

# Maedbh King, PhD

· ICoN FELLOW · MIT ·

Cambridge, MA

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

## Summary

Integrative Computational Neuroscience (ICoN) Fellow at MIT investigating the role of the developing cerebellum in cognition, and building biologically-driven models of neurodevelopmental disorders. 7+ years experience conducting hypothesis- and data-driven research, using functional magnetic resonance imaging (fMRI) and machine learning to build models of cerebellar function. Strong record of publishing in high-impact scientific journals. Invested in using data-driven solutions to formulate and recommend policy. Passionate about promoting transparency and accountability in academia.

## Education

2017-2022	<b>University of California, Berkeley</b> , Ph.D. in Cognitive Neuroscience (Psychology)	3.97/4.0
2020-2022	<b>University of California, Berkeley</b> , Graduate Certificate in Applied Data Science	3.98/4.0
2015-2017	<b>Western University</b> , M.Sc. in Neuroscience	4.0/4.0
2010-2014	<b>Trinity College Dublin</b> , B.A. with Honors in Psychology and French (Double Major)	4.0/4.0

## Recognition

### SCHOLARSHIPS & FELLOWSHIPS

2022	<b>Integrative Computational Neuroscience Fellowship</b> , ICoN Center, MIT	<a href="#">Link</a>
2021	<b>Presidential Management Fellowship Finalist 2022 (declined)</b> , U.S. Office of Personnel Management	<a href="#">Link</a>
2021	<b>Mark R. Rosenzweig Graduate Fellowship</b> , Department of Psychology, University of California, Berkeley	<a href="#">Link</a>
2015	<b>Government of Ireland Postgraduate Scholarship (declined)</b> , Irish Research Council	<a href="#">Link</a>
2015	<b>Ussher Fellowship (declined)</b> , Trinity College Dublin	<a href="#">Link</a>
2013	<b>Biomedical Vacation Scholarship</b> , Wellcome Trust, UK	<a href="#">Link</a>
2010	<b>Government of Ireland Undergraduate Scholarship</b> , Department of Education and Skills	<a href="#">Link</a>

### AWARDS

2020	<b>Cognitive Computational Neuroscience Travel Award</b> , CCN Conference	<a href="#">Link</a>
2017	<b>Gordon Cerebellum Student Travel Award</b> , Gordon Research Conferences	<a href="#">Link</a>
2014	<b>US Fulbright (Shortlisted)</b> , Fulbright Program	<a href="#">Link</a>
2010	<b>Entrance Exhibition Award</b> , Trinity College Dublin	<a href="#">Link</a>

### RESEARCH IMPACT

2020	<b>The mysterious, multifaceted cerebellum</b> , Knowable Magazine	<a href="#">Link</a>
2019	<b>Scientists map our underappreciated "little brain"</b> , University of California, Berkeley	<a href="#">Link</a>
2019	<b>New maps of the cerebellum show how our "little brain" works</b> , Psychology Today	<a href="#">Link</a>

## Experience

### ICoN Postdoctoral Fellow at MIT

**Advisors: John Gabrieli, PhD;  
Satrajit Ghosh, PhD**

CHARACTERIZING CORTICO-CEREBELLAR CONNECTIVITY IN THE DEVELOPING CEREBELLUM, AND USING MACHINE LEARNING TO IDENTIFY RISK PREDICTORS OF NEURODEVELOPMENTAL DISORDERS. PUBLICATIONS IN *Current Opinion in Behavioral Sciences*

2022-

- Developing a transdiagnostic approach to establish how individual variation in cortico-cerebellar connectivity relates to symptoms of neurodevelopmental disorders (e.g., ASD; ADHD). Leveraging large-scale datasets (ABCD; Healthy Brain Network; Developing HCP) to capture non-linear relationships in phenotypic profiles and functional neuroimaging data.
- Collaborating with psychiatrists from the Children's Hospital of Philadelphia to improve clinical workflows for identifying risk predictors of suicide attempt in an adolescent population. Using natural language processing to extract meaningful clinical variables from electronic health records.

### Ph.D. Researcher at UC Berkeley

**Advisor: Richard Ivry, PhD**

INVESTIGATING CORTICO-CEREBELLAR CONTRIBUTIONS TO COGNITION. PUBLICATIONS IN *Nature Neuroscience*; *ELife*; *Neurobiology of Language*; *Brain*; *Neuron*; *NeuroImage*; *Human Brain Mapping*

2017-2022

- Designed and tested a large-scale fMRI study (5 sessions; 300 experimental hours) to investigate how the cerebellum learns, and developed machine learning pipelines to characterize cortico-cerebellar connectivity. Tested patients with cerebellar ataxia on cognitive tasks to assess impairment. Analyzed post-mortem brain data to create a transcriptomic map of the cerebellum. Co-developed SUITPy, a Python library to visualize brain data.
- Recorded >15 hours of varsity athletes, and implemented markerless labeling of videos to understand human performance in predicting action [[link](#)].
- Awarded certificate in applied data science by taking graduate classes in advanced statistics and computer science to analyze high-dimensional data.
- 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 [[link](#)].

- ## Publications

*In Prep*

2023

*In Prep*

2023

**Cell Reports (Revise and Resubmit)**

2023

*Under Revision*

2023

*ELife*

2023

*Current Opinion in Behavioral  
Sciences*

2023

## Neurobiology of Language

2022

## Brain

2022

## Journal of Cognitive Neuroscience

2022

### Human Brain Mapping

2021

## Nature Neuroscience

2019

*Neuron*

2019

## arXiv

2019

**NeuroImage: Clinical**

2018

## Individual differences in resting corticospinal excitability are correlated with reaction time and GABA content in motor cortex

I GREENHOUSE, M KING, S NOAH, RJ MADDOCK, RB IVRY

*Journal of Neuroscience*

2017

## Towards a multi-function mapping of the cerebellar cortex

M KING, C HERNANDEZ-CASTILLO, J DIEDRICHSEN

*Brain*

2017

## Neural adaptations associated with interlimb transfer in a ballistic wrist flexion task

KL RUDDY, AK RUDOLF, B KALKMAN, M KING, A DAFFERTSHOFER, TJ CARROLL, R CARSON

*Frontiers in Human Neuroscience*

2016

## Registered reports for student research

M KING, F DABLANDER, L JAKOB, M AGAN, F HUBER, J HASLBECK, K BRECHT

*Journal of European Psychology Students*

2016

## A critical evaluation of the essentialist debate: do fathers make a unique contribution to child development?

M KING

*Student Psychology Journal of Ireland*

2015

## The locus coeruleus-noradrenergic arousal function modulates perceptual decision-making in humans: evidence from pupillometry

M KING, R O'CONNELL

*Unpublished Undergraduate Honors Thesis*

2014

## Invited Talks

### From theory to practice: a roadmap for machine learning models in adolescent mental health

ICoN CENTER NOMINATED SPEAKER

2023

*Yang-Tan Centers Retreat*

MIT Endicott House

### Why we should consider the role of the cerebellum in development

FLUX CONGRESS SYMPOSIA

2022

*Flux Conference*

Paris, France

### 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

## Grants

### Transformation of internal representations in multiple task domains.

GRADUATE CO-AUTHOR

Collaboration between University of California, Berkeley; Princeton University; Yale University

*NIH R35 (funded)*

2020

## Evaluating a Novel Model of Cerebellar Function Using Harmonized Online-Testing of Patients with Cerebellar Degeneration in the Bay Area and Oslo Communities

Sather Grant (unfunded)

GRADUATE CO-AUTHOR

2019

Collaboration between University of California, Berkeley; University of Oslo

## Understanding cortico-cerebellar contributions to cognition

NIH R01 (unfunded)

GRADUATE CO-AUTHOR

2018

Collaboration between University of California, Berkeley; Western University (Canada)

# Public Service & Outreach

## COMMITTEES & POLICY

### Council on Family and Work

Postdoc Representative [Link]

MIT

Sep. 2022 -

- Nominated to be the postdoc representative on the MIT Council on Family and Work based on prior work as part of MIT POWER (women postdocs at MIT). Conducted a project on postdoc satisfaction with parental and childcare policies at MIT ([survey \[link\]](#) and [results \[link\]](#)).
- As a member of the council, it is our responsibility to: 1) identify family and work-related issues, 2) establish a process to evaluate and respond to these issues, and 3) make periodic recommendations to MIT's senior officers about courses of action relevant to these specific issues.

### Science Policy Group - Executive Visit to D.C.

Member

MIT

Sep. 2022 -

- Selected to attend an executive visit trip to Washington, DC to meet with agency leaders from NSF, USDS, EPA, NASA to discuss science policy.
- Led a meeting at the White House office of science and technology policy (OSTP) with Obama's former CTO, Megan Smith.

### Graduate Assembly Students of Psychology

Member and RSO Signatory

UNIVERSITY OF CALIFORNIA, BERKELEY

Sep. 2018 - Mar. 2020

- Recognized need for formal mentor-mentee agreements in the UC Berkeley psychology department [[link](#)]. Assembled and co-led working committee to create policy to improve lab culture and mentor-mentee relationships.
- Wrote initial draft for 10-page policy document on mentorship and lab policy agreements [[link](#)]. Advised leadership on implementation of new departmental policies. Since Sep. 2021, 35/42 faculty have created lab policy documents.
- Advisor on Berkeley Psychology state of the department annual meeting [[link](#)], led team to conduct 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.
- 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.

### 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.

### Niteline (Student Helpline)

Publicity Officer

TRINITY COLLEGE, DUBLIN

Sep. 2011 - May 2014

- Provided practical program consultation to student helpline [[link](#)].

## COMMUNICATION & ADMINISTRATION

### Graduate Assembly Students of Psychology

Writer/Contributor [Link]

UNIVERSITY OF CALIFORNIA, BERKELEY

Sep. 2019 - May 2021

- Created, managed, and edited [[link](#)] Berkeley Psychology blog to spotlight graduate student research.
- Co-founded and co-operated Twitter account for Berkeley Psychology [[link](#)]. Increased follower count to >1500 after 2 years.
- Co-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.

## 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)

UNIVERSITY OF CALIFORNIA, BERKELEY

**Team Member [Link]**

Jan. 2018 - Jan. 2020

- 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

WESTERN UNIVERSITY

**Organizing Member [Link]**

May 2016

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

## Western Women Neuroscientists in Schools

WESTERN UNIVERSITY

**Team Leader [Link]**

Oct. 2015 - May 2017

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

## Brain Bee

WESTERN UNIVERSITY

**Volunteer**

May 2016 and May 2017

- Member of the organizing committee for the London Brain Bee, a neuroscience event that introduces high school students to neuroanatomy.

## Student-to-Student (S2S)

TRINITY COLLEGE, DUBLIN

**Peer Mentor**

2011 - 2012

- Provided after-school homework support to children on the autism spectrum.

# Mentorship

## Undergraduate Research Assistants at MIT

SEP. 2022 - SEP. 2023

**Alyson Brown, Shreya Ravikumar,  
Kai McClellan**

Psychology; Computer Science

- Shreya Ravikumar built predictive models of neuropsychiatric disorders.
- Alyson Brown did a meta-analysis on sex differences in ADHD diagnosis.
- Kai McClellan leveraged large language models to assess semantic similarity in clinical questionnaires.

## Honors Thesis Students at Berkeley

SEP. 2019 - MAY 2021

**Shannon Lee; Sienna Bruinsma**

Cognitive Science; Psychology

- 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.

## Undergraduate Research Assistants at Berkeley

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

**Zanib Naaem; Yiling Kao**

Psychology; Computer Science

- 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.

## Ph.D. Rotation Students at Berkeley

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

**Amanda LeBel; Jacob Zientz;  
Mark Gorenstein**

Neuroscience

- 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.

## Post-Baccalaureate Students at Berkeley

SEP. - DEC. 2018

**Dylan Benkley**

Psychology

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

# Teaching

## Mount Tamalpais College

GENERAL PSYCHOLOGY

**Lecturer [Link]**

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

BIOLOGICAL PSYCHOLOGY, PSYCH 110; COGNITIVE NEUROSCIENCE, PSYCH 127

**Instructor [Link]**

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

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

**Instructor [Link]**

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.

# Poster Presentations

<b>Cerebro-cerebellar connectivity is dominated by divergent mapping</b> M KING, L SHAHSHAHANI, IVRY, J DIEDRICHSEN 2021	<b>Society for Neuroscience Conference</b> Virtual Conference
<b>Predicting brain activation maps for arbitrary tasks with ontology-based encoding models</b> J WALTERS, M KING, P BISSETT, IVRY, J DIEDRICHSEN, R POLDRACK 2021	<b>Organization for Human Brain Mapping Conference</b> Virtual Conference
<b>Evaluating Brain Parcellations using the Multi-Domain Task Battery</b> J DIEDRICHSEN, M KING, C HERNANDEZ-CASTILLO, D ZHI, R IVRY 2019	<b>Organization for Human Brain Mapping Conference</b> Rome, Italy
<b>Evaluating different functional parcellations of the basal ganglia</b> C HERNANDEZ-CASTILLO, M KING, I HARDING, J DIEDRICHSEN, R IVRY 2019	<b>Organization for Human Brain Mapping Conference</b> Rome, Italy
<b>Transcriptomic Gradients of the Human Cerebellum</b> M KING, R IVRY, K WEINER 2019	<b>Cerebellum Gordon Research Conference</b> Les Diablerets, Switzerland
<b>A multi-domain task battery reveals the functional topography of the human cerebellum</b> M KING, C HERNANDEZ-CASTILLO, R POLDRACK, R IVRY, J DIEDRICHSEN 2018	<b>The Society for Neuroscience Conference</b> San Diego, California
<b>A multi-domain task battery reveals the functional topography of the human cerebellum</b> M KING, C HERNANDEZ-CASTILLO, R POLDRACK, R IVRY, J DIEDRICHSEN 2018	<b>Computational and Cognitive Neuroscience Conference</b> Philadelphia, Pennsylvania
<b>Navigating the "Little Brain": Comprehensive mapping of cognitive function in the human cerebellum</b> M KING, R IVRY, J DIEDRICHSEN 2017	<b>Helen Wills Neuroscience Retreat</b> Lake Tahoe, California
<b>Navigating the "Little Brain": Comprehensive mapping of cognitive function in the human cerebellum</b> M KING, R IVRY, J DIEDRICHSEN 2017	<b>Organization for Human Brain Mapping Conference</b> Vancouver, British Colombia
<b>Mapping the Human Cerebellum</b> M KING, R IVRY, J DIEDRICHSEN 2017	<b>Cerebellum Gordon Conference</b> Lewiston, Maine
<b>Transcranial magnetic stimulation measures of intrinsic motor system excitability and task-based inhibition exhibit intra-subject stability across weeks</b> I GREENHOUSE, M KING, R IVRY 2015	<b>Society for Neuroscience Conference</b> Chicago, Illinois
<b>Electroencephalography (EEG) signatures of impairment in cognitive, sensory and motor networks in Amyotrophic Lateral Sclerosis (ALS) disease</b> B NASSEROLESLAMI, K MOHR, M KING, O HARDIMAN 2015	<b>Annual ALS Irish Meeting</b> Dublin, Ireland

<b>Skills &amp; Interests</b>	
<b>Programming Languages</b>	Python, SQL, R, MATLAB, HTML, Bash
<b>Frameworks and Tools</b>	Keras, OpenCV, Git, Vim, Blender, Nipype, Deeplabcut, PsychoPy, Pandas, NumPy, Scikit-learn, Scipy
<b>Conceptual</b>	High performance computing (Savio), Grant Writing and IRB Ethics Protocols, MRI technician certificate
<b>Interpersonal</b>	Project management, Organizational leadership, Resourcefulness, Problem solving, Conflict resolution
<b>Languages</b>	English (Native), Irish (Native), French (Proficient), German (Basic)