

Maedbh King

· PH.D. CANDIDATE IN COGNITIVE NEUROSCIENCE · 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 (>10 articles, >370 citations), presenting at research conferences (>10 proceedings), and making science accessible (2 open-source datasets and 1 Python module). Passionate about using my experience as an educator and academic mentor to communicate complex ideas to non-expert audiences. Strongly believe in leading with equity, and using data-driven solutions to formulate and recommend policy. Motivated to apply my quantitative and communication expertise to high-impact projects that promote egalitarian health-care solutions.

Education

2017-2022 **University of California, Berkeley**, Ph.D. in Cognitive Neuroscience (GPA: 3.96/4.00)

2017-2022 **University of California, Berkeley**, Graduate Certificate in Applied Data Science (GPA: 3.98/4.00)

2015-2017 **Western University**, M.Sc. in Neuroscience (GPA: 4.0/4.0)

2010-2014 **Trinity College Dublin**, B.A. with Honors in Psychology and French (Double Major; GPA: 4.0)

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

Ph.D. Graduate Student Researcher (2017-2022)

[Github \[Link\]](#)

MAPPING NETWORKS OF THE HUMAN BRAIN DURING LEARNING. PUBLICATIONS IN *Nature Neuroscience*, *Neuron*, *Brain*

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, and analyzed post-mortem brain data to create a transcriptomic map of the cerebellum.
- Prioritized taking classes in advanced statistics and computer science to analyze high-dimensional neural data.
- Led a team of 5 to design and collect 300 experimental hours of functional magnetic resonance imaging (fMRI) data (during COVID-19 pandemic).
- Reviewed and analyzed 30 years of research to propose new theory of cerebellar function. Co-authored subsequent paper [\[link\]](#) (>70 citations).
- 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.
- Mentored two undergraduate students in designing and writing up honors thesis projects. One student was awarded a *Swan prize* [\[link\]](#) for their work, and presented at a national conference. Prioritized recruitment of students from marginalized demographics.

M.Sc. Graduate Student Researcher (2015-2017)

[Paper \[Link\]](#)

DEVELOPING NOVEL BRAIN MAPS OF THE HUMAN CEREBELLUM. PUBLICATIONS IN *Brain*, *NeuroImage*, *Frontiers*

Western University

- Created a novel and highly downloaded *map* [\[link\]](#) of the human cerebellum using machine learning and advanced statistics.
- Led a team of 2 to design and collect a 26-task, 6-session fMRI and behavioral experiment, totaling 250 hours of data collection [\[link\]](#).
- Initiated a collaboration with scientists from Stanford University to use natural language processing to assign cognitive labels to the human cerebellum [\[link\]](#). Developed programming pipeline for other researchers to replicate my novel approach, and wrote supporting documentation.
- Invested in open-source science. My data, which are publicly available, have been downloaded >200 times [\[link\]](#).

Selected Projects

TECHNICAL

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

[Developer \[Link\]](#)

UNIVERSITY OF CALIFORNIA, BERKELEY; WESTERN UNIVERSITY

Jan. - Sep. 2021

- Core developer of SUITPy, an open-source Python library to visualize brain data. Subsequently worked as project manager to identify best programming practices for improving core functionality, resulting in record monthly installations (4-fold increase).

Evaluating functional boundaries of the brain using a novel distance coefficient

[Paper \[Link\]](#)

JAN. - SEP. 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 \[Link\]](#)

2021

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

Predicting human performance using computer vision models

[Github \[link\]](#)

DEPARTMENT OF PSYCHOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

Jan. 2019 - Dec. 2021

- Recorded >15 hours of varsity athletes, and implemented markerless labeling of videos to understand human performance in predicting action.

Low dimensional embedding of genetic gradients in the human cerebellum

[Author \[Link\]](#)

HELEN WILLS NEUROSCIENCE INSTITUTE, UNIVERSITY OF CALIFORNIA, BERKELEY

May 2019 - Sep. 2021

- Initiated collaboration with incoming faculty at Berkeley to investigate genetic gradients in the human cerebellum. Learned new statistical tools to analyze postmortem human brain data, and developed pipelines to streamline data preprocessing, later adopted by >5 students.

PUBLIC HEALTH & POLICY

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

[Author \[Link\]](#)

SCHOOL OF INFORMATION, UNIVERSITY OF CALIFORNIA, BERKELEY

Sep. - Dec. 2020

- Built a statistical model predicting COVID-19 deaths in the U.S. from May - Aug. 2020 using data from the U.S. Census and Google Maps mobility reports. Increased optimization of algorithm by 20-fold. Presented findings in a poster presentation to faculty in the School of Information.

Cross-Functional and Cross-Disciplinary Research Collaboration

[Team Leader](#)

UNIVERSITY OF CALIFORNIA, BERKELEY; PRINCETON UNIVERSITY; YALE UNIVERSITY

Jan. 2019 - May. 2020

- Implemented and maintained data warehousing for clinical research projects, established guidelines for cross-functional collaboration.

Ethics Protocol for MRI projects

[Manager \[Link\]](#)

COGNITION AND ACTION LAB, UNIVERSITY OF CALIFORNIA, BERKELEY

Jan. 2018 - Dec. 2021

- 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.

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

[Leader \[Link\]](#)

DEPARTMENT OF PSYCHOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

Apr. 2019 - Apr. 2021

- 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.

Papers

IN PREP

Putting the cerebellum to the test: introducing a falsifiable model of cerebro-cerebellar connectivity

[In Prep](#)

M KING, L SHAHSHAHANI, R IVRY, J DIEDRICHSEN

2021

Changes in cerebro-cerebellar connectivity across learning

[In Prep](#)

M KING, J DIEDRICHSEN, R IVRY

2021

30 years later: where are we in understanding the cerebellum's role in cognition?

[In Prep](#)

M KING, A LeBEL, R IVRY

2021

PUBLISHED/UNDER REVIEW

Continuous manipulation of mental representations is compromised in cerebellar degeneration	<i>Brain</i>
SD McDougLe, J TSay, B Pitt, M King, W Saban, JA Taylor, RB Ivry	2022
Evaluating brain parcellations using the distance controlled boundary coefficient	<i>Human Brain Mapping (Under Review)</i>
D Zhi, M King, J Diedrichsen	2021
Transcriptomic Gradients Of The Human Cerebellum	<i>Cell Reports (Under Review)</i>
M King, Z Zhen, RB Ivry, KS Weiner	2020
Functional boundaries in the human cerebellum revealed by a multi-domain task battery	<i>Nature Neuroscience</i>
M King, CR Hernandez-Castillo, RA Poldrack, RB Ivry, J Diedrichsen	2019
Universal transform or multiple functionality? Understanding the contribution of the human cerebellum across task domains	<i>Neuron</i>
J Diedrichsen, M King, C Hernandez-Castillo, M Sereno, RB Ivry	2019
Visualizing Topographic Independent Component Analysis with Movies	<i>arXiv</i>
Z Chen, D Parvin, M King, S Hao	2019
Unique degeneration signatures in the cerebellar cortex for spinocerebellar ataxias 2, 3, and 7	<i>NeuroImage: Clinical</i>
CR Hernandez-Castillo, M King, J Diedrichsen, J Fernandez-Ruiz	2018
Individual differences in resting corticospinal excitability are correlated with reaction time and GABA content in motor cortex	<i>Journal of Neuroscience</i>
I Greenhouse, M King, S Noah, RJ Maddock, RB Ivry	2017
Towards a multi-function mapping of the cerebellar cortex	<i>Brain</i>
M King, C Hernandez-Castillo, J Diedrichsen	2017
Neural adaptations associated with interlimb transfer in a ballistic wrist flexion task	<i>Frontiers in Human Neuroscience</i>
KL Ruddy, AK Rudolf, B Kalkman, M King, A Daffertshofer, TJ Carroll, R Carson	2016
Registered reports for student research	<i>Journal of European Psychology Students</i>
M King, F Dablander, L Jakob, M Agan, F Huber, J Haslbeck, K Brecht	2016
A critical evaluation of the essentialist debate: do fathers make a unique contribution to child development?	<i>Student Psychology Journal of Ireland</i>
M King	2015
The locus coeruleus-noradrenergic arousal function modulates perceptual decision-making in humans: evidence from pupillometry	<i>Unpublished Undergraduate Honors Thesis</i>
M King, R O’Connell	2014

Grants	
Transformation of internal representations in multiple task domains.	<i>NIH R35 (funded)</i>
GRADUATE CO-AUTHOR	2020
Collaboration between University of California, Berkeley; Princeton University; Yale University	
Evaluating a Novel Model of Cerebellar Function Using Harmonized Online-Testing of Patients with Cerebellar Degeneration in the Bay Area and Oslo Communities	<i>Sather Grant (unfunded)</i>
GRADUATE CO-AUTHOR	2019
Collaboration between University of California, Berkeley; University of Oslo	
Understanding cortico-cerebellar contributions to cognition	<i>NIH R01 (unfunded)</i>
GRADUATE CO-AUTHOR	2018
Collaboration between University of California, Berkeley; Western University (Canada)	

Poster Presentations

Cerebro-cerebellar connectivity is dominated by divergent mapping

M KING, L SHAHSHAHANI, IVRY, J DIEDRICHSEN
2021

[Society for Neuroscience
Conference](#)

Virtual Conference

Predicting brain activation maps for arbitrary tasks with ontology-based encoding models

J WALTERS, M KING, P BISSETT, IVRY, J DIEDRICHSEN, R POLDRACK
2021

[Organization for Human Brain
Mapping Conference](#)

Virtual Conference

Evaluating Brain Parcellations using the Multi-Domain Task Battery

J DIEDRICHSEN, M KING, C HERNANDEZ-CASTILLO, D ZHI, R IVRY
2019

[Organization for Human Brain
Mapping Conference](#)

Rome, Italy

Evaluating different functional parcellations of the basal ganglia

C HERNANDEZ-CASTILLO, M KING, I HARDING, J DIEDRICHSEN, R IVRY
2019

[Organization for Human Brain
Mapping Conference](#)

Rome, Italy

Transcriptomic Gradients of the Human Cerebellum

M KING, R IVRY, K WEINER
2019

[Cerebellum Gordon Research
Conference](#)

Les Diablerets, Switzerland

A multi-domain task battery reveals the functional topography of the human cerebellum

M KING, C HERNANDEZ-CASTILLO, R POLDRACK, R IVRY, J DIEDRICHSEN
2018

[The Society for Neuroscience
Conference](#)

San Diego, California

A multi-domain task battery reveals the functional topography of the human cerebellum

M KING, C HERNANDEZ-CASTILLO, R POLDRACK, R IVRY, J DIEDRICHSEN
2018

[Computational and Cognitive
Neuroscience Conference](#)

Philadelphia, Pennsylvania

Navigating the "Little Brain": Comprehensive mapping of cognitive function in the human cerebellum

M KING, R IVRY, J DIEDRICHSEN
2017

[Helen Wills Neuroscience Retreat](#)

Lake Tahoe, California

Navigating the "Little Brain": Comprehensive mapping of cognitive function in the human cerebellum

M KING, R IVRY, J DIEDRICHSEN
2017

[Organization for Human Brain
Mapping Conference](#)

Vancouver, British Colombia

Mapping the Human Cerebellum

M KING, R IVRY, J DIEDRICHSEN
2017

[Cerebellum Gordon Conference](#)

Lewiston, Maine

Transcranial magnetic stimulation measures of intrinsic motor system excitability and task-based inhibition exhibit intra-subject stability across weeks

I GREENHOUSE, M KING, R IVRY
2015

[Society for Neuroscience
Conference](#)

Chicago, Illinois

Electroencephalography (EEG) signatures of impairment in cognitive, sensory and motor networks in Amyotrophic Lateral Sclerosis (ALS) disease

B NASSEROLESLAMI, K MOHR, M KING, O HARDIMAN
2015

[Annual ALS Irish Meeting](#)

Dublin, Ireland

Invited Talks

Cerebro-cerebellar connectivity across motor and cognitive circuits

NEUROPHYSIOLOGISCHES SEMINAR
2021

[Neurologische Uniklinik Essen](#)

Virtual Conference

Bringing a systems level perspective to neuroimaging analyses

EDUCATIONAL SYMPOSIUM: NEUROANATOMY FOR NEUROIMAGING
2021

[Organization for Human Brain
Mapping](#)

Virtual Conference [Link]

Transcriptomic gradients of the human cerebellum

COGNITIVE NEUROSCIENCE COLLOQUIUM

2020

[University of California, Berkeley](#)

Berkeley, California

Mapping the Human Cerebellum Using a Multi-Domain Task Battery

SYMPOSIUM: NEW PERSPECTIVES ON CEREBELLAR FUNCTION: IMPLICATIONS FOR MENTAL HEALTH

2019

[Society for Neuroscience](#)

Chicago, Illinois

A multi-domain task battery reveals the functional topography of the human cerebellum

UCB NEUROSCIENCE RETREAT

2018

[Helen Wills Neuroscience Institute](#)

Richmond, California

Mapping the Human Cerebellum

SEMINAR: THEORIES AND MODELS OF CEREBELLAR FUNCTION

2017

[Cerebellum Gordon Research](#)

[Conference](#)

Lewiston, Maine

Teaching

Mount Tamalpais College

GENERAL PSYCHOLOGY

- Designed and lectured course on general psychology to incarcerated students. Topics included "the brain and nervous system", "classical conditioning", and "mood disorders". Devised trauma-informed learning objectives, catering to students with diverse educational needs.

[Lecturer \[Link\]](#)

10 hrs/week; Sep. - Dec. 2019

University of California, Berkeley

BIOLOGICAL PSYCHOLOGY, PSYCH 110; COGNITIVE NEUROSCIENCE, PSYCH 127

- Instructed weekly seminars for 120+ students on topics including "memory and learning" and "ethics of artificial intelligence", under the supervision of UC Berkeley professors. Evaluated and supervised student research and wrote professional references for promising students.

[Instructor \[Link\]](#)

15 hrs/week; Aug. 2017 - Dec. 2018

Western University

BIOLOGY/STATISTICS, STAT 2244; PROBABILITY AND STATISTICS, STAT 2857

- Instructed undergraduate students in a statistics and data science laboratory using the programming language "R". Topics included "central limits theorem", "hypothesis testing" and "conditional probability". Wrote and administered exams and evaluated student work.

[Instructor \[Link\]](#)

15 hrs/week; Jan. 2016 - May. 2017

Public Service & Outreach

COMMITTEES & POLICY

Graduate Assembly Students of Psychology

UNIVERSITY OF CALIFORNIA, BERKELEY

- Provided data analytics to improve efficiency of phone banking for Psychology "Big Give". Contacted 10-fold more donors than previous year.
- Liaison officer between Berkeley development office and external donors. Organized faculty fundraisers in Silicon Valley, fund-raising \$15,000.

[Member and RSO Signatory](#)

Sep. 2018 - Mar. 2020

European Federation of Psychology Students' Association

EUROPEAN UNION

- Spearheaded initiative to pre-register scientific results in the Journal of European Psychology Students, a first for student journals worldwide.
- Advised organization leadership on best practices for successful implementation of pre-registration and authored journal article (>3500 views).

[Editor \[Link\]](#)

Jan. 2016 - May 2016

Schulich School of Medicine Graduate Council

WESTERN UNIVERSITY

- Provided budget evaluation of graduate student insurance plan to council. Served as student liaison officer, and oversaw a budget of \$5000

[Secretary](#)

Sep. 2015 - Sep. 2016

Niteline (Student Helpline)

TRINITY COLLEGE, DUBLIN

- Provided practical program consultation to student helpline [\[link\]](#), and wrote proposal to increase the yearly budget from \$5,000 to \$10,000.

[Publicity Officer](#)

Sep. 2011 - May 2014

COMMUNICATION & ADMINISTRATION

Graduate Assembly Students of Psychology

UNIVERSITY OF CALIFORNIA, BERKELEY

- Created, managed, and edited Berkeley Psychology blog to spotlight graduate student research. Increased monthly viewers 5-fold.
- Co-founded and operated Twitter account for Berkeley Psychology [\[link\]](#). Increased follower count to >1500 after 2 years.
- Lead writer of Psychology newsletter [\[link\]](#) (>2000 circulation). Included profiles on graduates to strengthen ties with alumni community.

[Writer/Contributor \[Link\]](#)

Sep. 2019 - May 2021

Journal of European Psychology Students

EUROPEAN UNION

- Managed peer review process for 30 papers including paper submission, reviewer recruitment, copy editing, and publication.
- Contributor to popular psychology and neuroscience blog post, aimed at engaging aspiring psychology students (>500 monthly views).

[Editor/Contributor \[Link\]](#)

Jan. 2014 - May 2016

EDUCATION & STEM OUTREACH

Prison University Project

SAN QUENTIN STATE PRISON

- 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.

Lecturer [Link]

Jan. - May 2019

Bay Area Scientists in Schools (BASIS)

UNIVERSITY OF CALIFORNIA, BERKELEY

- Co-developed and deployed neuroscience curriculum, "Know Your Brain", that has been presented to students in >20 Bay Area public schools.

Team Member [Link]

Jan. 2018 - Jan. 2020

Inspiring Young Women in STEM Inaugural Conference

WESTERN UNIVERSITY

- Co-organized first conference to encourage female students in STEM (>150 attendees), recruited keynote speakers, and evaluated research.

Organizing Member [Link]

May 2016

Western Women Neuroscientists in Schools

WESTERN UNIVERSITY

- Developed curriculum to explore neuroscience misinformation ("Myths and the Brain"). Presented to >2000 high-schoolers in Ontario schools.

Team Leader [Link]

Oct. 2015 - May 2017

Mentorship

Honors Thesis Students

SEP. 2019 - MAY 2021

- Shannon Lee's thesis developed eye-tracking and context models to inform social learning.
- Sienna Bruinsma's thesis evaluated the functional role of the cerebellum in linguistic processing using neuropsychology.

Shannon Lee; Sienna Bruinsma

Cognitive Science; Psychology

Undergraduate Research Assistants

JAN. 2021 - MAY 2021; SEP. 2019 - MAY 2020

- Zanib Naaem tested healthy college-aged students on a multi-session eye-tracking and behavioral learning project.
- Yiling Kao developed a verb generation task and used machine learning to study speech envelopes.

Zanib Naaem; Yiling Kao

Psychology; Computer Science

Ph.D. Rotation Students

SEP. - DEC. 2020; JAN. - MAY 2020; SEP. - DEC. 2018

- Amanda LeBel developed encoding models using speech features to study task-evoked cerebellar activity.
- Jacob Zientz set up fMRI preprocessing scripts (BIDS and fMRIPrep) on multi-session cerebellar data.
- Mark Gorenstein worked on preprocessing pipelines for cerebro-cerebellar connectivity models.

Amanda LeBel; Jacob Zientz; Mark Gorenstein

Neuroscience

Post-Baccalaureate Students

SEP. - DEC. 2018

- Dylan Benkley conducted a literature review on the role of the cerebellum in social cognition.

Dylan Benkley

Psychology

Skills & Interests

Programming Languages	Python, SQL, R, MATLAB, HTML, Bash
Frameworks and Tools	Keras, OpenCV, Git, Vim, Blender, Nipype, Deeplabcut, PsychoPy, Pandas, NumPy, Scikit-learn, Scipy
Conceptual	High performance computing (Savio), Grant Writing and IRB Ethics Protocols, MRI technician certificate
Interpersonal	Project management, Organizational leadership, Resourcefulness, Problem solving, Conflict resolution
Languages	English (Native), Irish (Native), French (Proficient), German (Basic)
Referees	PhD Advisor: Richard Ivry, PhD (email: ivry@berkeley.edu; phone: 510-326-6658)