

Daniel Halwell

AI & Data Engineering · Synextra

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Profile

I build AI agents, developer tools and machine learning systems. My personal projects span tool orchestration, agent policy controls, compiler design, scientific machine learning and language model research.

I came to engineering through pharmaceutical science. That background shapes how I work: define the problem, test against evidence, investigate failure modes and make results reproducible. Outside work, I build developer tools in Rust and TypeScript and research language model training and evaluation.

Earlier roles and consulting

AstraZeneca · Senior Scientist

Joined May 2021

- Led a RAG laboratory assistant from proof of concept to deployment with a cross-functional team, including risk assessment and evaluation against expected outputs in a regulated setting.
- Developed a nitrosamine assessment agent framework in Microsoft Copilot Studio, with input moderation, structured outputs, SME review and LLM-as-judge validation.
- Prototyped agent workflows for scientific method development, investigating failure modes and safe tool use.
- Built Python and Snowflake SQL data pipelines, Streamlit applications and two FastAPI REST APIs connecting data for generative AI tools and MCP.
- Applied Bayesian optimisation to reduce method development time by 50%, and worked on graph neural networks for chemical property prediction.
- Mentored colleagues through the internal Coding Network and served on the programming expert panel.

CoDHe Labs · AI Engineer, part-time

Started July 2025

- Advised on generative AI, machine learning and data analysis, particularly for non-profit organisations.
- Provided digital support, improvement strategies and Azure / Microsoft 365 service management.
- Built a proof-of-concept agentic VS Code extension for a healthcare client to turn unstructured data into a recognised standard.

Sanofi / Recipharm · Analytical Specialist

September 2016 - May 2021

- Developed analytical methods and investigated urgent manufacturing issues with scientists, engineers and microbiologists.
- Led internal and external extractables and leachables studies across multiple products.
- Led a cross-functional investigation into a critical impurity issue, generating £100,000 in savings.
- Used statistical analysis to support business decisions and regulatory submissions.

Sanofi · Quality & Senior Quality Analyst

October 2012 - September 2016

- Tested drug substances and products in a regulated quality-control environment.

- Led out-of-trend and out-of-specification investigations across engineering, manufacturing and quality.
- Deputised for line management, including workload planning and team coordination.

Mars Petcare · Research placements

August 2009 - September 2010; June - August 2011

- Investigated flavour perception and the persistence of compounds in the mouth, using mass spectrometry and sensory analysis.
- Introduced FIZZ sensory analysis software, including setup and documentation.
- Used LC-MS, GC-MS and GC-FID in food chemistry research, and supported pilot-scale production and sensory trials.

Project Trust · Volunteer Teacher

August 2006 - June 2007

- Taught mathematics, science and physical education to secondary school pupils in Guyana.

Selected engineering projects

Codyspendent

A local-first agentic developer environment built around a Rust daemon, with a terminal UI, Tauri desktop app and IDE integrations. Work includes session continuity, approvals, isolated Git worktrees, recovery and native application testing.

Typhon

A statically typed Python dialect with a compiler and developer tooling written in Rust. It emits readable Python and includes a type checker, language server, formatter and REPL.

Agent-Gantry and ADAPT-Agent

Agent-Gantry is a Python tool orchestration library for semantic tool selection, provider schema conversion, controlled execution and MCP / A2A integration. **ADAPT-Agent** adds agent policy controls, adversarial detection, taint tracking, evaluation and framework adapters.

Scientific machine learning

Spec2Graph explores molecular graph prediction from mass spectra using spectral diffusion models. Related chemistry projects include **chemical-graph-series**, **mol-modalist** and **ChemGPT-R**.

Language model research, training and evaluation

Architecture research includes the **OSRT** sparse recursive transformer series and **LANTERN**, which investigates adaptive computation based on token uncertainty.

Experiments in **coding model fine-tuning** cover supervised fine-tuning, preference optimisation and coding-agent evaluation, comparing task success, reasoning cost and full execution traces before promoting a model checkpoint.

Shallow Research Code Assistant

A Gradio-based MCP research and coding assistant that combines web search, specialised agents, Python code generation and execution in Modal sandboxes.

Other Rust research includes **ferro**, a tensor and automatic differentiation backend; **agent-framework-rs**, a Rust implementation of Microsoft Agent Framework; and **AnimaOS**, an experimental operating system for autonomous agents.

Skills

- **AI systems:** agents, RAG, MCP, prompt engineering, structured outputs, evaluation, synthetic data and adversarial testing.
- **Model development:** PyTorch, TensorFlow, scikit-learn, graph neural networks, Bayesian optimisation, supervised fine-tuning and preference optimisation.
- **Languages and applications:** Python, Rust, TypeScript, SQL, React, Next.js, Tauri, FastAPI, Flask, Streamlit and Gradio.
- **Agents and model APIs:** Microsoft Agent Framework, Azure AI Foundry, Copilot Studio, OpenAI Agents SDK, Google ADK, CrewAI, SmolAgents, LlamaIndex, LangGraph, OpenAI, Anthropic and Vertex AI.
- **Data and cloud:** Snowflake, Pandas, NumPy, Azure, Docker, REST APIs and observability; familiarity with AWS and GCP.
- **Communication:** Power BI, Matplotlib, Plotly, technical documentation, mentoring and collaboration across scientific and engineering teams.

Achievements

- Won the **US\$5,000 Modal Labs Choice Award** for an agentic MCP server at the Gradio + Hugging Face hackathon in July 2025.
- Placed **4th out of more than 4,300 participants** in a Kaggle rainfall prediction competition in March 2025.

Education

Master's in Chemistry · Loughborough University

2007 - 2012 · 2:1 with Diploma in Industrial Studies

Professional development

Certificates completed in 2023 - 2025:

- Docker Foundations Professional Certificate
- Microsoft Python Development Certificate
- IBM AI Developer Professional Certificate
- Google Data Analytics Professional Certificate
- DeepLearning.AI TensorFlow Developer Specialisation
- DataCamp SQL Associate and Data Scientist Associate certificates
- IBM RAG and Agentic AI Professional Certificate
- DeepLearning.AI Agentic AI Certificate
- Teaching the AI Fluency Framework · Anthropic · November 2025

Further study: IBM Generative AI Engineering and DeepLearning.AI PyTorch Professional Certification.

Outside work

I enjoy building tools and automations, studying science, economics, neuroscience and psychology, and following football, rugby and Formula 1.