Michelangelo Naim

Curriculum Vitae et Studiorum

Basis Research Institute
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As a Research Scientist II at Basis Research Institute, I specialize in the intersection of physics, mathematics, and artificial intelligence. My research is driven by a deep passion for AI, particularly in the realms of language and memory. By leveraging large language models, I apply advanced mathematical and computational methods to enhance deep learning performance and optimize memory design. I also excel in leadership, guiding teams from theoretical development to the creation of efficient, real-time solutions.

Experience

Aug 2024 - present **Basis Research Institute**, NYC, USA. Research Scientist II, focused on developing computational theories of intelligence, including reasoning, learning, and decision-making, while contributing to and maintaining open-source software.

Jan 2022 - Aug 2024 **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.

Education

Oct 2017 - Oct 2021 **Weizmann Institute of Science**, Rehovot, Israel. PhD in 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 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.

Awards and Honors

Apr 2024 **MIT Staff Excellence Award for Morale Booster**: This award acknowledges individuals who have improved the overall work environment.

Feb 2020 **The 2020 Lee A. Segel Memorial Prize in Theoretical Biology.**

Mar 2018 - Oct 2021 **M-GATE**: Participated in this Marie Sklodowska-Curie Innovative Training Network funded by Horizon2020 as one of 15 early-stage researchers.

Jan 2017 - Jul 2017 **Undergraduate Scholarship at SISSA**: Awarded for a Master's thesis project in theoretical physics applied to neural networks, supervised by Alessandro Treves at SISSA and Giorgio Parisi in Rome.

Oct 2013 - Jun 2015 **Percorso d'Eccellenza (Honor Classes) - Bachelor's Degree**: Selected for advanced coursework and problem-solving, reserved for the top 10% of students.

Intellectual Property

Jan 2024 **Named Inventor on Software Disclosure**, "Generative Agents with Large Language Models", Case No. 25635, submitted to MIT Technology Licensing Office.

Highlighted Publications

[3] Wen-Ding Li, Keya Hu, Carter Larsen, Yuqing Wu, Simon Alford, Caleb Woo, Spencer M Dunn, Hao Tang, Michelangelo Naim, Dat Nguyen, et al. "Combining induction and transduction for abstract reasoning". In: *arXiv preprint arXiv:2411.02272* (2024).

[2] Zhao Kaiya, Michelangelo Naim, Jovana Kondic, Manuel Cortes, Jiaxin Ge, Shuying Luo, Guangyu Robert Yang, and Andrew Ahn. "Lyfe Agents: Generative agents for low-cost real-time social interactions". In: *arXiv preprint arXiv:2310.02172* (2023).

[1] Michelangelo Naim, Mikhail Katkov, Sandro Romani, and Misha Tsodyks. "Fundamental law of memory recall". In: *Physical Review Letters* 124.1 (2020), p. 018101.