

# Gianluca Bencomo

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## EDUCATION

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- 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

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- 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

## PUBLICATIONS

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- 2023** Snell, J., Bencomo, G., & Griffiths, T. (2023). A Metalearned Neural Circuit for Nonparametric Bayesian Inference. *Under Review at International Conference on Artificial Intelligence and Statistics*.  
**2023** Bencomo, G., Snell, J., & Griffiths, T. (2023). Implicit Maximum a Posteriori Filtering via Adaptive Optimization. *Under Review at 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.  
**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

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**Princeton University, Department of Computer Science** 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<sub>2</sub> to O<sub>2</sub> 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.

## ACTIVITIES & COMMUNITY SERVICE

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**2017 - 2020** Whittier College Swimming & Diving Team Member (NCAA)

**2017 - 2020** Whittier College Chemistry Tutor

- Inorganic Chemistry, Organic Chemistry, Quantitative Analysis Theory

**2017 - 2020** LAC+USC Hospital, Department of Emergency Medicine Volunteer (300+ hours)

## TEACHING

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**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

## RELEVANT COURSEWORK

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- Foundations of Probabilistic Modeling
- Probabilistic Models of Cognition
- Computer Vision
- Modern Statistics
- Information Theory and Applications
- Introduction to Analytic Combinatorics
- Introduction to Robotics
- Operating Systems
- Numerical Analysis