Ir. Dr. h. c. Joost-Pieter Katoen
- May 2017 – July 2018  **Student Research Assistant**, RWTH Aachen, Germany
at the *Software Modeling and Verification Group*
headed by Prof. Dr. Ir. Dr. h. c. Joost-Pieter Katoen
- Apr. 2016 – Aug. 2016  **Student Teaching Assistant**, RWTH Aachen, Germany
at the *Software Modeling and Verification Group*
headed by Prof. Dr. Ir. Dr. h. c. Joost-Pieter Katoen





Education

- 2019 – 2024  **Dr. rer.nat. in Computer Science**, *summa cum laude* (with distinction), RWTH Aachen University, Germany
Thesis Title: *Automated Deductive Verification of Probabilistic Programs*
Supervisor: Prof. Dr. Ir. Dr. h. c. Joost-Pieter Katoen
Date of Defense: December 20, 2024
- 2017 – 2019  **M.Sc. Computer Science**, with distinction, RWTH Aachen, Germany
- 2013 – 2017  **B.Sc. Computer Science**, RWTH Aachen, Germany














Awards

- 2026  Best Paper Award at FM
-  Distinguished Artifact Award at ESOP
- 2025  **ETAPS Doctoral Dissertation Award**
-  Borchers Medal
for receiving a doctoral degree with distinction (*summa cum laude*)
-  Nomination for the Informatics Europe Best Dissertation Award 2025
by the Department of Computer Science of RWTH Aachen University.




Awards (continued)

- 2023  Distinguished Artifact Award at OOPSLA
- 2020  Best Paper Award at LOPSTR
- 2019  Springorum Medal
for receiving a Master's degree with distinction
- 2018  Finalist for cross-conference EATCS Best Paper Award at ETAPS 2018
Nominated as best theoretical paper at the European Joint Conferences on Theory and Practice of Software (ETAPS) 2018.

List of Courses

- 2024  Static Program Analysis
Teaching Assistant at RWTH Aachen University
- 2023  Probabilistic Programming
Guest Lecture at RWTH Aachen University
-  Semantics and Verification of Software
Teaching Assistant at RWTH Aachen University
- 2022  Compiler Construction
Teaching Assistant at RWTH Aachen University
-  Static Program Analysis
Teaching Assistant at RWTH Aachen University
- 2021  Concurrency Theory
Teaching Assistant at RWTH Aachen University
-  Semantics and Verification of Software
Teaching Assistant at RWTH Aachen University
- 2020  Compiler Construction
Teaching Assistant at RWTH Aachen University
-  Seminar: Probabilistic Programming
Supervised seminar students (technical report and talk) at RWTH Aachen University
-  Static Program Analysis
Teaching Assistant at RWTH Aachen University
-  Proseminar: Introduction to Program Analysis
Supervised seminar students (technical report and talk) at RWTH Aachen University
- 2019  Concurrency Theory
Teaching Assistant at RWTH Aachen University
-  Semantics and Verification of Software
Teaching Assistant at RWTH Aachen University

Supervised Students

- 2025  Oliver Bøving
PhD Student, Technical University of Denmark
Supervised him as an intern at University College London
-  Daniel Basgöze
Supervised his Master's thesis at RWTH Aachen University.
- 2024  Dinis Vitorino
Supervised his Bachelor's thesis at RWTH Aachen University.



Supervised Students (continued)

- 2023
 - Daniel Zilken
Supervised his Master's thesis at RWTH Aachen University.
Supervised him as a student teaching assistant.
Is now pursuing a PhD with Prof. Dr. Ir. Dr. h.c. Joost-Pieter Katoen.
Collaboration still active.
 - Nora Orhan
Supervised her Bachelor's thesis at RWTH Aachen University.
Supervised her as a student research assistant.
 - Zhiang Wu
Supervised him as a research intern at RWTH Aachen University.
 - Tom Biskup
Supervised his Master's thesis at RWTH Aachen University.
Supervised him as a research intern.
His thesis won the *Berthold Vöcking Master Award* at RWTH Aachen.
- 2022
 - Ben Sturgis
Supervised his Bachelor's thesis.
 - Philipp Schröer
Supervised his Master's thesis at RWTH Aachen University.
Supervised him as a student teaching assistant.
Is now pursuing a PhD with Prof. Dr. Ir. Dr. h.c. Joost-Pieter Katoen.
Collaboration still active.
- 2021
 - Marvin Jansen
Supervised his Master's thesis at RWTH Aachen University.
His thesis won the *CS Department Award* at RWTH Aachen.
 - Adrian Gallus
Supervised his Bachelor's thesis at RWTH Aachen University.
Supervised him as a student research assistant.
 - Florian Keßler
Supervised his Bachelor's thesis at RWTH Aachen University.
His thesis won the *CS Department Award* at RWTH Aachen.







Invitations to Invitation-Only Workshops, Research Visits, etc.

- 2026
 - Bellairs Workshop *Quantitative Reasoning*, Holetown, Barbados
 - IFIP WG 1.9/2.15 *Verified Software and Applications: Mathematical and Formal Solutions*, Turin, Italy
- 2025
 - Bellairs Workshop *41 Years of Probabilistic Semantics*, Holetown, Barbados
- 2024
 - JST ASPIRE Workshop *Network of Software Studies towards Social Trust in Information Technologies*, Shonan Village Center, Kanagawa, Tokyo
 - Research visit to Aarhus University, Aarhus, Denmark
Prof. Lars Birkedal, Ph.D., *Logic and Semantics Group*
- 2023
 - Invited talk at the online *POPV Seminar*, Boston University, Boston, USA
Prof. Marco Gaboardi, Ph.D., *Principles of Programming and Verification Group*
 - Dagstuhl Seminar *Scalable Analysis of Probabilistic Models and Programs*
- 2022
 - Research visit to the National University of Córdoba, Córdoba, Argentina
Prof. Pedro R. D'Argenio, Ph.D., *Dependable Systems Group*


















Workshop Organization

- 2026  6th Workshop on *VeriProP* (co-chair), Lisbon, Portugal
co-located with CAV 2026
- 2025  5th Workshop on *VeriProP* (co-chair), Zagreb, Croatia
co-located with CAV 2025

Program Committees

- 2027  *Logic in Computer Science* (LICS)
- 2026  *Workshop on Algebraic Development Techniques* (WADT)
-  *International Symposium on Automated Technology for Verification and Analysis* (ATVA, PC Member and AEC Co-Chair)
-  *International Conference on Formal Modeling and Analysis of Timed Systems* (FORMATS)
-  *International Conference on Quantitative Evaluation of SysTems* (QEST)
-  *International Symposium on Theoretical Aspects of Computer Science* (STACS)

External Reviewer for Conferences

- 2026  *International Symposium on Mathematical Foundations of Computer Science* (MFCS)
-  *ACM SIGPLAN Conference on Programming Language Design and Implementation* (PLDI)
-  *ACM/IEEE Ann. Symp. on Logic in Computer Science* (LICS)
- 2025  *ACM Symp. on Principles of Programming Languages* (POPL)
-  *Science of Computer Programming* (SCICO)
-  *Int. Conf. on Computer-Aided Verification* (CAV)
- 2024  *Int. Conf. on Computer-Aided Verification* (CAV)
-  *ACM/IEEE Ann. Symp. on Logic in Computer Science* (LICS)
-  *Int. Conf. on Foundations of Software Science and Computation Structures* (FoSSaCS)
- 2023  *Int. Conf. on Uncertainty in Artificial Intelligence* (UAI)
-  *ACM Symp. on Principles of Programming Languages* (POPL)
-  *Int. Conf. on Logic for Programming, Artificial Intelligence and Reasoning* (LPAR)
- 2022  *ACM Symp. on Principles of Programming Languages* (POPL)
- 2021  *ACM/IEEE Ann. Symp. on Logic in Computer Science* (LICS)
-  *Int. Conf. on Computer-Aided Verification* (CAV)
-  *Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems* (TACAS)
- 2019  *Int. Conf. on Quantitative Evaluation of SysTems* (QEST)

External Reviewer for Journals

- 2024  (2x) *Formal Methods in System Design* (FMDS)

Research Publications

- 1 Emmanuel Suárez Acevedo, Tiago Ferreira, **Kevin Batz**, Oliver Bøving, Nate Foster, and Alexandra Silva. “Weighted NetKAT: A Programming Language for Quantitative Network Verification”. In: *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*. To appear. 2026. arXiv: 2604 . 13987.

- 2 **Kevin Batz**, Benjamin Lucien Kaminski, Lucas Kehrer, Gerwin Klein, Henning Urbat, and Todd Schmid. “The Algebra of Iterative Constructions”. In: *Proceedings of the 41st Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*. To appear. 2026.
- 3 Tiago Ferreira, **Kevin Batz**, and Alexandra Silva. “SMT-Based Active Learning of Weighted Automata”. In: *Computer Aided Verification (CAV)*. To appear. 2026. arXiv: 2605 . 07758.
- 4 Darion Haase, **Kevin Batz**, Adrian Gallus, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Lutz Klinkenberg, and Tobias Winkler. “Generating Functions Meet Occupation Measures: Invariant Synthesis for Probabilistic Loops”. In: *Programming Languages and Systems (ESOP)*. Springer, 2026, pp. 314–343. [DOI](#): 10 . 1007/978-3-032-22720-1_12.
- 5 Philipp Schröder, **Kevin Batz**, Umut Yiğit Dural, Darion Haase, Benjamin Lucien Kaminski, Joost-Pieter Katoen, and Christoph Matheja. “Caesar: A Deductive Verifier for Probabilistic Programs”. In: *Computer Aided Verification (CAV)*. To appear. 2026. arXiv: 2605 . 15827.
- 6 Daniel Zilken, **Kevin Batz**, Joost-Pieter Katoen, and Tobias Winkler. “Verifying Sampling Algorithms via Distributional Invariants”. In: *Formal Methods (FM)*. Springer, 2026, pp. 259–278. [DOI](#): 10 . 1007/978-3-032-26204-2_14.
- 7 **Kevin Batz**, Joost-Pieter Katoen, and Nora Orhan. “Quantifier Elimination and Craig Interpolation: The Quantitative Way”. In: *Foundations of Software Science and Computation Structures (FoSSaCS)*. Springer, 2025, pp. 176–197. [DOI](#): 10 . 1007/978-3-031-90897-2_9.
- 8 **Kevin Batz**, Joost-Pieter Katoen, Francesca Randone, and Tobias Winkler. “Foundations for Deductive Verification of Continuous Probabilistic Programs: From Lebesgue to Riemann and Back”. In: *Proceedings of the ACM on Programming Languages* 9.OOPSLA1 (2025), pp. 421–448. [DOI](#): 10 . 1145/3720429.
- 9 **Kevin Batz**. “Automated Deductive Verification of Probabilistic Programs”. PhD thesis. RWTH Aachen University, 2024.
- 10 **Kevin Batz**, Tom Jannik Biskup, Joost-Pieter Katoen, and Tobias Winkler. “Programmatic Strategy Synthesis: Resolving Nondeterminism in Probabilistic Programs”. In: *Proceedings of the ACM on Programming Languages* 8.POPL (2024), pp. 2792–2820. [DOI](#): 10 . 1145/3632935.
- 11 **Kevin Batz**, Benjamin Lucien Kaminski, Christoph Matheja, and Tobias Winkler. “J-P: MDP. FP. PP. Characterizing Total Expected Rewards in Markov Decision Processes as Least Fixed Points with an Application to Operational Semantics of Probabilistic Programs”. In: *Principles of Verification: Cycling the Probabilistic Landscape*. Springer, 2024, pp. 255–302.
- 12 Mingqi Yang, **Kevin Batz**, Mingshuai Chen, Joost-Pieter Katoen, Zhiang Wu, and Jianwei Yin. “Latticed Craig Interpolation with an Application to Probabilistic Verification”. In: *Workshop on Theory and Applications of Craig Interpolation and Beth Definability (CIBD)*. Extended abstract. 2024.
- 13 **Kevin Batz**, Mingshuai Chen, Sebastian Junges, Benjamin Lucien Kaminski, Joost-Pieter Katoen, and Christoph Matheja. “Probabilistic Program Verification via Inductive Synthesis of Inductive Invariants”. In: *Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*. Springer, 2023, pp. 410–429. [DOI](#): 10 . 1007/978-3-031-30820-8_25.
- 14 **Kevin Batz**, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Christoph Matheja, and Lena Verscht. “A Calculus for Amortized Expected Runtimes”. In: *Proceedings of the ACM on Programming Languages* 7.POPL (2023), pp. 1957–1986. [DOI](#): 10 . 1145/3571260.
- 15 Philipp Schröder, **Kevin Batz**, Benjamin Lucien Kaminski, Joost-Pieter Katoen, and Christoph Matheja. “A Deductive Verification Infrastructure for Probabilistic Programs”. In: *Proceedings of the ACM on Programming Languages* 7.OOPSLA2 (2023), pp. 2052–2082. [DOI](#): 10 . 1145/3622870.
- 16 **Kevin Batz**, Ira Fesefeldt, Marvin Jansen, Joost-Pieter Katoen, Florian Keßler, Christoph Matheja, and Thomas Noll. “Foundations for Entailment Checking in Quantitative Separation Logic”. In:

Programming Languages and Systems (ESOP). Springer, 2022, pp. 57–84. [DOI](#):
10.1007/978-3-030-99336-8_3.

- 17 **Kevin Batz**, Adrian Gallus, Benjamin Lucien Kaminski, Joost-Pieter Katoen, and Tobias Winkler. “Weighted Programming: A Programming Paradigm for Specifying Mathematical Models”. In: *Proceedings of the ACM on Programming Languages* 6.OOPSLA1 (2022), pp. 1–30. [DOI](#):
10.1145/3527310.
- 18 **Kevin Batz**, Mingshuai Chen, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Christoph Matheja, and Philipp Schröder. “Latticed k-Induction with an Application to Probabilistic Programs”. In: *Computer Aided Verification (CAV)*. Springer, 2021, pp. 524–549. [DOI](#): 10.1007/978-3-030-81685-8_25.
- 19 **Kevin Batz**, Benjamin Lucien Kaminski, Joost-Pieter Katoen, and Christoph Matheja. “Relatively Complete Verification of Probabilistic Programs: An Expressive Language for Expectation-Based Reasoning”. In: *Proceedings of the ACM on Programming Languages* 5.POPL (2021), pp. 1–30. [DOI](#):
10.1145/3434320.
- 20 **Kevin Batz**, Sebastian Junges, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Christoph Matheja, and Philipp Schröder. “PrIC3: Property Directed Reachability for MDPs”. In: *Computer Aided Verification (CAV)*. Springer, 2020, pp. 512–538. [DOI](#): 10.1007/978-3-030-53288-8_25.
- 21 Lutz Klinkenberg, **Kevin Batz**, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Joshua Moerman, and Tobias Winkler. “Generating Functions for Probabilistic Programs”. In: *Logic-Based Program Synthesis and Transformation (LOPSTR)*. Springer, 2020, pp. 231–248. [DOI](#):
10.1007/978-3-030-68446-4_12.
- 22 **Kevin Batz**, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Christoph Matheja, and Thomas Noll. “Quantitative Separation Logic: A Logic for Reasoning About Probabilistic Pointer Programs”. In: *Proceedings of the ACM on Programming Languages* 3.POPL (2019), 34:1–34:29. [DOI](#):
10.1145/3290347.
- 23 **Kevin Batz**, Benjamin Lucien Kaminski, Joost-Pieter Katoen, and Christoph Matheja. “How Long, O Bayesian Network, Will I Sample Thee? A Program Analysis Perspective on Expected Sampling Times”. In: *Programming Languages and Systems (ESOP)*. Springer, 2018, pp. 186–213. [DOI](#):
10.1007/978-3-319-89884-1_7.