

# Elvisha Dhamala, PhD Candidate

Department of Radiology  
Brain and Mind Research Institute  
[Computational Connectomics \(CoCo\) Lab](#)  
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## Education

### PhD Weill Cornell Medicine

Neuroscience, 2017 - Present

*New York, USA*

Thesis Advisor: Amy Kuceyeski

### BSc McGill University

Neuroscience: Neurophysiology and Neural Computation, 2017

*Montréal, Canada*

## Research

### Graduate Student, Computational Connectomics Lab

Department of Radiology, Brain and Mind Research Institute, 2018 - Present

*Weill Cornell Medicine, New York, USA*

- I. Evaluated sex differences in temporal dependence properties of resting state fMRI using univariate and machine learning approaches
- II. Applied machine learning models to understand functional and structural connections in the brain underlying cognitive abilities
- III. Developing sex-specific machine learning models to understand multimodal correlates of cognitive abilities in females and males
- IV. Examining how hormone levels throughout the menstrual cycle relate to temporal dependence properties of fMRI and functional connections in the brain

### Research Assistant, Near Lab

Centre d'Imagerie Cérébrale, 2017

*Douglas Institute, Montréal, Canada*

- I. Developed a method to validate MRS measures of *in vivo* human brain metabolite concentrations in the absence of ground truth measures

### Undergraduate Student & Research Assistant, Boudrias Lab

Faculty of Medicine, Department of Physical and Occupational Therapy, 2016

*McGill University, Montréal, Canada*

- I. Tested the feasibility of functional and diffusion MRI protocols to quantify neural substrates underlying neuroplasticity induced by acute exercise

### **Undergraduate Student & Research Assistant, Pompeiano Lab**

Department of Psychology, 2015 - 2016

*McGill University, Montréal, Canada*

- I. Studied developmental expression levels of NKCC1 and KCC2 co-transporters, and NMDA<sub>R1</sub> and GABA<sub>A</sub> receptors in chick embryos

### **Peer Reviewed Publications**

- I. **Dhamala E**, Jamison KW, Sabuncu MR, Kuceyeski A. (2020). Sex classification using long-range temporal dependence of resting-state functional MRI. *Human Brain Mapping*, 41(13), 3567-3579. PMID: 32627300.
- II. **Dhamala E**, Abdelkefi I, Nguyen M, Hennessy TJ, Nadeau H, Near J. (2019). Validation of in vivo MRS measures of metabolite concentrations in the human brain. *NMR in Biomedicine*, 32(3), e4058. PMID: 30663818.

**Top 10% most downloaded papers in NMR in Biomedicine 2018 - 2019.**

### **Preprints and Submissions**

- I. **Dhamala E**, Jamison KW, Jaywant A, Dennis S, Kuceyeski A. (Preprint, Submitted). (2020). Integrating multimodal connectivity improves prediction of individual cognitive abilities. Preprint posted on *bioRxiv* June 29, 2020.
- II. Cha J, Speaker S, Bo H, Altinay M, Koirala P, Karne H, Spielberg J, Kuceyeski A, **Dhamala E**, Anand A. (In revision). (2020). Neuroimaging correlates of emotional response-inhibition discriminate between young depressed adults with and without sub-threshold bipolar symptoms. Preprint of previous version of this work posted on *bioRxiv* April 27, 2020.

### **Textbook Chapters**

- I. Thompson J, Kosofsky BE, **Dhamala E**, Duggan RC. (2020). Electrophysiology Monitoring. *Biomarkers for Traumatic Brain Injury*. Editors: A. Wu, W. Peacock. Elsevier Press. ISBN: 9780128163467

### **Invited Talks**

- I. **Distinct functional and structural connections predict individual cognitive abilities**  
Frontiers in Neuropsychiatry Seminar, June 2020  
*Weill Cornell Medicine, New York, USA*

- II. **Sex matters - Insights into sex differences in neural structure and function**  
Progress in Neuroscience Seminar, January 2020  
*Brain and Mind Research Institute, Weill Cornell Medicine, New York, USA*
- III. **Neurophysiological basis of sex and cognition - Insights using structural and functional MR Imaging**  
Matteson Lab, December 2019  
*Cornell University, Ithaca, USA*
- IV. **Sex classification using temporal dependence of resting-state fMRI**  
Psychiatric and Developmental Imaging Lab, July 2019  
*University of Pennsylvania, Philadelphia, USA*

### **Peer-Reviewed Conference Presentations: Talks, Symposia, Posters**

- I. **Dhamala E**, Jamison KW, Dennis SM, Patel R, Chakravarty MM, Kuceyeski A. Hybrid structure-function connectome predicts individual cognitive abilities. Oral power pitch. *International Society of Magnetic Resonance in Medicine*; August 2020; Virtual due to COVID-19.
- II. **Dhamala E** and Khosla M. Machine Learning in Neuroimaging. Breakout session leaders at Women in Machine Learning Un-Workshop. *International Conference on Machine Learning*. July 2020; Virtual due to COVID-19.
- III. **Dhamala E**, Jamison KW, Dennis SM, Patel R, Chakravarty MM, Kuceyeski A. Integration of structural and functional connectomes to predict individual cognitive abilities. Poster format. *Organization for Human Brain Mapping*; June 2020; Virtual due to COVID-19.
- IV. **Dhamala E**, Jamison KW, Kuceyeski A. (Accepted) Hybrid structure-function connectome predicts sex. Poster format. *Organization for the Study of Sex Differences*; May 2020; Cancelled due to COVID-19.
- V. **Dhamala E**, Jamison KW, Dennis SM, Patel R, Chakravarty MM, Kuceyeski A. Hybrid-structure-function connectome predicts crystallised and fluid cognition. Poster format. *Cognitive Neuroscience Society*; May 2020; Virtual due to COVID-19.
- VI. **Dhamala E**, Jamison KW, Dennis SM, Kuceyeski A. Prediction of individual cognitive ability using resting-state functional connectivity. Poster format. *Society for Neuroscience*; October 2019; Chicago, USA.
- VII. **Dhamala E**, Jamison KW, Kuceyeski A. Sex differences in long-term temporal dependence of resting state fMRI time series. Poster format. *Organization of Human Brain Mapping*; June 2019; Rome, Italy.
- VIII. Duggan RC, **Dhamala E**, Kosofsky BE. Heart rate variability during exercise is a biomarker distinguishing between subjects with post-concussive syndrome

following mild traumatic brain injury and healthy volunteers. Poster format. *Society for Neuroscience*; November 2018; San Diego, USA.

- IX. Kassinosopoulos M, Ghosh A, **Dhamala E**, Boudrias MH, Mitsis G. Cardiac noise removal from BOLD fMRI based on a dynamic linear model. Poster format. *Organization of Human Brain Mapping*; June 2017; Vancouver, Canada.

## Honours and Awards

- I. **Graduate Student Award:** Cognitive Neuroscience Society, 2020  
Approximately 1% of all poster presenters were awarded this prize
- II. **Student Service/Outreach Award Nominee:** Weill Cornell Medicine, 2020
- III. **IBM PhD Fellowship Internal Nominee:** Weill Cornell Medicine, 2019  
Maximum of 3 nominees per department
- IV. **Microsoft PhD Fellowship Internal Nominee:** Weill Cornell Medicine, 2019  
Maximum of 3 nominees per department

## Teaching

- I. **Founder, Facilitator, Presenter**  
Skills Development Workshop Series  
*Computational Connectomics Lab, New York, NY*  
2020 - Present  
Series of professional development workshops for academic trainees focusing on skills key to success in academia and industry. Topics include: academic reading and writing, statistics, neuroimaging, programming, machine learning, deep learning, networking, digital literacy, data visualisation, work-life balance, and applying to graduate and professional schools.
- II. **Instructor**  
HD 2200 The Human Brain and Mind, Cornell Prison Education Program  
*Auburn Correctional Facility, Auburn, NY; Cayuga Correctional Facility, Moravia, NY*  
Spring 2020; Fall 2020  
Intermediate undergraduate-level course that examines the neurobiological basis of human behaviour, with a particular emphasis on cognitive function. Topics include: neuroanatomy, synaptic transmission, methods, cognitive control, language, sensation and perception, movement, attention, memory, emotions, mental health disorders, and consciousness.
- III. **Founder, Organiser, Lecturer**  
Neuroscience Boot Camp  
*Weill Cornell Medicine, New York, NY*

Founded and organised in 2018, Lectured in 2018 and 2019

Boot Camp for incoming neuroscience PhD students that provides common knowledge base of neuroscience fundamentals to serve as an introduction and/or refresher to students prior to official classes. Topics include: molecular biology, neurotransmitters, neuroanatomy, methods, cell types, receptors, channels, and structure-function relationships.

## **Mentoring**

### **I. Computational Connectomics Lab**

2020 - Present

Undergraduate research project mentor for Catherine Cai (Cornell BSc '21), Jason Chen (Cornell BSc '22), and Elaine Wu (Cornell BSc '23)

### **II. Cornell University Multicultural Academic Council**

2019 - 2020

Mentored 15+ first-year graduate students from diverse backgrounds

### **III. Skype a Scientist**

2018 - Present

Met with 250+ middle and high school students to discuss post-secondary STEM education, career pathways in science, and my experiences as a scientist

### **IV. Boudrias Lab**

2016

Undergraduate research project mentor for Bennet Desormeau (McGill BSc '17), and Afuad Hossain (McGill BSc '17)

### **V. Pompeiano Lab**

2015 - 2016

Undergraduate research course mentor for Sharif Ahmed (McGill BSc '17), Bennet Desormeau (McGill BSc '17), and Natalie Sun (McGill BSc '17)

## **Reviewing**

### **I. IEEE Access**

Ad Hoc Reviewer, 2020 - Present

## **Professional Service**

### **I. Organisation for Human Brain Mapping**

Program Committee - Student and Postdoc Liaison, 2020 - 2021

Sustainability and Environmental Action Group - Social Coordinator, 2020 - 2021

Technology Task Force - Ad Hoc Member, 2020 - 2021

Distance-Based Education Taskforce - Student and Postdoc Liaison, 2020  
Student and Postdoc Group - Social Coordinator, 2019 - 2021

II. **Cornell University Graduate and Professional Students International**

Co-President, 2020 - 2021

Graduate and Professional Diversity Council Representative, 2020 - 2021

Health Officer Liaison, 2020 - 2021

Mentorship Coordinator, 2020

III. **Vincent du Vigneaud Memorial Research Symposium**

Outreach Coordinator, 2017 - 2018

IV. **Neuroscience Undergraduates of McGill**

Vice-President Internal, 2015 - 2017

V. **Kinesiology Games**

Head of Sponsorship, 2015 - 2016

## **Professional Trainings**

I. **National Institutes of Health: Office of Research on Women's Health**

Integrating Sex and Gender to Improve Human Health, 2020

II. **Coursera**

Writing in the Sciences, 2020

III. **Cornell University**

Teaching and Learning in the Diverse Classroom, 2020

IV. **Weill Cornell Medicine**

Art of Scientific Writing Workshop, 2019