Mehak Gurnani

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WORK EXPERIENCE

Imperial College London
Honorary Research Associate, Cardiac Electrophysiology and AI Research Group

December 2024 - Present

London, UK

- Granted the title in recognition of continued contributions to AI-ECG and cardiology research beyond the formal role
- Supporting ongoing research and collaborations within the group

Owlstone Medical
Data Scientist

December 2024 - February 2025

Cambridge, UK

- Supported OMED product development, including model building, feature engineering, device calibration, and unit testing, ensuring backward compatibility with CI/CD principles
- Worked on signal processing model development for disease classification, modularizing code to handle multi-sensor data efficiently and ensuring scalability through structured functions and classes
- Led regression analyses to quantify process errors and collaborated with engineers to guide lab activities, using data-driven insights to inform decision-making
- Effectively communicated technical findings and their implications on product and business decisions, leveraging a strong understanding of technical approaches and data visualization tools
- Contributed to ongoing breath biopsy research applying data science and software development skills, and extensively using Python and Git for analysis and collaboration

Imperial College London
Data Science Research Assistant, Cardiac Electrophysiology and AI Research Group

October 2023 - November 2024

London, UK

- Developed AI-ECG models using machine learning and statistical approaches on large clinical datasets (1.5M+) on Linux-based High Performance Computing Systems across both Python and R
- Worked with a multidisciplinary team of clinicians and computational experts, contributed to AI-based cardiology projects
- **Projects led** - utilising unsupervised tree-based models to uncover subgroups within broad QRS complex and atrial fibrillation, mortality prediction using transfer learning CNN models, optimizing therapy delivery within implantable cardioverter-defibrillators (ICDs) using time-series based deep learning approaches

elmeas
Data Analyst

March 2023 - June 2023

London, UK

- Performed various tasks including clinical modeling, deriving data insights and openEHR server development
- Developed advanced SQL queries for the backend development of a medical compound database, addressing user queries
- Leveraged Python and RESTful APIs to establish connections to PostgreSQL databases enabling seamless integration for efficient data aggregation, retrieval and analysis
- Developed proficiency in medical and health data coding systems, including ICD-9/10, SNOMED, and ATC

National Heart and Lung Institute
Machine Learning Researcher

July 2022 – September 2022

London, UK

- Worked within the Yang Lab to implement deep learning frameworks to complement lung disease diagnosis
- Implemented, trained and fine tuned U-Net convolution neural networks on CT scans to improve on current airway segmentation results using Python, achieving a Dice score 87%

AstraZeneca, AZ
Functional Genomics Intern, Early Drug Discovery

October 2021 - March 2022

Cambridge, UK

- Optimized a CRISPRn editing assay to annotate toxicity markers relevant to pre-clinical safety screening
- Utilized cutting-edge deep learning techniques for endpoint detection, effectively enhancing a data pre-processing pipeline dedicated to statistical analysis and visualization

EDUCATION

Imperial College London

MSc Health Data Analytics and Machine Learning, Distinction

2022 – 2023

- **Key modules**: Advanced Statistics, Advanced Analytics and Bayesian Methods, Machine Learning, Clinical Data Management, Computational Epidemiology, Translational Data Science
- Worked with real-world datasets (UKBioBank, OMICS data) using **R, Python and SQL**
- Proficient with predictive and network modeling, Machine Learning methodologies and Bayesian methods
- **Thesis**: Extending the Applications of AI-ECG Models to Uncover and Predict Clinically Relevant Phenogroups

BSc Medical Biosciences, First Class Honours

2019 – 2022

- Achieved Distinction in all written scientific pieces based on independent research projects
- Achieved **80.5%** in the Biomedical Data Science using Machine Learning models for biomarker identification

Projects

Healthcare Claims Trend Analysis: Built ARIMA models to forecast inflation trends using Snowflake and Python
Sequential Sentence Classification from RCT Abstracts – using Word2Vec embedding with a bidirectional LSTM
Transfer Learning on Colorectal Cancer Images – combined fine-tuned pre-trained ResNet50 with a Stacked Classifier
Causal Modeling for CVD Risk Prediction – used Cox regression, graphical models and structured causal modeling
Geospatial Modeling of Crimes Against Women – implemented Spatial-temporal Bayesian Modeling on INLA
Breast Cancer Survival Analysis – using clinical and genetic predictors for survival analysis modelling using R
Facebook Data Challenge – analyzed consumer trends and demographics for market segmentation insights on Python

Technical Skills

Languages: Python (PyData stack HuggingFace, pytest, unittest, Plotly Dash), R (ggplot2, dplyr, tidyverse, testthat), SQL
Software/Tooling: Git, LaTex, Microsoft Office, Bash, Jupyter, ELK Stack, Agile/Scrum, DVC
Statistics and ML-specific: regression analysis, hypothesis testing, time-series analysis, predictive modelling, deep learning, NLP

Conferences/Competitions

European Society of Cardiology (ESC) Conference 2024: Selected to deliver a presentation on "Utilizing unsupervised machine learning to uncover novel phenogroups within the broad QRS complex" representing Imperial

United Kingdom Environmental Mutagen Society (UKEMS) Conference 2022: Presented the poster "Repurposing whole genome CRISPR screening images to identify targets with genotoxic liabilities" representing AZ

Data to Insights Challenge using AI: Won 1st place within a company-wide AZ team challenge focused on utilising ML tools to derive clinical insights within a multi-disciplinary team

Publications

Mehak Gurnani, Arunashis Sau, Konstantinos Patlatzoglou, Joseph Barker, Libor Pastika, Nicholas S Peters, Daniel B Kramer, Jonathan W Waks, Fu Siong Ng, **Utilizing unsupervised machine learning to uncover novel phenogroups within the broad QRS complex**, *European Heart Journal*, Volume 45, Issue Supplement 1, October 2024. DOI: 10.1093/eurheartj/ehae666.333.

Krzysztof Macierzanka, Arunashis Sau, Konstantinos Patlatzoglou, Libor Pastika, Ewa Sieliwonczyk, **Mehak Gurnani**, Boroumand Zeidaabadi, Henry Zhang, Joseph Barker, Yixiu Liang, Nicholas S Peters, Daniel B Kramer, Jonathan W Waks, Fu Siong Ng. **Siamese neural networks can identify subjects from anonymised ECGs.** *European Heart Journal*, Volume 45, Issue Supplement 1, October 2024. DOI: 10.1093/eurheartj/ehae666.3460.

Arunashis Sau, Antônio H Ribeiro, Kathryn A McGurk, Libor Pastika, Nikesh Bajaj, **Mehak Gurnani**, et al. **Prognostic Significance and Associations of Neural Network-Derived Electrocardiographic Features.** *Circulation: Cardiovascular Quality and Outcomes*. Volume 17, Number 12, November 2024. DOI: 10.1161/CIRCOUTCOMES.123.010602.

Mehak Gurnani, Konstantinos Patlatzoglou, Joseph Barker, Derek Bivona, Libor Pastika, Ewa Sieliwonczyk, Boroumand Zeidaabadi, Paolo Inglese, Lara Curran, Ahran D Arnold, Declan O'Regan, Zachary Whinnett, Kenneth C. Bilchick, Nicholas S. Peters, Daniel B. Kramer, Jonathan W. Waks, Arunashis Sau, Fu Siong Ng. **Revisiting abnormalities of ventricular depolarisation: Redefining phenotypes and associated outcomes using tree-based dimensionality reduction** *In review at Journal of the American Heart Association, JAHA.*

Boroumand Zeidaabadi, Konstantinos Patlatzoglou, Joseph Barker, Libor Pastika, Gul Rukh Khattak, **Mehak Gurnani**, Xavier Da Silva Anjos Machado, Nicholas S Peters, Daniel B. Kramer, Jonathan Waks, Fu Siong Ng, and Arunashis Sau. **Image based artificial intelligence-enhanced ECG prediction of incident atrial fibrillation**. *In review at Journal of the American College of Cardiology, JACC: Clinical Electrophysiology.*

Khezia Asamoah, Rin Wada, Fernando Guntoro, Nazanin Zounemat-Kermani, Ruben Zuehlke-Colindres, Feng Zhao, Hanna Lunding, Pankaj K Bhavsar, James Tait, Daniel Adams, Fiona Rice, Hailey Gu, Wenqi Cho, Lea Khoueiry, Nicole Cizaukas, Sreenidhi Venkatesh, Kheerthiharan Saravan, Yang Shen, Robert H Campbell, Daniel Huntley, **Mehak Gurnani**, et al. **Exploring proteomic signatures of severe asthma traits from targeted plasma cytokines**. *In review at eBioMedicine, The Lancet.*