

Zac Garby

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[GitHub](#)

Experience

University of Nottingham

PhD Student, Functional Programming

2023—present

Nottingham

- Supervised by Professor Graham Hutton in the **Functional Programming Lab**.
- My main research area is **program calculation**: systematically deriving compilers, type systems, and more, from equational specifications. Also interested in **program synthesis** and interactive programming paradigms.

Cogna

Software Engineering Intern, 16 weeks

Summer 2025

London

- Series A startup delivering automated software engineering (i.e. **end-to-end program synthesis**) for large real-world industries such as utilities and logistics.
- Designed and implemented a tool to detect and resolve ambiguity throughout the synthesis pipeline, **combining formal methods with LLMs**. Deployed this to Cogna's platform, **improving reliability and performance** of synthesis.
- Meaningfully contributed in a small fast-paced team and across the organisation, delivering high quality, well-tested code in Python, Go, and TypeScript with React.

Education

University of Nottingham

MSci, Computer Science

2019—2023

Nottingham

- First-class Honours** (87% avg., awarded the best overall performance prize)
- Achieved the **highest ever grade** in Computer Science at the University. **Best dissertation** in third year, and **best research project** in my fourth:
Fantasia: Synthesising Recursive Functions Without Trace-complete Examples
Fugue: A Friendly Functional Programming Language with Holes

The Thomas Hardy School

GCSEs and A-levels

2015—2019

Dorchester, Dorset

- A-levels in Mathematics, Further Maths, Computer Science, and Physics (**A*AAA**)

Volunteering

Hackathons UK

2024—2025

Journal of Functional Programming, reviewed several articles 2024—present

President of HackSoc

2021—2023

University of Nottingham Students' Union

- Full responsibility for the society. Substantially **improved engagement**. Delivered talks and workshops. Also **lead organiser** of HackNotts, a 200-person event.

HackNotts '24, sponsored the Haskell prize, taught a workshop 2024

Intl. Conference on Functional Programming, student volunteer 2024, 2025

University of Nottingham, computer science mentor 2020—2021

Thomas Hardy School, founded programming club 2017—2019

Achievements & Recognition

YouTube, approx 50k views on my *Computerphile* video 2024

University of Nottingham, FP lab representative 2023—present

University of Nottingham 2019—2024

- Elizabeth and J D Marsden prize 2023
- Outstanding community contribution prize 2023
- Best overall performance (over the four years) 2023
- High achiever's award (top 5% each year) 2020, 2021, 2022, 2023
- Best dissertation 2022, 2023
- Awarded "silver" scholarship 2019
- UKMT, Silver award, senior mathematical challenge 2018

Skills

Haskell, Python, Go, TypeScript, Java, C, \LaTeX , Agda, Swift, Rust, C#, HTML, CSS.

Compilers & programming languages. **Web and backend**, server management, and networking. **Media** (audio, games, graphics, computer vision), electronics, low level systems, & mixed reality. **LLMs** and AI integration/programming.

Category theory, type theory, abstract algebra, formal logic and proofs, semantics.

Public speaking, leadership, event planning, logistics, finance. **Teaching** and engaging a wide range of audiences. Graphics and design. Qualified first aider.

Publications

Calculating Compilers Effectively

Zac Garby, Graham Hutton, and Patrick Bahr
Haskell Symposium 2024

The Calculated Typewriter

Zac Garby, Patrick Bahr, and Graham Hutton
Haskell Symposium 2025

Interests

Interactive programming, program synthesis, experimental programming languages and paradigms, compilers.

Computer science **community engagement**, education, and outreach.

Playing music, reading, climbing and running, cooking and baking. A training officer at medieval combat society.

Conferences

- Haskell Symposium** 2024, 2025
- ICFP** 2024, 2025
- Midlands Graduate School** 2022, 2024

Hackathons

- Royal Hackaway v8**, 2025 2nd place
- HackNotts '24**, 2024 special prize
- AstonHack 9**, 2024 2nd place
- HackSussex**, 2024 1st place
- Royal Hackaway v7**, 2024 1st place
- HackSussex**, 2023 1st place
- HackNotts**, 2023 lead organiser
- OxfordHack**, 2022 sponsor prize
- HackNotts**, 2022 an organiser
- AstonHack**, 2021 1st place + other prize
- HackNotts**, 2020 sponsor prize
- And more. View my [portfolio](#).