Gianluca Bencomo

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Education

2023 - present Ph.D. (Computer Science) at **Princeton University**, *Advisor*: Thomas L. Griffiths
2021 - 2023 M.S.E. (Computer Science) at **Princeton University**, *Advisor*: Thomas L. Griffiths, *Thesis*: Bayesian Filtering for Neural Networks
2017 - 2021 B.A. (Biochemistry) at **Whittier College**, *Minors*: Computer Science, Mathematics, *Thesis*: Drug-Drug Interaction Prediction with Gaussian Processes

Awards & Honors

2025 NSF AI Institute for Artificial and Natural Intelligence (ARNI) Research Grant, $125 000
2024 NSF AI Institute for Artificial and Natural Intelligence (ARNI) Research Grant, $125 000
2023 Princeton First Year Fellowship
2021 Pi Mu Epsilon Math Honor Society Inductee
2021 Nu Mu Rho Chemistry Honor Society Inductee
2021 W. Roy Newsome Award in Chemistry
2019 Harvard-Amgen Scholars Fellowship Recipient
2018 Keck Undergraduate Research Fellowship Recipient

Pre-Prints

2025 Veselovsky, V.*, Stroebl, B.*, Bencomo, G.*, Arumugam, D., Schut, L., Narayanan, A., Griffiths, T. Hindsight Merging: Diverse Data Generation with Language Models. *Pre-Print. Under review at UAI 2025.*
2024 Marjieh, R., Kumar, S., Campbell, D., Zhang, L., Bencomo, G., Snell, J., Griffiths, T. Using Contrastive Learning with Generative Similarity to Learn Spaces that Capture Human Inductive Biases. *Pre-Print.*

Publications

2025 Bencomo, G., Gupta, M., Marinescu, I., McCoy, R. T., & Griffiths, T. Teasing Apart Architecture and Initial Weights as Sources of Inductive Bias in Neural Networks. *Annual Meeting of the Cognitive Science Society (CogSci).*
2024 Snell, J., Bencomo, G., & Griffiths, T. (2024). A Metalearned Neural Circuit for Nonparametric Bayesian Inference. *Advances in Neural Information Processing Systems.*
2023 Bencomo, G., Snell, J., & Griffiths, T. (2023). Implicit Maximum a Posteriori Filtering via Adaptive Optimization. *International Conference of Learning Representations.*
2023 Pasarkar, A., Bencomo, G., Olsson, S., & Dieng, A. B. (2023). Vendi Sampling For Molecular Simulations: Diversity As A Force For Faster Convergence And Better Exploration. *Journal of Chemical Physics*, 159(14): 144108.
2021 Born, R. & Bencomo, G. (2021). Illusions, delusions, and your backwards bayesian brain: a biased visual perspective. *Brain Behavior and Evolution*, 95(5), 272-285.

Technical Reports

2018 Bencomo, G. & Jones, S. (2018). Electrochemical Production of Oxygen and Methane on Mars by In-Situ Resource Utilization. *NASA Technical Reports Server: NTRS. [Washington, D.C.]*
2016 Gunasekara, O., Jia, Z., Twagirayezu, F., Bencomo, G., Garcia, A., Nikaido, B., Garcia, J., &

Melton, J. (2016). small Unmanned Aerial Vehicles Modeling and Testing. *NASA Technical Reports Server: NTRS. [Washington, D.C.]*

Employment

Ludus Laboratories, President & Co-Founder April 2025 - present

Developing of physically-simulated environments where embodied agents can train and compete.

Princeton University, Department of Computer Science (on-leave) September 2021 - present

Fulfilled duties as an assistant instructor (Fall 2021 - Spring 2023) while concurrently pursuing a research program in Bayesian filtering and meta-learning. At present, I am pursuing my research interests in (1) considering Bayesian inference as optimization (implicit Bayesian inference), and (2) endowing neural networks with human-like inductive biases and other prior distributions of interest. *Supervisor*: Dr. Thomas L. Griffiths.

Harvard Medical School, Department of Neurobiology June 2019 - August 2021

Conducted a time-varying behavioral analysis of primate visual decision-making data using dynamic logistic regression and other Bayesian methods. Studied topics including V2/V3 cortical feedback, multi-task learning, illusions, dopamine, and Schizophrenia. *Supervisor*: Dr. Richard T. Born.

NASA Jet Propulsion Laboratory, Electrochemical Technologies June 2018 - August 2018

Assisted in the successful design and construction of an electrochemical cell for the conversion of CO_2 to O_2 using a novel synthetic route. Research was in the interest of in-situ resource utilization requirements for life support on Mars. *Supervisor*: Dr. Simon C. Jones.

Whittier College, Department of Biology January 2018 - March 2020

Explored and analyzed induced changes in anatomy, physiology, and the gene expression profile in PC-12 cells exposed to concentrations of commonly used agricultural pesticides. *Supervisor*: Dr. Erica Fradinger.

NASA Ames Research Center, Intelligent Systems June 2016 - August 2016

Assisted in the design and analysis of small Unmanned Aerial Vehicles (sUAVs) flying in urban settings under adverse weather conditions. *Supervisor*: Dr. Ben Nikaido.

Teaching

Fall 2021	Assistant Instructor, Princeton University, Introduction to Computer Science
Spring 2022	Assistant Instructor, Princeton University, Introduction to Computer Science
Fall 2022	Assistant Instructor, Princeton University, Introduction to Computer Science
Spring 2023	Assistant Instructor, Princeton University, Foundations of Probabilistic Modeling