

Xiaojia Rao

Imperial College London • London, UK | Updated: July 11, 2026
🌐 www.raoxiaojia.com | GitHub: [raoxiaojia](https://github.com/raoxiaojia) | ✉ [raoxiaojia \[0x40\] gmail \[0x2e\] com](mailto:raoxiaojia@ic.ac.uk)

Current Position

Independent Researcher

London, UK

Research interests: large-scale Lean/Rocq mechanisation, type theory, certified execution

Jan. 2026 – Present

- Independent Lean 4 mechanisation of WebAssembly 3.0, focusing on verified GC subtyping, certified progress-ful interpreters, conformance-tested runtime, and mechanised specification auditing (manuscript in preparation).
- Maintaining WasmCert-Rocq, a mechanisation of the W3C WebAssembly specification in Rocq, developing efficient persistent memory representations for extracted runtimes.

Education

Imperial College London

London, UK

PhD in Computer Science

Oct. 2020 – Nov. 2025

- Thesis: *Designing and Maintaining an Efficient WebAssembly Mechanisation*
- Advisors: Philippa Gardner, Conrad Watt

Imperial College London

London, UK

MSc Advanced Computing

2019–2020

- Average Grade: 84.58/100 (Distinction)
- CPP Award for Academic Excellence (Top of cohort)

University of Cambridge

Cambridge, UK

Mathematics (Master of Mathematics, Bachelor of Arts), St. John's College

2015–2019

- Part III Expository Essay: *Fraenkel-Mostowski Models of Set Theory*
- Class I, Part IA/IB/II
- College Wright Prize (Top 1/3 of Class I), Part IA/IB

Publications

1. Progressful Interpreters for Efficient WebAssembly Mechanisation

Xiaojia Rao, Stefan Radziuk, Conrad Watt, and Philippa Gardner

Proceedings of the ACM on Programming Languages (POPL), 2025

2. Bringing the WebAssembly Standard Up to Speed with SpecTec

Dongjun Youn, Wonho Shin, Jaehyun Lee, Sukyoung Ryu, Joachim Breitner, Philippa Gardner, Sam Lindley, Matija Pretnar, Xiaojia Rao, Conrad Watt, and Andreas Rossberg

Proceedings of the ACM on Programming Languages (PLDI), 2024

3. Iris-Wasm: Robust and Modular Verification of WebAssembly Programs

Xiaojia Rao*, Aina Linn Georges*, Maxime Legoupil, Conrad Watt, Jean Pichon-Pharabod, Philippa

Gardner, and Lars Birkedal

Proceedings of the ACM on Programming Languages (PLDI), 2023

4. **Two Mechanisations of WebAssembly 1.0**

Conrad Watt, **Xiaojia Rao**, Jean Pichon-Pharabod, Martin Bodin, and Philippa Gardner

Proceedings of the 24th International Symposium on Formal Methods (FM), 2021

Teaching and Supervision

Teaching Assistant

London, UK

Imperial College London

- Scalable Software Verification (Philippa Gardner, 2020-2023)
- Models of Computation (Azalea Raad, Herbert Wiklicky, Sophia Drossopoulou, 2020-2022)
- Probability and Statistics (Giuliano Casale, 2021-2022)
- Graphs and Algorithms (Iain Philipps, 2021)
- Reasoning about Programs (Sophia Drossopoulou, 2021)

Master Project/Undergraduate Final Year Project Technical Supervisor

London, UK

Imperial College London

- Diego Cupello (Wasm-SpecTec Generation of Coq Mechanisation, 2024, CPP Department Award)
- Henit Mandaliya (Type Soundness of WebAssembly 2.0, 2023)
- Stefan Radziuk (Sound and Progressful Interpreter for WebAssembly, 2023, Distinguished Project Prize)
- Liqing Yang (Soundness of WebAssembly Module Instantiation, 2022)

Work Experience

Softwire

London, UK

Software Engineer Intern

Jun. 2018 - Sep. 2018

Jane Street Capital

London, UK

Quantitative Trading Intern

Jun. 2017 - Sep. 2017

Prizes and Awards

CPP Award for Academic Excellence

London, UK

Top of cohort at Imperial College, MSc Advanced Computing

2019-2020

Wright Prize

Cambridge, UK

Top 1/3 of Class I at University of Cambridge, Mathematics Tripos

2015-2016, 2016-2017

Other Prizes

- Singapore Mathematics Olympiad:
Open Category: Gold (2011-2014, rank 17/12/14 in 2012/13/14)
Senior Category: Gold, rank 3 (2011)
- Singapore National Olympiad in Informatics: Gold, rank 1 (2011)

Skills and Qualifications

Theorem Provers

- Rocq, Lean: Advanced mechanisation experience

Programming Languages

- WebAssembly, C++, OCaml, Python

Natural Languages

- Native: Mandarin Chinese
- Proficient: English