

## **David Leigh Ferster**

Northwestern University  
Department of Neurobiology and Physiology  
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ferster@northwestern.edu

**DATE OF BIRTH:** July 5, 1952

**PLACE OF BIRTH:** Cleveland, Ohio

**EDUCATION:**

1974-1980 Ph.D. in Neurobiology, Harvard University, Boston, Massachusetts  
1970-1974 Sc.B. in Physics, Brown University, Providence, Rhode Island

**PROFESSIONAL EXPERIENCE:**

2001- Chair, Department of Neurobiology and Physiology, Northwestern University, Evanston, Illinois  
1993- Professor of Neurobiology and Physiology, Northwestern University, Evanston, Illinois  
1988-1993 Associate Professor of Neurobiology and Physiology, Northwestern University, Evanston, Illinois  
1982-1988 Assistant Professor of Neurobiology and Physiology, Northwestern University, Evanston, Illinois  
1980-1981 Research Associate, Physiology Institute, University of Göteborg, Sweden, with Dr. Sivert Lindström.  
1974-1980 Research Assistant, Department of Neurobiology and Physiology, Harvard University. Advisors: Drs. Torsten N. Wiesel and David H. Hubel. Dissertation: Cortical mechanisms of depth vision.

**AWARDS AND FELLOWSHIPS:**

2010 Fellow, American Academy of Arts and Sciences  
1990 McKnight Neuroscience Development Award  
1986 Swiss Medical Research Foundation Young Investigator Award  
1984 Alfred P. Sloan Fellowship in Neuroscience  
1980-1981 Swedish Medical Research Council Postdoctoral Fellowship  
1974-1980 Public Health Service Predoctoral Training Fellowship

**MAJOR FIELDS OF RESEARCH INTEREST:**

Neurobiology  
Neurophysiology  
Central mechanisms of mammalian visual processing  
Neuronal function of mammalian neocortex

## PROFESSIONAL ACTIVITIES:

Consulting reviewer for:

<i>Cerebral Cortex</i>	<i>Neuron</i>
<i>European Journal of Neuroscience</i>	<i>PNAS</i>
<i>Experimental Brain Research</i>	<i>Science</i>
<i>Journal of Comparative Neurology</i>	<i>Trends in Neuroscience</i>
<i>Journal of Neurophysiology</i>	<i>Visual Neuroscience</i>
<i>Journal of Neuroscience</i>	<i>Vision Research</i>
<i>Journal of the Optical Society of America</i>	National Science Foundation
<i>Journal of Physiology</i>	British Medical Research Council
<i>Nature</i>	The British Wellcome Trust
<i>Nature Neuroscience</i>	Israeli Science Foundation

Advisory Board, Hugh Knowles Center for Clinical and Basic Science in Hearing and its Disorders, 1997-2002

External reviewer, Riken Institute for Neuroscience, Japan, 2000

NIH Visual Sciences B Study Section, 1991-1997, 2002-2003, 2005

Editorial Board, *Visual Neuroscience*, 1992-1995

Associate Editor, *Journal of Neuroscience*, 1994-2002

Editorial Board, *Journal of Neurophysiology*, 1995-

Software Consultant, Axon Instruments, Foster City, California, 1992-1994

CEO, Actimetrics, Inc., 1998-

## RESEARCH PUBLICATIONS:

1. Ferster, D. (1980) Cortical mechanisms of depth vision in the cat. Ph.D. Dissertation, Harvard University.
2. LeVay, S. & Ferster, D. (1977) Relay cell classes in the lateral geniculate nucleus and the effects of visual deprivation. *Journal of Comparative Neurology* **172**: 563-584.
3. Ferster, D. & LeVay, S. (1978) Axonal arborizations of lateral geniculate neurons in the striate cortex of the cat. *Journal of Comparative Neurology* **182**: 923-944.
4. LeVay, S. & Ferster, D. (1979) Proportion of interneurons in the cat's lateral geniculate nucleus. *Brain Research* **164**: 304-308.
5. Ferster, D., (1981) A comparison of binocular depth mechanisms in area 17 and 18 of the cat visual cortex. *Journal of Physiology (London)* **311**: 623-655.
6. Ferster, D. & Lindström, S. (1983) An intracellular analysis of geniculocortical connectivity in the cat. *Journal of Physiology (London)* **342**: 181-216.
7. Ferster, D. & Lindström, S. (1985) Augmenting responses evoked in area 17 of the cat by intracortical axon collaterals of antidromically activated corticogeniculate cells. *Journal of Physiology (London)* **367**: 217-232.

8. Ferster, D. & Lindström, S. (1985) Synaptic excitation of neurones in area 17 of the cat by intracortical axon collaterals of cortico-geniculate cells. *Journal of Physiology (London)* **367**: 233-252.
9. Ferster, D. (1986) Orientation selectivity of synaptic potentials in neurons of cat visual cortex. *Journal of Neuroscience* **6**: 1284-1301.
10. Ferster, D. (1987) The origin of orientation selectivity in simple cells of the cat visual cortex. *Journal of Neuroscience* **7**: 1780-1791.
11. Ferster D. (1988) Spatially opponent excitation and inhibition in simple cells of the cat visual cortex. *Journal of Neuroscience* **8**:1172-1180.
12. Ferster, D. (1990) X- and Y- mediated synaptic potentials in areas 17 and 18 of cat visual cortex. *Visual Neuroscience* **4**:115-133.
13. Ferster, D. (1990) X- and Y-mediated current sources in areas 17 and 18 of cat visual cortex. *Visual Neuroscience* **4**:135-145.
14. Ferster, D. (1990) Binocular convergence of excitatory and inhibitory synaptic pathways onto neurons of cat visual cortex. *Visual Neuroscience* **4**:625-629.
15. Ferster, D. & Jagadeesh, B. (1991) Nonlinearity of spatial summation in simple cells of areas 17 and 18 of cat visual cortex. *Journal of Neurophysiology* **66**:1667-1679.
16. Ferster, D. & Jagadeesh, B. (1991) EPSP-IPSP interactions in cat visual cortex studied with *in vivo* whole-cell patch recording. *Journal of Neuroscience* **12**:1262-1274.
17. Jagadeesh, B., Gray, C.M. & Ferster, D. (1992) Visually-evoked oscillations of membrane potential in cells of cat visual cortex. *Science* **257**:552-554.
18. Jagadeesh, B., Wheat, H.S. & Ferster, D. (1993) Linearity of summation of synaptic potentials underlying direction selectivity in simple cells of the cat visual cortex. *Science* **262**:1901-904.
19. Ferster, D. Chung, S. and Wheat, H. (1996) Orientation selectivity of synaptic input from the lateral geniculate nucleus to simple cells of the cat visual cortex. *Nature* **380**: 249-252.
20. Carandini, M. and Ferster, D. (1997) A tonic hyperpolarization underlying contrast adaptation in cat visual cortex. *Science* **276**:949-952.
21. Jagadeesh, B., Wheat, H.S., Kontsevich, L.L., Tyler, C. and Ferster, D. (1997) The Organization of Synaptic Inputs to Direction Selective Simple Cells of the Cat Visual Cortex. *Journal of Neurophysiology* **78**:2772-2789.
22. Carandini, M., Movshon, J.A. and Ferster, D. (1998) "Pattern adaptation and cross-orientation interactions in the primary visual cortex", *Neuropharmacology* **37**: 501-511.
23. Chung, S. and Ferster, D. (1998) Strength and orientation tuning of the thalamic input to

- simple cells revealed by electrically evoked cortical suppression *Neuron* **20**: 1177-1189.
24. Lampl, I., Reichova, I. and Ferster, D. (1999) Synchronous membrane potential fluctuations in neurons of the cat visual cortex. *Neuron* **22**:361-374.
  25. Carandini, M. and Ferster, D. (2000) Membrane potential and firing rate in cat primary visual cortex. *Journal of Neuroscience* **20**:470-484.
  26. Anderson, J. S., Carandini, M. and Ferster, D. (2000) Orientation tuning of input conductance, excitation, and inhibition in cat primary visual cortex. *Journal of Neurophysiology* **84**:909-926.
  27. Anderson, J.A., Lampl, I., Reichova, I., Carandini, M. and Ferster, D. (2000) Stimulus dependence of two-state fluctuations of membrane potential in cat visual cortex. *Nature Neuroscience* **3**:617-621.
  28. Anderson, J.S., Lampl, L., Gillespie, D. and Ferster, D. (2000) The contribution of noise to contrast invariance of orientation tuning in cat visual cortex. *Science* **290**:1968-1971.
  29. Anderson, J.S., Lampl, I., Gillespie, D.C. and Ferster, D. (2001) Membrane potential and conductance changes underlying length tuning of cells in cat primary visual cortex. *Journal of Neuroscience* **21**:2104-2112.
  30. Lampl, L., Anderson, J.S., Gillespie, D. and Ferster, D. (2001) Prediction of orientation selectivity from receptive field architecture in simple cells of cat visual cortex. *Neuron* **30**:263-274.
  31. Gillespie, D., Lampl, L., Anderson, J.S., and Ferster, D. (2001) Dynamics of the orientation tuned membrane potential response in cat primary visual cortex. *Nature Neuroscience* **4**:1014-1019.
  32. Ikegaya, Y., Aaron, G., Lampl, I., Ferster, D. and Yuste, R. (2004) Synfire chains and cortical songs: elastic temporal modules of cortical activity. *Science* **304**: 559-564.
  33. Priebe, N.J., 1, Mechler, F., Carandini, M. and, Ferster, D. (2004) The contribution of the action potential threshold to the dichotomy between V1 simple and complex cells. *Nature Neuroscience*. **7**:1113-1122.
  34. Lampl, I., Ferster, D., Poggio, T., Riesenhuber M. (2004) Intracellular measurements of spatial integration and the MAX Operation in complex cells of the cat primary visual cortex. *Journal of Neurophysiology* **92**:2704-2713.
  35. Priebe, N.J. and Ferster, D. (2005) Direction-selectivity of excitation and inhibition in simple cells of the cat primary visual cortex *Neuron* **45**:133-145.
  36. Boudreau, C.E. and Ferster, D. (2005) Short-term synaptic depression in thalamocortical synapses of the cat primary visual cortex. *Journal of Neuroscience* **25**:7179-7190.
  37. Priebe, N.J. and Ferster, D. (2006) Mechanisms underlying cross-orientation suppression in cat primary visual cortex. *Nature Neuroscience* **9**:552-561.

38. Finn, I.M., Priebe, N.J. and Ferster, D. (2007) The emergence of contrast-invariant orientation tuning in simple cells of the cat visual cortex. *Neuron* **54**:137-152.
39. Finn, I.M. and Ferster, D. (2007) Computational Diversity in Complex Cells of Cat Primary Visual Cortex. *Journal of Neuroscience* **27**: 9638 – 9648.
40. Ozeki, H., Finn, I.M., Schaffer, E.S., Miller, K.D. and Ferster, D. (2009) Inhibitory stabilization of the cortical network underlies visual surround suppression. *Neuron* **62**:578-592.
41. Churchland M.M., Yu B.M., Cunningham J.P., Sugrue L.P., Cohen M.R., Corrado G.S., Newsome W.T., Clark A.M., Hosseini P., Scott B.B., Bradley D.C., Smith M.A., Kohn A., Movshon J.A., Armstrong K.M., Moore T., Chang S.W., Snyder L.H., Priebe N.J., Finn I.M., Ferster D., Ryu S.I., Santhanam G., Sahani M., and Shenoy K.V. (2010) Stimulus onset quenches neural variability: a widespread cortical phenomenon. *Nature Neuroscience* **13**:369-78.
42. Priebe, N.J., Lampl, I. and Ferster, D. (2010) Mechanisms of direction selectivity in cat primary visual cortex as revealed by visual adaptation. *Journal of Neurophysiology* (In press).

#### **OTHER PUBLICATIONS FROM THE LAB**

43. Carandini, C. and Ringach, D.L. (1997) Predictions of a recurrent model of orientation selectivity. *Vision Research*. **37**:3061-3071.
44. Carandini, M. (2004) Amplification of Trial-to-Trial Response Variability by Neurons in Visual Cortex. *PLoS Biology* **2**:1483-1493.
45. Priebe, N.J. (2008) The relationship between subthreshold and suprathreshold ocular dominance in cat primary visual cortex. *Journal of Neuroscience* **28**:8553-8559.

#### **REVIEWS, CHAPTERS AND OPINIONS**

1. Ferster, D. & Lindström, S. (1984) Neuronal circuitry of the cat visual cortex. In Dynamic Aspects of Neocortical Function, Edelman, G.M., Cowan, W.M. & Gall, W.E., Eds., John Wiley & Sons, Inc.
2. Ferster, D. and Koch, C. (1987) Neuronal connections underlying orientation selectivity in the cat visual cortex. *Trends In Neuroscience* **10**:487-492.
3. Ferster, D. (1989) The synaptic inputs to simple cells of the visual cortex. In Structure and Function of the Visual Cortex. D.M.-K. Lam and C.D. Gilbert, Ed. Gulf Publishing, Houston. pp. 63-85.
4. Ferster, D. (1992) The synaptic inputs to simple cells of the cat visual cortex. In Progress in Brain Research Volume 90: GABA in the Retina and Visual System, Ed. R.R. Mize, R. E. Marc & A. Sillito, Elsevier, Amsterdam. pp. 423-441.

5. Ferster, D. Wheat, H.S. and Jagadeesh, B. (1994) The linearity of synaptic mechanisms in simple cells of area 17 of cat visual cortex. In Structural and functional organization of the neocortex. A symposium in the memory of Otto. D. Creutzfeldt, Ed. Albowitz, B., Albus, K., Kuhnt, U., Nothdurft, H.C. and Wahle, P., Springer Verlag, Berlin Heidelberg New York. pp. 188-200.
6. Ferster, D. (1994) Linearity of synaptic interactions in the assembly of receptive fields in cat visual cortex. *Current Opinion in Neurobiology* **4**:563-568.
7. Ferster, D. and Spruston, N. (1995) A Perspective: Cracking the Neuronal Code. *Science* **270**: 756-757.
8. Ferster, D. (1996) A Perspective: Is neural noise just a nuisance. *Science* **273**:1812.
9. Ferster, D.(1998) News and Views: A sense of direction. *Nature* **392**:433-434.
10. Ferster, D. and Miller, K.N. (2000) Neural mechanisms of orientation selectivity in visual cortex. *Annual Review of Neuroscience* **23**:441-471.
11. Ferster, D. (2001) Sleepers Wake (Preview). *Neuron* **30**:8-9.
12. Priebe, N.J. & Ferster, D. (2002) A New Mechanism for Neuronal Gain Control (or How the Gain in Brains Has Mainly Been Explained). *Neuron* **35**:602.
13. Ferster, D. Assembly of receptive fields in cat visual cortex. (2003) In Visual Neuroscience Eds. L.M. Chalupa and J.S. Werner. MIT Press.
14. Boudreau, C.E. and Ferster, D. (2004) Mechanisms of Image Processing in the Visual Cortex. In Cognitive Neuroscience by M. Gazzaniga. MIT Press.
15. Ferster, D. (2004) Blocking Plasticity in the Visual Cortex. *Science* **303**:1619-1621.
16. Ferster, D. and Priebe, N.J. (2008) Inhibition, spike threshold and stimulus selectivity in primary visual cortex. *Neuron* **57**:482-497.
17. Priebe, N.J. and Ferster, D. (2008) Vision: mechanisms of orientation, direction and depth. In *Encyclopedia of Neuroscience*, Ed. Larry R. Squire, Academic Press, Oxford University Press.

#### **PERSPECTIVES AND REVIEWS FEATURING WORK FROM THE LAB:**

1. Barinaga, M. (1992) Patch clamp *au naturel* (Research News). *Science* **254**:1108.
2. Hubel, D.H. (1996) A big step along the visual pathway (News and Views). *Nature* **380**:197-198.
3. Das, A. (1996) Orientation in visual cortex: A simple mechanism emerges (Minireview). *Neuron*. **16**:477-480.
4. Reid, R.C. and Alonso, J.-M. (1996) The processing and encoding of information in the

visual cortex. *Current Opinion in Neurobiology* **6**:475-480.

5. Barlow, B. (1997) Adaptation by hyperpolarization (Perspective). *Science* **276**:913-914.
6. Volgushev, M. and Eysel, U. (2000) Noise makes sense in neuronal computing (Perspective). *Science* **290**:1908-1909.
7. Abeles, M. (2004) Time is Precious (Perspective). *Science* **304**:523-524.
8. Livingstone, M. (2005) Directional inhibition: A new slant on an old question. (Preview). *Neuron* **45**:5-7.
9. Carandini, M. (2007) Melting the iceberg: Contrast invariance in visual cortex. (Preview). *Neuron* **54**:11-13.

#### **INVITED PRESENTATIONS:**

##### *Symposia and Workshops*

- 1976 Society for Neuroscience: Symposium on development and plasticity of the geniculocortical pathway
- 1982 University of Rochester Center for Visual Science Symposium: Relating Physiology and Morphology in the Visual System  
The Neurosciences Institute Symposium at The Salk Institute: Dynamic Aspects of Cortical Function
- 1984 International School of Biophysics Symposium at the Ettore Majorana Centre for Scientific Culture, Erice, Sicily: Vision and Image Understanding
- 1985 Organizer and Speaker, Society for Neuroscience Society Symposium: Origins of orientation selectivity in mammalian visual cortex
- 1988 European Brain and Behavior Society Workshop: "Visual Processing of Form and Motion", Tübingen  
Symposium on Parallel Processing in Vision, Northwestern University, Evanston, IL
- 1989 Retina Research Foundation Symposium: Structure and Function of the Visual Cortex, Houston, Texas
- 1990 The Helmholtz Club, San Diego, California
- 1991 NATO Advanced Research Workshop: Physiological and Computational Aspects of Cortical Function, Sirolo, Italy
- 1993 Gordon Conference on the Neurobiology of Alcohol, Oxnard, California  
Otto D. Creutzfeldt Symposium on Visual Neuroscience, Göttingen, Germany  
Cold Spring Harbor Course on Structure, Function and Development of the Visual System, ColdSpring Harbor, New York
- 1994 Symposium on *In Vivo* Intracellular Recording Techniques  
Winter Conference on Brain Research, Snowbird, Utah  
McKnight Foundation Biennial Symposium, Minneapolis, Minnesota  
Special Symposium for the Freidenwald Awardee (Nigel Daw), Annual Meeting of the Association for Research in Vision and Ophthalmology, Sarasota, Florida  
Chairman, Visual Cortex V Session at the Annual Meeting of the Society for Neuroscience, Miami, Florida
- 1995 Symposium on Spatial and Temporal Processing in Olfaction and Vision

- Meeting of the International Brain Research Organization, Kyoto, Japan  
Symposium on Cerebral Cortex: Function and Development  
INSERM Group, Lyon, France
- 1996 The Helmholtz Club, San Diego, California  
Office of Naval Research Symposium on Computation by Cortical Circuits  
Zurich, Switzerland  
Symposium on the Origins of Orientation Selectivity, Computation and Neural  
Systems Conference, Boston, MA  
J. Arthur Rank Symposium on Motion Analysis, Grasmere, England  
Satellite Symposium on Mouse Somatosensory Barrel Fields, Washington, DC
- 1997 Vision Mini-symposium, Johns Hopkins/Georgetown/NIH, Washington, DC  
Cold Spring Harbor Laboratory Course on Structure., Function and Development of  
the Visual System, ColdSpring Harbor, New York
- 1998 Workshop on Computational Neuroscience, Institute for Mathematics and Its  
Applications, University of Minnesota, Minneapolis, MN  
Cold Spring Harbor Symposium: Neurocomputational Strategies: From Synapses to  
Behavior
- 1999 Cold Spring Harbor Symposium: Functional organization of thalamus and cortex and  
their interactions.  
Cold Spring Harbor Laboratory Course on Structure. Function and Development of  
the Visual System, ColdSpring Harbor, New York  
Neocortical Columns, The Weizmann Institute of Science, Rehovot, Israel
- 2000 Neural Computation Course, Marine Biological Labs, Woods Hole, MA
- 2001 Neural Information Coding Workshop, Big Sky, Montana
- 2002 12<sup>th</sup> Keio University International Symposium for Life Science and Medicine: The  
Neural Basis of Early Vision, Tokyo, Japan  
Shanghai Symposium on Visual Processing, Shanghai, China  
Center for Neuroscience Annual Retreat, University of Pittsburgh  
Conte Center Symposium on Detection and Recognition of Objects in Visual Cortex,  
Cambridge, MA
- 2003 Neural Circuits: Principles of design and operation. Cold Spring Harbor Laboratories,  
Cold Spring Harbor. NY  
Summer Institute in Cognitive Neuroscience, Lake Tahoe, CA  
Conte Center Symposium on Detection and Recognition of Objects in Visual Cortex,  
MIT, Cambridge, MA
- 2004 Conte Center Symposium on Detection and Recognition of Objects in Visual Cortex,  
MIT, Cambridge, MA  
Frontiers in Vision Science Symposium, University of Illinois, Chicago
- 2005 Conte Center Symposium on Detection and Recognition of Objects in Visual Cortex,  
MIT, Cambridge, MA  
Computational Neuroscience Course, Marine Biological Laboratories, Woods Hole,  
MA
- 2006 Conte Center Symposium on Detection and Recognition of Objects in Visual Cortex,  
MIT, Cambridge, MA  
Computational Neuroscience Course, Marine Biological Laboratories, Woods Hole,  
MA  
Optical Society of America Vision Meeting, Rochester, NY
- 2007 Visual System Workshop, Mathematical Biosciences Institute, Ohio State University,

Columbus, OH

- 2009 Visual Neuroscience Course, Marine Biological Laboratories, Woods Hole, MA
- 2010 Neural Circuits Workshop, Simons Foundation, New York, NY

*Lectures*

- 1981 Department of Anatomy, University of Pennsylvania  
Department of Neurobiology, Stanford University  
Department of Neurobiology, Harvard University  
Department of Neurobiology and Physiology, Northwestern University  
Department of Ophthalmology, University of Washington, Seattle  
Department of Anatomy and Neurobiology, Washington University  
Department of Physiology, University of North Carolina  
Department of Anatomy, Yale University  
Department of Anatomy, University of Chicago
- 1983 Department of Psychology, University of Illinois Champaign-Urbana
- 1985 Department of Neurobiology, Harvard Medical School  
Department of Psychology, Massachusetts Institute of Technology  
Department of Neurobiology, University of Wisconsin, Madison  
Department of Physiology, University of North Carolina  
Institute of Anatomy, University of Lausanne  
Max-Planck Institute for Brain Research
- 1986 The Salk Institute  
Department of Neurobiology, Stanford University  
Department of Physiology, University of California, San Francisco
- 1987 Department of Physiology, Northwestern University  
Division of Biology, California Institute of Technology, Pasadena  
Department of Anatomy and Neurobiology, Washington University
- 1988 Department of Physiology, Yale University  
Department of Biology, Illinois Institute of Technology  
Physiology Institute, University of Göteborg, Sweden
- 1989 Center for Vision Research, Rochester University  
Department of Neurobiology, Stanford University  
Department of Physiology, University of California, San Francisco  
Department of Optometry, University of California, Berkeley  
Department of Anatomy and Cell Biology, Medical College of Wisconsin
- 1990 Committee on Neurobiology, University of Chicago
- 1991 Department of Physiology, University of California, San Francisco
- 1992 Department of Anatomy, University of Pennsylvania, Philadelphia  
Center for Neurobiology, University of California, Davis California  
Committee on Neurobiology, University of Chicago
- 1993 Smith-Kettlewell Institute, San Francisco, California  
Department of Optometry, University of California, Berkeley  
Department of Psychology, Stanford University  
Department of Physiology and Biophysics, University of Iowa  
Department of Neurobiology, Rockefeller University  
Division of Neurobiology, University of California, Berkeley

- Department of Physiology, University of California, San Francisco  
1994 AT & T, Bell Laboratories, Princeton, NJ  
Division of Biology, California Institute of Technology, Pasadena  
Laboratory of Neurophysiology, University of California, Los Angeles  
Department of Neurobiology, Duke University, Durham  
Department of Anatomy, University of Wisconsin, Madison  
Division of Neuroscience, Baylor College of Medicine, Houston  
School of Biological Sciences, University of Kentucky, Lexington  
1995 Department of Anatomy, University of Pennsylvania, Philadelphia  
Institute of Physical and Chemical Research, Riken, Japan  
Department of Anatomy, University of Pittsburgh  
Laboratory of Neuropsychology, NIMH, Bethesda, MD  
1996 Department of Physiology, University of Nebraska, Omaha  
Center for Neuroscience, University of California, Davis  
Institute for Neuroinformatics, University of Zurich, Switzerland  
Department of Neurobiology, Harvard University  
Institute of Ophthalmology, University College, London  
Laboratory of Physiology, Oxford University, England  
1997 University of Alabama, Birmingham  
Zanvyl Krieger Mind/Brain Institute, The Johns Hopkins University, Baltimore, MD  
Department of Physiology and Biophysics, University of Washington, Seattle, WA  
Neuroscience Division, Brown University, Providence, RI  
Department of Neurobiology, The Weizmann Institute, Rehovoth, Israel  
Center for Neural Science, New York University  
Department of Physiology, University of California, San Francisco, CA  
Rockefeller University, New York, NY  
1998 Department of Biology, DePaul University  
Department of Neurobiology, The Weizmann Institute, Rehovoth, Israel  
Department of Physics, Jerusalem University, Israel  
Riken Institute for Neuroscience, Saitama, Japan  
Department of Neuroscience, University of Pennsylvania  
1999 Brandeis University, Waltham, MA  
Department of Neurobiology, Harvard Medical School  
2000 Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology  
Department of Biology, University of California, San Diego  
Baylor University, Neurobiology Department  
Case Western Reserve University, Neurobiology Department  
2001 University of Chicago  
Cold Spring Harbor Laboratories, Cold Spring Harbor, NY  
Smith-Kettlewell Research Institute, San Francisco, CA  
Department of Physiology, University of Washington, Seattle  
2002 Neuroscience Program, University of Connecticut, Storrs  
2003 Department of Biological Science, Columbia University, New York  
Department of Neuroscience, University of Texas, Austin  
Smith-Kettlewell Eye Research Institute, San Francisco, CA  
Department of Neuroscience, University of California, San Diego  
School of Optometry, University of California, Berkeley  
2004 Center for Visual Science, University of Rochester, Rochester, New York

- 2006 Zangvyl Krieger Mind/Brain Institute, The Johns Hopkins University, Baltimore, MD  
2007 Department of Neurobiology, Harvard Medical School, Boston, MA  
Computational Neuroscience Lecture Series, New York University, New York, NY  
Neuroscience Graduate Program Retreat, Columbia University, New York, NY  
Department of Neuroscience, Erasmus University, Rotterdam, Netherlands  
2008 Department of Neurobiology, Duke University, Raleigh, NC

**GRANT SUPPORT:**

*Current Research Grants*

National Eye Institute Grant 1 R01 EY04726-09 (7/1983-6/2010)

Title: Intracellular Study of Visual Cortical Function

Annual Direct Costs: \$200,000

Total Direct Costs: 1,000,000

Effort: 45%

National Science Foundation

Title: Collaborative Research: CRCNS: Detection and Recognition of Objects in Visual Cortex (Joint with MIT and Caltech)

Annual Total Costs for Northwestern Project: \$50,000

National Heart Lung and Blood Institute 1 R01 HL/MH/AG/NS 65147 (9/99-9/03)

Title: Genetic analysis of sleep regulation in the mouse (P.I. Fred Turek)

Annual Direct Costs: \$225,000

Total Direct Costs: \$900,000

Effort: 5%

The major goals of the project are to identify specific genetic and other factors that contribute to variability in how stress disrupts sleep. Our role in this project is in developing automated systems for scoring sleep stages in rodents.

National Eye Institute Training Grant 1 T32 EY07128

Title: Multidisciplinary visual sciences training program

Principle Investigator: Vijay Sarthy

Currently supporting Beth Boudreau in my lab.

Effort: 5%

*Previous Research Grants*

Human Frontiers Science Program (7/99-6/02)

Title: Functions and mechanisms of pattern adaptation in visual cortex

Annual Direct Costs: \$50,000

McKnight Neuroscience Development Award (1/91-12/94)

Title: Mechanisms of neuronal computation in the cat visual cortex

Annual Direct Costs: \$36,000

Total Direct Costs: \$118,000

Northwestern University Office of Research and Sponsored Projects, Institute for Neuroscience, College of Arts and Sciences (1990-1992).

Title: Laboratory in Neurophysiology

Total Costs: \$130,000

Searle Foundation Leadership Fund for the Life Sciences (1982-1985)

Total Award: \$50,000

University Research Grants Committee Grant 2015 (1983)

Title: Intracortical Connections in Primary Visual Cortex

Total Award: \$4,000

Alfred P. Sloan Fellowship Grant BR-2454 (1984-1988)

Total Award: \$25,000

## COURSES TAUGHT

412-C77	Sensory Physiology For advance undergraduates majoring in Neuroscience	1982-1983
412-A40	Senses of Animals and Man (Neurobiology and Physiology) Distribution requirement for non-science majors	1983, 1987
765-C01	Functional Neuroanatomy (Biomedical Engineering) Required course for majors in Biomedical Engineering	1984-1987
412-C11	ISP Neurobiology ISP is the Integrated Science Program, an intensive program program in math, physics and chemistry for selected undergraduates	1987-1988
845-D15	The Central Nervous System (Neuroscience Institute) For graduate students in neuroscience	1989-2001
845-D25	Laboratory in Neuroscience (Neuroscience Institute) For graduate students in neuroscience	1990-198

*845-D25 Laboratory in Neuroscience* consists of a series of laboratory exercises designed to introduce students to several classical experiments in the electrophysiology of neurons. Students first record intracellularly from muscle fibers of the frog and investigate the ionic basis of the resting membrane potential and its dependence on the potassium equilibrium. A second set of experiments use the frog neuromuscular junction to study the quantal nature of transmitter release at vertebrate synapses and to study the pharmacology of transmitter release. A third set of experiments use whole-cell patch recording in cultured neuroblastoma cells to study the ionic basis of the action potential. In a final set of experiments the students study their own myotactic reflex (using transcutaneous stimulation and electromyography) as an example of vertebrate sensory-motor integration.

## ADVISING ACTIVITIES:

### Doctoral Students

Jeffrey Anderson (1997-2000). MD-PhD student. Thesis on the effects of noise of the responses of visual cortical neurons. Currently on the faculty at University of Utah.

Sooyoung Chung (1994- 1997). Thesis on using cortical inactivation to study the role of thalamic inputs in determining cortical response properties. Currently on the Faculty at Korea Institute of Science and Technology.

Bharathi Jagadeesh (1989-1993). Thesis on the linearity of spatial summation in neurons of the visual cortex. Ph. D. March, 1993. Currently an assistant professor and University of Washington, Seattle.

Ian Finn (2003-2008) MSTP student.

Jianing Yu (2006- ) PhD student.

### Postdoctoral Fellows

Matteo Carandini (1996-1997). Currently on the faculty of University College London.

Ilan Lampl (1997-2003) Currently an assistant professor at the Weizmann Institute in Rehovot, Israel

Deda Gillespie (1998-2002) Currently at assistant professor at McMaster University.

Beth Boudreau (2001-2005)

Nicholas Priebe (2001-2008) Currently an assistant professor at University of Texas, Austin.

Hirofumi Ozeki (2003-2009) Currently a postdoctoral fellow at RIKEN, Japan.

Srivatsun Sadagopan (2008- )

**DEPARTMENTAL AND UNIVERSITY SERVICE:**

Planning Committee for the Chemistry of Life Processes Building, <i>ex officio</i>	2005-
SNUPER Advisory Committee	2005-
Research Data Integration and Access Committee	2004-2005
Chair, Evanston Campus Life Sciences Council	2003-
MSTP Executive Committee	2003-
WCAS Ad hoc Committee of Tenure and Promotions	2002-
NU fMRI Users Committee	2001-2004
WCAS Committee on Tenure	2001-2003
WCAS Life Sciences Council ( <i>ex officio</i> )	2002-2003
MSTP Admissions Committee	2000-2002
Intellectual Property Committee	1998-2001
Board of Undergraduate Program for Life Sciences	1991-2002
Biological Sciences Building Committee	1997-2000
Advisory Committee on Animal Resources	1995-1998
Director, Computer Network Services, Hogan and Life Sciences Building	1991-1998
Chairman, Curriculum Committee, Neurosciences Institute	1994-1999
Ad Hoc Faculty Group for University Development	1997-1998
Chairman, Faculty Search Committee, Neurobiology and Physiology	1995-1996
Internal Review Committee for the Department of Neurology	1994-1995
Curriculum Committee, Neurosciences Institute	1988-1994
University Committee on Computing and Information Processing	1991-1994
Freshman Counselor	1992-1993
Chairman, Faculty Appointment Committee, Neurobiology & Physiology	1988-1993
Integrated Science Program Committee	1988-1991
Animal Care and Use Committee	1988-1991
University Committee on Cognitive Science and Artificial Intelligence	1985-1987
Life Sciences Building Committee, College of Arts and Sciences	1985-1987
Committee on Honors and Superior Students, CAS	1983-1985