John Kelly

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Education

Imperial College London — London, England
Bachelor of Engineering in Electronic & Information Engineering (EECS) — *Sep. 2023 - July 2026*

Experience

Software Engineer - Intern — July. 2024 – Aug. 2024
Marshall Wace Asset Management — *Oxford, England*
- Incoming Summer 2024

Software Engineer — Sep. 2022 – Sep. 2023
Hero Health Software — *Oxford, England*
- Led a multi-team project over 6 months, integrating a new clinical system into the application, spanning multiple languages, frameworks, and services, including Rust, GraphQL, ProtoBuf, and TypeScript
- Upgraded language & frameworks across 2 major versions, involving changes to over 500 files and 20 thousand lines of code
- Re-designed the CI/CD pipeline, cutting test times from 90 minutes to 15 minutes and reducing cost
- Optimised high-throughput data processing services, cutting median execution time from 2 hours to under 4 seconds

Software Engineer - Intern — June 2021 – Aug. 2021
Hero Health Software — *Oxford, England*
- Migrated a background-job service between frameworks
- Designed, implemented, and tested code & infrastructure for card-reader payment systems

Open Source Work
.NET JIT Compiler, Rust Compiler, ComputeSharp, & Others
- Contributed to compilers and low-latency open-source software in Rust, C++, & C#
- Largest non-Microsoft contributor to DirectX12 documentation with over 50 articles written
- Developed high-performance JPEG decoding with SIMD for C#'s largest image library

Projects - *See 'Pinned' section of GitHub profile*

JCC | *C, Compilers, Optimisation* — Nov. 2023 - Ongoing
- Work-in-progress C11 compiler with zero 3rd party dependencies
- Pure C11 compliant code with a hand-written lexer, parser, and native ARM64 machine code backend
- Utilises SSA intermediate representation & linear-scan register allocation techniques for codegen

Rustf*ck (Brainf*ck interpreter + compiler) | *Rust, Compilers* — June 2023
- High-performance Brainf*ck interpreter and JIT compiler
- Built parse & optimiser with 3-stage IR
- Developed an AArch64 Just-in-Time Compiler

Voltium | *C#, DirectX 12, GPUs* — 2020
- 3D Render Engine built on top of DirectX 12 & Metal
- Featured powerful render graph + command-buffer systems
- Novel command-buffer approach allowed cross-device 3D rendering

MathSharp | *C#, x64, SIMD* — Oct. 2019
- The fastest SIMD-focused linear algebra library for C# at time of release
- At time of release, offered 40-75% speed improvements over the .NET Core library & other alternatives
- Utilised x64 & AArch64 architecture extensions including FMA, SSE, AVX, and NEON
- Gained over 600 stars on Github & over 7,000 downloads

Achievements & Awards

IBM Ponder Maths Puzzles *Solved October & November 2023 IBM Ponder Research questions* — 2023

First Place Undergraduate (3rd overall) - Imperial Algorithmic Trading Competition — 2023
Team of 2 - data modelling & research challenge by QRT

British Informatics Olympiad *Highest score in year* — 2022

Microsoft Most Valuable Professional Award Nomination *"Recognizes exceptional community leaders"* — 2022

UKMT Senior Maths Challenge - Gold Award — 2020

Summerton Prize for Computing - Magdalen College School *Received award for excellence in Computing* — 2019 & 2022

Top 15 in Oxford University Computing Challenge *Result out of over 10,000 international participants* — 2018

Bebras Computational Thinking Challenge - Gold Award — 2018 & 2019

Perse Coding Cup - Distinction — 2019