30 Helen Road
Oxford, OX1 0DE
+447851 808 700
james.wilsenach@stats.ox.ac.uk
jameswilsenach.github.io

James Wilsenach

Education

2017-Pres. **PhD Statistics**, *University of Oxford (OU)*, Topic: Long Range Dependence in Neurobiological Data.

2017 **MSc Informatics: Neuroinformatics & Machine Learning**, *University of Edinburgh* (UoE), Thesis: Differential Network Analysis of the Neocortex in Development & Ageing.

2015 **BScHons Mathematics: Biomathematics**, *Stellenbosch University* (SU) *& The African Institute for Mathematical Sciences* (AIMS), Thesis: Physically Inspired Evolutionary Fields as a Model for Adaptive Dynamics of Food Webs and Ecological Communities.

2011-2014 **BSc**, *University of Cape Town* (UCT), Triple Major: Mathematics, Statistics and Genetics.

Academic Awards & Scholarships

PhD: 2020 Alan Turing Centre for Data Science and Artificial Intelligence PhD Enrichment Scheme

PhD: 2020 Oppenheimer Trust Final Year Scholarship

PhD: 2017 UK Commonwealth PhD Scholarship for Developing Countries

2017 Oxford Oppenheimer Scholarship

2017 Selected for UoE Principal's Career Development & Global Research Scholarship

MSc: 2017 Top Performance Prize for MSc in Informatics

BSc: 2016 Golden Key Honours Society Membership

2015 Graduated BScHons Mathematics *cum laude, dux literatum*

2012/3 Dean's Merit List

Research

Publications, Conferences & Competitions

2021-Pres. **Research Publication (In Progress)**, *J. Wilsenach, G. Reinert, C. Deane, K. Warnaby*, Target: Frontiers in Neuroscience, fMRI Activity Reflects a Comparable Shift in EEG Brain State Dynamics During Anaesthetisation.

2020 **Poster Presentation**, Quantitative BioImaging (QBI), Title: 3D Model Building Pipeline for Light-Sheet Imaging of Hippocampal Neurons for Simulation and Analysis of Calcium Dynamics.

2019 **Conference Competition Winner**, BR41N.IO, BR41N.IO, The Brain-Computer Interface Designer's Competition, was the opening event of the IEEE Systems, Man and Cybernetics Conference, 2019.

2018 **Poster Presentation**, COSTNET, Title: CommFinedWalker: Controlling for Inspection Bias in Annotated Networks.

2017 **Conference Speaker**, Models in Population Dynamics and Ecology (MPDE), Talk Title: The Applicability of Field Theories in The Population Sciences.

2017 **Research Publication**, *J. Wilsenach, P. Landi, C. Hui*, Physical Review E, Evolutionary Fields Can Explain Patterns of High Dimensional Complexity in Ecology doi.org/10.1103/PhysRevE.95.042401.

2015 **Poster Presentation & Workshop Attendee**, Meaningful Modelling of Epidemiological Data (MMED), Developed important statistical modelling skills to formulate research questions and conduct studies and experiments in the area of pubic health.

Student Research Projects

2017-Pres. **PhD Thesis: Long Range Dependence in Neurobiological Data**, OU Department of Statistics, Project focused on the analysis of different types of proteomics and neuroscientific data with a focus on mitigation of long range spatio-temporal noise with applications to protein interaction networks, dynamic N neuronal calcium (microscopy) and neuroimaging (simultaneous EEG/fMRI) data with unsupervised learning methods (including Hidden Markov Models)., Supervisors: Charlotte M. Deane & Gesine Reinert.
Experimental Collaborators: Nigel Emptage & Peter Haslehurst (Synaptic Pharmacology) and Katy Warnaby (Neuroscience)

2017 **MSc Thesis: Differential Network Analysis of the Neocortex in Development & Ageing**, UoE School of Informatics, Comparative analysis of rat and human gene expression modules across developmental and neurodegenerative disease progression using Gene Ontology terms and network-based gene enrichment analysis, Supervisors: Dr Ian Simpson & Prof Douglas Armstrong.

2015 **BScHons Thesis: Physically Inspired Evolutionary Fields as a Model for Adaptive Dynamics of Food Webs and Ecological Communities**, SU Department of Mathematics, Formalised a new dynamical model for systems of populations that are competing/cooperating and thus co-evolving with each other. Later this model was published after it was found that it reproduced complexity and spectral properties of real ecological time series not observed in other models, Supervisors: Prof Cang Hui, Dr Pietro Landi.

2013 **3rd year Genetics Project**, *Investigation of gene duplication using protein interaction networks in Mycobacterium tuberculosis*, UCT Health Computational Biology Group, Supervisor: Nicola Mulder.

2013 **3rd Year Mathematics Project**, *Neuromanifolds - Applications of Information Geometry in the Study of Neural Networks*, UCT Mathematics Department, Supervisor: Jeff Murigan.

Computer Skills

Basic HTML, Java, C++, Git

Intermediate ImageJ, Vaa3D, Commandline Linux & Bash

Confident Python, MATLAB, R, LaTeX

Experience

Scientific & Teaching Experience

2020 **Research Intern**, Neuroelectrics, Worked primarily on stereo EEG (sEEG) analysis and simulation as part of the Hybrid Brain Modelling Team, including work with differential equations (neural mass modelling), EEG feature extraction and unsupervised learning, Fourier and networks analysis. I also contributed to work on Diffusion Tensor Imaging-based structural connectome construction and modelling and anatomical reconstruction of single neurons from microscope images.

2020-Pres. **Organiser**, OU Probability for Machine Learning Group, Organisation of talks, seminars, news letters, website design and administration for OU Probability for Machine learning (ProbML) research..

2019 **Assistant Conference Coordinator**, Luminous Workshop, Assisted organizers in running the Luminous Consortium's Public Engagement and Conference events on the Neuroscience of Consciousness.

2018-Pres. **Statistics Tutor & Teaching Assistant**, OU, 4^{th} Year: Topics in Computational Biology, Statistical Analysis of Networks.

2016 **Research Assistant**, SU Department of Mathematics, Duties including tutoring undergraduate students and development of theory to explain evolutionary mechanisms underlying complex ecological phenomena, leading to a publication and a conference talk.

2016 **Senior Head Mathematics Tutor**, SU Department of Mathematics, 1^{st} Year; 2^{nd} Year: Engineering, Foundations.

2013 **Undergraduate Research Intern**, UCT Computational Biology Group, Phylogenetic Tree Construction and Ortholog Functional Analysis, Supervisor: Nicola Mulder.

Additional

2019 **Language Student**, OU Language Centre, Completed Stage 2 course in written and spoken Mandarin Chinese.

2018 **Volunteer**, OU Museum of Natural History, Working together with other volunteers in the *Move a Million Project* to count and catalogue the museum's vast insect collection.

2017/8 **Competitor**, British University Championships (BUCS), Oxford Men's 1^{st} Team in the BUCS Karate Tournament.

2013 **Volunteer Mentor**, UCT Students Health and Welfare Organisation, Mentored Grade 10 students to ready promising, underprivileged students for university education.

Languages

English (Mothertongue), **Afrikaans** (Intermediate), **Mandarin** (Basic)

Interests

- Improvisational Music (Harmonica) & Comedy
- Martial Arts (Shotokan Karate)
- Neurophilosophy and Ethics
- Linguistics