

David J. Freedman, Ph.D.

Assistant Professor, Department of Neurobiology at The University of Chicago
Member, Committee on Neurobiology and Committee on Computational Neuroscience

Contact Information

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Education

1997-2002 Ph.D. in Systems Neuroscience, Massachusetts Institute of Technology (MIT)
1993-1997 B.A. in Brain and Cognitive Sciences, University of Rochester

Current Positions

2008- Assistant Professor, Department of Neurobiology, University of Chicago

Past Positions

2003-2008 Postdoctoral Research Fellow, Laboratory of John Assad at Harvard Medical School
2002-2003 Postdoctoral Associate, Laboratory of Earl K. Miller at MIT
1997-2002 Graduate Student, Laboratory of Earl K. Miller at MIT
1996-1997 Research Assistant, Laboratories of Walter Makous and David R. Williams at U Rochester

Honors, Awards and Fellowships

2008 Brain Research Foundation Fay/Frank Seed Grant Award
2006 Charles H. Hood Foundation Postdoctoral Fellowship
2006 Edward R. and Anne G. Lefler Center Postdoctoral Fellowship (declined)
2005 Eli Lilly Society for Neuroscience Chapters Postdoctoral Travel Fellowship Award
2003 NIH Kirschstein National Research Service Award Individual Postdoctoral Fellowship
2002 Outstanding Ph.D. Thesis Award, Department of Brain and Cognitive Sciences, MIT
2000 AccuScan Society for Neuroscience Fellowship, honorable mention
1999 Lucille P. Markey Charitable Trust Fellowship Award
1997 Cum Laude, University of Rochester

Editorships and Editorial Boards

2008- Reviewing Editor, Frontiers in Systems Neuroscience

Teaching Experience

1998-2000 Teaching Assistant: Introduction to Psychology (prof. Steven Pinker), Brain and Behavior Laboratory (prof. Earl Miller), Introduction to Neuroanatomy (prof. Mandar Jog), MIT.
1995-1997 Teaching Assistant: Sensation and Perception (prof. David Williams), Mammalian Anatomy and Physiology (prof. Alan Dietsche), University of Rochester.

Ad Hoc Reviewer

Animal Cognition, Cerebral Cortex, Cognitive Affective and Behavioral Neuroscience, Current Biology, European Journal of Neuroscience, Experimental Brain Research, Journal of Neurophysiology, Journal of Neuroscience, Learning and Memory, National Science Foundation, Neuron, Science, Vision Research, Wellcome Trust

Academic Committees and Service

2008- U of Chicago, Neurobiology, Student Preliminary and Awards Committee
2006-2007 Graduate student rotation supervisor, mentorship of first year graduate students
2000-2003 UROP supervisor, mentorship of MIT undergraduate research assistants

1998-1999 Chairman and coordinator, Brain Lunch seminar series

Professional Memberships

Boston Area Neuroscience Group
Society for Neuroscience
Vision Sciences Society

Peer-Reviewed Publications

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Task-Dependence of Visual Representations in Prefrontal and Inferior Temporal Cortices. *Manuscript in preparation*.

Freedman D.J. and Assad J.A. Distinct Encoding of Spatial and Non-Spatial Factors in Parietal Cortex. *Manuscript under review*.

Meyers E.M., Freedman D.J., Krieman G., Poggio T., and Miller E.K. Using Neuron Population Readout to Decode the Temporal Dynamics of Category Information. **Journal of Neurophysiology**, *in press*.

Freedman D.J. and Assad J.A. Experience-Dependent Representation of Visual Categories in Parietal Cortex. **Nature** 443: 85-88, 2006.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Experience-Dependent Sharpening of Visual Shape Selectivity in Inferior Temporal Cortex. **Cerebral Cortex**, 16: 1631-1644, 2006. (ePub, 12/2005)

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. A Comparison of Primate Prefrontal and Inferior Temporal Cortices During Visual Categorization. **Journal of Neuroscience** 23: 5235-5246, 2003.

Nieder A., Freedman D.J., and Miller E.K. Representation of the Quantity of Visual Items in the Primate Prefrontal Cortex. **Science** 297: 1708-1711, 2002.

Knoblich U., Freedman D.J., and Riesenhuber M. Categorization in IT and PFC: Model and Experiments. **AI Memo** 2002-007, Artificial Intelligence Lab, Massachusetts Institute of Technology, 2002.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Visual Categorization and the Primate Prefrontal Cortex: Neurophysiology and Behavior. **Journal of Neurophysiology** 88: 914-928, 2002.

Freedman D.J., Riesenhuber M., Poggio T., Miller E.K. Categorical Representation of Visual Stimuli in the Primate Prefrontal Cortex. **Science** 291: 312-316, 2001.

Review Articles and Book Chapters

Freedman D.J. and Miller E.K. Neural Mechanisms of Visual Categorization: Insights from Neurophysiology. *Neuroscience and Biobehavioral Reviews*, 32: 311-329, 2008.

Freedman D.J. Neuronal Mechanisms of Visual Categorization and Category Learning. In: *The Neuroscience of Rule-Guided Behavior*. Wallis J.D. and Bunge S. (eds.). Oxford University Press, pp 391-418, 2007.

Freedman D.J. Posterior Parietal Cortex: Space...and Beyond. *Neuron*, 42: 881-883, 2004.

Miller E.K., Nieder A., Freedman D.J., and Wallis J.D. Neural Correlates of Categories and Concepts. *Current Opinion in Neurobiology*, 13:2:198-203, 2003.

Miller E.K., Freedman D.J., and Wallis J.D. The Prefrontal Cortex: Categories, Concepts, and Cognition. In: *The Physiology of Cognitive Processes*. Parker A., Derrington A., Blakemore C. (eds.). Oxford University Press, pp 252-273, 2003.

Miller E.K., Freedman D.J., and Wallis J.D. The Prefrontal Cortex: Categories, Concepts, and Cognition. *Philosophical Transactions of the Royal Society London: Biological Sciences*, 357: 1123-1136, 2002.

Invited Talks

2008

Catholic University of Leuven, Symposium on Parietal Cortex, Leuven, Belgium. December, 2008.
The University of Chicago, Biopsychology Seminar Series, Chicago, IL. April, 2008.
National Institute of Mental Health, Bethesda, MD. February. 2008.

2007

Brigham and Women's Hospital, Visual Attention Lab, Cambridge, MA. November, 2007.
Vanderbilt University, Institute of Imaging Science, Nashville, TN. April, 2007.
OIST Workshop on Cognitive Neurobiology, Okinawa, Japan. March, 2007.
University of Chicago, Department of Neurobiology, Chicago, IL. February, 2007.
Yale School of Medicine, Department of Neurobiology. New Haven, CT. February, 2007.
Washington University, Department of Anatomy and Neurobiology, St. Louis, MO. January, 2007.

2006

University of Glasgow, Department of Psychology. Glasgow, UK. October, 2006.
Experimental Psychology Society, Symposium on Categorical Perception. Plymouth, UK. July, 2006.
Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Boston, MA, April 2006.

2005

MIT, NIH-Conte Center for Detection and Recognition of Objects in Visual Cortex, September 2005.
Harvard Medical School, Department of Neurobiology, Boston, MA, December 2005.

2004

MIT, NIH-Conte Center for Detection and Recognition of Objects in Visual Cortex, September 2004.
Johns Hopkins, Department of Psychological and Brain Sciences, Baltimore, MD. May 2004.
Johns Hopkins, Zanvyl Krieger Mind/Brain Institute, Baltimore, MD. March 2004.
Harvard University, Department of Psychology, Cambridge, MA. February 2004.

2003

Cognitive Neuroscience of Category Learning Symposium. New York, NY. September 2003.

2002

Harvard Medical School, Department of Neurobiology, Boston, MA. May 2002.
National Institute of Mental Health, Bethesda, MD. May 2002.

2001

MIT, The Picower Center for Learning and Memory Retreat, Kennebunkport, ME. June 2001.
Brown University Brain Science Program, March 2001.
RIKEN Brain Sciences Institute, Tokyo, Japan, October 2001.
MIT, Center for Biological and Computational Learning, Object Recognition Workshop. January 2001.

2000

MIT, The Picower Center for Learning and Memory Retreat, Ogunquit, ME. June 2000.

Conference Proceedings

Fitzgerald J.K., Assad J.A. and Freedman D.J. Associative Representations in Lateral Intraparietal (LIP) Area. Society for Neuroscience Abstracts, 2008.

Fitzgerald J.K., Assad J.A. and Freedman D.J. Learning-Dependent Shape Representations in Lateral Intraparietal (LIP) Area. Society for Neuroscience Abstracts, 2007.

Freedman D.J and Assad J.A. Non-Spatial Encoding of Behaviorally Relevant Information in Parietal Cortex During Visual Motion Categorization. Society for Neuroscience Abstracts, 2007.

Freedman D.J and Assad J.A. Experience-Dependent Representation of Visual Categories in Parietal Cortex Area LIP. Society for Neuroscience Abstracts, 2006.

Freedman D.J. and Assad J.A. Categorical Representation of Visual Motion Direction in Primate Posterior Parietal Cortex. Vision Sciences Society Abstracts, 2006.

Freedman D.J. and Assad J.A. Categorical Representation of Visual Motion Direction in Primate Posterior Parietal Cortex. Society for Neuroscience Abstracts, 2005.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Shape-Tuning in Primate Inferior Temporal Cortex is Enhanced by Experience. Society for Neuroscience Abstracts, 2004.

Freedman D.J., Riesenhuber M., Machon M., Poggio T., and Miller E.K. Experience-Dependent 2D Orientation Tuning in Primate Inferior Temporal Cortex. Society for Neuroscience Abstracts, 2003.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Stimulus-Specificity of Category-Related Neurons in Primate Prefrontal and Inferior Temporal Cortices. Society for Neuroscience Abstracts, 2002.

Nieder A., Freedman D.J., and Miller E.K. Neurons in Primate Prefrontal Cortex Reflect Numerical Information in Visual Displays. Society for Neuroscience Abstracts, 2002.

Knoblich U., Freedman D.J., Poggio T., and Miller E.K., Riesenhuber M. Category-Tuning vs. Stimulus-Tuning in Inferotemporal and Prefrontal Cortex: Insights From Modeling. Society for Neuroscience Abstracts, 2002.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Comparison of Primate Prefrontal and Inferior Temporal Lobe Cortical Activity During Visual Categorization. Society for Neuroscience Abstracts, 2001.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Neuronal and Psychophysical Correlates of Categorical Perception in the Macaque Monkey. Cognitive Neuroscience Society Abstracts, 2001.

Freedman D.J., Riesenhuber M., Poggio T., and Miller E.K. Neuronal Correlates of Categorical Learning in the Primate Prefrontal Cortex. Society for Neuroscience Abstracts 2000, 26:975.

Freedman D.J., Riesenhuber M., Shelton C., Poggio T., and Miller E.K. Categorical Representation of Objects in the Primate Prefrontal Cortex. Cognitive Neuroscience Society Abstracts 2000.

Freedman D.J., Riesenhuber M., Shelton C., Poggio T., and Miller E.K. Categorical Representation of Visual Stimuli in the Monkey Prefrontal Cortex. Society for Neuroscience Abstracts 1999, 25:884.

Freedman D., Barbur J.L., and Lennie P. Pupil Response Latencies and Reaction Times to Chromatic and Achromatic Stimuli. Association for Research in Vision and Ophthalmology Abstracts, 1997.

Students Supervised

2001-2003 Michelle Machon, MIT undergraduate

2006-2008 Jamie Fitzgerald, Harvard graduate student in neurobiology

2008- Sruthi Swaminathan, U of Chicago graduate student in neurobiology

2008- Christopher Rishel, U of Chicago, M.D./Ph.D. student in computational neuroscience

2008- Richard Williams, U of Chicago graduate student in neurobiology

2008- Jared Clemens, U of Pittsburgh, summer student

2008- Steve McClellan, Reed College, summer student