Dr. Simon Cooksey

Research

I study modern multiprocessor computers to understand the behaviours admitted by their complex micro-architectural designs. My research is focussed on *weak memory behaviours*, which are exhibited on machines that allow out-of-order execution and caching.

Education

The University of Kent

Doctor of Philosophy, Computer Science Computer Science with a Year in Industry BSc (Hons), *First class*

Employment

NVIDIA Research Scientist

The University of Kent

Visiting Researcher Research Fellow in Programming Languages Research Associate Assistant Lecturer

NVIDIA

Research Intern

XMOS

Development Intern

Skills

- $\bullet\,$ Rust. Modifying the Rust compiler to target the new Morello platform.
- OCaml. Using OCaml to implement mathematical artefacts for mechanised evaluation.
- Weak memory consistency. Understanding and constructing mathematical models for multiprocessor systems, both in hardware and software.
- Formal Hardware Specification. Using internal hardware specifications and design manuals to capture a mathematical abstraction of machine behaviour, using *Alloy*.
- Programming languages. Regular user of C/C++, JavaScript, OCaml, and Python.

Publications

- Rust for Morello: Always-on Memory Safety, Even in Unsafe Code: 37th European Conference on Object-Oriented Programming, 2023. Sarah Harris, Simon Cooksey, Michael Vollmer, Mark Batty
- P2850 Minimal Compiler Preserved Dependencies: ISO C++ Standards Committee meeting, Varna, 2023. Mark Batty and Simon Cooksey
- Mixed-Proxy Extensions for the NVIDIA PTX Memory Consistency Model: 49th IEEE/ACM International Symposium on Computer Architecture, 2022. Daniel Lustig, Simon Cooksey, Olivier Giroux ★ IEEE Micro Top Picks Honourable Mention
- The Leaky Semicolon: Compositional Semantic Dependencies for Relaxed-Memory Concurrency: 49th ACM SIGPLAN Symposium on Principles of Programming Languages, 2022. Alan Jeffery, James Riely, Mark Batty, Simon Cooksey, Ilya Kaysin, Anton Podkopaev
- Modular Relaxed Dependencies in Weak Memory Concurrency: 29th European Symposium on Programming, 2020. Marco Paviotti, Simon Cooksey, Anouk Paradis, Daniel Wright, Scott Owens, Mark Batty
- P1780 Modular Relaxed Dependencies: A new approach to the Out-Of-Thin-Air Problem: ISO C/C++ Standards Committee meeting, Cologne, 2019. Mark Batty, Simon Cooksey, Scott Owens, Anouk Paradis, Marco Paviotti, Daniel Wright
- PrideMM: Second Order Model Checking for Memory Consistency Models: 10th Workshop on Tools for Automatic Program Analysis, 2019. Simon Cooksey, Sarah Harris, Mark Batty, Radu Grigore, and Mikoláš Janota

Prizes

- VeTSS Doctoral Dissertation Award: (June 2025) Award for doctoral dissertation published in 2022.
- Kent Postgraduate Prize: (July 2020) Recognising the significant impact of my research.

Grants

All £ values at 80% FEC, unless otherwise noted.

• Embedded Rust for Defence Applications: *Principal Investigator* (£87,763 100% FEC) Defence and Security Accelerator. Competition: CHERI within Defence and Security

Canterbury, United Kingdom Sept. 2016 – Sept. 2021 Sept. 2012 – Jul. 2016

> Remote, United Kingdom Oct. 2023 – Present

Canterbury, United Kingdom Sept. 2023 – Present Jul. 2022 – Sept. 2023 Jul. 2020 – Jul. 2022 Sept. 2016 – Jun. 2020

> Santa Clara, California Jul. 2018 – Dec. 2018

Bristol, United Kingdom Aug. 2014 – Aug. 2015

- Complementing Capabilities: Introducing Pointer-Safe Programming to DSbD Tech: Researcher Co-Investigator (£494,770) UK Innovation Funding. ISCF digital security by design software ecosystem development
- CAPC: Capability C Semantics, Tools and Reasoning: Named Researcher and Grant Co-Author (£596,634) UKRI: Digital Security by Design
- Fixing the Thin-Air Problem: ISO Dissemination: Named Researcher and Grant Co-Author (£60,455) UK Research Institute: Verified Trustworthy Software Systems

Conference Attendance

- FoWM @ POPL, 2024: Presenting the NVIDIA position on the future of weak memory.
- ECOOP, 2023: Presenting the Rust for Morello work.
- VeTSS Inaugural Meeting, 2023: Presenting the Rust for Morello work at the first new VeTSS meeting.
- DSbD All Hands, October 2022: Catching up with other researchers working on the DSbD project.
- High Integrity Systems, 2022: Building industrial links for research collaboration.
- CHERITech, 2022: Presenting work on porting Rust to Morello.
- POPL, 2022: Presenting *The Leaky Semicolon* with collaborators.
- Aarhus Concurrency Workshop, 2017: Explained the issues surrounding simulating the latest memory models and presented an early version of PrideMM.
- **PLMW/POPL**, 2017: Attended the Programming Languages Mentoring Workshop at POPL'17 in Paris with a grant from the ACM.

Professional Service

- ASPLOS 2025: Program committee member.
- PLDI 2024: Artefact evaluation committee member.
- ISO C++ Standards Committee: Commenting on and developing the concurrency specification of the C++ programming language in SG1. Cologne (2019); Belfast (2019); Hawaii (2022); Varna (2023).
- DSbD Research Day: Presenting progress on our research programme to DSbD stakeholders.

Technical committee membership

British Standards Institute	IST/5/-/21
Part of the British Standards Institute delegation to the ISO C++ committee.	May 2024 – Present
American National Standards Institute	INCITS C++
Part of the ANSI delegation to the ISO C++ committee.	May $2024 - Present$

References

Available on request.