Minhaj Hussain

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Education

2018 – 2020 **MS in Biomedical Engineering**, *Duke University*, *Durham, NC*.
Focus Area: Neural Engineering. GPA: 3.92
Coursework: Signal Processing and Applied Mathematics; Bioelectricity; Neural Prosthetic Systems; Computational Neuroengineering; Neurodynamics; Machine Learning in Imaging; Medical Software Design; Quantitative Pathophysiology
Independent Study: Machine Learning and Simulation in Neuromodulation

2012 – 2015 **BA (Hons.) in Preclinical Medicine**, *Cambridge University*, *Cambridge, UK*.
Part II Neuroscience. Class: 2.i
Modules: Control of Action; Sensory Transduction; Central Mechanisms of Sensation and Behaviour; Learning, Memory, and Cognition

Skills

Computing Python (NEURON, PyTorch, TensorFlow, NumPy), C/C++, MATLAB, Julia, LaTeX, Git

Lab Human / Animal Dissection, Anatomy

Certificates

Introduction to Machine Learning by Duke University, *Python 3.6.5, TensorFlow, Jupyter Notebooks, PyCharm IDE*.
Duke +DataScience online coursework along with in-person learning
https://www.coursera.org/account/accomplishments/certificate/23QQGT4QSMJS

Experience

Dec 2018 – Present **Associate in Research**, *SPARC Project "Modeling Activation and Block of Autonomic Nerves for Analysis and Design" - Award Number: OT2 OD025340*, Supervisors Dr. Nikki Pelot, Ph.D; Dr. Warren Grill, Ph.D.

- Design and implementation of Python libraries for large-scale parallel simulation of peripheral nerve stimulation on MPI-enabled compute clusters with NEURON.
- Design and implementation of parameter optimisation algorithms for selective stimulation of fibres in compound nerves with NumPy and Cython.
- Design and implementation of ML and data pipeline for accelerated inference of dynamic axonal responses under continuous perturbation by extracellular electric fields (PyTorch, TensorFlow, HDF5).

Additionally:

- Modeling of strength-duration relationships, kHz frequency block and activity-dependent slowing from in-vivo data (NEURON, Python, COMSOL).
- Aided parallel network implementation of a gut-motility model in NetPyNE (Python).

Sep 2014 – May 2015 **Undergraduate Project and Thesis**, *Word finding failures and longitudinal brain changes across the lifespan*, Supervisor Dr. Meredith Shafto, Ph.D.

- Voxel based regression of structural MRI data in SPM12 (MATLAB) to understand relationships between grey- and white-matter changes and language test outcomes through time.
- Statistical analysis and visualisation of psychological test outcomes in R, IBM SPSS, Graphpad Prism, Excel

2015 – 2016 **Clinical Medical Training**, *Barts and the London School of Medicine and Dentistry*, Royal London Hospital, St. Bartholomews Hospital.
Rotations in Gastroenterology and General and Vascular Surgery (RLH), Endocrinology and Metabolic Medicine (St. Barts), Cardiac Medicine (St. Barts)