

# Nicholas T Franklin, Ph.D.

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Researcher in Machine Learning and AI

## Experience

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### Flagship Pioneering

Senior Scientist, Machine Learning

Cambridge, MA

*Nov 2023–Present*

- Research in ML/AI for biology and chemistry supporting Flagship's venture portfolio as member of Pioneering Intelligence, the company's ML/AI center of excellence
- Areas of interest include generative methods (foundation models), reinforcement learning (GFlowNets), and LLMs. Projects include:
  - Autoregressive GFlowNets for *de novo* protein & small molecule design
  - Uncertainty quantification in deep classification models
  - Latent-space representation for protein & small molecule generation
  - Bayesian approaches to hallucination-based protein design
  - LLM judges and agentic systems
- Technical leadership includes research planning, junior scientist recruitment/training, internship supervision, cross-ecosystem collaboration on strategy and hands-on implementation, and disseminating state-of-the-art methods to technical and non-technical stakeholders

### Hyperscience

Applied Scientist

New York, NY

*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

Postdoctoral Fellow, Lab of Samuel J Gershman

Cambridge, MA

*Sep 2017–Jan 2021*

- Research in human learning and AI with deep generative models and probabilistic Bayesian methods
- Published work includes neurosymbolic and non-parametric Bayesian accounts of human learning and memory. Research methods include deep generative models (LSTMs and VAEs) and probabilistic inference.
- Created research software used by external collaborators. Supervised student projects in computational neuroscience and deep learning. Managed internal and external collaborations with empirical scientists.

### Brown University

Graduate Researcher, Lab of Michael J Frank

Providence, RI

*Sept 2011–Aug 2017*

- Conducted theoretical research on human learning and brain function, focusing on reinforcement learning, Bayesian methods, and biological neural network modeling
- Developed models for biological neural networks and nonparametric Bayesian reinforcement learning
- Published theoretical and empirical findings in leading computational neuroscience journals. Taught and mentored students in neural network and cognitive modeling courses

## 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

## Technical Skills

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**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

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

## Publications

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1. Liu A, Elaldi A, **Franklin NT**, Russell N, Atwal GS, Ban YEA, Viessmann O (2025): Flash Invariant Point Attention. *NeurIPS 2025*
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 KA, Ranganath C, Zacks JM, Gershman SJ (2020) Structured event memory: a neuro-symbolic model of event cognition. *Psychological Review*
5. Schulz E, **Franklin NT**, Gershman SJ (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*