Personal Info

email: mikail@mit.edu; Date of Birth: 12/20/1995
Address: 76A Pleasant Street, Cambridge, MA 02139

Education

2018-ongoing	PhD candidate in Physics (Currently in year 4, expected 2024 summer), Massachusetts Institute of Technology.
March '19 - present	MathWorks Science Fellowship (one of 20 across the School of Science at MIT), Graduate research in theoretical and computational systems neuroscience Primary Advisor: Ila Fiete, Secondary Advisor: Mehran Kardar. Studying self organized module formation in neural circuits with mammalian grid cells as a paradigmatic example. Other projects include modelling preparatory activity in motor cortices with RNNs, bottom-up growth models of retinotopic maps in human visual cortex.
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**; with a GPA of 9.5 (out of 10). Bachelor's thesis: Modelling of cell acto-myosin cortex using liquid crystal hydrodynamics. Derived PDEs determining dynamics of velocity flow field and nematic order, followed by numerical investigations of instabilites and pattern formation in this complex fluid.
High School	The Bombay Scottish School, Mahim, Mumbai, India

Conference Abstracts/Posters

- **Khona, Mikail**, Chandra, Sarthak, Konkle, Talia and Fiete, Ila (2022). Modelling the formation of the human visual cortical hierarchy. 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.

Publications

- (2021) 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.
- Schaeffer, Rylan, **Khona, Mikail**, Meshulam, Leenoy, Fiete, Ila (2020) Reverse-engineering recurrent neural network solutions to a hierarchical inference task for mice. Proceedings of NeurIPS, 2020.
- **Mikail Khona**, Ila R. Fiete, Nature reviews neuroscience.
  Attractor and Integrator Networks in Neuroscience. (invited review, in revision, preprint available at *this arxiv link*.)
- Spontaneous emergence of topologically robust grid cell modules: A multiscale instability theory.
  Khona, Mikail*, Chandra, Sarthak*, Fiete, Ila (2021). Submitted, preprint available at *this biorxiv link.*
- A. Pérez-Escudero, **Mikail Khona**, Jeff Gore (in prep)
  A simple rule governs the outcome of foraging in *Caenorhabditis elegans.*

Technical Skills

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

Past Undergraduate Awards/Achievements

2016-2017 Institute Academic Award for the highest GPA among undergraduates in the Physics department (9.95/10)

2016-2017 Competitive DAAD-WISE scholarship for an undergraduate project in Germany for summer 2017 [declined].

2014 An **All India Rank 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.