

## TOM TARPEY

**Principal AI Engineer | Security & Database Analyst | Infrastructure & Software Architect | CS Consultant**

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## TECHNICAL SKILLS

### AI / ML / LLM:

**Large Language Models:** GPT-4, Claude, LLaMA, Mistral, Falcon, Gemma, QLoRA, LoRA, PEFT

**LLM Fine-tuning:** Custom dataset preparation, sentiment tuning, prompt engineering, hyperparameter optimization

**Quantization & Micro-LLMs:** QLoRA/LoRA techniques for embedded & low-powered hardware

**RAG (Retrieval-Augmented Generation):** Vector database integration, knowledge retrieval systems

**Agentic Workflows:** Autonomous agents, form-filling agents, document research agents, orchestration tools (LangChain, LCEL)

**Observability Platforms:** LLMOps, tracing, performance & cost analysis, success rate optimization

**Computer Vision:** Integrated machine vision with LLMs for threat monitoring, video feed analysis

**Security & Guardrails:** Adversarial testing, LLM gating, prompt injection mitigation, red teaming

**DevOps for AI:** Model deployment, system integration, multi-cloud operations (AWS Bedrock, local deployments)

**Teaching:** AI for Developer Productivity, ML/LLM curriculum design, quantization, transformers

**Backend:** C, C++, C#, Assembly, Java, Flask, Django, AWS (Lambda, EBS, API GW, Amplify, Polly), Node.js, Express, SQL, Postgres, Python, Git CLI, GitHub, VS Code, MongoDB, Kubernetes, Vercel, Heroku, Netlify, GCP, JSON, JSON Web Tokens, RESTful APIs, Knex

**Frontend:** React.js, Next.js, Electron, RxJS, React Native, JavaScript, Typescript, HTML, CSS, Redux, Context API, Hooks, NextJS, Jest, Cypress, Yup, Axios, Sass, Styled-Components, Bootstrap, MaterialUI, Tailwind

## EXPERIENCE

### Gauntlet AI — Head of Engineering / Principal Solutions Architect

*2024 – Present*

Lead engineering initiatives across AI-driven EdTech platforms with a focus on productivity and assessment automation. Designed and deployed Automated Marking Workflows using hyper-specialized LLMs based on custom scenarios and rubrics. Developed LMS-integrated agentic systems to monitor, evaluate, and enhance learner performance through time-tracking and watchdog agents. Taught internal and external courses in AI for Developer Productivity, LLM fine-tuning, quantization (LoRA, QLoRA), transformers, security, and CV integration. Oversaw the full DevOps and SysOps lifecycle of Gauntlet AI's platforms. Managed cross-functional teams to deliver scalable AI/ML infrastructure, data pipelines, and model deployment systems

### Aitra — Engineering Manager / Principal AI Engineer

*2022 – Present*

Delivered LLM-based solutions for various clients across industries including utility management, embedded systems, and defense. Designed and implemented agentic workflows such as a Form Filling Agent and Form Research Agent to automate utility sign-up processes. Integrated OpenAI models with observability platforms to track costs, improve outcomes, and reduce client-customer friction. Built micro LLMs for constrained hardware using quantization and QLoRA, supporting fine-tuned, low-latency performance. Worked on video overwatch systems using integrated CV/LLM pipelines for threat detection and situational awareness. Developed security-focused LLM gating mechanisms and performed hyperparameter optimization for high-performance deployments. Led multiple project teams as Engineering Manager across RAG pipelines, agent development, LLM orchestration, and API integrations.

### BloomTech (formerly Lambda School) — CS / Java Enterprise Backend Development Instructor

*2019 – Present*

Delivered comprehensive backend and computer science curriculum content with a focus on Java, Spring Boot, Postgres, and system design. Built and maintained internal educational platforms and developer tools. Led student cohorts through Labs projects and contributed to curriculum evolution. Conducted whiteboarding sessions, mock interviews, and personalized support for learner outcomes

## **Decagon Development Limited — CEO / Dev Director / Security & DB Analyst / Infrastructure Architect**

*1998 – 2019*

Oversaw company-wide development operations including system design, architecture, and security compliance for B2B/B2G clients. Delivered infrastructure solutions tailored to client needs including telemetric, encrypted, and compliant systems. Led multiple development teams across simultaneous projects for web, mobile, and embedded platforms. Pioneered some of the BERT model integrations in the Machine Learning Development teams as an early adopter of the BERT and GPT2 models

## **Computer Learn UK Ltd — Director of Education / DPO / CIO**

*2012 – 2016*

- Oversaw the educational and IT strategy, delivering compliant and scalable platforms for learners
- Audited and maintained network security and QoS standards across the entire academic platform

## **Technology Nets Ltd — Development Director / CEO / CIO**

*2012 – 2015*

- Delivered technical leadership and infrastructure management across multiple SaaS and internal product builds
- Developed business intelligence solutions and managed brand strategy

## **Target Security Solutions Ltd — Security Analyst / Software Architect / DPO**

*2012 – 2014*

- Designed and deployed critical infrastructure security systems for real-time monitoring and biometric data collection
- Led architecture and deployment of wearable device networks for security personnel

## **First Debt Help Ltd — Software Architect / Development Consultant**

*2012 – 2014*

- Built enterprise dialing systems and cloud-based infrastructure linking marketing, lead-gen, and customer service systems

## PC Components (Midlands) Ltd — Managing Director / CEO / Technical Consultant / DPO

2006 – 2010

- Led business strategy, back-end systems design, and security practices for local and national clients

## POSIX Computers — Computer Consultant

2001 – 2006

- Delivered consultation services on system upgrades, security modeling, and embedded system integration

## Millennium Computer Consultants — Technical Consultant

1999 – 2001

- Led technical teams delivering software solutions for GKN and other major enterprise clients

## Dectaro Computer Security — Security Consultant

1997 – 2000

- Conducted advanced security audits, systems modeling, and infrastructure deployment for sensitive clients

## AI & LLM PROJECTS

**Aitra Utility Agent System:** Built a form-filling and research agent workflow using OpenAI models to automate tenant/landlord utility enrollment. Integrated observability tools to monitor model cost and outcome success for optimization. Employed agentic design to remove customer friction and improve processing speeds

**Aitra Embedded LLM Deployment:** Delivered fine-tuned quantized micro-LLMs for client-specific use cases on low-powered embedded hardware. Used QLoRA/LoRA to retain performance while meeting hardware constraints

**Aitra Video Overwatch Threat Monitoring System:** Combined machine vision and LLMs to create a video analysis pipeline for identifying potential threats and object tracking

**Gauntlet AI Marking Automation System:** Developed automated grading system using specialized LLMs fine-tuned with rubrics for learner evaluation. Integrated with LMS and agentic workflows for end-to-end submission and feedback automation

**Gauntlet AI Time Tracking & Watchdog Agent** - Created agentic time tracker to monitor and log student activity, enforce proctoring, and detect learning bottlenecks

## OTHER PROJECTS

**Tutorial Video Series, Creator / Editor [YouTube]** - Topics: JavaScript, Express, Docker, Python, Radare2, Java, Parrot OS, Git, Springboot, DynamoDB

**Speaq, Consultant** - Designed backend with Python, Flask, SQL, AWS Polly. Set up CI/CD DevOps pipelines for deployment automation

**DsA-AsA, Developer / Designer** - Full-stack educational platform with React, Spring Boot, Postgres. Now used in Bloomtech Labs curriculum

## EDUCATION

**Scheidegger MiS, Honors** - Dissertation: *Virtual Mnemonic Encryption structure to enhance military-grade security* – 2005

**Scheidegger MiS, Honors** - Dissertation: *Modern O/S Secure Kernel Writing and Development* – 2000

**Josiah Mason College, HND in Manufacturing– Electrical and Electronics Engineering** - Thesis: *Electrical Components & Bipolar Magnetism – Better Shielding Techniques* – 1997