HARSHA GURNANI, PhD

Postdoctoral scholar, *University of Washington*

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PROFESSIONAL APPOINTMENTS

Schmidt Science Fellow, *University of Washington*. Advisor: Prof Bing Brunton 2023-
Postdoctoral Researcher, *University College London*. Advisor: Prof Angus Silver 2022
Undergraduate Research Internship, *Brandeis University*. Advisor: Prof Eve Marder, Dr Tim O'Leary 2015-2016

EDUCATION

PhD in Neuroscience, *University College London* 2016-2022
Advisor: Prof R Angus Silver, FRS
Bachelor of Science with Major in **Biology**, Minor in **Mathematics** 2012-2016
Indian Institute of Science [First Class with Distinction]

AWARDS, HONORS, & DISTINCTIONS

Schmidt Catalyst Grant 2025-2026
UW/eScience Data Science Fellowship 2023-
Schmidt Science Fellowship (2-year postdoctoral fellowship) 2022-2024
Wellcome Trust PhD Studentship 2016-2021
Khorana Scholarship for 3-month research internship [Khorana Scholars Program, DBT] 2015
KVPY 4-year Undergraduate Fellowship [Dept. of Science and Technology, India] 2012-2016
eScience Postdoctoral Grant 2024
Travel grant from Gatsby Foundation for ICTP Summer Workshop 2024
Computational and Systems Neuroscience (Cosyne 2019) Travel grant 2019
Travel grant from DeepMind for Cajal Course in Computational Neuroscience (CCCN 2017) 2017
IISc UG University Gold Medal 2016

RESEARCH INTERESTS

Distributed learning systems; closed-loop dynamics in cortico-cerebellar circuits; dynamical systems and control theory; deep reinforcement learning

PUBLICATIONS

* denotes (co-) first authorship

Preprints:

Gurnani H*, *Liu W, Brunton BW*. **Feedback control of recurrent dynamics constrains learning timescales of motor adaptation**. *bioRxiv* 2024; doi: 10.1101/2024.05.24.595772

Peer-reviewed:

Sinha A, Gleeson P*, Marin B, Dura-Bernal S, Panagiotou S, Crook S, Cantarelli M, Cannon RC, Davison AP, Gurnani H, Silver RA*. **The NeuroML ecosystem for standardized multi-scale modelling in neuroscience.** eLife 2024; doi: 10.1101/2023.12.07.570537

Gurnani H*, Cayco-Gajic NA*. **Signatures of task learning in neural representations**. Curr Opinion in Neurobiology - Computational Neuroscience issue 2023, doi: 10.1016/j.conb.2023.102759

Gurnani H*, Silver RA*. **Multidimensional population activity in an electrically coupled inhibitory circuit in the cerebellar cortex.** Neuron 2021; doi: 10.1016/j.neuron.2021.03.027

Lanore F, Cayco-Gajic NA**, ***Gurnani H****, Coyle D, Silver RA*. **Cerebellar granule cell axons support high dimensional representations.** Nature Neuroscience, 2021; doi: 10.1038/s41593-021-00873-x

Lak A, Okun M, Moss MM,* ***Gurnani H,*** *Farrell K, Wells MJ, Reddy CB, Kepecs A, Harris KD, Carandini M*. **Dopaminergic and Prefrontal Basis of Learning from Sensory Confidence and Reward Value.** Neuron 2020; doi: 10.1016/j.neuron.2019.11.018

TEACHING AND MENTORING

Sensation, Perception and Beyond, UW Bothell;	Co-instructor and course developer	2024
STEP-WISE Scholar, University of Washington;	Pedagogical training	2023-2024
BIOL0029: Computational Biology, UCL;	Teaching Assistant (TA)	2021
Data Science and Machine Learning in Python, UCL;	Course instructor and content developer	2020, 2021
NEUR0019: Neuroinformatics course (methods in quantitative neurophysiology), UCL;	TA	2020, 2021
Systems Training in Maths, Informatics, Statistics and Computational Biology, UCL;	TA	2018, 2019
Computational Approaches to Memory and Plasticity (CAMP), Bangalore;	TA	2016
MB208: Theoretical and Computational Neuroscience, IISC, Bangalore;	TA	2016

Mentees:

Jianqiao (Lawrence) Hu (Neuroscience PhD student, UW)	2023-
Weixuan Liu (undergraduate researcher, UW)	2024-
Brennan Summy (undergraduate researcher with ENDURE program, UW)	2024
Mattias Loidolt (Optical Biology PhD student, UCL)	2021-22
David Orme (MRC Programme PhD student, UCL)	2020-21
Lewis Winyard (undergraduate thesis project, UCL)	2019-20
Grade 5/6 students with ReachOut, UK	2019-2021

SELECTED PRESENTATIONS

Project: **Feedback control of recurrent dynamics constrains learning timescales during motor adaptation**
Harsha Gurnani*, *W Liu, BW Brunton*

[Talk]	UCL Gatsby Unit	Nov 2024
[**Invited talk**]	Bernstein Conference – Workshop on Bridging RNNs and Data	Sep 2024
[Poster]	Data-Driven Discovery: AI and Modelling in Biology (Allen Institute)	Sep 2024
[**Invited talk**]	Orsborn lab, University of Washington	July 2024
[**Talk**]	ICTP Workshop on Recent Advances in Theoretical Neuroscience	Jun 2024
[**Talk**]	Mathematics Of Neuroscience and AI	May 2024
[**Talk**]	NCEC – Neural Computation and Engineering Connection (UW)	May 2024
[Poster]	Cosyne 2024	Feb 2024

Project: **Transformation of cortico-pontine inputs during associative learning**
Harsha Gurnani*, *RA Silver*

[Poster]	Lake Conference, Neural Dynamics	Oct 2023
[**Invited talk**]	5th France Cerebellar Meeting	Feb 2022

Project: **Cerebellar-like structure improves feedback-learning in recurrent neural networks**
*Alessandro Barri**, ***Harsha Gurnani****, RA Silver.*

[Poster]	ICTP Workshop on Recent Advances in Theoretical Neuroscience	Jun 2024
[Poster]	Cosyne 2021	Feb 2021

Project: **Dynamics of electrically coupled inhibitory networks**
Harsha Gurnani*, NA Cayco Gajic, RA Silver.*

[Poster]	Computational and System Neuroscience conference (*Cosyne*)	Feb 2021
[**Talk**]	Janelia Junior Scientist Workshop on Theoretical Neuroscience	Oct 2019

Project: **Coordination of inhibitory Golgi Population Activity in the Cerebellar Cortex**
Harsha Gurnani*, RA Silver.*

[**Talk**]	Gordon research Seminar & Conference (Cerebellum)	July 2019
[Poster]	Computational and Systems Neuroscience conference (*Cosyne 2019*)	Mar 2019
[Poster]	3rd France Cerebellar Meeting	Jan 2019
[Poster]	Champalimaud Research Symposium	Oct 2018

Project: **Imaging circuit function across multiple scales with non-linear acousto-optic microscopy**
*RA Silver, Antoine Valera, **Harsha Gurnani**, T J Younts, VA Griffiths, S Punde, TF Alfonso, P A Kirkby, KMNS Nadella*
[Poster] NIH Brain Initiative meeting Jun 2021

Project: **Dopaminergic and frontal signals for reward learning in perceptual decisions**
Armin Lak, M Okun, M Moss, **Harsha Gurnani**, MJ Wells, CB Reddy, KD Harris, M Carandini.*
[Poster] Neuroscience 2018 (SfN) Nov 2018
[Poster] Neuroscience 2017 (SfN) Nov 2017

Project: **Maintaining neuronal properties during growth with local and global homeostatic regulation**
***Harsha Gurnani**, T O' Leary, E Marder*.
[Poster] Neuroscience 2016 (SfN) Nov 2016
[**Talk**] Dynamic Neural Networks: STG Meeting 2015 Oct 2015

WORKSHOPS AND SCHOOLS

Data-Driven Discovery: AI and Modeling in Biology Sep 2024
ICTP Junior Scientist Workshop on Advances in Theoretical Neuroscience Jun 2024
Janelia Junior Scientist Workshop on Theoretical Neuroscience Oct 2019
Optical Imaging and Electrophysiological Methods in Neuroscience May 2018
CAJAL Course in Computational Neuroscience Aug 2017
Computational Approaches to Memory and Plasticity Jul 2014
Bangalore Cognition Workshop Dec 2013

VOLUNTEERING AND SERVICE

Cosyne workshop (*Learning fast and slow*); co-organized with Jacob Sacks, Matt Golub (*upcoming*) 2025
Writer/Editor at Stories of Women in Neuroscience (Stories of WiN) 2024-
Organizing committee, UCL NeuroAI 2022
Organizing committee, UCL PhDs in Systems Neuroscience 2019-2020
PhD student committee, NPP, UCL 2018-2019
Winter volunteer with CRISIS UK 2016-2018
Volunteer at Notebook Drive, IISc (working with underprivileged schools in Bangalore) 2013-2016
Ad hoc reviewer for *Neuron*, *PLOS CB*, *Nature Neuroscience*, *COSYNE*, *UW Bio* departmental awards, Schmidt Polymaths Program 2019-

REFERENCES

Prof Bing W Brunton Professor & H. Stewart Parker Endowed Faculty Fellow, Department of Biology, University of Washington, Seattle, USA
Prof R Angus Silver Professor & Wellcome Trust Principal Research Fellow, Department of Neuroscience, Physiology & Pharmacology, University College London, UK
Dr N Alex Cayco Gajic Group for Neural Theory (GNT), École Normale Supérieure (ENS), Paris, France