TEDDY CURTIS

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Education

Imperial College London - CERN CMS Experiment   London
PhD, High Energy Physics   *Oct. 2021 – Oct. 2025*

PhD researcher for the CMS experiment at CERN, searching for evidence of dark matter.
Courses: Yandex Machine Learning & Deep Learning Course, Advanced Statistics Course.

University of Manchester   London
MPhys, Theoretical Physics - First-Class Honours (84%)   *Sep. 2016 – June 2020*

Experience

Searches for Dark Matter Production at CERN   Geneva / London
Doctoral Researcher   *Oct. 2021 – Jan. 2026*

- Single-handedly engineered scalable data processing pipelines in Python for rare event detection across 100+ TB datasets using large-scale batch computing infrastructure.

- Leveraged graph neural networks and transformer models for particle identification, and developed feedforward networks for event classification in extremely noisy environments.

- Implemented rigorous uncertainty quantification to ensure statistically robust, interpretable results, ultimately achieving world-leading constraints on specific dark matter models.

Graph Neural Networks for Electron/Photon Identification   Geneva / London
Doctoral Researcher   *Oct. 2021 – March 2022*

- Developed a graph neural network for classification on irregular detector data, achieving 30% improvement in signal efficiency at a fixed background rejection compared to boosted decision tree baseline, and eliminating manual feature engineering.

Cardiac Signal Reconstruction Research   London / Sydney (remote)
Technical Lead - University of Sydney   *May 2020 – Jan. 2022*

- Technical lead for patented algorithm reconstructing full 12-channel ECG from sequential single-electrode measurements, collaborating with cardiologists to validate performance.

- Achieved clinical-grade accuracy without approximations required by previous few-electrode methods, enabling high-quality cardiac monitoring with portable devices.

Deep Learning for Cardiac Arrhythmia Detection   Manchester
Masters Thesis - University of Manchester   *Sep. 2019 – June 2020*

- Developed end-to-end deep learning pipeline for cardiac rhythm classification from patient ECG data, including signal preprocessing, model training, and evaluation.

- Compared CNN, RNN, and hybrid architectures in Python (Keras/TensorFlow), achieving performance comparable to state-of-the-art models

Skills

- **Languages:**   Python, SQL, Bash, LaTeX
- **Machine Learning:** PyTorch, CNNs, RNNs, GNNs, Transformers, Statistical Inference, XGBoost, Numpy, Pandas, Scipy
- **Infrastructure:**   Distributed Computing, Batch Processing, HPC, Git