Mikail Khona

Personal Info

email: mikail@mit.edu; Date of Birth: 12/20/1995
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Education

2018-ongoing	PhD candidate in Physics (Currently in year 4, expected 2023), Massachusetts Institute of Technology.
March '19 - present	Graduate research in theoretical and computational systems neuroscience Primary Advisor: Ila Fiete, Secondary Advisor: Mehran Kardar
August '21	Methods in Computational Neuroscience (MCN), Summer School at Woods Hole, MA
2014-2018	Bachelor's degree from the Indian Institute of Technology (IIT), Bombay in Engineering physics with a minor in **Mathematics** and Major with honours in **Physics**
High School	The Bombay Scottish School, Mahim, Mumbai, India

Awards/Achievements

2022-23	K. Lisa Yang ICoN Graduate Student Fellow (100k)
2021-2022	MathWorks Science Fellowship (one of 20 across the School of Science at MIT) (100k)
2018-19	Seigel Fellowship, Department of Physics (100k)
2016-2018	Institute Academic Award for the highest GPA among undergraduates in the Physics department at IITB (9.95/10)
2016-2017	Competitive DAAD-WISE scholarship for an undergraduate project in Germany in 2017 [declined].
2014	An All India Rank of 562 (Percentile 99.96) in the **IIT** - **JEE** examination 2014 out of 1.4 million applicants all over India.
2013-2014	INSPIRE Scholarship for Higher Education - A scholarship awarded by the Government of India to meritorious students in high school who plan to pursue a degree in the natural sciences.

Publications

- **Khona, Mikail**, Fiete, Ila.
  Attractor and Integrator Networks in Neuroscience. (in press, Nature Reviews Neuroscience, preprint available at *this arxiv link.*)
- Schaeffer, Rylan, **Khona, Mikail**, Meshulam, Leenoy, Fiete, Ila.
  No Free Lunch from Deep Learning in Neuroscience:
  A Case Study through Models of the Entorhinal-Hippocampal Circuit. NeurIPS, 2022. Preprint available at *this biorxiv link*.
- Schaeffer, Rylan, **Khona, Mikail**, Fiete, Ila.
  Reverse-engineering recurrent neural network solutions to a hierarchical inference task for mice. NeurIPS, 2020.
- **Khona, Mikail***, Chandra, Sarthak*, Fiete, Ila.
  Spontaneous emergence of topologically robust grid cell modules: A multiscale instability theory. Submitted, preprint available at *this biorxiv link.*
- **Khona, Mikail***, Chandra, Sarthak*, Ma, Joy, Fiete, Ila.
  Winning the lottery with neurobiology: faster learning on many cognitive tasks with fixed sparse RNNs. Submitted, preprint available at *this arxiv link.*
- G. Madirolas, A. Al-Asmar, L. Gaouar, L. Marie-Louise, A. Garza-Enriquez, **M. Khona**, C. Ratzke, J. Gore, A. Pérez-Escudero.
  A taste for numbers: *Caenorhabditis elegans.* foraging follows a low-dimensional rule of thumb. Preprint at *this biorxiv link.*

- Schaeffer, Rylan*, Bordelon Blake*, **Khona, Mikail***, Pan, Weiwei, Fiete, Ila.
  Efficient Online Inference for Nonparametric Latent Variable Time Series. Conference on Uncertainity in Artificial Intelligence(UAI), 2021.

Conference Abstracts/Posters

- **Khona, Mikail**, Chandra, Sarthak, Konkle, Talia and Fiete, Ila (2022). Modelling the formation of the human visual cortical hierarchy with bottom-up growth. Cosyne Abstracts 2022, Lisbon, Portugal.
- **Khona, Mikail**, Chandra, Sarthak, Acosta, Francisco, Fiete, Ila (2021) The emergence of discrete grid cell modules from smooth gradients in the brain. Cosyne Abstracts 2021.
- **Khona, Mikail**, Xu, Qianli and Fiete, Ila (2020). A model of oscillatory gating of information flow between neural circuits as a function of local recurrence. Cosyne Abstracts 2020, Denver, CO.
- Schaeffer, Rylan, **Khona, Mikail**, Fiete, Ila.
  No Free Lunch from Deep Learning in Neuroscience:
  A Case Study through Models of the Entorhinal-Hippocampal Circuit, ICML AI4Science Workshop, 2022.

Technical Skills

- Deep learning with Python: Pytorch
- Scientific computing with Python (NumPy, SciPy) and MATLAB.
- Scientific illustration with Adobe Illustrator.