Maedbh **King**

· PMF Finalist 2022 and Ph.D. Candidate at 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), and presenting at research conferences (>10 proceedings). 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 serve the American public.

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 & Research Impact

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*
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 human 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

Policy & 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
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.

Data Science & Information Technology

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).

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

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.

Public Service & Outreach

Committees & Policy

Graduate Assembly Students of Psychology
Member and RSO Signatory

University of California, Berkeley — *Sep. 2018 - Mar. 2020*

- 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.

European Federation of Psychology Students' Association
Editor [Link]

European Union — *Jan. 2016 - May 2016*

- 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).

Schulich School of Medicine Graduate Council
Secretary

Western University — *Sep. 2015 - Sep. 2016*

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

Niteline (Student Helpline)

Publicity Officer

Trinity College, Dublin — *Sep. 2011 - May 2014*

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

Communication & Administration

Graduate Assembly Students of Psychology

Writer/Contributor [Link]

University of California, Berkeley — *Sep. 2019 - May 2021*

- 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.

Journal of European Psychology Students

Editor/Contributor [Link]

European Union — *Jan. 2014 - May 2016*

- 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).

Education & STEM Outreach

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.

Bay Area Scientists in Schools (BASIS)

Team Member [Link]

University of California, Berkeley — *Jan. 2018 - Jan. 2020*

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

Inspiring Young Women in STEM Inaugural Conference

Organizing Member [Link]

Western University — *May 2016*

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

Western Women Neuroscientists in Schools

Team Leader [Link]

Western University — *Oct. 2015 - May 2017*

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

Mentorship

Undergraduate Students

Supervisor

Cognitive Science; Psychology; Computer Science — *15 hrs/week; Sep. 2019 - May 2021*

- Supervised and mentored four undergraduate students at the University of California, Berkeley in conducting scientific research for their honors thesis work. Managed the full cycle of their projects from initial concepts and experimental design to data analysis and final poster *[link]* and conference *[link]* presentation. All students were supervised during the COVID-19 pandemic, which required the development of efficient communication strategies, as well as flexibility and adaptability in coordinating project time-lines..

Ph.D. Students

Supervisor

Neuroscience — *5 hrs/week; Sep. 2018 - Dec. 2020*

- Developed and managed collaborative projects with 3 first-year Ph.D. students, two of whom were supervised during the COVID-19 pandemic. Projects included a meta-analysis of brain connectivity, computational models of neural data *[link]*, and cross-integration of clinical platforms. Advocated on behalf of the students to present their research findings at departmental seminars.

Teaching

Mount Tamalpais College

Lecturer [Link]

General Psychology — *10 hrs/week; Sep. - Dec. 2019*

- 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.

University of California, Berkeley

Instructor [Link]

Biological Psychology, PSYCH 110; Cognitive Neuroscience, PSYCH 127 — *15 hrs/week; Aug. 2017 - Dec. 2018*

- 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.

Western University

Instructor [Link]

Biology/Statistics, STAT 2244; Probability and Statistics, STAT 2857 — *15 hrs/week; Jan. 2016 - May. 2017*

- 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.

Selected Publications & Presentations

Papers

Evaluating brain parcellations using the distance controlled boundary coefficient — *bioRxiv [Link]*
D Zhi, M King, J Diedrichsen — *2021*

Transcriptomic Gradients Of The Human Cerebellum — *bioRxiv [Link]*
M King, Z Zhen, RB Ivry, KS Weiner — *2020*

Functional boundaries in the human cerebellum revealed by a multi-domain task battery — *Nature Neuroscience [Link]*
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 — *Neuron [Link]*
J Diedrichsen, M King, C Hernandez-Castillo, M Sereno, RB Ivry — *2019*

Grants

Transformation of internal representations in multiple task domains. — *NIH R35 (funded)*
Graduate Co-Author — *2020*
Collaboration between University of California, Berkeley; Princeton University; Yale University

Understanding cortico-cerebellar contributions to cognition — *NIH R01 (unfunded)*
Graduate Co-Author — *2018*
Collaboration between University of California, Berkeley; Western University (Canada)

Conferences

Cerebro-cerebellar connectivity is dominated by divergent mapping — *Society for Neuroscience*
M King, L Shahshahani, Ivry, J Diedrichsen — *Virtual Conference*
2021

Evaluating Brain Parcellations using the Multi-Domain Task Battery — *Organization for Human Brain Mapping*
J Diedrichsen, M King, C Hernandez-Castillo, D Zhi, R Ivry — *Rome, Italy*
2019

Transcriptomic Gradients of the Human Cerebellum — *Cerebellum Gordon Research*
M King, R Ivry, K Weiner — *Les Diablerets, Switzerland*
2019

Invited Talks

Cerebro-cerebellar connectivity across motor and cognitive circuits — *Neurologische Uniklinik Essen*
Neurophysiologisches Seminar — *Virtual Conference*
2021

Bringing a systems level perspective to neuroimaging analyses — *Organization for Human Brain Mapping*
Educational Symposium: Neuroanatomy for neuroimaging — ***Virtual Conference [Link]***
2021

Mapping the Human Cerebellum Using a Multi-Domain Task Battery — *Society for Neuroscience*
Symposium: New Perspectives on Cerebellar Function: Implications for Mental Health — *Chicago, Illinois*
2019

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)