William Dorrell

Theoretical physicist working in neuroscience and machine learning

06/2018 BA, Physics, 1st - 80% Emmanuel College, Cambridge

RESEARCH

Gatsby Unit – University College London

09/2020 - Present PhD student in Theoretical Neuroscience and Machine Learning, projects:
i) Group Theory as a tool to understand neural responses e.g. grid cells.
ii) Bayesian & Point Process analysis of neural recordings from asleep mice.

Okinawa Institute of Science and Technology

02/2020 – 08/2020 Research intern in Prof. Erik de Schutter's lab, there I designed a biologically-plausible hierarchical reinforcement learning agent.

Harvard University

04/2019 – 12/2019 As a research fellow in Prof. Cengiz Pehlevan's lab, I demonstrated the presence of structured connectivity in the mouse olfactory cortex using experimental data from a collaborator, Prof Venkatesh Murthy.

08/2018 – 03/2019 As a research scholar in Prof. Jennifer Hoffman's lab, I created a scheme for replicating van der Waals behaviour in metamaterials, this work has led to multiple ongoing projects and collaborations.

TEACHING

09/2019 – 12/2019 Teaching Fellow in an Applied Maths course: Neural Computation for 20 graduate students
10/2016 – 05/2017 Volunteer teacher in local Cambridge School for GCSE Science
06/2016 – 08/2016 Private tutor for key stage 3 science in Worcester, UK.

AWARDS

2018/19 Herchel Smith Scholarship - $80,000 to attend Harvard for a year
2017 Davies Senior Scholarship & Mainhood Prize
2017 Summer research fellowship – Harvard PRISE programme
2016 Davies Scholarship & Mainhood Prize – for university exam performance
2015 British Chemistry Olympiad Roentgenium Award – highest performance

OTHER

12/2020 – 09/2021	Organiser for symposium on swarm intelligence: *How dumb agents do clever things*.
01/2020	Attendant, Imbizo Computational Neuroscience Summer School, Cape Town, South Africa
06/2019 – 08/2019	Proctor, Harvard University Summer Research Program
09/2017 – 06/2018	Founded and ran a weekly discussion club: the Big Thinks' Club
09/2017 – 06/2018	Events Officer for Emmanuel College Music Society, payed guitar and cello for a variety of groups.
01/2017 – 12/2017	Treasurer for Emmanuel College Students' Union
09/2013 – 06/2015	Founder-Editor of a satirical magazine during 6th form
Computer	MATLAB, python, some Julia, some app & website development
Languages	English (native), French (B2)

PUBLICATIONS

- J Grimaud, **W Dorrell**, C Pehlevan, V Murthy, *"Bilateral Alignment of receptive fields in the olfactory cortex points to non-random connectivity"*, bioRXiv:2020.02.24.960922 (2020).

- S Verduzco-Flores, **W Dorrell**, E De Schutter, *"An Approach to Synaptic Learning for Autonomous Motor Control"*, arXiv:2006.13471 (2020).

- S. Gardezi, H. Pirie, S. Carr, **W. Dorrell**, J. Hoffman, *"Simulating twistronics in acoustic metamaterials"*, 2D Materials, (2021). (Journal link, Arxiv link)

- **W Dorrell**, H. Pirie, S. Gardezi, N. Drucker, J. Hoffman, *"van der Waals metamaterials"*, Phys. Rev. B (2020). (Arxiv link)

CONFERENCES & TALKS

- [contributed poster] "*To what extent can the olfactory cortex be modelled by random connectivity?"*, Computational and Systems Neuroscience (Cosyne) Conference, Denver, United States, (2020).

- [invited talk] *"Of Mice and Models"*, Murthy Group Lab Meeting, Harvard, Boston, United States (2019).

- [contributed talk] *"Twisted Bilayer Graphene as a Phononic Metamaterial"*, APS March Meeting, Boston, United States (2019).