

Sebastian Krings

Curriculum Vitae

Current Positions

Academia

since 04.2018 Postdoc - Competence Centre for Information Security
Niederrhein University of Applied Sciences
Parental leave 12.2018 – 02.2019

Industry

since 04.2018 Network and Information Security Specialist
Lukas Hospital Neuss
Parental leave 12.2018 – 02.2019

since 2006 Freelance work in programming education, training and consulting

Work Experience

08.2017–03.2018 Postdoc - Chair for Programming Languages and Software Engineering
Heinrich-Heine-University Düsseldorf

12.2012–07.2017 Research Fellow
Chair for Programming Languages and Software Engineering

03.2012–08.2012 Research Assistant
Chair for Mathematics and Applied Fields

03.2011–09.2011 Research Assistant
Chair for Mathematics and Applied Fields

08.2010–12.2010 Research Assistant
Chair for Programming Languages and Software Engineering

Academic Education

Ph.D. Computer Science, *magna cum laude*

12.2012–06.2017 Heinrich-Heine-University Düsseldorf
Thesis Towards Infinite-State Symbolic Model Checking for B and Event-B

M.Sc. Computer Science, *excellent (A)*

02.2010–10.2012 an der Heinrich-Heine-University Düsseldorf
Thesis Inference of Physical Units in Formal Models, *very good (B)*

B.Sc. Mathematik, *good (C)*

Schiefbahner Str. 64 – 41352 Korschenbroich

☎ +49 176 20955265 • ✉ sebastian@krin.gs • 🌐 www.krin.gs

- 04.2008–02.2012 an der Heinrich-Heine-University Düsseldorf
Thesis Mathematical Modeling of Wrist Joint Mobility, *very good (B)*
B.Sc. Informatik, *excellent (A)*
- 10.2006–02.2010 an der Heinrich-Heine-University Düsseldorf
Thesis Code Coverage Analysis for Prolog, *very good (B)*

Further Education

- 11.2018 *Applied Data Science with Python*
University of Michigan via Coursera
- 11.2018 *ISMS Auditor/LEAD-Auditor ISO/IEC 27001*
HS Niederrhein
- 03.2018 Specialization Certificate *Professionelle Lehrkompetenz für die Hochschule (Professional teaching competence for universities)*
Netzwerk Hochschuldidaktik NRW
- 06.2017 *Cambridge English: Proficiency*
University of Cambridge via VHS Düsseldorf
- 02.2017 Extended Certificate *Professionelle Lehrkompetenz für die Hochschule (Professional teaching competence for universities)*
Netzwerk Hochschuldidaktik NRW
- 10.2016 Basic Certificate *Professionelle Lehrkompetenz für die Hochschule (Professional teaching competence for universities)*
Netzwerk Hochschuldidaktik NRW

Rewards & Scholarships

- 2015 Best Paper Award for *From Failure to Proof: The ProB Disprover for B and Event-B*, Software Engineering and Formal Methods
- 10.2010–09.2011 NRW Scholarship Program „Chancen Nutzen“
ARAG Insurance

Funding and Industry Projects

Funding

- 2019 DAAD travel grant for attending the 15th International Conference on integrated Formal Methods, Bergen, Norwegen.
- 2018 *GENERATED - GENERation of ReAlistic Artificial TEst Data*. Project in cooperation with Periplus Instruments, internal start-up funding by Niederrhein University of Applied Sciences, 1 year, 15.000€

Project Involvement

- 2019 EFRE Projekt *CPS-Labor MG 4.0* by Niederrhein University of Applied Science
- 2017 Industry project *Virtual Block Function for Hybrid L3* by Thales Berlin and Heinrich-Heine-University

2012–2014 EU FP7-ICT Projekt *ADVANCE - Advanced Design and Verification Environment for Cyber-physical System Engineering*

Academic Services

Reviewing

Journals IEEE Access, Software Tools for Technology Transfer, Theoretical Computer Science

Conferences & Workshops RSSRail 2019, ABZ 2018, FM 2018, RSSRail 2017, LOPSTR 2016, ICLP 2016, IJCAI 2016, RSSRail 2016, SETS 2015, FM 2014

Event Organization

2019 Conference „Information Security Management in Hospitals“ as part of the European Cyber Security Month
Workshop „Ethical Hacking“ as part of the European Cyber Security Month

2018 Conference „Information Security Management in Hospitals“ as part of the European Cyber Security Month
Workshop „Ethical Hacking“ as part of the European Cyber Security Month

Self-Government

2017 Member of the appointments committee *Artificial Intelligence*, University of Düsseldorf

Conferences, Workshops and Schools Attended

2019 35th International Conference on Logic Programming, Las Cruces, USA
Declare 2019 – Conference on Declarative Programming, Cottbus, Germany

2018 26th International Workshop on Functional and Logic Programming (WFLP), Frankfurt, Germany
18th International Workshop on Automated Verification of Critical Systems (AVoCS), Oxford, GB
20th International Symposium on Practical Aspects of Declarative Languages (PADL), Los Angeles, USA
45th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL), Los Angeles, USA
2nd InSite User Group Meeting, Brussels, Belgium

2017 Declare 2017 – Conference on Declarative Programming, Würzburg, Germany

2016 12th International Conference on integrated Formal Methods (iFM), Reykjavik, Iceland
PhD Symposium at iFM'16 on Formal Methods: Algorithms, Tools and Applications, Reykjavik, Iceland

- 5th International Conference on Abstract State Machines, Alloy, B, TLA, VDM and Z (ABZ), Linz, Austria
- 6th Rodin User and Developer Workshop, Linz, Austria
- Leipzig Week of Declarative Programming, Leipzig, Germany
- 2014 1st Workshop on Formal-IDE (F-IDE), Grenoble, France
- 4th International Summer School on SAT/SMT, Semmering, Austria
- 20th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Grenoble, France
- 2013 11th International Conference on Software Engineering and Formal Methods (SEFM), Madrid, Spain
- 4th Rodin User and Developer Workshop, Turku, Finland
- Summer School Marktoberdorf on Software Systems Safety, Marktoberdorf, Germany
- 3rd CHR Summer School, Berlin, Germany

Languages

- German native
- English fluent in written and spoken (CEFR Level C2)

Sebastian Krings

Publications

Book Chapters

- 2014 Michael Leuschel, Jens Bendisposto, Ivaylo Dobrikov, **Sebastian Krings**, and Daniel Plagge. “From Animation to Data Validation: The ProB Constraint Solver 10 Years On”. In: *Formal Methods Applied to Complex Systems: Implementation of the B Method*. Ed. by Jean-Louis Boulanger. Hoboken, NJ: Wiley ISTE, 2014. Chap. 14, pp. 427–446

Journal Articles

- 2019 **Sebastian Krings**, Michael Leuschel, Joshua Schmidt, David Schneider, and Marc Frappier. “Translating Alloy and Extensions to Classical B”. in: *Science of Computer Programming* (2019). Accepted with minor revisions.
- Jessica Petrasch, Jan-Hendrik Oepen, **Sebastian Krings**, and Moritz Gericke. “Writing a Model Checker in 80 Days: Reusable Libraries and Custom Implementation”. In: *Electronic Communications of the EASST* 76 (Apr. 2019)
- 2017 **Sebastian Krings** and Michael Leuschel. “Proof Assisted Bounded and Unbounded Symbolic Model Checking of Software and System Models”. In: *Science of Computer Programming* 158 (Aug. 2017)
- 2015 **Sebastian Krings** and Michael Leuschel. “Inferring Physical Units in Formal Models”. In: *Software & Systems Modeling* 16.1 (Mar. 2015), pp. 25–47

Conference and Workshop Proceedings

- 2019 Philipp Körner, Jens Bendisposto, Jannik Dunkelau, **Sebastian Krings**, and Michael Leuschel. “Embedding High-Level Formal Specifications into Applications”. In: *Proceedings of the 23rd International Symposium on Formal Methods*. LNCS. To appear. Springer, 2019
- Sebastian Krings** and Michael Leuschel. “Embedding SMT-LIB into B for Interactive Proof and Constraint Solving”. In: *Proceedings of the 15th International Conference on Integrated Formal Methods*. Vol. 11918. LNCS. Springer, 2019
- Falco Nogatz, Philipp Körner, and **Sebastian Krings**. “Prolog Coding Guidelines: Status and Tool Support”. In: *Technical Communications of the 35th International Conference on Logic Programming*. Vol. 306. EPTCS. 2019

- Sebastian Krings**, Joshua Schmidt, Patrick Skowronek, Jannik Dunkelau, and Dierk Ehmke. “Towards Constraint Logic Programming over Strings for Test Data Generation”. In: *Proceedings Declare 2019 – Conference on Declarative Programming*. 2019
- Jannik Dunkelau, **Sebastian Krings**, and Joshua Schmidt. “Automatic Backend Selection for ProB Using Deep Learning”. In: *Proceedings of the 11th Annual NASA Formal Methods Symposium*. Vol. 11460. LNCS. Springer, 2019
- Sebastian Krings**, Philipp Körner, and Joshua Schmidt. “Experience Report on An Inquiry-Based Course on Model Checking”. In: *Tagungsband des 16. Workshops zu Software Engineering im Unterricht der Hochschulen*. Vol. 2358. CEUR. 2019
- Sebastian Krings** and Philipp Köerner. “Prototyping Games using Formal Methods”. In: *Proceedings of the 1st International Workshop on Formal Methods - Fun for Everybody*. 2019
- 2018 Alexandros Efreimidis, Joshua Schmidt, **Sebastian Krings**, and Philipp Körner. “Measuring Coverage of Prolog Programs Using Mutation Testing”. In: *Proceedings of the 26th International Workshop on Functional and Logic Programming*. Vol. 11285. LNCS. Springer, 2018
- Joshua Schmidt, **Sebastian Krings**, and Michael Leuschel. “Repair and Generation of Formal Models Using Synthesis”. In: *Proceedings of the 14th International Conference on Integrated Formal Methods*. Vol. 11023. LNCS. Springer, 2018
- Sebastian Krings**, Joshua Schmidt, Carola Brings, Marc Frappier, and Michael Leuschel. “A Translation from Alloy to B”. in: *Proceedings of the 6th International Conference on Abstract State Machines, Alloy, B, TLA, VDM, and Z*. vol. 10817. LNCS. Springer, 2018
- Dominik Hansen, Michael Leuschel, David Schneider, **Sebastian Krings**, Philipp Körner, Thomas Naulin, Nader Nayeri, and Frank Skowron. “Using a Formal B Model at Runtime in a Demonstration of the ETCS Hybrid Level 3 Concept with Real Trains”. In: *Proceedings of the 6th International Conference on Abstract State Machines, Alloy, B, TLA, VDM, and Z*. vol. 10817. LNCS. Springer, 2018
- Stefan Hallerstede, Miran Hasanagic, **Sebastian Krings**, Peter Gorm Larsen, and Michael Leuschel. “From Software Specifications to Constraint Programming”. In: *Proceedings of the 16th International Conference on Software Engineering and Formal Methods*. Vol. 10886. LNCS. Springer, 2018
- Sebastian Krings**, Michael Leuschel, Philipp Körner, Stefan Hallerstede, and Miran Hasanagic. “Three is a crowd: SAT, SMT and CLP on a chessboard”. In: *Proceedings of the 20th International Symposium on Practical Aspects of Declarative Languages*. Vol. 10702. LNCS. Springer, 2018

- 2017 **Sebastian Krings** and Philipp Körner. “plspec – A Specification Language for Prolog Data”. In: *Proceedings Declare 2017 – Conference on Declarative Programming*. Vol. 10997. LNCS. Springer, 2018
- 2016 **Sebastian Krings** and Michael Leuschel. “SMT Solvers for Validation of B and Event-B models”. In: *Proceedings of the 12th International Conference on Integrated Formal Methods*. Vol. 9681. LNCS. Springer, 2016
- Sebastian Krings** and Michael Leuschel. “Proof Assisted Symbolic Model Checking for B and Event-B”. in: *Proceedings of the 5th International Conference on Abstract State Machines, Alloy, B, TLA, VDM, and Z*. vol. 9675. LNCS. Springer, 2016
- Joshua Schmidt, **Sebastian Krings**, and Michael Leuschel. “Interactive Model Repair by Synthesis”. In: *Proceedings of the 5th International Conference on Abstract State Machines, Alloy, B, TLA, VDM, and Z*. vol. 9675. LNCS. Springer, 2016
- Sebastian Krings** and Michael Leuschel. “Constraint Logic Programming over Infinite Domains with an Application to Proof”. In: *Proceedings of the 30th Workshop on (Constraint) Logic Programming*. Vol. 234. EPTCS. 2016
- 2015 **Sebastian Krings**, Jens Bendisposto, and Michael Leuschel. “From Failure to Proof: The ProB Disprover for B and Event-B”. in: *Proceedings of the 13th International Conference on Software Engineering and Formal Methods*. Vol. 9276. LNCS. Springer, 2015
- 2014 **Sebastian Krings**, Jens Bendisposto, and Michael Leuschel. “Turning Failure into Proof: Evaluating the ProB Disprover”. In: *Proceedings of the 1st International Workshop about Sets and Tools*. 2014
- Jens Bendisposto, **Sebastian Krings**, and Michael Leuschel. “Who watches the watchers: Validating the ProB Validation Tool”. In: *Proceedings of the 1st Workshop on Formal-IDE*. vol. 149. EPTCS. 2014
- 2013 **Sebastian Krings** and Michael Leuschel. “Inferring Physical Units in B Models”. In: *Proceedings of the 11th International Conference on Software Engineering and Formal Methods*. Vol. 8137. LNCS. Springer, 2013

Extended Abstracts

- 2019 **Sebastian Krings**, Michael Butler, Philipp Körner, Thierry Lecomte, Michael Leuschel, and Laurent Voisin. *The History and Evolution of B and Event-B*. Extended Abstract and Talk at the History of Formal Methods Workshop (HFM 2019). 2019
- Sebastian Krings**, Philipp Körner, and Joshua Schmidt. *Inquiry- and Research-based Teaching in a Course on Model Checking*. Proceedings of the 1st International Workshop on Formal Methods - Fun for Everybody. 2019

- 2016 **Sebastian Krings**. *The Burden of High-Level Languages: Complicated Symbolic Model Checking*. PhD Symposium at iFM'16 on Formal Methods: Algorithms, Tools and Applications. 2016
- Sebastian Krings**. *Meta-Predicates for Rodin*. 6th Rodin User and Developer Workshop. 2016
- 2013 **Sebastian Krings**, Jens Bendisposto, Ivaylo Dobrikov, and Michael Leuschel. "B constrained". In: *Proceedings of the 4th Rodin User and Developer Workshop*. TUCS Lecture Notes. TUCS, 2013
- Jens Bendisposto, Joy Clark, Ivaylo Dobrikov, Philipp Körner, **Sebastian Krings**, Lukas Ladenberger, Michael Leuschel, and Daniel Plagge. "ProB 2.0 Tutorial". In: *Proceedings of the 4th Rodin User and Developer Workshop*. TUCS Lecture Notes. TUCS, 2013