# Nicholas Thompson Franklin

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Researcher in machine learning and AI for scientific discovery

## Education

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| Ph.D. in Cognitive Science, Brown University, | August 2017 |
| B.S. Biology, B.A. Spanish, The University of Texas at Austin, | May 2009 |

## Professional Experience

**Flagship Pioneering** — **Cambridge, MA**

*Senior Scientist, Machine Learning* — Nov 2023–Present

- Research in state-of-the-art machine learning in biology and chemistry to support Flagship Pioneering's early-stage venture portfolio

- Areas of interest and focus include generative models, reinforcement learning and NLP. Modalities of interest include protein design, small molecules and agentics systems.

- Technical leadership and internal impact include planning reasearch efforts, recruitment and training of junior scientists, collaborating with technical and non-technical partners across the ecosystem, and the development of technical best practices

**Hyperscience** — **New York, NY**

*Applied Scientist* — Feb 2021–Jul 2022

- Member of ML research and engineering team in a growth stage start-up focused on document understanding and business automation.

- Led research initiatives to enhance machine learning models for document understanding, spanning computer vision and natural language processing.

- Designed ML solutions from prototype to production in Python and PyTorch.

**Harvard University** — **Cambridge, MA**

*Postdoctoral Fellow, Lab of Samuel J Gershman* — Sep 2017–Jan 2021

- Research in human learning and cognition with deep generative models and probabilistic Bayesian methods.

- Designed neuro-symbolic machine learning using autoregressive models, variational autoencoders and probabilistic inference (non-parametric Bayes). Used these methods as a theoretical account of human learning and for video segmentation.

- Created research software used by external collaborators; supervised student projects in computational neuroscience and deep learning.

**Brown University** — **Providence, RI**

*Graduate Researcher, Lab of Michael J Frank* — Sept 2011–Aug 2017

- Conducted theoretical research on human learning and brain function, focusing on reinforcement learning, Bayesian methods, and neural network modeling.

- Developed models for biological neural networks and Bayesian nonparametric reinforcement learning.

- Published theoretical and empirical findings in leading computational neuroscience journals.

- Taught and mentored students in neural network and cognitive modeling courses.

## Skills

**Programming:** Python, PyTorch, NumPy, Git, AWS, Lightning

**Machine learning & AI:** Deep generative models (VAEs, autoregressive methods, transformers, flow-matching), reinforcement learning (GFlowNets, tabular methods, PPO), Bayesian nonparametrics, probabilistic modeling, NLP (LLMs, agentic systems)

**Domains of Application:** Biomolecular design, protein and small molecule modeling, computational neuroscience

**Spoken Languages:** English (native), Spanish (professionally proficient), French (intermediate)

## Selected Publications

[1] Liu A, Elaldi A, **Franklin NT**, Russell N, Atwal GS, Ban YEA, Viessmann O (2025): Flash Invariant Point Attention. *arXiv*

[2] Buekers AO, Collin Silvy HP, Kempner RP, **Franklin NT**, Gershman SJ, Norman KA (2024) Blocked training facilitates learning of multiple schemas. *Communications Psychology*

[3] **Franklin NT** & Frank MJ (2020). Generalizing to generalize: humans flexibly switch between compositional and conjunctive structures during reinforcement learning. *PLOS Computational Biology*

[4] **Franklin NT**, Norman K.A., Ranganath C., Zacks J.M., Gershman S.J., (2020) Structured event memory: a neuro-symbolic model of event cognition. *Psychological Review*

[5] Schulz E, **Franklin NT**, Gershman S.J., (2020). Finding structure in multi-armed bandits. *Cognitive Psychology*

[6] **Franklin NT** Frank MJ (2018). Compositional clustering in task structure learning. *PLOS Computational Biology*

[7] **Franklin NT** & Frank MJ (2015). A cholinergic feedback circuit to regulate striatal population uncertainty and optimize reinforcement learning. *eLife*