

PAVAN CHAGGAR

DPhil Student \diamond Mathematical Institute \diamond University of Oxford
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EDUCATION

University of Oxford, DPhil, Mathematical Institute 2019 — 2023

Provisional Title: Data-Driven Mathematical Modelling of Neurodegeneration

Academic Advisors: Alain Goriely (primary), Saad Jbabdi

Industrial Advisors: Stefano Magon (Roche), Gregory Klein (Roche)

Funding: EPSRC CDT for Sustainable Approaches to Biomedical Sciences

University College London, M.Sc in Neuroscience 2018 — 2019

Merit with Distinction in thesis

Thesis Advisors: Maria Chain, Karl Friston, Gareth Barnes

King's College London, B.Sc in Biomedical Sciences 2012 — 2016

Upper Second Class Honors

Thesis Advisor: Clive Coen

RESEARCH INTERESTS

Differential equations, dynamics, probabilistic inference, scientific machine learning, neurodegenerative disease, neuroscience

PUBLICATIONS

Prama Putra, Travis B Thompson, Pavanjit Chaggar, and Alain Goriely. Braiding braak and braak: Staging patterns and model selection in network neurodegeneration. *bioRxiv*, 2021 (In review)

Travis B Thompson, Pavanjit Chaggar, Ellen Kuhl, Alain Goriely, Alzheimer's Disease Neuroimaging Initiative, et al. Protein-protein interactions in neurodegenerative diseases: A conspiracy theory. *PLoS computational biology*, 16(10):e1008267, 2020

CONFERENCE PRESENTATIONS

Pavanjit Chaggar. Mathematical modelling of alzheimer's disease. Early Career British Mathematicians' Colloquium, July 2021

Pavanjit Chaggar. Prion: Proteopathy modelling on connectomes with python. International Brain Mechanics and Trauma Workshop, April 2021

Roberta Bianco, Pavanjit Chaggar, Rosemary Southwell, Sven Bestmann, Gareth Barnes, and Maria Chait. A brain network of temporo-frontal areas supports pattern detection in rapid sound sequences. Advances and Perspectives in Auditory Neuroscience, August 2020

INVITED TALKS

Inference methods for mathematical models of neurodegeneration. Presented at the Raj group seminar, UCSF, July 2021

Analysing ADNI sMRI and PET data with SPM. Presented at the UCL Wellcome Trust Centre for Neuroimaging Methods Seminar, July 2020

SOFTWARE

Connectomes.jl

Julia package for plotting and manipulating connectome graphs using the graphml format.
<https://github.com/PavanChaggar/Connectomes.jl>.

ECIQC

Automated quality control and validation for medical imaging data. C++.
<https://github.com/Extensible-Clinical-Imaging-QC-Tool/ECIQC>.

Paint4Brains

Machine learning tool for fast and accurate segmentation of degenerated brains. Python.
<https://github.com/SABS-R3-projects/Paint4Brains>.

In Development:

ConnectomeDynamics

Package for performing Bayesian Inference (variational and sampling methods) for differential equation problems on graphs. Python and Julia.

Pryon (in preparation for publication)

Scientific computing software for efficiently solving high dimensional non-linear ordinary differential equations on graphs. C++ and Python.

TEACHING

Software Engineering

Doctoral Training Center, University of Oxford

2020-2021

Mathematical Modelling and Scientific Computing

Doctoral Training Center, University of Oxford

Feb 2021