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Date of birth: 10 December 1950  
Place of birth: New York, NY, USA  
Nationality: USA  
Marital status: Separated, two children (born 1982 and 1984)

### Education

1955–1968 The Browning School, New York, NY, USA  
1968–1969 McGill University, Montreal, Quebec, Canada  
1969–1972 Churchill College, University of Cambridge  
1972 B. A. (Honours)  
1972–1975 Research Student, The Psychological Laboratory, University of Cambridge  
1975 Ph. D. (Supervisor: Colin Blakemore)  
Dissertation: *Plasticity of Binocular Organization in the Kitten's Visual System*  
1976 M. A.

### Honors

1972–1975 Research Training Scholarship, The Wellcome Trust  
1977–1981 Research Fellowship in Neuroscience, Alfred P. Sloan Foundation  
1980–1985 Research Career Development Award, National Eye Institute, National Institutes of Health  
1985 Young Investigator Award, Society for Neuroscience  
1985–1986 Visiting Fellowship, All Souls College, Oxford  
1985–1986 Royal Society Guest Research Fellowship, University Laboratory of Physiology, Oxford  
1985–1986 Senior International Fellowship, Fogarty International Center, National Institutes of Health  
1986 Fellow, New York Institute for the Humanities

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| 1992 | Rank Prize for Optoelectronics   |
| 1993 | Herman and Margaret Sokol Faculty Award, New York University           |
| 1993 | Fellow, American Association for the Advancement of Science            |
| 1996 | Lamport Lectureship, University of Washington, Seattle                 |
| 1999 | Presidential Professorship, New York University                        |
| 2000 | W. R. Bauer Foundation Lectureship, Brandeis University                |
| 2002 | Silver Professorship, New York University                              |
| 2006 | A. J. Carlson Lectureship, University of Chicago                       |
| 2006 | Fellow, Association for Psychological Science                          |
| 2007 | Rank Prize Funds Lectureship, European Conference on Visual Perception |
| 2008 | Member, National Academy of Sciences                                   |
| 2009 | Fellow, American Academy of Arts and Sciences                          |
| 2010 | Member, Dana Alliance for Brain Initiatives                            |
| 2010 | Silver Fellow, Association for Research in Vision and Ophthalmology    |
| 2010 | António Champalimaud Vision Award                                      |

### **Academic Positions**

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| 1975–1978                                | Assistant Professor of Psychology, New York University                                   |
| 1978–1984                                | Associate Professor of Psychology, New York University                                   |
| 1984–present                             | Professor of Psychology, New York University   |
| 1987–present                             | Professor of Neural Science, New York University   |
| 1987–1991,<br>1993–1998,<br>2004–present | Director, Center for Neural Science, New York University                                 |
| 1990–present                             | Adjunct Professor of Physiology and Neuroscience, New York University School of Medicine |
| 1991–2003                                | Investigator, Howard Hughes Medical Institute  |
| 1999–2002                                | Presidential Professor, New York University  |
| 2002–present                             | Silver Professor, New York University  |
| 2011–present                             | University Professor, New York University  |

## **Learned Societies**

- 1972–present American Association for the Advancement of Science  
AAAS Fellow, 1993
- 1974–present Association for Research in Vision and Ophthalmology  
Electrophysiology Section Committee, 1982–1983  
Chair, Electrophysiology Section, 1984  
Silver Fellow, 2010
- 1976–present Society for Neuroscience  
Program Committee, 1987–1991 (Chair, 1991)  
Information Technology Committee, 2006–2009
- 1990–present Association for Psychological Science (American Psychological Society)  
APS Fellow, 2006
- 1996–present American Physiological Society
- 1999–present Cognitive Neuroscience Society  
Program Committee, 1999–2006  
Chair, Program Committee, 2005–2006
- 2001–present Vision Sciences Society  
Program Review Board, 2001–2007  
Board of Directors, 2007–present  
President, 2009–2010
- 2008–present National Academy of Sciences
- 2009–present American Academy of Arts and Sciences

## **Research Interests**

Neurophysiology and neuroanatomy of the central visual system.

Psychophysics of spatial vision and visual motion perception.

Neurophysiology, neuroanatomy and psychophysics of visual development.

Computational approaches to problems in vision and neuroscience.

## **Teaching Experience**

- 1972–1975 Tutorial and laboratory teaching of undergraduate students in psychology and physiology, University of Cambridge.
- 1975–present Teaching graduate and undergraduate students in psychology and neuroscience, New York University, including Physiological Psychology, Neural Science, Perception, Sensory Physiology, Developmental Neurobiology, Visual Neuroscience.
- 1985–1994 Founder and Organizer, Cold Spring Harbor Laboratory Summer Course on Computational Neuroscience.

## Professional Service

National Institutes of Health, Division of Research Grants, Visual Sciences B Study Section (1982–1987)

Chair, NEI/DRG Workshop on Anesthesia and Paralysis in Experimental Animals, Bethesda, MD, 1984 (report published in *Visual Neuroscience* **1**, 421–426, 1988).

National Research Council, Institute of Laboratory Animal Resources, Committee on the Detection and Alleviation of Pain and Distress in Laboratory Animals (1988–1990)

National Institutes of Health, National Eye Institute, Special Review Committee (1993–present)

National Science Foundation, Neuroscience Advisory Panel (2001–2004)

National Institute of Mental Health, Board of Scientific Counselors (*ad hoc* member, 2001)

Washington National Primate Research Center, National Scientific Advisory Board (2005, 2010–present)

National Eye Institute, Board of Scientific Counselors (*ad hoc* member, 2006, 2010)

Cold Spring Harbor Laboratory, Board of Trustees (1993–1998)

Alfred P. Sloan Foundation, Neuroscience Fellowship Panel (1994–2000)

The McKnight Endowment Fund for Neuroscience, Technological Innovations in Neuroscience Panel (1998–2004), Scholar Awards Panel (2009–present)

James S. McDonnell Foundation, 21<sup>st</sup> Century Awards Panel (2000–2008)

EJLB Foundation, Scientific Advisory Board (2001–2004)

Burroughs Wellcome Fund, Advisory Panel for Career Awards in the Biomedical Sciences (2002–present)

Jewish Guild for the Blind, Bressler Prize Jury (2002–2004)

Gatsby Computational Neuroscience Unit, University College, London, Quinquennial Review Committee (2005), Scientific Advisory Board (2006–present)

The Patterson Trust, Scientific Review Board (2006–2009)

The Simons Foundation, Scientific Advisory Board (2006–present)

The Weizmann Institute of Science, Rehovot, Israel, Scientific and Academic Advisory Committee (2006)

Champalimaud Foundation, Scientific Committee (2009–present)

*Annual Review of Neuroscience* (Editorial Board, 1983–1987)

*Visual Neuroscience* (Editorial Board, 1987–1989)

*Journal of Cognitive Neuroscience* (Editorial Board, 1988–2003)

*Trends in Neurosciences* (Advisory Editorial Board, 1993–1996)

*Network – Computation in Neural Systems* (Executive Board, 1995–2003)

*Journal of Neuroscience* (Associate Editor, 1996–2002)

*Journal of Vision* (Editorial Board, 2000–present)

*Neuron* (Editorial Board, 2007–present)

*Perception* (Editorial Board, 2010–present)

*Proceedings of the National Academy of Sciences* (Editorial Board, 2010–present)

## Publications: Research Reports

- J. A. Movshon, B. E. I. Chambers and C. Blakemore (1972). Interocular transfer in normal humans, and those who lack stereopsis. *Perception* **1**, 483–490.
- J. A. Movshon and C. Blakemore (1973). Orientation specificity and spatial selectivity in human vision. *Perception* **2**, 53–60.
- C. Blakemore, M. Donaghy, L. Maffei, J. A. Movshon, D. Rose and R. C. Van Sluyters (1974). Evidence that nitrous oxide can maintain anaesthesia after induction with barbiturates. *Journal of Physiology* **237**, 39–41P.
- J. A. Movshon (1974). Velocity preferences of simple and complex cells in the cat's striate cortex. *Journal of Physiology* **242**, 121–123P.
- J. A. Movshon and C. Blakemore (1974). Functional reinnervation in kitten visual cortex. *Nature* **251**, 504–505.
- J. A. Movshon (1975). The velocity tuning of single units in cat striate cortex. *Journal of Physiology* **249**, 445–468.
- J. A. Movshon and D. J. Tolhurst (1975). On the response linearity of neurones in cat visual cortex. *Journal of Physiology* **249**, 56–57P.
- D. J. Tolhurst and J. A. Movshon (1975). Spatial and temporal contrast sensitivity of striate cortical neurones. *Nature* **257**, 674–675.
- C. Blakemore, R. C. Van Sluyters and J. A. Movshon (1976). Synaptic competition in the kitten's visual cortex. *Cold Spring Harbor Symposia on Quantitative Biology* **40**, 601–609.
- M. R. Dürsteler, L. J. Garey and J. A. Movshon (1976). Reversal of the morphological effects of monocular deprivation in the kitten's lateral geniculate nucleus. *Journal of Physiology* **261**, 189–210.
- A. P. Ginsburg, J. A. Movshon and D. J. Tolhurst (1976). Periodicity in complex cell responses. *Journal of Physiology* **254**, 69–70P.
- J. A. Movshon (1976). Reversal of the physiological effects of monocular deprivation in the kitten's visual cortex. *Journal of Physiology* **261**, 125–174.
- J. A. Movshon (1976). Reversal of the behavioural effects of monocular deprivation in the kitten. *Journal of Physiology* **261**, 175–187.
- J. A. Movshon and D. J. Tolhurst (1976). The use of a digital computer in the study of neuronal properties in the visual system. *Journal of Physiology* **254**, 2–4P.
- D. E. Mitchell, M. Cynader and J. A. Movshon (1977). Recovery from the effects of monocular deprivation in kittens. *Journal of Comparative Neurology* **176**, 53–64.
- J. A. Movshon and M. R. Dürsteler (1977). Effects of brief periods of unilateral eye closure on the kitten's visual system. *Journal of Neurophysiology* **40**, 1255–1265.
- C. Blakemore, J. A. Movshon and R. C. Van Sluyters (1978). Modification of the kitten's visual cortex by exposure to spatially periodic patterns. *Experimental Brain Research* **31**, 561–572.
- J. A. Movshon, I. D. Thompson and D. J. Tolhurst (1978). Spatial summation in the receptive fields of simple cells in the cat's striate cortex. *Journal of Physiology* **283**, 53–77.

- J. A. Movshon, I. D. Thompson and D. J. Tolhurst (1978). Receptive field organization of complex cells in the cat's striate cortex. *Journal of Physiology* **283**, 79–99.
- J. A. Movshon, I. D. Thompson and D. J. Tolhurst (1978). Spatial and temporal contrast sensitivity of neurones in areas 17 and 18 of the cat's visual cortex. *Journal of Physiology* **283**, 101–120.
- P. G. Thompson and J. A. Movshon (1978). Storage of spatially specific threshold elevation. *Perception* **7**, 65–73.
- J. A. Movshon and P. Lennie (1979). Spatially selective adaptation in striate cortical neurones. *Nature* **278**, 850–852.
- A. R. Arditi, P. A. Anderson and J. A. Movshon (1981). Monocular and binocular detection of moving sinusoidal gratings. *Vision Research* **21**, 329–336.
- A. R. Arditi, L. Kaufman and J. A. Movshon (1981). A simple explanation of the induced size effect. *Vision Research* **21**, 755–764.
- T. Pasternak, W. H. Merigan and J. A. Movshon (1981). Motion mechanisms in strobe-reared cats: psychophysical and electrophysiological measures. *Acta Psychologica* **48**, 321–332.
- T. Pasternak, J. A. Movshon and W. H. Merigan (1981). Creation of direction selectivity in adult strobe-reared cats. *Nature* **292**, 834–836.
- D. J. Tolhurst, J. A. Movshon and I. D. Thompson (1981). The dependence of response amplitude and variance of cat visual cortical neurones on stimulus contrast. *Experimental Brain Research* **41**, 414–419.
- E. H. Adelson and J. A. Movshon (1982). Phenomenal coherence of moving visual patterns. *Nature* **300**, 523–525.
- E. H. Adelson and J. A. Movshon (1983). The perception of coherent motion in two-dimensional patterns. *Proceedings of the Association of Computing Machinery. Interdisciplinary Workshop on Motion: Representation and Perception, Toronto, Canada*, pp. 11–14, April 4–6, 1983.
- A. R. Arditi, L. Kaufman and J. A. Movshon (1983). A reply to the comments of Mayhew and Frisby. *Vision Research* **23**, 665–668.
- D. J. Tolhurst, J. A. Movshon and A. F. Dean (1983). The statistical reliability of signals in single neurons in cat and monkey striate cortex. *Vision Research* **23**, 775–785.
- R. A. Schumer and J. A. Movshon (1984). Length summation in simple cells of cat striate cortex. *Vision Research* **24**, 565–571.
- J. A. Movshon, E. H. Adelson, M. S. Gizzi and W. T. Newsome (1985). The analysis of moving visual patterns. In *Pattern Recognition Mechanisms*, ed. C. Chagas, R. Gattass and C. Gross (*Pontificiae Academiae Scientiarum Scripta Varia* **54**, 117–151). Rome: Vatican Press. (Reprinted in *Experimental Brain Research, Supplementum* **11**, 117–151, 1986, and in *Frontiers in Cognitive Neuroscience*, ed. S. M. Kosslyn and R. A. Andersen, Cambridge, MA: MIT Press, 1992).

- T. Pasternak, R. A. Schumer, M. S. Gizzi and J. A. Movshon (1985). Abolition of cortical directional selectivity affects visual behavior in cats. *Experimental Brain Research* **61**, 214–217.
- L. Kiorpes and J. A. Movshon (1987). The development of vernier acuity and spatial resolution in infant monkeys. *Journal of Physiology* **396**, 141P.
- L. Kiorpes, R. G. Boothe, A. E. Hendrickson, J. A. Movshon, H. M. Eggers and M. S. Gizzi (1987). Effects of early unilateral blur on the macaque's visual system. I. Behavioral observations. *Journal of Neuroscience* **7**, 1318–1326.
- A. E. Hendrickson, J. A. Movshon, H. M. Eggers, M. S. Gizzi, R. G. Boothe and L. Kiorpes (1987). Effects of early unilateral blur on the macaque's visual system. II. Anatomical observations. *Journal of Neuroscience* **7**, 1327–1339.
- J. A. Movshon, H. M. Eggers, M. S. Gizzi, A. E. Hendrickson, L. Kiorpes and R. G. Boothe (1987). Effects of early unilateral blur on the macaque's visual system. III. Physiological observations. *Journal of Neuroscience* **7**, 1340–1351.
- J. A. Movshon and L. Kiorpes (1988). Analysis of the development of spatial contrast sensitivity in monkey and human infants. *Journal of the Optical Society of America, A* **5**, 2166–2172.
- P. A. Anderson and J. A. Movshon (1989). Binocular combination of contrast signals. *Vision Research* **29**, 1115–1132.
- L. Kiorpes and J. A. Movshon (1989). Differential development of two visual functions in primates. *Proceedings of the National Academy of Sciences, U. S. A.* **86**, 8998–9001.
- W. T. Newsome, K. H. Britten and J. A. Movshon (1989). Neuronal correlates of a perceptual decision. *Nature* **341**, 52–54.
- W. T. Newsome, K. H. Britten, J. A. Movshon and M. Shadlen (1989). Single neurons and the perception of visual motion. In *Neural Mechanisms of Visual Perception. Proceedings of the Retina Research Foundation Symposium, Vol. 2*, ed. D. M. K. Lam and C. D. Gilbert. Woodlands, TX: Portfolio Publishing.
- M. S. Gizzi, E. Katz and J. A. Movshon (1990). Spatial and temporal analysis by neurons in the representation of the central visual field in the cat's lateral suprasylvian visual cortex. *Visual Neuroscience* **5**, 463–468.
- M. S. Gizzi, E. Katz, R. A. Schumer and J. A. Movshon (1990). Selectivity for orientation and direction of motion of single neurons in the cat's striate and extrastriate visual cortex. *Journal of Neurophysiology* **63**, 1529–1543.
- J. B. Levitt, R. M. Sanchez, E. L. Smith III and J. A. Movshon (1990). Spatio-temporal interactions and the spatial phase preferences of visual neurons. *Experimental Brain Research* **80**, 441–445.
- J. A. Movshon, S. G. Lisberger and R. J. Krauzlis (1990). Visual cortical signals supporting smooth pursuit eye movements. *Cold Spring Harbor Symposia on Quantitative Biology* **LV**, 707–716.
- W. T. Newsome, K. H. Britten, C. D. Salzman and J. A. Movshon (1990). Neuronal mechanisms of motion perception. *Cold Spring Harbor Symposia on Quantitative Biology* **LV**, 697–705.

- B. C. Skottun, R. L. DeValois, D. H. Grosof, J. A. Movshon, D. G. Albrecht and A. B. Bonds (1991). Classifying simple and complex cells on the basis of response modulation. *Vision Research*, **31**, 1079–1086.
- K. H. Britten, M. N. Shadlen, W. T. Newsome and J. A. Movshon (1992). The analysis of visual motion: a comparison of neuronal and psychophysical performance. *Journal of Neuroscience* **12**, 4745–4765.
- S. P. McKee, C. M. Schor, S. B. Steinman, N. Wilson, G. G. Koch, S. M. Davis, C. Hsu-Winges, S. H. Day, C. L. Chan, J. A. Movshon, M. C. Flom, D. M. Levi and J. T. Flynn (1992). The classification of amblyopia on the basis of visual and oculomotor performance. *Transactions of the American Ophthalmological Society* **90**, 123–148.
- K. H. Britten, M. N. Shadlen, W. T. Newsome and J. A. Movshon (1993). Responses of neurons in macaque MT to stochastic motion signals. *Visual Neuroscience* **10**, 1157–1169.
- L. Kiorpes, D. C. Kiper and J. A. Movshon (1993). Contrast sensitivity and vernier acuity in amblyopic monkeys. *Vision Research* **33**, 2301–2311.
- K. R. Gegenfurtner, D. C. Kiper, J. M. H. Beusmans, M. Carandini, Q. Zaidi and J. A. Movshon (1994). Chromatic properties of neurons in macaque MT. *Visual Neuroscience* **11**, 455–466.
- J. B. Levitt, D. C. Kiper and J. A. Movshon (1994). Receptive fields and functional architecture of macaque V2. *Journal of Neurophysiology* **71**, 2517–2542.
- S. G. Lisberger and J. A. Movshon (1994). A different approach to modelling pursuit eye movements. In *Contemporary Ocular Motor and Vestibular Research: A Tribute to David A. Robinson*, ed. A. F. Fuchs, T. Brandt, U. Buttner and D. Zee. New York: Thieme, pp 304–311.
- K. H. Britten, W. T. Newsome, M. N. Shadlen, S. Celebrini and J. A. Movshon (1996). A relationship between behavioral choice and the visual responses of neurons in macaque MT. *Visual Neuroscience* **13**, 87–100.
- M. Carandini, F. Mechler, C. S. Leonard and J. A. Movshon (1996). Spike train encoding by regular-spiking cells of the visual cortex. *Journal of Neurophysiology* **76**, 3425–3441.
- D. J. Heeger, E. P. Simoncelli and J. A. Movshon (1996). Computational models of cortical visual processing. *Proceedings of the National Academy of Sciences, U. S. A.* **93**, 623–627.
- L. Kiorpes and J. A. Movshon (1996). Amblyopia: a developmental disorder of the central visual pathways. *Cold Spring Harbor Symposia on Quantitative Biology* **LXI**, 39–48.
- L. Kiorpes, P. J. Walton, L. P. O'Keefe, J. A. Movshon and S. G. Lisberger (1996). Effects of early-onset artificial strabismus on pursuit eye movements and on neuronal responses in area MT of macaque monkeys. *Journal of Neuroscience* **16**, 6537–6553.
- D. C. Kiper, K. R. Gegenfurtner and J. A. Movshon (1996). Cortical oscillatory responses do not affect visual segmentation. *Vision Research* **36**, 539–544.
- J. A. Movshon and W. T. Newsome (1996). Visual response properties of striate cortical neurons projecting to area MT in macaque monkeys. *Journal of Neuroscience* **16**, 7733–7741

- M. N. Shadlen, K. H. Britten, W. T. Newsome and J. A. Movshon (1996). A computational analysis of the relationship between neuronal and behavioral responses to visual motion. *Journal of Neuroscience* **16**, 1486–1510.
- W. Bair, J. R. Cavanaugh and J. A. Movshon (1997). Reconstructing stimulus velocity from neuronal responses in area MT. In *Advances in Neural Information Processing Systems 9*, ed. M.C. Mozer, M. I. Jordan and T. Petsche. Cambridge, MA: MIT Press, pp 34–40.
- M. Carandini, H. B. Barlow, L. P. O'Keefe, A. B. Poirson and J. A. Movshon (1997). Adaptation to contingencies in macaque primary visual cortex. *Philosophical Transactions of the Royal Society of London, Series B*, **352**, 1149–1154.
- M. Carandini, D. J. Heeger and J. A. Movshon (1997). Linearity and normalization in simple cells of the macaque primary visual cortex. *Journal of Neuroscience* **17**, 8621–8644.
- M. Carandini, J. A. Movshon and D. Ferster (1998). Pattern adaptation and cross-orientation interactions in the primary visual cortex. *Neuropharmacology* **37**, 501–511.
- L. Kiorpes, D. C. Kiper, L. P. O'Keefe, J. R. Cavanaugh and J. A. Movshon (1998). Neuronal correlates of amblyopia in the visual cortex of macaque monkeys with experimental strabismus and anisometropia. *Journal of Neuroscience* **18**, 6411–6424.
- L. Kiorpes and J. A. Movshon (1998). Peripheral and central factors limiting the development of contrast sensitivity in macaque monkeys. *Vision Research* **38**, 61–70.
- K. M. Murphy, D. G. Jones, S. B. Fenstemaker, V. D. Pegado, L. Kiorpes and J. A. Movshon (1998). Spacing of cytochrome oxidase blobs in visual cortex of normal and strabismic monkeys. *Cerebral Cortex* **8**, 237–244.
- L. P. O'Keefe, J. B. Levitt, D. C. Kiper, R. M. Shapley and J. A. Movshon (1998). Functional organization of owl monkey lateral geniculate nucleus and visual cortex. *Journal of Neurophysiology* **80**, 594–609.
- L. P. O'Keefe and J. A. Movshon (1998). Processing of first- and second-order motion signals by neurons in area MT of the macaque monkey. *Visual Neuroscience* **15**, 305–317.
- L. Kiorpes, C. Tang and J. A. Movshon (1999). Factors limiting contrast sensitivity in experimentally amblyopic macaque monkeys. *Vision Research* **39**, 4152–4160.
- S. G. Lisberger and J. A. Movshon (1999). Visual motion analysis for pursuit eye movements in area MT of macaque monkeys. *Journal of Neuroscience* **19**, 2224–2246.
- J. B. Levitt, R. A. Schumer, P. D. Spear, S. M. Sherman and J. A. Movshon (2001). Visual response properties of neurons in the lateral geniculate nucleus of normally-reared and visually-deprived monkeys. *Journal of Neurophysiology* **85**, 2111–2129.
- S. B. Fenstemaker, L. Kiorpes and J. A. Movshon (2001). Effects of experimental strabismus on the architecture of macaque monkey striate cortex. *Journal of Comparative Neurology* **438**, 300–317.
- W. Bair, J. R. Cavanaugh, M.A. Smith and J. A. Movshon (2002). The timing of response onset and offset in macaque visual neurons. *Journal of Neuroscience* **22**, 3189–3205.

- J. R. Cavanaugh, W. Bair and J. A. Movshon (2002). Nature and interaction of signals from the receptive field center and surround in macaque V1 neurons. *Journal of Neurophysiology* **88**, 2530–2546.
- J. R. Cavanaugh, W. Bair and J. A. Movshon (2002). Selectivity and spatial distribution of signals from the receptive field surround in macaque V1 neurons. *Journal of Neurophysiology* **88**, 2547–2556.
- N. C. Rust, S. R. Schultz and J. A. Movshon (2002). A reciprocal relationship between reliability and responsiveness in developing visual cortical neurons. *Journal of Neuroscience* **22**, 10519–10523.
- M. A. Smith, W. Bair and J. A. Movshon (2002). Signals in macaque striate cortical neurons that support the perception of Glass patterns. *Journal of Neuroscience* **22**, 8334–8345.
- S. P. McKee, D. M. Levi and J. A. Movshon (2003). The pattern of visual deficits in amblyopia. *Journal of Vision* **3**, 380–405 (<http://www.journalofvision.org/3/5/5/>).
- A. Kohn and J. A. Movshon (2003). Neuronal adaptation to visual motion in area MT of the macaque. *Neuron* **39**, 681–691.
- W. Bair, J. R. Cavanaugh and J. A. Movshon (2003). Time course and time-distance relationships for surround suppression in macaque V1 neurons. *Journal of Neuroscience* **23**, 7690–7701.
- L. Kiorpes, C. Tang, M. J. Hawken and J. A. Movshon (2003). Ideal observer analysis of the development of spatial contrast sensitivity in macaque monkeys. *Journal of Vision* **3**, 630–641 (<http://journalofvision.org/3/10/6/>)
- N. C. Rust, O. Schwartz, J. A. Movshon and E. P. Simoncelli (2004). Spike-triggered characterization of excitatory and suppressive stimulus dimensions in monkey V1. *Neurocomputing* **58–60**, 793–799.
- A. Kohn and J. A. Movshon (2004). Adaptation changes the direction tuning of macaque MT neurons. *Nature Neuroscience* **7**, 764–772.
- W. Bair and J. A. Movshon (2004). Adaptive temporal integration of motion in direction selective neurons in macaque visual cortex. *Journal of Neuroscience* **24**, 7305–7323.
- L. Kiorpes and J. A. Movshon (2004). Development of sensitivity to visual motion in macaque monkeys. *Visual Neuroscience* **21**, 851–859.
- M. A. Smith, N. J. Majaj and J. A. Movshon (2005). Dynamics of motion signaling by neurons in macaque area MT. *Nature Neuroscience* **8**, 220–228.
- J. A. Movshon, L. Kiorpes, M. J. Hawken and J. R. Cavanaugh (2005). Functional maturation of the macaque's lateral geniculate nucleus. *Journal of Neuroscience* **25**, 2712–2722.
- N. C. Rust, O. Schwartz, J. A. Movshon and E. P. Simoncelli (2005). Spatiotemporal elements of macaque V1 receptive fields. *Neuron* **46**, 945–956.
- N. J. Priebe, S. G. Lisberger and J. A. Movshon (2006). Tuning for spatiotemporal frequency and speed in directionally selective neurons of macaque striate cortex. *Journal of Neuroscience* **26**, 2941–2950.

- M. A. Smith, W. Bair and J. A. Movshon (2006). Dynamics of suppression in macaque V1. *Journal of Neuroscience* **26**, 4826–4834.
- M. Jazayeri and J. A. Movshon (2006). Optimal representation of sensory information by neural populations. *Nature Neuroscience* **9**, 690–696.
- L. Kiorpes, C. Tang and J. A. Movshon (2006). Sensitivity to visual motion in amblyopic macaque monkeys. *Visual Neuroscience* **23**, 247–256.
- Z. Kourtzi, M. Augath, N. K. Logothetis, J. A. Movshon and L. Kiorpes (2006). Development of visually evoked activity in infant macaque monkeys studied longitudinally with fMRI. *Magnetic Resonance Imaging* **24**, 359–366.
- N. C. Rust, V. Mante, E. P. Simoncelli and J. A. Movshon (2006). How MT cells analyze the motion of visual patterns. *Nature Neuroscience* **9**, 1421–1431.
- R. C. Kelly, M. A. Smith, J. M. Samonds, A. Kohn, A. B. Bonds, J. A. Movshon and T.-S. Lee (2007). Comparison of recordings from microelectrode arrays and single electrodes in visual cortex. *Journal of Neuroscience* **27**, 261–264.
- N. J. Majaj, M. Carandini and J. A. Movshon (2007). Motion integration by neurons in macaque MT is local, not global. *Journal of Neuroscience* **27**, 366–370.
- M. A. Smith, A. Kohn and J. A. Movshon (2007). Glass pattern responses in macaque V2 neurons. *Journal of Vision* **7** (3):5, 1–15, <http://journalofvision.org/7/3/5/>
- M. Jazayeri and J. A. Movshon (2007). A new perceptual illusion reveals mechanisms of sensory decoding. *Nature* **446**, 912–915.
- M. Jazayeri and J. A. Movshon (2007). Integration of sensory evidence in motion discrimination. *Journal of Vision* **7** (12):7, 1–7, <http://journalofvision.org/7/12/7/>
- J. L. Gardner, E. P. Merriam, J. A. Movshon and D. J. Heeger (2008). Maps of visual space in human occipital cortex are retinotopic, not spatiotopic. *Journal of Neuroscience* **28**, 3988–3999.
- L. Chukoskie and J. A. Movshon (2009). Modulation of visual signals in macaque MT and MST neurons during pursuit eye movement. *Journal of Neurophysiology* **102**, 3225–3233.
- M. M. Churchland, B. M. Yu, J. P. Cunningham, L. P. Sugrue, M. R. Cohen, G. S. Corrado, W. T. Newsome, A. M. Clar, P. Hosseini, B. B. Scott, D. C. Bradley, M. A. Smith, A. Kohn, J. A. Movshon, K. M. Armstrong, T. Moore, S. W. Chang, L. H. Snyder, N. J. Priebe, I. M. Finn, D. Ferster, S. I. Ryu, G. Santhanam, M. Sahani and K. V. Shenoy (2010). Stimulus onset quenches neural variability: a widespread cortical phenomenon. *Nature Neuroscience* **13**, 369–378.
- C. Tailby, N. J. Majaj and J. A. Movshon (2010). Binocular integration of pattern motion signals by MT neurons and by human observers. *Journal of Neuroscience* **30**, 7344–7349.
- Y. El-Shamayleh, L. Kiorpes, A. Kohn and J. A. Movshon (2010). Visual motion processing by neurons in area MT of macaque monkeys with experimental amblyopia. *Journal of Neuroscience* **30**, 12198–12209.

- Y. El-Shamayleh, J. A. Movshon and L. Kiorpes (2010). Development of sensitivity to visual texture modulation in macaque monkeys. *Journal of Vision* **10** (11): 11, 1–12, <http://journalofvision.org/10/11/11>
- A. C. Schütz, D. I. Braun, J. A. Movshon and K. R. Gegenfurtner (2010). Does the noise matter? Effects of different kinematogram types on smooth pursuit eye movements and perception. *Journal of Vision* **10** (13):26, 1–22, <http://www.journalofvision.org/content/10/13/26>
- D. M. Levi, S. P. McKee and J. A. Movshon (2011). Visual deficits in anisometropia. *Vision Research* **51**, 48–57.
- A. B. A. Graf, A. Kohn, M. Jazayeri and J. A. Movshon (2011). Decoding the activity of neuronal populations in macaque primary visual cortex. *Nature Neuroscience* **14**, 239-245.
- Y. El-Shamayleh and J. A. Movshon (2011). Neuronal responses to texture-defined form in macaque visual area V2. *Journal of Neuroscience* **31**, 8543-8555.
- J. H. Hedges, Y. Gartshteyn, A. Kohn, N. C. Rust, M. N. Shadlen, W. T. Newsome and J. A. Movshon (2011). Dissociation of neuronal and psychophysical responses to local and global motion. *Current Biology* **21**, 2023-2028.

#### **Publications: Books**

- M. S. Landy and J. A. Movshon, eds. (1991). *Computational Models of Visual Processing*. Cambridge, MA: MIT Press.
- M. S. Gazzaniga, et al., eds. (1995). *The Cognitive Neurosciences*. Cambridge, MA: MIT Press (section editor for *Sensation and Perception*).
- M. S. Gazzaniga, et al., eds. (2000). *The New Cognitive Neurosciences, 2<sup>nd</sup> Edition*. Cambridge, MA: MIT Press (section editor for *Sensation and Perception*).
- M. S. Gazzaniga, et al., eds. (2004). *The Cognitive Neurosciences, 3<sup>rd</sup> Edition*. Cambridge, MA: MIT Press (section editor for *Sensation and Perception*).
- M. S. Gazzaniga, et al., eds. (2009). *The Cognitive Neurosciences, 4<sup>th</sup> Edition*. Cambridge, MA: MIT Press (section editor for *Sensation and Perception*).

#### **Publications: Reviews, Book Chapters, Opinion Pieces**

- J. A. Movshon (1978). Hypercomplexities in the visual cortex. *Nature* **272**, 305–306.
- J. A. Movshon (1980). Binocularity (review of *Stereoscopic Vision, Proceedings of the Royal Society*, vol. 204, no. 1157). *Science* **208**, 171.
- J. A. Movshon (1981). Cortical effects of monocular deprivation: suppression or deafferentation? *Nature* **291**, 284–285.
- J. A. Movshon and R. C. Van Sluyters (1981). Visual neural development. *Annual Review of Psychology* **32**, 477–522.
- A. S. Kelly, J. A. Movshon, A. Schoppmann, C. Shatz, M. P. Stryker and R. C. Van Sluyters (1982). Vision at Neuroscience. *Trends in Neuroscience* **5**, no. 3, 1.

- D. Y. Teller and J. A. Movshon (1986). Visual development. *Vision Research (Silver Jubilee Issue)* **26**, 1483–1506.
- J. A. Movshon (1987). Computational modeling and empirical research. In *Frontiers of Visual Science: Proceedings of the 1985 Symposium*. Washington, DC: National Academy Press.
- R. Sekuler, S. M. Anstis, O. J. Braddick, T. Brandt, J. A. Movshon and G. Orban (1989) The perception of motion: psychophysics and physiology In *The Neurophysiological Foundations of Visual Perception*, ed. L. Spillman and J. S. Werner. New York: Academic Press.
- L. Kiorpes and J. A. Movshon (1990) The behavioral analysis of visual development. In *The Development of Sensory Systems in Mammals*, ed. J. R. Coleman. New York: Wiley.
- J. A. Movshon (1990). Visual processing of moving images. In *Images and Understanding*, ed. M. Weston-Smith, H. B. Barlow and C. Blakemore. New York: Cambridge University Press.
- J. A. Movshon and L. Kiorpes (1990) The role of experience in visual development. In *The Development of Sensory Systems in Mammals*, ed. J. R. Coleman. New York: Wiley.
- J. A. Movshon (1991) In the eye of the beholder (review of *Vision: Coding and Efficiency*, ed. C. Blakemore). *Nature* **351**, 24.
- J. A. Movshon and W. T. Newsome (1992). Neural foundations of visual motion perception. *Current Developments in Psychological Science* **1**, 36–39.
- J. A. Movshon and L. Kiorpes (1993). Biological limits on visual development in primates. In *Early Visual Development, Normal and Abnormal*, ed. K. Simons. New York: Oxford University Press.
- C. A. Barnes, A. Baranyi, L. J. Bindman, Y. Dudai, Y. Fregnac, M. Ito, T. Knopfel, S. G. Lisberger, R. G. M. Morris, M. Moulins, J. A. Movshon, W. Singer and L. R. Squire (1994). Relating activity-dependent modifications of neuronal function to changes in neural systems and behavior. In *Cellular and Molecular Mechanisms Underlying Higher Neural Functions (Dahlem Workshop Life Sciences Research Report 54)*, ed. A. I. Selverston and P. Ascher. Chichester, UK: John Wiley and Sons.
- C. Blakemore and J. A. Movshon (1995). Sensory systems: introduction. In *The Cognitive Neurosciences*, ed. M.S. Gazzaniga. Cambridge, MA: MIT Press.
- W. T. Newsome, M. N. Shadlen, E. Zohary, K. H. Britten and J. A. Movshon (1995). Visual motion: linking neuronal activity to psychophysical performance. In *The Cognitive Neurosciences*, ed. M.S. Gazzaniga. Cambridge, MA: MIT Press.
- J. A. Movshon (1996). Using computation to help relate neurobiology and behaviour. *Network: Computation in Neural Systems* **7**, 157–159.
- M. Carandini, D. J. Heeger and J. A. Movshon (1999). Linearity and gain control in V1 simple cells. In *Cerebral Cortex, Volume 13, Models of Cortical Circuits*, ed. P. S. Ulinski, E. G. Jones and A. Peters. New York: Kluwer Academic/Plenum.
- M. N. Shadlen and J. A. Movshon (1999). Synchrony unbound: a critical evaluation of the temporal binding hypothesis. *Neuron* **24**, 67–77

- J. A. Movshon (2000). Reliability of neuronal responses. *Neuron* **27**, 412–414.
- J. A. Movshon and C. Blakemore (2000). Sensory systems: introduction. In *The New Cognitive Neurosciences*, ed. M.S. Gazzaniga. Cambridge, MA: MIT Press.
- J. A. Movshon, T. D. Albright, G. F. Stoner, N. J. Majaj and M. A. Smith (2003). Responses to visual motion in area MT of awake and anesthetized macaque monkeys. *Nature Neuroscience* **6**, 3.
- B. A. Wandell and J. A. Movshon (2003). Cognitive neuroscience. *Current Opinion in Neurobiology* **13**, 141–143.
- L. Kiorpes and J. A. Movshon (2004). Neural limitations on visual development in primates. In *The Visual Neurosciences*, ed. L. Chalupa and J. S. Werner, Cambridge, MA: MIT Press.
- J. A. Movshon and B. A. Wandell (2004). Sensory systems: introduction. In *The Cognitive Neurosciences 3<sup>rd</sup> Edition*, ed. M.S. Gazzaniga. Cambridge, MA: MIT Press.
- P. Lennie and J. A. Movshon (2005). Coding of color and form in the geniculostriate visual pathway. *Journal of the Optical Society of America A* **22**, 2013–2033.
- N. C. Rust and J. A. Movshon (2005). In praise of artifice. *Nature Neuroscience* **8**, 1647–1650.
- B. Pesaran and J. A. Movshon (2008). What to do, or how to do it? *Neuron* **58**, 301–303.
- P. Wallisch and J. A. Movshon (2008). Structure and function come unglued in the visual cortex. *Neuron* **60**, 195–197.
- D. P. Corey and J. A. Movshon (2008). Sensory systems: from molecules to percepts. *Current Opinion in Neurobiology* **18**, 355–356.
- J. A. Movshon and B. A. Wandell (2009). Sensory systems: introduction. In *The Cognitive Neurosciences 4<sup>th</sup> Edition*, ed. M.S. Gazzaniga. Cambridge, MA: MIT Press.
- M. A. Smith, N. Majaj and J. A. Movshon (2009). Dynamics of pattern motion computation. In *Dynamics of Visual Motion Processing*, ed. U. J. Ilg and G. S. Masson. New York: Springer.