

Joshua Smart

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EDUCATION

University of Southampton

Masters of Engineering, Software Engineering

Southampton, UK

September 2022 — June 2026

- Predicted to graduate with First Class Honours, currently averaging 80%.
- Awarded the NetCraft prize in my 2nd year for top 10 average in that year.
- Awarded the G-Research 'Best Dissertation' award in my 3rd year, achieving a grade of 95%.
- Focused on modules exploring practical aspects of software development and programming language theory.

Exeter Mathematics School

*A-Level Mathematics, Further Maths, and Computer Science (A*A*A*)*

Exeter, UK

September 2020 — July 2022

- Attended a top institution for mathematics education, excelling in all assessments.
- Completed the 'extra pure' component of my further maths course, exploring group theory and advanced linear algebra.

WORK EXPERIENCE

Director

JSmart Software Development Ltd

March 2023 — Present

- Formed the company 'JSmart Software Development Ltd' as a software development contracting service. This has been very successful, with projects completed for both previous employers and academic institutions.
- For Beran Instruments Ltd; I developed an alert summary service in Rust and React, allowing users to visualise alerts from the company's industrial condition monitoring systems.
- For IT University of Copenhagen, completed a project on verifying tensors. Discussed later in Projects.

Lab Demonstrator - COMP2313 Formal Specification and Verification

University of Southampton, Electronics and Computer Science

January 2026 — June 2026

Southampton, UK

- Was present in the students weekly lab sessions, answering questions and assisting with their excersie sheets wherein they were asked to learn the Rocq proof assistant; teaching them key skills in the formal verification of software.
- Assisted the students in verifying a simplified model of the Java Virtual Machine.

Junior Software Developer

Beran Instruments Ltd

July 2022 — September 2022

Devon, UK

- Worked on a system to generate dynamic displays of sensor data from the company's range of industrial condition monitoring systems. This allows the user full customisation of how the data is presented to them. This program was written in TypeScript with React, and involved deploying a new major version of the product with a reconfigured and moderised build system.
- I also worked on a data processing middleware application, created to ingest data from older hardware and advertise it in a new format that was compatible with the company's next-generation software. This was initially prototyped in C/C++ and finally deployed in C# with the Dependency Injection architecture.
- My final project involved rewriting an internal C-based testing application originally developed a decade prior. I was happy to leave this project in a much more maintainable state than I found it, benefiting future developers interacting with it.

PROJECTS

Project SixthSense: IPv6 Assessment, Project Manager

September 2025 — January 2026

- Worked alongside a team of students, as project manager, to deliver a report assessing the current state of security and implementation of the IPv6 protocol. This was completed for the benefit of our project's external partner David Kennedy, director of Arkenox Ltd.
- Specifically targeted IPv6-related firewall rules and their associated vulnerabilities, generating a comprehensive report that was discussed at the UK IPv6 Council roundtable in February 2026.
- Additionally, I was responsible for delivering a Command-Line tool to detect and verify vulnerabilities and mitigations related to the points we had investigated.

- Attended a 6 week visit to Denmark to add an implementation of the tensor data structure to the Mathematical Components library, benefiting the formal verification community. This is a key step towards the formal verification of Neural Networks and related technologies in the Rocq language.
- This was a large open-source contribution, and in the process I interacted with many key players in the space. This included academics of the IT University of Copenhagen as well as maintainers of the MathComp project.

Implementation of a Rocq Backend to the Vehicle Neural Network Specification Language

(portfolio.jsmart.dev/assets/rocq-backend.pdf)

September 2024 — April 2025

- Introduced support for the Rocq prover to the Vehicle language, a toolkit for Neural Network verification. This expands the capabilities of the tool and aims to further the effort towards secure and correct applications of AI.
- This open-source work was completed primarily in Haskell, with specific language integrations in the Rocq proof language.
- I worked alongside both academics in the fields of type systems and theorem proving, as well as other developers and maintainers of the Vehicle project.

SKILLS AND AWARDS

- **Programming Languages:** Rust, JavaScript/TypeScript, C#, Haskell, C/C++, Python, Java, Rocq
- **Technologies:** React, Vue, Dependency Injection
- **Awards:** NetCraft award, G-Research 'Best Dissertation' award
- **Interests:** Sailing, Theatre Tech, Musical Theatre, Self-Hosting/Homelab