

Stefan Winter

Curriculum Vitæ

Research Interests

Construction and assessment challenges for complex software-intensive systems with a focus on

- testing approaches
- execution determinism

Education

- 01/06/2009 **Dr.-Ing. (PhD equiv.) in computer science,**
- 07/05/2015 *Technische Universität Darmstadt, Darmstadt/Germany, Grade: summa cum laude.*
- 01/10/2001 **Diplom (MSc equiv.) in computer science,**
- 30/04/2009 *Technische Universität Darmstadt, Darmstadt/Germany.*
- 01/10/2006 **Semester abroad,**
- 28/02/2007 *Tōhoku University, Sendai, Japan.*

Experience

Current and Previous Academic Positions

- 29/08/2019 **Visiting scholar,** UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN.
- 26/11/2019
 - Research on flaky tests with the group of Prof. Darko Marinov (ISSRE'20, OOPSLA'20)
 - Research on timing error propagation with the group of Prof. Ravishankar K. Iyer
- 08/05/2015 **Postdoctoral research fellow, lecturer,** TU DARMSTADT.
 - Present
 - Analyzing test inter-dependencies on shared resources (ICSE'15, PRDC'18, ISSTA'19)
 - Representative faults for fault injections and mutation testing (ISSTA'14, ISSRE'19, TSE'20)
 - Error propagation analysis for multi-threaded programs (ICST'17, DSN'20)
- 01/06/2009 **Research assistant, lecturer,** TU DARMSTADT.
- 07/05/2015
 - Fault injection for AUTOSAR safety mechanism validation (DSN'12, ISORC'15, EDCC'15)
 - Fault models for OS robustness testing (ICSE'11, DSN'13, ICSE'15)

Awards and Grants

- 2020 **ACM SIGSOFT Distinguished Paper Award,** “Community Expectations for Research Artifacts and Evaluation Processes”, FSE 2020.
- 2018 – 2019 **Research funding “Safe Artificial Intelligence Based Controllers for Life and Mission Critical Applications”,**
Hitachi Research, 20 K €.

- 2018 – 2019 **Research funding “Detecting and Analyzing Error Propagation in Multi-threaded Software”**,
DAAD funding “Projektbezogener Personenaustausch mit Kanada”, 12 K €.
- 2017 – 2020 **Research funding “Security at Large – Assessment”**,
Project within the BMBF/LOEWE Center for Research in Security and Privacy (CRISP), 1 PhD position.
- 2017 – 2018 **Research funding “Testing Control Cyber-Physical Systems Software: A Symbolic Execution Approach that Exploits Physical Subsystem Features”**,
DAAD funding “Projektbezogener Personenaustausch mit Hongkong”, 11 K €.
- 2015 – 2017 **Research funding “ESCUDO-CLOUD”**,
EC Horizon 2020 project, Overall project volume 3.8 M €.
- 2015 – 2018 **“Agile Trust: Enhancing Trust in Evolving Large Scale Software Systems”**,
Project within the BMBF/LOEWE Center for Research in Security and Privacy (CRISP), 1 PhD position.
- 2013 – 2015 **Research funding “Formal Verification of Safety-Critical Cyber-Physical Systems”**,
Hitachi Research, 20 K €.
- 2013 – 2014 **Research funding “Profiling Faults in Cyber-Physical Systems for Dependability Assurance from a Hybrid Modeling Perspective”**,
DAAD funding “Projektbezogener Personenaustausch mit Hongkong”, 8 K €.
- 2012 – 2014 **Research funding “Assessing and Validating AUTOSAR Safety Mechanisms”**,
General Motors, 2 PhD positions.

Selected Peer Reviewed Publications

More than 30 peer reviewed publications in top tier conferences and journals

My full list of peer-reviewed publications can be retrieved via

- my web site: <https://www.stefan-winter.net/publications/>
- my Google Scholar profile: <https://scholar.google.de/citations?user=pUxbBG4AAAAJ>
- B. Hermann, S. Winter, and J. Siegmund. “Community Expectations for Research Artifacts and Evaluation Processes”. In: *Proceedings of the 28th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*. ESEC/FSE 2020. Virtual Event, USA: Association for Computing Machinery, 2020, pp. 469–480. ISBN: 9781450370431. DOI: 10.1145/3368089.3409767. URL: <https://doi.org/10.1145/3368089.3409767> **ACM SIGSOFT Distinguished Paper**
- W. Lam, S. Winter, A. Wei, T. Xie, D. Marinov, and J. Bell. “A Large-Scale Longitudinal Study of Flaky Tests”. In: *Proc. ACM Program. Lang.* 4.OOPSLA (Nov. 2020). DOI: 10.1145/3428270. URL: <https://doi.org/10.1145/3428270>

- W. Lam, S. Winter, A. Astorga, V. Stodden, and D. Marinov. “Understanding Reproducibility and Characteristics of Flaky Tests Through Test Reruns in Java Projects”. In: *2020 IEEE 31st International Symposium on Software Reliability Engineering (ISSRE)*. 2020, pp. 403–413. DOI: 10.1109/ISSRE5003.2020.00045
- H. Saissi, S. Winter, O. Schwahn, K. Pattabiraman, and N. Suri. “TraceSanitizer - Eliminating the Effects of Non-Determinism on Error Propagation Analysis”. In: *2020 50th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)*. 2020, pp. 52–63
- R. Natella, S. Winter, D. Cotroneo, and N. Suri. “Analyzing the Effects of Bugs on Software Interfaces”. In: *IEEE Transactions on Software Engineering* 46.3 (Mar. 2020), pp. 280–301. ISSN: 2326-3881. DOI: 10.1109/TSE.2018.2850755
- Y. Chen, S. Winter, and N. Suri. “Inferring Performance Bug Patterns from Developer Commits”. In: *2019 IEEE 30th International Symposium on Software Reliability Engineering (ISSRE)*. Oct. 2019, pp. 70–81. DOI: 10.1109/ISSRE.2019.00017
- O. Schwahn, N. Coppik, S. Winter, and N. Suri. “Assessing the State and Improving the Art of Parallel Testing for C”. in: *Proceedings of the 28th ACM SIGSOFT International Symposium on Software Testing and Analysis. ISSTA 2019*. Beijing, China: ACM, 2019, pp. 123–133. DOI: 10.1145/3293882.3330573
- O. Schwahn, N. Coppik, S. Winter, and N. Suri. “FastFI: Accelerating Software Fault Injections”. In: *2018 IEEE 23rd Pacific Rim International Symposium on Dependable Computing (PRDC)*. Dec. 2018, pp. 193–202. DOI: 10.1109/PRDC.2018.00035
- O. Schwahn, S. Winter, N. Coppik, and N. Suri. “How to Fillet a Penguin: Runtime Data Driven Partitioning of Linux Code”. In: *IEEE Transactions on Dependable and Secure Computing* 15.6 (Nov. 2018), pp. 945–958. ISSN: 1545-5971. DOI: 10.1109/TDSC.2017.2745574
- N. Coppik, O. Schwahn, S. Winter, and N. Suri. “TrEKer: Tracing Error Propagation in Operating System Kernels”. In: *Proceedings of the 32nd IEEE/ACM International Conference on Automated Software Engineering, ASE 2017*. 2017
- A. Chan, S. Winter, H. Saissi, K. Pattabiraman, and N. Suri. “IPA: Error Propagation Analysis of Multi-Threaded Programs Using Likely Invariants”. In: *2017 IEEE International Conference on Software Testing, Verification and Validation (ICST)*. 2017, pp. 184–195
- T. Piper, S. Winter, N. Suri, and T. E. Fuhrman. “On the Effective Use of Fault Injection for the Assessment of AUTOSAR Safety Mechanisms”. In: *Proceedings of the European Dependable Computing Conference (EDCC)*. 2015
- G. Pellegrino, D. Balzarotti, S. Winter, and N. Suri. “In the Compression Hornet’s Nest: A Security Study of Data Compression in Network Services”. In: *24th USENIX Security Symposium (USENIX Security 15)*. USENIX Association, 2015, pp. 801–816
- S. Winter, T. Piper, O. Schwahn, R. Natella, N. Suri, and D. Cotroneo. “GRINDER: On Reusability of Fault Injection Tools”. In: *Proceedings of the 10th International Workshop on Automation of Software Test. AST ’15*. 2015, pp. 75–79

- S. Winter, O. Schwahn, R. Natella, N. Suri, and D. Cotroneo. “No PAIN, No Gain? The Utility of PARallel Fault INjections”. In: *Software Engineering (ICSE), 2015 IEEE/ACM 37th IEEE International Conference on*. 2015, pp. 494–505
- T. Piper, S. Winter, O. Schwahn, S. Bidarahalli, and N. Suri. “Mitigating Timing Error Propagation in Mixed-Criticality Automotive Systems”. In: *Real-Time Distributed Computing (ISORC), 2015 IEEE 18th International Symposium on*. 2015, pp. 102–109
- A. Lanzaro, R. Natella, S. Winter, D. Cotroneo, and N. Suri. “An Empirical Study of Injected Versus Actual Interface Errors”. In: *Proceedings of the 2014 International Symposium on Software Testing and Analysis*. ISSTA 2014. 2014, pp. 397–408
- S. Winter, M. Tretter, B. Sattler, and N. Suri. “simFI: From single to simultaneous software fault injections”. In: *Dependable Systems and Networks (DSN), 2013 43rd Annual IEEE/IFIP International Conference on*. 2013, pp. 1–12
- T. Piper, S. Winter, P. Manns, and N. Suri. “Instrumenting AUTOSAR for dependability assessment: A guidance framework”. In: *Dependable Systems and Networks (DSN), 2012 42nd Annual IEEE/IFIP International Conference on*. 2012, pp. 1–12
- S. Winter, C. Sarbu, N. Suri, and B. Murphy. “The impact of fault models on software robustness evaluations”. In: *Software Engineering (ICSE), 2011 33rd International Conference on*. 2011, pp. 51–60

Patents

- T. Ishigooka, F. Narisawa, K. Sakurai, N. Suri, H. Saissi, T. Piper, and S. Winter. *Method and system for testing control software of a controlled system*. US Patent 9,575,877. Feb. 2017

Talks and Presentations

Talks and presentations in this section do not include conference and workshop presentations for published articles

- 2019 “Detecting and Characterizing Error Propagation Across Software Components”, invited talk at the DEPEND research group, University of Illinois, Urbana-Champaign
- 2019 “Detecting and Characterizing Error Propagation Across Software Components”, invited talk at the CS dept.’s software engineering seminar, University of Illinois, Urbana-Champaign
- 2019 “Fault Injection – A Gentle Introduction”, invited talk at the University of Luxembourg
- 2018 “Detecting and characterizing bug migration across software components”, invited talk at the University of British Columbia, Vancouver
- 2016 “No PAIN, No Gain? The Utility of PARallel Fault INjections”, Software Engineering & Management, Vienna
- 2015 “Error models for the representative injection of software defects”, Software Engineering & Management, Dresden

Research Mentoring

Three co-advised PhD students, 35 supervised Master's and Bachelor's theses; degrees and collaborations with industry partners indicated in brackets

- Ongoing Yiqun Chen (PhD)
- 2020 Nicolas Coppik (PhD), Karthikeyan Srinivasan (MSc), Prashanth Kumar (MSc)
- 2019 Oliver Schwahn (PhD), Meghana Shanti Pamula (MSc), Shujie Zhao (MSc), Sebastian Roland (MSc), Luca Gladiator (BSc), Lukas Rothenberger (BSc), Timo Freitag (BSc)
- 2018 Kevin Kelpen (MSc, ERNW GmbH)
- 2017 Sumit Sati (MSc, NEC Europe), Yiqun Chen (MSc), Sujay Gopalakrishna (MSc, Bosch), Dinesh Kandavel (MSc, IBM), Mahdi Enan (BSc, usd AG), Alexander Hirsch (BSc)
- 2016 Soha Alboghdady (MSc), Arun Tawatia (MSc)
- 2014 Manuel Benz (BSc)
- 2013 Oliver Schwahn (MSc), Jannik Kappes (MSc), Michael Tretter (MSc), Martin Tsarev (MSc), Magnus Brand (BSc), Jan Andresen (BSc), Holger Rother (BSc), Ralf Almon (BSc)
- 2012 Gregor Wicklein (BSc), Nicolas Coppik (BSc), Olga Koziol (BSc), Julio Missao (BSc), Robert Reinecke (BSc)
- 2011 Michael Tretter (BSc), Benjamin Sattler (BSc), Fabian Vogt (BSc)
- 2010 Martin Tsarev (BSc)

Teaching Experience

More than 10 years of teaching experience with different types of courses and up to 600 participants

- HAW
Landshut
2020
- Software Engineering I (~100 participants, teaching assignment)
- TU
Darmstadt
since 2009
- Betriebssysteme/Operating Systems (annual, ~600/250 participants)
 - Reliable Software and Operating Systems (annual, 100–200 participants)
 - Seminars (Program Analysis and Software Test, Implementing Secure and Reliable Software, Building and Breaking Operating Systems) (biannual, 5–10 participants)

Service to Professional Community

- PC Member
- ISSRE since 2018
 - ISSTA Artifact Evaluation Committee 2016, 2018
 - WoSoCer workshop since 2014
 - SEPS workshop 2016–2018
- Reviewer
- Several journals, including IEEE TDSC, IEEE TPDS, and ACM TOSEM

- Co-Reviewer
- o EuroSys 2017, 2020
 - o ICSE 2016
 - o DSN 2010–2012, 2014–2020

Professional Memberships and Affiliations

- 2011 ACM member
- Present
- o SIGSOFT member
 - o SIGOPS member
- 2004 GI member (Gesellschaft für Informatik, German computer science association)
- Present
- o SIG Software Testing, Analysis, and Verification
 - o SIG Operating Systems
 - o SIG Fault-tolerant Systems

References

Darko Marinov

Department of Computer Science
University of Illinois at Urbana-
Champaign
4233 Siebel Center, 201 N. Goodwin
Ave.
Urbana, IL 61801, USA
✉ marinov@illinois.edu

Neeraj Suri

Faculty of Science and Technology –
Computing and Communications
Lancaster University
InfoLab21
LA1 4WA Lancaster, UK
✉ neeraj.suri@lancaster.ac.uk

Karthik Pattabiraman

Electrical and Computer Engineering
University of British Columbia
Rm. 4048, Fred Kaiser Building
2332 Main Mall, Vancouver, BC
V6T1Z4, Canada
✉ karthikp@ece.ubc.ca

Domenico Cotroneo

Dipartimento di Ingegneria elettrica e
delle Tecnologie dell'Informazione
Universita' degli Studi di Napoli
Federico II
Via Claudio 21
80125 Naples, Italy
✉ cotroneo@unina.it