

Timothy J. Buschman

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Education

- 2008 **Massachusetts Institute of Technology**
 Ph.D. in Neuroscience under the supervision of Dr. Earl K. Miller
- 2001 **California Institute of Technology**
 B.S. in Biology

Current Positions

- 2013- **Princeton University**
 Associate Professor, Princeton Neuroscience Institute and Department of Psychology
- 2013-2022 **Princeton University**
 Assistant Professor, Princeton Neuroscience Institute and Department of Psychology

Past Positions

- 2010-2013 **Massachusetts Institute of Technology**
 Postdoctoral Fellow with Dr. Christopher I. Moore
- 2011-2013 **Massachusetts Institute of Technology**
 Postdoctoral Fellow with Dr. Ed Boyden
- 2008-2010 **Massachusetts Institute of Technology**
 Postdoctoral Associate with Dr. Earl K. Miller
- 2002-2008 **Massachusetts Institute of Technology**
 Graduate Student with Dr. Earl K. Miller
- 2001-2002 **National Institute of Mental Health, Laboratory of Neurophysiology**
 Postbaccalaureate Intramural Research Training Award (IRTA) under the supervision of
 Drs. Robert Desimone, Pascal Fries and Elizabeth Buffalo.
- 2000-2001 **California Institute of Technology**
 Undergraduate research under the supervision of Dr. Christof Koch.
- 1994-1999 **Walter Reed Army Institute of Research**
 Research assistant under the supervision of Dr. Victor W. Macdonald.

Committees, Advisory Boards, and Other Professional Positions

- 2014- Chair of Scientific Advisory Board, SplitSage. Commercial development of technologies
 taking advantage of discovery of independent cognitive capacities in the brain.
- 2010-2013 Consultant, BBN Technologies. Consulted on neurally-plausible, brain-based computational
 architectures for 'sense-making' of satellite imagery.
- 2019- Cognitive Neuroscience Society, Poster Committee Member
- 2020- Reviewing Editor, Frontiers in Decision Neuroscience
- 2020- Consulting Editor, Journal of Cognitive Neuroscience

Professional Societies

- 2002- **Society for Neuroscience**
- 2008- **Faculty of 1000**

Editorial Activities

Ad hoc Editor for: eLife, PLoS Computational Biology

Ad hoc Reviewer for: Nature, Science, Cell, Neuron, Nature Neuroscience, eLife, PNAS, Current Biology, Cerebral Cortex, Nature Communications, Scientific Reports, Journal of Neuroscience, Journal of Experimental Psychology: General, Journal of Cognitive Neuroscience, Journal of Neurophysiology, Trends in Cognitive Sciences, Trends in Neurosciences, Frontiers in Human Neuroscience, Frontiers in Neural Circuits, Biological Reviews, Biological Cybernetics, Experimental Neurology, Computational and Systems Neuroscience (COSYNE) Meeting (2012, 2013, 2014, 2015, 2016), Cognitive Computational Neuroscience (CCN) Meeting (2017, 2018), Cognitive Neuroscience Society (2019, 2020)

Awards, Honors and Prizes

- 2014 **Awarded NIH Director's "New Innovator" Award**
- 2010 **Awarded K99/R00, Pathway to Independence Award by National Institute of Mental Health**
NIMH/1 K99 MH092715-01 – Pathway to Independence Award
- 2009 **Buschman and Miller, *Science*, 2007 designated a Hot Paper by Thompson ISI**
Designation was highlighted in *The Scientist* - <http://www.the-scientist.com/2009/10/1/57/1/>
- 2004 **Team Award for Outstanding Teaching**
For teaching in Undergraduate Brain Lab in the department of Brain and Cognitive Science, MIT
- 1997 **FEEA/Blue Cross Blue Shield Special Distinction Scholarship**
Assistance with undergraduate tuition; awarded for research at Walter Reed Army Institute of Research.

Patents

- 2016 Earl Keith Miller, **Timothy Joseph Buschman**, and Simon John Kornblith. *Dynamic Display System And Method For Customizing A Controller In A Display System*. US Patent approved; filed August 17, 2016. Describes a method for using neurophysiological signals to determine an individual's cognitive capacity. This can be used to improve performance on a variety of different tasks.
- 2014 **Timothy Joseph Buschman**, 2014. *Adaptive Cognitive Prosthetic and Applications Thereof*. EU Patent
EP3203904A1; US Patent approved; filed October 7, 2014. Describes a method for constructing a cognitive prosthetic for alleviating various neurological and/or neuropsychiatric disorders. In particular, we describe an adaptive cognitive prosthetics capable of learning to replace or augment function lost by a damaged or diseased brain region.
- 2011 Earl Keith Miller and **Timothy Joseph Buschman**. 2011. *Method And Apparatus Accounting for Independent Cognitive Capacities in the Right vs. Left Half of Vision*. U.S. Patent 9927940; filed June 3, 2011, issued March 27, 2018. Method for increasing information processing in visual displays. Based on neurophysiological and psychophysical understanding of our limited capacity to process information in visual displays. Method allows for display systems to dynamically adjust how, when, and where information is presented in order to maximize perceptual processing.

Peer-Reviewed Publications

1. **Top-down versus bottom-up control of attention in the prefrontal and posterior parietal cortices**
Buschman TJ and Miller EK.
Science 2007; 315 (5820): 1860-1862.
2. **Serial, covert shifts of attention during visual search are reflected by the frontal eye fields and correlated with population oscillations**
Buschman TJ and Miller EK.
Neuron 2009; 63 (3): 386-96.
3. **Shifting the spotlight of attention: evidence for discrete computations in cognition**
Buschman TJ and Miller EK.
Frontiers in Human Neuroscience 2010; 4: 194. doi: 10.3389/fnhum.2010.00194
4. **Comparison of primate prefrontal and premotor cortex neuronal activity during visual**
Cromer JA, Roy JE, Buschman TJ and Miller EK
Journal of Cognitive Neuroscience, 2011. 23 (11): 3355-3365. doi:10.1162/jocn_a_00032
5. **Neural substrates of cognitive capacity limitations**
Buschman TJ, Siegel M, Roy JE and Miller EK.
Proceedings of the National Academy of Sciences USA 2011; 108(27): 11252-11255., doi: 10.1073/pnas.1104666108
6. **Laminar differences in gamma and alpha coherence in the ventral stream**
Buffalo E, Fries P, Landman R, Buschman TJ and Desimone R
Proceedings of the National Academy of Sciences USA 2011; 108(27) 11262-11267, doi: 10.1073/pnas.1011284108
7. **Synchronous oscillatory neural ensembles for rules in the prefrontal cortex**
Buschman TJ, Denovellis E, Diogo C, Bullock D, Miller EK
Neuron, 2012; 76 (4): 838-846.
8. **Cortical circuits for the control of attention**
Miller EK and Buschman TJ
Current Opinion in Neurobiology, 2013. 23: 216-222.
9. **PFC Neurons Reflect Categorical Decisions about Ambiguous Stimuli**
Roy JE, Buschman TJ, and Miller EK
Journal of Cognitive Neuroscience, 2014. 26(6): 1283-91.
10. **Working memory capacity: Limits on the bandwidth of cognition**
Miller EK and Buschman TJ
Daedalus, 2014. 144 (1): 112-122.
11. **Goal-direction and top-down control**
Buschman TJ and Miller EK
Philosophical Transactions of the Royal Society B, 2014. 369 (1655): 20130471.
12. **Cortical Information Flow during Flexible Sensorimotor Decisions**
Siegel M, Buschman TJ and Miller EK
Science, 2015. 348 (6241): 1352-1355.

13. **From behavior to neural dynamics: An integrated theory of attention**
Buschman TJ and Kastner S
Neuron, 2015; 88 (1): 127-144.
14. **Gamma and Beta Bursts Underlie Working Memory**
Lundqvist M, Rose J, Herman P, Brincat SL, Buschman TJ, Miller EK
Neuron, 2016; 90 (1): 152-64.
15. **Stimulus Load and Oscillatory Activity in Higher Cortex**
Kornblith S, Buschman TJ, Miller EK
Cerebral Cortex, 2016. 26 (9): 3722-3784.
16. **Working Memory Load Modulates Neuronal Coupling**
Pinotsis DA, Buschman TJ, Miller EK
Cerebral Cortex, 2018; 29 (4): 1670-1681. <https://doi.org/10.1093/cercor/bhy065>
17. **Evidence supporting a role for astrocytes in the regulation of cognitive flexibility and neuronal**
Brockett AT, Kane GA, Monari PK, Briones BA, Vigneron PA, Barber GA, Bermudez A, Dieffenbach U, Kloth AD, Buschman TJ, Gould E
PLoS One, 2018; 13 (4): e0195726. <https://doi.org/10.1371/journal.pone.0195726>
18. **Intrinsic neuronal dynamics predict distinct functional roles during working memory**
Wasmuht DF, Spaak E, Buschman TJ, Miller EK, Stokes MG
Nature Communications, 2018; 9 (1): 3499. <https://doi.org/10.1038/s41467-018-05961-4>
19. **A flexible model of working memory**
Bouchacourt F and Buschman TJ
Neuron, 2019; 103 (1): 147-160. <https://doi.org/10.1016/j.neuron.2019.04.020>
20. **Perineuronal nets, inhibitory interneurons, and anxiety-related ventral hippocampal neuronal oscillations are altered by early life adversity**
Murthy S, Kane GA, Katchur NJ, Lara Mejia PS, Obiofuma G, Buschman TJ, McEwen BS, and Gould E
Biological Psychiatry, 2019; 85 (12): 1011-1020.
<https://doi.org/10.1016/j.biopsych.2019.02.021>
21. **Error-correcting dynamics in visual working memory**
Panichello MF, DePasquale B, Pillow JW, and Buschman TJ
Nature Communications, 2019; 10: 3366. <https://doi.org/10.1038/s41467-019-11298-3>.
22. **Drifting codes within a stable coding scheme for working memory**
Wolff MK, Jochim J, Akyütrk, Buschman TJ, and Stokes MG
PLoS Biology, 2020; <https://doi.org/10.1371/journal.pbio.3000625>
23. **Low-Dimensional Spatio-Temporal Dynamics Underlie Cortex-Wide Neural Activity**
MacDowell CJ and Buschman TJ
Current Biology, 2020. 30: 2665–2680. <https://doi.org/10.1016/j.cub.2020.04.090>
24. **Delay-period activity in frontal, parietal, and occipital cortex tracks different attractor dynamics in visual working memory**
Yu Q, Panichello MF, Postle BR and Buschman TJ
PLoS Biology, 2020. <https://doi.org/10.1371/journal.pbio.3000854>
25. **Learning to Control the Brain through Adaptive Closed-Loop Patterned Stimulation**

Tafazoli S, MacDowell CJ, Che Z, Letai KC, Steinhardt C and **Buschman TJ**
Journal of Neural Engineering, 2020. <https://iopscience.iop.org/article/10.1088/1741-2552/abb860>

26. **Is Activity Silent Working Memory Simply Episodic Memory?**
Beukers AO, **Buschman TJ**, Cohen JD, and Norman K
Trends in Cognitive Sciences, 2021. <https://doi.org/10.1016/j.tics.2021.01.003>
27. **Rotational Dynamics Reduce Interference Between Sensory and Memory Representations**
Libby A and **Buschman TJ**
Nature Neuroscience, 2021. <https://dx.doi.org/10.1038/s41593-021-00821-9>
28. **Shared mechanisms underlie the control of working memory and attention**
Panichello MF and **Buschman TJ**
Nature, 2021. <https://doi.org/10.1038/s41586-021-03390-w>
29. **Balancing Flexibility and Interference in Working Memory**
Buschman TJ
Annual Reviews of Vision Science, 2021. <https://doi.org/10.1146/annurev-vision-100419-104831>.
30. **Perineuronal nets in the dorsomedial striatum contribute to behavioral dysfunction in mouse models of excessive repetitive behavior**
Briones BA, Pitcher MN, Fleming WT, Libby A, Diethorn EJ, Haye AE, MacDowell CJ, Zych AD, Waters RC, **Buschman TJ**, Witten IB, and Gould E
Biological Psychiatry Global Open Science, 2021.
<https://doi.org/10.1016/j.bpsgos.2021.11.005>.
31. **A Goldilocks theory of cognitive control: Balancing precision and efficiency with low-dimensional control states**
MacDowell CJ, Tafazoli S, and **Buschman TJ**
Current Opinion in Neurobiology 76, 102606. 2022.
<https://doi.org/10.1016/j.conb.2022.102606>.
32. **Reduced variability of bursting activity during working memory**
Lundqvist M, Rose J, Warden M, **Buschman TJ**, Herman P, and Miller EK
Scientific Reports. 12 (15050), 2022. <https://doi.org/10.1038/s41598-022-18577-y>.
33. **Neural signature of flexible coding in prefrontal cortex**
Bocincova A, **Buschman TJ**, Stokes MG, and Manohar SG
PNAS. 119 (40) e2200400119, 2022. <https://doi.org/10.1073/pnas.2200400119>
34. **Fast rule switching and slow rule updating in a perceptual categorization task**
Bouchacourt F⁺, Tafazoli S⁺, Mattar MG, **Buschman TJ**^{*}, and Daw ND^{*} (+ and * denotes equal contributions)
eLife 11:e82531, 2022. <https://doi.org/10.7554/eLife.82531>
35. **Variability in sampling of cortex-wide neural dynamics explains individual differences in functional connectivity and behavioral phenotype**
MacDowell CJ, Briones BA, Lenzi MJ, Gustison ML, and **Buschman TJ**

Non-peer reviewed scientific or medical publications/materials in print or other media

Bootstrapping Your Brain: How Interactions Between the Frontal Cortex and Basal Ganglia May Produce Organized Actions and Lofty Thoughts

Miller EK and **Buschman TJ**

Raymond P. Kesner and Joe L. Martinez (Eds.), *Neurobiology of learning and memory* (2nd edition, pp. 339 - 354). 2007. Oxford, UK: Elsevier.

Rules through Recursion: How Interactions between the Frontal Cortex and Basal Ganglia May Build Abstract, Complex Rules from Concrete, Simple Ones

Miller EK and **Buschman TJ**

Silvia A. Bunge and Jonathan D. Wallis (Eds.), *Neuroscience of rule-guided behavior* (1st edition, pp. 419 - 440). 2007. New York, NY: Oxford University Press.

Top-Down Control of Attention by Rhythmic Neural Computations

Miller EK and **Buschman TJ**

Posner, M.I. (ed) *Cognitive Neuroscience of Attention*, New York: Guilford Press, 2011

Brain Rhythms for Cognition and Consciousness

Miller EK and **Buschman TJ**

A. Battro, S. Dehaene and W. Singer (eds); *Neurosciences and the Human Person: New Perspectives on Human Activities*, Pontifical Academy of Sciences, Scripta Varia 121, Vatican City, 2013

Neural mechanisms for the executive control of attention

Miller EK and **Buschman TJ**

Kastner S and Nobre K(ed); *Oxford's Handbook of Attention*, Oxford University Press, January 2014

Paying Attention to the Details of Attention

Buschman TJ

Neuron 2015. Jun 3; 86(5): 1111-1113.

Dynamic coding for flexible cognitive control

Stokes M, **Buschman TJ**, and Miller EK

The Wiley Handbook of Cognitive Control, Ed. by Tobias Egner, John Wiley & Sons, (Chichester, West Sussex, UK).

Visual Attention

Kastner S and **Buschman TJ**

Oxford Research Encyclopedia of Neuroscience. doi: 10.1093/acrefore/9780190264086.013.79

In V1, attending is not learning to see

Jahn CI and **Buschman TJ**

Neuron. doi: 10.1016/j.neuron.2022.01.032

Public Lectures and Scientific Outreach

2021 **Scientific Sense Podcast**

2014 **BRAINWAVE at Rubin Museum of Art, New York City**

Invited Lectures and Presentations

2023 **University of California, San Diego, San, Diego, CA, January 2023**

University of Hamburg, Germany, May 2023.

- 2022 **New York University**, New York, NY December 2022
Rutgers University, New Brunswick, NJ November 2022
Oxford University, Oxford, UK July, 2022
Searching for the WM Engram Conference, Groningen, Netherlands, June 2022
Japanese Neuroscience Society, Okinawa, Japan, June, 2022
COSYNE, Lisbon, Portugal, March, 2022
McGill University, Montreal, Canada, March, 2022
Yale University, New Haven, CT, January, 2022
- 2021 **University of Cambridge**, Cambridge, UK, October, 2021
Brain & Mind Conference at Sharif University, June, 2021
Columbia University (Center for Theoretical Neuroscience), New York, NY, June, 2021
Facebook AI Research (FAIR) Lab, New York, NY, May, 2021
Pontificia Universidad Católica of Chile, Santiago, Chile, May, 2021
- 2020 **University of Chicago**, Chicago, US, September, 2020
University College London (Gatsby Computational Neuroscience), London, UK, June 2020
- 2019 **Ernst Strüngmann Institute (ESI) for Neuroscience**, Frankfurt, Germany, September 2019
Tübingen Systems Neuroscience Symposium, Tübingen, Germany, September 2019
Computational Neuroscience Meeting, Barcelona, Spain, July 2019
Control Processes Meeting, Providence RI, May 2019
- 2018 **University of Wisconsin**, Madison, WI, November 2018
Columbia University (Psychology), New York, NY, October 2018
Washington University in St. Louis, St. Louis, MO, September 2018
FENS, Berlin Germany, July 2018
New York University, New York, NY, March 2018
- 2017 **Florida Atlantic University**, Orlando FL, March 2017
- 2016 **Neurobiology of Cognition Gordon Research Conference**, Newry ME, July 2016
Neuroscience 2016, Japan Neuroscience Society, Yokohama, July 2016
Osaka University and CiNET, Osaka Japan, July 2016
University of Saskatchewan, Saskatoon, Canada, March 2016
Cosyne: Oscillations Workshop, Speaker, Salt Lake City, UT, March 2016
Cosyne: Executive Flexibility Workshop, Organizer/Speaker, Salt Lake City, UT, March 2016
Yale University, New Haven, CT, January 2016
- 2015 **University of Rockefeller**, New York City, December 2015
University of Trento, Italy, Rovereto Attention Workshop, November 2015
Ernst Strüngmann Institute for Neuroscience, Germany, “Brain Codes” Conference, June 2015
Banbury Center at Cold Spring Harbor Laboratory, NIMH Sponsored Conference, “Brain Rhythms as Potential Targets for Intervention in Cognitive Dysfunctions”, March 2015
UT Austin, Imaging Research Center, January 2015
- 2014 **Cold Spring Harbor Laboratory**, “Connections and Communications in the Brain”, Banbury Center
Oxford University, Work on the nature and function of neural oscillations
Queens College, City of New York, December 2014
- 2013 **22nd Annual Computational Neuroscience Meeting**; Workshop on “Neural mechanisms of working memory limits”, Paris, France; July 2013
Oxford University; Oxford, England; July 2013
Task-Driven Control of Thought and Action by Working Memory: Linking Mind and Brain; Conference at Beilefeld University, Bielefeld, Germany; June 2013

- 2012 **Princeton University**; NIAM Lecture Series, Princeton, NJ; May 2013
Harvard University; Psychology Department, Cambridge, MA; February 2013
Visual Search and Selective Attention; Conference, Munich, Germany; July 2012
University of Tubingen; Tubingen, Germany; July 2012
Harvard University, Visual Attention Lab, Cambridge, MA
California Institute of Technology, Pasadena, CA; March 2012
Princeton University, Princeton, NJ; March 2012
Stanford University, School of Medicine, Palo Alto; February 2012
New York University, New York, NY; January 2012
University of Wisconsin, Madison, Madison, WI; January 2012
- 2010 **Dynamics of Cortico-Cortical Interactions**, Chico, MT
Workshop on Computational Properties of Prefrontal Cortex, Vancouver, BC Canada
- 2009 **Harvard University**, Visual Attention Lab, Cambridge, MA
- 2008 **NSF Science of Learning Annual Meeting**, Washington, DC

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings

- 2022 **Computation through coherence: how oscillations control and organize neural dynamics.**
Society for Neuroscience
Libby A, **Buschman TJ**
- Learning attentional templates in frontal and parietal cortex**
Society for Neuroscience
Jahn CI, Markov NT, Morea BM and **Buschman TJ**
- Geometry of Transformations in Working Memory**
Society for Neuroscience
Ardalan A, Ye J, Kollias P, **Buschman TJ**
- Neural representation of learning multiple abstract rules in fronto-parietal network and basal ganglia.**
Society for Neuroscience Conference
Tafazoli S, Bouchacourt F, Markov N, Uchimura M, Mattar M, Daw N, and **Buschman TJ**
- Brain-wide interactions are organized into multiplexed subspace networks.**
Society for Neuroscience
MacDowell CJ, Tafazoli S, Papadoyannis ES, Jahn CI, Libby AG, and **Buschman TJ**
- 2021 **Unique sampling of cortex-wide neural dynamics underlies individual behavioral phenotypes.**
Society for Neuroscience
MacDowell C, Miller K, Lenzi M, Ferguson D, **Buschman TJ**
- Oscillations regulate attractor dynamics within neural circuits**
Society for Neuroscience
Libby A and **Buschman TJ**
- Synchronous Oscillatory Neural Ensembles Flexibly Encode Inference of Abstract Rules in Prefrontal and Posterior Parietal Cortices**
Society for Neuroscience
Tafazoli S, Jahn C, Markov N, MacDowell C, **Buschman TJ**
- Behavioral and neural substrates of learning attentional rules.**
Society for Neuroscience Conference
Jahn CI, Markov N, Morea B and **Buschman TJ**
- Perineuronal nets in the dorsomedial striatum contribute to behavioral dysfunction in mouse models of excessive repetitive behavior.**
Society for Neuroscience

Briones B, Pitcher M, Fleming W, Libby A, Diethorn E, Haye A, MacDowell C, Zych A, Waters R, **Buschman TJ**, Witten I, Gould E

Behavioral and neural substrates of learning attentional rules.

Cognitive Neuroscience Society

Jahn CI, Markov N, Morea B and **Buschman TJ**

A Model-Free Framework for Adaptive, Closed-Loop Brain Stimulation

North American Neuromodulation Society

Tafazoli S, MacDowell C, **Buschman TJ**

Automated quantification of mouse behavior from post estimation data.

Annual Biomedical Research Conference for Minority Students, 2021.

Ferguson D, Lenzi M, Miller K, MacDowell C, **Buschman TJ**

2020 Behavioral and neural substrates of learning attentional rules

Poster at Cosyne, 2020

Jahn CI, Markov N, Morea B and **Buschman TJ**

Neural mechanisms of selection in visual working memory

Poster at Cosyne, 2020

Panichello MF and **Buschman TJ**

2019 Dynamic motifs capture brain-wide patterns of neural activity

Society for Neuroscience Annual Meeting 2019

MacDowell CJ and **Buschman TJ**

Neural mechanisms of retrospective selection in visual working memory

Poster at Cosyne, 2019

Panichello MF and **Buschman TJ**

Sustained and dynamic representations reduce interference in short-term memory

Talk at Cosyne, 2019

Libby A and **Buschman TJ**

Exploration via disrupted sensorimotor control dynamics

Talk at Cosyne, 2019

Ebitz B, Cohen J, **Buschman TJ**, Moore T, Hayden B

Navigating in neural and perceptual manifolds with closed-loop multi-site electrical microstimulation system

Poster at Cosyne, 2019

Tafazoli S, MacDowell CJ, Letai K, Che D, and **Buschman TJ**

2018 A flexible model of working memory

Talk at Cosyne, 2018

Bouchacourt F, **Buschman TJ**

The neural circuit basis of feature-binding in working memory

Cosyne, 2018

Barbosa J, Temudo A, Babushkin V, **Buschman TJ**, Sreenivasan K, Compte A

Cortical network graphs and dynamic functional connectivity in a mouse model of autism spectrum disorder

Society for Neuroscience Annual Meeting, 2018

MacDowell CJ, **Buschman TJ**

Navigating in neural and behavioral manifolds with closed-loop multi-site electrical microstimulation system

Society for Neuroscience Annual Meeting, 2018

Tafazoli S, MacDowell CJ, Letai K, Che D, **Buschman TJ**

A flexible model of working memory

Talk at Society for Neuroscience Annual Meeting, 2018
Bouchacourt F and **Buschman TJ**

Intrinsic neuronal dynamics predict distinct functional roles during working memory

Society for Neuroscience Annual Meeting, 2018
Wasmuht DF, Spaak E, **Buschman TJ**, Miller EK, Stokes MG

2017 Compression of information in visual working memory

Society for Neuroscience Annual Meeting, 2017
Kollias P, **Buschman TJ**

Control mechanisms for flexibility in a changing world

Society for Neuroscience Annual Meeting, 2017
Ebitz BA, Cohen JD, **Buschman TJ**

Memory load modulates the dynamics of visual working memory

Society for Neuroscience Annual Meeting, 2017
Panichello MF, DePasquale BD, Pillow JW, **Buschman TJ**

A Bayesian approach to inferring latent connectivity patterns from spike trains reveals that working memory maintenance induces rapid synaptic plasticity

Society for Neuroscience Annual Meeting, 2017
Spaak E, Constantinidis C, Duncan J, **Buschman TJ**, Miller EK, Stokes MG

Learning sound sequences in mouse auditory cortex

Society for Neuroscience Annual Meeting, 2017
Libby AG, **Buschman TJ**

Memory through randomness: A spiking network model for flexible working memory

Society for Neuroscience Annual Meeting, 2017
Bouchacourt F, **Buschman TJ**

Navigating in neural and behavioral manifolds with multi-site electrical microstimulation

Society for Neuroscience Annual Meeting, 2017
Tafazoli S, Letai K, **Buschman TJ**

Bottom-up salience drives choice during exploration

Cosyne, 2017
Ebitz B, Moore T, **Buschman TJ**

2016 Altered balance between top-down and bottom-up saccadic control across exploration and exploitation

Society for Neuroscience Annual Meeting, 2016
Ebitz RB, Moore T, **Buschman TJ**

Generating complex neural patterns with multi-site electrical microstimulation

Society for Neuroscience Annual Meeting, 2016
Tafazoli S, **Buschman TJ**

The neural basis of dynamic coding in prefrontal cortex during a spatial working memory task

Society for Neuroscience Annual Meeting, 2016
Spaak E, Wasmuht D, **Buschman TJ**, Miller EK, Stokes M

Pinging the brain reveals hidden states for working memory guided behavior

Society for Neuroscience Annual Meeting, 2016
Wolff M, Jochim J, **Buschman TJ**, Akyurek EG, Stokes MG

Working memory load may modulate neuronal coupling

Society for Neuroscience Annual Meeting, 2016
Pinotsis, D, **Buschman TJ**, Miller EK

2014 Modulation of power and synchrony of local field potentials by working memory load in the macaque

Society for Neuroscience Annual Meeting, 2014

- Kornblith S, **Buschman TJ**, Miller EK
- 2013** **Probing interactions between distinct cortical microcircuits through spatiotemporally patterned 3-D optogenetics**
Society for Neuroscience Annual Meeting, 2013
Zorzos AN, **Buschman TJ**, Monahan PE, Scholvin J, Fonstad C, and Boyden ES
- Contributions of prefrontal cortical areas during task switching**
Society for Neuroscience Annual Meeting, 2013
Denovellis EL, **Buschman TJ**, Bullock D, Miller EK
- 2012** **Dynamic, synchronous, sub-networks in prefrontal cortex encode stimulus-response rules**
Society for Neuroscience Annual Meeting, 2012
Buschman TJ, Denovellis EL, Diogo C, Bullock D, Miller EK
- Point process models of anterior cingulate and dorsolateral prefrontal cortical neurons during cognitive control**
Society for Neuroscience Annual Meeting, 2012
Denovellis EL, **Buschman TJ**, Diogo C, Bullock D, Miller EK
- Prefrontal cortex neurons reflect decisions about ambiguous stimuli.**
Society for Neuroscience Annual Meeting, 2012
Roy JE, **Buschman TJ**, Miller EK
- Neural recoding from the prefrontal network during the update of working memory**
Society for Neuroscience Annual Meeting, 2012
Rose JM, **Buschman TJ**, Miller EK
- In vivo optogenetic neural circuit control using 3-D microfabricated optical waveguide arrays**
Society for Neuroscience Annual Meeting, 2012
Zorzos AN, Monahan PE, **Buschman TJ**, Scholvin J, Acker L, Fonstad CG, Boyden ES
- Dynamic networks in frontal cortex support the cognitive flexibility to switch between rules**
Computational and Systems Neuroscience (Cosyne) 2012
Buschman TJ, Denovellis EL, Diogo C, Bullock D, Miller EK
- Neural recoding from the prefrontal network during the update of working memory**
8th Federation of European Neuroscience Societies (FENS) Forum of Neuroscience
Rose J, **Buschman TJ**, Miller EK
- 2011** **Investigating cortico-cortical interactions in the mouse somatosensory system using electrophysiological and optogenetic techniques**
Society for Neuroscience Annual Meeting
Buschman TJ, Voigts J, Siegle J, Vierling-Classen D, Moore CI
- Tasking Switching in the Prefrontal and Anterior Cingulate Cortex**
Society for Neuroscience Annual Meeting
Denovellis EL, **Buschman TJ**, Diogo C, Bullock D, Miller EK
- Evidence from Capacity Limitations for a Dual-Model of Working Memory**
Society for Neuroscience Annual Meeting
Rose J, **Buschman TJ**, Yorgan VR, Miller EK
- 2010** **Neural Correlates of Working Memory Capacity Limitations in Primate Prefrontal and Parietal Cortices**
Society for Neuroscience Annual Meeting
Buschman TJ, Yorgan V, Siegel M, and Miller EK
- 2008** **The Role of Synchrony and Oscillations in the Control of Visual Attention in Monkey Cortex**
Society for Neuroscience Annual Meeting
Buschman TJ and Miller EK
- 2007** **Shared and Distinctive Mechanisms in Primate Frontal and Parietal Cortex During Internal and External Control of Attention**

- Society for Neuroscience Annual Meeting
Buschman TJ and Miller EK
- 2006** **Comparison of AND, OR, and XOR rules in monkeys**
Society for Neuroscience Annual Meeting
Buschman TJ, Machon M, and Miller EK
- 2005** **Roles of monkey prefrontal and parietal cortices in exogenous and endogenous control of visual attention**
Society for Neuroscience Annual Meeting
Buschman TJ and Miller EK
- 2004** **Different timecourses for visual target selection in the monkey prefrontal vs. parietal cortex**
Society for Neuroscience Annual Meeting
Buschman TJ and Miller EK
- 2002** **Modulation of neuronal synchronization in area V2 by selective visual attention**
Society for Neuroscience Annual Meeting
Buffalo EA, **Buschman TJ**, Fries P, Desimone R

Teaching

- 2021-22, Spring;
2020-21, Spring; "From Molecules to Systems to Behavior"
2019-20, Spring; NEU 502A/MOL 502A
2018-19, Spring; Neuroscience, Princeton University.
2017-18, Spring
- 2020-21, Fall;
2018-19, Fall; "Cognitive Neuroscience of Selective Attention"
2016-17, Fall; PSY 316/NEU 316
2015-16, Spring Psychology and Neuroscience, Princeton University.
- 2014-15, Fall "Cellular and Systems Neuroscience"
NEU 408/MOL 408/PSY 404
Psychology and Neuroscience, Princeton University.
- 2013-14, Spring "Neural Dynamics and Their Role in Cognition"
NEU/PSY 422/522
Psychology and Neuroscience, Princeton University.
- 2011, Fall Guest lecturer on "Basal Ganglia and the Prefrontal Cortex: From Habits to Cognition" in PGY2
Clinical Neuroscience Lecture Series, MGH.
- 2011, Fall Guest lecturer on "Working Memory and Executive Control" in Neural Basis of Learning and
Memory, 9.03, Undergraduate Course, MIT.
- 2005-2006, Fall Teaching Assistant for 9.011, Introductory to Systems Neuroscience Graduate Course, Dept.
Brain and Cognitive Science at MIT.
- 2004, Spring Teaching Assistant for 9.02, Undergraduate Brain Lab in Dept. Brain and Cognitive Sciences at
MIT.