John Kelly

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Education

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

Magdalen College School — Oxford, England
A-levels in Maths (A), Computer Science (A*), and Physics (A*)* — *Sep. 2015 - July 2022*

Experience

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

- Developed Elastic-based document search store system
- Utilised dense & sparse vector search algorithms to build fast search capabilities across different file formats, languages, and contexts
- Integrated search capabilities with internal tooling, ML models, and documentation systems

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#

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

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

Voltium | *C++, C#, DirectX, Metal, 3D Graphics* — Ongoing

- Lightweight, cross-platform render engine focusing on performance and usability
- Developed a system to allow remote rendering & debugging using a proprietary command buffer system
- Created a render graph & ECS framework to allow efficient scheduling & execution of rendering

Achievements & Awards

First Place - OPTIC London Forecasting competition — 2024

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

Microsoft Most Valuable Professional Award Nomination - Youngest Ever Nominee — 2022
"Recognizes exceptional community leaders for their technical expertise, leadership, speaking experience, online influence, and commitment to solving real world problems"

.NET Foundation Voting Member — 2020
World's youngest member at time of acceptance (age 16)

UKMT Senior Maths Challenge - Gold Award — 2020

GCHQ CyberDiscovery Program — 2019
Attended to the in-person CyberDiscovery Elite camp as part of the only team that successfully cracked the final challenge

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

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

Bebras Computational Thinking Challenge - Gold Award — 2018 & 2019
Achieved maximum score possible both years

Perse Coding Cup - Distinction — 2019