curriculum vitæ of

Nischal Mainali

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Education

2021 – present **Ph.D.** in Theoretical Neuroscience — Hebrew University of Jerusalem
(w/ Prof. Yoram Burak)

2020 – 2021 **M.S.** in Applied Cybernetics (High Distinction) — Australian National University

2015 – 2019 **B.S.** in Mathematics (magna cum laude) — New York University Abu Dhabi
Minor in Economics & Computer Science

Research

Oct. 2021 – present **Theoretical Neuroscience** — Hebrew University of Jerusalem
I work on developing a mathematical theory of spatial cognition in the mammalian brains with Prof. Yoram Burak. In particular, I am interested in unifying the theories of spatial cognition and navigation in the brain such that they can explain observed neural behavior across size and dimensions of space.

Jul. 2020 – Dec. 2020 **Smart Water Infrastructures** — Australian National University
I 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 *Hydrology & Water Resources Symposium 2021*.

Aug. 2018 – May. 2019 **Undergraduate Thesis in Algebraic Topology** — NYUAD Mathematics
I automated the calculation of characterstic classes of topological manifolds such as Chern, Pontryajin, 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
I participated in a summer research project on deep Learning methods for Reynolds-averaged Fluid simulation for Airfoils with Prof.Nils Thuerey. I was involved in design of normalization procedure and custom loss function, Data generation, and Coding the model. *Preprint here.*

Jan. 2018 – May. 2018 **Classification of Moral Reasoning** — NYU Center for Data Science
We trained a ML algorithm on applied ethics papers corpora for classification of moral reasoning employed in legal text with Prof. Elliott Ash and Prof. Daniel Chen. We used the model to analyse US Circuit Court judge rulings since 1891 and find a phase shift from deontological to consequentialist reasoning. Paper published in *Computational Legal Studies.*

Teaching

Teaching Assistant **Information & Coding in the Brain** — Hebrew University of Jerusalem
Taught Tutorial Classes, and designed homework and exams for the graduate level course that dealt with analyzing high dimensional neural data, and information representation and it's optimality in the brain under Prof. Yoram Burak.

Teaching Assistant **Information Theory and Learning** — Hebrew University of Jerusalem
Taught Tutorial Classes, and designed homework and exams for the graduate level course that dealt with information representation and learning in the brain under Prof. Haim Sompolinsky.

Teaching Assistant **Foundation Courses in Math** — Courant Institute, NYU
Held office hours for undergraduate courses in Calculus, Linear Algebra, & Probability.

Work

March. 2021 – Jun. 2021 — **Consultant** — Place Intelligence

I wrote a report on urban design and analytics for disaster impact management with Place Intelligence. I also designed a predicitve framework that can be used to forecast and control for the impacts of disasters such as bush fires.

Oct. 2020 – Mar. 2021 — **ML for Consevation Researcher** — Microsoft / DPIE

I worked on a joint Project between Microdoft and Department of Planning, Industry and Energy, NSW. We designed an ML model to sift through automatically captured camera trap data to aid environment research and conservation work. I worked on designing an interface for using the model off the shelf.

Jul. 2020 – Dec. 2020 — **Smart City Consultant** — School of Cybernetics, ANU

We analysed and provided recommendation to Quenbeyan smart city project. It involved analysing the decision making, governance, and engineering process and providing reccomendations around managing safety and sustainability using a more-than-human approach.

May. 2019 – Aug. 2019 — **Research Student** — NYU Environmental Fluid Dynamics Lab

I worked on a research project that collected data from the Ilulissat Icefjord in Greenland with Prof. David Holland. We were out in the ocean at the vicinity of the fjord to collect boundary data to simulate the melting of the fjord.

May. 2016 – Jul. 2016 — **Research Student** — CTED Ghana

I worked in a summer project where we researched market forces in rural Ghana with an aim to increase market access for farmers. I analysed various incomplete property data and extrapolated them to full set of data with aim to safeguard farmer's property rights.

Fellowships and Conferences

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
Jul. 2018	Conference on Numerical Ranges	Munich, Germany
Nov. 2017	HackHarvard	Boston, USA

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, Hindi

Programming — Python (TensorFlow, PyTorch), Matlab, LaTeX