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EDUCATION

1964 A.B., Harvard University, Cambridge, MA

1968 Ph.D., McGill University, Montreal, PQ

POSTDOCTORAL TRAINING

1968-1971 Postdoctoral Fellow in Neurophysiology, Stanford Medical School (K. L. Chow)

1971-1973 NIH Special Fellow in Neurophysiology, Harvard Medical School (A. Ames, III)

ACADEMIC APPOINTMENTS

1971-1975 Associate in Physiology, Harvard Medical School

1975-1981 Assistant Professor of Physiology in Surgery, Harvard Medical School

1981-1989 Associate Professor of Physiology in Surgery, Harvard Medical School

1989-1990 Professor of Neuroscience in Surgery, Harvard Medical School

1990- Professor of Neuroscience and Professor of Ophthalmology, Harvard Medical School

1991- Charles A. Pappas Professor of Neuroscience, Harvard Medical School

1993-2006 Investigator, Howard Hughes Medical Institute

2009- David G. Cogan Professor of Ophthalmology and Professor of Neurobiology, Harvard Medical School

2009- Director, Howe Laboratory, Massachusetts Eye and Ear Infirmary

AWARDS AND HONORS

1964 Woodrow Wilson Fellow

1971 Junior Investigator of the King Trust

1975 NIH Research Career Development Award

1983 Hoopes Prize, Harvard University (Excellence in Teaching)

1987	National Eye Institute MERIT award
1993	RPB Senior Scientific Investigator Award
1999	Fellow, American Association for the Advancement of Science
2000	Irving M. London Award (Excellence in Teaching)
2002	Brian Boycott Prize (Research on the Retina)
2010	Fellow, Association for Research in Vision and Ophthalmology
2010	Proctor Medal, ARVO

NATIONAL COMMITTEE ASSIGNMENTS

1977-1981	Member, NIH Visual Disorders B Study Section,
1979-1982	Reviewer, Sensory Processes Program (N.S.F.)
1985-1989	Member (Chairman, 1988-1989) NIH Cellular and Molecular Basis of Disease Study Section
1990-1992	Program Committee, Association for Research in Vision and Ophthalmology
1992-1994	National Advisory Council, NEI, National Institutes of Health
1994	Chairman, FASEB Summer Conference on Vision

EDITORIAL BOARDS

1983-1985	Editorial Board, <i>Molecular Physiology</i> ,
1985-1991	Associate Editor, <i>Journal of Neuroscience</i>
1992-1997	Editorial Board, <i>Investigative Ophthalmology and Visual Science</i>
1999-2006	Editorial Board, <i>Journal of Neurophysiology</i>
1999-	Faculty of 1000

PROFESSIONAL SOCIETIES

1967-	American Association for the Advancement of Science
1972-	American Physiological Society
1973-	Association for Research in Vision and Ophthalmology
1973-	Society for Neuroscience
1992-	American Society for Cell Biology

TEACHING EXPERIENCE

1976-1981	Instructor, Physiology 700 (Mammalian Physiology), Harvard Medical School
1982-1991	Course Director, Physiology 707 (Physiology of the Retina), Harvard Medical School

1988-1990	Instructor, Neurobiology 707 (Nervous System and Behavior), Harvard Medical School
1989-1991	Course Director, Biology 99 (undergraduate honors seminar) Harvard College
1989	Resident Instructor, Friday Harbor Retina Course, University of Washington
1991-1993	Co-founder, Neurobiology 200 (Introduction to Neurobiology), Harvard Medical School
1992-2008	Resident Instructor, Fundamental Issues in Vision Research, Marine Biological Laboratories, Woods Hole
1994-2002	Course Director, Neurobiology 200 (Introduction to Neurobiology), Harvard Medical School
2001-2004	Lecturer, Structure, Function and Development of the Visual System, Cold Spring Harbor Laboratories
2006 -	Course Director, Neurobiology 200 (Introduction to Neurobiology), Harvard Medical School

Original Reports

Masland RH (1969) Visual motion perception: experimental modification. *Science* 165:819-821.

Chow KL, Masland RH, Stewart DL (1971) Receptive field characteristics of striate cortical neurons in the rabbit. *Brain Res* 33:337-352.

Stewart DL, Chow KL, Masland RH (1971) Receptive field characteristics of lateral geniculate neurons in the rabbit. *J Neurophysiol* 34:139-147.

Masland RH, Chow KL, Stewart DL (1971) Receptive field characteristics of superior colliculus neurons in the rabbit. *J Neurophysiol* 34:148-156.

Masland RH, Schwartzkroin PA, Chow KL (1972) Responses of single lateral geniculate cells during performance of a visually guided discrimination. *Brain Res* 45:271-277.

Spear PD, Chow KL, Masland RH, Murphy EH (1972) Ontogenesis of receptive field characteristics of superior colliculus neurons in the rabbit. *Brain Res* 45:67-86.

Masland RH (1974) A minimal system for recording from single cells in moving animals. *Med Biol Eng* 12:564-566.

Masland RH, Ames A III (1975) Dissociation of field potential from neuronal activity in the isolated retina: failure of the b-wave with normal ganglion cell response. *J Neurobiol* 6:305-312.

Masland RH, Livingstone CJ (1976) Effect of stimulation with light on synthesis and release of acetylcholine by an isolated mammalian retina. *J Neurophysiol* 39:1210-1219.

Masland RH, Ames A III (1976) Responses to acetylcholine of ganglion cells in an isolated mammalian retina. *J Neurophysiol* 39:1220-1235.

Masland RH (1977) Maturation of function in the developing rabbit retina. *J Comp Neurol* 175:275-286.

- McArdle CG, Dowling JE, Masland RH (1977) Development of outer segments and synapses in the rabbit retina. *J Comp Neurol* 175:253-274.
- Pepperberg DR, Masland RH (1978) Retinal-induced sensitization of light-adapted rabbit photoreceptors. *Brain Res* 151:194-200.
- Masland RH, Mills JW (1979) Autoradiographic identification of acetylcholine in the rabbit retina. *J Cell Biol* 83:159-178.
- Hayden SA, Mills JW, Masland RH (1980) Acetylcholine synthesis by displaced amacrine cells. *Science* 210:435-437.
- Masland RH, Mills JW (1980) Choline accumulation by photoreceptor cells of the rabbit retina. *Proc Natl Acad Sci USA* 77:1671-1675.
- Parkinson D, Baughman R, Masland RH, Rando RR (1981) Dopamine metabolism following irreversible inactivation of aromatic amino acid decarboxylase in retina. *J Neurosci* 1:1205-1210.
- Masland RH (1982) Choline metabolism and the maintenance of photoreceptor cell structure. *Retina* 2:282-287.
- Leifer D, Lipton SA, Barnstable CJ, Masland RH (1984) Monoclonal antibody to Thy-1 enhances regeneration of processes by rat retinal ganglion cells in culture. *Science* 244:303-306.
- Masland RH, Mills JW, Hayden SA (1984) Acetylcholine-synthesizing amacrine cells: identification and selective staining by using radioautography and fluorescent markers. *Proc R Soc Lond [Biol]* 223:79-100.
- Masland RH, Mills JW, Cassidy C (1984) The functions of acetylcholine in the rabbit retina. *Proc R Soc Lond [Biol]* 223:121-139.
- Tauchi M, Masland RH (1984) The shape and arrangement of the cholinergic neurons in the rabbit retina. *Proc R Soc Lond [Biol]* 223:101-119.
- Pu GA, Masland RH (1984) Biochemical interruption of membrane phospholipid renewal in retinal photoreceptor cells. *J Neurosci* 4:1559-1575.
- Masland RH, Tauchi M (1985) A possible amacrine cell substrate for the detection of stimulus motion. *Neurosci Res Suppl.* 2:S185-S199.
- Tauchi M, Masland RH (1985) Local order among the dendrites of an amacrine cell population. *J Neurosci* 5:2494-2501.
- Masland RH, Tauchi M (1986) The cholinergic amacrine cell. *Trends Neurosci* 9:218-223.
- Masland RH (1986) The functional architecture of the retina. *Sci Am* 254:102-111.
- Sandell JH, Masland RH (1986) A system of indoleamine-accumulating neurons in the rabbit retina. *J Neurosci* 6:3331-3347.
- Masland RH, Cassidy C (1987) The resting release of acetylcholine by a retinal neuron. *Proc R Soc Lond [Biol]* 232:227-238.
- Masland RH (1988) Amacrine cells. *Trends Neurosci* 11:405-410.

- Sandell JH, Masland RH (1988) Photoconversion of some fluorescent markers to a diaminobenzidine product. *J Histochem Cytochem* 36:555-559.
- Tauchi M, Masland RH (1988) Morphology of the catecholaminergic neurons in the rabbit retina. *Biomed Res Suppl* 9:135-138.
- O'Malley DM, Masland RH (1989) Co-release of acetylcholine and γ -aminobutyric by a retinal neuron. *Proc Natl Acad Sci USA* 86:3414-3418.
- Sandell JH, Masland RH, Raviola E, Dacheux RF (1989) Connections of indoleamine-accumulating cells in the rabbit retina. *J Comp Neurol* 283:303-313.
- Sandell JH, Masland RH (1989) Indoleamine accumulation by retinal neurons exposed to blood. *Histochemistry* 92:57-60.
- Sandell JH, Masland RH (1989) Shape and distribution of an unusual retinal neuron. *J Comp Neurol* 280:489-497.
- Tauchi M, Madigan NM, Masland RH (1990) Shapes and distributions of the catecholamine-accumulating neurons in the rabbit retina. *J Comp Neurol* 293:178-189.
- O'Malley DM, Sandell JH, Masland RH (1992) Co-release of acetylcholine and GABA by the starburst amacrine cells. *J Neurosci* 12:1394-1408.
- Yang G, Masland RH (1992) Direct visualization of the dendritic and receptive fields of directionally selective retinal ganglion cells. *Science* 258:1949-1952.
- O'Malley DM, Masland RH (1993) Responses of the starburst amacrine cells to moving stimuli. *J Neurophysiol* 69:730-738.
- Masland RH, Rizzo JF, Sandell JH (1993) Developmental variation in the structure of the retina. *J Neurosci* 13:5194-5202.
- Jeon C-J, Masland RH (1993) Selective accumulation of diaminidino yellow and chromomycin A3 by retinal glial cells. *J Histochem Cytochem* 41:1651-1658.
- Yang G, Masland RH (1994) Receptive fields and dendritic structure of directionally selective retinal ganglion cells. *J Neurosci* 14:5267-5280.
- Strettoi E, Masland RH (1995) The organization of the inner nuclear layer in the rabbit retina. *J Neurosci* 15:875-888.
- Jeon C-J, Masland RH (1995) A population of wide-field bipolar cells in the rabbit's retina. *J Comp Neurol* 360:403-412.
- Peters BN, Masland RH (1996) Responses to light of starburst amacrine cells. *J Neurophysiol* 75:469-480.
- Masland RH (1996) Unscrambling color vision [Perspective]. *Science* 271:616-617.
- Masland RH (1996). Processing and encoding of visual information in the retina. *Curr Opin Neurobiol* 6:467-474.

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- Jeon C-J, Strettoi E, Masland RH (1998) The major cell populations of the mouse retina. *J Neurosci* 18:8936-8946.
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- Masland RH, Raviola E (2000) Confronting complexity: strategies for understanding the microcircuitry of the retina. *Ann Rev Neurosci* 23:249-284.
- Rockhill RL, Euler T, Masland RH (2000) Spatial order within but not between types of retinal neurons. *Proc Natl Acad Sci* 97:2303-2307.
- Euler T, Masland RH (2000) Light-evoked responses of bipolar cells in a mammalian retina. *J Neurophysiol* 83:1817-1829.
- Brown SP, He S, Masland RH (2000) Receptive field microstructure and dendritic geometry of retinal ganglion cells. *Neuron* 27:371-383.
- Keyser KT, MacNeil MA, Dmitrieva N, Wang F, Masland RH, Lindstrom JM (2000) Amacrine, ganglion, and displaced amacrine cells in the rabbit retina express nicotinic acetylcholine receptors. *Vis Neurosci* 17:743-752.
- Masland RH (2001) Neuronal diversity in the retina. *Current Opin Neurobiol* 11:431-436.
- Brown SP, Masland RH (2001) Spatial scale and cellular substrate of contrast adaptation by retinal ganglion cells. *Nature Neurosci.* 4:44-51.
- Masland RH (2001) The fundamental plan of the retina. *Nature Neurosci* 4:877-886.
- Rockhill RL, Daly FJ, MacNeil MA, Brown SP, Masland RH (2002) The diversity of ganglion cells in a mammalian retina. *J Neurosci* 22:3831-3843.

- Jeon C-J, Kong J-H, Strettoi E, Rockhill R, Stasheff SF, Masland RH (2002) Pattern of synaptic excitation and inhibition upon direction-selective retinal ganglion cells. *J Comp Neurol* 449:195-205.
- Stasheff SF, Masland RH (2002) Functional inhibition in direction-selective retinal ganglion cells: spatiotemporal extent and intralaminar interactions. *J Neurophysiol* 88:1026-1039.
- Chiao C-C, Masland RH (2002) Starburst cells nondirectionally facilitate the responses of direction selective retinal ganglion cells. *J Neurosci* 22:10509-10513.
- Masland, RH (2003) The retina's fancy tricks [News and Views]. *Nature* 423:387-388.
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- Jakobs TC, Ben Y, Masland RH (2003) CD15 immunoreactive amacrine cells in the mouse retina. *J Comp Neurol* 465:361-371.
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- MacNeil MA, Heussy JK, Dacheux RF, Raviola E, Masland RH (2004) The population of bipolar cells in the rabbit retina. *J Comp Neurol* 472: 73-86.
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- Lin B, Masland RH (2006) Populations of wide-field amacrine cells in the mouse retina. *J Comp Neurol*. 499:797-809.
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- Koizumi A, Zeck G, Jakobs TC, Ben Y, Masland RH (2007) Organotypic culture of physiologically functional adult mammalian retinas. *PloS One* 1:e221.
- Jakobs TC, Ben Y, Masland RH (2007) Expression of mRNA for glutamate receptor subunits distinguishes the major classes of retinal neurons, but is less specific for individual cell types. *Mol Vision* 13:933-948.

- Zeck G, Masland RH. (2007) Spike train signatures of retinal ganglion cells. *European Journal of Neuroscience*, 26: 367–380,
- Martin P, Masland RH (2007) Essay: the unsolved mystery of vision. *Curr Biol* 18:R577 –R583.
- Howell GR, Libby RT, Jakob TC, Smith RS, Phalan FC, Barter JW, Barbay JM, Marchant JK, Mahesh N, Porciatti V, Whitmore AV, Masland RH, John SWM. (2007) Axons of retinal ganglion cells are insulted in the optic nerve early in DBA/2J glaucoma. *J. Cell Biol.*, 31:1523-37.
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- Jakobs TC, Koizumi A, Masland RH (2008) The spatial distribution of glutamatergic inputs to dendrites of retinal ganglion cells. *J. Comp Neurol.*, 510: 221-236.
- Lin B, Koizumi A, Tanaka N, Panda S, Masland RH (2008) Restoration of visual function in retinal degeneration mice by ectopic expression of melanopsin. *Proc Nat Acad Sci USA* 105: 16009-16014.
- Lin B, Masland RH, Strettoi E. (2009) Remodeling of cone photoreceptor cells after rod degeneration in rd mice. *Exper Eye Res.*, 88: 589–599.
- Sun D, Lye-Barthel M, Masland RH, Jakobs T. (2009) The morphology and spatial arrangement of astrocytes in the optic nerve head of the mouse. *J. Comp Neurol* 516:1–19.

Books

- Masland RH, Albright TW (Eds) The Senses: a Comprehensive Reference, Vision I. Academic Press, San Diego, 2008.
- Albright TW, Masland RH (Eds) The Senses: a Comprehensive Reference, Vision II. Academic Press, San Diego, 2008.

Chapters and Notes

- Masland RH (1972) Book review: The physiology of the eye, by Hugh Davson. *N Engl J Med* 287:471-472.
- Masland RH, Mills JW. Aspects of choline metabolism in photoreceptor cells. In: *Effects of constant light on visual processes*, edited by Williams TP and Baker BN. New York: Plenum, 1980.
- Masland RH, Mills JW. Acetylcholine in the retina. In: *Neurochemistry of the retina*, edited by Bazan N and Lolley R. New York: Pergamon, 1980.
- Masland RH, Cassidy C, O'Malley DM. The release of acetylcholine and GABA by neurons of the rabbit retina. In: *Neurobiology of the Inner Retina*, edited by Weiler R and Osborne NN. Berlin: Springer, 1989.

Ames A III, Masland RH. The rabbit retina in vitro. In: *Preparations of Vertebrate Central Nervous System In Vitro*, edited by Jahnsen H. New York: Wiley, 1990.

Masland RH, Ferris TG. The development of receptive fields. In: *Principles and Practice of Ophthalmology*, edited by Albert DM and Jakobiec FA. Philadelphia: Saunders, 1994.

Masland RH. Cell mosaics and neurotransmitters. In: *Principles and Practice of Ophthalmology*, edited by Albert DM and Jakobiec FA. Philadelphia: Saunders, 1994.

Masland RH. Amacrine cells: morphology, physiology and transmitters. In: *The Retinal Basis of Vision*, edited by Toyoda J-i, Murakami M, Kaneko A and Saito T. Tokyo: Elsevier, 1999.

MacNeil MA, Brown,SP, Rockhill,RL, Masland RH. Retinal cell mosaics and neurotransmitters. In: *Principles and Practice of Ophthalmology*, 2nd edition, edited by Albert DM and Jakobiec FA. Philadelphia: Saunders, 2000.

Masland RH (2004) Direction selectivity in retinal ganglion cells. In: *The Visual Neurosciences*, edited by Chalupa LM and Warner JS. Cambridge, MIT Press.