

Nischal Mainali

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EDUCATION

2021 – present	Ph.D. in Theoretical Neuroscience (w/ Prof. Yoram Burak)	HEBREW UNIVERSITY OF JERUSALEM
2024 – present	Visiting Ph.D. student (w/ Prof. Peter Dayan)	MAX PLANCK INSTITUTE FOR BIOLOGICAL CYBERNETICS
2020 – 2021	M.S. in Applied Cybernetics (High Distinction)	AUSTRALIAN NATIONAL UNIVERSITY
2015 – 2019	B.S. in Mathematics (Magna cum Laude) Minor in Economics & Computer Science	NEW YORK UNIVERSITY ABU DHABI

PUBLICATIONS

1. Nischal Mainali, Lucas Texeria. **Theory and application of Exact training dynamics of linear transformer that learns in-context.** *Working paper*
1. Nischal Mainali, Rava Azeredo da Silveira, Yoram Burak. **Universal statistics of hippocampal place fields across species and dimensionalities.** *Neuron*, 2025
1. Freya Behrens, Nischal Mainali, Chiara Marullo, Sebastian Lee, Ben Sorscher, Haim Sompolinsky. **Statistical mechanics of deep learning.** *Journal of Statistical Mechanics: Theory and Experiment*, 2024
2. Nischal Mainali[†], Liam Meier[†], Elliott Ash, Daniel L Chen. **Automated classification of modes of moral reasoning in judicial decisions.** *Computational Legal Studies*, 2021

TEACHING

Teaching Assistant	Information & Coding in the Brain: 2023, 2024 Taught tutorial classes, and designed homework and exams for the graduate level course on mathematical models of neural code under <i>Prof. Yoram Burak</i> .	HEBREW UNIVERSITY OF JERUSALEM
Teaching Assistant	Information Theory and Learning: 2022 Taught tutorial classes, and designed homework and exams for the graduate level course that dealt with information representation and learning in the brain under <i>Prof. Haim Sompolinsky</i> .	HEBREW UNIVERSITY OF JERUSALEM
Teaching Assistant	Foundation Courses in Mathematics: 2018 Held office hours for undergraduate courses in Calculus, Linear Algebra, & Probability.	COURANT INSTITUTE, NYU

FELLOWSHIPS AND CONFERENCES

Mar. 2024	Cosyne, Presenter's grant	LISBON, PORTUGAL
Jul. 2023	Principles of Intelligent Behavior in Biological and Social Systems	PRAGUE, CZECHIA
Mar. 2023	Imbizo - Computational Neuroscience	CAPE TOWN, SOUTH AFRICA
Jul. 2022	Summer school on Statistical Physics & Machine learning	LES HOUCHEs, FRANCE
Jul. 2021	Diverse Intelligence Summer Institute Fellow	ONLINE/UCLA
Jul. 2021	London Mathematical Laboratory Summer Fellow	ONLINE/LONDON
Jan. 2019	Workshop on Applied Topology	KYOTO, JAPAN

WORK

March. 2021 – Jun. 2021	Consultant	PLACE INTELLIGENCE
	Wrote a report on urban design and analytics for disaster impact management with Place Intelligence and designed a predictive framework to forecast and control for the impacts of disasters such as bush fires.	
Jul. 2020 – Dec. 2020	Smart Water Infrastructures	AUSTRALIAN NATIONAL UNIVERSITY
	Worked in a team to design and develop a prototype of a smart tap that modulates water volume via a computer vision enabled sensor. We presented the work at <i>Hydrology & Water Resources Symposium 2021</i> .	
Aug. 2018 – May. 2019	Undergraduate Thesis in Algebraic Topology	NYUAD MATHEMATICS
	Automated calculation of characteristic classes of topological manifolds such as Chern, Pontryagin, and Wu classes, their relations and the associated polynomials with Prof. Hisham Sati.	
May. 2018 – Aug. 2019	Generative Model for Fluids	TECHNICAL UNIVERSITY OF MUNICH
	Research project on deep Learning methods for Reynolds-averaged Fluid simulation for Airfoils with Prof. Nils Thuerey. <i>Preprint here</i> .	

AWARDS

2019	Full Graduate Scholarship to Australian National University	AUSTRALIA
2019	Rhodes Scholarship National Finalist	UAE
2017	NYU Global Leadership Scholar	WASHINGTON D.C.
2015	Full Undergraduate Scholarship to NYU Abu Dhabi	UAE
2015	National Topper in A level Further Mathematics	NEPAL

SKILLS

Languages	Nepali, English
Programming	Python, PyTorch, \LaTeX