

Jefferson E. Roy

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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*. Copenhagen: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 IPFC. *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.