Gursukh Sembi

(+44) 7930 085394 | gursukhsembi@gmail.com | linkedin.com/in/gursukh-sembi/

Educational Qualifications

Imperial College London, MEng Computing (AI & ML) **London, UK** | Oct 2022 – Jun 2026

- ◇ **Grade:** First Class Honours (Expected)
- ◇ **Technical Awards: 1st Prize** in CUDA Kernel Development Competition · **1st Prize** in Shader Graphics Competition
- ◇ **Interdisciplinary:** First Class distinction in Psychology, Philosophy & Music Technology

Work Experience

Software Engineer (Placement), *Bloomberg LP* **London, UK** | May 2025 – Oct 2025

- ◇ Spearheaded the R&D of a novel machine learning architecture to replace legacy C++ infrastructure, achieving a **1000x acceleration** in inference latency for single-assets and **100x** for multi-asset portfolios
- ◇ Engineered a high-precision inference model using PyTorch and JIT compilation, optimizing for numerical stability to ensure outputs remained deterministic and accurate to **12 decimal places**
- ◇ Authored a technical white paper detailing the model's mathematical foundations and presented the research methodology to **500+ engineers**, facilitating knowledge transfer across varying levels of ML proficiency

Software Engineer, *Terra API* **London, UK** | May 2023 – Nov 2024

- ◇ Architected and deployed a full-stack web platform using Next.js and AWS, optimizing caching strategies and static generation to achieve **sub-second load latencies** while scaling to 6,000 daily visitors.
- ◇ Engineered an end-to-end event ingestion pipeline processing **100,000+ daily events** across client and server-side streams, utilizing Python and Postgres to ensure reliable data consistency for downstream analytics.
- ◇ Co-designed a high-throughput API microservice using **Go and GCP**, architected to handle concurrency for over **1,000,000 end users** with minimal overhead.
- ◇ Instrumented application observability using **OpenTelemetry** and PostHog to identify user friction points, driving a **15% reduction** in customer drop-off through data-driven optimizations.

ARM Technology Insight Day, *ARM Technology* **Warwick, UK** | May 2022

- ◇ Selected for an exclusive insight program with senior engineers regarding the future of semiconductor architectures
- ◇ Produced an analysis of the proposed Nvidia-ARM acquisition, evaluating the impacts on the RISC architecture ecosystem

Projects & Other Experience

ICLand, *JAX, Python, GPU Acceleration* **London, UK** | Jan 2025 – Mar 2025

- ◇ Developed an open-source reproduction of Google DeepMind's XLand, optimizing multi-agent reinforcement learning environments to win the **Ocado Technology Prize** for technical excellence
- ◇ Engineered a custom renderer and physics engine completely within **JAX**, leveraging JIT compilation and auto-vectorization to simulate **thousands of environments in parallel** on a single GPU
- ◇ Implemented the **Gymnasium API** interface to ensure compatibility with standard RL libraries, enabling seamless adoption by the research community

Hack Harvard Winner, *C++, Python, IoT, Microcontrollers* **Boston, USA** | Oct 2024

- ◇ Engineered a smart insole incorporating pressure sensor arrays and microcontrollers to perform **real-time gait analysis** and dynamic shape adjustment for diabetic patients
- ◇ Architected a low-latency telemetry pipeline to ingest **high-frequency sensor data** from edge devices, enabling remote clinical diagnosis and pattern recognition of foot pathologies

DurHack Winner (QRT Challenge), *Python, AWS, Graph Optimization* **Durham, UK** | Oct 2025

- ◇ Developed a **multi-objective optimization engine** to determine optimal global meeting locations, minimizing a non-convex weighted cost function of CO_2 emissions, travel latency, and jetlag inequality
- ◇ Built a scalable backend on AWS to execute **pathfinding algorithms** across a dense graph of flight routes connecting QRT offices and the world's top 50 international airports

Stanford University & MIT Hackathon Judge, **San Francisco / Boston, USA** | Feb 2024

- ◇ Judged 200+ projects, providing detailed advice on improving technical feasibility and viability, leading to the continuation of several projects post hackathon.
- ◇ Conducted workshops, teaching participants how to use REST APIs, resulting over 100 teams using said tools as an integral part of their project.

Skills, Interests & Volunteering

Skills: Python, C++, Go, TypeScript, Java, C# PyTorch, JAX, NumPy, CUDA, SciPy, Pandas, AWS, GCP, Docker, Kubernetes
Interests: Callisthenics, Thai boxing, machine learning & AI, jazz pianist, guitarist, and cooking.
Volunteering: Sikh Temple Volunteer (2018-2019), Wood4Trees Volunteer (2021-2022), MillionMeals (2025-Present).