

Jeffrey P. Gavornik, Ph.D.

Assistant Professor of Biology
Boston University

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EDUCATION **The University of Texas**, Austin TX, USA.

Doctor of Philosophy in Electrical Engineering. May 2009.

Dissertation Title: "Learning temporal representations in cortical networks through reward dependent expression of synaptic plasticity."

Rice University, Houston TX, USA.

Master of Electrical Engineering. May 2003.

Bachelor of Science, Electrical and Computer Engineering & History. May 1999.

PROFESSIONAL
EXPERIENCE &
TRAINING

Boston University. Boston MA. 2015-.

Assistant Professor, Department of Biology. Center for Systems Neuroscience, Center for Memory and Brain, Center for Research in Sensory Communications and Neural Technology.

The Massachusetts Institute of Technology. Cambridge MA. 2015-.

Research Affiliate, The Picower Institute for Learning and Memory.

The Massachusetts Institute of Technology. Cambridge MA. 2009-2014.

Postdoctoral Research Associate, Howard Hughes Medical Institute, The Picower Institute for Learning and Memory, Department of Brain and Cognitive Sciences.

The University of Texas Health Science Center. Houston TX. 2006-2009.

Researcher, Department of Neurobiology and Anatomy.

University of California San Diego. La Jolla CA. August, 2006.

Summer Program in Experimental & Computational Neurodynamics, Center for Theoretical Biological Physics.

The Boeing Company. Houston TX. 1999-2006.

Engineer, Integrated Defense Systems, International Space Station Hardware/Software Integration.

The MITRE Corp. Bedford MA. 1998-1999.

Internship, Satellite Communications Division.

MD Anderson Cancer Center. Houston TX. 1995-1998

Internship, Diagnostic Physics Department.

Air Force Office of Scientific Research. San Antonio TX. 1993-1995.

Internship, Anderson Lab.

FUNDING NIH Pathway to Independence Award, K99/R00 (NIMH K99MH099654/R00MH099654)

PEER REVIEWED
PUBLICATIONS

1. Kaplan ES, Cooke SF, Komorowski RW, Chubykin AA, Thomazeau A, Khibnik LA, Gavornik JP, Bear MF (2016) Contrasting roles for parvalbumin-expressing inhibitory neurons in two forms of adult visual cortical plasticity. *eLife* e11450.

2. Cooke SF, Komorowski RW, Kaplan ES, Gavornik JP, Bear MF (2015) Visual recognition memory, manifest behaviourally as long-term habituation, requires synaptic plasticity in V1. *Nat Neurosci*. 18(2) 262-271.

3. Gavornik JP and Bear MF. (2014) Higher brain function served by the lowly rodent primary visual cortex. *Learning & Memory* 21(10) 527-533.
4. Shouval HZ, Hussain Shuler MG, Agarwal A, Gavornik JP (2014) What does scalar timing tell us about neural dynamics? *Front Hum Neurosci*, 8:438.
5. Gavornik JP and Bear MF (2014) Learned spatiotemporal sequence recognition and prediction in the primary visual cortex. *Nat Neurosci*, 17(5) 732-737.
6. Melom J, Akbergenova Y, Gavornik JP and Littleton JT (2013) Spontaneous and evoked release are independently regulated at individual active zones. *J Neurosci* 33(44) 17253-17263.
7. Shouval HZ, Agarwal A, Gavornik JP (2013) Scaling of perceptual errors can predict the shape of neural tuning curves. *Phys Rev Lett* 110(16):168102.
8. Gavornik JP, Shouval HZ. (2011) A network of spiking neurons that can represent interval timing: mean field analysis. *J Comput Neurosci* 30(2) 501-13.
9. Shouval HZ, Gavornik JP (2011) A single spiking neuron that can represent interval timing: analysis, plasticity and multi-stability. *J Comput Neurosci* 30(2) 488-99.
10. Coleman J, Nahmani M, Gavornik JP, Haslinger R, Heynen A, Bear MF and Erisir A. (2010) Rapid structural remodeling of thalamocortical synapses parallels experience-dependent functional plasticity in mouse primary visual cortex. *J Neurosci* 30(29) 9670-82.
11. Gavornik JP, Shuler MGH, Loewenstein Y, Bear MF and Shouval, HZ (2009) Learning reward timing in cortex through reward dependent expression of synaptic plasticity. *Proc Natl Acad Sci U S A* 106(16):6826-31.
12. Cai Y, Gavornik JP, Cooper LN, Yeung LC, and Shouval HZ (2007) Effect of stochastic synaptic and dendritic dynamics on synaptic plasticity in visual cortex and hippocampus. *J Neurophysiol* 97:375-386.

INVITED TALKS &
LECTURES

1. Computational and systems neuroscience (COSYNE), Perception and Learning of Temporal Information in Sensory Streams Workshop. Salt Lake City, UT. February 2017.
2. Neurophotonics Faculty Showcase. Boston, MA. September, 2016.
3. Greater Boston Area Research Opportunities for Young Women (GROW) Program, July 2016.
4. Graduate Program in Neuroscience Retreat, Essex Conference Center. Essex, MA. June 2016
5. Tertulia Colloquium, "How the Brain Works". Boston, MA. March, 2016.
6. Society for Neuroscience, Influence of Memory on Perception Symposium. Chicago, IL. October 2015.
7. Boston University CAS Junior Faculty Colloquium, Panel Discussion on Networks. Boston, MA. April, 2015.
8. Brandeis University, Volen National Center for Complex Systems, Computational and Systems Neuroscience . Waltham, MA. November 2014.
9. Computational and systems neuroscience (COSYNE), Sequence Generation and Timing Signals in Neural Circuits Workshop. Salt Lake City, UT. March 2014.
10. Boston University, Department of Biology. Boston, MA. February 2014.
11. Northeastern University Department of Biology, Computational Neuroscience Course. Boston, MA. October 2013.
12. The University of Utah Department of Neurobiology and Anatomy, Departmental Colloquium. Salt Lake City, UT. September 2013.
13. The University of Florida Department of Pediatrics, Departmental Colloquium. Gainesville, FL. July 2013.

14. The 5th Annual Dana & Betty Fisher Retreat of the Picower Institute. South Yarmouth, Cape Cod, MA. June 2012.
15. "Brain Lunch" Colloquia. The Massachusetts Institute of Technology, Cambridge, MA. November 2011.
16. Department of Neurobiology and Anatomy Colloquia Series. The University of Texas Medical School at Houston, Houston, TX. May 2009
17. Fifth Annual GCC Conference on Theoretical and Computational Neuroscience. Rice University, Houston, TX. January , 2008.

CONFERENCE
ABSTRACTS &
PRESENTATIONS

1. Gavornik JP and Bear MF. Spatiotemporal sequence learning in mouse primary visual cortex. Society for Neuroscience Annual Meeting. New Orleans, LA, USA. October 13-17, 2012.
2. Shouval HZ, Agarwal A and Gavornik JP. What does Weber's Law tell us about spike statistics? Society for Neuroscience Annual Meeting. New Orleans, LA, USA. October 13-17, 2012.
3. Bhakar AL, Gavornik J, Nagarajan N, Cernasov N, Williams A, and Bear MF. Development of a high-content neuronal assay to discover biomarkers and screen for therapeutics in Fragile X. Society for Neuroscience Annual Meeting. New Orleans, LA, USA. October 13-17, 2012.
4. Cooke SF, Gavornik JP and Bear MF. Stimulus-specific habituation: the acquisition and expression of familiarity requires dual cortical NMDA receptor-dependent processes. Society for Neuroscience Annual Meeting. New Orleans, LA, USA. October 13-17, 2012.
5. Bhakar AL, Gavornik J, Nagarajan N, Cernasov N, Williams AJ, Hong PY and Bear MF. Development of a high-content neuronal assay to discover biomarkers and screen for therapeutics in Fragile X. Gordon research conference: Fragile X and Autism-related Disorders. Stonehill College in Easton, MA, USA. June 10-15, 2012.
6. Gavornik J and Bear MF. Sequence Learning in Primary Visual Cortex. Computational and systems neuroscience (COSYNE). Salt Lake City, UT, USA. February 23-26, 2012.
7. Gavornik J and Bear MF. Sequence Learning in Primary Visual Cortex. Society for Neuroscience Annual Meeting. Washington, DC, USA. November 11-16, 2011.
8. Gavornik J and Shouval H. Scalar timing law for interval timing in a plastic network of spiking neurons. Nineteenth Annual Computational Neuroscience Meeting: CNS*2010. San Antonio, TX, July 24-30, 2010.
9. Gavornik J and Shouval H. A single cell with active conductance's can learn timing and multi-stability. Computational and systems neuroscience (COSYNE). Salt Lake City, UT, USA. February 26 - March 3, 2009.
10. Shouval H, Gavornik J and Shuler M. A spiking network model for learning reward timing in cortex. Computational and systems neuroscience (COSYNE). Salt Lake City, UT, USA. February 26 - March 3, 2009.
11. Gavornik J and Shouval H. Mean field theory of temporal representation in a plastic network. Society for Neuroscience Annual Meeting. Washington, DC, USA. November 15-19, 2008.
12. Gavornik J, Shuler M, Loewenstein Y, and Shouval, H. Learning temporal representations through reward dependent expression of synaptic eligibility traces in recurrent networks. Computational and systems neuroscience (COSYNE). Salt Lake City, UT, USA. February 28 - March 2, 2008.
13. Gavornik J, Shuler M, and Shouval, H. Learning temporal representations through reward dependent expression of synaptic eligibility traces in recurrent networks. Society for Neuroscience Annual Meeting. San Diego, CA, USA. November 3-7, 2007.
14. Gavornik J, Loewenstein Y and Shouval H. A network model that can learn reward timing using reinforced expression of synaptic plasticity. Sixteenth Annual Computational Neuroscience Meeting:

CNS*2007. Toronto, Canada. July 7-12, 2007

15. Gavornik J, Shuler M and Shouval H. A network model that can learn reward timing using reinforced consolidation of synaptic plasticity. Society for Neuroscience Annual Meeting. Atlanta, GA, USA. October 14-18, 2006.

16. Cai, Y, Gavornik J and Shouval H. Simulation of spike timing dependent plasticity induced by spike triplets with stochastic transmitter release. Society for Neuroscience Annual Meeting. Washington, DC, USA. November 12-16, 2005.

ACADEMIC HONORS Swartz Foundation COSYNE travel fellowship, 2008.

& AWARDS

Brown College Community Associate, Rice University, 2002-2003.

President's Honor Roll, Rice University, 1999.

Honor Council Member, Rice University, 1997-1999.

National Merit Scholar, Rice University, 1995.

Carl B. & Florence E. King Foundation Summer Program in Biomedical Sciences, MD Anderson Cancer Center, 1995.