

Ratneshwaran (Ratnesh) Maheswaran

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[LinkedIn](#) [GitHub](#) [Portfolio](#)

Research Profile: AI researcher with experience in reliable, evaluation-led LLM systems for high-stakes settings and reproducible ML pipelines for complex real-world datasets. Strong in experimental design, benchmarking, error analysis, and building research software that supports transparent iteration. Open to research across domains, with a focus on strong ML methodology, evaluation, and reproducibility, and demonstrated applied work in healthcare and scientific data.

Education

University College London (UCL), UK Sep 2024 - Dec 2025
MSc Artificial Intelligence for Biomedicine and Healthcare
Grade: Distinction

The University of Nottingham, UK Sep 2021 - Jul 2024
BEng (Hons) Electronic and Computer Engineering
Grade: Upper Second-Class Honours

Research Experience

UCL Centre for Artificial Intelligence Oct 2025 - Dec 2025
Research Assistant (*collaboration with Freedom from Torture, UK charity*)

- Prototyped multilingual, trauma-informed conversational agents using LLMs and agentic frameworks (LangGraph, CrewAI).
- Built structured synthetic clinician-style dialogue datasets and evaluation harnesses for reliability and safety behaviours.
- Implemented conservative risk monitoring and escalation logic to handle high-risk content, with audit-friendly logging.
- Integrated multiple model providers (OpenAI, Claude, Llama, Groq, AWS Bedrock) into reproducible, testable pipelines.

Secier Lab, UCL Genetics Institute Mar 2025 - Sep 2025
MSc AI Researcher (Applied ML on scientific datasets) (*part time*)

- Built reproducible pipelines (PyTorch, Scanpy, scvi-tools) for processing and analysing large-scale single-cell datasets across multiple cohorts.
- Benchmarked foundation model approaches for classification and state prediction using Accuracy, F1, AUROC, and AUPRC.
- Studied generalisation under batch effects and dataset shift using systematic diagnostics and stratified error analysis.
- Maintained clean research code, experiment tracking, and documentation to support reuse and preprint preparation.

Selected Research Outputs and Research Software

Grounded By Design: Safety-aware LLM Voice Assistant (Prototype) 2025 - 2026

- Research prototype exploring reliability and safety mechanisms for multilingual voice-based LLM support in sensitive contexts.
- Implemented monitoring and guardrails to detect high-risk content and route to conservative handover pathways.

- Built an end-to-end STT and TTS pipeline with instrumentation for auditability (logging, transcript capture) and outcome signals.
- Manuscript in preparation.

LitAgent: AI Agent for Literature Search and Synthesis 2025

- LangGraph-driven multi-agent system for automated search and synthesis across *arXiv* and *PubMed*, with Crossref enrichment.
- Exports structured outputs (Markdown, JSON, CSV), supports CLI and REST API, and includes critique checks to flag overclaims.
- [GitHub](#)

Zero-Shot Cell Annotation with Foundation Models 2025

- Implemented zero-shot pipelines for cell classification and multi-class state prediction across multiple datasets.
- Integrated evaluation (Accuracy, F1, AUROC, AUPRC) and diagnostic visualisations to assess generalisation and dataset shift.
- [LangCell GitHub](#), [Geneformer GitHub](#)

Record2Table: Multi-document Processing Pipeline for Structured Outputs 2026

- Pipeline to ingest multiple documents per case and produce consolidated structured JSON, tables, and concise summaries.
- Implemented schema-based extraction, normalisation utilities, provenance-friendly outputs (source snippets), and evaluation scripts.

RareTree Scout: Confidence-aware Canopy Mapper 2026

- Aerial imagery segmentation pipeline with uncertainty estimation and GIS-ready exports (GeoJSON, Shapefile, confidence rasters).

Enhancing Aspect-Based Sentiment Analysis with Adversarial Training and Hierarchical Aggregation (BERT) 2025

- Improved aspect extraction and sentiment classification by combining adversarial training with hierarchical aggregation.
- Preprint in preparation.

Additional projects and technical write-ups are available on my [website](#) and [GitHub](#).

Research Interests

Reliable and Safe LLM Systems, Agentic Evaluation and Testing, Representation Learning, AI Bias, Reproducible ML, AI for Scientific and Biomedical Data, Large-scale Data Analytics

Skills

Programming: Python, R, SQL, C/C++, MATLAB, Java, TypeScript

ML and Data: PyTorch, TensorFlow, scikit-learn, NumPy, Pandas; evaluation (Accuracy, F1, AUROC, AUPRC), error analysis

Scientific ML: Scanpy, scvi-tools; single-cell data preprocessing and QC, batch-aware benchmarking, embedding diagnostics

LLM Systems: LangChain, LangGraph; RAG and embeddings; OpenAI APIs; AWS Bedrock; monitoring and structured evaluation

Compute and Reproducibility: Linux, bash, HPC (SLURM), Snakemake or Nextflow, conda or poetry, CI (GitHub Actions), Docker

Tools and Platforms: Git, FastAPI, PostgreSQL, Node.js, React, Streamlit, LaTeX, AWS

Additional: Computer vision (segmentation, IoU, Dice), geospatial tooling (GeoPandas, Rasterio, QGIS basic)

Leadership and Service

Open-Source Assistive Devices (OPAD), University of Nottingham

Sep 2022 - Jul 2024

President, Faculty of Engineering Society

- Directed 12+ student-led assistive and medical device projects, coordinating cross-disciplinary teams across hardware, software, and data workflows.
- Set requirements, milestones, and QA checks for reliable prototypes aligned to user needs; secured £1500 in grant funding.

40seconds.org (Ratneshwaran Foundation)

Jan 2020 - 2023

Founder and CEO (Non-profit, currently in hiatus)

- Founded a global non-profit promoting mental health awareness and human rights among youth; led initiatives across 19 countries.
- Coordinated 120+ volunteers; delivered initiatives and articles; raised £2000 for COVID-19 relief.

Honours

- **Vice-Chancellor's Medal (Top 0.1%), University of Nottingham** 2024
- **EEE Undergraduate Studies Award, University of Nottingham** 2024
- **Nottingham Advantage Awards, University of Nottingham** 2023 - 2024
- **Union Prize and Student Representative of the Year, University of Nottingham** 2022
- **Top 6 Teen Heroes, India** 2021
- **Speaker Invitations (selected): World Summit AI, TEDx, university conferences**

References: Available upon request.