Prof. Dr. Gidon Marian Ernst

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Personal

Nationality: Germanborn February 7, 1986, Freiburg im Breisgau, GermanyLanguages: German (native), English (IELTS 8.5 of 9.0), French (intermediate), Japanese (basic)

Education

2010-2016	Dr. rer. nat, Formal Methods, University of Augsburg (summa cum laude) Examiners: Prof. Wolfgang Reif, Prof. Alexander Knapp, Prof. John Derrick
2008-2010	MSc with honours, Software Engineering Elite Graduate Program (1.15) TUM, LMU, University of Augsburg
2005-2008	BSc, Informatics, University of Freiburg (1.3)

ACADEMIC POSITIONS

04/2019-03/2026	Junior Professor W1 for Software Verification, LMU Munich
05/2018-02/2019	Postdoc Fellow, University of Melbourne, Prof. Toby Murray
02/2018-04/2018	Research Visit, Uni Waterloo, Profs. Krzysztof Czarnecki, Sean Sedwards
06/2017-04/2018	Postdoc Researcher, National Institute of Informatics, Tokyo, Prof. Ichiro Hasuo
01/2017-04/2017	Research Internship, Amazon New York, Prof. Byron Cook, Dr. Ernie Cohen
08/2010-11/2016	Research Assistant, University of Augsburg, Prof. Wolfgang Reif
2008-2010	Student Researcher, University of Augsburg, Prof. Wolfgang Reif
2009	Industrial Internship, Siemens Corporate Technology, Munich

Research and Cooperation

My reseach focuses on theoretical foundations and formal methods for reliable software and systems. Concrete research goals are the development of approaches for the specification, proof, and synthesis of correctness properties as well as information flow security. I value the construction and evaluation of program analysis tools which implement the theoretical advances.

Projects, Collaboration

- Specification and Proof Engineering for SMT-LIB and Boogie, lemma synthesis, inference of coupling relations and invariants (with G. Fedyukovich, Florida State University). Tool: Cuvée, github.com/gernst/cuvee
- VerifyThis, Long-term Challenge, integration and comparison of verification approaches, with M. Huisman, A. Weigl, M. Ulbrich and others. Website: verifythis.github.io
- Security Concurrent Separation Logic, with T. Murray, M. Tiwari, P. Yan, University of Melbourne, and D. Naumann, Stevens Institute of Technology, Tool: SECC, covern.org/secc
- Verification with Horn-clauses and loop contracts. Tool: KORN, github.com/gernst/korn
- Simulation-based analysis of hybrid systems, with Z. Zhang (Kyushu University), S. Sedwards (Waterloo), I. Hasuo (NII Tokyo), Tool: FalStar, github.com/ERATOMMSD/falstar and with J. Fejlek and S. Ratschan (Tschechische Akademie der Wissenschaften)

Past Projects

- Software testing with machine learning concepts, with D. Liu, T. Murray, B. Rubinstein, T. Pham, University of Melbourne, Tool: Legion, github.com/gernst/legion-symcc
- Flashix: a verified file system for flash memory PI: W. Reif, Augsburg, isse.de/flashix
- KIV: an interactive theorem prover, with W. Reif, G. Schellhorn, J. Pfähler, Augsburg, isse.de/kiv

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Grants

As Principal Investigator

• Security Specifications for Dafny, Amazon Research Award, USD 50,000 (2023).

Via the LMU Postdoc Support Fund

- Funding for research students EUR 7,500 (2024).
- Travel support: EUR 6,750 (2023).
- Support for the Alpine Verification Meeting (AVM): EUR 4,600 (2022). Used to offer free registration and accomodation to 34 junior participants.
- Travel support: EUR 2,750 (2022).

In preparation/planned

- Detection of Hidden Design Errors in Cyber-Physical Systems, The Bavarian-Czech Academic Agency, EUR 137,000 (with Stefan Ratschan, under review).
- Software Specification and Verification via Design Prototypes, German Research Fund (in revision).
- Integrated Java Verification, German Research Fund (with Dr. Mattias Ulbrich from KIT)

As Contributor

• Contribution to the proposal RE828/13-2, DFG (PI: W. Reif, 2 persons for 2 years, granted 2016): Co-conceptioned the scientific program, wrote approximately a third of the program.

Awards and Recognitions

- VerifyThis @ ETAPS, Louxembourg, 2024: most impressive tool medley, with Hanna Lachnitt.
- Application for career track professorship "Energy-efficient Software Engineering", Twente University, **second place**, 2023.
- Application for W2 professorship "Reliable Software", LMU Munich, second place, 2022.
- "Methods in Software Engineering" awarded **best master lecture in informatics** by the student association, 2022.
- Nomination of the lecture "Formal Specification and Verification" by the faculty for the teaching innovation price of LMU, 2021.
- VerifyThis @ ETAPS, London, 2015: best student team with Jörg Pfähler.
- VerifyThis @ FM, Paris, 2012: best student team with Jörg Pfähler.
- 2nd VSCOMP 2011: gold medal with Gerhard Schellhorn, Bogdan Tofan, Kurt Stenzel.

Press

• Garantierte Fehlerfreiheit für Flash-Speicher, Augsburger Allgemeine, Forschungsmagazin, 2016.

PROFESSIONAL ACTIVITIES

Organisation

- SpecifyThis track (at ISoLA), 2024.
- CHC-COMP Horn clause verification competition, 2024.
- PhD Symposium of Integrated Formal Methods (iFM), 2023.
- VerifyThis Long-term Challenge (VT-LTC), 2023.
- Alpine Verification Meeting (AVM), 2022.
- ETAPS Mentoring Workshop, 2022.
- ARCH friendly competition, falsification category, 2019–2022.
- Workshop on Formal Techniques for Java-like Programs (FTfJP), 2019.
- VerifyThis Software Verification Competition, 2018.

Editorial Board

• Software Tools for Technology Transfer (STTT). Theme: Competitions and Challenges (CoCha), 2021-.

Program Committee

- International Conference on Rigorous State-Based Methods (ABZ), 2024.
- Horn Clause Verification and Synthesis (HCVS), 2024.
- Formal Methods in Software Engineering (FormaliSE), 2023.
- Horn Clause Verification and Synthesis (HCVS), 2021.
- Hybrid Systems: Computation and Control (HSCC), 2021.
- Verified Software: Theories, Tools, Experiments (VSTTE), 2020.
- Symposium On Applied Computing (SAC), track: Software Verification and Testing, 2019, 2020.
- Symposium on Formal Approaches to Parallel and Distributed Systems (4PAD), 2018, 2019.
- Workshop on Automated Reasoning in Software Verification (ARiSVe), 2013.

Artifact Evaluation

- Hybrid Systems: Computation and Control (HSCC), 2020.
- Static Analysis Symposium (SAS), 2018.

Journal Reviews, since 2013, e.g. for

- Science of Computer Programming (SCP).
- Formal Aspects of Computing (FAC).
- Software and Systems Modeling (SoSyM).
- Software Tools for Technology Transfer (STTT).
- Software Quality Journal (SQJO).
- Journal of Logical and Algebraic Methods in Programming (JLAMP).
- Nonlinear Analysis: Hybrid Systems (NAHS).
- Transactions on Modeling and Computer Simulation (TOMACS).
- Special Issue: Fundamental Approaches to Software Engineering (FASE).
- Computing Science–Research and Education (CORE).

Conference Reviews

- Formal Methods in Computer-Aided Design (FMCAD), 2022, 2023.
- International Symposium On Leveraging Applications of Formal Methods, Verification and Validation (ISoLa), 2022.
- Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2019–2021.
- Verification, Model Checking, and Abstract Interpretation (VMCAI), 2020.
- Foundations of Software Engineering (ESEC/FSE), 2020.
- Formal Modeling and Analysis of Timed Systems (FORMATS), 2019.
- Software Engineering and Formal Methods (SEFM), 2019.
- Integrated Formal Methods (iFM), 2018.
- Conference on Concurrency Theory (CONCUR), 2018.
- Hybrid Systems: Computation and Control (HSCC), 2017.
- Alloy, ASM, B, TLA, VDM, and Z (ABZ), 2016.
- European Dependable Computing Conference (EDCC), 2012.
- Formal Verification of Object-Oriented Software (FoVeOOS), 2011.
- Tests and Proofs (TAP), 2011.

PUBLICATIONS

h-Index: 19 https://scholar.google.com/citations?user=_JqtqisAAAAJ

Doctoral Thesis

• G. Ernst. A verified POSIX-compliant flash file system—modular verification technology & crash tolerance. PhD Thesis, Augsburg University, 2016.

Journal Articles

- 1. G. Ernst, S. Sedwards, Z. Zhang, and I. Hasuo. Falsification of hybrid systems using adaptive probabilistic search. *Transact. on Modeling and Comp. Simulations (TOMACS)*, 31(3):1–22, 2021.
- 2. Z. Zhang, G. Ernst, S. Sedwards, P. Arcaini, and I. Hasuo. Two-Layered Falsification of Hybrid Systems Guided by Monte Carlo Tree Search. *Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, 37(11):2894–2905, 2018. Nominated for best paper.
- 3. Y. Bao, G. T. Leavens, and G. Ernst. Unifying separation logic and region logic to allow interoperability. *Formal Aspects of Computing*, 30(3–4):381–441, 2018.
- 4. G. Schellhorn, G. Ernst, J. Pfähler, S. Bodenmüller, and W. Reif. Symbolic execution for a clash-free subset of ASMs. *Science of Computer Programming (SCP)*, 158:21–40, 2018.
- 5. G. Ernst, J. Pfähler, G. Schellhorn, and W. Reif. Modular, crash-safe refinement for ASMs with submachines. *Science of Computer Programming (SCP)*, 131:3–21, 2016.
- 6. G. Ernst, J. Pfähler, G. Schellhorn, D. Haneberg, and W. Reif. KIV–Overview and VerifyThis competition. *Software Tools for Technology Transfer (STTT)*, 17(6):677–694, 2015.
- 7. G. Schellhorn, B. Tofan, G. Ernst, J. Pfähler, and W. Reif. RGITL: A temporal logic framework for compositional reasoning about interleaved programs. *Annals of Mathematics and Artificial Intelligence (AMAI)*, 71:1–44, 2014.
- 8. G. Ernst, G. Schellhorn, and W. Reif. Verification of B+ trees by integration of shape analysis and interactive theorem proving. *Software & Systems Modeling (SoSyM)*, 14(1):27–44, 2015.

Conference/Workshop Publications

- 1. G. Ernst and A. Weigl. Verify this: Memcached—a practical long-term challenge for the integration of formal methods (short paper). In *Proc. of Integrated Formal Methods (iFM)*, volume 14300 of *LNCS*, pages 82–89. Springer, 2023.
- 2. T. Murray, M. Tiwari, G. Ernst, and D. Naumann. Assume but verify: Deductive verification of leaked information in concurrent applications. In *Proc. of Computer and Communications Security (CCS)*, pages 1746–1760. ACM, 2023.
- 3. T. Murray, P. Yang, and G. Ernst. Compositional vulnerability detection with insecurity separation logic. In *Proc. of International Conference on Formal Engineering Methods (ICFEM)*, volume 14308 of *LNCS*, pages 65–82. Springer, 2023.
- 4. G. Ernst. KORN: Horn clause based verification of C programs (competition contribution). In *Proc.* of Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS 13994. Springer, 2023.
- 5. G. Ernst, A. Knapp, and T. Murray. A Hoare logic with regular behavioral specifications. In *Proc. of International Symposium on Leveraging Applications of Formal Methods (ISoLA)*, volume 13701 of *LNCS*. Springer, 2022.
- 6. D. Liu, V.-T. Pham, G. Ernst, T. Murray, and B.I.P. Rubinstein. State selection algorithms and their impact on the performance of stateful network protocol fuzzing. In *Proc. of Software Analysis, Evolution and Reengineering (SANER)*. IEEE, 2022.
- 7. G. Ernst. Loop verification with invariants and summaries. In *Proc. of Verification, Model-Checking, and Abstract Interpretation (VMCAI)*, volume 13182 of *LNCS*. Springer, 2022.
- 8. G. Ernst, J. Blau, and T. Murray. Deductive verification via the debug adapter protocol. In *Proc. of Formal Integrated Development Environment (F-IDE)*, 2021.
- 9. G. Fedyukovich and G. Ernst. Bridging arrays and ADTs in recursive proofs. In *Proc. of Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, volume 12652 of *LNCS*, pages 24–42. Springer, 2021.

- 10. D. Liu, G. Ernst, T. Murray, and B. Rubinstein. Legion: Best-first concolic testing. In *Proc. of Automated Software Engineering (ASE)*, pages 54–65. IEEE, 2020.
- 11. D. Liu, G. Ernst, T. Murray, and B.I.P. Rubinstein. Legion: Best-first concolic testing (competition contribution). In *Proc. of Fundamental Approaches to Software Engineering (FASE)*, pages 545–549, 2020.
- 12. G. Ernst, S. Sedwards, Z. Zhang, and I. Hasuo. Fast falsification of hybrid systems using probabilistically adaptive input. In *Proc. of Quantitative Evaluation of Systems (QEST)*, volume 11785 of *LNCS*, pages 165–181. Springer, 2019.
- 13. G. Ernst and T. Murray. SecCSL: Security Concurrent Separation Logic. In *Proc. of Computer Aided Verification (CAV)*, volume 11562 of *LNCS*, pages 208–230. Springer, 2019.
- 14. G. Ernst, M. Huisman, W. Mostowski, and M. Ulbrich. VerifyThis Verification Competition with a Human Factor. In *Proc. of Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, volume 11429 of *LNCS*. Springer, 2019.
- 15. G. Ernst, I. Hasuo, Z. Zhang, and S. Sedwards. Time-staging Enhancement of Hybrid System Falsification, 2018. Presented at: Symbolic and Numerical Methods for Reachability Analysis (SNR). To appear in Proc. of SNR 2021.
- J. Pfähler, G. Ernst, S. Bodenmüller, G. Schellhorn, and W. Reif. Modular verification of order-preserving writeback caches. In *Proc. of Integrated Formal Methods (iFM)*, volume 10510 of *LNCS*, pages 375–390. Springer, 2017.
- 17. G. Schellhorn, G. Ernst, J. Pfähler, and W. Reif. A relational encoding for a clash-free subset of ASMs. In *Proc. of Alloy, ASM, B, TLA, VDM, and Z (ABZ)*, volume 9675 of *LNCS*, pages 237–243. Springer, 2016.
- G. Ernst, J. Pfähler, G. Schellhorn, and W. Reif. Inside a verified Flash file system: transactions & garbage collection. In *Proc. of Verified Software: Theories, Tools, Experiments (VSTTE)*, volume 9593 of *LNCS*, pages 73–93. Springer, 2015.
- 19. Y. Bao, G. T. Leavens, and G. Ernst. Conditional effects in fine-grained region logic. In *Proc. of Formal Techniques for Java-like Programs (FTfJP).* ACM, 2015.
- 20. G. Ernst, J. Pfähler, G. Schellhorn, and W. Reif. Modular refinement for submachines of ASMs. In *Proc.* of *Alloy, ASM, B, TLA, VDM, and Z (ABZ)*, volume 8477 of *LNCS*, pages 188–203. Springer, 2014.
- 21. G. Schellhorn, G. Ernst, J. Pfähler, D. Haneberg, and W. Reif. Development of a verified Flash file system. In *Proc. of Alloy, ASM, B, TLA, VDM, and Z (ABZ)*, volume 8477 of *LNCS*, pages 9–24. Springer, 2014. Invited Paper.
- G. Ernst, G. Schellhorn, D. Haneberg, J. Pfähler, and W. Reif. Verification of a Virtual Filesystem Switch. In Proc. of Verified Software: Theories, Tools, Experiments (VSTTE), volume 8164 of LNCS, pages 242–261. Springer, 2013.
- 23. B. Tofan, G. Schellhorn, G. Ernst, J. Pfähler, and W. Reif. Compositional verification of a lock-free stack with RGITL. *Electronic Communications of the Automated Verification of Critical Systems (EASST)*, 66, 2014.
- 24. J. Pfähler, G. Ernst, G. Schellhorn, D. Haneberg, and W. Reif. Formal specification of an erase block management layer for Flash memory. In *Haifa Verification Conference (HVC)*, volume 8244 of *LNCS*, pages 214–229. Springer, 2013.
- 25. G. Ernst, G. Schellhorn, D. Haneberg, J. Pfähler, and W. Reif. A formal model of a Virtual Filesystem Switch. In *Proc. of Software and Systems Modeling (SSV)*, volume 102 of *EPTCS*, pages 33–45, 2012.
- 26. G. Ernst, G. Schellhorn, and W. Reif. Verification of B+ trees: an experiment combining shape analysis and interactive theorem proving. In *Proc. of Software Engineering and Formal Methods (SEFM)*, volume 7041 of *LNCS*, pages 188–203. Springer, 2011.
- 27. G. Schellhorn, B. Tofan, G. Ernst, and W. Reif. Interleaved programs and rely-guarantee reasoning with ITL. In *Proc. of Temporal Representation and Reasoning (TIME)*, pages 99–106. IEEE, 2011.
- 28. M. Junker, D. Haneberg, G. Schellhorn, W. Reif, and G. Ernst. Simulating a Flash File System with CoreASM and Eclipse. In *Proc. of Dependable Software for Critical Infrastructures (DSCI)*, volume 192 of *GI Lecture Notes in Informatics*. Gesellschaft für Informatik, 2011.
- 29. T. Bormer, M. Brockschmidt, D. Distefano, G. Ernst, J.-C. Filliâtre, R. Grigore, M. Huisman, V. Klebanov,

C. Marché, R. Monahan, W. Mostowski, N. Polikarpova, C. Scheben, G. Schellhorn, B. Tofan, J. Tschannen, and M. Ulbrich. The COST IC0701 verification competition 2011. In *Proc. of Formal Verification of Object-Oriented Software (FoVeOOS)*, volume 7421 of *LNCS*, pages 3–21. Springer, 2011.

F. Aslam, L. Fennell, C. Schindelhauer, P. Thiemann, G. Ernst, E. Haussmann, S. Rührup, and Z. A. Uzmi. Optimized Java binary and virtual machine for tiny motes. In *Proc. of Distributed Computing in Sensor Systems (DCOSS)*, volume 6131 of *LNCS*, pages 15–30. Springer, 2010.

Book Chapters

• G. Ernst. A Survey of Interactive and Automated Deductive Program Verification Tools. Book Chapter in *Advances in Software Verification*. To Appear.

Unrefereed/Other

- 1. G. Ernst et al. ARCH-COMP 2022 category report: Falsification with unbounded resources. In *Proc. of Applied Verification of Continuous and Hybrid Systems (ARCH)*, volume 90 of *EPiC*, pages 204–221. EasyChair, 2022.
- 2. G. Ernst et al. ARCH-COMP 2021 category report: Falsification with validation of results. In *Proc.* of *Applied Verification of Continuous and Hybrid Systems (ARCH)*, volume 80 of *EPiC*, pages 133–152. EasyChair, 2021.
- 3. G. Ernst et al. ARCH-COMP 2020 category report: Falsification. In *Proc. of Applied Verification of Continuous and Hybrid Systems (ARCH)*, volume 74 of *EPiC*, pages 140–152. EasyChair, 2020.
- 4. G. Ernst and L. Rieger. Information Flow Testing of a PGP Keyserver. In *Proc. of the VerifyThis Longterm Challenge 2020*, pages 11–13. KIT Library, 2020. Technical Report.
- 5. G. Ernst, T. Murray, and M. Tiwari. Verifying the Security of a PGP Keyserver. In *Proc. of the VerifyThis Long-term Challenge 2020*, pages 14–16. KIT Library, 2020. Technical Report.
- G. Ernst, P. Arcaini, A. Donze, G. Fainekos, L. Mathesen, G. Pedrielli, S. Yaghoubi, Y. Yamagata, and Z. Zhang. ARCH-COMP19 Category Report: Results on the Falsification Benchmarks. In Proc. of Applied Verification of Continuous and Hybrid Systems (ARCH), volume 61 of EPiC, pages 129–140. EasyChair, 2019.
- A. Dokhanchi, S. Yaghoubi, B. Hoxha, G. Fainekos, G. Ernst, Z. Zhang, P. Arcaini, I. Hasuo, and S. Sedwards. ARCH-COMP18 Category Report: Results on the Falsification Benchmarks. In *Proc. of Applied Verification of Continuous and Hybrid Systems (ARCH)*, volume 54 of *EPiC*, pages 104–109. EasyChair, 2018.
- 8. M. Huisman, R. Monahan, P. Müller, A. Paskevich, and G. Ernst. VerifyThis 2018: A Program Verification Competition. Technical Report hal-01981937, Université Paris-Saclay, 2018.
- 9. Z. Zhang, G. Ernst, I. Hasuo, and S. Sedwards. Time-staging Enhancement of Hybrid System Falsification (Abstract). In *Proc. of Monitoring and Testing of Cyber-Physical Systems (MT-CPS)*. IEEE, 2018.
- 10. A. Issa, T. Murray, and G. Ernst. In Search of Perfect Users: Towards Understanding the Usability of Converged Multi-Level Secure User Interfaces. In *Proc. of Computer Human Interaction Australia (OzCHI)*, pages 572–576. ACM, 2018. Work in Progress Report.
- 11. Y. Bao, G. T. Leavens, and G. Ernst. Translating separation logic into dynamic frames using fine-grained region logic. Technical Report CS-TR-13-02a, University of Central Florida, 2014.
- 12. J. Pfähler, G. Ernst, G. Schellhorn, D. Haneberg, and W. Reif. Crash-safe refinement for a verified Flash file system. Technical Report 2014-02, University of Augsburg, 2014.
- 13. G. Ernst and A. Habermaier. Garantiert fehlerfrei! Mechatroniknews, Februar 2013.
- 14. F. Aslam, C. Schindelhauer, G. Ernst, D. Spyra, J. Meyer, and M. Zalloom. Introducing TakaTuka: a Java Virtual Machine for motes. In *Proc. of the Embedded Network Sensor Systems (SENSYS)*, pages 399–400. ACM, 2008. Poster Abstract.

INVITED TALKS

1. G. Ernst. Automating software verification with respect to strong specifications. Verimag Seminar,

Grenoble, France, 2023.

- 2. G. Ernst. Calculating Equational Laws over ADTs. Seminar on Abstract Interpretation, Schloss Dagstuhl, Germany, 2023. Joint work in progress with G. Fedyukovich and R. Sögtrop.
- 3. G. Ernst. Contracts for Loops. Seminar on Principles of Contract Languages, Schloss Dagstuhl, Germany, 2022.
- 4. G. Ernst. Verification of Loops with Invariants and Summaries. Security Research Seminar, University of Exeter, 2022.
- 5. G. Ernst. Verification of Loops with Invariants and Summaries. CPAchecker Workshop, 2020.
- 6. G. Ernst. VerifyThis tasks in the SV-COMP benchmarks. CPAchecker Workshop, Frauenchiemsee, Germany, 2019.
- 7. G. Ernst. SecCSL: Security Concurrent Separation Logic. Alpine Verification Meeting (AVM), Brno, Czech Republic, 2019.
- 8. G. Ernst. Curious Computation Models. CONNECTIONS Computer Art Workshop by fuzzybinaires, Kreativquartier Munich, Germany, 2019.
- 9. G. Ernst. SecCSL: Security Concurrent Separation Logic. Ringvorlesung of the Software Engineering Graduate Program, Augsburg University, Germany, 2019.
- 10. G. Ernst. Applications of type theory for software verification. TYPES workshop, Munich, Germany, 2019.
- 11. G. Ernst. Hybrid System Falsification by Optimization and Tree Search. Generative Software Development Lab, University of Waterloo, Canada, 2018.
- 12. G. Ernst. Insights and Future Directions from the Verification of a Flash File System. LMU Munich, Germany, 2018.
- 13. G. Ernst. Flashix: A verified, crash-tolerant flash file system. ERATO project colloquium, National Institute of Informatics, Tokyo, Japan, 2017.
- 14. G. Ernst. On modular verification and substitution. Oberseminar Theoretical Computer Science group, LMU Munich, Germany, 2016.
- 15. G. Schellhorn and G. Ernst. KIV–A Mini Tutorial. Seminar on Evaluating Software Verification Systems: Benchmarks and Competitions, Schloss Dagstuhl, Germany, 2014.
- 16. G. Ernst. Solving the VSTTE'12 competition with KIV. COST IC0701 WG meeting, Darmstadt, Germany, 2012.
- 17. G. Ernst. The KIV Tool. Verified Software: Theories, Tools, Experiments (VSTTE), Philadelphia, PA, USA, 2012. Prize talk for winning a gold medal at the 2nd VSCOMP.
- 18. G. Ernst. Verification of B⁺ Trees: An Experiment Combining Shape Analysis and Interactive Theorem Proving. COST IC0701 WG meeting, Aalborg, Denmark, 2011.

Events attended

- Lorentz Seminar on Contract Languages, Leiden, The Netherlands, 2024.
- Dagstuhl Seminar on Abstract Interpretation, Germany, 2023.
- Dagstuhl Seminar on Principles of Contract Languages, Germany, 2022.
- Alpine Verification Meeting (AVM), Frauenchiemsee, Germany, 2019 (organizer).
- CPAchecker workshop, virtual, 2020, 2021.
- CPAchecker workshop, Frauenchiemsee, Germany, 2019.
- Alpine Verification Meeting (AVM), Brno, Czech Republic, 2019.
- CONNECTIONS Computer Art Workshop, Munich, Germany, 2019.
- Summer School on Information Security and Protection (ISSISP), Canberra, Australia, 2018.
- Shonan Seminar on Model-Based Design for Smart Products and Systems: Advanced Capabilities and Challenging Applications, Japan, 2017.
- Django Girls Workshop (as Coach), Munich, Germany, 2015.
- Dagstuhl Seminar on Evaluating Software Verification Systems, Germany, 2014.
- Summer School on Formal Techniques (SSFT), Menlo Park, USA, 2013.

• COST IC0701 WG meetings: Darmstadt, Germany (2012), Aalborg, Denmark (2011), Turin, Italy (2011).

Software Verification Events and Competitions

- VerifyThis @ ETAPS, 2021–2024. Tools: SECC, Dafny, Isabelle.
- SV-COMP @ ETAPS, 2021–2024 Tool: Korn.
- VerifyThis Long-term Challenge Series (since 2019, co-organizer).
- VerifyThis @ ETAPS, Thessaloniki, Greece, 2018 (co-organizer).
- VerifyThis @ ETAPS, Eindhoven, Netherlands, 2016.
- VerifyThis @ ETAPS, London, UK, 2015 (best student team).
- 4th VSCOMP 2014.
- Verify This @ FM, Paris, France, 2012 (best student team).
- 2nd VSCOMP 2011 (gold medal).
- VerifyThis @ FoVeOOS, Turin, Italy, 2011.

Testing Competitions

- Test-Comp, 2022 and 2023 @ FASE. Tool: Legion/SymCC.
- Test-Comp, 2021 @ FASE. Tools: Legion, CMA-ES Fuzz.
- Test-Comp, 2020 @ FASE. Tool: Legion.

Hybrid Systems Falsification Competitions

• ARCH-COMP 2018–2023 (Group Leader, 2019–2022). Tool: FalStar.

TEACHING

Qualifications

- PROFiL seminar: digital time- and self-management (Dr. Daniel Kunzelmann), 2022.
- PROFiL seminar: supervision of student theses (Dzifa Vode, M.A.), 2022.
- PROFiL seminar: teaching methods (Dr. Andreas Hendrich), LMU München, 2019.
- CIS teaching development (Dr. Antonette Mendoza), University of Melbourne, 2018.

LMU Munich

- MSc lecture: Methods in Software Engineering (english, since 2021)
- BSc lecture: Formal Specification and Verification (since 2019)
- BSc lecture: Introduction to Programming and Software Engineering (minor subject, 2019–2022)
- BSc lecture: Software Engineering (2019)
- BSc seminars: Software Quality Assurance (2021,2024), Verification of Programs with Arrays and Loops (2023), Formal Methods for Cyber-physical Systems (2022–), Program synthesis (2022).
- MSc seminars: Software Quality Assurance (2020, 2021), Deductive Verification (2019, 2020), Fuzz Testing (2019)

University of Augsburg

- MSc lab course: Formal Methods in Software Engineering (2010–2016)
- MSc seminar: System Modelling and Verification (2010-2014)
- BSc seminar: Software & Systems Engineering (2015)
- BSc seminar: Innovative Concepts of Modern Software Engineering (2010–2013)

Supervision

- PhD: Dongge Liu (with Toby Murray, Ben Rubinstein, Thuan Pham, 2018-2022),
- PhD external reviewer: Henrich Lauko (2024), Stefan Bodenmüller (2022).
- Master-/Diploma completed theses: E. Lempa (2024), M. Doods (2024), D. Albert (official supervisor: Alexander Knapp, 2023), D. Spormann (2022), K. Moser (2022), M. Ammann (primary supervisor: A. Knapp, 2021), L. Hoffmann (2021), J. Blau (2021), T. Gaida (2021), S. Bodenmüller (2016), B. Stoll (2013),

M. Pini (2013), T. S. Do (2012).

- Bachelor completed theses: T. Engin (2024), M. Kliemke (2024), R. Sögtrop (2023), B. Beuttel (2023), L. Ederer (2023), L. Schröder (2022), A. Weiß (2022), M. Doods (2021), M. Funk (2021), L. Rieger (2021), H. Kim (2020), G. Alexandru (2019), L. Schmidt (2016), S. Fritsch (2015), A. Vogelsgsang (2015), S. Bodenmüller (2014), K. Weber (2014), D. Halke (2014), M. Knebel (2013).
- Lab Projects: D. Baier (2021), B. Pöttinger (2019), J. Blau (2019), J. Ertel (2016), A. Sabitzer (2014), S. Edenhofer (2013), J. Tretter (2013).

ACADEMIC ENGAGEMENT

- Adaption of the introductory lecture of the secondary subject "informatics" from Java to Python, LMU Munich (2022)
- Robotics lab course, open days, LMU Munich (2020, cancelled)
- Host of Public Climate School lecture, with Students for Future Munich (2019)
- Representation of the Software-Engineering Elite Graduate Program at the annual VHK career forum, Garching (2011–2014)
- Contribution to the Curriculum of the new bachelor program Computer science Engineering at the University of Augsburg (first cohort: 2013)
- Contribution to the planning of the new MRM building at University of Augsburg