Brendan Frick

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github.com/BrendanFrick

Analytical researcher and programmer with practiced understanding of computational and mathematical principles. Seeking opportunity to engineer analysis frameworks to solve complex problems.

Employment

Computational Cognitive Science Researcher June 2016 - Present
Badre Lab | Brown Unversity | Providence, RI

Development of analysis pipeline for intracranial recording data

Design Innovation Intern June 2013 - October 2013
Segal Design Institute | Northwestern University | Evanston, IL

Prototyping of deformation monitor for Winnetka Park District water tank

Education

Brown University Spring 2017
Coursework in fMRI analysis and neural dynamics

Northwestern University, Evanston, IL Fall 2012- Spring 2016
McCormick School of Engineering
B.S Triple Major

Computer Science Major	**Theory (VLSI applications) and AI dual concentration** *Advisor: Ken Forbus, PhD*
Neuroscience Major	**Computation and Systems Modelling concentration** *Advisor: Valerie Kilman, PhD*
Integrated Science Major	**Computational Biology Focus** *Advisor: Andre de Gouvea, PhD*

Skills

Data analysis	statistics, machine learning, modelling, signal processing
Data engineering	pipelines, databases, distributed systems, parallel processing
Programming	Python, MATLAB, C++, bash, git, Netlogo
Communication	data-visualization, presentation, documentation, collaboration, Q&A site participation

Posters and Publications

Frick B, Hoy C, Lin J, Knight R, D'Esposito M, Badre D. *Neurodynamic mechanisms of working memory gating*. SFN Poster Presentation. 2017.

Miller A, **Frick B**, Smith D, Radulovic J, Corcoran, K. *Network oscillatory activity driven by context memory processing is differently regulated by glutamatergic and cholinergic neurotransmission.* Neurobiology of Learning and Memory. 2017

Corcoran K, **Frick B**, Kay LM, Radulovic J. *Coherent activity between retrosplenial cortex, hippocampus, thalamus, and anterior cingulate cortex during retrieval of recent and remote context fear memory*. Neurobiology of Learning and Memory. 2016

Corcoran K, **Frick B**, Kay LM, Radulovic J. *Altered states: amnestic treatments alter coherent activity between retrosplenial cortex and associated structures during memory retrieval*. SFN Poster Presentation. 2015.

Glaser JI, Lawlor PN, Wood DK, Ramkumar P, Caddigan S, Drapekin J, **Frick B**, Qin B, Kording KP, Segraves MA. *The frontal eye field reflects task demands in natural scenes.* SFN Poster Presentation. 2014.

Selected Research

Working memory gating in human intracranial recordings 2016- 2018
Badre Lab – CLPS, Brown University

Purpose To understand functional dynamics of context-dependent working memory selectivity

Aims Analyzed human intracranial recording data collected from patients with epilepsy

Developed novel oscillation-burst analysis to test hypothesis that beta-oscillations are task-related event signatures for cognitive operations in prefrontal cortex

Results Established sophisticated analysis pipeline (multi-source ingestion, data architecture conducive to rotating researchers, efficient parallel computing, distributed database, integrated data visualization, shell and MATLAB interfaces) to collect and analyze intracranial recording data for multi-year project

Presented novel analysis at Society for Neuroscience conference

Skills **signal processing** (transforms, filter design, event detection)**, machine-learning** (GLMs, HMMs, RNNs, PCA), **statistics** (hypothesis testing, bootstrap) **data engineering** (pipeline, database, ingestion, distributed systems, parallel processing)**, data visualization**

Oscillatory network involvement in context dependent learning 2014- 2016
Radulovic Lab – Feinberg School of Medicine, Northwestern University

Purpose To examine elecrophysiological connectivity within default mode network during state-dependent memory retrieval

Aims Performed pharmacological state manipulations on mice in fear conditioning experiements

Results Analysis pipeline reduced electrophysiological analysis time by 95%

Peer-reviewed papers (x2), conference presentations (x2), grant awards (x2)

Skills **statistics** (hypothesis testing, ANOVA, time series analysis), **signal processing**, **data engineering** (pipeline, ingestion, parallel processing, streaming), **data visualization**

Natural scene search and free-view models in primate FEF 2012 - 2015
Segraves Lab – Department of Neurobiology, Northwestern University

Purpose To test the hypothesis that frontal eye field neural activity relates to control and execution of exploratory and exploitative saccades

Aims Trained and recorded from primates performing novel natural scene free-view task

Built bottom-up relevancy model to analyze images for non-salient, non-contextual, non-gist features that demand attention in free-view task

Results Developed low-success object-recognition model; analyzed the implications of null results

Conference presentation (x1), grant awards (x1)

Skills **computer vision** (recognition), **machine learning** (clustering, classification, dimensionality reduction), **signal processing** (LFP analysis, spike detection)

Leadership

Northwestern University Neuroscience Club 2014 - 2016
Founding Board Member (2014)
Journal Club Chair (2014-16)

Student led group founded to engage undergraduate students in neuroscience research and catalyze the creation of an undergraduate Neuroscience Major at Northwestern University. Responsible for organizing and facilitating journal club discussions. Resulted in undergraduate Neurscience Major offered in 2016.

Alternative Student Breaks – Northwestern University 2012 - 2016
Program Director (2014-15)
Site Development Coordinator (2015-16)
Trip Leader (x4)

Student run group responsible for planning and executing ~30 weeklong service learning trips each school year. Responsible for managing 15 person executive board, balancing >$30,000 budget, and overseeing all operations as Program Director.