

## BIOGRAPHICAL SKETCH

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NAME William H. Merigan		POSITION TITLE Professor of Ophthalmology, Visual Science and Brain and Cognitive Sciences	
eRA COMMONS USER NAME wmerigan			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Boston College, Boston, MA	B.A.	1967	Psychology
University of Maryland, College Park, MD	M.S.	1972	Biopsychology
University of Maryland, College Park, MD	Ph.D.	1975	Biopsychology

Please refer to the application instructions in order to complete sections A, B, and C of the Biographical Sketch.

### A. Personal Statement

The general goal of my research is to examine the function of different classes of retinal ganglion cells in macaque and mouse retina. This research is pursued with a variety of methods that reveal visual function of retinal cells, including adaptive optics imaging, inserting calcium indicators or light gated channels into retinal cells by viral vector methods, visual threshold testing and making focal lesions of outer retina with preservation of inner retina.

My research involves collaboration with many other investigators, both within and outside the University. I work most closely with David Williams and Jennifer Hunter on adaptive optics imaging. Richard Libby and Lin Gan are collaborators on a project on mouse retinal ganglion cells. These projects heavily utilize core facilities of the Center for Visual Sciences core grant. I also collaborate with Edward Callaway at the Salk Institute and John Flannery of the University of California at Berkeley.

### B. Positions and Honors

#### Positions and Employment

1975-1977 NIEHS Postdoctoral Fellow, Department of Radiation Biology and Biophysics, University of Rochester, Rochester, NY.

1978-1980 Assistant Professor, Department of Biophysics, University of Rochester, Rochester, NY.

1979-1985 Assistant Professor, Department of Ophthalmology, University of Rochester, Rochester, NY.

1978-1998 Associate Professor, Center for Visual Science, University of Rochester, Rochester, NY.

1980-1985 Associate Professor, Department of Biophysics, University of Rochester, Rochester, NY.

1985-1998 Associate Professor, Department of Environmental Medicine, University of Rochester, Rochester, NY.

1985-1998 Associate Professor, Department of Ophthalmology, University of Rochester, Rochester, NY.

1996-1998 Associate Professor, Brain and Cognitive Sciences, University of Rochester, Rochester, NY.

1998-Present Professor, Department of Environmental Medicine, University of Rochester, Rochester, NY.

1998-Present Professor, Center for Visual Science, University of Rochester, Rochester, NY.

1998-Present Professor, Brain and Cognitive Sciences, University of Rochester, Rochester, NY.

1998-Present Professor, Department of Ophthalmology, University of Rochester, Rochester NY

#### Honors

National Merit Scholar, NIH Study Section-VisB, Special Emphasis (Adhoc), NSF Study Section-Sensory Physiology,

### C. Selected peer-reviewed publications

#### Most relevant to the current application

1. Yin L., Greenberg, K., Hunter, J. J., Dalkara, D., Kolstad, K. D., Masella, B. D., Wolfe, R., Visel, M., Stone, D., Libby, R. T., DiLoreto, D., Jr., Schaffer, D., Flannery, J., Williams, D. R., Merigan, W. H. (2010) Intravitreal injection of AAV2 transduces macaque inner retina, *Investigative Ophthalmology & Visual Science*,
2. Hunter, J.J., Masella, B., Dubra, A., Sharma, R., Yin, L., Merigan, W. H., Palczewska, G., Palczewski, K., and Williams, D.R. (2011) Images of photoreceptors in living primate eyes using adaptive optics two-photon ophthalmoscopy. *Biomedical Optics Express*. 2,139-148.
3. Rossi, E. A., Chung, M., Dubra, A., Hunter, J.J., Merigan, W. H., and Williams, D. R., (2011) Imaging retinal mosaics in the living eye. *Eye*. 1-8.
4. Geng, Y., Dubra, A., Yin, L., Merigan, W.H., Sharma, R., Libby, R.T., Williams, D.R. (2012) *Biomed Opt Express*. 1;3(4):715-734.
5. Hunter, J.J., Morgan, J.I., Merigan, W.H., Sliney, D.H., Sparrow, J.R., Williams, D.R. (2012) The susceptibility of the retina to photochemical damage from visible light. *Prog Retin Eye Res*. 31(1):28-42.

#### **Additional recent publications**

1. Merigan, W. H, and Pasternak, T. (2001). Lesions in Primate Visual Cortex Leading to Deficits of Perception, Chapter in "Neuropsychology of Vision", Fahle, M. and Greenlee, M. Eds, Oxford University Press.
2. Shimozaki, S, Hayhoe, M, Zelinsky, G, Weinstein, A, Merigan, W, & Ballard, D. (2003). Effect of parietal lobe lesions on saccade targeting and spatial memory in a naturalistic visual search task. *Neuropsychologia*, 41, 1365-1386.
3. Merigan, W. H. and Saunders, R. C. (2004). Unilateral deficits in visual perception and learning after unilateral inferotemporal cortex lesions in macaques. *Cerebral Cortex*. 14, 863-71.
4. Gray, D.C, Merigan W, Wolfing, J. I, Gee, B, Dubra, A, Porter, J, Twietmeyer, T, Ahmad, K, and Tumber, R, Reinholz, F, and Williams, D.R, (2006). *In vivo* fluorescence imaging of primate retinal ganglion cells and retinal pigment epithelial cells, *Optics Express*. 14, 7144-7158.
5. Hayes, R.D. and Merigan, W. H. (2007). Mechanisms of sensitivity loss due to visual cortex lesions in humans and macaques. *Cerebral Cortex*. 17, 1117-28.
6. Gray D.C, Wolfe R, Gee B, Scoles D, Geng Y, Masella B, Dubra A, Luque S, Williams, D.S. and Merigan W.H. (2008). *In vivo* imaging of the fine structure of rhodamine labeled macaque retinal ganglion cells, *Investigative Ophthalmology and Visual Science*. 49, 467-473.
7. Morgan, J.I.W, Hunter, J, Masella, B, Wolfe, R, Gray, D.C, Merigan, W.H, Delori, F. C, Williams, D.R, (2008). Light-induced retinal changes observed using high-resolution autofluorescence imaging of the retinal pigment epithelium, *Investigative Ophthalmology and Visual Science* 49, 3715-3729.
8. Morgan JI, Dubra A, Wolfe R, Merigan WH, Williams DR.(2009) *In vivo* autofluorescence imaging of the human and macaque retinal pigment epithelial cell mosaic. *Investigative Ophthalmology & Visual Science*. 50:1350-9.
9. Scoles D., Gray D.C., Wolfe R., Gee B., Geng Y., Masella B., Hunter, J J., Libby, R. T., Russell, S., Williams, D.S. and Merigan W.H. (2009) *In-vivo* imaging of retinal nerve fiber layer vasculature: imaging-histology comparison. *BMC Ophthalmology*, 9, 9.
10. Morgan, J.I.W., Hunter, J., Merigan, W.H., Williams, D.R., (2009) The reduction of retinal autofluorescence caused by light exposure. *Investigative Ophthalmology & Visual Science*, 50, 6015-6022.

#### **D. Research Support.**

E.

#### **Ongoing Research Support**

RO1EY021166 Merigan Jr, William H (PI) Funding Period: 2/01/2011 – 01/31/2014

Functional Imaging of Ganglion Cells in the Living Mammalian Eye

Type: Research Grant

Goal of Project: Use a genetically encoded calcium indicator, G-CaMP3, to examine physiological responses of retinal ganglion cells in macaque and mouse. A major goal is to study the putative directional ganglion cells in primate retina.

Overlap: none

PN2EY018241 Ehud Isacoff, (PI) Funding Period: 9/30/08 – 9/29/13

Nanomedicine Development Center for the Optical Control of Biological Function. Lawrence Berkeley National Lab/University of California, Berkeley

Type: Research grant

Goal of Project: develop improved method for viral vector penetration of the inner limiting membrane of the

retina for insertion of channelrhodopsin  
Overlap with R21 project, None

EY014375-05-Adaptive Optics Instrumentation for Advanced Ophthalmic Imaging  
Role on Project: Co-PI (Williams, D. PI) Agency: NIH/NEI  
Type: Research Grant Funding period: 9/1/08-8/31/13  
This is a multi-institutional proposal to build adaptive optics systems for imaging  
the retina at high resolution  
Overlap: none

Retinal Mechanisms  
Role on Project: Co-PI (Williams, D. PI) Agency: NIH-ROI  
Type: Research Grant Funding period: 1/1/09-12/31/11  
This grant studies the light damage caused to the photoreceptor RPE complex by  
long duration exposures  
Overlap: none

### **Completed Research Support**

Can light sensors, placed in ganglion cells restore vision in a blind retina?  
R21 EY019375-01A1  
Role on Project: PI Funding Agency: NIH (Center grant)  
Type: Pilot Research Grant Funding period: 09/01/09-08/30/11  
This grant investigates if light-gated channels inserted in ganglion cells restore vision  
in a blind retina  
Overlap: none

NIH/EY01319 D. Williams (PI)  
Core Grant for Vision Research (shared w/ 25 faculty)  
Goal of project: This grant funds the Core activities of the Center for Visual Science, providing support for  
shared technical staff and equipment.  
Responsibilities: Administrative role in Center

NIH/T32EY07125 D. Knill (PI)  
Training Grant in Vision Science (shared w/ 25 faculty)  
Goal of project: Funding for student and post-doctoral support for training in the Center for Visual Science.  
Responsibilities: Supervising students

Schmitt, Novel retinal circuits. L. Romanski, (PI)  
Pilot project funding for studying visual system anatomy  
Goal of project: Pilot support for tracking retinal projections.  
Responsibilities: Tracking bifurcating projections of retinal ganglion cells  
Overlap? No overlap.