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 | * Mentoring and supervision | * Technical consulting | * Compliance |
| --- | --- | --- | --- |
| * In vivo recording | * Scientific writing | * Science outreach | * Budgeting |
| * Matlab and Julia | * Presentations | * Content creation | * 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.

**Select Manuscripts**

Bardon, A.G., Ballesteros, J.J., Brincat, S.L., **Roy, J.E.**, Mahnke, M.M., Ishizawa, Y., Brown, E.N., and Miller, E.K. (2025) Convergent effects of different anesthetics on changes in phase alignment of cortical oscillations, *Cell Reports*, in press.

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.