Michael Sammler

Curriculum Vitae

Campus E1.5
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Research Interests

I am developing techniques for *formal verification of realistic low-level systems software* that combine *machine-checked proofs* with a *high degree of automation*.

Education

2019–2023 (expected) **Ph.D.**, *Computer Science*, Saarland University / Max Planck Institute for Software Systems.
Advisors: *Deepak Garg* and *Derek Dreyer*
Thesis: *Automated and Foundational Verification of Low-Level Programs*

2016–2019 **M.Sc.**, *Computer Science*, Friedrich-Alexander-University Erlangen, *grade 1.0 (GPA 4.0)*.
with exchange semester at Universitat Politècnica de Catalunya (Winter 2017)

2013–2016 **B.Sc.**, *Computer Science*, Friedrich-Alexander-University Erlangen, *grade 1.0 (GPA 4.0)*.

Publications

POPL'23 **DimSum: A Decentralized Approach to Multi-language Semantics and Verification**.
Michael Sammler, Simon Spies, Youngju Song, Emanuele D'Osualdo, Robbert Krebbers, Deepak Garg, Derek Dreyer

POPL'23 **Conditional Contextual Refinement**.
Youngju Song, Minki Cho, Dongjae Lee, Chung-Kil Hur, *Michael Sammler*, Derek Dreyer

OOPSLA'22 **BFF: Foundational and Automated Verification of Bitfield-Manipulating Programs**.
Fengmin Zhu, *Michael Sammler*, Rodolphe Lepigre, Derek Dreyer, Deepak Garg

PLDI'22 **Islaris: Verification of Machine Code Against Authoritative ISA Semantics**.
Michael Sammler, Angus Hammond, Rodolphe Lepigre, Brian Campbell, Jean Pichon-Pharabod, Derek Dreyer, Deepak Garg, Peter Sewell

POPL'22 **Simuliris: A Separation Logic Framework for Verifying Concurrent Program Optimizations**.
Lennard Gäher, *Michael Sammler*, Simon Spies, Ralf Jung, Hoang-Hai Dang, Robbert Krebbers, Jeehoon Kang, Derek Dreyer
Distinguished Paper Award

POPL'22 **VIP: Verifying Real-World C Idioms with Integer-Pointer Casts**.
Rodolphe Lepigre, *Michael Sammler*, Kayvan Memarian, Robbert Krebbers, Derek Dreyer, Peter Sewell

PLDI'21 **RefinedC: Automating the Foundational Verification of C Code with Refined Ownership Types**.
Michael Sammler, Rodolphe Leprigre, Robbert Krebbers, Kayvan Memarian, Derek Dreyer, Deepak Garg
Distinguished Paper Award and **Distinguished Artifact Award**

POPL'20 **The High-Level Benefits of Low-Level Sandboxing**.
Michael Sammler, Deepak Garg, Derek Dreyer, Tadeusz Litak

USENIX Security'19 **ERIM: Secure, Efficient In-process Isolation with Protection Keys (MPK)**.
Anjo Vahldiek-Oberwagner, Eslam Elnikety, Nuno O. Duarte, *Michael Sammler*, Peter Druschel, Deepak Garg
Distinguished Paper Award and **Internet Defense Prize**

Invited Talks and Workshop Presentations

CMU, 2022 **DimSum: A Decentralized Approach to Multi-language Semantics and Verification**, *invited talk*, at Principles of Programming seminar.

Iris'22 **Predictable, efficient, and extensible Iris automation with Lithium**, *presentation*.

VerifyThis'22 **RefinedC**, *invited tutorial*.

RustVerify'21 **RustBelt: A Quick Dive Into the Abyss**, *invited talk*, with Ralf Jung.

Huawei, 2021 **RefinedC: Automating the Foundational Verification of C Code with Refined Ownership Types**, *invited talk*.

Industry Experience

Fall 2022 **Research Intern**, *Google*.
- Designed a method for supporting dynamically sized memory in virtual machines
- Implemented the method in the Linux kernel and a Rust-based hypervisor
- Contributed improvements to a persistent memory driver to the Linux kernel

Fall 2020 **Verification Engineer, Intern**, *BedRock Systems*.
- Contributed to the verification of the Bedrock HyperVisor™
- Developed new reasoning principles for interaction verification of loops in separation logic

2016–2017 **Software Engineer, Working Student**, *Senacor Technologies*.
- Built full-stack microservices for an internal CRM tool for B2B relations using Java 8, Spring and angular.js
- Optimized and debugged Elasticsearch queries
- Developed complex requirements for Outlook integration together with stakeholders

2014–2016 **Software Engineer, Working Student**, *SIEMENS / PRIMETALS*.
- Contributed to the development of an internal tool for code generation for different industrial automation platforms
- Maintained legacy code based in C#, added new features and improved performance
- Designed the architecture of server-side code after a rewrite using node.js + CoffeeScript + angular.js
- Designed and implemented domain specific languages used for code and test generation

Awards, Honors, and Scholarships

2020–2023 **Google Ph.D. Fellowship**

POPL'22 **Distinguished Paper Award** for *Simuliris: A Separation Logic Framework for Verifying Concurrent Program Optimizations*

PLDI'21 **Distinguished Paper Award** and **Distinguished Artifact Award** for *RefinedC: Automating the Foundational Verification of C Code with Refined Ownership Types*

VerifyThis'21 **Most distinguished tool feature award** for *RefinedC*

USENIX Security'19 **Internet Defense Prize** and **Distinguished Paper Award** for *ERIM: Secure, Efficient In-process Isolation with Protection Keys (MPK)*

2013–2019 Scholarship from the **Max-Weber-Program** and **Elite Network Bavaria**

2016 Prize for bachelor thesis by Brose Fahrzeugteile GmbH & Co. KG

Mentorship

2022–2023 **Kimaya Bedarkar**, *PhD student*, Formal verification of a scheduling algorithm using RefinedC.

2021–2023 **Lennard Gäher**, *PhD student*, RefinedRust: Automated and foundational verification for Rust.

2020–2022 **Fengmin Zhu**, *PhD student*, BFF: Foundational and automated verification of bitfield-manipulating programs.

2022 **Kwing Hei Li**, *Intern*, Multi-language verification of a closure-based language.

2019 **George Pîrlea**, *Intern*, Equipping RustBelt with support for pinning.

Teaching Experience

Summer 2022 **Teaching assistant**, *Category Theory Seminar*, Saarland University.

Winter 2019 **Teaching assistant**, *Operating Systems*, Saarland University.

Professional Service

FCS'23 Program committee

PriSC'23 Program committee

POPL'22 Artifact evaluation committee

TOPLAS Reviewer

CAV'22 Reviewer

ESOP'21 Reviewer