Zac Garby

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Academic

University of Nottingham 2023—**present**
PhD Student, Functional Programming

Supervised by Professor Graham Hutton in the **Functional Programming Lab**.

My main interests are **program calculation**, automated **program synthesis**, and interactive programming paradigms, as well as combining these for "friendly", effective programming experiences.

Published *"Calculating Compilers Effectively"*, in the *Haskell Symposium 2024*.

University of Nottingham 2019—2023
MSci, Computer Science

First Class Honours (**87%** average, awarded the **best overall** performance prize)

Achieved the **highest ever grade** in Computer Science at the University.

Two dissertations (years 3 & 4). Awarded the **best dissertation prize** for both:

Fantasia: Synthesising Recursive Functions Without Trace-complete Examples
Fugue: A Friendly Functional Programming Language with Holes

The Thomas Hardye School, Dorchester 2015—2019

Four A-levels: Maths, Further Maths, Computer Science, and Physics (**A*AAA**)

Volunteering

Hackathons UK 2024—**present**

A member of a core team at Hackathons UK—a UK **charity**—supporting university students in organising and hosting hackathons across the country.

HackSoc (University of Nottingham Students' Union) 2021—2023

President, and **lead organiser** of HackNotts; previously other committee roles. Full responsibility for the society. Substantially **improved society engagement** and community. Gave **talks** and delivered **workshops**. Handled budget, logistics, and on-the-day activities for a 200-person event.

Intl. Conference on Functional Programming, student volunteer 2024

University of Nottingham, computer science mentor 2020—2021

Thomas Hardye School, founded programming club 2017—2019

Thomas Hardye School, taught robotics STEM days 2017—2019

Achievements & Recognition

Journal of Functional Programming, reviewed a special issue article 2024

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 2023
- Best overall performance (over four years) 2019—2023
- High achiever (top 5% each year) 2020, 2021, 2022, 2023
- Best year 4 research project 2023
- Best year 3 dissertation 2022
- Awarded "silver" scholarship 2019

UKMT, Silver award, senior mathematical challenge 2018

Links

github.com/zac-garby, devpost.com/zac-garby, youtube.com/@zacmg

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.

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

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

Publications

Calculating Compilers Effectively
Zac Garby, Graham Hutton, and Patrick Bahr
In Proceedings of the 17th ACM SIGPLAN International Haskell Symposium (Haskell '24), September 6–7, 2024, Milan, Italy.

Interests

Interactive programming, **program synthesis**, experimental programming paradigms, and 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
- **ICFP**, 2024
- **Midlands Graduate School**, 2024
- **Midlands Graduate School**, 2022

Hackathons

- **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**
- **AstonHack7**, 2021, **1st place + &c.**
- **HackNotts**, 2020, sponsor prize
- Full portfolio on my website