

CURRICULUM VITAE

Emily Hueske

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Personal Details

Address: 77 Massachusetts Ave, Bldg 46-6033, Cambridge MA 02139

Nationality: American, German

Positions and Employment

2017-present **Research Scientist**

McGovern Institute for Brain Research, MIT, Cambridge, MA

Mouse behavioral genetics to study circuits and disorders

Advisor: Dr. Ann M. Graybiel, Ph.D.

2015-2017 **Research Scientist**

Picower Institute for Learning & Memory, MIT, Cambridge, MA

Mouse behavioral genetics and quantitative analysis

Optogenetic perturbation and multiple regression analyses to isolate independent influences of dopamine in mouse decision-making assay.

Advisor: Dr. Susumu Tonegawa, Ph.D.

Spring 2014 **Lecturer in Neuroscience**

Tufts University, Somerville, MA

Co-developed, co-taught Survey of Brain Systems

Most over-subscribed course in Ex College, Invited back to teach again.

2011-2015 **Postdoctoral Associate**

Picower Institute for Learning & Memory, MIT, Cambridge, MA

***In vivo* electrophysiology, optogenetics and mouse behavior**

Project title: *Dopamine induces behavioral biases in decision-making through reward prediction error like signaling: in vivo recordings of dopamine neurons in perceptual decision-making task.*

Advisor: Dr. Susumu Tonegawa, Ph.D.

2005-2011 **Graduate Student**

Department of Brain & Cognitive Sciences, MIT, Cambridge, MA

Neural circuit genetic analyses of rodent decision-making

PhD Thesis Title: *Role of NMDARs in Dopamine Neurons in Learning and Decision-Making.*

Thesis Advisor: Dr. Susumu Tonegawa, Ph.D., Brain & Cognitive Sciences, MIT

Co-Advisor: Dr. Naoshige Uchida, Ph.D., Molecular and Cellular Biology, Harvard University

2002-2005 **Graduate Student**

Department of Brain & Cognitive Sciences, MIT, Cambridge, MA

Cellular Electrophysiology & Imaging

Project title: *Structural and functional distribution and regulation of presynaptic vesicular transporters, VGLUT1 and VGAT in hippocampal cell types.*

Advisor: Dr. Guosong Liu, M.D., Ph.D.

01/00-06/01 **Undergraduate Research Fellow**

Chemistry Department, University of Texas, Austin, TX

Electrochemistry

Project Title: *Development and characterization of Hemispherical Hg Ultramicroelectrode for biological detection of Tl⁺.*

Supervisor: Dr. Alan J. Bard, Ph.D.

Membership in Professional Societies

2002-pres Society for Neuroscience

2000-2002 American Chemical Society

Honors

2016 Dopamine 2016 Congress Travel Award, Med Univ of Vienna, Vienna

2014 Neurobiology & Hollywood, Course admitted to Ex College, Tufts Univ

2009 WGBH Feature: Bringing it to the Kids, WGBH Public Radio, Boston

2005 BCS Team Teaching Award, Dept of Brain & Cognitive Science, MIT

2005 HHMI Bulletin Feature: Cranial Explorations in MIT Splash! Class

2004 Poitras Research Fellowship, MIT

2002 NSF Graduate Fellowship Honorable Mention

2001 Presidential Graduate Fellowship, MIT

2001 Kolthoff Award for Young Analytical Chemist, ACS (11 nationally)

2000 Undergraduate Research Fellowship, University of Texas at Austin

Teaching and Outreach

2014 Survey of Brain Systems Tufts University, Somerville, MA

Teaching faculty – Tufts Experimental College

2009 Continuing Education Lecture Series MIT, Cambridge, MA

Invited Lecturer –Dept. of Comparative Medicine

2003-2006 Introduction to Neuroanatomy MIT, Cambridge, MA

Instructor – MIT Educational Studies Program

2005 Experimental Molecular Neurobiology MIT, Cambridge, MA

Teaching Assistant – Dept. of Brain & Cognitive Sciences

2003 Introduction to Neurobiology MIT, Cambridge, MA

Teaching Assistant – Dept. of Brain & Cognitive Sciences

2003 After-School Science Initiative EastEnd House, Cambridge MA

Instructor & Coordinator

2002 Introduction to Psychology MIT, Cambridge, MA

Teaching Assistant – Dept. of Brain & Cognitive Sciences

Publications

Friedman A*, Hueske E*, Drammis SM, Toro Arana SE, Nelson ED, Carter CW, Delcasso S, Rodriguez RX, Lutwak H, DiMarco KS, Zhang Q, Rakocevic LI, Hu D, Xiong JK, Zhao J, Gibb LG, Yoshida T, Siciliano CA, Diefenbach TJ, Ramakrishnan C, Deisseroth K, Graybiel AM. Striosomes Mediate Value-Based Learning Vulnerable in Age and Huntington's Model. Cell. (Accepted Aug 10, 2020; *equal contribution).

Lak A, Hueske E, Hirokawa J, et al. Reinforcement biases subsequent perceptual decisions when confidence is low, a widespread behavioral phenomenon. *Elife*. 2020;9:e49834. Published 2020 Apr 15.

Hueske EA, Jung HY, Das G, Xu S, Puryear CB, O'Connor T, Rao V, Uchida M, Uchida N, Tonegawa S. Dopamine neuron reward prediction errors update choice strategy depending on decision difficulty. (*in preparation*).

Xu S, Das G, Hueske EA, Tonegawa S. Control of intertemporal choice by dorsal raphe serotonergic neurons. *Curr Biol*. 2017 Oct 23;27(20):3111-3119.

Hueske EA, Jung HY, Das G, Puryear CB, O'Connor T, Rao V, Uchida M, Uchida N, Tonegawa S. Dynamic updating of choice strategy by dopamine reward prediction errors. *Intrinsic Activity: Proceedings of Dopamine 2016*. 2016 Sep:4(2).

Sanjana NE, Levanon EY, Hueske EA, Ambrose JM, Li JB. Activity-dependent A-to-I RNA editing in rat cortical neurons. *Genetics*. 2012 Sep;192(1):281-7.

Hueske E. The role of dopamine neurons NMDARs in learning and decision-making. PhD dissertation, MIT. Cambridge: <http://hdl.handle.net/1721.1/65286>, 2011.

Wilson NR, Kang JS, Hueske EA, Leung T, Varoqui H, Murnick JM, Erickson J, Liu G. Presynaptic control of excitatory transmission by vesicular transporter expression. *J.Neurosci*. 2005 Jun 29;25(26):6221-34.

Dunah AW, Hueske E, Wyszynski M, Hoogenraad CC, Jaworski J, Pak DT, Simonetta A, Liu G, Sheng M. LAR receptor protein tyrosine phosphatases in the development and maintenance of excitatory synapses. *Nature Neurosci*. 2005 Apr;8(4):458-67.

Mauzeroll J, Hueske E, Bard AJ. Scanning electrochemical microscopy. 48. Hg/Pt hemispherical ultramicroelectrodes: fabrication and characterization. *Anal Chem*. 2003 Aug 1;75(15):3880-9.

Abstracts & Talks

Invited Speaker. *Striosomes Regulate Valence-based Learning and are Vulnerable in Aging and Huntington's Disease Model Mice*. McLean Hospital Center for Depression, Anxiety and Stress Research: CDASR Speaker Series, April 15, 2020.

Hueske E*, Friedman A*, Delcasso S, Gibb LG, Lutwak H, Toro Arana SE, Drammis SM, Rakocevic LI, Fajardo JD, Xiong JK, Siciliano CA, Hu D, Carter CW, Nelson ED, Graybiel AM. Evaluation of approach-avoidance learning in mouse model of Huntington's disease by a novel battery of cost-benefit decision-making tasks compatible with high-throughput imaging. Program No. 758.27. 2018 Neuroscience Meeting Planner. San Diego: Society for Neuroscience, 2018. Online.

Friedman A*, Hueske E*, Delcasso S, Gibb LG, Lutwak H, Toro Arana SE, Drammis SM, Rakocevic LI, Fajardo JD, Xiong JK, Siciliano CA, Hu D, Carter CW, Nelson ED, Graybiel AM. Novel computation approaches for signal extraction from striatal multi-color photometry recordings and evaluating high-throughput approach-avoidance learning applied to Huntington's disease mouse model. Program No. 758.26. 2018 Neuroscience Meeting Planner. San Diego: Society for Neuroscience, 2018. Online.

Invited Speaker. *Dynamic updating of choice strategy by reward prediction errors*. Princeton Neuroscience Institute: Informal Seminar, April 29, 2016.

E. A. Hueske, H.Y. Jung, C.B. Puryear, T. O'Connor, G. Das, N. Uchida, S. Tonegawa. Dopamine neuron reward prediction errors update choice strategy depending on decision difficulty. Chicago: Molecular & Cellular Cognition Society Symposium, 2015.

E. A. Hueske, S. Tonegawa, N. Uchida. Dopamine neuron NMDARs are required for dynamic updating of a choice strategy depending on decision difficulty. 2011 Abstract Viewer/Itinerary Planner. Program No. 514.13. Washington DC: Society for Neuroscience, 2011.

C. B. Puryear, G. Das, E. A. Hueske, D. Friedman, S. Tonegawa. Optical identification and control of dopamine neurons in the freely moving mouse. 2010 Abstract Viewer/Itinerary Planner. Program No. 106.11. San Diego: Society for Neuroscience, 2010.

Invited Speaker. *Circuit Genetic Approaches to Study of Dopamine Function*. MIT Department of Comparative Medicine: Continuing Education Lecture Series, July 29, 2009.

E. A. Hueske, J. S. Kang, G. Liu. Postsynaptic cell-type dependent regulation of presynaptic vesicular transporters. *2005 Meeting on Imaging Neurons and Neural Activity Poster Abstracts*. Cold Spring Harbor: CSHL Meeting, May, 2005.

E. A. Hueske, J. S. Kang, G. Liu. Structural and Functional Balance of Excitation and Inhibition in Cultured Hippocampal Neurons. 2003 Abstract Viewer/Itinerary Planner. Program No. 256.20. New Orleans: Society for Neuroscience, 2003. Online.

E. A. Hueske. Structural and functional balance of excitatory and inhibitory inputs to hippocampal pyramidal neurons. Talk presented at *Brain Lunch*. Department of Brain & Cognitive Sciences, MIT, Cambridge, MA. November 2002.

E. A. Hueske, J. Mauzeroll. Fabrication and characterization of Hg⁺ ultramicroelectrode for measurement of TI⁺ currents. San Diego: American Chemical Society National Meeting, 2001.

Acknowledged

Ramirez S, Liu X, MacDonald CJ, Moffa A, Zhou J, Redondo RL, Tonegawa S. Activating positive memory engrams suppresses depression-like behaviour. *Nature*. 2015 Jun 18;522(7556):335-9.

Wang DD, Kriegstein AR. GABA Regulates Excitatory Synapse Formation in the Neocortex via NMDA Receptor Activation. *J Neurosci*. 2008 May 21; 28(21): 5547–5558.

Sanjana NE, Fuller SB. A fast flexible ink-jet printing method for patterning dissociated neurons in culture. *J Neurosci Methods*. 2004 Jul 30;136(2):151-63.

Liu G. Local structural balance and functional interaction of excitatory and inhibitory synapses in hippocampal dendrites. *Nat Neurosci*. 2004 Apr;7(4):373-9.