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HARSHA GURNANI, PhD

Postdoctoral scholar-fellow, University of Washington

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WORK EXPERIENCE

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

EDUCATION

2016 - 2022   **PhD in Neuroscience,** *University College London*
Advisor: Prof R Angus Silver, FRS

2012 – 2016   **Bachelor of Science** with Major in **Biology**, Minor in **Mathematics**
Indian Institute of Science   [First Class with Distinction; University Gold Medal]

FELLOWSHIPS AND AWARDS

2024	**Schmidt Catalyst Grant**
2024	eScience Postdoctoral Grant
2022-	**UW/eScience Data Science Fellowship**
2022-2024	**Schmidt Science Fellowship** (2-year postdoctoral fellowship)
2019	Computational and Systems Neuroscience (Cosyne 2019) Travel Grant
2017	Award from DeepMind for Cajal Course in Computational Neuroscience (CCCN 2017)
2016-2021	**Wellcome Trust PhD Studentship**
2015	**Khorana Scholarship** for 3-month research internship [Khorana Scholars Program, DBT]
2012-2016	**KVPY (Undergraduate) Fellowship** [Dept. of Science and Technology, India]

RESEARCH INTERESTS

Parallel learning systems; flexible decision making; closed-loop dynamics in cortico-cerebellar circuits; dynamical systems and control theory; deep reinforcement learning

PUBLICATIONS

Preprints:

1. *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:

2. *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

3. *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

4. *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

5. *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

6. *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   [as *preprint* doi: 10.1101/411413]

* denotes joint first authorship

TEACHING AND MENTORING

2024	Co-instructor and course developer for Sensation, Perception and Beyond, UW Bothell
2023-24	STEP-WISE Scholar, University of Washington (Pedagogical training)
2021	TA for BIOL0029: Computational Biology, UCL
2020, 2021	Course instructor and content creator for Data Science and Machine Learning in Python, UCL
2020, 2021	TA for NEUR0019: Neuroinformatics course (methods in quantitative neurophysiology), UCL
2018, 2019	TA at LIDO-PhD SysMIC course: Systems Training in Maths, Informatics, Statistics and Computational Biology, UCL
2016	TA at Computational Approaches to Memory and Plasticity (CAMP), Bangalore
2016	TA for MB208: Theoretical and Computational Neuroscience (IISC, Bangalore)
2024-	Mentor-supervisor for undergraduate researcher
2024	Mentor for undergraduate project with ENDURE program
2020-21	Mentor for 3-month PhD rotation project
2019-20	Mentor-supervisor for BSc. thesis project
2019-2021	Mentor at ReachOut, UK (working with grade 5/6 students)

CONFERENCE PRESENTATIONS

Project:	**Feedback control of recurrent dynamics constrains learning timescales during motor adaptation**	
	Harsha Gurnani*, Bing W. Brunton	
July 2024	Orsborn lab, University of Washington	[**Invited talk**]
June 2024	ICTP Workshop on Recent Advances in Theoretical Neuroscience	[**Contributed talk**]
May 2024	Mathematics Of Neuroscience and AI	[**Spotlight talk**]
May 2024	NCEC – Neural Computation and Engineering Connection (UW)	[**Contributed talk**]
Feb 2024	Cosyne 2024	[Poster]

Project:	**Transformation of cortico-pontine inputs during associative learning**	
	Harsha Gurnani*, RA Silver	
Oct 2023	Lake Conference, Neural Dynamics	[Poster]
Feb 2022	5th France Cerebellar Meeting	[**Invited Talk**]

Project:	**Cerebellar-like structure improves feedback-learning in recurrent neural networks**	
	Alessandro Barri, **Harsha Gurnani**, RA Silver.*	
June 2024	ICTP Workshop on Recent Advances in Theoretical Neuroscience	[Poster]
Feb 2021	Cosyne 2021	[Poster]

Project:	**Dynamics of electrically coupled inhibitory networks**	
	Harsha Gurnani*, NA Cayco Gajic, RA Silver.	
Feb 2021	Computational and System Neuroscience conference (*Cosyne*)	[Poster]
Oct 2019	(Janelia) Junior Scientist Workshop on Theoretical Neuroscience	[**Talk**]

Project:	**Coordination of inhibitory Golgi Population Activity in the Cerebellar Cortex**	
	Harsha Gurnani*, RA Silver.	
July 2019	Gordon research Seminar & Conference (Cerebellum)	[**Talk**]
Mar 2019	Computational and Systems Neuroscience conference (*Cosyne 2019*)	[Poster]
Jan 2019	3rd France Cerebellar Meeting	[Poster]
Oct 2018	Champalimaud Research Symposium	[Poster]

Project:	**Imaging circuit function across multiple scales with non-linear acousto-optic microscopy**	
	*RA Silver, Antoine Valera, **Harsha Gurnani**, Thomas J Younts, Victoria A. Griffiths, Sameer Punde, Tomas Fernandez Alfonso, Paul A. Kirkby, K M Naga Srinivas Nadella*	
June 2021	NIH Brain Initiative meeting	[**Poster**]

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.*	
Nov 2018	Neuroscience 2018 (SfN)	[Poster]
Nov 2017	Neuroscience 2017 (SfN)	[Poster]

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

WORKSHOPS AND SCHOOLS
Jun 2024	ICTP Junior Scientist Workshop on Advances in Theoretical Neuroscience
Oct 2019	Janelia Junior Scientist Workshop on Theoretical Neuroscience
May 2018	Optical Imaging and Electrophysiological Methods in Neuroscience
Aug 2017	CAJAL Course in Computational Neuroscience
July 2014	Computational Approaches to Memory and Plasticity
Dec 2013	Bangalore Cognition Workshop

VOLUNTEERING
2023	International Solidarity Work Group, UAW4121
2022	Organizing committee, UCL NeuroAI
2019-20	Organizing committee, UCL PhDs in Systems Neuroscience
2018-19	PhD student committee, NPP, UCL
2016-18	Winter volunteer with CRISIS UK