Nicholas T Franklin

Email: nthompsonfranklin@gmail.com **Website**: https://nicktfranklin.github.io

Education

Brown University, PhD, Cognitive Science *2018*
Dissertation: Compositionality in Human Structure Learning

The University of Texas at Austin, Austin, TX *2009*
BS, Neurobiology; BA, Spanish

Employment History

Flagship Pioneering *Cambridge, MA*
Senior Scientist, Machine Learning *2023-*
Research in generative modeling and reinforcement learning

Hyperscience *New York, NY*
Applied Scientist *2021-2022*
Research in computer vision and natural language processing.

Harvard University *Cambridge, MA*
Postdoctoral Fellow *2017-2021*
Advisor: Samuel J Gershman

Brown University *Providence, RI*
Graduate Researcher *2011-2017*
Advisor: Michael J Frank

Weill Cornell Medical College *New York, NY*
Research Assistant *2009-2011*
Advisor: BJ Casey

Pre-Prints

Beukers, A. O., Collin, S. H., Kempner, R. P., **Franklin, N. T.**, Gershman, S. J., & Norman, K. A. (2023). Blocked training facilitates learning of multiple schemas.

Publications

Franklin N.T., & Frank, M. J. (2020). Generalizing to generalize: humans flexibly switch between compositional and conjunctive structures during reinforcement learning. *PLoS Computational Biology*.

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

Schulz E.*, **Franklin N.T.***, Gershman S.J., (2020). Finding structure in multi-armed bandits. *Cognitive Psychology*.
** denotes equal contribution*

Franklin N.T., & Frank, M. J. (2018). Compositional clustering in task structure learning. *PLoS Computational Biology*, 14(4).

Franklin N.T., & Frank, M. J. (2015). A cholinergic feedback circuit to regulate striatal population uncertainty and optimize reinforcement learning. *Elife*, 4.

Teslovich, T., Mulder, M., **Franklin N.T.**, Ruberry, E. J., Millner, A., Somerville, L. H., Simen, P., Durston, S. & Casey, B. J. (2014). Adolescents let sufficient evidence accumulate before making a decision when large incentives are at stake. *Developmental Science*, 17(1), 59-70.

Casey, B. J., Somerville, L. H., Gotlib, I. H., Ayduk, O., **Franklin N.T.**, Askren, M. K., Jonides J., Berman M. G., Wilson N. L., Teslovich T., & Glover, G (2011). Behavioral and neural correlates of delay of gratification 40 years later. *Proceedings of the National Academy of Sciences*, 108(36).

Invited Talks

Structured Event Memory, University of California, Davis, Ranganath Lab 2020
Structured Event Memory, Duke University, De Brigard Lab 2020
Structured Event Memory, Harvard Medical School, Krieman Lab 2020
What is Open Science? Max Plank Institute, Tübingen, Germany 2020
"Becoming a better scientist" workshop
Structured Event Memory,Boston College, Anzellotti Lab 2020
(*cancelled due to COVID- 19 outbreak*)
Finding structured multi-armed Bandits Harvard University, 2019
New England Research on Decision Making mini-conference
Structured Event Memory Brown University, Nassar Lab 2019
Structured Event Memory Princeton University, Norman Lab 2018
Compositional generalization in human structure learning New York University, 2018
ConCats seminar series

Conference Presentations

Franklin N.T., & Frank M.J. (2019). Compositional task structure clustering. Talk presented at the *Structure for Efficient Reinforcement Learning (SERL) workshop* at the 4^{th} *Multidisciplinary Conference on Reinforcement Learning and Decision Making* (co-organizer)

Franklin N.T., & Schulz, E., & Gershman S.J. (2019). Structured Multi-armed Bandits. Poster presented at the 4^{th} *Multidisciplinary Conference on Reinforcement Learning and Decision Making.*

Franklin N.T., & Schulz, E., & Gershman S.J. (2019). Finding structured multi-armed Bandits. Talk presented at the *New England Research on Decision Making* mini-conference

Franklin N.T., & Gershman S.J. (2018). Structured event memory: a structured probabilistic model of event cognition. Poster presented at the *The 51st Society for Mathematical Psychology & 16th International Conference on Cognitive Modeling Meetings*

Franklin N.T., & Frank M.J. (2017). Compositional Task Clusters in Human Transfer Learning. Poster presented at the *The* 3^{rd} *Multi-disciplinary Conference on Reinforcement Learning and Decision Making*

Franklin N.T., & Frank M.J. (2017). A Cholinergic Feedback Mechanism to Modulate Dopaminergic Learning within the Striatum in Response to Striatal Population Uncertainty. Poster presented at the *50th Meeting of the Winter Conference on Brain Research*

Franklin N.T., & Frank M.J. (2016). Independent generalization of action-effects and outcome-values in multistep and goal-directed learning. Poster presented at the *38e Symposium International du GRSNC, The Neuroscience of Decision Making*

Franklin N.T., & Frank M.J. (2016). Generalization in goal-directed learning: benefits of independent clustering of world-model and goals. Poster presented at the *23rd Annual Meeting of the Cognitive Neuroscience Society*

Franklin N.T., & Frank M.J. (2016). Generalization in goal-directed learning: independent clustering of action- effect and outcome-values. Poster presented at the *Computational and Systems Neuroscience (Cosyne)*

Franklin N.T., & Frank M.J. (2015). Independent clustering and generalization of action-outcome and outcome-values in goal-directed learning. Talk presented at the *45th Annual Meeting of the*

Society for Neuroscience

Franklin N.T., & Frank M.J.. (2014). A Bayesian perspective on flexibly responding to stochastic and non-stationary task: a role for striatal acetylcholine. Poster presented at the *Computational and Systems Neuroscience (Cosyne)*

Franklin N.T., & Frank M.J. (2013). Contributions of tonically active neurons and uncertainty to striatal learning. Poster presented at the *43rd Annual Meeting of the Society for Neuroscience*

Franklin N.T., & Frank M.J. (2013). Uncertainty and the striatum: How tonically active neurons may aid learning in dynamic environments. Poster presented at the *Computational and Systems Neuroscience (Cosyne)*

Franklin N.T., & Dominick A. (2009). The Role of Attention in Reward Motivated Learning. Poster presented at the *The University of Texas at Austin College of Natural Sciences Undergraduate Forum*

Fellowships & Awards

Kenneth R. and Pamela L. Galner Fund Dissertation Fellowship	2016
Excellence in Human Development, Family, & Social Science Res, UT Austin	2009
Undergraduate Research Fellowship, UT at Austin	2009
Phi Beta Kappa	2008

Professional Service

ad-hoc Reviewing

Behavioral and Brain Sciences, Biological Psychiatry, Behavioral Brain Research, Cognition, Cognition & Emotion, CogSci, Connection Science, Cosyne, eLife, Journal of Neuroscience, Nature, Nature Neuroscience, Neuropsychopharmacology, PLoS Computational Biology, Scientific Reports

Guest Editor

PLoS Computational Biology

Workshop Organizing

Structure for efficient reinforcement learning. 2019
Workshop at the 4^{th} Multidisciplinary Conference on Reinforcement Learning and Decision Making. Co-organizer with Eric Schulz

Other Service

Co-led Workshop on Open Science for Harvard Psychology	2019
Organized Brown CLPS department Cognition Seminar Series	2014-2015

Students Supervised

Prashant Raju (Cognitive Science)	2020

Undergraduate Students

Gargi Singh (Visiting Computer Science Student)	2020
Jerry Tang (Computer Science)	2017-2018
Michael Opara (Computer Science)	2018

Teaching Experience

Teaching assistant. Computational Cognitive Neuroscience	2013-14, 2016
Teaching assistant. Introduction to Cognitive Neuroscience	2014
Teaching assistant. Computational Cognitive Science	2013
Teaching assistant. Making Decisions	2012

Skill

Computational methods and machine learning
Deep neural networks (CNNs, RNNs, Transformers, & generative methods), reinforcement Learning, non-parametric Bayesian methods (Gaussian processes, non-parametric clustering), non-convex optimization, stochastic methods, attractor neural networks

Programming
Python, PyTorch, TensorFlow, NumPy, Keras, Scikit-Learn, Git, Matlab, Javascript, HTML, CSS

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