

Shantanu P. Jadhav, Ph.D.

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CURRENT POSITION

2014-present **Brandeis University**

Assistant Professor, Department of Psychology and Neuroscience Program
Volen National Center for Complex Systems
Sloan-Swartz Center for Theoretical Neuroscience

EDUCATION AND TRAINING

2009-2014 **University of California, San Francisco (UCSF)**

Postdoctoral Fellow, Neuroscience
Advisor: Dr. Loren Frank

2008-2009 **University of California, Berkeley**

Postdoctoral Fellow, Neuroscience
Advisor: Dr. Daniel Feldman

2003-2008 **University of California, San Diego (UCSD)**

Ph.D., Biology (Computational Neurobiology)
Advisor: Dr. Daniel Feldman

2002-2003 **National Center for Biological Science (NCBS), India**

Junior Research Fellow
Advisor: Dr. Sumantra Chattarji

1998-2002 **Indian Institute of Technology (IIT), Bombay, India**

Bachelor of Technology (B. Tech), Engineering Physics

GRANTS, HONORS AND AWARDS

GRANTS

2019-2024 **NIH NIMH R01 Award**

2017-2022 **NIH NIMH R01 Award**

2014-2017 **NIH NIMH R00 Pathway to Independence Award**

2013-2014 **NIH NIMH K99 Pathway to Independence Award**

HONORS AND AWARDS

2019-2022 **Smith Foundation Odyssey Award**

2016-2020 **Whitehall Foundation Research Grant Award**

2016-2018 **NARSAD Young Investigator, Brain & Behavior Foundation**

2015-2017 **Alfred P. Sloan Research Fellowship in Neuroscience, Alfred P. Sloan Foundation**

- 2013 **Peter and Patricia Gruber International Research Award**, Society for Neuroscience (SFN)
- 2013 **Wellcome Trust/ DBT India Alliance** Intermediate Fellowship (declined)
- 2012 **COSYNE Presenter's Travel Award**, Gatsby Foundation, Cosyne 2012
- 2009 **Wheeler Center Grant**, UCSF
- 2006–2007 **La Jolla Interfaces In Science Pre-Doctoral Award** (Burroughs-Wellcome Fund), UCSD
- 2005 **Advanced Course in Computational Neuroscience**, IBRO/FENS, Arcachon, France
- 2003–2005 **NSF-IGERT Training Grant**, Computational Neurobiology Program, UCSD
- 2004 **Ray Thomas Edwards Graduate Student Travel Award**, UCSD
- 2003 Offered **Hopfield fellowship**, California Institute of Technology (declined)
- 2003 Offered **Presidential Fellowship**, Duke University (declined)
- 2002–2003 **Junior Research Fellow**, National Center for Biological Sciences, Bangalore, India
- 2001 **Undergraduate Research Program** Fellowship, Cold Spring Harbor Laboratory, NY
- 2000 **Visiting Students Research Fellowship**, Tata Institute of Fundamental Research, India

PUBLICATIONS (Peer-reviewed journal articles – reverse chronological order)

1. Tang W, Shin JD, **Jadhav SP** (2021), “Multiple time-scales of decision making in the hippocampus and prefrontal cortex”, ***eLife***, 10:e66227, doi: 10.7554/eLife.66227.
2. Herzog LE, Katz DB, **Jadhav SP** (2020), “Refinement and reactivation of a taste-responsive hippocampal network”, ***Current Biology***, 30:1306-1311, doi: <https://doi.org/10.1016/j.cub.2020.01.063>.
3. Zielinski MC, Tang W, **Jadhav SP** (2020), “The role of replay and theta sequences in mediating hippocampal-prefrontal interactions for memory and cognition”, ***Hippocampus***, 30(1):60-72, doi: 10.1002/hipo.22821 (Peer-reviewed review article, Special Issue of *Hippocampus*).
4. Shin JD, Tang W, **Jadhav SP** (2019), “Dynamics of awake hippocampal-prefrontal replay for spatial learning and memory-guided decision making”, ***Neuron***, 104(6):1110-1125, doi: <https://doi.org/10.1016/j.neuron.2019.09.012>.
5. Zielinski MC, Shin JD, **Jadhav SP** (2019), “Coherent coding of spatial position mediated by theta oscillations in the hippocampus and prefrontal cortex”, ***Journal of Neuroscience***, 39(23):4550-4565; doi: 10.1523/JNEUROSCI.0106-19.2019.
6. Herzog LE, Pascual LM, Scott SJ, Mathieson ER, Katz DB, **Jadhav SP** (2019), “Interaction of taste and place coding in the hippocampus”, ***Journal of Neuroscience***, 39(16):3057-3069; doi: 10.1523/JNEUROSCI.2478-18.2019.
7. Tang W, **Jadhav SP** (2019), “Sharp-wave ripples as a signature of hippocampal-prefrontal reactivation for memory during sleep and waking states”, ***Neurobiology of Learning and Memory***, 160:11-20; doi: 10.1016/j.nlm.2018.01.002 (Peer-reviewed review article).
8. Maharjan DM, Dai Y, Glantz EH, **Jadhav SP** (2018), “Disruption of dorsal hippocampal-prefrontal interactions using chemogenetic inactivation impairs spatial learning”, ***Neurobiology of Learning and Memory***, 155(1):351-360
9. Tang W, Shin JD, Frank LM, **Jadhav SP** (2017), “Hippocampal-prefrontal reactivation during learning is stronger in awake compared with sleep states”, ***Journal of Neuroscience***, 37(49): 11789-11805.

10. Papale AE, Zielinski MC, Frank, LM, **Jadhav SP**, Redish AD (2016), "Interplay between hippocampal sharp-wave ripple events and vicarious trial and error behaviors in decision making", ***Neuron***, 92:975-982.
11. Shin JD and **Jadhav SP** (2016), "Multiple modes of hippocampal-prefrontal interactions in memory-guided behavior", ***Current Opinion in Neurobiology***, 40:161-169 (Peer-reviewed review article).
12. **Jadhav SP***, Rothschild G*, Roumis DR, Frank LM (2016), "Coordinated excitation and inhibition of prefrontal ensembles during awake hippocampal sharp-wave ripple events", ***Neuron***, 90(1):113-127.
13. Felix SH, Shah KG, Tolosa VM, Sheth HJ, Tooker AC, Delima TL, **Jadhav SP**, Frank LM, Pannu SS (2013), "Insertion of Flexible Neural Probes Using Rigid Stiffeners Attached with Biodissolvable Adhesive", ***Journal of Visualized Experiments***, (79):e50609.
14. **Jadhav SP**, Kemere C, German PW, Frank LM (2012), "Awake hippocampal sharp-wave ripples support spatial memory", ***Science***, 336(6087): 1454-1458.
15. Morita T, Kang H, Wolfe J, **Jadhav SP**, Feldman DE (2011), "Psychometric curve and behavioral strategies for whisker-based texture discrimination in rats", ***PLoS One***, 6(6): e20437.
16. Carr MF*, **Jadhav SP***, Frank LM (2011), "Hippocampal replay in the awake state: a potential substrate for memory consolidation and retrieval", ***Nature Neuroscience***, 14(2):147-153. (*Equal author contribution, Peer-reviewed review article).
17. **Jadhav SP**, Feldman DE (2010), "Texture coding in the whisker system", ***Current Opinion in Neurobiology***, 20(3):313-318. (Peer-reviewed review article).
18. Li L*, Bender KJ*, Drew PJ, **Jadhav SP**, Sylwestrak E, Feldman DE (2009), "Endocannabinoid signaling is required for development and critical period plasticity of the whisker map in somatosensory cortex", ***Neuron***, 64(4):537-549.
19. **Jadhav SP**, Wolfe J, Feldman DE (2009), "Sparse temporal coding of elementary tactile features during active whisker sensation", ***Nature Neuroscience***, 12(6):792-800.
20. Gabernet L, **Jadhav SP**, Feldman DE, Carandini M, Scanziani M (2005), "Somatosensory integration controlled by dynamic thalamocortical feed-forward inhibition", ***Neuron***, 48(2):315-327.
21. Vyas A*, **Jadhav S***, Chattarji S (2006), "Prolonged chronic stress induces amygdaloid neuronal hypertrophy and enhanced anxiety-like behavior", ***Neuroscience***, 143(2):387-393. (*Equal author contribution).
22. Mitra R, **Jadhav S**, McEwen BS, Vyas A, Chattarji S (2005), "Stress duration modulates the spatiotemporal patterns of spine formation in the basolateral amygdala", ***PNAS***, 102(26):9371-9376.

PREPRINTS

1. Symanski CA, Bladon J, Kullberg E, **Jadhav SP** (2021), "Neural coordination mechanisms for associative memory recall and decision making in the hippocampal-prefrontal network", *bioRxiv*, doi: <https://doi.org/10.1101/2020.06.08.140939> (currently *In Review*).
2. Sarmashghi M, **Jadhav SP**, Eden U (2020), "Efficient spline regression for neural spiking data", *bioRxiv*, doi: <https://doi.org/10.1101/2020.09.01.276105>.

BOOK CHAPTERS AND PREVIEWS

1. Tang W, **Jadhav SP** (2018), “Conducting the Neural Symphony of Memory Replay”, *Neuron*, 100: 1016-1019 (Preview).
2. **Jadhav SP**, Frank LM (2014), “Memory replay in the hippocampus”, *Space, Time and Memory in the Hippocampal Formation* (Ed: D. Derdikman, J. Knierim). Springer Publishers.
3. **Jadhav SP**, Frank LM (2009), “Reactivating Memories for Consolidation”, *Neuron*, 62: 745-746 (Preview).

SERVICE AS REVIEWER

- 2012 – Ad hoc Manuscript Reviewer for Research Journals: *Science*, *eLife*, *Nature Neuroscience*, *Journal of Neuroscience*, *Nature Communications*, *Cell Reports*, *Hippocampus*, *Current Opinion in Neurobiology*, *Scientific Reports*, *Neurobiology of Learning and Memory*, *Behavioral Neuroscience*, *Journal of Neurophysiology*, *Trends in Cognitive Science*, *Progress in Neurobiology*, *Proceedings of the National Academy of Sciences (PNAS)*, *Biological Cybernetics*, *Frontiers* (Review Editor)
- 2015 – Reviewer for Grant and Fellowship Panels: *Wellcome Trust*, *European Research Council (ERC)*, *Biotechnology and Biological Sciences Research Council (BBSRC) UK*, *French National Research Agency (ANR)*, *German Research Foundation (DFG)*, *COSYNE Meeting*, *Neurological Foundation of New Zealand*, *Medical Research Council – University of Oxford UK*, *University of Nottingham UK*
- 2018 – Reviewer for NIH: ad hoc member, *Neurobiology of Learning and Memory Study Section* (2018, 2020); *Neurobiology of Learning, Memory and Decision Making Study Section* (2021); *Brain Initiative F32 Postdoctoral Training Grants* (2018, 2019)

TEACHING EXPERIENCE

- 2018, 2021 Advanced Data Analysis, Brandeis University
- 2017, 2019 Memory and the Brain, Brandeis University
- 2016, 2020 Systems Neuroscience, Brandeis University
- 2015 Neuroscience Proseminar, Brandeis University

MENTORING EXPERIENCE

- 2015 – Advisor for 7 Ph.D. students, 4 postdoctoral researchers, 5 Master’s students, and 16 undergraduate research assistants at Brandeis University.

CONFERENCE ABSTRACTS

1. Tang W, Shin JD and **Jadhav SP** (2019), “Dynamics of awake hippocampal-prefrontal replay for spatial learning and memory-guided decision making”, *Society for Neuroscience*, 335.26.
2. Shin JD, Tang W and **Jadhav SP** (2019), “Ontogeny of coordinated representations in the hippocampal-prefrontal network during spatial learning”, *Society for Neuroscience*, 335.27.
3. Symanski CA, Kullberg E and **Jadhav SP** (2019), “Odor-place associative memory in the hippocampal-prefrontal network”, *Society for Neuroscience*, 335.25.

4. Tang W, Shin JD and **Jadhav SP** (2019), "Hippocampal-prefrontal replay mediates retrospection and prospection for spatial choice learning", *Conference on Learning and Memory, UT Austin*.
5. Shin JD, Tang W and **Jadhav SP** (2019), "Ontogeny of representations in hippocampal-prefrontal networks for spatial learning", *Conference on Learning and Memory, UT Austin* (Best poster award).
6. Shin JD, Tang W and **Jadhav SP** (2018), "Development of hippocampal-prefrontal representations in parallel with behavioral learning", *Society for Neuroscience*, 424.07.
7. Tang W, Shin JD and **Jadhav SP** (2018), "Learning-associated changes in awake replay content in the hippocampal-prefrontal network", *Society for Neuroscience*, 424.06.
8. Young RY, Shin JD and **Jadhav SP** (2018), "Dual phase-locking in the hippocampal-prefrontal network", *Society for Neuroscience*, 424.05.
9. Zielinski MC, Shin JD and **Jadhav SP** (2018), "Hippocampal theta supports distinct prefrontal representations on a behavioral timescale", *Society for Neuroscience*, 424.03.
10. Symanski CA, Kullberg E and **Jadhav SP** (2018), "Odor-place associative memory in the hippocampal-prefrontal network", *Society for Neuroscience*, 424.02.
11. Herzog LE, Pascual L, Katz DB and **Jadhav SP** (2018), "Interactions of taste and place coding in the hippocampus", *Society for Neuroscience*, 424.01.
12. Nanu R, Lin C, Katz DB, **Jadhav SP**, Pi H and Lisman J (2018), "Investigating thalamic contributions to abnormal hippocampal oscillatory activity in a mouse model of schizophrenia", *Society for Neuroscience*, 424.04.
13. Tang W, Shin JD, Frank LM and **Jadhav SP** (2017), "Hippocampal-prefrontal reactivation during awake and sleep sharp-wave ripple events", *Society for Neuroscience*, 166.06.
14. Tang W, Shin JD, Frank LM and **Jadhav SP** (2017), "Coordination in the hippocampal-prefrontal network during awake and sleep sharp wave ripple events", *Computational and Systems Neuroscience Meeting*.
15. Maharjan DM, Glantz EH, Dai Y, **Jadhav SP** (2016), "Contralateral inactivation of the dorsal hippocampus and prefrontal cortex using DREADDs impairs spatial learning", *Society for Neuroscience*, 554.13.
16. Zielinski MC, Papale AE, Redish AD, Frank LM, **Jadhav SP** (2015), "Disrupting awake sharp-wave ripples increases vicarious trial and error behavior", *Society for Neuroscience*. 86.07.
17. Papale AE, Zielinski MC, Frank LM, **Jadhav SP**, Redish AD (2015), "Sequential activity during theta and sharp wave ripples supports flexible decision making", *Society for Neuroscience*. 86.04.
18. **Jadhav SP**, Rothschild G, Roumis DK, Grossrubatscher I, Frank LM (2014), "Coordinated awake reactivation of behaviorally related hippocampal-prefrontal ensembles", *Society for Neuroscience*. 93.06.
19. **Jadhav SP**, Frank LM (2013), "Multiple modes of hippocampal-prefrontal interactions during learning", *Society for Neuroscience*. 95.10.
20. **Jadhav SP**, Kemere C, German PW, Frank LM (2012), "Awake hippocampal sharp-wave ripples support spatial working memory", *Computational and Systems Neuroscience Meeting*, T17 (Invited talk).
21. **Jadhav SP**, Kemere C, German PW, Frank LM (2011), "Selective disruption of awake sharp-wave ripples impairs learning in a spatial working memory task", *Society for Neuroscience*. 731.22.
22. **Jadhav SP**, Wolfe J, Feldman DE (2008), "Sparse ensemble coding of slip-stick whisker motion events in somatosensory cortex during voluntary whisking on surfaces", *Society for Neuroscience*. 775.23.
23. **Jadhav SP**, Gabernet L, Feldman DE, Carandini M, Scanziani M (2004), "Controlling thalamo-cortical integration with dynamic feed-forward inhibitory circuits", *Society for Neuroscience*. 509.13.

INVITED TALKS

Sep 2020 Behavioral Neuroscience Seminar, University of Delaware, DE
 Jan 2020 Winter Conference on Neurobiology of Learning and Memory, Utah
 Dec 2019 Wellesley College, Wellesley, MA
 Nov 2019 Bridging the Two Cultures, Brandeis University
 Jun 2019 Spring Hippocampal Research Conference, Taormina, Sicily
 May 2019 Yale University School of Medicine, New Haven, CT
 Jan 2019 Winter Conference on Neurobiology of Learning and Memory, Utah
 Apr 2018 Learning and Memory Conference, UC Irvine
 Feb 2018 IISER Pune, India
 Jan 2018 Rice University and Baylor College of Medicine, Houston, TX
 Sep 2017 Max Planck Institute for Brain Research, Frankfurt, Germany
 Sep 2017 Heidelberg Neuronal Ensemble Conference, Heidelberg, Germany
 Jun 2017 Spring Hippocampal Research Conference, Taormina, Sicily
 Feb 2017 Winter Conference on Brain Research (WCBR), Montana
 Jan 2017 University of Chicago, Neuro Club
 Nov 2016 Interdisciplinary Neuroscience Program Colloquium, University of Rhode Island
 May 2016 Psychological and Brain Sciences, Dartmouth University
 Dec 2014 Center for Interdisciplinary Research in Complex Systems, Northeastern University
 Mar 2014 Department of Anatomy & Neurobiology, UC Irvine
 Feb 2014 Boston Children's Hospital, Harvard University
 Feb 2014 Department of Psychiatry, UT SouthWestern
 Feb 2014 Department of Anatomy & Neurobiology, Washington University
 Feb 2014 Department of Psychology, University of Chicago
 Jan 2014 Department of Biology, Boston University
 Jan 2014 Psychology & Neuroscience, Brandeis University
 Dec 2013 Department of Psychology, Rutgers University
 Nov 2013 Department of Psychology, University of Michigan
 Nov 2013 Department of Psychology, University of Washington, Seattle
 Apr 2013 National Center for Biological Sciences (NCBS), India
 Mar 2013 Institute of Neuroscience, University of Oregon
 Feb 2013 Janelia Farms Research Institute, HHMI
 Jan 2013 Princeton Neuroscience Institute, Princeton University
 Jan 2013 Department of Neurobiology, Northwestern University
 Dec 2012 Brain and Cognitive Science, Rochester University
 Nov 2012 National Institute of Health (NIH)
 Feb 2012 Computational and Systems Neuroscience Meeting (COSYNE) 2012