Maedbh **King**

· Ph.D. Candidate · UC Berkeley ·

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Summary

Cognitive and computational neuroscientist with leadership experience in academia and non-profit work. 6+ years experience conducting hypothesis- and data-driven research, and using machine learning and statistics to build models of brain function. Strong record of publishing in scientific journals (>350 citations), presenting at research conferences (>10 proceedings), and making science accessible. Passionate about using my experience as an educator and academic mentor to communicate complex ideas to non-expert audiences. Strongly believe in using data-driven solutions to formulate and recommend policy. Motivated to apply my quantitative and communication expertise to high-impact projects that promote health care solutions.

Education

University of California, Berkeley — *Berkeley, California*

Ph.D. in Cognitive Neuroscience (GPA: 3.96/4.00) — *Sep. 2017 - Expected: May. 2022*

- **Advisor: Richard Ivry, Ph.D.**
- Graduate Certificate in Applied Data Science, School of Information [*link*]

Western University — *London, Ontario*

M.Sc. in Neuroscience (GPA: 4.0) — *Sep. 2015 - May. 2017*

- **Advisor: Joern Diedrichsen, Ph.D.**

Trinity College Dublin — *Dublin, Ireland*

B.A. in Psychology and French (Double Major; GPA: 4.0) — *Sep. 2010 - May. 2014*

- **Advisor: Redmond O'Connell, Ph.D.**

Recognition

Scholarships/Fellowships

2021	**Presidential Management Fellowship Finalist 2022**, U.S. Office of Personnel Management	*Link*
2021	**Mark R. Rosenzweig Graduate Fellowship**, Department of Psychology, University of California, Berkeley	*Link*
2015	**Government of Ireland Postgraduate Scholarship**, Irish Research Council	*Link*
2015	**Ussher Fellowship**, Trinity College Dublin	*Link*
2013	**Biomedical Vacation Scholarship**, Wellcome Trust, UK	*Link*
2010	**Government of Ireland Scholarship (Full-Ride)**, Department of Education and Skills	*Link*

Awards

2020	**Cognitive Computational Neuroscience Travel Award**, CCN Conference	*Link*
2017	**Gordon Cerebellum Student Travel Award**, Gordon Research Conferences	*Link*
2014	**US Fulbright (Shortlisted)**, Fulbright Program	*Link*
2010	**Entrance Exhibition Award**, Trinity College Dublin	*Link*

Research Impact

2020	**The mysterious, multifaceted cerebellum**, Knowable Magazine	*Link*
2019	**Scientists map our underappreciated "little brain"**, University of California, Berkeley	*Link*
2019	**New maps of the cerebellum show how our "little brain" works**, Psychology Today	*Link*

Experience

Graduate Researcher (2017-) — *Github [link]*

Ph.D. Thesis: Mapping cerebro-cerebellar networks of the human brain during learning — *University of California, Berkeley*

- Developed machine learning pipelines to predict cognitive function in the human cerebellum during learning, tested patients with spinocerebellar ataxia on a series of cognitive tasks to assess cerebellar deficits, analyzed post-mortem human brain data to create a transcriptomic map of the human cerebellum, and led a team of 5 to collect 300 experimental hours of functional magnetic resonance imaging (fMRI) data (during COVID-19 pandemic).
- Co-wrote an R35 grant that received 5-year funding from the NIH. Managed an institutional review board (IRB) protocol for fMRI experiments.
- Created a widely adopted mentorship agreement for research assistants to ensure transparency and accountability in mentoring practices. Co-led a journal club for undergraduate research assistants, instructing them on the scientific method, data analysis, and statistics.

Graduate Researcher (2015-2017) — *Paper [link]*

M.Sc. Thesis: Understanding the functional organization of the human cerebellum — *Western University*

- Created a novel map of the human cerebellum by applying matrix factorization to high-dimensional neural data [*link*].
- Initiated a collaboration with scientists from Stanford University to use natural language processing and regularized regression to assign cognitive labels *[link]* to the human cerebellum. Invested in open-source science, the data are publicly available and have been downloaded >200 times [*link*].

Selected Projects

Technical

SUITPy: Open-source package for the visualization of cerebellum imaging data
Library [link]

Western University; University of California, Berkeley — *2021*

- Core developer of *SUITPy*, an open-source Python toolbox to visualize cerebellum data. Identified best programming practices for improving core functionality, resulting in novel implementation of 2D surface mapping and incorporation of brain atlases from open-source repositories.

Low dimensional embedding of genetic gradients in the human cerebellum
Paper [link]

Helen Wills Neuroscience Institute, University of California, Berkeley — *2021*

- Investigated genetic gradients in the human cerebellum using postmortem brain data from the Allen Human Brain Atlas [*link*].
- Used regularized regression to identify cerebellar genes, and hierarchical clustering and PCA to determine organizational structure of genetic gradients.

Evaluating functional boundaries of the brain using a novel distance coefficient
Paper [link]

Western University; University of California, Berkeley — *2021*

- Co-developed a novel statistical metric to evaluate the validity of brain parcellations, an advancement on Homogeneity and Silhouette coefficients.

Predicting brain activation maps for arbitrary tasks with cognitive encoding models
Poster [link]

Stanford University; University of California, Berkeley — *2021*

- Used natural language processing to extract features from a cognitive ontology and built machine learning models to predict novel brain data.

Predicting penalty shots using markerless pose estimation
Github [link]

Department of Psychology, University of California, Berkeley — *2020*

- Implemented markerless labeling of soccer players and built computer vision models to understand human performance in predicting penalty shots.

Predicting COVID-19 mortality rates across the U.S. using mobility and census data
Report [link]

Department of Computer Science, University of California, Berkeley — *2020*

- Used economic and mobility features to predict COVID-19 deaths across the U.S. using data from the 2019 U.S. Census and 2020 Google Maps mobility reports. Model features were extracted using dimensionality reduction and elastic net regularization was used to train and test models.

Cross Platform Integration of Clinical Data
Team Leader

Department of Psychology, University of California, Berkeley — *2020*

- Implemented and maintained data warehousing for clinical projects that contained sensitive patient information (e.g., disease etiology).

Leadership & Management

Graduate Mentoring Policies
Co-Chair [link]

Department of Psychology, University of California, Berkeley — *Jan. 2020 - Sep. 2021*

- Recognized need for formal mentor-mentee agreements in the UC Berkeley psychology department. Assembled and co-led working committee to create policy to improve lab culture and mentor-mentee relationships. Recruited panelists from diverse backgrounds.
- Authored 10-page policy document on mentorship and lab policy agreements. Advised leadership on implementation of new departmental policies during quarterly climate and equity meetings. Since Sep. 2021, 35/42 faculty have created lab policy documents.

State of the Department Initiative
Team Leader [link]

Department of Psychology, University of California, Berkeley — *2020*

- Team leader for faculty accountability initiative. Developed survey for Berkeley Psychology state of the department annual meeting, and conducted data analytics and statistics to translate graduate student concerns into policy recommendations. Used data and statistics to highlight funding discrepancy between neuroscience and clinical psychology students, resulting in a 20% yearly increase in graduate student stipends.

Prison University Project
Lecturer [link]

San Quentin State Prison — *Jan. - May 2019*

- Designed and lectured a new curriculum in General Psychology for incarcerated students. I brought human brains into the classroom to teach neuroanatomy, mirroring the UC Berkeley student experience. Provided executive board with formal analysis of organizational operations.

Ethics Protocol for MRI projects
Manager [link]

Cognition and Action Lab, University of California, Berkeley — *Jan. 2018 -*

- Drafted guidelines and maintained ethics protocol for institutional review board (IRB) magnetic resonance imaging (MRI) projects. Completed human research program on "Human Research: Biomedical Research Investigators", and trained 3 research assistants on the protocol.

Skills & Interests

Programming Languages Python, SQL, R, MATLAB, HTML, Bash

Frameworks and Tools Keras, OpenCV, Nipype, Scikit-learn, Scipy, Pandas, NumPy, Git, Vim, Blender, Deeplabcut

Conceptual High performance computing (Savio), Grant Writing and IRB Ethics Protocols, MRI technician certificate

Hobbies Road Biking, Yoga, Running, Mountain Climbing, Fiddle Playing (traditional Irish music), Crosswords