Joe Loach (he/him)

A motivated Software Developer with a strong foundation in SoC design, AI, and GPU programming.
Proven experience in building hardware and software solutions through University projects and feelance work.
Seeking a developer role to apply and expand technical skills in a professional setting.

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Education

The University of Manchester | High 2:1 Sep. 2021 - Jun. 2024

Bachelor of Computer Science

- Awarded top 5%, First class grade for Third Year Dissertation, Project and Screencast.
- Received distinctions for innovative and creative approaches for AI model implementation.

Ecclesbourne School | A Levels Sep. 2019 - Jun. 2021

A* Computer Science, A* Mathematics, A Physics

Experience

SmartUI | C#, Unity, Adobe Photoshop, Github, Teams Jun. 2023 - Sep. 2023

Freelance for Digital Spirit Ltd

- Created complex mesh effects for non-destructive edits to 2D Components for UI.
- Designed custom Unity editor UIs with Multi-object and Undo support for seamless integration.
- Tightly coupled communication with client over GitHub issues and Teams to deliver maximal UX.

Coursework

Implementing System-on-Chip Designs | High 1st Jan. 2024 - May. 2024

- Developed, debugged, and verified a CPUs FSM module using Verliog in Cadence.
- Implemented an ASIC Mandelbrot hardware accelerator integrated with a VGA controller.

Natural Language Understanding | High 1st Jan. 2024 - May. 2024

- Leveraged Keras and Python to create AI deep learning models for textual evidence detection.
- Adapted ideas from current state-of-the-art models to create a novel DNN architecture.
- Lead a small group to deliver two exceedingly creative and accurate models.

Projects

ARM Assembler | Rust, Javascript, Markdown, mdbook Aug. 2024 - Present

ARM subset (HAND) compiler and interactive learning handbook.

- Hand-written lexer, parser and grammars for recoverable syntax trees and deeply informative errors.
- Parses UAL to define a customisable instruction set.
- Generates JS and Markdown to create an interactive booklet with runnable code.

Third Year Project & Dissertation | Rust, WGSL, Vulkan, WebGPU Sep. 2023 - Apr. 2024

Real-time physically accurate black hole renderer.

- Developed GPU kernels to accelerate the path tracing algorithm.
- Custom hardware agnostic renderer, multithreading on the CPU with SIMD.

Teaching

Tutoring | GCSE Maths and Physics Jun. 2021 - Sep. 2021

- Effectively explained and communicated ideas to others in an structured environment.
- Adapted to students gaps in knowledge and proactively applied creative solutions to fill them.

Technical Skills

Programming Languages

Rust, C#, C++, C, Python, JavaScript, TypeScript, Lua, Haskell, Java, HTML, CSS

Workflows and Software

git, cargo, VSCode, Visual Studio, Cadence, Eclipse, Adobe Photoshop

Interests

- **Squash**: I am a keen squash player of 10 years, cultivating my competitive nature and teamwork skills through the university society.
- **Music**: I've been a member of various choirs and within the last year taught myself how to play the electric and acoustic guitar, recently experimenting with creating and recording my own music using Reaper.

References available on request