

Qirui Chen /'tʃɪəri tʃɛn/

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PROFILE

Senior software engineer with a strong focus on modern C++ and Python, high-performance numerical systems, and ML infrastructure. I have led the design and implementation of latency and throughput-critical backends, modernised large legacy codebases, and shipped ML-powered features from prototype to production.

WORK EXPERIENCE

Senior Software Engineer, Scrum Master

2022 — Present

Carveco

Developed high-performance, modern C++ CAD/CAM software used by global design and manufacturing companies, working on performance-critical geometry, rendering and toolpath computation in a large, partially legacy codebase.

- Optimised multiple hot paths from $O(n^2)$ to $O(n)$ via algorithmic redesign and cache-aware data layouts, significantly improving responsiveness on large models
- Designed and implemented a graph-based texture brush engine, including serialisation to and from a SQLite archive
- Extended OpenGL rendering and toolpath generation to support rotary reliefs
- Modernised a legacy MFC/embedded IE frontend into a React + CEF architecture, defining clean C++/JS APIs

Led an AI-powered feature from research prototype to production, collaborating across engineering, application specialists, and commercial teams.

- Researched and adapted state-of-the-art machine learning models in Python (PyTorch) for a patent-pending feature, including experimentation, evaluation, and integration into an existing C++ product
- Directed an MLOps effort scaling a Django-based inference and credit-billing service from 0.05 RPS / 5k MAU to 50 RPS / 20k MAU by removing N+1 query patterns, introducing selective caching, and migrating to Async Django
- Automated Docker and Terraform-based deployment of Azure infrastructure via DevOps pipelines; introduced modern tooling (uv, ruff, lefthook, nix) and implemented telemetry and monitoring through Sentry, Azure dashboards, and Slack alerting

Analyst (Employee #2)

2021 — 2022

Ultra Horizon

Delivered secure networking and technical services for high-net-worth clients across complex environments (multi-site estates, superyachts).

- Produced technical reports and presentations on topics such as cryptocurrency, quantum computing, machine learning and AI, creating a new sales channel and deepening client engagement
- Deployed and maintained self-hosted services (e.g. Bitwarden, Jitsi) on Proxmox, automating routine operations and improving reliability
- Coordinated timelines and scope between partners and collaborators, reducing work overlap and shortening project cycles

Technical Consultant

2018 — 2020

Various

- Safran UK – Data Extraction and Migration
 - Unblocked a large-scale data migration for a Tier-1 aerospace and defence company ahead of schedule, using advanced Excel wizardry to automate an ETL pipeline, classifying and transferring BOM data into a PLM system under strict regulatory constraints
- United Blinds – Infrastructure and Warehouse Management Prototype
 - Migrated networking infrastructure for a major UK distributor while assisting staff with day-to-day technical issues
 - Prototyped a Flutter-based warehouse management system, improving inventory visibility and providing a path away from manual processes
- Knight & Jones (now part of Curzon Green Solicitors) – GDPR Advisory
 - Analysed data-handling workflows and identified operational risks prior to GDPR implementation

- Proposed pragmatic process and systems changes to support compliant data management, retention, and access control

Teaching Assistant

2016 — 2018

University of Bristol

- Lead workshops for Theory of Computation coursework
- Assisted students in labs for Computer Graphics and Concurrent Computing

Software Engineer Intern

2017

Autodesk

- Lead migration from OpenGL 2 to 3, unblocking long-running technical debt
- Worked as part of a team producing multiple updates for a industry leading creative desktop application

Functional Programming Intern

2016

University of Bristol

- Redesigned first year Haskell lab exercises, updating coursework scaffolding for compatibility with all operation systems
- Adapted final project towards visually interesting exploration of fractal L-systems

PROJECTS

S&P 500 Drawdown Analysis, (qqii.github.io/spx-info/index.html)

2025

- Analysed historical drawdowns in the S&P 500 index using Python, Pandas and Plotly, exploring market regimes and recovery behaviour
- Automated data ingestion from Yahoo Finance and static site generation via GitHub Actions CI, producing an always-up-to-date, reproducible analysis
- Shared results publicly and received community feedback on Reddit ([link](#))

Advent of Code, author (github.com/qqii?tab=repositories&q=advent-of-code)

2022, 2023

- Explored advanced Excel features, including functional programming in Excel
- Learnt BQN (array programming language) to contrast STL `<algorithms>`, `<ranges>` and numpy

Open Source Contributions

- **Python:** [huggingface/diffusers](#), [encode/django-rest-framework](#), [em1208/adrf](#), [jpadilla/pyjwt](#)
- **Web:** [Shopify/web-configs](#), [braver/programmingfonts](#)
- **Infra:** [hashicorp/terraform-provider-azurerms](#), [xtruder/nix-devcontainer](#), [microsoft/winget-pkgs](#)

EDUCATION

University of Bristol

Bachelor's of Science, Computer Science

2015 — 2020 (inc. Part Time)

- Unbeaten performance in concurrent Game of Life implementation, multi core XMOS architecture ([report](#))
- Software Renderer implementing wire-frames, Blinn-Phong and ray marching (metaballs) ([video](#))
- Multiplayer rhythm arcade dungeon crawler (think Crypt of the NecroDancer + MMO) ([org](#))

Paindora's Box, co-author (github.com/qqii/paindoras-box)

2018

- A box that feels pain ([video](#))

SKILLS

Programming Languages

- **Fluent:** Modern C++, Python, Bash, JavaScript, PowerShell
- **Literate:** C, Java, C#, Visual Basic, Lua, Go

Libraries

- **Fluent:** Abseil, GLM, Google Test, Catch2, Boost Ranges, React, Async Django
- **Literate:** SQLite, Chromium Embedded Framework (CEF), FastAPI, Pydantic, msgpack, Sentry (Python), Microsoft Foundation Classes (MFC), Active Template Library (ATL), OpenGL

Tools

- **Fluent:** Git, Docker, Excel (functions, macros, PowerQuery), Visual Studio Code, Proxmox
- **Literate:** Docker Compose, Postgres, Linux, Azure, AWS, GCP, uv, devcontainers