Jefferson E. Roy

Neuroscientist with extensive experience in the investigation of goal-directed behavior using electrophysiological recording techniques. Knowledgeable about grant management and budgeting. Engaged technical consultant.

KEY STRENGTHS

- Cognitive study design
- In vivo recording
- Matlab and Julia
- Mentoring and supervision
- Scientific writing
- Presentations
- Technical consulting
- Science outreach
- Content creation
- Compliance
- Budgeting
- Grant writing

NEUROSCIENCE EXPERIENCE

Research Scientist III *2007-present* *Cambridge, MA, USA*

The Picower Institute for Learning and Memory at MIT under mentorship of Dr. Earl K. Miller

- Investigating neuronal mechanisms of cognitive flexibility during goal-directed behavior
- Design and implement multiple electrophysiological non-human primate studies of cognitive behavior
- Analyze complex neuronal signals and behavior with custom Matlab and Julia scripts
- Proficient with chronic array implantation and recordings, acute recordings, EEG recordings, and electrical stimulation

Associate Lab Director of Miller Lab *2013-present* *Cambridge, MA, USA*

The Picower Institute for Learning and Memory at MIT

- Perform and teach surgical procedures (e.g. headposts, acute recording chambers, chronic arrays)
- Collaborative mentor to new postdoctoral researchers and graduate students
- Ensure budgetary compliance per MIT, NIH, NSF, and industry guidelines
- Ensure biosafety and animal use compliance per MIT, USDA, and AAALAC guidelines
- Manage grant applications and progress reports
- Member of MIT Compassion Fatigue Committee (2024-present)

Postdoctoral Associate *2002-2007* *Cambridge, MA, USA*

The Picower Institute for Learning and Memory at MIT under mentorship of Dr. Earl K. Miller

Graduate Student *1995-2002* *Montréal, QC, Canada*

McGill University Department of Physiology with Dr. Kathleen E. Cullen

- Investigated neuronal control of the VOR, VCR, and eye movements in alert behaving non-human primates
- Analyzed complex neuronal signals and behavior with custom Matlab scripts

CONSULTING

Muddled Mind Consulting LLC. (Founder) *2013-present* *Cambridge, MA, USA*

- Provide neuroscience technical consulting services to companies that includes writing whitepapers, data analysis, grant writing and editing, scripts/storyboards, educational content creation, and instruction

EDUCATION

McGill University, Ph.D. in Physiology (Dean's Honours List) *Montréal, QC, Canada*

University of Western Ontario, B.Sc. in Physiology (Honours List) *London, ON, Canada*

COURSES

Google Project Management Certificate: by Google on Coursera *2024*

OUTREACH

The Innovation Institute *2019-2021* *Newton, MA, USA*

- Instruction of grade 4-5 students in hands-on science exploration of body systems (e.g. muscles, CNS, bones)

Science from Scientists *2014-2017* *Bedford, MA, USA*

- Taught engaging lessons to 4th grade students with the mission to improve attitudes and aptitudes in STEM fields.

Judge for Middle and High Schools Science Fairs

- Boston Public School Citywide Science Fair *2016-2017, 2023-24* *Boston, MA, USA*
- Massachusetts State High School Science and Engineering Fair *2009-2023* *Cambridge, MA, USA*

PUBLICATIONS

Book

Bundgaard, M.H. and Roy, J.E., The Motivated Brain. Coppenhagen:CreateSpace, 2014.

Scientific Manuscripts

Miller, E.K., Brincat, S.L., and **Roy, J.E.** Cognition is an emergent property. *Curr. Opin. Behav. Sci.*, in press, 2024.

Bastos, A.M., Donoghue, J.A., Brincat, S.L., Mahnke, M., Yanar, J., Correa, J., Waite, A.S., Lundqvist, M., **Roy, J.**, Brown, E.N. and Miller, E.K. Neural effects of propofol-induced unconsciousness and its reversal using thalamic stimulation. *eLife*, DOI: 10.7554/eLife.60824, 2021.

Tiganj, Z., Cromer, J.A., **Roy, J.E.**, Miller, E.K., and Howard, M.W. Compressed Timeline of Recent Experience in Monkey lPFC. *J.Cogn. Neurosci*, 1-16, 2018.

Wutz, A., Loonis, R., **Roy, J.E.**, Donoghue, J.A., and Miller, E.K. Different levels of category abstraction by different dynamics in different prefrontal areas. *Neuron*, 97, 716-726, 2018.

Stanley, D.A., **Roy, J.E.**, Aoi, M.C., Kopell, N.J., and Miller, E.K. Low-beta Oscillations Turn Up the Gain During Category Judgments. *Cerebral Cortex*, 28, 116-130, 2018.

Roy, J.E., Buschman, T.J., and Miller, E.K. Prefrontal Cortex Neurons Reflect Categorical Decisions About Ambiguous Stimuli. *J.Cogn. Neurosci*, 26, 1283-1291, 2014.

Buschman, T.J., Siegel, M., **Roy, J.E.**, and Miller, E.K. Neural Substrates of Cognitive Capacity Limitations. *PNAS*, 108, 11252-11255, 2011.

Cromer, J., **Roy, J.E.**, Buschman, T.J., and Miller, E.K. Comparison of Primate Prefrontal and Premotor Cortex Neuronal Activity During Visual Categorization. *J. Cogn. Neurosci*, 23, 3355-3365, 2011.

Roy, J.E., Riesenhuber, M., Poggio, T., and Miller, E.K. Prefrontal Cortex Activity during Flexible Categorization. *J. Neurosci.* 30, 8519-8528, 2010.

Cromer, J., **Roy, J.E.**, and Miller, E.K. Representation of Multiple, Independent Categories in the Primate Prefrontal Cortex. *Neuron* 66, 796-807, 2010.

Cullen, K.E. and **Roy, J.E.** Signal Processing in the Vestibular System during Active versus Passive Head Movements. *J. Neurophysiol.* 91, 1919-1933, 2004.

Roy, J.E. and Cullen, K.E. Dissociating Self-Generated from Passively Applied Head Motion: Neural Mechanisms in the Vestibular Nuclei. *J. Neurosci.* 24, 2102-2111, 2004.

Roy, J.E. and Cullen, K.E. Brain Stem Pursuit Pathways: Dissociating Visual, Vestibular, and Proprioceptive Inputs during Combined Eye-Head Gaze Tracking. *J.Neurophysiol.* 90: 271-290, 2003.

Roy, J.E. and Cullen, K.E. Vestibuloocular Reflex Signal Modulation During Voluntary versus Passive Head Movements. *J. Neurophysiol.* 87, 2337-2357, 2002.

Roy, J.E. and Cullen, K.E. Selective Processing of Vestibular Reafference During Self-generated Head Motion. *J. Neurosci.* 21, 2131-2142, 2001.

Roy, J.E. and Cullen, K.E. A Neural Correlate for Vestibulo-Ocular Reflex Suppression During Voluntary Eye-Head Gaze Shifts. *Nature Neurosci.*1, 404-410, 1998.