Nicholas T Franklin, Ph.D.

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Researcher in Machine Learning and AI

Experience

Flagship Pioneering Cambridge, MA
Senior Scientist, Machine Learning *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 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 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 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 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

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

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

1. Ko J, Rontogiannis A, Ban YEA, Elaldi A, **Franklin NT** (2025): Relaxed Sequence Sampling for Diverse Protein Design. *arXiv*
2. Migliorini G, Rontogiannis A, Guitchounts G, Franklin NT, Elaldi A, Viessmann O (2025): PairSAE: Mechanistic Interpretability from Pair Representations In Protein Co-Folding. *Machine Learning in Structural Biology Workshop*
3. Liu A, Elaldi A, **Franklin NT**, Russell N, Atwal GS, Ban YEA, Viessmann O (2025): Flash Invariant Point Attention. *NeurIPS 2025*
4. Buekers AO, Collin Silvy HP, Kempner RP, **Franklin NT**, Gershman SJ, Norman KA (2024) Blocked training facilitates learning of multiple schemas. *Communications Psychology*
5. **Franklin NT** & Frank MJ (2020). Generalizing to generalize: humans flexibly switch between compositional and conjunctive structures during reinforcement learning. *PLOS Computational Biology*
6. **Franklin NT**, Norman KA, Ranganath C, Zacks JM, Gershman SJ (2020) Structured event memory: a neuro-symbolic model of event cognition. *Psychological Review*
7. Schulz E, **Franklin NT**, Gershman SJ (2020). Finding structure in multi-armed bandits. *Cognitive Psychology*
8. **Franklin NT**, Frank MJ (2018). Compositional clustering in task structure learning. *PLOS Computational Biology*
9. **Franklin NT** & Frank MJ (2015). A cholinergic feedback circuit to regulate striatal population uncertainty and optimize reinforcement learning. *eLife*