

# Sami Hatoum

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## Education

University of St Andrews

BSc Computer Science

2021 – 2025

First Class Honours, Dean's List

University College London

MSc Artificial Intelligence and Medical Imaging

2025 – 2026

Predicted Distinction

## Experience

PricewaterhouseCoopers (PwC)

Software Consulting Intern (AI)

Jun 2024 – Aug 2024

- Built a **sentiment analysis model** using **PyTorch BERT** to automate customer feedback classification for a retail client. Achieved **91% F1 score** on an imbalanced dataset (3:1 negative to positive), processing **10,000 reviews daily**
- Engineered containerised deployment with **Flask API** on **AWS EC2** with auto-scaling across multiple instances. Collaborated with 3 senior consultants to validate **sub-500ms latency** under load testing
- Set up **CloudWatch** monitoring dashboards and wrote a retraining script triggered when weekly evaluation accuracy dropped below **85%**
- Optimised the preprocessing pipeline with **pandas vectorisation**, reducing daily batch processing time by **60%**

PricewaterhouseCoopers (PwC)

Software Engineering Intern

Aug 2023 – Sep 2023

- Developed an internal **client onboarding dashboard** in **React** and **Node.js** that replaced a manual spreadsheet workflow for a financial services team, reducing onboarding processing time from **3 days to 4 hours**
- Designed and implemented a **PostgreSQL** data model with role-based access control, integrating with PwC's internal **SSO authentication** system
- Wrote **CI/CD pipelines** in **GitHub Actions** with automated testing and staged deployments to **AWS**, achieving **90%+ code coverage** across 45 unit and integration tests

## Projects

Database Query Optimiser

- Developed a **PostgreSQL analysis tool** that parses **query ASTs**, evaluates **EXPLAIN plans**, and recommends indexes. Reduced query execution time from **2.4s to 420ms** on table scans over **500K rows**
- Reviewed **200+ production queries** across a **five-million-row database** (12 tables), identifying **21 missing indexes** that reduced average query time by **65%**
- Deployed on **AWS ECS** with **RDS PostgreSQL**, implementing **CloudWatch** alerts and **auto-scaling groups** for batch analysis traffic spikes

Selective Prediction for Prostate Cancer Segmentation (MSc Dissertation)

- Trained **nnU-Net** (5-fold cross-validation, 9-class segmentation) on multi-institutional prostate MRI, achieving **0.82 mean foreground DSC** with per-organ scores exceeding **0.90** on major structures
- Implemented **Monte Carlo Dropout** inference (T=20 forward passes) with entropy, mutual information, and coefficient of variation aggregation to produce per-scan clinical deferral decisions
- Built a **selective prediction framework** that maintained **0.89 DSC at 85% coverage**, automatically flagging unreliable cases for clinical review and reducing potential silent failures in treatment planning

Clinically Weighted Pelvic Organ Segmentation (Group Project)

- Designed a custom **hierarchical loss function** encoding radiosensitivity scores, anatomical proximity to isocentre, and asymmetric penalty weighting for prostate **IMRT** planning
- Trained a **3D Residual Encoder U-Net** on **589 multi-institutional T2-weighted MRI** volumes (7 institutions, 1.5T and 3T scanners) achieving **0.886 mean foreground DSC**; improved **NVB segmentation from 0.630 to 0.659 DSC** over unweighted baseline
- Conducted **ablation studies** across 3 loss functions and 3 weighting schemes, isolating contributions of sensitivity and distance error weighting

## Skills

**Programming Languages:** Python, Java, JavaScript, TypeScript, SQL

**Frameworks:** React, Next.js, Node.js, Flask, React Native

**Cloud & DevOps:** AWS (Certified Cloud Practitioner), Docker, Git, Kubernetes, Jira, CI/CD

**AI & Machine Learning:** TensorFlow, PyTorch, BERT, NLP, U-Net, Scikit-learn, Pandas, NumPy