

# MICHELANGELO NAIM

*Curriculum Vitae et Studiorum*

Department of Brain and Cognitive Sciences  
Massachusetts Institute of Technology (MIT)  
Cambridge, MA 02139  
✉ [mnaim@mit.edu](mailto:mnaim@mit.edu)  
🌐 [naimic.github.io](https://naimic.github.io)

I am a service-minded, detail-oriented Postdoctoral Scientist with a strong background in physics and math. I have a profound passion for AI, especially in the areas of language and memory. My goal is to use AI to model the brain, hoping to develop brain-inspired learning principles to boost neural network performance. I am deeply committed to AI safety and its responsible advancement. I also aim to make AI more understandable, believing that this will help us learn and grow faster.

## Experience

- April 2022 - present **MIT - Massachusetts Institute of Technology**, Cambridge, USA. K. Lisa Yang Integrative Computational Neuroscience (ICoN) Postdoctoral Fellow at the McGovern Institute for Brain Research. Advisors: Guangyu Robert Yang and Ann Graybiel.
- Jan 2022 - April 2022 **MIT - Massachusetts Institute of Technology**, Cambridge, USA. Postdoctoral Associate in the Department of Brain and Cognitive Sciences. Advisor: Guangyu Robert Yang.

## Education

- Oct 2017 - Oct 2021 **Weizmann Institute of Science**, Rehovot, Israel. PhD in Theoretical Neuroscience. Advisor: Misha Tsodyks. Thesis title: “Episodic memory from first principles”.
- Oct 2015 - Sept 2017 **Sapienza - Università di Roma**, Rome, Italy. Master’s degree in Theoretical Physics, 110/110 cum Laude. Thesis advisors: Giorgio Parisi and Alessandro Treves (SISSA). Thesis title: “Analysis of a Potts Neural Network”.
- Oct 2012 - Sept 2015 **Sapienza - Università di Roma**, Rome, Italy. Bachelor’s degree in Physics. 110/110 cum Laude. Thesis advisor: Federico Ricci Tersenghi. Thesis title: “Phase transitions in the Ising Model”.

## Visiting Institutions

- Sept 2019 - Dec 2019 **Institute for Advanced Study**, Princeton, NJ.
- Aug 2018 - Sept 2018 **Kavli Institute for Theoretical Physics**, Santa Barbara, CA.

## Publications

- [6] Mikhail Katkov et al. “Mathematical models of human memory”. In: *Journal of Mathematical Physics* 63.7 (2022), p. 073303.
- [5] Michelangelo Naim, Mikhail Katkov, and Misha Tsodyks. “Effects of order on memory of event times”. In: *Scientific Reports* 11.1 (2021), pp. 1–9.
- [4] Michelangelo Naim et al. “Fundamental law of memory recall”. In: *Physical Review Letters* 124.1 (2020), p. 018101.
- [3] Michelangelo Naim et al. “Emergence of hierarchical organization in memory for random material”. In: *Scientific Reports* 9.1 (2019), p. 10448.
- [2] Michelangelo Naim et al. “Reducing a cortical network to a Potts model yields storage capacity estimates”. In: *Journal of Statistical Mechanics: Theory and Experiment* 2018.4 (2018), p. 043304.
- [1] Chol Jun Kang et al. “Life on the Edge: Latching Dynamics in a Potts Neural Network”. In: *Entropy* 19.9 (2017), p. 468.

## Awards and honors

- Feb 2020 **The 2020 Lee A. Segel Memorial Prize in Theoretical Biology**
- March 2018 - Oct 2021 **M-GATE**: International PhD programme for highly motivated young scientists, offering 15 early-stage researchers (ESRs) the opportunity to improve their research and entrepreneurial skills and enhance their career prospects. This Marie Skłodowska-Curie Innovative Training Network is funded by the European Community’s Framework programme Horizon2020.

- Jan 2017 - Jul 2017 **Undergraduate scholarship at SISSA:** scholarship for my Master's thesis project in which I applied theoretical physics to neural networks with supervisors Alessandro Treves at SISSA and Giorgio Parisi in Rome.
- Oct 2013 - Jun 2015 **Percorso d'Eccellenza (Honor classes) - Bachelor's degree:** It consists of a class formed by the most promising students (about 10% of all students) who are asked to dedicate time in deepening topics through the discussion of problems, the presentation of relevant and methodological examples and to solve exercises. The whole is divided into seven additional courses.

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## Skills

- Languages **English** (fluent), **Hebrew** (competent), **Italian** (native)
- Programming **Python** (advanced), **C** (advanced), **PyTorch** (advanced), **L<sup>A</sup>T<sub>E</sub>X** (advanced), **Unity** (competent), **C#** (competent), **Matlab** (competent), **Mathematica** (competent), **C++** (competent), **GML** (competent), **Java** (competent), **Javascript** (competent)