

James J. DiCarlo MD PhD

Curriculum vitae updated December 2008

Contact information

McGovern Institute for Brain Research and
Department of Brain and Cognitive Sciences
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Degrees

1998 Ph.D. Biomedical Engineering, Johns Hopkins University, Baltimore, MD
1998 M.D., Johns Hopkins University School of Medicine, Baltimore, MD
1990 B.S.E. with Highest Distinction in Biomedical Engineering,
Northwestern University, Evanston, IL

Employment

Present appointment

2007-present Associate Professor of Neuroscience,
McGovern Institute for Brain Research
Department of Brain and Cognitive Sciences
Massachusetts Institute of Technology, Cambridge, MA

Previous appointments

2002-2007 Assistant Professor of Neuroscience,
McGovern Institute for Brain Research
Department of Brain and Cognitive Sciences
Massachusetts Institute of Technology, Cambridge, MA

1998 - 2002 Research Associate, Howard Hughes Medical Institute and
Division of Neuroscience, Baylor College of Medicine, Houston, TX
Laboratory of Dr. John H.R. Maunsell

1998 Postdoctoral Fellow, Krieger Mind/Brain Institute,
Johns Hopkins University, Baltimore, MD
Laboratory of Dr. Kenneth O. Johnson

Other research appointments

1992-1998 Research Assistant, Department of Biomedical Engineering and
Krieger Mind/Brain Institute, Johns Hopkins University

1991 Research Assistant, Department of Psychology, Johns Hopkins University

1987-1990 Research Assistant, Department of Psychology, Northwestern University

1987-1989 Research Intern, National Aeronautics and Space Agency, Cleveland, OH

External positions held

Program Planning Committee, *Society for Neuroscience*, Washington DC (2007-present)
Technical Advisory Board, *Numenta, Inc.*, Menlo Park, CA (2008-present)
Consultant, *The PreTesting Company, Inc*, Tenafly, NJ (2008)

Membership:

Society for Neuroscience, 1994-present
American Physiological Society
American Association for the Advancement of Science

Honors and awards

McKnight Scholar Award in Neuroscience, McKnight Foundation, 2006-2009
Surdna Research Foundation Award, MIT, 2005
MIT School of Science Prize for Excellence in Undergraduate Teaching, 2005
Pew Scholar in the Biomedical Sciences, 2002-2006
Alfred P. Sloan Research Fellow, 2002
Martin and Carol Macht Young Investigator Research Prize, Johns Hopkins University, 1998
National Institutes of Health Medical Scientist Training Program Award, Johns Hopkins University, 1990-1998
Honors in Biomedical Engineering, Northwestern University, 1990

Student and postdoctoral supervision

Sponsored undergraduates in research (UROP)

Van Aken, David (MIT class of 2003), fall 2002
Oertelt, David (MIT class of 2007), 2003-2004, 2007
Karr, Jonathan (MIT class of 2006), spring 2006
Dilwali, Prashant (MIT class of 2008), spring 2006
Green, Julia (Brown class of 2008), summer 2006
Fogerson, Michelle (MIT class of 2007), spring 2005-2006
Hendley, Imran (MIT class of 2007), summer 2006
Sabrina Tsang (MIT class of 2008), summer 2007 - 2008
Mariano, Laura (UCONN class of 2008) AMGEN Scholar, Summer 2007
Rothkopf, Rebecca (Wellesley class of 2009), summer 2008
Palkar, Radhika (Univ. of California at Irvine class of 2008), MSRP Student, Summer 2008
Buenrostro, Isaac (MIT class of 2011), fall 2008

Ph.D. students supervised (primary advisor role)

Cox, David. *The role of visual experience in the tolerance of neuronal object representations in monkeys and humans*. Supervised 2002-2007 (PhD 2007 Dept. of Brain and Cog Sciences, MIT).
Current position: Rowland Junior Fellow (independent laboratory), The Rowland Institute at Harvard, Harvard University, Cambridge, MA

Aparicio, Paul (PhD candidate 2003-in progress), Dept. of Brain and Cognitive Sciences, MIT.
Functional organization of object-selectivity in monkey temporal lobe. Supervised 2005-present

Li, Nuo (PhD candidate 2005-in progress), Dept. of Brain and Cognitive Sciences, MIT. *The invariance*

of neuronal object representations in monkeys during natural vision. Supervised 2005-present

Pinto, Nicolas (PhD candidate 2007-in progress), Dept. of Brain and Cognitive Sciences, MIT.
Supervised 2007-present

Masters students supervised

Vuong, Yihvan ME Biological Engineering, MIT, 2003-2004
Current position: Materials Engineer, US Department of Defense, Washington, DC

Oreper, Daniel ME Electrical Engineering and Computer Science, MIT, 2004-2006
Current position: Senior Software Engineer, BAE Systems, Burlington, MA

Pinto, Nicolas ME Computer Science, UTBM, France 2006-2007
Current position: PhD candidate, Computation Track, Dept. of Brain and Cognitive Sciences, MIT

Radwan, Basma ME Biomedical Engineering, Boston University, 2007-2008
Current position: PhD candidate, Center for Neural Science, NYU, New York, NY

Postdoctoral researchers supervised (primary supervisor role)

Hung, Chou (Ph.D.) 2002-2006
Read-out and write-in of neuronal object representations in non-human primates.
Current position: Assistant Professor, Institute of Neuroscience, National Yang Ming University, Taipei, Taiwan

Op de Beeck, Hans (Ph.D., Human Frontiers Long-term Postdoctoral Fellow Award) 2003-2006
Functional organization of neuronal object representations in monkeys and humans; Effects of visual experience.
Current position: Senior Fellow of the Research Foundation, Laboratory of Experimental Psychology, University of Leuven, Leuven, Belgium

Zoccolan, Davide (Ph.D., Human Frontiers Long-term Postdoctoral Fellow Award) 2003-2008
Selectivity and tolerance of neuronal populations underlying object recognition in clutter.
Accepted position 2009: Assistant Professor, International School for Advanced Studies (SISSA), Trieste, Italy

Papanastassiou, Alexander (M.D.) 2005-2007
Spiking- and fMRI-determined spatial organization of object representations in monkeys.
Current position: Resident, Dept. of Neurosurgery, Brigham and Women's Hospital / Harvard Medical School

Rust, Nicole (Ph.D., NIH NRSA Postdoctoral Award) 2006-present
Transformation of visual representations along the ventral visual processing stream.
Accepted position 2009: Assistant Professor, Department of Psychology, University of Pennsylvania

Majaj, Najib (Ph.D., New York University) 2007-present

Issa, Elias (Ph.D., Johns Hopkins University) 2008-present

Service

Internal service:

Primary supervisor of Electronics Fabrication and Repair Shop, Dept. of Brain and Cognitive Sciences, MIT, 2004-present

Faculty search committees: McGovern Institute for Brain Research, MIT (2002-2003); McGovern Institute for Brain Research, MIT (2004-present); Dept. of Brain and Cognitive Sciences, MIT (2006-present)

McGovern / Martinos Imaging Center user committee, McGovern Institute for Brain Research, MIT (2005-present).

Participation in MIT commencement 2003

Ph.D. student committees

Liu, Jia. Dept. of Brain and Cognitive Sciences, MIT, 2002-2003 (PhD 2003)

Maimon, Gaby. Dept. of Neurobiology, Harvard Medical School, 2004-2005 (PhD 2005)

Wu, Wan-Chen. Dept. of Mechanical Engineering, MIT, 2003-2006 (PhD 2006)

Serre, Thomas. Dept. of Brain and Cognitive Sciences, MIT, 2004-2006 (PhD 2006)

Balas, Benjamin. Dept. of Brain and Cognitive Sciences, MIT, 2006-2007 (PhD 2007)

Mruczek, Ryan. Dept. of Neuroscience, Brown University, 2006-2007 (PhD 2007)

Feingold, Joseph. Dept. of Brain and Cognitive Sciences, MIT, 2002-present

Haushofer, Johannes. Dept. of Neurobiology, Harvard, 2004-2007 (PhD 2007)

Schwarzlose, Rebecca. Dept. of Brain and Cognitive Sciences, MIT, 2005-2007 (PhD 2008)

Cronin, Beau. Dept. of Brain and Cognitive Sciences, MIT, 2007-2008 (PhD 2008)

MIT undergraduate advisees (past and present)

Kim, JinSuk (class of 2005), Won, Annie (class of 2005), Bobrow, Laurel (class of 2006), Golji, Javad (class of 2006), Liang, Joy (class of 2006), Dohlman, Thomas (class of 2007), Motola-Barnes, Rebecca (class of 2007), Evrony, Gilad (class of 2007), Garcia, Adrian (class of 2007), Nakano, Lisa (class of 2008), Wentz, Christian (class of 2008), Chandawarker, Akash (class of 2009), Pollard, Courtney (class of 2009), Thornton, Elliot (class of 2009), Pointer, Kelli (class of 2009), Hatch, Mary (class of 2008), Greenman, Susan (class of 2011), DeBoer, Caroline (class of 2011)

External Service:

Society for Neuroscience, Annual Meeting **Program Planning Committee**, (2007-present)

Computational and Systems Neuroscience (COSYNE), Annual Meeting **Program Committee** (2008-present)

Reviewer for *Biological Cybernetics, Cerebral Cortex, Current Biology, Journal of Cognitive Neuroscience, Journal of Neurophysiology, Journal of Neuroscience, Journal of Neuroscience Methods, Learning and Memory, Nature, Nature Neuroscience, Neural Information Processing Systems (NIPS), Neuron, Public Library of Science (PLOS), Visual Neuroscience*

Study section reviewer for NIH Sensorimotor Integration (SMI) study section, Ad hoc member.

Publications

Refereed publications

- Cox DD, Papanastassiou A, Oreper D, Andken B, and DiCarlo JJ. High-resolution three-dimensional microelectrode brain mapping using stereo microfocal x-ray imaging, *Journal of Neurophysiology* (in press, available online)
- Op de Beeck H, DiCarlo JJ, Goense J, Grill-Spector K, Papanastassiou A, Tanifuji M, and Tsao D. Fine-scale spatial organization of face and object selectivity in the temporal lobe: Do fMRI, optical imaging, and electrophysiology agree? *Journal of Neuroscience* (in press)
- Pinto N, DiCarlo JJ, and Cox DD. Establishing Good Benchmarks and baselines for Face Recognition. Proceedings of the *European Conference on Computer Vision* (ECCV) 2008 (in press).
- Li N and DiCarlo JJ. Unsupervised natural experience rapidly alters invariant object representation in visual cortex *Science*, 321:1502-07 (2008).
- Cox DD and DiCarlo JJ. Does learned shape selectivity in inferior temporal cortex automatically generalize across retinal position? *Journal of Neuroscience*, 28: 10045-55 (2008).
- Pinto N, Cox DD, DiCarlo JJ. Why is real-world object recognition hard? *PLoS Computational Biology*, 4(1): e27 (2008).
- Op de Beeck H, Deutsch J, Vanduffel W, Kanwisher N, DiCarlo JJ. A stable topography of selectivity for unfamiliar shape classes in monkey inferior temporal cortex. *Cerebral Cortex*, 18: 1676-94 (2008).
- Zoccolan D, Kouh M, Poggio T and DiCarlo JJ. Trade-off between shape selectivity and tolerance to identity-preserving transformations in monkey inferotemporal cortex. *Journal of Neuroscience*, 27: 12292-307 (2007).
- DiCarlo JJ and Cox DD. Untangling invariant object recognition. *Trends in Cognitive Neuroscience* 11: 333-341 (2007).
- Op de Beeck H, Baker C, DiCarlo JJ and Kanwisher N. Discrimination training alters object representations in human extrastriate cortex. *Journal of Neuroscience* 26: 13025-36 (2006).
- Kreiman GK, Hung CP, Kraskov A, Quian Quiroga R, Poggio TA, DiCarlo JJ. Object selectivity of local field potentials and spikes in the macaque inferior temporal cortex. *Neuron* 49: 433-445 (2006).
- Hung CP, Kreiman GK, Poggio T, and DiCarlo JJ. Fast read-out of object identity from macaque inferior temporal cortex. *Science* 310: 863-866 (2005).
- Zoccolan, D, Cox DD, DiCarlo JJ. Multiple objects response normalization in monkey inferotemporal cortex. *Journal of Neuroscience* 36: 8150-64 (2005).
- Cox DD, Meier P, Oertelt N, and DiCarlo JJ. "Breaking" position invariant object recognition. *Nature Neuroscience* 8:1145-1147 (2005).
- DiCarlo JJ and Maunsell JHR. Using neuronal latency to determine sensory-motor processing pathways in reaction time tasks. *Journal of Neurophysiology* 5: 2974-86 (2005).
- DiCarlo JJ and Maunsell JHR. Anterior inferotemporal neurons of monkeys engaged in object

recognition can be highly sensitive to object retinal position. *Journal of Neurophysiology* 89: 3264-3278 (2003).

DiCarlo JJ and Maunsell JHR. Form representation in monkey inferotemporal cortex is virtually unaltered by free viewing. *Nature Neuroscience* 3: 814-821 (2000).

DiCarlo JJ and Johnson KO. Changes in stimulus scanning direction reveal the spatial and temporal receptive field structure of neurons in primary somatosensory cortical area 3b of the alert monkey. *Journal of Neuroscience* 20: 495-510 (2000).

DiCarlo JJ and Johnson KO. Velocity invariance of receptive field structure in somatosensory cortical area 3b of the alert monkey. *Journal of Neuroscience* 19: 401-419 (1999).

DiCarlo JJ, Johnson KO, Hsiao SS. Structure of receptive fields in area 3b of primary somatosensory cortex in the alert monkey. *Journal of Neuroscience* 18: 2626-2645 (1998).

DiCarlo JJ, Lane JW, Hsiao SS, and Johnson KO. Marking microelectrode penetrations with fluorescent dyes. *Journal of Neuroscience Methods* 64: 75-81 (1996).

Schmajuk NA and DiCarlo JJ. Stimulus configuration, classical conditioning and hippocampal function. *Psychological Review* 99: 268-305 (1992).

Schmajuk NA and DiCarlo JJ. A neural network approach to hippocampal function in classical conditioning. *Behavioral Neuroscience* 105: 125-153 (1990).

Non-refereed publications

DiCarlo JJ. Do we have a strategy for understanding how the visual system accomplishes object recognition? *Object Categorization: Computer and Human Vision Perspectives*, Dickenson A, Leonardis A, Schiele B, and Tarr MJ (Eds.), Cambridge University Press (in press)

DiCarlo JJ. Making faces in the brain (*News & Views*). *Nature* 442: 644 (2006).

Kourtzi Z and DiCarlo JJ. Learning and neural plasticity in visual object recognition. *Current Opinion in Neurobiology* 16: 152-8 (2006).

Hung CP, Kreiman GK, Poggio TA, DiCarlo JJ. Ultra-fast object recognition from few spikes, *MIT AI Memo 2005-022* (2005).

Kreiman GK, Hung CP, Poggio TA, DiCarlo JJ. Selectivity of local field potentials in macaque inferior temporal cortex, *MIT AI Memo 2004-020* (2004).

DiCarlo JJ and Johnson KO. Receptive field structure in cortical area 3b of the alert monkey. *Behavioral Brain Research* 135: 167-178 (2002).

Hsiao SS, Johnson KO, Twombly IA, DiCarlo JJ. Form processing and attention effects in somatosensory cortex. *Somesthesia and the Neurobiology of the Somatosensory Cortex*, Birkhauser, O. Franzen, R. Johansson, and L. Terenius (Eds.), Birkhauser Verlag Basel, Switzerland (1996).

Schmajuk NA and DiCarlo JJ. Neural dynamics of hippocampal modulation of classical conditioning. *Neural Network Models of Conditioning and Action*, M. Commons, S. Grossberg, and J.E.R.

Staddon (Eds.), Lawrence Erlbaum Assoc., Hillsdale, NJ, (1991).

Schmajuk NA and DiCarlo JJ. A hippocampal theory of schizophrenia. *Behavioral and Brain Sciences* 14: 47-49 (1991).

Abstracts

Rust N and DiCarlo JJ. Balanced increases in selectivity and invariance produce constant sparseness across the ventral visual pathway, *Vision Science Society Annual Meeting*, (May. 2009)

Papanastassiou A, Op de Beeck H, Andken B and DiCarlo JJ. A systematic exploration of the relationship of fMRI signals and neuronal activity in the primate temporal lobe, *Society for Neuroscience Annual Meeting (mini-symposium)*, Washington, DC (Nov. 2008)

Majaj N, Li N and DiCarlo JJ. Inferior temporal cortex robustly signals encounters with new objects, but is not an online representation of the visual world, *Society for Neuroscience Annual Meeting*, Washington, DC (Nov. 2008)

Rust N and DiCarlo JJ. Increases in selectivity are offset by increases in tolerance ("invariance") to maintain sparseness across the ventral visual pathway, *Society for Neuroscience Annual Meeting*, Washington, DC (Nov. 2008)

Li N, and DiCarlo JJ. Unsupervised natural experience rapidly alters invariant object representation in visual cortex, *Society for Neuroscience Annual Meeting*, Washington, DC (Nov. 2008)

Rust N, and DiCarlo JJ. Concurrent increases in selectivity and tolerance produce constant sparseness across the ventral visual stream. *COSYNE*, Salt Lake City, Utah (Feb. 2008).

Li N, and DiCarlo JJ. Natural experience drives online learning of tolerant object representations in visual cortex. *COSYNE*, Salt Lake City, Utah (Feb. 2008).

Cox DD*, Pinto N*, Doukhan D, Corda B and DiCarlo JJ. A high-throughput screening approach to discovering good forms of visual representation. *COSYNE*, Salt Lake City, Utah (Feb. 2008).

Pinto N*, Cox DD*, Corda B, Doukhan D and DiCarlo JJ. Why is real-world object recognition hard?: Establishing honest benchmarks and baselines for object recognition. *COSYNE*, Salt Lake City, Utah (Feb. 2008).

Zoccolan D, Cox D, Oertelt N, Radwan B, Tsang S and DiCarlo JJ. Is the rodent a valuable model system for studying invariant object recognition? *COSYNE*, Salt Lake City, Utah (Feb. 2008).

Li N, Cox DD, Zoccolan D, and DiCarlo JJ. Flexible and robust object recognition in inferior temporal cortex supported by neurons with limited position and clutter tolerance. *Society for Neuroscience*, Atlanta, GA, Oct. (2006).

Zoccolan D, Kouh M, Poggio T and DiCarlo JJ. Trade-off between shape selectivity and tolerance to identity-preserving transformations in monkey inferotemporal cortex. *Gordon Convergence: Sensation and the Natural Environment*, Bozeman, MT, Aug. (2006).

Op de Beeck H, Deutsch J, Vanduffel W, Kanwisher N, DiCarlo JJ. A large-scale shape map in monkey inferior temporal cortex. *Society for Neuroscience*, Atlanta, GA, Oct. (2006).

Cox DD and DiCarlo JJ. Is the “binding problem” a problem in inferotemporal cortex? ***Society for Neuroscience***, Washington, DC, Nov. (2005).

Zoccolan D, Cox DD and DiCarlo JJ. Multiple object response normalization in monkey inferotemporal cortex. ***Society for Neuroscience***, Washington, DC, Nov. (2005).

Hung CP, Kreiman GK, Quiroga R, Kraskov A, Poggio T, and DiCarlo JJ. Using ‘read-out’ of object identity to understand object coding in the macaque anterior inferior temporal cortex. ***Computational and Systems Neuroscience (COSYNE)***, Salt Lake City, UT, March (2005).

Cox DD and DiCarlo JJ. The effect of visual experience on the position tolerance of primate object representations. ***Society for Neuroscience***, San Diego, CA, Nov. (2004).

Kreiman GK, Hung CP, Poggio TA, and DiCarlo JJ. Object recognition by selective spike and LFP data in macaque inferior temporal cortex. ***Society for Neuroscience***, San Diego, CA, Nov. (2004).

DiCarlo JJ and Maunsell JHR. Mapping functional neuronal processing chains underlying sensory-motor tasks in the primate. ***Gordon Research Conference: Sensory coding and the natural environment***, Oxford, UK, August (2004).

DiCarlo JJ and Maunsell JHR. Using reaction time tasks to map sensory-motor chains in the monkey. ***Society for Neuroscience***, Orlando, FL, Nov. (2002).

DiCarlo JJ and Maunsell JHR. Inferotemporal representations underlying object recognition in the free viewing monkey. ***Society for Neuroscience***, New Orleans, LA, Nov. (2000).

DiCarlo JJ and Johnson KO. Form processing in area 3b. ***International Symposium on Brain Mechanisms of Tactile Perception***, Stockholm, Sweden, Oct. (1999).

DiCarlo JJ, Hsiao SS, and Johnson KO. Spatial and temporal properties of neural receptive fields in area 3b of the awake monkey. ***Society for Neuroscience***, New Orleans, LA, Nov. (1997).

Twombly IA, DiCarlo JJ, Hsiao SS and Johnson KO. Linear and non-linear processing of tactile spatial form in area 3b of the awake macaque. ***Society for Neuroscience***, Washington, D.C., Nov. (1996).

DiCarlo JJ, Twombly IA, Hsiao SS and Johnson KO. Laminar differences in spatiotemporal receptive field structure of neurons in area 3b of the awake macaque. ***Society for Neuroscience***, Washington, D.C., Nov. (1996).

Hsiao SS, DiCarlo JJ and Johnson KO. Interlaminar processing of tactile spatial form in area 3b of the somatosensory system. ***Biomedical Engineering Society***, Boston, Oct. (1995).

DiCarlo JJ, Hsiao SS and Johnson KO. Transformation of tactile spatial form within a cortical column in area 3b of the macaque. ***Society for Neuroscience***, Miami, FL, Nov. (1994).

Schmajuk NA and DiCarlo JJ. The short-term memory regulation hypothesis of hippocampal function. ***Midwestern Psychology Association***, Chicago, IL, May, (1990).

Schmajuk NA and DiCarlo JJ. Neural dynamics of hippocampal modulation of classical conditioning. ***12th Symposium on Models of Behavior: Neural Network Models of Conditioning and Action***, Cambridge, MA, June, (1989).

Patents

Device and method for tracking eye gaze direction

Inventors: Cox, DD and DiCarlo, JJ.

(US Serial No: 60/664,593) (Filed March 2006)

Submitted and in progress publications

Li N, Cox DD, Zoccolan and DiCarlo JJ. What response properties do individual neurons need to underlie position- and clutter-invariant object recognition? (submitted)

Zoccolan D, Oretelt N, DiCarlo JJ and Cox DD. A rodent model for studying invariant visual object recognition (submitted)

Pinto N, DiCarlo JJ, and Cox DD. A high-throughput screening approach to discovering good forms of visual representation (submitted)

DiCarlo JJ, Zoccolan DD, and Rust N. How does the ventral visual stream solve object recognition? Review article for *Neuron* (in preparation)

Pagan M, Majaj N, Rust N, and DiCarlo JJ. A functional “fingerprint” method to assess stability in chronic recordings in higher visual areas (in preparation)

Presentations and invited lectures

Stanford University, Department of Neurobiology, Palo Alto, CA (1997)

Baylor College of Medicine, Division of Neuroscience, Houston, TX (1997)

Johns Hopkins University, Department of Biomedical Engineering, Baltimore, MD (1997)

Massachusetts Institute of Technology, Department of Brain and Cognitive Sciences, Cambridge, MA (2001)

University of California at Davis, Center for Neuroscience, Davis, CA (2001)

University of California at Santa Barbara, Institute for Theoretical Physics, Santa Barbara, CA (2001)

McGovern Institute 1st Annual Retreat, M.I.T., Falmouth, MA (2002)

Harvard University, Department of Psychology, Cambridge, MA (2002)

Harvard Medical School, Department of Neurobiology, Boston, MA (2002)

Pew Scholars and Fellows Annual Meeting, Bahamas (2002)

Johns Hopkins University, Krieger Mind/Brain Institute, Baltimore, MD (2003)

Conte Center Annual Meeting, Detection and Recognition of Objects in Visual Cortex, Cambridge, MA (2004)

Computational and Systems Neuroscience annual meeting (COSYNE), Salt Lake City, UT (2005)

Conte Center Annual Meeting, , Detection and Recognition of Objects in Visual Cortex, Cambridge, MA (2005)

Stanford University, Neuroscience Institute, Palo Alto, CA (2005)

Massachusetts General Hospital Martinos Imaging Center, Charlestown, MA (2005)
University of Washington, Dept. of Physiology and Biophysics, Seattle, WA (2006)
Massachusetts Institute of Technology, Dept. of Brain and Cognitive Sciences and CSAIL, Cambridge, MA (2006)
Pew Scholars and Fellows Annual Meeting, Costa Rica (2006).
Harvard University, Department of Psychology, Cambridge, MA (2006)
DARPA NeoVision workshop, Washington, DC (2006)
Gordon Research Conference: Sensory coding and the natural environment, Big Sky, MO (2006)
University of California at San Diego, Dept. of Neuroscience, San Diego, CA (2006)
California Institute of Technology, Pasadena, CA (2006)
Smith-Kettlewell Eye Institute, San Francisco, CA (2007)
University of California at San Francisco, Dept. of Neuroscience, San Francisco, CA (2007)
Computational and Systems Neuroscience annual meeting (COSYNE), Salt Lake City, UT (2007)
Cold Spring Harbor Laboratory Invited Lecture, Cold Spring Harbor, NY (2007)
Functional Requirements of Visual Theory Group Meeting, Montana State University, MT (2007)
European Brain and Behavior Society Annual Meeting, Trieste, Italy (2007)
International Conference on Computer Vision (ICCV), Rio de Janeiro, Brazil (2007)
Harvard Medical School, Department of Neurobiology, Boston, MA (2007)
Columbia University, New York, NY (2008)
University of California at Los Angeles, CA (2008)
University of Southern California, CA (2008)
Cognitive Neuroscience Society (CNS) Annual Meeting, San Francisco, CA (2008)
Principles of Biological Computation workshop, Santa Fe Institute, Santa Fe, NM (2008)
Perceptual Expertise Network (PEN) workshop, Banff, Canada (2008)
Japan Annual Neuroscience Meeting, Tokyo, Japan (2008)
RIKEN Brain Science Institute, Wako, Japan (2008)
National Institute for Physiological Sciences, Okazaki, Japan (2008)
Harvard University, Brigham and Women's, Cambridge, MA (2008)
Workshop of Learning and Dynamics in Vision, Glion, Switzerland (2008)
26th Army Science Conference, Orlando, FL (2008)
Yale University, Swartz Computational Systems Series, New Haven, CT (to present, Jan. 2009)
University of Rochester, Center for Visual Science, Rochester, NY (to present, Jan. 2009)
Center for Nonlinear Studies Colloquium, Los Alamos National Laboratory Los Alamos, NM (to present, Feb. 2009)
New York University, Center for Neural Science, New York, NY (to present, March 2009)
The Thirteenth International Conference on Cognitive and Neural Systems (ICCNs), Boston University, Boston, MA (to present May 2009)

McKnight Endowment Fund Annual Neuroscience Conference, Aspen, CO (to present, June 2009)
Annual Meeting of the Sloan-Swartz Centers for Theoretical Neurobiology, Harvard, Cambridge, MA
(to present July 2009)

Teaching history

MIT 9.02 Systems Neuroscience Laboratory (undergraduate neurophysiology laboratory)
Department of Brain and Cognitive Sciences, MIT
Semesters taught: spring 2003, 2004, 2005, 2006, 2007, 2008, (planned 2009)
Role: Lead instructor (along with two co-instructors), course design, organization, execution and administration
Approximately 10 hours of lecture and 60 hours of direct laboratory teaching per semester.

MIT 9.720 Neural Basis of Object Recognition in Monkeys and Humans (graduate course)
Department of Brain and Cognitive Sciences, MIT
Semesters taught: spring 2005, fall 2006, spring 2008, (planned 2009)
Role: Co-instructor (of two), course design, organization, execution and administration
Approximately 10 hours of lecture and 30 hours of shared teaching per semester.

MIT Matlab (undergraduate IAP course)
Department of Brain and Cognitive Sciences, MIT
Semesters: IAP 2008

MIT 9.95 Research Topics in Neuroscience (undergraduate IAP course)
Department of Brain and Cognitive Sciences, MIT
Semesters taught: IAP 2004, IAP 2005, IAP 2006, IAP 2007
Role: Lecturer, Approximately 3 hours of direct lecture teaching per semester.

Computational Neuroscience of Vision (graduate / postdoctoral course)
Cold Spring Harbor Laboratories Summer Courses, Cold Spring, NY
Semesters taught: summer 2004
Role: Co-instructor, Approximately 4 hours of direct lecture teaching.

Methods in Computational Neuroscience (graduate / postdoctoral course)
Marine Biological Laboratory at Woods Hole, MA
Semesters taught: summer 2008
Role: Guest lecturer, Approximately 2 hours of direct lecture teaching.

BU CN730 Models of Visual Perception (graduate)
Department of Cognitive and Neural Systems, Boston University
Semesters taught: spring 2007
Role: Guest lecturer, Approximately 3 hours of direct lecture teaching.

Neural Networks (undergraduate course)
Department of Biomedical Engineering, Johns Hopkins University
Semesters taught: 1995
Role: Teaching assistant

Computational models of the Neuron (undergraduate course)
Department of Biomedical Engineering, Johns Hopkins University

Semesters taught: 1994
Role: Teaching assistant

Human Histology (medical student course)
School of Medicine, Johns Hopkins University
Semesters taught: 1994
Role: Teaching assistant