BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Matthew Alden Wilson	Professor
eRA COMMONS USER NAME (credential, e.g., agency login)	
mwilson2	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Rensselaer Polytechnic Institute, Troy NY	BS	5/83	Electrical Engineering
University of Wisconsin, Madison WI	MS	5/86	Electrical Engineering
California Institute of Technology, Pasadena CA	Ph.D	5/91	Computation Neural Systems
University of Arizona, Tucson AZ	postdoctoral	5/94	Behavioral Neurophysiology

A. Personal Statement

With a background in Electrical Engineering, Dr. Wilson pioneered the application of large-scale multiple electrode microarray implants for monitoring ensemble activity in the freely behaving rodent during awake and sleep states. Using these approaches he was the first to demonstrate the coordinated reactivation of memory patterns during sleep in the hippocampus and has continued to pursue the role of sleep in memory processing, and the study of sleep-regulation of brain systems. His studies have led to the development of analytical methods for characterization of both the content and the temporal linkage of high-dimensional neuronal ensemble patterns, as well as the structure and coordination of EEG activity across brain regions. He has experience in the application of electrical stimulation and the use of targeted genetic manipulations of hippocampal function in the study of neuronal systems and behavior.

B. Positions and Honors

1990	National Science Foundation Research Associate in Computational Neuroscience
1991-1993	Research Associate, University of Arizona, Department of Psychology
1993-1994	Adjunct Assistant Professor, University of Arizona, Department of Psychology
1994-1999	Assistant Professor of Brain and Cognitive Sciences and Biology, MIT
1994-1996	Alfred P. Sloan Research Fellow
1995-1998	Edward J. Poitras Assistant Professorship for Career Development
1996-1997	John Merck Scholars Award
1996-1999	Office of Naval Research Young Investigator
1997	Middleton Neurosciences Award
1999	Adjunct Laboratory Head, RIKEN, Tokyo Japan
1999-2004	Associate Professor, Department of Brain and Cognitive Sciences, MIT
2004	Professor, Department of Brain and Cognitive Sciences, MIT
2008	Sherman Fairchild Professorship
2008-2012	Associate Department Head for Education, Department of Brain and Cognitive Sciences, MIT
2010-present	Associate Director, Picower Institute for Learning and Memory, MIT
2011	Fellow, American Association for the Advancement of Science
2012	Fellow, American Academy of Arts and Sciences
2013	Associate Director, NSF Center for Brains, Minds, and Machines, MIT

C. Selected peer-reviewed publications (in chronological order)

1. **Wilson, MA**, and McNaughton, BL, "Reactivation of hippocampal ensemble memories during sleep," *Science*, 65:676-679, 1994. PMID: 8036517. Summary: the first demonstration of structured neuronal ensemble activity during sleep that reflected memory recent behavioral experience.

2. McHugh,TJ, Blum, KE, Tsien, JZ, Tonegawa, S, **Wilson, MA**, "Impaired hippocampal representation of space in CA1-specific NMDAR1 knockout mice," *Cell* 87:1339-1349, 1996. PMID: 8980239. Summary: the first demonstration of tissue-specific genetic manipulations combined with neuronal ensemble recording revealing the potential relationship between neuronal representations of space and mechanisms of synaptic plasticity.

3. Siapas, AG and **Wilson, MA**, "Coordinated Interactions between Hippocampal Ripples and Cortical Spindles during Slow-Wave Sleep", *Neuron*, 21:1123-1128, 1998. Summary: the first demonstration of coordination of sleep-related activity in the hippocampus and neocortex at the population and EEG level.

4. Louie, K, **Wilson, MA**, "Temporally structured replay of awake hippocampal ensemble activity during rapid eye movement sleep", *Neuron*, 29:145-156, 2001. PMID: 11182087. Summary: the first demonstration of hippocampal memory reactivation during REM sleep.

5. Lee, AK, **Wilson, MA**, "Memory of Sequential Experience in the Hippocampus During Slow Wave Sleep", *Neuron*, 36:1183-1194, 2002. PMID: 12495631. Summary: the first characterization of the sequential structure of hippocampal memory reactivation during slow wave sleep.

6. Foster, DJ, **Wilson, MA**, "Reverse replay of behavioural sequences in hippocampal place cells during the awake state.", *Nature*, 440(7084):680-3. Epub Feb. 12, 2006. PMID: 16474382. Summary: the first demonstration of hippocampal memory reactivation during the quiet wakeful state, and the ability of reactivated memory sequences to be expressed in time-reversed form.

7. Ji, D, **Wilson, MA**, "Coordinated memory replay in the visual cortex and hippocampus during sleep", *Nature Neuroscience*, 10:100-107, 2007. PMID: 17173043. Summary: the first demonstration of coordination of sequence memory reactivation between the hippocampus and visual cortex.

8. Davidson, TJ, Kloosterman, F, **Wilson, MA**, "Hippocampal replay of extended experience", *Neuron*, 63:497-507, 2009. PMID: 19709631. Summary: development of analytical methods for Bayesian reconstruction of neuronal ensemble activity and application to the study of memory reactivation during quiet-wakefulness and sleep.

9. Ego-Stengel, V., **Wilson, MA**, "Disruption of ripple-associated hippocampal activity during rest impairs spatial learning in the rat.", *Hippocampus*, 20:1-10. Epub 2009 Oct 8. PMID: 19816984. Summary: demonstration of the use of electrical stimulation to disrupt neuronal activity during sleep in order to demonstrate the role of ripple-associated activity in selective memory processing that could influence subsequent behavior.

10. Nguyen, DP, **Wilson, MA**, Brown, EN, Barbieri, R. Measuring instantaneous frequency of local field potential oscillations using the Kalman smoother. J Neurosci Methods. 2009 Nov 15;184(2):365-74. Epub 2009 Aug 21.PMID: 19699763. Summary: develop an algorithm for characterizing non-stationary rhythms with high temporal and spectral resolution for the quantification of small timescale local field potential dynamics.

11. Vijayan, S, Hale, GJ, Moore, CI, Brown, EN, **Wilson, MA**, "Activity in the Barrel Cortex During Active Behavior and Sleep", *J. Neurophys*. Feb. 17, 2010. PMID:20164403 PMCID: PMC2853270. Summary: Characterization and comparison of neuronal ensemble and EEG activity in the hippocampus and neocortex during sleep and anesthesia.

12. Bendor, D, **Wilson, MA**, "Biasing the content of hippocampal replay during sleep", *Nature Neuroscience*, Epub Sept 2, 2012. PMID: 2294111. Summary: Demonstration that sleep replay can be manipulated by external stimulation providing further evidence for the role of hippocampal replay in memory consolidation.

13. Suh J, Foster DJ, Davoudi H, **Wilson MA**, Tonegawa S. Impaired hippocampal ripple-associated replay in a mouse model of schizophrenia. Neuron. 2013 Oct 16;80(2):484-93 PMID: 24139046. Summary: Calcineurin knockout (KO) mice exhibited changes in EEG that may contribute to the cognitive impairments in schizophrenia.