

## Elizabeth A. Buffalo, Ph.D.

---

Professor, Department of Physiology and Biophysics  
University of Washington School of Medicine  
Chief, Neuroscience Division  
Washington National Primate Research Center  
1705 NE Pacific Street  
Box 357290  
Seattle, WA 98195

Phone: (206) 543-1432 (office)  
(206) 616-7107 (lab)  
E-mail: [ebuffalo@uw.edu](mailto:ebuffalo@uw.edu)  
<http://buffalomemorylab.com>

---

### ***Academic Appointments***

2016 - Professor of Physiology and Biophysics, University of Washington School of Medicine  
2015 - Chief, Division of Neuroscience, Washington National Primate Research Center  
2013 - 2016 Associate Professor of Physiology and Biophysics, University of Washington School of Medicine  
2013 - Core Faculty, Division of Neuroscience, Washington National Primate Research Center  
2012 - 2013 Associate Professor of Neurology, Emory University School of Medicine  
2009 - 2013 Core Faculty, Division of Neuropharmacology and Neurologic Diseases, Yerkes National Primate Center  
2005 - 2012 Assistant Professor of Neurology, Emory University School of Medicine

### ***Academic History***

1999 – 2005 Post-doctoral Research Fellow, Laboratory of Neuropsychology, NIMH, Dr. Robert Desimone  
1998 Ph.D., Neurosciences, University of California, San Diego, Drs. Stuart Zola and Larry Squire  
1995 M.A. Philosophy, University of California, San Diego, Dr. Patricia Churchland  
1992 B.A., Philosophy, Wellesley College

### ***Fellowships, Awards, and Other Special Appointments***

2016 Elected to the Washington State Academy of Sciences  
2014 - Member, Dana Alliance for Brain Initiatives  
2014 – Scientific Advisory Board, caesar, Max Planck Research Institute  
2014 - 2020 Associate Editor, *Behavioral Neuroscience*  
2014 - 2016 Associate Editor, *Proceedings of the Royal Society B: Biological Sciences*  
2014 - 2017 Standing Member, Learning and Memory study section, NIH  
2012 - Faculty Member, Faculty of 1000  
2011 Troland Research Award, National Academy of Sciences  
2011 Ad-hoc member of NIH study section LAM, October  
2011 External reviewer, National Science Foundation of China, July  
2007-2011 Ad-hoc member of NIH study section MDCN (11 meetings)  
2010 Woodruff Leadership Academy, Emory University School of Medicine  
2010 Editorial Board of *Frontiers in Perception Science*, Review Editor  
2009 Ad-hoc member of NIH study section IFCN-L, July  
2009 Ad-hoc member of NIH study section ETTN-Q, November  
2007 Editorial Board, *Statistics in Medicine*, Special Edition, 26(21)  
2005 External Reviewer, National Science Foundation, September  
1999-2005 National Institutes of Health Intramural Research Training Award  
1994-1998 Fellow, McDonnell-Pew Center for Cognitive Neuroscience, San Diego  
1996-1998 NIH, Neuroplasticity of Aging Training Grant  
1995-1996 NSF, Systems and Integrative Neurobiology Training Grant  
1993-1997 University of California, San Diego, Predoctoral Humanities Fellowship  
1992 Wellesley College Trustee Scholar (awarded to two graduates each year)

### ***Current Research Support***

*Neuronal Synchronization in the Medial Temporal Lobe and Memory Formation (PI)*

National Institutes of Health (R01 MH080007)

07/01/08-10/31/18

*Neural Dynamics for a Cognitive Map in the Macaque Brain (PI)*

Simons Foundation, Simons Collaboration on the Global Brain (SCGB)

08/01/15 – 07/31/18

*Neurobiology and Neuropharmacology of Prosocial Behavior in Primates: Novel Approaches to Treating Social Deficits (PI of Project 2)*

National Institutes of Health (P50 MH100023, PI:Young)

07/01/13 – 05/31/18

*Collaboration for Preclinical Endophenotyping in Circuitry of Disease (CAPECOD) (PI)*

Pfizer

02/01/16 – 03/01/18

### ***Completed Research Support***

*The Neural Basis of Relational Memory (PI)*

National Institutes of Health (R01 MH093807)

3/01/12-12/31/16

*Memory Enhancement with Modeling, Electrophysiology, and Stimulation (MEMES) (PI of TA3)*

DARPA (BAA-14-081, PI: Kahana)

07/01/14 – 12/31/15

*Automated Web-Based Behavioral Diagnostics of Cognitive Impairment (Co-I)*

National Institutes of Health (R01 EB014266)

08/01/11 – 07/31/15

*Memory Enhancement and Deep-Brain Stimulation in the Medial Temporal Lobe (Pilot Project PI)*

Support of Yerkes National Primate Research Center (Michael Johns, PI)

National Institutes of Health (P51 OD011132-52)

05/1/12-4/30/13

*BP-Endure Atlanta: Engaging Undergraduates in Neuroscience Research (Emory Director)*

National Institutes of Health (R25 GM097636)

09/01/10 – 08/31/13

*Institute on Neuroscience at Yerkes, ION@Yerkes (PI)*

Emory Neuroscience Initiative

1/1/12-12/31/13

*Characterizing Effects of Deep Brain Stimulation on Medial Frontal and Cingulate Cortex (Co-I)*

Charles A. Dana Foundation

04/01/11 – 03/31/12

*Oxytocin and Social Cognition (Co-I)*

Emory Neuroscience Initiative

07/01/11 – 06/30/12

*Venture Lab Phase I, InViza Technologies (Co-PI)*  
Georgia Research Alliance  
09/09/11-10/15/12

*Summer Research Experiences for Students and Science Educators (PI)*  
Administrative Supplement to Yerkes Base Grant  
06/08/09-09/30/10

*Early Cognitive Deficits in Parkinson's Disease: Functional and Morphological Evidence from Nonhuman Primate Model to Patients with Parkinson's Disease (Co-PI)*  
National Institutes of Health, Administrative Supplement to Yerkes Base Grant  
12/01/08-05/31/10

*Automatic Web-based System for Early Detection of Mild Cognitive Impairment (Co-PI)*  
Emory Alzheimer's Disease Research Center  
05/01/09-04/30/10

*Laminar-Specific Neural Mechanisms for Memory in the Entorhinal Cortex (PI)*  
Yerkes Base Grant Venture Grant  
05/01/06-04/30/07

*Neuronal Mechanisms of Memory in the Medial Temporal Lobe (PI)*  
Emory Alzheimer's Disease Research Center  
05/01/06-04/30/07

*Hippocampal-Cortical Interactions and Memory (PI)*  
Emory University Research Council  
01/01/06-12/31/07

## ***Publications***

1. Rueckemann, J.W. and Buffalo, E.A. (2017). Auditory landscape on the cognitive map. *Nature*. 543(7647):631-632.
2. Wilming, N., Kietzmann, T.C., Jutras, M., Xue, C., Treue, S., Buffalo, E.A., and König, P. (2017). Differential contribution of low- and high-level image content to eye movements in monkeys and humans. *Cerebral Cortex*. 27(1): 279-293.
3. Eichenbaum, H., Amaral, D.G., Buffalo, E.A., Buzsaki, G., Cohen, N., Davachi, L., Frank, L., Heckers, S., Morris, R.G.M., Moser, E.I., Nadel, L., O'Keefe J., Preston, A., Ranganath, C., Silva, A., and Witter, M. (2016). Hippocampus at 25. *Hippocampus*. 26(10):1238-49.
4. König, S.D. and Buffalo, E.A. (2016). Modeling visual exploration in rhesus macaques with bottom-up salience and oculomotor statistics. *Frontiers in Integrative Neuroscience*. 30 June; 10:23.
5. Meister, M.L. and Buffalo, E.A. (2016). Getting directions from the hippocampus: The neural connection between looking and memory. *Neurobiology of Learning and Memory*. 134 Pt A:135-44.
6. Killian, N.J., Potter, S., and Buffalo, E.A. (2015). Saccade direction encoding in the primate entorhinal cortex during visual exploration. *Proceedings of the National Academy of Sciences*. 112(51):15743-8.
7. Schiller, D., Eichenbaum, H., Buffalo, E.A., Davachi, L., Foster, D., Leutgeb, S., and Ranganath, C. (2015). Memory and Space: Towards an Understanding of the Cognitive Map. *Journal of Neuroscience*. 35(41):13904-11.
8. Buffalo, E.A. (2015). Bridging the gap between spatial and mnemonic views of the hippocampal formation. *Hippocampus*. 25(6):713-8.
9. Solyst, J.A. and Buffalo, E.A. (2014). Social relevance drives viewing behavior independent of low-level salience in rhesus macaques. *Frontiers in Neuroscience*. 8:354.
10. Killian, N.J. and Buffalo, E.A. (2014). Distinct frequencies mark the direction of communication. *Proceedings of the National Academy of Sciences*. 111(40):14316-7.
11. König, S.D. and Buffalo, E.A. (2014). A nonparametric method for detecting fixations and saccades using cluster analysis: Removing the need for arbitrary thresholds. *Journal of Neuroscience Methods*. 227:121-31.

12. Jutras, M.J. and Buffalo, E.A. (2014). Oscillatory correlates of memory in non-human primates. *Neuroimage*. 85 Part 2:694-701.
13. Vinck M., Womelsdorf T., Buffalo, E.A., Desimone R., and Fries, P. (2013). Attentional modulation of cell-class-specific gamma-band synchronization in awake monkey area V4. *Neuron*. 80(4):1077-89.
14. Jutras, M.J., Fries, P., and Buffalo, E.A. (2013). Oscillatory activity in the monkey hippocampus during visual exploration and memory formation. *Proceedings of the National Academy of Sciences*. 110(32):13144-9.
15. Killian, N.J., Jutras, M.J., and Buffalo, E.A. (2012). A map of visual space in the primate entorhinal cortex. *Nature*. 491(7426):761-4.
16. Lagun, D., Manzanares, C., Zola, S.M., Buffalo, E.A., and Agichtein, E. (2011). Detecting cognitive impairment by eye movement analysis using automatic classification algorithms. *Journal of Neuroscience Methods*. 201:196-203.
17. Buffalo, E.A., Fries, P., Landman, R., Buschman, T.J., and Desimone, R. (2011). Laminar differences in gamma and alpha coherence in the ventral stream. *Proceedings of the National Academy of Sciences*. 108:11262-7.
18. Jutras, M.J. and Buffalo, E.A. (2010). Recognition memory signals in the macaque hippocampus. *Proceedings of the National Academy of Sciences*. 107:401-6.
19. Jutras, M.J. and Buffalo, E.A. (2010). Synchronous neural activity and memory formation. *Current Opinion in Neurobiology*. 20:150-5. Epub March 18, 2010.
20. Buffalo, E.A., Fries, P., Landman, R., Liang, H., and Desimone, R. (2010). A backwards progression of attentional effects in the ventral stream. *Proceedings of the National Academy of Sciences*. 107: 361-5.
21. Jutras, M.J., Fries, P., and Buffalo, E.A. (2009). Gamma-band synchronization in the macaque hippocampus and memory formation. *Journal of Neuroscience*. 29:12521-31.
22. Bellgowan, P.S.F., Buffalo, E.A., Bodurka J., and Martin A. (2009) Lateralized spatial and object memory encoding in entorhinal and perirhinal cortices. *Learning and Memory*. 16:433-438.
23. Buffalo, E.A., Bellgowan, P.S.F., and Martin, A. (2006) Distinct roles for medial temporal lobe structures in memory for objects and their locations. *Learning and Memory* 13:638-643.
24. Liang, H., Bressler, S.L., Buffalo, E.A., Desimone, R., and Fries, P. (2005) Empirical mode decomposition of field potentials from macaque V4 in visual spatial attention. *Biological Cybernetics* 92:380-392.
25. Buffalo, E.A., Bertini, G., Ungerleider, L.G., and Desimone, R. (2005) Impaired filtering of distracter stimuli by TE neurons following V4 and TEO lesions in macaques. *Cerebral Cortex* 15:141-151.
26. Bertini, G., Buffalo, E.A., DeWeerd, P., Ungerleider, L.G., and Desimone, R. (2004) Visual responses to targets and distracters by inferior temporal neurons after lesions of extrastriate areas V4 and TEO. *NeuroReport* 15:1611-1615.
27. Floel, A., Peoppel, D., Buffalo, E.A., Braun, A., Wu, C.W.H., Seo, H.J., Stefan, K., Knecht, S., and Cohen, L.G. (2004) Prefrontal cortex asymmetry for memory encoding of words and abstract shapes. *Cerebral Cortex* 14:404-409.
28. Squire, L.R., Schmolck, H., and Buffalo, E.A. (2001). Memory distortions develop over time: A reply to D.B. Horn. *Psychological Science* 12:182.
29. Buffalo, E.A., Ramus, S.J., Squire, L.R., and Zola, S.M. (2000). Perception and recognition memory following perirhinal cortex lesions in the monkey. *Learning and Memory* 7:375-382.
30. Stefanacci, L., Buffalo, E.A., Schmolck, H., and Squire, L.R. (2000). Profound amnesia after damage to the medial temporal lobe: A neuroanatomical and neuropsychological profile of patient E.P. *Journal of Neuroscience* 20:7024-7036.
31. Schmolck, H., Buffalo, E.A., and Squire, L.R. (2000). Memory distortions develop over time: Recollections of the O.J. Simpson trial verdict after 15 and 32 months. *Psychological Science* 11:39-45.
32. Zola, S.M., Squire, L.R., Teng, E., Stefanacci, L., Buffalo, E.A., and Clark, R.E. (2000). Impaired recognition memory in monkeys after damage limited to the hippocampal region. *Journal of Neuroscience* 20:451-463.
33. Buffalo, E.A., Ramus, S.J., Clark, R., Teng, E., Squire, L.R., and Zola, S.M. (1999). Dissociation between the effects of damage to the perirhinal cortex and area TE. *Learning and Memory* 6:572-599.
34. Paule, M.G., Chelonis, J.J., Buffalo, E.A., Blake, D.J., and Casey, P.H. (1999). Operant test battery performance in children: Correlation with IQ. *Neurotoxicology and Teratology* 21:223-230.
35. Buffalo, E.A., Reber, P.J., and Squire, L.R. (1998). The human perirhinal cortex and recognition memory. *Hippocampus* 8:330-339.
36. Buffalo, E.A., Stefanacci, L., Squire, L.R., and Zola, S.M. (1998). A reexamination of the concurrent discrimination learning task: The importance of inferotemporal cortical area TE. *Behavioral Neuroscience* 112:3-14.

37. Buffalo, B., Gaffan, D., Murray, E.A. (1994). A primacy effect in monkeys when list position is relevant. *The Quarterly Journal of Experimental Psychology* 47:353-369.
38. Buffalo, E.A., Gillam, M.P., Allen, R.R., and Paule, M.G. (1994). Acute behavioral effects of MK-801 in rhesus monkeys: Assessment using an operant test battery. *Pharmacology Biochemistry and Behavior* 48:935-40.
39. Buffalo, E.A., Gillam, M.P., Allen, R.R., and Paule, M.G. (1993). Acute effects of caffeine on several operant behaviors in rhesus monkeys. *Pharmacology Biochemistry and Behavior* 46:733-7.

### **Book Chapters**

1. M. Meister and E.A. Buffalo (2015). Memory in *Translational Neuroscience*, M. Conn, ed. Elsevier: New York.
2. E.A. Buffalo and L.R. Squire (2014). Declarative Memory, Neural Basis of, in *The International Encyclopedia of Social and Behavioral Sciences 2E*, J. Wright, ed., Elsevier: New York.
3. E.A. Buffalo and J. Manns (2013). Learning and Memory: Brain Systems, in *Fundamental Neuroscience*, 4<sup>th</sup> Edition, L.R. Squire, D. Berg, F.E. Bloom, S. du Lac, A. Ghosh, and N.C. Spitzer, eds., Elsevier: New York, pp. 1029-1052.
4. E.A. Buffalo and R. Desimone (2002). Multiple Neuronal Mechanisms for Memory in the Anterior Inferior Temporal Cortex of Monkeys, in *Neuropsychology of Memory*, 3<sup>rd</sup> Edition, L.R. Squire and D. Schacter, eds., Guilford: New York, pp. 311-325.

### **Invited Talks**

#### **2017**

- Sackler Winter Conference in Developmental Psychobiology, Turks and Caicos, January 3-7, 2017.
- Winter Conference on Neural Plasticity, Grenada, February 4-11, 2017.
- Computational and Systems Neuroscience (COSYNE), Workshop on High-Dimensional Neuro-Behavioral Analyses, Snowbird, Utah, February 27-28, 2017.
- Temporal Dynamics of Learning Center-Dart NeuroScience Seminar Series, University of California, San Diego, March 1, 2017.
- The Neural Basis of Active Sensation and Navigation, Janelia Conference, Janelia Research Campus, Ashburn, VA, March 26-29, 2017.
- Boynton Colloquium Series, University of Rochester, Rochester, NY, April 10, 2017.
- Helen Wills Neuroscience Institute, MCB Division of Neurobiology Seminar Series, University of California, Berkeley, April 27, 2017.
- Center for the Neurobiology of Learning and Memory, University of California, Irvine, May 2, 2017.
- Oregon National Primate Research Center, May 17, 2017.
- Oxford Oscillations Workshop, Oxford, UK, September 2-6, 2017.
- Memory Disorders Research Society, Chicago, IL, September 14-16, 2017.

#### **2016**

- Winter Conference on Neural Plasticity, Maui, HI, January 30-February 6, 2016.
- The Future of Primate Neuroscience, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China, March 22-23, 2016.
- 113<sup>th</sup> International Titisee Conference, "Building tools for quantifying brain and behavior", Titisee, Black Forest, Germany, April 6-10, 2016.
- University of Texas, Houston, Department of Anatomy and Neurobiology Seminar Series, Houston, TX, April 28, 2016.
- Washington University Department of Anatomy and Neurobiology, St. Louis, MO, May 11, 2016.
- Celebrating 25 years of the journal *Hippocampus*, Boston, MA, May 23-24, 2016.
- Functional Architecture of Memory, Bochum, Germany, May 25-27, 2016.
- Interdisciplinary Navigation Symposium, Bad Gastein, Austria, June 26-30, 2016.
- Gordon Conference on the Neurobiology of Cognition, Sunday River Resort, Newry, ME, July 24-29, 2016.
- Annual Meeting, Simons Collaboration on the Global Brain, New York, NY, September 11-13, 2016.
- Neuroscience Seminar Series, UT Southwestern, Dallas, TX, September 20, 2016.
- A Celebration of 60 Years of Behavioral and Cognitive Neuroscience in the Laboratory of Neuropsychology, Bethesda, MD, October 19-21, 2016.

Caltech Conte Center, California Institute of Technology, Pasadena, CA, November 9-10, 2016.

## **2015**

Computational and Neural Systems Seminar Series, Caltech, “Neural signals for memory and space in the primate medial temporal lobe”, Pasadena, CA, January 12, 2015.  
NIH Neuroscience Seminar Series, National Institutes of Health, Bethesda, MD, March 16, 2015.  
Austin Conference on Learning and Memory, University of Texas, Austin, TX, April 24-25, 2015.  
UCLA Joint Seminars in Neuroscience Lecture, Los Angeles, CA, June 2, 2015.  
Spring Hippocampal Research Conference, Taormina, Sicily, June 7-11, 2015.  
Simons Foundation for the Global Brain Collaborative, New York, NY, September 10-12, 2015.  
Max Planck Symposium on Primate Neuroscience, Gottingen, Germany, September 17-18, 2015.  
Minisymposium, “How Can We Reconcile the Divergent Views of the Hippocampus?”, Annual Meeting of the Society for Neuroscience, Chicago, IL, October, 19, 2015.  
Society for Neuroscience, Distinguished Traveling Scientist, Greater New Orleans Chapter of the Society for Neuroscience, November 18, 2015.  
Perspectives in Neuroscience Seminar Series, University of California, Davis, CA, December 3, 2015.

## **2014**

University of Texas at Austin, Keynote Address, Neuroscience Symposium, January 25, 2014.  
Kavli Institute Symposium on Neurophysics of Space, Time, and Memory, February 3-9, 2014.  
Winter Conference on Neural Plasticity, February 22-March 1, 2014.  
Janelia Farms Conference, “How to Read a Map: Understanding Structure-Function Relationships in the Brain”, April 6-9, 2014.  
University of Pennsylvania Mahoney Institute for Neurological Sciences, April 16, 2014.  
Seattle Arts and Lectures, Hacking the Brain to Reveal, Repair, and Rebuild, “Finding your way: How brains encode space and how we remember where we are”, Seattle, WA, October 22, 2014.  
University of Washington School of Medicine, New Investigator Lecture, October 29, 2014.  
Human Single Neuron Conference, “Neural activity related to visual exploration and navigation in primates”, Baltimore, MD, November 13-14, 2014.  
Institute for Cognitive Neuroscience, University of Osnabruck, “Neural Signals for Memory and Space in the Primate”, Osnabruck, Germany, December 18, 2014.

## **2013**

Johns Hopkins University, Neuroscience Research Seminar Series, “Neural Signals for Memory and Space in the Primate”, Baltimore, MD, January 10, 2013.  
Winter Conference on Neural Plasticity, “A Map of Visual Space in the Primate Entorhinal Cortex”, Curacao, Dutch Caribbean, February 15, 2013.  
University of California, San Diego, Neuroscience Graduate Program Seminar Series, “Neural Signals for Memory and Space in the Monkey Hippocampal Formation”, San Diego, CA, March 5, 2013.  
Osnabruck Computational Cognition Alliance Meeting, “Neural Representations in the Primate Medial Temporal Lobe”, Osnabruck, Germany, May 29, 2013.  
Cognitive Rhythms Collaborative, MIT, “Rhythmic Neural Activity and Memory Formation”, Cambridge, MA, June 4, 2013.  
Pacific Northwest Computational Neuroscience Connection, “Seeing is Remembering: Visual Exploration and Memory Formation in Nonhuman Primates”, September 27, 2013.  
Oregon Neuroscience Celebration, “Neural Signals for Memory and Space in the Primate Medial Temporal Lobe”, October 18, 2013.

## **2012**

Zanvyl Krieger Mind/Brain Institute, Johns Hopkins University, “Spatial and Object Representations in the Monkey Entorhinal Cortex”, Baltimore, MD, March 5, 2012.  
Brown University Neuroscience Graduate Program Seminar Series, “Mechanisms for memory in the Monkey Medial Temporal Lobe”, Providence, RI, March 22, 2012.  
Boston University, “Neural Codes for Memory and Space in the Monkey Medial Temporal Lobe”, Boston, MA, May 30, 2012.

University of Washington, Department of Physiology and Biophysics, “Neural Codes for Memory and Space in the Monkey Hippocampal Formation”, Seattle, WA, June 5, 2012.

## **2011**

University of Chicago, Neurobiology seminar series, “Neuronal Synchronization and Memory Formation”, Chicago, IL, March 3, 2011.

Spring Hippocampus Meeting, “Theta-Gamma Phase Coupling in the Monkey Hippocampus”, Verona, Italy, May 26, 2011.

International Conference on Plastic Vision, Center for Vision Research, “Visual Exploration, Recognition Memory, and the Hippocampus”, York University, Toronto, CA, June 17, 2011.

Mount Sinai Medical Center, “Neural Codes for Memory and Space in the Monkey Medial Temporal Lobe”, New York, NY, December 1, 2011.

University of California, San Francisco, Neuroscience seminar series, “Neural Codes for Memory and Space in the Monkey Medial Temporal Lobe”, San Francisco, CA, December 8, 2011.

## **2010**

Janelia Farms Research Campus, “Recognition Memory Signals in the Macaque Hippocampus”, Janelia Farms, VA, July 14, 2010.

Stanford Institute for Neuro-Innovation and Translational Neurosciences, “Neuronal Synchrony and Memory Formation”, Palo Alto, CA, December 3, 2010.

Winter Conference on the Neurobiology of Learning and Memory, “Theta-Frequency Oscillations in the Primate Hippocampus Related To Visual Exploration”, Park City, UT, January, 2010.

COSYNE (Computational and Systems Neuroscience) Workshop, “Hippocampal Oscillations and Synchronization in Memory Formation”, Snowbird, UT, March 2, 2010.

Gordon Conference, Neurobiology of Cognition, “Neural Synchrony in the Macaque Hippocampus and Memory Formation”, Waterville, NH, August 3, 2010.

American Psychological Association, “Neuronal Synchrony in the Medial Temporal Lobe and Memory Formation”, San Diego, CA, August 12, 2010.

## **2009**

Brain and Behavior Discovery Institute, “Memory Signals in the Macaque Hippocampus”, Medical College of Georgia, Augusta, GA, April 22, 2009.

Winter Conference on the Neurobiology of Learning and Memory, “Gamma- and Theta-Band Oscillations in the Monkey Hippocampus”, Park City, Utah, January, 2009.

Spring Hippocampus Meeting, “Theta-Band Oscillations in the Monkey Hippocampus”, Verona, Italy, May, 2009.

## **2008**

Fridtjof Nansen Conference on Neural Networks and Behavior, “Recognition Memory Signals in the Macaque Hippocampus”, Svalbard, Norwegian Arctic, June, 2008.

Exciting Biologies: Biology of Cognition, Cell Press, “Recognition Memory Signals in the Macaque Hippocampus”, Chantilly, France, October, 2008.

## **2007**

Workshop on Cognitive Neurobiology, “Gamma-Band Synchrony and Recognition Memory”, Okinawa Institute of Science and Technology, Okinawa, Japan, March, 2007.

## **2006**

NIMH-Sponsored Satellite Symposium, Dynamical Neuroscience, “Neuronal Synchronization and Memory Formation”, Atlanta, Georgia, October 12, 2006.

## **2005**

COSYNE, Computational Systems and Neuroscience workshop, “Layer-Specific Attentional Modulation in Early Visual Areas”, Snowbird, Utah, March 22, 2005.

## **2004**

Emory University Medical School, Department of Neurology, “Neural Mechanisms of Memory and Attention”, Atlanta, GA, May, 2004.

Workshop on the Statistical Analysis of Neuronal Data (SAND2), “Layer-Specific Attentional Modulation of Neuronal Synchrony”, Carnegie Mellon University, Pittsburgh, PA, May, 2004.

Communication in Brain Systems, “Layer-Specific Attentional Modulation of Neuronal Synchrony”, Banbury Center, Cold Spring Harbor Laboratory, NY, May 17, 2004.

Platform presentation, Organization for Human Brain Mapping, “The Perirhinal and Parahippocampal Cortices Make Distinct Contributions to Recognition Memory”, Budapest, Hungary, June 16, 2004.

Neuromorphic Engineering Workshop, “The Neurobiology of Attention”, Telluride, CO, July 7, 2004.

### 2003

Department of Neurology, Georgetown Medical School, “Mechanisms of Attention in the Ventral Stream and the Organization of Memory in the Medial Temporal Lobe”, Washington, DC, February, 2003.

Department of Brain and Cognition, Johns Hopkins University, “Neural Mechanisms of Memory and Attention”, Baltimore, MD, April, 2003.

Workshop on Neural Spectroscopy, “Layer-Specific Attentional Modulation of Neuronal Synchrony”, Marine Biological Laboratories, Woods Hole, MA, August, 2003.

### 2002

Picower Center for Learning and Memory, Massachusetts Institute of Technology, “Mechanisms of Attention in Extrastriate Cortex”, Cambridge, MA, February, 2002.

Department of Psychology, Vanderbilt University, “Mechanisms of Attention in Extrastriate Cortex”, Nashville, TN, March, 2002.

Center for Neuroscience, University of California, Davis, “Mechanisms of Attention in Extrastriate Cortex”, Davis, CA, March, 2002.

Yerkes Regional Primate Center, Emory University, “Mechanisms of Attention in Extrastriate Cortex”, Atlanta, GA, April, 2002.

Memory Disorders Research Society, “The Perirhinal and Parahippocampal Cortices Make Distinct Contributions to Recognition Memory”, San Francisco, CA, October, 11, 2002.

### *Published Abstracts and Presentations*

1. Buffalo E.A., Zola-Morgan S., and Squire L.R. (1994). Inferotemporal cortex area TE as redefined by recent anatomical studies. *Society for Neuroscience Abstracts* 20:1074.
2. Buffalo E.A., Ramus S.J., Zola-Morgan S., and Squire L.R. (1995). Different behavioral effects of damage to visual area TE and perirhinal cortex. *Society for Neuroscience Abstracts* 21:1493.
3. Buffalo E.A., Stefanacci L., Zola S.M., and Squire L.R. (1996). Contrasting behavioral effects following lesions of perirhinal cortex and area TE: A retrospective analysis. Cold Spring Harbor Memory Colloquium.
4. Zola S.M., Buffalo E.A., Ramus S.J., and Squire L.R. (1997). Different behavioral effects of damage to perirhinal cortex and visual area TE: Visual short-term vs. long-term memory. *Society for Neuroscience Abstracts* 23:12.
5. Buffalo E.A., Stefanacci L., Squire L.R., and Zola S.M. (1997). A reexamination of the concurrent discrimination learning task: The importance of inferotemporal cortical area TE. *Society for Neuroscience Abstracts* 23:12.
6. Zola S.M., Teng E., Clark R.E., Stefanacci L., Buffalo E.A., and Squire L.R. (1998). Impaired recognition memory and simple discrimination learning in monkeys following lesions limited to the hippocampal region made by radio frequency, ischemia, or ibotenic acid. *Society for Neuroscience Abstracts* 24:17.
7. Buffalo E.A., Ramus S.J., Clark R.E., Teng E., Squire L.R., and Zola S.M. (1998). Distinguishing the functions of perirhinal cortex and visual area TE. *Society for Neuroscience Abstracts* 24:17.
8. Bertini G., Buffalo E.A., Thakar H., Jagadeesh B., DeWeerd P., Desimone R., and Ungerleider L.G. (1999). The effects of V4/TEO lesions on responses of macaque area TE neurons to targets embedded in distracters. *Society for Neuroscience Abstracts* 25: 916.
9. Popke E.J., Gillam M.P., Buffalo E.A., Paule M.G., and Schmued L. (1999). Effects of nicotine on memory and motivation in non-human primates. *Society for Neuroscience Abstracts* 25:629.
10. Buffalo E.A., Bertini G., Ungerleider L.G., and Desimone R. (2000). Behavioral and neuronal attention deficits following extrastriate cortical lesions in Macaques. *Society for Neuroscience Abstracts*.



11. Buffalo E.A., Bellgowan P.S.F., Desimone R., and Martin A. (2001). The perirhinal and parahippocampal cortices make distinct contributions to recognition memory. Seventh Conference on the Neurobiology of Learning and Memory.
12. Buffalo E.A., Buschman T., Fries P., and Desimone R. (2002). Modulation of neuronal synchronization in area V2 by selective attention. Program No. 418.3, *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience.
13. Buffalo E.A., Bellgowan P.S.F., and Martin A. (2003). Differential activation of medial temporal lobe structures during recognition memory. Program No. 17.3, *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience Abstracts.
14. Fries P., Buffalo E.A., Mitra P.P., and Desimone R. (2003). Selective visual attention modulates oscillatory neuronal synchronization in monkey areas V1 and V4. Program No. 385.10, *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience Abstracts.
15. Floel, D. Poeppel, E.A. Buffalo, A. Braun, C.W.-H. Wu, H. Seo, K. Stefan, S. Knecht, L.G. Cohen (2003). Frontal Cortex Asymmetry for Memory Encoding Of Words And Pictures. Program No. 514.1. *2003 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience.
16. Bellgowan P.S.F., Buffalo E.A., Bodurka J., and Martin A. (2003). High resolution imaging of the anterior medial temporal lobe during object and spatial memory. Program No. 556.1, *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience Abstracts.
17. Buffalo E.A., Bellgowan P.S.F., and Martin A. (2004). The hippocampus and the surrounding cortex play different roles in memory. Organization for Human Brain Mapping.
18. P.S.F. Bellgowan, E.A. Buffalo, N.G. Raymundo, K. Lindstrom, J. Bodurka, A. Martin (2004). High resolution fmri improves detection of task modulated activity in the entorhinal and perirhinal cortex during object and spatial encoding. Program No. 596.5. *2004 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2004.
19. E.A. Buffalo, P. Fries, R. Desimone (2004). Layer-specific attentional modulation in early visual areas. Program No. 717.6. *2004 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2004.
20. H. Liang, S.L. Bressler, E.A. Buffalo, R. Desimone, P. Fries (2004). Empirical mode decomposition of local field potentials from macaque V4 in visual spatial attention. Program No. 921.15. *2004 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2004.
21. R. Landman, E.A. Buffalo, R. Desimone (2004). Spike-field synchronization depends on neuronal stimulus selectivity in V1 of awake monkey. Program No. 986.18. *2004 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2004.
22. E.A. Buffalo, P. Fries, R. Landman, H. Liang, R. Desimone (2005). Latency of attentional modulation in ventral visual cortex. Program No. 411.6. *2005 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2005.
23. M.J. Jutras, P. Fries, E.A. Buffalo (2006). Hippocampal gamma-band synchronization during encoding predicts successful recognition memory. Program No. 371.24. *2006 Abstract Viewer/Itinerary Planner*. Atlanta, GA: Society for Neuroscience, 2006.
24. M.J. Jutras and E.A. Buffalo (2007). Recognition memory signals in the primate hippocampus. Program No. 427.13. *2007 Abstract Viewer/Itinerary Planner*. San Diego, CA: Society for Neuroscience, 2007.
25. M.J. Jutras, P. Fries, and E.A. Buffalo (2008). Hippocampal activity reflects recognition memory on a trial-by-trial basis. Program No. 296.6. *2008 Neuroscience Meeting Planner*. Washington, DC: Society for Neuroscience, 2008. Online.
26. T. Womelsdorf, B. Lima, M. Vinck, R. Oostenveld, C. Bosman, W. Singer, E.A. Buffalo, S. Neuenschwander, R. Desimone, and P. Fries (2008). Putative excitatory and inhibitory neurons synchronize at different phases of the gamma cycle in visual areas V1 and V4 of awake monkeys. Program No. 568.4. *2008 Neuroscience Meeting Planner*. Washington, DC: Society for Neuroscience, 2008. Online.
27. M.J. Jutras, and E.A. Buffalo (2009). Theta-band oscillations in the primate hippocampus are modulated by saccades during a free-viewing task. Society for Neuroscience, 2009.
28. N. Killian and E.A. Buffalo (2009). Recognition memory signals in the macaque entorhinal cortex: a laminar analysis. Society for Neuroscience, 2009.
29. M. Tompkins, M.J. Jutras, and E.A. Buffalo (2009). Enhanced memory for faces in rhesus Macaques. Society for Neuroscience, 2009.
30. J.A. Solyst, M.J. Jutras, M. Tompkins, and E.A. Buffalo (2010). Face-preferring neurons in the monkey hippocampus. Society for Neuroscience, 2010.

31. M.J. Jutras and E.A. Buffalo (2010). Theta-band phase reset in the primate hippocampus influences recognition memory performance. Society for Neuroscience, 2010.
32. N.J. Killian and E.A. Buffalo (2010). The time-course of gamma-band synchronization across layers of the macaque entorhinal cortex predicts the strength of memory formation. Society for Neuroscience, 2010.
33. E. Agichtein, E.A. Buffalo, D. Lagun, C. Manzanares, and S.M. Zola (2010). VPC-W: A web-based visual paired comparison task for early detection of amnesic mild cognitive impairment. Society for Neuroscience, 2010.
34. C.A. Erickson, M.J. Jutras, N.J. Killian, and E.A. Buffalo (2011). Stereotyped viewing of familiar images in the Visual Preferential Looking Task. Society for Neuroscience, 2011.
35. M. Tompkins, S. Uthayathas, A. Weinkle, S. Papa, T. Wichmann, Y. Smith, and E.A. Buffalo (2011). Pre-motor cognitive impairments following minimal MPTP intoxication in rhesus monkeys. Society for Neuroscience, 2011.
36. S. Li, M. Tompkins, J. Bachevalier, and E.A. Buffalo (2011). Impaired item and relational memory after hippocampal damage in monkeys. Society for Neuroscience, 2011.
37. N.J. Killian, M.J. Jutras, and E.A. Buffalo (2011). Gamma-band synchronization in the macaque MTL during recognition. Society for Neuroscience, 2011.
38. L. Kakalios, M.J. Jutras, M.L. Tompkins, J. Bachevalier, and E.A. Buffalo (2012). Assessing relational memory in monkeys with a contextual cueing task. Society for Neuroscience, 2012.
39. S. Li, K. Staikov, M.J. Jutras, J. Bachevalier, and E.A. Buffalo (2012). The importance of context for relational memory formation in monkeys. Society for Neuroscience, 2012.
40. N.J. Killian, M.J. Jutras, and E.A. Buffalo (2012). Spatial representations in the macaque entorhinal cortex. Society for Neuroscience, 2012.
41. K.J. Frantz, C.T. Goode, J.L. Larimore, E.A. Buffalo, Y. Smith, K. Brakke, T. McKlin (2013). BP-ENDURE Atlanta: Engaging undergraduates in neuroscience research. Society for Neuroscience, 2013.
42. S. Koenig, and E.A. Buffalo (2013). Visual salience and memory modulate viewing behavior of natural scenes in monkeys. Society for Neuroscience, 2013.
43. C.A. Erickson, M.L. Jutras, A. R. Zavilla, B.E. Taylor, J.K. Williamson-Jones, and E.A. Buffalo (2013). Memory for visual images: Comparison between humans and monkeys. Society for Neuroscience, 2013.
44. N.J. Killian, S.M. Potter, and E.A. Buffalo (2013). Encoding of saccade direction in the primate entorhinal cortex. Society for Neuroscience, 2013.
45. M.L.R. Meister, N.J. Killian, and E.A. Buffalo (2013). Allocentric representations in primate entorhinal neurons. Society for Neuroscience, 2013.
46. J.A. Solyst and E.A. Buffalo (2013). Intranasal oxytocin modulations attention to social stimuli in rhesus macaques. Society for Neuroscience, 2013.
47. G. Holst, S. Kokandaramiah, C.R. Phaneuf, W. Stoy, I. Kolb, I. Wickersham, N. Killian, E.A. Buffalo, E.S. Boyden, and C.R. Forest (2013). Miniaturized actuation system for automated, in-vivo, patch clamp recording. Society for Neuroscience, 2013.
48. N. Wilming, P. Konig, and E.A. Buffalo (2014). Grid cells reflect the locus of attention, even in the absence of movement. Society for Neuroscience, 2014.
49. N.J. Killian and E.A. Buffalo (2014). Entorhinal inter-laminar coupling underlies the encoding and recognition of visual stimuli. Society for Neuroscience, 2014.
50. M.J. Jutras, J.A. Solyst, and E.A. Buffalo (2014). Theta activity in the monkey hippocampus during virtual navigation. Society for Neuroscience, 2014.
51. J.A. Solyst and E.A. Buffalo (2014). Social relevance drives viewing behavior independent of low-level salience in rhesus macaques. Society for Neuroscience, 2014.
52. E.A. Buffalo (2015). Using virtual reality to investigate spatial memory in the nonhuman primate. Society for Neuroscience, 2015.
53. M.J. Jutras, Y. Browning, M.K. McKinley, K.L. Morrisroe, C.M. Lewis, P. Fries, T. Stieglitz, and E.A. Buffalo (2015). Enhanced theta- and gamma-band coherence within the primate hippocampus predicts spatial recall on a virtual water maze task. Society for Neuroscience, 2015.
54. Y. Browning, M.J. Jutras, K.L. Morrisroe, M.K. McKinley, A. L. Fairhall, and E.A. Buffalo (2015). A virtual water maze task to study spatial memory and navigation in monkeys. Society for Neuroscience, 2015.
55. M.L. Meister and E.A. Buffalo (2016). Spatial non-grid cells in the primate entorhinal cortex. Society for Neuroscience, 2016.
56. S.D. Koenig and E.A. Buffalo (2016). View cells in the primate hippocampus during visual exploration and directed saccades. Society for Neuroscience, 2016.
57. Y. Browning, M.J. Jutras, K.L. Morrisroe, C. Lewis, E. Fiedler, T. Stieglitz, P. Fries, A.L. Fairhall, and E.A.

Buffalo (2016). Spatial representations in the monkey hippocampus during free-foraging in virtual reality. Society for Neuroscience, 2016.