Sebastian Krings

Curriculum Vitae

Summary

Software engineering team lead working on static analysis techniques for C and C++. Experienced in analysis of safety aspects with an additional background in security. Keeping both techniques and customers in mind by doing implementational as well as integrational work. Backed by a PhD in formal methods and software analysis. In lively contact with academia and actively teaching.

Current Positions

since 04.2023	**Manager R&D**
	Qt Group
Main Tasks	○ Leading the "Compiler & Analysis Team"
	○ Developing compilers for C, C++ and C#
	○ Development of static analyses for safety and security
	○ Development of semantic analyses for C and C++
	○ Presentations and talks at conferences and fairs
08.2022-04.2023	**Senior R&D Engineer / Professional Services**
	Qt Group
Main Tasks	○ Development of static analyses for safety and security
	○ Development of semantic analyses for C and C++
	○ Technical integration into customer's workflows
	○ Implementing project- and customer-specific adaptations
	○ Presentations and talks at conferences and fairs
04.2020–08.2022	**Senior R&D Engineer / Professional Services**
	Axivion GmbH
Main Tasks	○ Development of static analyses for safety and security
	○ Development of semantic analyses for C and C++
	○ Technical integration into customer's workflows
	○ Implementing project- and customer-specific adaptations
	○ Presentations and talks at conferences and fairs
since 2006	Freelance work in programming education and training

Main Tasks	○ University lectures on secure software development
	○ Programming courses

Previous Work Experience (Industry)

04.2018–03.2020	Network and Information Security Specialist
	Lukas Hospital Neuss
Main Task	○ Implementing an information security management system

Previous Work Experience (Academia)

04.2018–03.2020	Postdoc - Competence Centre for Information Security
	Niederrhein University of Applied Sciences
08.2017–03.2018	Postdoc - Chair for Programming Languages and Software Engineering
	Heinrich-Heine-University Düsseldorf
12.2012–07.2017	Researcher - Chair for Programming Languages and Software Engineering
	Heinrich-Heine-University Düsseldorf

Academic Education

Ph.D. Computer Science

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

M.Sc. Computer Science

02.2010–10.2012	Heinrich-Heine-University Düsseldorf
Major	Software Engineering and Programming Languages
Thesis	Inference of Physical Units in Formal Models

B.Sc. Mathematics and Applied Fields

04.2008–02.2012	Heinrich-Heine-University Düsseldorf
Major	Applied Mathematics
Thesis	Mathematical Modeling of Wrist Joint Mobility

B.Sc. Computer Science

10.2006–02.2010	Heinrich-Heine-University Düsseldorf
Major	Software Engineering and Programming Languages
Thesis	Code Coverage Analysis for Prolog

Further Education

04.2020	*Security for Hackers and Developers*
	Dr. Jared DeMott via Pluralsight
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

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* 188 (2019)

Dominik Hansen, Michael Leuschel, Philipp Körner, Sebastian Kringsand Thomas Naulin, Nader Nayeri, David Schneider, and Frank Skowron. "Validation and Real-Life Demonstration of ETCS Hybrid Level 3 Principles Using a Formal B Model". In: *Software Tools for Technology Transfer* 22(3) (2020), pp. 315–332

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

2022   **Sebastian Krings**. "Experience Report on a Student-Organized AI Course". In: *Proceedings of 27th annual conference on Innovation and Technology in Computer Science Education.* ACM, 2022

Sebastian Krings. "Analyzing Security Aspects of Software Architectures". In: *Proceedings Embedded World Conference 2022.* WEKA Fachmedien GmbH, 2022

2021   Philipp Körner and **Sebastian Krings**. "Increasing Student Self-Reliance and Engagement in Model-Checking Courses". In: *Proceedings Formal Methods Teaching Workshop and Tutorial*. LNCS. Springer, 2021

Sebastian Krings. "Erkennung von Security-Schwachstellen – Grenzen und Anwendbarkeit der Common Weakness Enumeration (CWE)". in: *Proceedings Embedded Software Engineering Kongress 2021*. Vogel Verlag, 2021

Sebastian Krings. "Testing, Model Checking and Static Analysis – Dream Team or Rivals?" In: *Proceedings Embedded World Conference 2020*. WEKA Fachmedien GmbH, 2021

2020   **Sebastian Krings**, Philipp Körner, Jannik Dunkelau, and Chris Rutenkolk. "A Verified Low-Level Implementation of the Adaptive Exterior Light and Speed Control System". In: *Proceedings of the 7th International Conference on Rigorous State Based Methods*. Vol. 12071. LNCS. Springer, 2020

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. 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*. Vol. 12057. LNCS. Springer, 2020, pp. 139–159

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 Efremidis, 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

Articles in Technical Journals

2021 **Sebastian Krings**. "Unscheinbare Bugs finden und Systemsicherheit optimieren". In: *Elektronikpraxis* 22/2021 (2021), pp. 44–45

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