Dr. Martin Schäf

Contact Information

Amazon Web Services
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Professional Employment

Amazon Web Services, New Yrok, NY, USA.
Senior Applied Scientist. Since March 2017

SRI International, Menlo Park, CA, USA.
Senior Computer Scientist. October 2016 to February 2017.
Computer Scientist. January 2014 to September 2016.
International fellow. March 2013 to September 2013.

Laxino Ltd., Macau, China.
Consultant from December 2012 to September 2015.

CEA List, Paris, France.
Visiting researcher from November 2013 to December 2013.

United Nations University, Macau, China.
Post-doctoral research fellow from July 2010 to October 2013.

Microsoft Research, Redmond, WA.
Consulting researcher from June 2009 to July 2009.

Albert-Ludwigs Universität, Freiburg i. Br., Germany.
PhD student from April 2006 to June 2010.

Education

2006–2011 **University of Freiburg**, Freiburg, Germany
Ph.D. in Computer Science
Thesis: Static Detection of Inevitable Errors
Adviser: Prof. Andreas Podelski

2002–2006 **Saarland University**, Saarbrücken, Germany
M.Sc. Honor's Degree in Computer Science, April 2006
Thesis: Transition relations as a means of proving program properties
Adviser: Prof. Andreas Podelski

Conference Publications

1. **Verifying Object Construction**.
   Martin Kellogg, Manli Ran, Manu Sridharan, Martin Schäf, Michael D. Ernst in *42nd International Conference on Software Engineering (ICSE)*, Seoul, South Korea
2. **JayHorn: A Java Model Checker - (Competition Contribution)**.
   Temesghen Kahsai, Philipp Rümmer, and Martin Schäf in *International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Prague, Czech Republic
3. **Quantified Heap Invariants for Object-Oriented Programs**.
   Temesghen Kahsai, Rody Kersten, Philipp Rümmer, and Martin Schäf in *21st International Conferences on Logic for Programming, Artificial Intelligence and Reasoning (LPAR)*, Maun, Botswana, March 2017
4. **Abduction by Non-Experts**.
   Nikolaj Bjørner, Dejan Jovanović, Tancrède Lepoint, Philipp Rümmer, and Martin Schäf in *21st International Conferences on Logic for Programming, Artificial Intelligence and Reasoning (LPAR)*, Maun, Botswana, March 2017
5. **Resource Contracts for Java**.
   Temesghen Kahsai, Rody Kersten, and Martin Schäf in *Java PathFinder Workshop*, Seattle, WA, November 2016
6. **JayHorn: A Framework for Verifying Java programs**.
   Temesghen Kahsai, Huascar Sanchez, Philipp Rümmer, and Martin Schäf in *28th International Conference on Computer Aided Verification (CAV)*, Toronto, Canada, July 2016
7. **Classifying Bugs with Interpolants**.
   Andreas Podelski, Martin Schäf, and Thomas Wies in *10th International Conference on Tests and Proofs (TAP)*, Vienna, Austria, July 2016
8. **Multistaging to Understand: Distilling the Essence of Java Code Examples**.
   Huascar Sanchez, E. James Whitehead, and Martin Schäf in *24th IEEE International Conference on Program Comprehension (ICPC)*, Austin, TX, May 2016
9. **Detecting Similar Programs via the Weisfeiler-Leman Graph Kernel**.
   Wenchao Li, Hassen Saidi, Huascar Sanchez, Martin Schäf, and Pascal Schweitzer in *15th International Conference on Software Reuse (ICSR)*, Limassol, Cyprus, June 2016
10. **Crowd-Sourcing Program Preconditions via a Classification Game**.
    Daniel Fava, Dan Shapiro, Joseph Osborn, Martin Schäf, and E. James Whitehead in *38th International Conference on Software Engineering (ICSE)*, Austin, TX, May 2016
11. **Finding Inconsistencies in Programs with Loops**. Temesghen Kahsai, Jorge A. Navas, Dejan Jovanović, and Martin Schäf in *20th International Conferences on Logic for Programming, Artificial Intelligence and Reasoning (LPAR)*, Suva, Fiji, November 2015
12. **Gamifying Program Analysis**. Daniel Fava, Julien Signoles, Matthieu Lemerre, Martin Schäf, and Ashish Tiwari in *20th International Conferences on Logic for Programming, Artificial Intelligence and Reasoning (LPAR)*, Suva, Fiji, November 2015
13. **Severity Levels of Inconsistent Code**. Martin Schäf, and Ahsish Tiwari in *13th International Symposium on Automated Technology for Verification and Analysis (ATVA)*, Shanghai, PRC, October 2015

14. **Non-Monotonic Program Analysis**. Daniel Schwartz-Narbonne, Chanseok, Martin Schäf, Philipp Rümmer, Ahsish Tiwari, and Thomas Wies in *Workshop on Horn Clauses for Verification and Synthesis (HCVS)*, San Francisco, USA, July 2015
15. **Bixie: Finding and Understanding Inconsistent Code**. Tim McCarthy, Philipp Rümmer, Martin Schäf in *37th International Conference on Software Engineering (ICSE), Demonstration*, Florence, Italy, May 2015
16. **VERMEER: A Tool for Tracing and Explaining Faulty C Programs**. Daniel Schwartz-Narbonne, Chanseok Oh, Martin Schäf, and Thomas Wies in *37th International Conference on Software Engineering (ICSE), Demonstration*, Florence, Italy, May 2015
17. **Conflict-Directed Graph Coverage**. Daniel Schwartz-Narbonne, Martin Schäf, Dejan Jovanović, Philipp Rümmer, and Thomas Wies in *7th Nasa Formal Methods Symposium (NFM)*, Pasadena, CA, USA, April 2015
18. **Concolic Fault Abstraction**. Chanseok Oh, Martin Schäf, Daniel Schwartz-Narbonne, and Thomas Wies in *4th IEEE International Working Conference on Software Code Analysis and Manipulation (SCAM)*, Victoria, Canada, September 2014
19. **Quantification of Verification Progress**. Stephan Arlt, John Murray, and Martin Schäf in *2nd Verisure Workshop*, Vienna, Austria, July 2014
20. **Chekofv: Crowd-sourced Formal Verification**. Heather Logas, Florent Kirchner, John Murray, Martin Schäf, and Jim Whitehead in *2nd Workshop on Fun With Formal Methods (FWFM)*, Vienna, Austria, July 2014
21. **The Gradual Verifier**. Stephan Arlt, Cindy Rubio-González, Philipp Rümmer, Martin Schäf, and Natarajan Shankar in *6th Nasa Formal Methods Symposium (NFM)*, Houston, TX, USA, April 2014
22. **Reconstructing Paths for Reachable Code**. Stephan Arlt and Martin Schäf in *15th International Conference on Formal Engineering Methods (ICFEM)*, Queenstown, New Zealand, October 2013
23. **A Theory for Control-Flow Graph Exploration**. Stephan Arlt, Philipp Rümmer, and Martin Schäf in *11th International Symposium on Automated Technology for Verification and Analysis (ATVA)*, Hanoi, Vietnam, October 2013
24. **Explaining Inconsistent Code**. Martin Schäf, Daniel Schwartz-Narbonne, and Thomas Wies in *21st ACM SIGSOFT symposium and the 14th European conference on Foundations of software engineering (ESEC/FSE)*, Saint Petersburg, Russia, August 2013
25. **Joogie: From Java through Jimple to Boogie**. Stephan Arlt, Philipp Rümmer, and Martin Schäf in *ACM SIGPLAN International Workshop on State of the Art in Java Program analysis (SOAP)*, Seattle, USA, June 2013
26. **Flow-sensitive Fault Localization**. Jürgen Christ, Evren Ermis, Martin Schäf, and Thomas Wies in *14th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, Rome, Italy, January 2013
27. **Parameterized GUI Tests**. Stephan Arlt, Pedro Borromeo, Martin Schäf, and Andreas Podelski in *23rd IFIP Int. Conference on Testing Software and Systems (ICTSS)*, Aalborg, Denmark, November 2012
28. **Lightweight Static Analysis for GUI Testing**. Stephan Arlt, Andreas Podelski, Cristiano Bertolini, Martin Schäf, Ishan Banerjee, and Atif Memon in *23rd IEEE International Symposium on Software Reliability Engineering (ISSRE)*, Dallas TX, USA, November 2012

29. **Error Invariants**. Evren Ermis, Martin Schäf, and Thomas Wies in *18th International Symposium on Formal Methods (FM)*, Paris, France, August 2012
30. **Joogie: Infeasible Code Detection for Java**. Stephan Arlt, Martin Schäf in *24th International Conference on Computer Aided Verification (CAV)*, Berkeley CA, USA, July 2012
31. **Infeasible Code Detection**. Cristiano Bertolini, Martin Schäf, and Pascal Schweitzer in *4th Conference on Verified Software: Theories, Tools and Experiments (VSTTE)*, Philadelphia PA, USA January 2012
32. **Towards a Formal Integrated Model of Collaborative Healthcare**. Cristiano Bertolini, Martin Schäf, and Volker Stolz in *1st International Symposium on Foundations of Health Information Engineering and Systems (FHIES)*, Johannesburg, South Africa August 2011
33. **Behind the Scenes: An Approach to Incorporate Context in GUI Test Case Generation**. Stephan Arlt, Cristiano Bertolini, and Martin Schäf in *Testing Techniques & Experimentation Benchmarks for Event-Driven Software (TESTBEDS)*, Berlin, Germany March 2011
34. **AutoPA: Automatic Prototyping from Requirements**. Xiaoshan Li, Zhiming Liu, Martin Schäf, and Ling Yin in *4th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation (ISoLA)*, Heraklion, Greece, September 2010
35. **It's doomed; we can prove it**. Jochen Hoenicke, K. Rustan M. Leino, Andreas Podelski, Martin Schäf, Andreas Podelski In *16th International Symposium on Formal Methods (FM)*, Eindhoven, Netherlands, November 2009

Journal Publications

36. **One-Click Formal Methods**.
John Backes, Pauline Bolignano, Byron Cook, Andrew Gacek, Kasper Luckow, Neha Rungta, Martin Schäf, Cole Schlesinger, Rima Tanash, Carsten Varming, Michael Whalen in *IEEE Software 36*
37. **Doomed Program Points**. Jochen Hoenicke, K. Rustan M. Leino, Andreas Podelski, Martin Schäf, Andreas Podelski in *37th Journal on Formal Methods in System Design* September 2010

Book Chapters

38. **Trends in Model-based GUI Testing**. Stephan Arlt, Cristiano Bertolini, and Martin Schäf in *Advances in Computers*, Volume 86

Research Grants

Served as principle investigator for:

1. **MUSE** Mining and Understanding Software Enclaves. Funded by DARPA with 6,100,000 USD from 2014 to 2017.
2. **JOOGIE** Efficient infeasible code detection. Funded by MSTDF with 1,990,000 MOP (approx 250,000 USD) from 2013 to 2016.
3. **COLAB** Risk Prediction for Small Software Projects. Funded by MSTDF with 378,000 MOP (approx 48,000 USD) from 2012 to 2014.

Teaching Experience

University of Freiburg:

- Lecture: Informatik II (data structures and algorithms), Head Teaching Assistant, Summer Term 2010
- Seminar: Advanced Topics in Video Game Programming, Winter Term 2008/2009
- Development Project: Anwendungsprogrammierung (application development), Winter Term 2008/2009
- Engineering Lab: Softwarepraktikum (software lab), Summer Term 2008
- Seminar: Seminar Advanced Topics in Software Engineering, Winter Term 2007/2008
- Engineering Lab: Softwarepraktikum für Hörer aller Fakultäten (software lab for non-CS students), Winter Term 2007/2008
- Engineering Lab: Softwarepraktikum, Summer Term 2007
- Engineering Lab: Softwarepraktikum für Hörer aller Fakultäten (software lab for non-CS students), Winter Term 2006/2007
- Development Project: Sichere Systeme, Winter Term 2006/2007
- Lecture: Verification, Teaching Assistant, Winter Term 2006/07
- Engineering Lab: Softwarepraktikum (software lab), Summer Term 2006

Supervised Students

1. Quin Jie, Bachelor, *A Prototype of Electronic Medical Record System for a Dialysis Center*, 2012
   Received best dissertation award of the East China Normal University, Shanghai
2. Arend von Reinersdorff, Bachelor *Teaching Software Projects Using Code Review*, 2009
3. Benjamin Bäuerle, Master, *Workflow Improvements Using A Large Scale Game Engine*, 2009
   In collaboration with CryTek GmbH, Frankfurt am Main, Germany
4. Philipp Vath, Bachelor *Visualization of video metadata*, 2008
5. Peter Schmitt, Bachelor, *Teaching Software Projects Using Code Review*, 2007
   Received "Medien Preis" award of the University of Freiburg, Germany

Professional Activities

Program Committee Member

- 9th NASA Formal Methods Symposium, 2017
- 13th International Colloquium on Theoretical Aspects of Computing, 2016
- 28th Symposium on Applied Computing, 2013
- 25th International Conference on Testing Software and Systems, 2013
- 1st International Symposium on Foundations of Health Information Engineering and Systems, 2011

Organization

- General Chair for 7th Working Conference on Verified Software: Theories, Tools, and Experiments San Francisco, California, USA

Refereed for

- International Symposium on Formal Aspects of Component Software (FACS), 2011

- International Symposium on Formal Methods (FM), 2012, 2010
- International Conference on Formal Engineering Methods (ICFEM) 2013, 2012, 2010
- International Colloquium on Theoretical Aspects of Computing (ICTAC), 2012
- International Symposium on Object/component/service-oriented real-time distributed computing (ISORC), 2012
- International Conference on Software Engineering and Formal Methods (SEFM), 2013
- International Workshop on Harnessing Theories for Tool Support in Software (TTSS), 2011
- Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), 2014
- Formal Methods in Computer-Aided Design (FMCAD), 2014
- Haifa Verification Conference (HVC), 2014
- IEEE Transactions on Software Engineering (TSE-2014-11-0315),2014
- 27th International Conference on Computer Aided Verification, 2015