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Education

- Postdoctoral Fellow -University of Rochester -** **2010-2015**
Project: *Functional imaging of the retina using adaptive optics*
Advisor: David R. Williams, Ph.D.
- Ph.D. Neuroscience -SUNY Upstate Medical University-** **2010**
Thesis: *Elucidating the Origins of Stimulus-Evoked Intrinsic Optical Signals in the Retina*
Advisor: Daniel Ts'o, Ph.D.
- B.S. Bioengineering -Syracuse University-** **2003**
Thesis: *Ultrastructural Study of Shedding Mechanisms in the Ventral Eye of *Limulus polyphemus**
Advisor: Steven Chamberlain, Ph.D.

Training and Research Related Experience

- Predoctoral Graduate Student** **2004-2010**
SUNY Upstate Medical University **Advisor:** Daniel Ts'o, Ph.D.
Project: Primate & feline neocortical and retinal physiology research
- Research Rotations** **2003-2004**
SUNY Upstate Medical University
Advisor: Dennis Stelzner, Ph.D.
Project: Drug loaded nanosphere injection in spinal cord injury model in rats
Advisor: Charles Hodge, M.D.
Project: Imaging and electrophysiology of whisker-barrel field somatotopy in rats
- Maybel E. Lewis Summer Research Fellow** **June 2002 – August 2002**
Institute for Sensory Research, Syracuse NY
Advisor: Steven C. Chamberlain, Ph.D.
Project: Quantification of rhabdom shedding in ventral eye of *Limulus polyphemus*
- Summer Research Fellow** **June 2001 – August 2001**
Institute for Sensory Research, Syracuse, NY.

Advisor: Steven C. Chamberlain, Ph.D.

Project: Rhabdom shedding in the lateral eye of *Limulus polyphemus*

Awards and Honors

- The Dana Foundation- David Mahoney Neuroimaging Award - 2016-2019**
Title: Imaging single blood cell rheology and flux within the smallest vessels in human diabetic retinopathy
- Research to Prevent Blindness Career Development Award 2016-2020**
Title: Imaging microscopic changes in retinal capillary structure and function associated with hyperglycemia in a mouse model of diabetes
- Ruth Kirschstein National Research Service Award (NRSA) 2013-2015**
NIH, National Eye Institute grant -1F32EY023496-01
Title: High-resolution imaging of pericytes and capillary blood flow in diabetic mice
- Edmund Optics Higher Education Grant Program finalist 2013**
- Schmitt Program on Integrative Brain Research Postdoctoral Fellowship 2012**
Title: Dynamic regulation of capillary blood flow
- ARVO Member in Training (MIT) Outstanding Poster Award 2012**
Association for Research in Vision and Ophthalmology (ARVO) meeting
- Retina Research Foundation/J.M. and E.C. Lawrence Travel Award 2012**
ARVO meeting, Ft Lauderdale, FL -RRF 7350-70
- Center for Visual Science Training Fellowship -5T32EY007125-22 2012-2013**
University of Rochester, Center for Visual Science
- Maybel E. Lewis Summer Research Fellow Summer 2002**
Institute for Sensory Research, Syracuse, NY

Patents Pending

- U.S. Provisional Patent application (University of Rochester) Filed July: 2014**
New imaging modalities using a reflective aperture array in the imaging plane to dynamically image and compare components of the diffraction pattern
- U.S. Provisional Patent application (University of Rochester) Filed January: 2014**
In vivo flow cytometry and blood cell velocimetry in the living eye
*more information on filed IP may be addressed to: Patrick Emmerling, PhD
UR Ventures: email: patrick.emmerling@rochester.edu phone: 585-273-3250

Professional Society Membership and Service

- Association for Research in Vision and Ophthalmology **2010 - present**
- The Optical Society **2013 - present**

- ARVO Blood flow session moderator **2014 - present**
- Society for Neuroscience **2004 - 2012**
- Biomedical Engineering Society **2001 - 2002**
- Reviewer for: Journal of Vision, Investigative Ophthalmology and Visual Science, Biomedical Optics Express, Journal of Biomedical Optics, Optometry and Vision Science

Teaching Experience

Co-Course Director (*with Ruchira Singh, PhD*)
Neuroscience Student Seminar (NSC 503) **2016-2018**

Invited Lectures

Vision and the Eye (Optics 248/448/BCS 223) **Spring 2012-2016**

- 1) *Single photon response and photoreceptor sensitivity*
- 2) *Ganglion cell structure and function*
- 3) *Visual cortex: motion, form and color*

Instructor: Jennifer J. Hunter, Ph.D.

Integrative and Systems Neuroscience (NSC 531) **Spring 2016**

Visual System: Retina and retinal projections

Instructor: Tatiana Pasternak, PhD., Ed Freedman, PhD

Academic Preceptor (undergraduate TA) **2001**

Bioengineering Analysis of Living Systems (BEN 305/605)

Dept. of Bioengineering and Neuroscience, Syracuse University, NY.

Instructors: Steven C. Chamberlain, Ph.D. and Gustav Engbretson, Ph.D.

Mentored Students

Aby Joseph, PhD Candidate-Optics-University of Rochester **2014-present**

R. Andrés Guevara-Torres, PhD Candidate-Optics-University of Rochester **2013-present**

Vigneshwar Subramanian, Undergrad.- Chemistry, Cornell University **2015**
 University of Rochester, Center for Visual Science summer fellow

Andrew Stidwill, Undergrad.- Motion Picture Science, RIT **2015**
 Summer Co-op student

Zhenlin Xu, Masters Student.- Imaging Science, RIT **2015**
 Summer Co-op student

Gwen Musial, Undergrad. -, Biomedical Engineering, University of Rochester **2013**

Geetika Baghel, Undergrad.- Neuroscience, Rutgers University **summer 2013**
 University of Rochester, Center for Visual Science summer fellow

Christina Schwarz, PhD Candidate, visiting scholar **summer 2012**

HoanVu Nguyen, Undergrad. -Biology, University of Denver, CO **2012**
University of Rochester, Center for Visual Science summer fellow
(National Eye Institute travel grant recipient to ARVO 2013 for mentored project)
-co-authorship on IOVS publication (Schallek et al 2013)

Peer Reviewed Publications

Alarcon-Martinez, L., Yemisci, M., **Schallek, J.**, Kivılcım Kılıç K., Dalkara, T. Pericytes on microvessels prevent complete reperfusion after retinal ischemia *~In Review*
December 2016 Circulation Research

Schallek, J., Guevara-Torres, R.A., Schwarz, C. and Williams, D.R. Automated blood cell velocimetry in the living eye using high spatiotemporal resolution images.
Manuscript in preparation ~submission expected December 2016

Guevara-Torres, A., Joseph, A. & **Schallek, J.** (2016) Label free measurement of retinal blood cell flux, velocity, hematocrit and capillary width in the living mouse eye. *Biomed. Opt. Express*, BOE 7, 4228–4249 (2016). PMID- to be assigned
*Editor's Pick designation: [Link](#)

Guevara-Torres A, Williams DR, **Schallek J.** (2015) Imaging translucent cell bodies in the living mouse retina without contrast agents. *Biomedical Optics Express*. 6(6):2106-2119. doi:10.1364/BOE.6.002106. [PMID- 26114032](#)
*Spotlight on Optics designation: [link](#)

Schallek J., Geng, Y., Nguyen, H., and Williams, D.R. (2013) Morphology and topography of retinal pericytes in the living mouse retina using in vivo adaptive optics imaging and ex vivo characterization. *Invest Ophthal Vis Sci*. **54**,(13):8237–8250 [PMID- 24150762](#)

Schallek J., McLellan G, Viswanathan S, Ts'o D (2012) Retinal Intrinsic Optical Signals in a Cat Model of Primary Congenital Glaucoma. *Invest Ophthal Vis Sci* **53**, 1971 – 1981 [PMID- 22395886](#)

Schallek, J. and Ts'o, D. (2011) Blood Contrast Agents Enhance Intrinsic Signals in the Retina: Evidence for an Underlying Blood Volume Component. *Invest Ophthal Vis Sci* **52**, 1325 -1335. [PMID- 21051719](#)

Schallek J., Li H, Kardon R, Kwon Y, Abramoff M, Soliz P, Ts'o D (2009a) Stimulus-Evoked Intrinsic Optical Signals in the Retina: Spatial and Temporal Characteristics. *Invest Ophthal Vis Sci* 50:4865-4872. [PMID-19420337](#)

Schallek J., Kardon R, Kwon Y, Abramoff M, Soliz P, Ts'o D (2009b) Stimulus-Evoked Intrinsic Optical Signals in the Retina: Pharmacologic Dissection Reveals Outer Retinal Origins. *Invest Ophthal Vis Sci* 50:4873-4880. [PMID-19420331](#)

Ts'o D, **Schallek J**, Kwon Y, Kardon R, Abramoff M, Soliz P (2009) Noninvasive Functional Imaging of the Retina Reveals Outer Retinal and Hemodynamic Intrinsic Optical Signal Origins. *Jap Journ of Ophthal* 53:334-344. [PMID-19763750](#)

Soliz, P. Barriga, E.S. **Schallek, J**, Ts'o, D. Davis, H. (2009) Intrinsic signal detection of an evoked response with a low-cost scanning laser ophthalmoscope. *IEEE Computer-Based Medical Systems*: 1-5.

Published Abstracts and Conference Presentations

Schallek J, Joseph A, Guevara-Torres A. (2016) Imaging invisible cells: new advances in adaptive optics reveal structure of the translucent retinal cells of the inner retina. OSA Fall Vision Meeting, Rochester NY

Schallek, J, Joseph, A. & Guevara-Torres, A. (2016) Label Free Imaging of Ganglion Cells in the Living Mouse Eye. *Invest. Ophthalmol. Vis. Sci.* 57, (2016).

Joseph, A., Guevara-Torres, A. & **Schallek, J**. (2016). In vivo flow cytometry measures red to white blood cell ratio in the living mouse eye. *Invest. Ophthalmol. Vis. Sci.* 57, 4616–4616 (2016).

Guevara-Torres, A., Joseph, A. & **Schallek, J**. (2016). Population analysis of red blood cell flux in retinal capillaries of mice. *Invest. Ophthalmol. Vis. Sci.* 57, 5109–5109 (2016).

Joseph A, Guevara-Torres A, Williams DR, **Schallek J**. (2015) Measurement of blood flow in the largest vessels and smallest capillaries in the living mouse retina using an adaptive optics scanning light ophthalmoscope. *Invest Ophthalmol Vis Sci.* 2015;56(7):3323-3323.

Guevara-Torres A, Williams DR, **Schallek J**. (2015) Split-detector imaging reveals photoreceptors, outer nuclear layer somata and horizontal cells without contrast agents in the living mouse retina. *Invest Ophthalmol Vis Sci.* 2015;56(7):4371-4371.

Schallek J, Guevara-Torres A, Williams DR. (2015). Imaging the morphology, rheology and flux of single red blood cells in the living mouse eye without contrast agents. *Invest Ophthalmol Vis Sci.* 2015;56(7):3363-3363.

Schallek, J, *In vivo* retinal blood cell velocimetry and erythrocyte flux imaged with adaptive optics. Association for Ocular Circulation 2014 –Poster-

Schallek J, Parkins K, Williams DR. In vivo retinal blood flow cytometry and velocimetry. *Invest Ophthalmol Vis Sci E-Abstract* 2014; 55(5):4325.

Ts'o, D, **Schallek, J**, Kardon, R and Q. Du, Q.(2013) Intrinsic Signal Functional Imaging of the Retina: Outer Retinal Origins. *Frontiers in Optics*, I. Kang, D. Reitze, N. Alic, and D. Hagan, eds., Optical Society of America. [Paper FTu5I.1](#) -conference paper-

Schallek J, Schwarz C, Williams DR (2013) Rapid, automated measurements of single cell blood velocity in the living eye. *Invest Ophthalmol Vis Sci E-Abstract*: 54(6):398 -Paper/talk-

Nguyen, HN, Williams DR **Schallek J**, (2013) Density and distribution of NG2+ pericytes in the living mouse retina. *Invest Ophthalmol Vis Sci E-Abstract*:TBA 2013-Poster-

Schallek J, Nguyen HN, Schwarz C, Williams DR (2012) Non-invasive Adaptive Optics Imaging of

Retinal Pericytes and Capillary Blood Velocity in Mice. *Journal of Vision* 12: 50–50.
doi:10.1167/12.14.50 -OSA Fall vision meeting poster

- Schallek J**, Geng Y, Williams, D.R. (2012) *In vivo* adaptive optics imaging of retinal pericytes and capillary blood velocity in mice. *Invest Ophthalmol Vis Sci* A6271: E-Abstract:2012.
-MIT Outstanding Poster Award -Retina Research Foundation Travel Award
- Schallek J**, Masella B Hunter, J. and Williams, D.R. (2011) Dynamics of capillary blood flow revealed with adaptive optics scanning laser ophthalmoscopy. *Engineering the Eye III*, Benasque, Spain. –Poster-
- Schallek J**, Masella B Hunter, J. and Williams, D.R. (2011) Stimulus-dependent Changes In Capillary Blood Velocity Revealed With Adaptive Optics Scanning Laser Ophthalmoscopy. *Invest Ophthalmol Vis Sci*. E-Abstract 6029/A240. –Poster-
- Schallek J**, Ts'o DY (2010). The scotopic action spectra of intrinsic signals of the retina reveal a rod-driven mechanism. *Society for Neuroscience Abstracts*. –Poster-
- Ts'o DY, **Schallek J** (2010) Chromatic Bleaching Reveals A Rod-driven Component In Retinal Intrinsic Optical Signals. *Invest Ophthalmol Vis Sci*. E-Abstract 1068/D713.
- Schallek J**, Ts'o DY (2009) Intrinsic signals of the retina reveal a rod-driven component consistent with dark adaptation time course. *Society for Neuroscience Abstracts*, #403.1. –**Nanosymposium Talk-**
- Ts'o DY, **Schallek J**, Kardon R, Kwon Y, Abramoff M, Soliz P (2009) Hemodynamic Components Contribute to Intrinsic Signals of the Retina and Optic Disc. *Invest Ophthalmol Vis Sci*. 2009 50: E-Abstract 4322.
- Soliz, P, Barriga, S, **Schallek J**, Ts'o DY, Davis, H. (2009) Intrinsic Signal Detection of an Evoked Response with a Low-cost Scanning Laser Ophthalmoscope. *IEEE CBMS Albuquerque, NM*
- Schallek J**, Ts'o D (2008) Pharmacological vasodilation reveals hemodynamic components of the intrinsic optical signals in the retina in vivo. *Society for Neuroscience Abstracts*, #567.18/JJ32. –Poster-
- Ts'o DY, **Schallek J**, McLellan G, Viswanathan S (2008) Functional Retinal Imaging of Intrinsic Optical Signals in a Cat Model of Glaucoma. *Invest Ophthalmol Vis Sci* 49: E-Abstract:2006.
- Schallek J**, Zarella M, Kwon Y, Abramoff M, Kardon R, Pokorny J, Soliz P, Ts'o D (2007) Stimulus/response characteristics of functional intrinsic optical signals recorded in the retina in vivo. *Society for Neuroscience Abstracts*, #121.13. –**Slide Talk-**
- Ts'o DY, **Schallek J**, Kwon Y, Kardon R, Abramoff M, Soliz P, Pokorny J (2007) Blood Flow Dynamics Contribute to Functional Intrinsic Optical Signals in the Cat Retina in vivo. *Invest Ophthalmol Vis Sci* 48: E-Abstract:1951.
- Schallek J**, Zarella M, Kwon Y, Kardon R, Abramoff M, Pokorny J, Soliz P, Ts'o D (2006) The spatial and temporal characteristics of negative and positive intrinsic optical signals recorded in the cat retina in vivo. *Society for Neuroscience Abstracts*, #210.3. –**Slide Talk-**
- Ts'o DY, **Schallek J**, Zarella M, Ghim M, Abramoff M, Kwon Y, Kardon R, Pokorny J, Soliz P (2006) Pharmacological Dissection of Laminar Contributions to Intrinsic Optical Signals in the Retina. *Invest Ophthalmol Vis Sci* 47: E-Abstract:5899.
- Schallek J**, Zarella M, Kwon Y, Kardon R, Abramoff M, Soliz P, Pokorny J, Ts'o D (2005) Stimulus-dependent intrinsic optical signals of the retina do not arise from ganglion cells. *Society for Neuroscience Abstracts*, #246.7. –**Slide Talk-**
- Zarella M, **Schallek J**, Ts'o D (2005) Optical imaging of orientation surround effects in V2 suggests a role in surface segmentation. *Society for Neuroscience Abstracts*, #820.6.

Ts'o DY, Zarella M, **Schallek J**, Kwon Y, Kardon R, Abramoff M, Soliz P, Pokorny J (2005) The Origins of Stimulus Dependent Intrinsic Optical Signals of the Retina. *Invest Ophthalmol Vis Sci* 46: E-Abstract:2258.

Ts'o DY, Zarella M, **Schallek J**, Kwon Y, Kardon R, Soliz P (2004) The origins of stimulus dependent intrinsic optical signals of the retina. *Journal of Vision* 4: E-Abstract:39-39.

Chamberlain S, **Schallek J**, Herloski B, Michaud B, Sacunas R (2002) *In Vivo* Rhabdom Shedding in Horseshoe Crab Ventral Photoreceptors. *Invest Ophthalmol Vis Sci* 43: E-Abstract:1425

Invited Talks and Colloquia

Schallek J (March 2016) Seeing Stars: How Astronomy has Enabled New Visions of the Living Eye
University of Rochester Phelps Colloquia Series. Rochester NY. **-invited talk**

Schallek J (October 2015) Longitudinal imaging in the mouse retina with cellular resolution: dynamic insights in models of retinal disease *Frontiers in Optics*. San Jose, CA. Optical Society of America. -
invited talk/conference paper- declined due to paternity

Schallek J (2013) Measuring Single-cell Blood Velocity in the Living Eye: Adaptive Optics Reveals Micro- and Macrovascular Function. *Frontiers in Optics*, I. Kang, D. Reitze, N. Alic, and D. Hagan, eds., Orlando, FL. Optical Society of America. [Paper FTu5I.3](#) **-invited talk/conference paper-**

Research Support

Active

2016/01/01 – 2020/01/01

Research to Prevent Blindness Career Development Award

Title: Imaging single blood cell rheology and flux within the smallest vessels in human diabetic retinopathy

Schallek, Jesse (PI)

2016/09/08 – 2019/09/08

Dana Foundation- David Mahoney Neuroimaging Award

Title: Imaging microscopic changes in retinal capillary structure and function associated with hyperglycemia in a mouse model of diabetes

Schallek, Jesse (PI)

2015/07/07 - 2016/07/07

Flaum Eye Institute Pilot Grant

Imaging optic nerve head and peripapillary vasculature in normal pressure glaucoma

Schallek, Jesse; Hunter, Jennifer; and Smolyak, Regina. (co-PIs)

Completed

2013/03/01-2015/02/28

National Research Service Award (Individual Fellowship)

F32 EY023496-02, National Eye Institute (NEI)

Schallek, Jesse Barrett (PI)
High-resolution imaging of pericytes and capillary blood flow in diabetic mice

2012/01/01-2012/12/31

National Service Research Award (Training Fellowship)

T32 EY007125-22, National Eye Institute (NEI)

KNILL, DAVID C (PI)

Training Grant in Vision Science

2012/05/01-2013/05/01

5-27428, Schmitt Program on Integrative Brain Research

Schallek, Jesse (PI)

Dynamic regulation of capillary blood flow

References

Provided upon request