

# Maedbh King

· PH.D. CANDIDATE IN COGNITIVE NEUROSCIENCE · UC BERKELEY ·

67 Glen Avenue, #202, Oakland, CA, USA

☎ (510) 570-5306 | ✉ [maedbhking@gmail.com](mailto:maedbhking@gmail.com) | 🌐 [www.maedbhking.com](http://www.maedbhking.com) | 📷 [maedbhk](#) | 🌐 [maedbhking](#) | 🎓 Maedbh King

## Summary

Current Ph.D. candidate in Cognitive Neuroscience at the University of California, Berkeley. 5+ years experience in designing and testing multi-task fMRI experiments and applying machine learning tools in python to fMRI, eye-tracking, and behavioral data. Motivated to advance predictive models of brain function with a keen interest in utilizing big data to map the cognitive and transcriptomic domains of the human cerebellum ("little brain").

## Education

### University of California, Berkeley

PH.D. IN COGNITIVE NEUROSCIENCE (GPA: 3.96/4.00)

• **Advisor:** Richard Ivry, Ph.D.

• Applied Data Science Certificate, School of Information. Awards: Mark R. Rosenzweig Graduate Fellowship (2021); Cognitive Computational Neuroscience Travel Award (2020)

**Berkeley, California**

Sep. 2017 - Expected: Dec. 2022

### Western University

M.Sc. IN NEUROSCIENCE (GPA: 4.0)

• **Advisor:** Joern Diedrichsen, Ph.D. Awards: Gordon Cerebellum Student Travel Award (2017)

**London, Ontario**

Sep. 2015 - May. 2017

### Trinity College Dublin

B.A. IN PSYCHOLOGY AND FRENCH (DOUBLE MAJOR; GPA: 4.0)

• **Advisor:** Redmond O'Connell, Ph.D. Awards: Irish Research Council Postgraduate Scholarship (2015); Ussher Fellowship, Trinity College Dublin (2015); US Fulbright Program (shortlisted); Wellcome Trust Biomedical Scholarship (2014); Entrance Scholarship, Trinity College Dublin

**Dublin, Ireland**

Sep. 2010 - May. 2014

## Experience

### Thesis: Mapping cerebro-cerebellar networks of the human brain during learning

[Github \[Link\]](#)

UNIVERSITY OF CALIFORNIA, BERKELEY

Graduate Researcher (2017-)

- Led a team of 9 (3 Ph.D. students, 5 research assistants, 1 postbac student) to design and collect 300 hours of fMRI and eye-tracking data.
- Used machine learning to predict cerebro-cerebellar connectivity across learning, features were extracted by parcellating the human cerebral cortex and feature selection was performed with L1 regularization.
- Used dimensionality reduction (PCA, ICA), clustering, regression, permutation tests and other machine learning techniques to analyze behavioral and eye-tracking data to predict human learning performance on movie-based action prediction tasks.

### Thesis: Understanding the functional organization of the human cerebellum

[Paper \[Link\]](#)

WESTERN UNIVERSITY

Graduate Researcher (2015-2017)

- Led a team of 2 (1 research assistant and one post-doctoral fellow) to design and collect a 26-task fMRI experiment and used machine learning (semi non-negative matrix factorization) to generate a novel functional map of the human cerebellum.
- Initiated a collaboration with scientists from Stanford University to use natural language processing and regularized regression to assign cognitive labels (cognitiveatlas.org) to the human cerebellum.
- Invested in open-source science. My data, which are publicly available on [openneuro.org](http://openneuro.org), have been downloaded by hundreds of researchers.

## Selected Projects

### SUITPy: Open-source package for the visualization of cerebellum imaging data

[Github \[Link\]](#)

2021

- Core developer of SUITPy, an open-source python toolbox based on a highly popular MATLAB toolbox. I implemented mapping of brain data to 2D surface space and incorporated brain atlases from open-source repositories.

### Evaluating functional boundaries of the brain using a novel distance coefficient

[Paper \[Link\]](#)

2021

- Co-developed a novel statistical metric to evaluate the validity of brain parcellations, an advancement on Homogeneity and Silhouette coefficients. Evaluated metric on open-source brain data from Human Connectome Project.

### Low dimensional embedding of genetic gradients in the human cerebellum

[Paper \[Link\]](#)

2021

- Investigated genetic gradients in the human cerebellum using postmortem data from the Allen Human Brain Atlas. Used feature-based encoding to locate gene samples in the cerebellum, and hierarchical clustering and PCA to determine organizational structure of genetic gradients

### Predicting brain activation maps for arbitrary tasks with cognitive encoding models

[Poster \[Link\]](#)

2021

- Evaluated cognitive encoding models on brain data and used natural language processing to extract features from a formal cognitive ontology.

### Predicting penalty shots using markerless pose estimation

[Github \[Link\]](#)

2020

- Implemented markerless labeling of video data (>12 hours of soccer players taking penalty shots) and feature-based encoding to compare model and human performance in predicting penalty outcomes.

## Skills

### Programming Languages

Python, SQL, R, MATLAB, HTML, Bash

### Frameworks and Tools

Keras, OpenCV, Git, Vim, Blender, Numpy, Deeplabcut, PsychoPy, Pandas, NumPy, Scikit-learn, Scipy

### Conceptual

High performance computing (Savio), MRI certificate from Henry H. Wheeler Jr. Brain Imaging Center