Paxton Fitzpatrick

Paxton.C.Fitzpatrick.GR@Dartmouth.edu | paxtonfitzpatrick.me
github.com/paxtonfitzpatrick | linkedin.com/in/paxtonfitzpatrick

EDUCATION

Dartmouth College, Hanover, NH **2021 – present**
Ph.D. candidate: *Cognitive Neuroscience*
Advisor: *Jeremy R. Manning, Ph.D.*

Dartmouth College, Hanover, NH **2024**
Master of Science: *Cognitive Neuroscience*
Master's Thesis: *Text embedding models yield high-resolution insights into conceptual knowledge from short multiple-choice quizzes*

Dartmouth College, Hanover, NH **2015 – 2019**
Bachelor of Arts: *Neuroscience with Honors*
Honors Thesis: *Capturing the evolving geometric and neural structures of experiences and memories*

RESEARCH EXPERIENCE

Contextual Dynamics Lab, Hanover, NH **March 2017 – Sept. 2021**
Laboratory & Research Manager *June 2018 – Sept. 2021*
Research Assistant *March 2017 – June 2018*
PI: Jeremy R. Manning, Ph.D.

Dartmouth Brain Imaging Center, Hanover, NH **Sept. 2016 – June 2019**
Research Assistant
PI: James V. Haxby, Ph.D.

Bregman Media Labs, Hanover, NH **March 2017 – July 2017**
Research Assistant
PI: Michael A. Casey, Ph.D.

PUBLICATIONS & PRESENTATIONS

Manuscripts

Fitzpatrick, P. C., Heusser, A. C., & Manning, J. R. (under late-stage review at *Nature Communications*). Text embedding models yield high-resolution insights into conceptual knowledge from short multiple-choice quizzes. doi:10.31234/osf.io/dh3q2.

Manning, J. R., Whitaker, E. C., **Fitzpatrick, P. C.**, Lee, M. R., Frantz, A. M., Bollinger, B. J., Romanova, D., Field, C. E., & Heusser, A. C. (2024). Feature and order manipulations in a free recall task affect memory for current and future lists. *PsyArXiv*:10.31234/osf.io/erzfp.

Fitzpatrick, P. C., & Manning, J. R. (2024). Davos: a Python package "smuggler" for constructing lightweight reproducible notebooks. *SoftwareX, 25,* 101614.

Manning, J. R., Notaro, G. M., Chen, E., & **Fitzpatrick, P. C.** (2022). Fitness tracking reveals task-specific associations between memory, mental health, and physical activity. *Scientific Reports*, *12*(1), 1-12.

Heusser, A. C. †, **Fitzpatrick, P. C.** †, & Manning, J. R. (2021). Geometric models reveal behavioural and neural signatures of transforming experiences into memories. *Nature Human Behaviour*, *5*(7), 905-919.

Ziman, K., Heusser, A. C., **Fitzpatrick, P. C.**, Field, C. E., & Manning, J. R. (2018). Is automatic speech-to-text transcription ready for use in psychological experiments?. *Behavior Research Methods*, *50*(6), 2579-2605.

Heusser, A. C., **Fitzpatrick, P. C.**, Field, C. E., Ziman, K., & Manning, J. R. (2017). Quail: a Python toolbox for analyzing and plotting free recall data. *The Journal of Open Source Software*, *2*(18), 424.

Talks

Fitzpatrick, P. C. (2024). Davos: a novel approach to sharing reproducible research code with collaborators, students, and the public. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C. (2024). A framework for modeling idiosyncratic distortions and compressions of semantic content representations. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C. (2023). How do context and time modulate the geometric trajectory of memory?. *Context and Episodic Memory Symposium*. Lake Buena Vista, FL.

Fitzpatrick, P. C. (2023). Modeling real-world learning & memory. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C. (2022). Automated personalized instruction for improving online learning. *PBS Annual Retreat*. Fairlee, VT.

Fitzpatrick, P. C. (2022). Thought trajectories: a geometric framework for studying complex cognitive processes. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C. (2022). Using topic models to capture conceptual knowledge and learning from online courses. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C. (2022). Capturing the geometric and neural structures of experiences and memories. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C., & O'Nell, K. C. (2022). Connecting fragmented networks of neuroscientific research via bibliometric analysis. *Dartmouth College*. Hanover, NH.

†Denotes equal contribution

Fitzpatrick, P. C. (2021). Docker for scientific research. *Dartmouth College*. Hanover, NH.

Fitzpatrick, P. C. (2020). Web-based behavioral experiments for online data collection. *EPSCoR Attention Consortium meeting*. (virtual).

Abstracts & Poster Presentations

Fitzpatrick, P. C., Heusser, A. C., & Manning, J. R. (2022). A geometric approach to modeling knowledge and learning from Khan Academy course videos. *Context and Episodic Memory Symposium*. Philadelphia, PA.

Jain, S., Schreder, N., **Fitzpatrick, P. C.**, Ziman, K., & Manning, J. R. (2022). Cognitive Markers of Mental Health. *Wetterhahn Science Symposium*. Hanover, NH.

Jain, S., Schreder, N., **Fitzpatrick, P. C.**, Ziman, K., & Manning, J. R. (2021). Cognitive tasks as a diagnostic tool for mental health. *Trends in Psychology Summit*. Cambridge, MA.

Fitzpatrick, P. C., Heusser, A. C., & Manning, J. R. (2019). Exploring the evolving geometric structure of experiences and memories. *Society for Neuroscience Annual Meeting*. Chicago, IL.

Fitzpatrick, P. C., Heusser, A. C., & Manning, J. R. (2019). Capturing the evolving geometric and neural structures of experiences and memories. *Wetterhahn Science Symposium*. Hanover, NH.

Fitzpatrick, P. C., Heusser, A. C., & Manning, J. R. (2018). Mapping between naturalistic experience and verbal recall. *Society for Neuroscience Annual Meeting*. San Diego, CA.

Heusser, A. C., **Fitzpatrick, P. C.**, & Manning, J. R. (2018). Capturing the geometric structure of our experiences and how we remember them. *Conference on Cognitive Computational Neuroscience*. Philadelphia, PA.

Fitzpatrick, P. C., Ziman, K., Heusser, A. C., Field, C. E., & Manning, J. R. (2018). The utility of speech-to-text software for transcription of verbal response data. *Wetterhahn Science Symposium*. Hanover, NH.

Lee M., Chacko, R., Whitaker, E., **Fitzpatrick, P. C.**, Field, C. E., Ziman, K., Bollinger, B., Heusser, A. C., & Manning, J. R. (2018). Adaptive free recall: Enhancing (or diminishing) memory. *Wetterhahn Science Symposium*. Hanover, NH.

Ziman, K., Heusser, A. C., **Fitzpatrick, P. C.**, Field, C. E., & Manning, J. R. (2018). Is automatic speech-to-text transcription ready for use in psychological experiments?. *Context and Episodic Memory Symposium*. Philadelphia, PA.

OPEN-SOURCE SOFTWARE

Original software

Fitzpatrick, P. C., & Manning J. R. (2023). Davos: The Python package smuggler. GitHub.

Fitzpatrick, P. C. (2021). Docker Tutorials: Pre-built Docker images and walkthroughs for online experiment deployment and data analyses. GitHub.

Fitzpatrick, P. C. (2021). PsiTurk Experiment Template: A template behavioral experiment ready to be deployed locally or on Amazon Mechanical Turk. GitHub.

Fitzpatrick, P. C. (2021). particle-image: animate a particlized image in vanilla JavaScript. GitHub.

Manning, J. R., & **Fitzpatrick, P. C.** (2020). Hierarchical Topographic Factor Analysis with Brainiak (tutorial). GitHub.

Fitzpatrick, P. C. (2020). CDL Docker Stacks: Lightweight, customizable, hierarchically built Docker images for common neuro/data science applications. GitHub.

Fitzpatrick, P. C. (2020). GitTracker: a Python application for simultaneously tracking many local git repositories. GitHub.

Heusser, A. C., Ziman, K., **Fitzpatrick, P. C.**, Field, C. E., & Manning, J. R. (2017) AutoFR: a scalable verbal free recall experiment with automatic speech-to-text transcription. GitHub.

Heusser, A. C., **Fitzpatrick, P. C.**, Field, C. E., Ziman, K., & Manning J. R. (2017) Quail: a Python toolbox for analyzing and plotting free recall data. GitHub.

Other open-source contributions (selected)

Lead maintainer, Hypertools: A Python toolbox for gaining insights into high-dimensional data (GitHub) **2019 – present**

Core maintainer, UMAP: Uniform Manifold Approximation and Projection (GitHub) **2019 – present**

Core contributor, ComputationalFoundations: Course materials for PSYC 178: Computational Foundations for Neuroscience **2023**

Core contributor, DataWrangler: Wrangle messy numerical, image, and text data into consistent well-organized formats (GitHub) **2021**

Core contributor, Cluster-Tools-Dartmouth: A Python toolbox for remotely interacting with Dartmouth's Discovery HPC cluster (GitHub) **2019 – 2021**

Core contributor, Timecorr: Estimate dynamic high-order correlations in multivariate timeseries data (GitHub) **2018 – 2021**

Core contributor, SuperEEG: Infer activity throughout the brain from a small(ish) number of electrodes using Gaussian process regression (GitHub) **2020**

AWARDS & HONORS

Sigma Xi Scientific Research Honors Society, Associate Member nomination **July 2025**

Dartmouth Center for the Advancement of Learning **April 2025**
Outstanding Graduate Student Teacher award

Neukom Prize for Outstanding Graduate Research in Computational Science **June 2023**

Neukom Institute Travel Grant **April 2022**

Methods in Neuroscience at Dartmouth (MIND) attendee **July 2019**

Lt. William Brewster Nickerson 1964 Psychology and Brain Sciences Prize **May 2019**

Robert N. Leaton Prize for Best Neuroscience Thesis **May 2019**

Sigma Xi Scientific Research Honors Society, Associate Member nomination **May 2019**

Dartmouth Academic Skills Center Tutor Spotlight award **March 2019**

Undergraduate Research Senior Conference Grant award **August 2018**

Citation for Meritorious Performance – Systems Neuroscience with Laboratory **May 2018**

TEACHING & MENTORSHIP

TA & Guest Lecturer, Laboratory in Psychological Science **Summer 2023, Fall 2024**
Guest lectures:
Experimental design and the Theory-Data Cycle
Lightning-fast intuitions for understanding and choosing statistical tests
Introduction to academic research poster presentations

TA, Methods in Neuroscience at Dartmouth (MIND) Summer School **Summer 2023**

TA, Experimental Design, Methodology, and Data Analysis Procedures **Winter 2023**

TA, Laboratory in Experimental Psychology **Spring 2022**

TA, Intro to Programming for Psychological Scientists **Winter 2021**

TA, Storytelling with Data **Spring 2020**

TA & Guest Lecturer, Intro to Programming for Psychological Scientists **Winter 2020**
Guest lecture unit: "ELIZA: Programming a non-directive therapist"

TA, Human Memory **Fall 2019**

Peer Tutor, Intro to Programming and Computation **Spring 2019**

Peer Tutor, Intro to Programming and Computation **Winter 2019**

Peer Tutor, Intro to Programming and Computation **Fall 2018**

Undergraduate research mentees:
Darren Gu, William Baxley, Shane Park, Chelsea Uddenberg,
Esme Chen, Tehut Biru, Swestha Jain, Anne George, Molly McQuoid,
Daniel Carstensen, Jacob Bacus, Alexandra Wingo, Angelyn Liu,
Kaitlyn Peng, Sarah Parigela, Om Shah, Joy Maina, Alishba Tahir

PROFESSIONAL ACTIVITIES & SERVICE

Ad hoc reviewerships

The Journal of Open Source Software **2020, 2023**

Workshops & Events

The Meditating Brain: Neuroscience & Meditation Workshop **Sept. 2018**
Co-facilitator

Exnectome: Brainwave Sonification Musical Ensemble **Feb. 2017 – May 2017**
Co-creator & performer

Paint Your Brain: An Interactive EEG-driven Sonic Art Exhibit **May 2017**
Co-creator & organizer

Service

Upper Valley Land Trust – Social Impact Practicum **March 2019 – June 2019**
Data Analyst & Presenter

Hartford Autism Regional Program – Social Impact Practicum **Jan. 2019 – April 2019**
Data Analyst & Presenter

Oxfam America, Dartmouth College Chapter **Sept. 2016 – Sept. 2018**
President & Co-founder

Last updated: July 28, 2025