Tuomas Laakkonen

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Portfolio: tuomas56.github.io/portfolio

Education

University of Oxford *(Oct 2021-present)*
Graduate Student
- MSc in Mathematics and Foundations of Computer Science
- Current modules include: Quantum Software & Information, Formal Verification, Cryptography

Imperial College London *(2018-2021)*
Undergraduate Student
- BSc in Mathematics: 1st class (4.0 GPA equivalent).
- Modules included Data Science, Stochastic Simulation, Computational Linear Algebra, Numerical ODEs, Markov Processes, and Number Theory.

Marlborough College, Wiltshire *(2013-2018)*
Academic Scholar
A Levels:
- 4 A*'s and 1 A in Mathematics, Further Mathematics, Computer Science, Physics and Chemistry respectively.
- A* in an EPQ related to Computer Science and AI.

GCSEs: 10 A*s and 2 As including A*s in Mathematics, Computer Science, and triple Science and an A in Electronics.

Experience

Canon Medical Research Europe *(2021 June-August)*
Software Engineer Intern (SHAIP Team)
- Developed tooling for use by AI researchers to automate containerized machine learning tasks.
- Wrote a CLI application in **Go** to orchestrate **Docker containers**, including bindings to **CPython** and VS Code integration in **Typescript**.
- Implemented an authentication system based on elliptic curve digital signatures in Typescript and Go - used to implement a **federated learning** system with SSH.

Coursework and Projects

Individual Research Coursework *Imperial College London (2019)*
- Title: **"Accelerating Gillespie's SSA with Dynamic Compilation"**
- Created a compiler to accelerate chemical reaction simulations using **Rust and LLVM**. The speed mostly matched or exceeded the industry standard StochKit software.
- Achieved a 99% final score.

Computer Science Coursework *Marlborough College (2018)*
- Developed a computer algebra system in **Haskell** designed for use by A-Level students, supporting integration, differentiation, root-finding and statistical operations.
- Achieved a 100% final score.

Others *(2016-2020)*
- Personal project (2019) implementing the **Quadratic Sieve** in **Rust**, a modern fast number-theoretic algorithm to factorise integers.
- Project for the Engineering Education Scheme (2016) developing embedded **indoor navigation systems** in **C++**.
- Numerical Analysis Coursework (2018) implementing the QR and LU decomposition algorithms.

Programming Language Skills

Rust *4 years experience, 20K+ lines written*
- Projects include: A prototype **operating system** with support for text output, keyboard input and basic user executables. A multithreaded **path tracer** for diffuse, metallic and glossy objects. A **compiler** for a simple systems programming language.

Haskell *3 years experience*
- Projects include: A **computer algebra system**, a **regular expression engine**, and a Lisp interpreter.

Python (2 and 3) *6 years experience, 10K+ lines written*
- Projects include: **Compiler and interpreter projects** for Lisp and a custom language, GUI and web-based projects, and creative coding.

Others
- JavaScript, including a database tool for searching past papers. x86 Assembly including a freestanding Lisp interpreter.

Other Interests

Digital Electronics (Arduino, 6502-based retro computers) and Fencing.