Ravi Francesco Srinivasan

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EDUCATION

University of California Berkeley — Berkeley, CA
Neuroscience Ph.D. Student — *Aug. 2024 – present*

Harvard University, Kreiman Lab — Boston, MA
Master Thesis — *Mar. 2023 – Sep. 2023*

Eidgenössische Technische Hochschule Zürich (ETHZ) — Zürich, Switzerland
Master in Computer Science — *Sep. 2021 – Oct. 2023*

École Polytechnique Fédérale de Lausanne (EPFL) — Lausanne, Switzerland
Exchange student in the Computer Science bachelor program — *Feb. 2021 – Jul. 2021*

Politecnico di Milano — Milan, Italy
Bachelor of Science in Engineering of Computing Systems — *Sep. 2018 – Sep. 2021*

PROFESSIONAL EXPERIENCE

Harvard Medical School - Boston Children's Hospital — Boston, U.S.A.
Graduate Research Assistant — *Oct. 2023 – Jan. 2024*
- Conducting research at the Kreiman Lab on compositional reasoning in machine learning models and humans.

Brain, Minds and Machines Summer Course — Woods Hole, MA
Student — *Aug. 2023*
- Conducted research on compositional visual reasoning.

IBM Research — Zürich, Switzerland
Research Intern — *Jul. 2022 – Feb. 2023*
- Studied forward learning rule using theoretical and analytical approaches.

SELECT LIST OF PROJECTS

Investigating compositionality using first order logic — *Aug. 2023 – present*
- Developed a first-order logic framework to formally describe scenes.
- Currently investigating machine generalization using the generated dataset.

Models of working memory [1] — *Mar. 2023 – Jul. 2023*
- Developed a biologically-inspired Hebbian attractor model of working memory.
- Analysed the model performance in the memory matching game and matched human behavioral data.
- Studied properties of the model qualitatively similar to the humans' neurophysiological recordings.

Forward learning with top-down feedback [2] — *Jul. 2022 – Jan. 2023*
- We propose PEPITA—a biologically plausible alternative to backpropagation.
- Contributed to empirical studies comparing PEPITA with other forward learning algorithms, and analytical proofs characterizing their convergence properties.

PUBLICATIONS

1. Yuchen Xiao*, Paula Sánchez López*, Ruijie Wu*, **Ravi Srinivasan**, Peng-Hu Wei, Yong-Zhi Shan, Daniel Weisholtz, Garth Rees Cosgrove, Joseph R Madsen, Scellig Stone, Guo-Guang Zhao, and Gabriel Kreiman. Neurophysiological and computational mechanisms of non-associative and associative memories during complex human behavior. *bioRxiv preprint*, 2023. doi: 10.1101/2023.03.27.534384. (Under Review)

2. Ravi Francesco Srinivasan, Francesca Mignacco, Martino Sorbaro, Maria Refinetti, Avi Cooper, Gabriel Kreiman, and Giorgia Dellaferrera. Forward learning with top-down feedback: Empirical and analytical characterization. In *The Twelfth International Conference on Learning Representations*, 2024. URL https://openreview.net/forum?id=My7lkRNnL9.

ETH-D-INFK Excellence Scholarship — ETHZ
2021-2023

Scholarship awarded to the top research proposals by applicants to Master's programs.
Covers tuition for 4 semester and living expenses (CHF 41,000).

Swiss-European Mobility Programme scholarship — EPFL
Feb. 2021 – Jul. 2021

Awarded to top two applicants to the exchange program based on academic achievement.
Covers living expenses during exchange period (CHF 4,200).

Merit-Based Scholarship — Politecnico di Milano
2018 – 2021

Scholarship awarded to student with excellent GPA (>29/30) covering tuition.

Best Freshman Award — Politecnico di Milano
2019

Awards given to top performing freshmen in each department (€1000)