Ben Hull

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A results-driven Software Developer and Security Consultant with expertise in machine learning, software development, and cyber security. Brings a unique analytical perspective from a Mathematics and Physics background, with a proven ability to transform complex theoretical concepts into practical solutions.

Employment and Experience

CrowdComms

API Developer ***June 2024 – Onwards***

Backend developer specialising in Python web frameworks and API development. Developing and maintaining robust, scalable API solutions while managing multiple projects independently. Experienced in creating complex workflows, such as payment processing, and designing and implementing machine learning and AI product features.

- Developed and maintained REST APIs using Django and FastAPI, ensuring the implementations were robust and efficient.
- Helped design and implement a standardised platform integration framework, reducing the time to integrate third-party systems from months to a matter of days.
- Developed a delegate matchmaking system using similarity searching between embeddings from a variety of data sources, with results fine-tuned on the distribution of historical company data.
- Designed a RAG assistant for our service desk, trained on the company knowledge base and previous support tickets, reducing the time to resolve tickets.

WithSecure (formerly F-Secure)

Associate Security Consultant ***June 2021 – June 2024***

Associate Security Consultant with experience and expertise in delivering a wide range of security consulting projects across Web Applications, Infrastructure, and Mainframes. Developed excellent written and verbal communication skills which allowed me to effectively engage with clients to meet their needs. During the role I:

- Developed advanced expertise in penetration testing and security consulting, with a particular focus on Mainframe and Network security.
- Delivered tailored security solutions for a diverse portfolio of clients, successfully addressing complex and high-stakes challenges across varied industries.
- Conducted research into novel attack detection techniques using machine learning (PyTorch), engineered a Mainframe security auditing tool in Python, applied advanced data analysis and visualisation techniques, and built automated vulnerability reporting frameworks to streamline security assessments.

Publications

- **Domain-specific prompt injection detection (WithSecure Labs, April 2024)**: Led research on prompt injection detection in LLMs, developing novel approaches for machine learning-based detection of adversarial prompts using the BERT architecture.

Skills

Software Development: Python, Django, FastAPI, PyTorch, Backend Development, AWS

Development Tools & Methodologies: Jira, Git, Agile SDLC, Test Driven Development

AI and Machine Learning: Deep Learning, Transformers, NLP, Computer Vision, Self-Supervised Learning, RAG, Fine Tuning, Network Design

Data: Data Manipulation & Cleaning, Data Visualisation, Web Scraping, Anomaly Detection, Statistical Analysis and Modelling, Data Visulisation

Cyber Security: Network Security, Application Security, Enumeration, OSINT, LLM Security

Education and Qualifications

Durham University

MSci Mathematics and Physics, First Class ***2017 – 2021***

Specialised in Quantum Field Theory, Particle Physics, General Relativity, Quantum Information, Real Analysis and Differential Geometry.

Publications

- *Using residual heat maps to visualise Benford's multi-digit law, Benjamin Hull et al 2022 Eur. J. Phys. 43 015803, https://doi.org/10.1088/1361-6404/ac3671*: Analysed house price data to determine tax reduction behaviours in response to law changes in tax bracket thresholds.

Professional Qualifications

- June 2023 Crest Registered Penetration Tester (CRT)
- January 2022 Microsoft Azure Administrative Associate
- March 2020 Offensive Security Certified Professional (OSCP)

Projects and Publications

My research demonstrates my expertise across machine and deep learning architectures, financial analysis and cyber security. Key areas of focus include transformer-based architectures, fraud detection and machine learning for financial markets. All my research projects are available at https://bluehood.github.io.

- **Contextual Chess Position Embeddings (2025)**: Designed and implemented a novel Transformer-based model to learn rich, contextual vector representations (embeddings) of chess positions through self-supervised training.
- **Financial Fraud Detection Research (2021)**: Led a research project at Durham University analysing the application of Benford's law to financial fraud detection, focusing on house price data and SEC filings to develop novel detection methodologies. Analysed the mathematical framework of Benford's law and proved novel results to enable the analysis of smaller constrained datasets.
- **Language Translation Transformer (2024)**: Implemented an English-to-French translation model using the Transformer architecture in PyTorch, focusing on creating an accessible implementation of the "Attention is All You Need" paper's concepts.
- **GPT Implementation Research (2024)**: Developed a from-scratch implementation of the GPT architecture using PyTorch, demonstrating a deep understanding of transformer architecture and language modelling principles.

Additional Interests

- Competitive chess player who participates in online tournaments.
- As an enthusiastic athlete, I have represented my county in Cricket and Hockey. I also regularly compete in long-distance running races.
- Previously mentored and tutored students from disadvantaged backgrounds in Mathematics and Physics, whilst helping them prepare for University applications.
- Volunteer at the Dorset Lavender Farm Project, helping young people from difficult backgrounds gain the experience and skills to find jobs.