

## Curriculum Vitae

### Earl K. Miller

Picower Professor of Neuroscience  
The Picower Institute for Learning and Memory and  
Department of Brain and Cognitive Sciences at the  
Massachusetts Institute of Technology

### Contact information

Massachusetts Institute of Technology  
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### Date of Birth

30 November 1962

### Education

1990 Ph.D. in Psychology and Neuroscience, Princeton University  
1987 M.A. in Psychology and Neuroscience, Princeton University  
1985 B.A. *summa cum laude* with honors in Psychology, Kent State University

### Current Positions

2003 Picower Professor of Neuroscience, The Picower Institute for Learning and Memory and  
Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology  
2014 Co-founder and Chief Scientist, SplitSage  
2023 Co-founder, Neuroblox

### Past Positions

2009-2011 Co-Director, Center of Excellence for Learning in Education, Science, and Technology,  
National Science Foundation Science of Learning Center  
2001-2009 Associate Director, The Picower Institute for Learning and Memory, Massachusetts  
Institute of Technology  
2002-2009 Director (Thrust 5), Center of Excellence for Learning in Education, Science, and  
Technology, National Science Foundation Science of Learning Center  
1999-2008 Investigator, RIKEN-MIT Neuroscience Research Center  
2002-2003 Professor of Neuroscience, The Picower Center for Learning and Memory and  
Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology  
1999-2002 Associate Professor of Neuroscience, Department of Brain and Cognitive Sciences,  
Massachusetts Institute of Technology  
2000-2006 Director of Graduate Studies in Brain and Cognitive Sciences, Massachusetts Institute of  
Technology  
1996-1999 Associate Member, Center for Learning and Memory, Massachusetts Institute of  
Technology  
1995-1999 Assistant Professor of Neuroscience, Department of Brain and Cognitive Sciences,  
Massachusetts Institute of Technology  
1990-1995 Intramural Research Fellow, Laboratory of Neuropsychology, National Institute of Mental  
Health  
1989-1990 Lecturer, Princeton University

1985-1990 Research Assistant, Princeton University  
1985-1989 Assistant in Instruction, Princeton University  
1983-1985 Research Assistant, Kent State University

## Awards and Honors

2025 Excellence in Graduate Mentoring, Department of Brain and Cognitive Sciences, MIT  
2020 Doctor of Science (honoris causa), Kent State University  
2019 George A. Miller Prize in Cognitive Neuroscience  
2018 Excellence in Graduate Teaching, Department of Brain and Cognitive Sciences, MIT  
2017 Elected to the American Academy of Arts and Sciences  
2017 Miller and Cohen (2001) identified as the 5<sup>th</sup> most-cited paper in Neuroscience  
(Yeung et al., 2017 Front. Hum. Neurosci., 21 July 2017)  
2017 Paul and Lilah Newton Brain Science Award  
2016 Goldman-Rakic Prize for Outstanding Achievement in Cognitive Neuroscience  
2016 Commencement Address, Kent State University  
2016 Elected to the Memory Disorders Research Society  
2015 Professional Achievement Award, Kent State University Alumni Association  
2014 Amar G. Bose Research Fellow  
2014 Antzoulatos and Miller (2014) selected as one of Neuron's best papers of 2014-2015  
2013 Distinguished Member, National Society of Collegiate Scholars  
2010 MERIT Award, National Institute of Mental Health  
2008 "An Integrative Theory of Prefrontal Cortex Function" (Miller and Cohen, 2001)  
designated a *Current Classic* by Thomson Scientific as among the most cited papers in  
the field of Neuroscience and Behavior  
2007 Mathilde Solowey Award in the Neurosciences  
2006 Elected to the International Neuropsychological Symposium  
2005 Fellow, American Association for the Advancement of Science  
2003 Picower Professorship (endowed chair)  
2002 Elected to the International Society for Behavioral Neuroscience  
2000 Society for Neuroscience Young Investigator Award  
2000 National Academy of Sciences Troland Research Award  
1999 Tenured at MIT two years ahead of schedule  
1999 Class of 1956 Career Development Professorship (endowed chair)  
1998 John Merck Scholar Award  
1996 Pew Scholar Award  
1996 McKnight Scholar Award  
1996 Whitehall Foundation Fellowship  
1996 Alfred P. Sloan Research Fellow  
1987 National Research Service Award Predoctoral Fellowship  
1986 National Institutes of Health Predoctoral Training Fellowship  
1985 Graduated *summa cum laude* with honors, Kent State University  
1985 Phi Beta Kappa

## Editorships and Editorial Boards

2020 Associate Editor, Frontiers in Systems Neuroscience  
2017 Editorial Board, Current Opinion in Behavioral Sciences  
2016 Senior Editor, Oxford Research Encyclopedia of Neuroscience  
2016 Editorial Board, Annual Review of Psychology

2011 Advisory Editorial Board, *Trends in Cognitive Science*  
 2010 Co-Editor, Cognitive Neuroscience 2010, Current Opinion in Neurobiology  
 2010 Editorial Board, *Neural Systems & Circuits*  
 2010 Editorial Board, *Neuroscience Research*  
 2009 Co-Editor, *Experimental Brain Research*  
 2008 Reviewing Editor, *Frontiers in Systems Neuroscience*  
 2006 Senior Editor, *Journal of Neuroscience*  
 2005 Reviewing Editor, *Journal of Neuroscience*  
 2004 Associate Editor, *New Encyclopedia of Neuroscience*  
 2003 Action Editor, *Journal of Cognitive Neuroscience*  
 2002 Editorial Board, Cognitive Sciences, MIT Press  
 2002 Editorial Board, *Journal of Neurophysiology*  
 2001 Consulting Editor, *Behavioral Neuroscience*  
 2000 Editorial Board, *Neuron*  
 2000 Editorial Board, *Cognitive, Affective, and Behavioral Neuroscience*

### **Committees, Advisory Boards, Consultant Work, Etc.**

2023 Chair, Advisory Board, Brain Health Research Institute, Kent State University  
 2022 Advisor, Centre for Technology and Human Agency  
 2022 Steering Committee, Brain Health Research Institute, Kent State University.  
 2022 Special Advisor to the Director, Brain Health Research Institute, Kent State University  
 2021 BrainsCAN International Scientific and Outreach Advisory Board  
 2021 Scientific Advisory Board, Neurable  
 2021 Expert Witness, cognition and memory.  
 2020 External Advisory Committee, COBRE Center for Central Nervous System Function  
 2020 Consultant, Cognito  
 2019 Scientific Advisory Board, Ernst Strungmann Institute for Neuroscience  
 2015 Scientific Advisory Board, Motimatic  
 2012 Scientific Advisory Board, Thync  
 2011 Society for Neuroscience Committee on Animals in Research  
 2011 Advisory Council, International Association for the Study of Attention and Performance  
 2010 Consultant, BBN Technologies  
 2010 Advisory Panel, Research Domain Criteria Project, National Institute of Mental Health  
 2010 College of CSR Reviewers, National Institutes of Health  
 2010 Consultant, Shire Pharmaceuticals  
 2010 Selection Committee, Eppendorf and Science Prize for Neurobiology  
 2009 Advisory Board, National Institutes of Health Program Project, Yale University  
 2008 National Institute of Neurological Disorders and Stroke Advisory Panel for Basic Research  
 2006 Scientific Advisory Board, Nielsen Neuroscience.  
 2006 Scientific Advisory Board, Polimetrix, Inc  
 2005 National Institutes of Health Cognitive Neuroscience study section  
 2005 National Institute of Mental Health Workshop on Social Neuroscience  
 2004 College of Reviewers for Canada Research Chairs  
 2003 Working Group on Interspecific Chimeric Brains, Phoebe R. Berman Bioethics Institute, Johns Hopkins University  
 2003 Advisory Council, Department of Psychology, Princeton University

2002	Advisory Board, International Centre for Research on the Biology of Memory, Norwegian Research Council
1999	Advisory Council of the International Association for the Study of Attention and Performance
1997	Steering Committee, Boston Area Neuroscience Group

## Patents

Method and Apparatus Accounting for Independent Cognitive Capacities in the Right vs Left Half of Vision. Patent No. 9927940 Inventors: Earl Keith Miller and Timothy J. Buschman

Dynamic Display System and Method for Customizing a Controller in a Display System  
Patent No. 10986992 Inventors: Earl Keith Miller, Timothy Joseph Buschman, Simon John Kornblith

## Publications

1. Bardon, A.G., Ballesteros, J.J., Brincat, S.L., Roy, J.E., Mahnke, M.M., Ishizawa, Y., Brown, E.N., and Miller, E.K. "Convergent effects of different anesthetics on changes in phase alignment of cortical oscillations", *Cell Reports*, 2025, in press.
2. Brincat, S.L. and Miller, E.K. "Cognitive independence and interactions between cerebral hemispheres", *Neuropsychologia*, 2025, in press.
3. Eisen, A.J., Kozachkov, L., Bastos, A.M., Donoghue, J.A., Mahnke, M.K., Brincat, S.L., Chandra, S., Brown, E.N., Fiete, I. and Miller, E.K. "Propofol anesthesia destabilizes neural dynamics across cortex", *Neuron*, 2024, <https://doi.org/10.1016/j.neuron.2024.06.011>.
4. Xiong, Y., Donoghue, J.A., Lundqvist, M., Mahnke, M. Major, A.J., Brown, E.N., Miller, E.K., and Bastos, A.M. "Propofol-mediated loss of consciousness disrupts predictive routing and local field phase modulation of neural activity", *Proceedings of the National Academy of Sciences*, 2024, in press.
5. Tye, K.M., Miller, E.K., Taschbach, F.H., Benna, M.K., Rigotti, M., Fusi, S. "Mixed Selectivity: Cellular Computations for Complexity", *Neuron*, 2024, <https://doi.org/10.1016/j.neuron.2024.04.017>.
6. Adam, E., Kowalski, M. Akeju, S. Miller, E.K., Brown, E.N., McCarthy, M.M., Kopell, N.J. "Ketamine can produce oscillatory dynamics by engaging mechanisms dependent on the kinetics of NMDA receptors." *Proceedings of the National Academy of Sciences*, 2024, <https://doi.org/10.1073/pnas.2402732121>.
7. Miller, E.K., Brincat, S.L., and Roy, J.E. "Cognition is an emergent property", *Current Opinion in Behavioral Sciences*, 2024, <https://doi.org/10.1016/j.cobeha.2024.101388>
8. Lundqvist, M., Miller, E.K., Nordmark, J., Liljefors, J., Herman, P. "Beta: Bursts of cognition" *Trends in Cognitive Sciences*, 2024, <https://doi.org/10.1016/j.tics.2024.03.010>.
9. Mendoza-Halliday, D., Major, A. J., Lee, N., Lichtenfeld, M.J., Carlson, B., Mitchell, B., Meng, P.D., Xiong, Y., Westerberg, J.A., Jia, X., Johnston, K.D., Selvanayagam, J., Everling, S., Maier, A., Desimone, R., Miller, E.K., and Bastos, A. M. "A ubiquitous spectrolaminar motif of local field potential power across the primate cortex". *Nature Neuroscience*, 2024. <https://doi.org/10.1038/s41593-023-01554-7>
10. Tauber, J.M., Brincat, S.L., Stephen, E.P., Donoghue, J.A., Kozachkov, L., Brown, E.N., and Miller, E.K. "Propofol mediated unconsciousness disrupts progression of sensory signals through the

- cortical hierarchy". *Journal of Cognitive Neuroscience*, 2023. [https://doi.org/10.1162/jocn\\_a\\_02081](https://doi.org/10.1162/jocn_a_02081)
11. Chakravarty, S., Donoghue, J., Waite, A.S., Mahnke, M., Garwood, I.C., Miller, E.K., and Brown, E.N. "Closed-loop control of anesthetic state in non-human primates", *PNAS Nexus*, 2023. <https://doi.org/10.1093/pnasnexus/pgad293>
  12. Garwood, I.C., Major, A.J., Antonini, M.J., Correa, J., Lee, Y., Sahasrabudhe, A., Mahnke, M.K., Miller, E.K., Brown, E.N. and Anikeeva, P. "Multifunctional fibers enable modulation of cortical and deep brain activity during cognitive behavior in macaques", *Science Advances*, in press.
  13. Peppercorn, J. Miller, E.K., and Hasselmo, M.E. "Don't You Worry 'Bout a Thing: Harnessing the power of music to improve emotional health in oncology" *JCO Oncology Practice*, 2023. <https://ascopubs.org/doi/10.1200/OP.23.00555>
  14. Pinotsis, D.A. and Miller, E.K. "In vivo ephaptic coupling allows memory network formation". *Cerebral Cortex*, 2023. <https://doi.org/10.1093/cercor/bhad25>.
  15. Pinotsis, D.A., Fridman, G., and Miller, E.K. "Cytoelectric Coupling: Electric fields sculpt neural activity and "tune" the brain's infrastructure". *Progress in Neurobiology*, 2023 <https://doi.org/10.1016/j.pneurobio.2023.102465>.
  16. Lundqvist, M. Brincat, S.L., Rose, J. Warden, M.R., Buschman, T.J., Miller, E.K., and Herman, P. "Working memory control dynamics follow principles of spatial computing". *Nature Communications*, 2023. <https://doi.org/10.1038/s41467-023-36555-4>
  17. Sanchez-Todo, R., Bastos, A.M., Sola, E.L., Mercadal, B., Santarnecchi, E., Miller, E.K., Deco, G. and Ruffini, G. "A physical neural mass model framework for the analysis of oscillatory generators from laminar electrophysiological recordings". *NeuroImage*, 2023 <https://doi.org/10.1016/j.neuroimage.2023.119938>
  18. Kozachkov, L., Tauber, J., Lundqvist, M., Brincat, S.L., Slotine, J.J., and Miller, E.K. "Robust and brain-like working memory through short-term synaptic plasticity" *PLOS Computational Biology*, 2022. <https://doi.org/10.1371/journal.pcbi.1010776>
  19. Buschman, T.J., and Miller, E.K. "Working memory is complex and dynamic, like your thoughts". *Journal of Cognitive Neuroscience*, 2022 [https://doi.org/10.1162/jocn\\_a\\_01940](https://doi.org/10.1162/jocn_a_01940)
  20. Lundqvist, M., Rose, J., Brincat, S.L., Warden, M.R., Buschman, T.J., Herman, P., and Miller, E.K. "Reduced variability of bursting activity during working memory" *Scientific Reports*, 2022. <https://doi.org/10.1038/s41598-022-18577-y>
  21. Barack, D.L., Miller, E.K., Moore, C.I., Packer, A.M., Pessoa, L. Ross, L.N., and Rust, N.C. "A call for more clarity around causality in neuroscience" *Trends in Neurosciences*, 2022 <https://doi.org/10.1016/j.tins.2022.06.003>
  22. Bhattacharya, S., Donoghue, J.A., Mahnke, M., Brincat, S.L., Brown, E.N., and Miller, E.K. "Propofol anesthesia alters cortical traveling waves". *Journal of Cognitive Neuroscience*, 2022, [https://doi.org/10.1162/jocn\\_a\\_01856](https://doi.org/10.1162/jocn_a_01856).
  23. Pinotsis, D.A., and Miller, E.K. "Beyond dimension reduction: Stable electric fields emerge from and allow representational drift". *NeuroImage*, 2022. <https://doi.org/10.1016/j.neuroimage.2022.119058>
  24. Bhattacharya, S., Brincat, S. L., Lundqvist, M., and Miller, E. K. "Traveling waves in the prefrontal cortex during working memory". *PLOS Computational Biology*, 2022. <https://doi.org/10.1371/journal.pcbi.1009827>

25. Garwood, I.C., Chakravarty, S., Donoghue, J., Kahali, P., Chamadia, S., Akeju, O., Miller, E.K., Brown, E.N. "A hidden Markov model reliably characterizes ketamine-induced spectral dynamics in macaque LFP and human EEG". *PLOS Computational Biology*, 2021, 17(8), e1009280. <https://doi.org/10.1371/journal.pcbi.1009280>
26. Bastos, A.M., Donoghue, J.A., Brincat, S.L., Mahnke, M., Yanar, J., Correa, J., Waite, A.S., Lundqvist, M., Roy, J., Brown, E.N. and Miller, E.K. "Neural effects of propofol-induced unconsciousness and its reversal using thalamic stimulation". *eLife*, 2021, DOI: 10.7554/eLife.60824.
27. Brincat, S.L, Donoghue, J.A., Mahnke, M.K., Kornblith, S., Lundqvist, M. and Miller, E.K. "Interhemispheric transfer of working memories". *Neuron*, 2021, Published online Feb 8 2021; <https://doi.org/10.1016/j.neuron.2021.01.016>
28. Bastos, A.M., Lundqvist, M., Waite, A.S., Kopell, N. and Miller, E.K. "Layer and rhythm specificity for predictive routing". *Proceedings of the National Academy of Sciences*, 2020, Published November 23, 2020; <https://doi.org/10.1073/pnas.2014868117>.
29. Cruzado, N.A., Tiganj, Z. Brincat, S.L., Miller, E.K., and Howard, M.W. "Conjunctive representation of what and when in monkey hippocampus and lateral prefrontal cortex during an associative memory task." *Hippocampus*, 2020. <https://doi.org/10.1002/hipo.23282>.
30. Pinotsis, D.A. and Miller, E.K. "Differences in visually induced MEG oscillations reflect differences in deep cortical layer activity" *Communications Biology*, 2020 <https://doi.org/10.1038/s42003-020-01438-7>
31. Kozachkov, L., Lundqvist, M. Slotine, J.J, and Miller. E.K. "Achieving stable dynamics in neural circuits" *PLOS Computational Biology*, 2020. <https://doi.org/10.1371/journal.pcbi.1007659>
32. Lundqvist, M., Bastos, A.M., and Miller, E.K. "Preservation and changes in oscillatory dynamics across the cortical hierarchy" *Journal of Cognitive Neuroscience*, 2020. [https://doi.org/10.1162/jocn\\_a\\_01600](https://doi.org/10.1162/jocn_a_01600)
33. Ito, T., Brincat, S.L., Siegel, M., Mill, R.D., He, B.J., Miller, E.K., Rotstein, H.G., and Cole, M.W. "Task-evoked activity quenches neural correlations and variability across cortical areas", *PLOS Computational Biology*, 2020. <https://doi.org/10.1371/journal.pcbi.1007983>
34. Sherfey, J., Ardid, S., Miller, E.K., Hasselmo, M.E., and Kopell, N. "Prefrontal oscillations modulate the propagation of neuronal activity required for working memory" *Neurobiology of Learning and Memory*, 2020 <https://doi.org/10.1016/j.nlm.2020.107228>.
35. Gong, X., Mendoza-Halliday, D., Ting, J.T., Kaiser, T., Sun, X., Bastos, A.M., Wimmer, R.D., Guo, B., Chen, Q., Zhou, Y., Pruner, M., Wu, C., Park, D., Barak, B., Boyden, E.S., Deisseroth, K., Miller, E.K., Halassa, M.M., Fu, Z., Bi, G., Desimone, R., Feng, G. "An ultra-sensitive step-function opsin for minimally invasive optogenetic stimulation in mice and macaques" *Neuron*, Published: April 29, 2020 DOI:<https://doi.org/10.1016/j.neuron.2020.03.032>.
36. Liu, Y., Brincat, S.L., Miller, E.K., and Hasselmo, M.E. "Neural population dynamics in prefrontal cortex and hippocampus during paired-associate learning" *Journal of Cognitive Neuroscience*, in press.
37. Klein, N., Orellana, J., Brincat, S.L., Miller, E.K., Kass, R. "Torus graphs for multivariate phase coupling analysis" *Annals of Applied Statistics*, Volume 14, Number 2, 635-660, 2020.
38. Trainto, C., Nicolai, C., Miller, E.K., and Siegel, M. "Extracellular spike waveform dissociates four functionally distinct cell classes in primate cortex". *Current Biology*, Aug 22, 2019.

<https://doi.org/10.1016/j.cub.2019.07.051>

39. Pinotsis, D.A., Siegel, M. and Miller, E.K. "Sensory processing and categorization in cortical and deep neural networks". *NeuroImage*, 2019. <https://doi.org/10.1016/j.neuroimage.2019.116118>.
40. Sandhaeger, F., Nicolai, C., Miller, E.K., and Siegel, M. "Monkey EEG links neuronal color and motion information across species and scales" *eLife* 2019;8:e45645 DOI: 10.7554/eLife.45645.
41. Miller, E.K. and Desimone, R. "Charles Gordon Gross (1936-2019)" *Neuron*, 2019. <https://doi.org/10.1016/j.neuron.2019.05.010>
42. Widge, A.S., Zorowitz, S., Basu, I. Paulk, A., Cash, S., Eskandar, E., Deckersbach, T., Miller, E.K., and Dougherty, D. "Deep brain stimulation of the internal capsule enhances human cognitive control and prefrontal cortex function." *Nature Communications*, 2019. <https://doi.org/10.1038/s41467-019-09557-4>
43. Widge, A.S. and Miller, E.K. "Next-generation clinical brain stimulation: Targeting cognition and networks through neural oscillations" *JAMA Psychiatry*, 2019. doi:10.1001/jamapsychiatry.2019.0740
44. Miller, E.K., Lundqvist, L., and Bastos, A.M. "Working Memory 2.0" *Neuron*, 2018, <https://doi.org/10.1016/j.neuron.2018.09.023>.
45. Brincat, S.L., Siegel, M, Nicolai, C., and Miller, E.K. "Gradual progression from sensory to task-related processing in cerebral cortex." *Proceedings of the National Academy of Sciences*, 2018. <https://doi.org/10.1073/pnas.1717075115>
46. Widge, A.S., Boggess, M. Mullen, A, Sheopory, S., Loonis, R. Freeman, D.K., and Miller, E.K. "Altering alpha-frequency brain oscillations with rapid analog feedback-driven neurostimulation" *PLOS ONE*, in press.
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48. Lundqvist, M., Herman, P., and Miller, E.K. "Working Memory: Delay Activity, Yes! Persistent Activity? Maybe not." *Journal of Neuroscience*, 8 August 2018, 38 (32) 7013-7019; DOI: <https://doi.org/10.1523/JNEUROSCI.2485-17.2018>.
49. Buschman, T.J., and Miller, E.K. "How Working Memory Works" In: *The Cognitive Neurosciences*, 6/e, Gazzaniga, Mangun and Poeppel (eds), in press.
50. Villagrasa, F., Baladron, J., Vitay, J., Schroll, H., Antzoulatos, E., Miller, E.K., and Hamker, F. "On the role of cortex-basal ganglia interactions for category learning: A neuro-computational approach." *Journal of Neuroscience*, 18 September 2018, 0874-18; DOI: <https://doi.org/10.1523/JNEUROSCI.0874-18.2018>.
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52. Pinotsis, D.A., Buschman, T.J. and Miller, E.K. "Working Memory Load Modulates Neuronal Coupling" *Cerebral Cortex*, 2018 <https://doi.org/10.1093/cercor/bhy065>

53. Tiganj, Z., Cromer, J. A., Roy, J. E., Miller, E. K., & Howard, M. W. "Compressed Timeline of Recent Experience in Monkey Lateral Prefrontal Cortex." *Journal of Cognitive Neuroscience*, 1-16, 2018
54. Lundqvist, M., Herman, P. Warden, M.R., Brincat, S.L., and Miller, E.K. "Gamma and beta bursts during working memory read-out suggest roles in its volitional control" *Nature Communications* 9: 394, 2018
55. Wutz, A., Loonis, R., Roy, J.E., Donoghue, J.A., and Miller, E.K. "Different levels of category abstraction by different dynamics in different prefrontal areas" *Neuron*, 97:,1-11, 2018.
56. Bastos, A.M., Loonis, R., Kornblith, S., Lundqvist, M., and Miller, E.K. "Laminar recordings in frontal cortex suggest distinct layers for maintenance and control of working memory" *Proceedings of the National Academy of Sciences*, 2018.
57. Loonis, R.F, Brincat, S.L., Antzoulatos, E.G., and Miller, E.K. "A meta-analysis suggests different neural correlates for implicit and explicit learning.", *Neuron*, 96:521-534, 2017.
58. Lindsay, G.W., Rigotti, M., Warden, M.R., Miller, E.K., and Fusi, S. "Hebbian Learning in a Random Network Captures Selectivity Properties of Prefrontal Cortex." *Journal of Neuroscience*, in press.
59. Pinotsis, D. Brincat, S.L., and Miller, E.K. "On memories, neural ensembles and mental flexibility" *NeuroImage*, 2017.
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63. Stokes, M., Buschman, T.J., and Miller, E.K. "Dynamic coding for flexible cognitive control." *The Wiley Handbook of Cognitive Control*, The Wiley Handbook of Cognitive Control, Edited by Tobias Egner, John Wiley & Sons, 2017(Chichester, West Sussex, UK).
64. Brincat, S.L. and Miller, E.K "Prefrontal networks shift from external to internal modes during learning" *Journal of Neuroscience*. 36(37): 9739-9754, 2016 doi: 10.1523/JNEUROSCI.0274-16.2016.
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66. Lundqvist, M., Rose, J., Herman, P, Brincat, S.L, Buschman, T.J., and Miller, E.K. "Gamma and beta bursts underlie working memory" *Neuron*, published online March 17, 2016.
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69. Kornblith, S., Buschman, T.J., and Miller, E.K. "Stimulus load and oscillatory activity in higher cortex." *Cerebral Cortex*, 2015. Published online August 18, 2015 doi: 10.1093/cercor/bhv182



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71. Brincat, S.L. and Miller, E.K. "Frequency-specific hippocampal-prefrontal interactions during associative learning." *Nature Neuroscience*, 2015. Published online 23 Feb 2015  
doi:10.1038/nn.3954
72. Miller, E.K. and Buschman, T.J. "Working memory capacity: Limits on the bandwidth of cognition". *Daedalus*, Vol. 144, No. 1, Pages 112-122, 2015.
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74. Buschman TJ, Miller EK. "Goal-direction and top-down control". *Philos Trans R Soc Lond B Biol Sci*. Nov 5;369(1655), 2014
75. Roy, J.E., Buschman, T.J., Miller, E.K. "PFC neurons reflect categorical decisions about ambiguous stimuli" *Journal of Cognitive Neuroscience*, 26:6, 1283-1291, 2014.
76. Antzoulatos, E.G. and Miller, E.K. Increases in functional connectivity between the prefrontal cortex and striatum during category learning." *Neuron*, 83:216-225, 2014.
77. Puig, M.V. and Miller, E.K. "Neural substrates of dopamine D2 receptor modulated executive functions in the monkey prefrontal cortex." *Cerebral Cortex*, published online May 9, 2014
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## **Distinguished Lectures**

*Presidential Lecture* – Society for Neuroscience Annual Meeting, San Diego, 2025

*Keynote Address* – Social and Affective Neuroscience Meeting, Chicago, 2025

*Keynote Address* – Midway Meeting of the Memory Minds, Chicago, 2025

*Keynote Address* – Gordon Conference on Frontal Cortex, 2024

*Keynote Address* - The Science of Consciousness, Tuscon, 2024

*Keynote Address* – Simian Collective Meeting, Chicago, 2023

*Plenary Lecture* - Bhaktivedanta Institute, 2023

*Grand Rounds* - University of California Riverside, School of Medicine, 2022

*Keynote Address* – Opening of The Brain Health Research Institute at Kent State University, 2021

*Grand Rounds* - Boston University School of Medicine Clinical Neuroscience, 2019

*George A. Miller Award Lecture* - San Francisco, 2019

*Panelist* - Cell Press "The State of the Mind 2018", San Diego, 2018

*Panelist* - Boston Book Festival, "Twitter Ate My Brain", 2018  
*Distinguished Lecture Series* - University of Pittsburgh, Department of Psychiatry, 2018  
*Plenary Speaker* - International Neuropsychological Society Conference, 2018  
*Goldman-Rakic Prize Memorial Lecture* - Yale University, 2017  
*Commencement Address* - Kent State University, 2016  
*Keynote Address* - Annual Alumni College, Kent State University, 2014  
*Keynote Address* - Eastern Psychological Association Annual Meeting, 2014  
*Biomed Distinguished Lecturer* - University of Leuven, Belgium, 2011  
*Plenary Lecture* - International Conference on Cognitive and Neural Systems, Boston University, 2010  
*Carlson Lecture* - University of Chicago, 2009  
*Keynote Speaker* - Meeting of the Comparative Cognition Society, 2009  
*Engineering Distinguished Lecture* - National Science Foundation, Washington, DC, 2009  
*Keynote Speaker* - Yale University Science Day, 2008  
*Jeffrey Lecture in Cognitive Neuroscience* - UCLA, 2007  
*Mathilde Solowey Lecture in the Neurosciences* - National Institutes of Health, 2007  
*Plenary Lecture* - Japanese Society for Neuroscience Meeting, Yokohama, Japan, 2007  
*Grass Lecture* - University of Illinois at Urbana-Champaign, 2006  
*Keynote Address* - Human Brain Mapping Meeting, Toronto, Canada, 2005  
*Keynote Address*, Motivational Neuronal Network meeting, Clearwater, Florida, 2005  
*Fred Attneave Lecture* - Department of Psychology, University of Oregon, 2004  
*Swammerdam Lecture* - Vrije Universiteit and University of Amsterdam, The Netherlands, 2002

## **Invited Lectures**

### **2025**

Seminar, Yale University  
Seminar, University of California at San Diego  
Seminar. MIT ILP  
Madison Symposium on Memory and Control

### **2024**

Seminar, University of California at San Diego  
Seminar, Martinos Center at MGH  
Seminar, Georgia Tech  
Seminar, University of Illinois at Urbana-Champaign  
Seminar, Columbia University  
Seminar, Carnegie Mellon University

### **2023**

Seminar, Northwestern University  
Seminar, Queen Mary University



Seminar, University of Lisbon  
Seminar, Cognitive Neuroscience Society Meeting, San Francisco  
Seminar, University of Trento  
Seminar, University of Texas at Austin  
Workshop, National Institute on Aging  
Seminar, Naval Undersea Warfare Centers  
Seminar, Yale University  
Seminar, Carnegie Mellon University  
Seminar and Interview, The Learning Salon  
Interview, Brain Inspired Podcast

## **2022**

Kavli Summer Brain Workshop  
10<sup>th</sup> Anniversary of the Kent State Brain Health Research Institute  
Seminar, Ernst Strüngmann Institute (ESI) for Neuroscience  
Gordon Research Conference on the Neurobiology of Cognition  
Seminar, Tufts University  
Seminar, Center for Brain, Behavior, and Cognition, Pennsylvania State University  
Seminar, Research Unit 5159, German Research Foundation

## **2021**

Seminar, Bar-Ilan University  
Transatlantic Systems Neuroscience Seminar  
Brains, Minds, and Machines Seminar, MIT  
Frontiers in Cognitive Neuroscience, Karolinska Institutet

## **2020**

Seminar, University of California at Berkeley  
Seminar, Medical Research Council Cognition Unit, Cambridge, UK  
EEG Core Initiative Seminar, Brown University  
Neuroscience Seminar, Boston University  
Gordon Conference on the Neurobiology of Cognition

## **2019**

Seminar, University of Western Ontario  
Cognitive Lunch Seminar, Massachusetts Institute of Technology  
3<sup>rd</sup> Control Processes Meeting, Brown University  
Seminar, University of California at Berkeley

## **2018**

Plenary Speaker, International Neuropsychological Society Conference  
Office of Naval Research Workshop  
Memory Disorder Research Society  
ECoG Workshop, Society for Neuroscience Annual Meeting

## **2017**

Goldman-Rakic Memorial Lecture, Yale University  
Big Questions in Neuroscience, Arlington, VA  
Seminar, Brown University  
Seminar, New York University  
Symposium, Memory Disorders Research Society Meeting, Chicago, IL  
ONR Computational Neuroscience Program

## **2016**

Symposium, Memory Disorders Research Society Meeting, Princeton, NJ  
Seminar, Boston University  
28th Annual International Mental Health Research Symposium, Brain and Behavioral Research Foundation, NYC

## **2015**

Brain Stimulation Based Neural Circuit Modeling: Linking Levels of Analysis, Chicago  
Workshop on Advances in Electroencephalography, Chicago  
Computational Neuroscience Seminar, Brandeis University  
Computational Properties of the Prefrontal Cortex, Bethesda  
Neurobiology Seminar, Yale University  
Pfizer Neuroscience Seminar Series

## **2014**

Workshop on Neural Oscillations, Oxford University  
Keynote Address, Annual Alumni College, Kent State University  
Keynote Address, Eastern Psychological Association Annual Meeting  
Symposium on Categorization, Eastern Psychological Association Annual Meeting  
Gordon Conference on Cognitive Neuroscience  
Seminar, Dartmouth College

## **2013**

Symposium on Attention, 20<sup>th</sup> Annual Meeting of the Cognitive Neuroscience Society  
Cognitive Rhythms Collaborative Conference: Rhythmic Dynamics and Cognition, Cambridge, MA  
Neural Circuits for Adaptive Control of Behavior, Paris, France  
Affective Brain Lab Talk, University College London  
Seminar, University of New Hampshire  
Working Memory Conference, University of Oregon

## **2012**

Working Group of the Pontifical Academy of Sciences on "Human Activities, Neurosciences, and the Person", The Vatican  
Reprogramming the Brain, University of Texas at Dallas  
Biomedical Engineering Seminar, Tufts University  
"Rewards, Habits, and Learning: Towards an Integrative View of Frontostriatal Function", Columbia University

“Measuring and Interpreting Cognitive Changes in Early Huntington’s Disease”, CHDI Foundation, New York

Workshop on Categorization, Cosyne Meeting, Salt Lake City

Workshop on Working Memory, Cosyne Meeting, Salt Lake City

Center for Mind/Brain Medicine Seminar Series, Brigham and Women's Hospital

## **2011**

International Conference on Cognitive Neuroscience, Mallorca, Spain

Biomed Distinguished Lecturer, University of Leuven, Belgium

International Neuropsychological Symposium, Mondsee, Austria

Meet-the-Expert Event, Society for Neuroscience Annual Meeting, Washington, DC

Helen Wills Neuroscience Institute, University of California at Berkeley

Interdisciplinary Graduate Conference on Consciousness, Boston University

Neuroscience Seminar, Brandeis University

Neuroscience Seminar, Columbia University

Cognitive Rhythms Collaborative, Cambridge, MA

Visual Attention Seminar, Brigham and Women’s Hospital, Cambridge, MA

## **2010**

Center for Brain Science Seminar, Harvard University

Cognitive Brain and Behavior Seminar, Department of Psychology, Harvard University

“Lunch and Learn” seminar, Shire Pharmaceuticals, Philadelphia

Workshop on Working Memory, National Institute of Mental Health, Bethesda, MD

Symposium at the annual meeting of the American Psychiatric Association, New Orleans

Plenary Lecture, International Conference on Cognitive and Neural Systems, Boston University

Homewood Brain and Cognition Lecture Series, Johns Hopkins University

The Frontal Lobes 2010, Toronto, Canada

Adler Symposium, Salk Institute for Biological Studies

## **2009**

Carlson Lecture, University of Chicago

Keynote Speaker, Meeting of the Comparative Cognition Society

Engineering Distinguished Lecture, National Science Foundation, Washington, DC

Ernst Strungmann Forum on Dynamic Coordination in the Brain, Frankfurt, Germany

Neuroscience Seminar, University of California at San Diego

Banbury Workshop: “Searching for principles underlying memory in biological systems”, Cold Spring Harbor

Invited address, Computational and Systems Neuroscience meeting, Salt Lake City, Utah

University of Minnesota Department of Neuroscience seminar

Charles River Association for Memory seminar, Cambridge, MA

## **2008**

Conference on Memory and Neural Networks, Longyearbyen, Svalbard, Norway

Netherlands Neuroscience Institute Conference on Perceptual Learning, Motor Learning, and Automaticity, Amsterdam, Netherlands  
Keynote Speaker, Yale University Science Day  
Shire Biopharmaceuticals Advisory Board Meeting – Guanfacine Mechanism of Action in ADHD, New York City  
Seminar, Merck & Co., Inc., Philadelphia  
Neuroscience Seminar, Brown University  
Cognitive Neuroscience Seminar Series, Columbia University  
Seminar, Princeton University  
"Emotions, Memories, Consciousness, and Attention: Biological Approaches to Cognitive Problems", Columbia University  
Symposium in honor of Brenda Milner, Montreal Neurological Institute  
Cognitive, Computational and Systems Neuroscience Seminar, Washington University, St. Louis  
BrainMap Seminar, Martinos Center, Massachusetts General Hospital

## **2007**

Mathilde Solowey Lecture in the Neurosciences, National Institutes of Health  
Plenary Lecture, Japanese Society for Neuroscience Meeting, Yokohama, Japan  
Jeffrey Lecture in Cognitive Neuroscience, UCLA  
Cambridge Neuroscience Symposium, Cambridge, UK  
Meeting on Executive Functions, Leiden, Netherlands  
Neuroscience Seminar, University of California at Irvine  
Wisconsin Symposium on Emotion, University of Wisconsin  
"Neurons, brains and models: crossing levels of analysis in cognitive brain research", University of Michigan  
"The cognitive science of semantics", Tufts University  
Neuroscience Seminar, University of Maryland

## **2006**

"Memories: Molecules and Circuits", IPSEN Foundation, Paris, France  
Invited Address, Annual Meeting, American Psychological Society, New York City  
Symposium on "Prefrontal cortex, Working Memory, Flexible behavior", Yale University  
Learning Sciences Institute seminar, Vanderbilt University  
Grass Lecture, University of Illinois at Urbana-Champaign  
Neuroscience Seminar Series, University of California at Berkeley  
Neuroscience Colloquium, Boston University School of Medicine  
"New Frontiers in Brain Science: from molecules to mind", Massachusetts Institute of Technology

## **2005**

Keynote Address, Human Brain Mapping Meeting, Toronto, Canada  
International Conference on Cognitive Neuroscience, Havana, Cuba  
Fudan University Institute of Neurobiology Seminar, Shanghai, China  
International Neuropsychology Symposium, Sardinia, Italy

Helmholtz Lecture Series, Helmholtz Research Institute, Universities of Utrecht, Amsterdam, and Rotterdam, The Netherlands

Colloquium, Max Planck Institute, Berlin, Germany

Symposium on Executive Functions and the Frontal Lobe, Tuebingen, Germany

Keynote Address, Motivational Neuronal Network meeting, Clearwater, Florida

Computational Neuroscience Seminar Series, University of Chicago

Neuroscience Seminar, University of California at San Diego

Mind and Brain Colloquium, University of California at Davis

Psychology Seminar, Stanford University

Seminar, California Institute of Technology

Seminar, Harvard Mind, Brain, and Behavior Initiative, Harvard University

Course on the Biology of Memory, Cold Spring Harbor

Workshop on Schizophrenia, Cold Spring Harbor

## **2004**

Munich Encounters in Cognition and Action Symposium, Max Planck Institute, Munich, Germany

International Congress of Psychology, Beijing, China

American College of Neuropsychopharmacology Meeting, Puerto Rico

Neurons and Memory, a satellite meeting of the Society for Neuroscience Annual Meeting, San Diego

Neural Control of Behavior Meeting, University of California, Los Angeles

Center for Visual Science Symposium, University of Rochester

Neuroscience Symposium, University of Western Ontario

Mind, Brain and Behavior Distinguished Lecture, Duke University

Symposium, Cognitive Neuroscience Meeting, San Francisco

Course on Brain Science for Knight Science Journalism Fellows, M.I.T.

Working Group on Interspecific Chimeric Brains, Phoebe R. Berman Bioethics Institute, Johns Hopkins University

Interdisciplinary Program in Neuroscience Seminar, Georgetown University

Seminar, University of Texas Medical School

Seminar, Harvard Medical School

Seminar, Johns Hopkins University

Summer Institute in Cognitive Neuroscience, Dartmouth College

Fred Attneave Lecture, Department of Psychology, University of Oregon

## **2003**

Fyssen Colloquium, St Germain en Laye, France

Department of Psychology Colloquium, Cornell University

Center for Neural Science Seminar, New York University

International Joint Conference on Neural Networks, Portland, Oregon

Symposium at the Cognitive Neuroscience Society Meeting, New York

Department of Neuroscience Seminar, University of Connecticut Health Center

NIDA Workshop on Developing Behavioral Treatments for Cognitively Impaired Drug Abusers, Bethesda

NIH Workshop on Executive Functions, New York City  
Roche Pharmaceuticals, Palo Alto  
RIKEN Brain Sciences Institute Retreat, Shinrin-Koen, Japan  
John Merck Summer Course in Cognitive Neuroscience, Princeton University  
Cognitive Science Seminar, University of Quebec in Montreal  
Neuroscience Seminar Series, Mount Sinai School of Medicine, New York  
Neuroscience Formal Seminar Series, University of California, San Francisco  
Neuroscience Retreat, University of Pittsburgh  
Department of Psychology Seminar, Stanford University  
Seminar, Columbia University

## **2002**

UCLA Neuroscience Seminar Series  
F.C. Donners Lecture, University of Nijmegen, The Netherlands  
Swammerdam Lecture, Vrije Universiteit and University of Amsterdam, The Netherlands  
Symposium at the European Conference on Visual Perception, Glasgow, Scotland  
Seminar, Honda Research and Development Co., Wako-shi, Japan  
Meeting of the American Association for the Advancement of Science (symposium organizer), Boston  
University of Illinois Neuroscience Seminar Series  
Emory University Neuroscience Colloquium  
Institute for Cognitive Science Colloquium Series, University of Colorado at Boulder  
Helmholtz Club, University of California at Irvine  
Sloan Seminar, California Institute of Technology  
Neurobiology and Behavior Seminar Series, Columbia University  
Cognitive Neuroscience Seminar, National Institutes of Health  
Department of Psychology Seminar, University of Pennsylvania  
Neuroscience Seminar, Wake Forest University School of Medicine

## **2001**

Society for Research in Child Development, Minneapolis  
Winter Conference on Neural Plasticity, Antigua, West Indies  
Gordon Research Conference on Neural Plasticity, Newport, Rhode Island  
International Society for Behavioral Neuroscience, Marrakech, Morocco  
Royal Society Meeting, London, UK  
Association for the Study of Consciousness Meeting, Duke University  
Rotman Research Institute Seminar, Toronto, Canada  
University of Rochester Colloquium Series  
Cold Spring Harbor Summer Course  
Kennedy Shriver Center Colloquium Series, Waltham, MA  
Memory Research and Disorders Society Meeting, Boston  
Department of Psychology Colloquium, Harvard University

## **2000**

The Frontal Lobes: In the Forefront of the Millennium, Rotman Research Institute, Toronto Canada  
Symposium on the Cognitive Neuroscience of Attention and Awareness, London, UK  
Neuroscience Seminar, Washington University  
RIKEN Brain Institute Summer Program, Japan  
Workshop on Executive Functions of Attention, New York University  
University of Minnesota Center for Cognitive Sciences Colloquium  
Mini-Symposium on Visual Working Memory, ARVO Meeting  
Neuroscience Colloquium, Massachusetts General Hospital  
Towards Animal Models of Attention and Consciousness, Cold Spring Harbor  
Harvard Psychology Seminar  
Boston University Psychology Seminar  
Baylor University Neuroscience Seminar  
Department of Physiology Seminar, University of Montreal  
Neuroscience Seminar Series, National Institutes of Health

## **1999**

Department of Psychology Seminar, Princeton University  
Neuroscience Seminar Series, Boston University  
Attentional Processes in Selective Perception and Working Memory, Satellite Symposium of the Cognitive Neuroscience Society Meeting, Washington, DC  
Department of Psychiatry, Harvard Medical School  
Neuroscience Seminar, University of California at Berkeley  
Summer Institute in Cognitive Neuroscience, Dartmouth College  
RIKEN Brain Institute Summer Program, Japan  
Brain and Machines Lecture Series, MIT  
Stanford Neurosciences Program Annual Retreat, Monterey, CA  
Department of Psychology Seminar, University of Iowa  
Conference in Cognitive Science, Vancouver, Canada  
Brandeis Summer Lecture Series in Neuroscience

## **1998**

Workshop on Visuospatial Working Memory, Executive Control and The Frontal Lobes, Delmenhorst, Germany  
International Symposium on Learning and Memory, University of Otago, New Zealand  
Attention and Performance 18, The Great Park, Windsor, England  
Symposium at the Annual Society for Neuroscience Meeting: Neural Basis of Working Memory  
RIKEN Symposium, Tokyo, Japan  
Cognitive Neuroscience Society Meeting, San Francisco  
McKnight Foundation Meeting, Aspen  
Neuroscience Seminar Series, Princeton University  
Winter Conference on Brain Research, Snowbird, Utah

Winter Conference on Neural Plasticity, St. Lucia, West Indies  
Institute for Research in Cognitive Science Seminar, University of Pennsylvania  
Neuroscience Seminar Series, Rockefeller University  
Zanvyl Krieger Mind/Brain Institute Seminar Series, Johns Hopkins University  
Developmental Neuroscience Seminar, Eunice Kennedy Shriver Center, Waltham  
Neuroscience Seminar Series, Center for Neuroscience, Rutgers University  
Department of Neuroanatomy Seminar, Boston University  
Second International Conference on Cognitive and Neural Systems, Boston University  
Center for Neuroscience Seminar, University of California at Davis  
Laboratory of Neuropsychology Symposium, National Institute of Mental Health

### **1997**

Novartis Foundation Meeting on Functions of the Prefrontal Cortex, London, UK  
Colloquium Series, MRC Applied Psychology Unit, Cambridge, UK  
ONR Workshop on Cognitive Neuroscience, Marine Biology Lab, Woods Hole  
Department of Psychology Colloquium, Carnegie Mellon University  
Neuroscience Colloquium Series, Brown University  
Bowman Gray Medical School Neuroscience Colloquium Series  
Neurocomputation Seminar, Brandeis University  
Pew Scholars Annual Meeting, San Jose, Costa Rica  
Department of Neurobiology Seminar, Harvard University  
Department of Psychology Seminar, Boston University  
Department of Neuroanatomy Seminar, Boston University  
Imaging Center Seminar, Massachusetts General Hospital  
Brain and Cognitive Sciences Colloquium Series, MIT

### **1996**

Department of Neurobiology Seminar, Weizmann Institute of Science, Israel  
Department of Psychology Seminar, University of Connecticut

### **1995**

Winter Conference on the Neurobiology of Learning and Memory, Park City  
The Helmholtz Club, University of California, Irvine  
Vision Center Laboratory Seminar, The Salk Institute for Biological Studies  
Harvard Undergraduate Neuroscience Society

### **1994**

Cooperation Forum for Multi-Disciplinary Researches, Hiroshima, Japan  
Department of Neurobiology Seminar, Harvard Medical School  
Third Appalachian Conference on Behavioral Neurodynamics, Center for Brain Research and Informational Sciences, Radford University  
Neural Systems, Memory, and Aging Seminar, University of Arizona  
Third Workshop on Neural Networks, Elba International Physics Center, Italy



Department of Psychology Seminar, Carnegie Mellon University  
Joint Vision Laboratory - Cognitive Brain and Behavior Seminar, Harvard University  
Department of Brain and Cognitive Sciences Seminar, Massachusetts Institute of Technology  
Department of Neurobiology Seminar, Emory University  
Department of Physiology and Biophysics Seminar, University of Washington

**1992**

Section on Neurobiology Seminar, Yale University  
Vision Center Laboratory Seminar, The Salk Institute for Biological Studies  
Neural Systems Seminar, National Institute of Neurological Disorders and Stroke

**Teaching (MIT):**

Systems Neuroscience (9.011)  
Brain and Behavior Laboratory (9.02)  
Survey of Cognitive Science (9.401)  
Cognitive Neuroscience (9.10)  
Neural Plasticity (9.30/7.98)  
Brain and Cognitive Sciences (9.012)