Curriculum Vitae

Brad E. Pfeiffer

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University of Texas Southwestern Medical Center
Department of Neuroscience
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Education/Research

University of Texas Southwestern Medical Center, 2015-Present
Assistant Professor, 2015-Present

Johns Hopkins University, 2008-2015
Post-doctoral Fellow, 2008-2015

University of Texas Southwestern Medical Center, 2003-2008
Ph.D. in Neuroscience, 2008

Texas A&M University, 1994-1997
*University of Texas at San Antonio,*1997-2001
B.S., 2001

Research Experience

Postdoctoral Research, 2015-Present
University of Texas Southwestern Medical Center
Department Chair: Dr. Joseph Takahashi

- Examining the neural mechanisms involved in information coding, memory formation, and memory recall.

Postdoctoral Research, 2008-2015
Johns Hopkins University
Research Adviser: Dr. David J. Foster

- Studied the circuit-level mechanisms involved in memory encoding following experience and memory recall for use in guiding future behavior.
- Expanded *in vivo* electrophysiological recording techniques to enable simultaneous recording from over 250 neurons during free behavior in rats.
- Explored the role of hippocampal reactivation (*a.k.a.*, 'replay') in spatial memory and goal-directed navigation, demonstrating that reactivation can be used to guide subsequent navigational choice.
- Examined the effects of reward/salience on hippocampal reactivation during both the awake state and subsequent sleep.
- Examined hippocampal function in a mouse model of Fragile X syndrome to better understand the circuit-level changes that occur in this disease and to establish a foundation to explore similar questions in other disease models.

Doctoral Research, 2003-2008
University of Texas Southwestern Medical Center
Research Adviser: Dr. Kimberly M. Huber

- Investigated the synaptic mechanisms underlying Fragile X syndrome, discovering that the Fragile X mental

retardation protein, along with the transcription factor MEF2, plays a key role in synaptic development and pruning.

• Examined protein-synthesis-dependent synaptic plasticity, elucidating molecular mechanisms of metabotropic glutamate receptor- and muscarinic acetylcholine-dependent long-term depression and how these forms of synaptic plasticity may be altered in Fragile X syndrome.

• Explored the role of brain-specific cholesterol metabolism in synaptic plasticity.

Research Technician, 1999-2003
Southwest Foundation for Biomedical Research
Research Adviser: Dr. Robert E. Lanford

• Investigated mechanisms of GBV-B (a primate-specific form of Hepatitis C) infection and replication in cell culture and primary tamarin tissue.

• Provided technical support for several hepatitis research projects.

Research Interests

Scientific Questions

- How are experiences (memories) stored in the brain and how are prior experiences used to inform future choices?
- How do circuit-level activity patterns contribute to acquisition and recall of memory?
- How does the hippocampus in particular represent spatial and episodic information?
- How does the hippocampus communicate with 'upstream' and 'downstream' brain regions to receive and transmit information?
- What role does circuit-level reactivation of hippocampal neurons (a.k.a., 'replay') play in memory and imagining?
- What is the mechanism underlying sleep-based consolidation of memory?

Research Techniques

- High-density *in-vivo* extracellular electrophysiology in awake, freely behaving rodents
- Behavioral training and testing in rodents
- Whole-cell and extracellular electrophysiology in acute neuronal slices or cultured neurons

Awards and Honors

2013	Invited Speaker, S.P.I.N.E.S. Seminar Series, N.Y.U.
2012	Greater Baltimore Society for Neuroscience, Poster Presentation, 2nd place
2011	Johns Hopkins Neuroscience Department Retreat, Best Postdoctoral Poster Presentation
2011	Johns Hopkins Postdoctoral Association, Poster Presentation Honorable Mention
2010	Johns Hopkins Neuroscience Department Retreat, Best Postdoctoral Poster Presentation
2005	Graduate Student Organization (GSO) Poster Presentation Travel Award
2005	Sigma Xi Abstract Award
2004	Sigma Xi Abstract Award

Funding

2015-	Southwestern Medical Foundation Scholar in Biomedical Research
2005-2007	Ruth L. Kirschstein Pre-Doctoral National Research Service Award (NRSA 1F31NS050992)
2004-2005	Cell and Molecular Biology Training Program Grant Award Member (5T32GM008203)

Publications and Presentations

Publications:

Pfeiffer BE, Foster DJ. Discovering the brain's cognitive map. *JAMA Neurol*. (2015).

Pfeiffer BE, Foster DJ. Hippocampal place-cell sequences depict future paths to remembered goals. *Nature*.

497(7447). 74-79 (2013).

Pfeiffer BE, Zang T, Wilkerson JR, Taniguchi M, Maksimova MA, Smith LN, Cowan CW, Huber KM. Fragile X mental retardation protein is required for synapse elimination by the activity-dependent transcription factor MEF2. *Neuron*. 66(2). 191-197 (2010).

Pfeiffer BE, Huber KM. The state of synapses in fragile X syndrome. *Neuroscientist*. 15(5). 549-67 (2009).

Waung MW, **Pfeiffer BE**, Nosyreva ED, Ronesi JA, Huber KM. Rapid translation of Arc/Arg3.1 selectively mediates mGluR-dependent LTD through persistent increases in AMPAR endocytosis rate. *Neuron*. 59(1). 84-97 (2008).

Volk LJ, **Pfeiffer BE**, Gibson JR, Huber KM. Multiple Gq-coupled receptors converge on a common protein synthesis-dependent long-term depression that is affected in fragile X syndrome mental retardation. *J Neurosci*. 27(43). 11624-11634 (2007).

Pfeiffer BE, Huber KM. Fragile X mental retardation protein induces synapse loss through acute postsynaptic translational regulation. *J Neurosci*. 27(12). 3120-3130 (2007).

Pfeiffer BE, Huber KM. Current advances in local protein synthesis and synaptic plasticity. *J Neurosci*. 26(27). 7147-7150 (2006).

Kotti TJ, Ramirez DM, **Pfeiffer BE**, Huber KM, Russell DW. Brain cholesterol turnover required for geranylgeraniol production and learning in mice. *PNAS*. 103(10). 3869-3874 (2006).

Lanford RE, Guerra B, Lee H, Averett DR, **Pfeiffer B**, Chavez D, Notvall L, Bigger C. Antiviral effect and virus-host interactions in response to alpha interferon, gamma interferon, poly(i)-poly(c), tumor necrosis factor alpha, and ribavirin in hepatitis C virus subgenomic replicons. *J Virol*. 77(2). 1092-1104 (2003).

Presentations/Abstracts

Pfeiffer BE, Foster DJ. Hippocampal place-cell sequences depict future paths to remembered goals. 2013 invited speaker for S.P.I.N.E.S. seminar series at N.Y.U.

Pfeiffer BE, Foster DJ. Place-cell sequences depict behaviorally relevant trajectories during sleep. Poster presentation at 2013 *Society for Neuroscience* meeting.

Pfeiffer BE, Foster DJ. Selective retrieval of neuronal sequences reflecting paths to a remembered goal during a spatial memory task. Poster presentation at 2012 *Society for Neuroscience* meeting.

Feng T, Silva D, **Pfeiffer BE**, Foster DJ. Rapid development of hippocampal theta sequences with experience. Poster presentation at 2011 *Society for Neuroscience* meeting.

Foster DJ, **Pfeiffer BE**, Ambrose E. Hippocampal replay during an open field spatial task. Poster presentation at 2011 *Society for Neuroscience* meeting.

Pfeiffer BE, Foster DJ. Hippocampal replay expresses multiple behavioral aspects of experience. Poster presentation at 2011 *Johns Hopkins Postdoctoral Association* postdoctoral symposium.

Wilkerson J, **Pfeiffer B**, Zang T, Taniguchi M, Cowan C, Huber KM. Fragile X mental retardation protein is required for reguilation of synapse number by the activity-dependent transcription factor MEF2. Poster presentation at 2009 *Society for Neuroscience* meeting.

Pfeiffer BE, Huber KM. FMRP phosphorylation status regulates synapse number and dendritic protein levels. Poster presentation at 2007 *Society for Neuroscience* meeting.

Waung M, Nosyreva, E, **Pfeiffer BE**, Huber KM. Rapid translation of Arc by Group 1 mGluRs contributes to persistent increases in AMPAR endocytosis. Poster presentation at 2007 *Society for Neuroscience* meeting.

Pfeiffer BE, Darnell JC, Darnell RB, Huber KM. Effects of acute expression of fragile X mental retardation protein (FMRP) on synaptic function. Poster/abstract presentation at 2005 *UT Southwestern Graduate Student Organization (GSO)/Sigma Xi Poster/Abstract Competition*.

Pfeiffer BE, Darnell JC, Darnell RB, Huber KM. Effects of acute expression of fragile X mental retardation protein (FMRP) on synaptic function. Poster presentation at 2005 *Society for Neuroscience* meeting.

Pfeiffer BE, Darnell JC, Darnell RB, Huber KM. Effects of acute expression of fragile X mental retardation

protein (FMRP) on synaptic function. Poster/abstract presentation at 2004 *UT Southwestern Graduate Student Organization (GSO)/Sigma Xi Poster/Abstract Competition*.

Pfeiffer BE, Darnell JC, Huber KM. Effects of acute overexpression of fragile X mental retardation protein (FMRP) on synaptic function. Poster presentation at 2004 *Society for Neuroscience* meeting.