Ahmed Elhussein

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EDUCATION

2021 – Present **PhD Student, Biomedical Informatics, Columbia University**
- Classes: Probability theory, Advanced Deep Learning, Machine learning for Healthcare
- Maintained **3.95 GPA**
- Extensive experience with multimodal data including EHR, medical imaging and genetic

2018 – 2019 **MPH in Biostatistics, Johns Hopkins Bloomberg School of Public Health**
- Awarded highly competitive merit-based Sommer Scholarship
- Concentrated in Biostatistics and Epidemiology with **GPA 3.95**
- Classes: Biostatistics I-IV, Bayesian statistics, Epidemiology I-III, Machine learning

2015 – 2018 **MD, New College, University of Oxford**
- Graduated with **Distinction**
- Ranked in **top 10%** of cohort with **3.96 GPA** (external assessor)

2012 – 2015 **BA Neuroscience, Queens' College, Cambridge University**
- **Triple First-Class Honors** in Neuroscience
- Ranked 4th and 3rd across cohort of c. 350 in second and third year, respectively
- Maintained estimated **4.0 GPA** (external assessor)

WORK EXPERIENCE

2021 – Present **Research assistant, Gürsoy lab, New York Genome Center and Columbia University**
- Developed a Partial-FL approach that uses a 'federation sensitivity' metric to determine which layers to federate, showed improvement on real-world healthcare datasets
- Created an interpretable and privacy-preserving metric to assess dataset similarity in multi-source settings; metric showed robust correlation with model performance and data collection practices across a range of real-world tasks
- Developed Clustered Federated Learning algorithm that enabled patient grouping on individual-level data while safeguarding privacy; achieved a ~10% performance improvement and generated clinically meaningful clusters for federated phenotyping
- Built a decentralized and secure multimodal data-sharing network for clinical and genetic data that enabled the creation of precision medicine cohorts; facilitated the discovery of novel insights in subtype presentation of a rare disease (ALS)
- Currently mentoring on a project to develop a transformer-based model for Phenome Wide Association Studies; responsible for supporting full project pipeline including patient phenotyping, disease embedding, SNP prediction, and model interpretation

2019 – 2021 **Associate, McKinsey & Company**
- Received the **top rating of 'Distinctive'** across all three review cycles
- Led a team of data scientists to team to develop cost-estimating tool of patients admitted with cerebrovascular disease
- Led team of engineers to build tool that optimizes clinical trial site selection, leading to a 15% increase in recruitment over 6 months

SKILLS

- Proficient in Python, Pytorch, BCFTools, PLINK
- Intermediate skills in R, SQL

FIRST-AUTHOR PUBLICATIONS

- Privacy-preserving patient clustering for personalized federated learning, *PMLR (Machine Learning for Healthcare Conference), 2023*
- A generalizable physiological model for detection of Delayed Cerebral Ischemia using Federated Learning, *IEEE Bioinformatics and Biomedicine, 2023*
- Racial/ethnic and socioeconomic disparities in the use of newer diabetes medications in the Look AHEAD study*, Lancet Reg. Health Americas, 2021*

UNDER REVIEW
- A universal metric of dataset similarity for Multi-source learning
- PLayer-FL: A principled approach to personalized layer-wise Federated Learning
- Realizing the potential of secure and decentralized harmonization of clinical and genetic data for precision medicine