

Jesse B. Schallek, Ph.D.

Associate Professor, Ophthalmology
Associate Professor, Neuroscience
Associate Professor, Biomedical Engineering
Associate Professor, Optics

Director of Research and Associate Chair, Flaum Eye Institute
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Director of Computing, Center for Visual Science

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Appointments

Director of Research, Dept. Ophthalmology, University of Rochester	2024-present
Associate Professor, Dept. Ophthalmology, University of Rochester	2022-present
Associate Professor, Institute of Optics, University of Rochester	2026-present
Associate Professor, Dept. Neuroscience, University of Rochester	2022-present
Associate Professor, Dept. Biomedical Engineering, University of Rochester	2022-present
Associate Professor, Center for Visual Science, University of Rochester	2022-present
Tenure Awarded	2023
Assistant Professor, Dept. Biomedical engineering, University of Rochester	2021-2022
Assistant Professor, Dept. Ophthalmology, University of Rochester	2015-2022
Assistant Professor, Dept. Neuroscience, University of Rochester	2015-2022
Assistant Professor, Center for Visual Science, University of Rochester	2015-2022

Education

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

Predoctoral & Undergraduate Research Experience

Predoctoral Graduate Student **2004-2010**

SUNY Upstate Medical University

Advisor: Daniel Ts'o, Ph.D.

Project: Primate & feline neocortical and retinal intrinsic signal optical imaging

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 **Summer 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 **Summer 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

Research to Prevent Blindness Career Advancement Award **2022-2024**

Title: Imaging the behavior and identity of single retinal immune cells using label-free adaptive optics imaging

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

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

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 Association for Research in Vision and Ophthalmology (ARVO)	2012
Retina Research Foundation/J.M. and E.C. Lawrence Travel Award ARVO meeting, Ft Lauderdale, FL -RRF 7350-70	2012
Center for Visual Science Training Fellowship -5T32EY007125-22 University of Rochester, Center for Visual Science	2012-2013
Maybel E. Lewis Summer Research Fellow Institute for Sensory Research, Syracuse, NY	Summer 2002

Patents

- 1. European Patent #19804922.3** Issued: **12/04/2024**
"In vivo object identification, counting, and imaging based on light backscattered from a plane behind the object" [Patent Link](#)
Inventors: Andres Guevara-Torres Aby Joseph and Jesse Schallek (Assignee: University of Rochester)
- 2. US Patent #11,337,604 Japan #7508121** Issued: **05/24/2022 US 06/21/2024 JPN**
"In vivo object identification, counting, and imaging based on light backscattered from a plane behind the object" [Patent Link](#)
Inventors: Andres Guevara-Torres Aby Joseph and Jesse Schallek (Assignee: University of Rochester)
- 3. US Patent #11,185,222** Issued: **11/30/2021**
"Label-free contrast enhancement for translucent cell imaging by purposefully displacing the detector" [PDF LINK](#)
Inventors: Andres Guevara-Torres and Jesse Schallek (Assignee: University of Rochester)
- 4. US Patent #10,803,601** Issued: **10/13/2020**
"Rapid assessment and visual reporting of local particle velocity" [PDF LINK](#)
Inventors: Jesse Schallek, Keith Parkins and Aby Joseph (Assignee: University of Rochester)
- 5. European Patent #3277155** Issued: **09/09/2020**
"Imaging Modalities Using a Reflective Aperture Array in the Imaging Plane to Dynamically Image and Compare Components of the Diffraction Patterns and Imaging Point-Spread Function"
Inventors: Jesse Schallek and Andres Guevara-Torres (Assignee: University of Rochester)
- 6. US Patent # 10,964,944** Issued: **06/30/2020**
"System and Method for Enhanced Contrast Imaging Based on Detection of Different Portions of a Lateral Point-Spread of Light Pattern" [PDF LINK](#)
Inventors: Jesse Schallek and Andres Guevara-Torres (Assignee: University of Rochester)
- 7. US Patent #9,844,320** Issued: **12/19/2017**

“System and Method for Observing an Object in a Blood Vessel” [PDF LINK](#)
Inventor: Jesse Schallek (Assignee: University of Rochester)

Patents Filed: *Provisional status*

U.S. Provisional Patent application (University of Rochester) Filed: **2024**

SYSTEMS AND METHODS FOR CAPTURING AND RENDERING DEPTH INFORMATION IN AN EYE” 204606-0185-P1US

U.S. Provisional Patent Application No 63/642,053, filed May 3, 2024.

U.S. Provisional Patent application (University of Rochester) Filed: **2022**

Method of computational scanning light ophthalmoscopy to provide volumetric reflectance, fluorescent and quantitative phase imaging based on the angular dependence of light

U.S. Provisional Patent application (University of Rochester) Filed: **2018**

Blood cell identification using comparisons of scatter in single and double pass light in the living retina

*more information on filed IP may be addressed to: Curtis Broadbent
UR Ventures: email: Curtis_Broadbent@URMC.Rochester.edu

National Service

- Research to Prevent Blindness Grant Review Panel (NY, NY) **2025**
- Imaging Cellular Dynamics, Symposium Moderator (ARVO, Seattle WA) **2024**
- Photoreceptor Development and Degeneration Moderator (ARVO, Seattle, WA) **2024**
- NIH Study Section NV-12: **2024**
SBIR/STTR Phase I/II review panel
Small business: aging and development, auditory, vision and low vision technologies.
SRO: Barbara Mallon
- Fall Vision Meeting Planning Committee: **2021-2023**
Chair: Rochester Local Organizing Committee (2022)
Chair: *Applications*
- Guest Editorial Board Member, Investigative Ophthalmology and Visual Science **2023**
- Fall Vision Meeting Planning Committee: **2018-2021**
Chair-elect: *Applications*
- Vice Chair OSA Clinical Vision Science Technical Group **2021-2023**
- NSF Study Section **2020**
Biomedical Technologies SBIR/STTR Phase I/II review panel
- Moorfields Eye Charity **2020**
Grant Review
- Research to Prevent Blindness Career Development Award Advisory Committee **2019**
- NEI Study Section: ZRG1 ETTN-P (81) S **2019**

Special Topics: Vision Imaging, Bioengineering and Low Vision Technology Development

- NEI Study Section (VIBT) – ZRG1 ETTN-P81 **2019**
Vision Imaging, Bioengineering and Low Vision Technology Development
- NSF Study Section **2018**
Medical Imaging Technologies SBIR/STTR Phase I review panel
- NSF Study Section **2018**
Diagnostic Assays and Platforms SBIR/STTR Phase I review panel

Professional Society Membership

- Association of University Professors in Ophthalmology (AUPO) **2024 - present**
- SPIE International society for optics and photonics **2023 - present**
- Association for Research in Vision and Ophthalmology **2010 - present**
- International Ocular Circulation Society (**founding member*) **2019 - present**
- The Optical Society **2013 - present**
- International Society for Eye Research **2016 –present**
- Society for Neuroscience **2004-2012; 2019-present**
- ARVO Blood flow session moderator **2014 – 2017**
- ARVO Novel imaging techniques and applications session moderator **2018-2019**
- Biomedical Engineering Society **2001 - 2002**
- Reviewer for:
Proceedings of the National Academy of Science (PNAS), eLife, Nature-Communications Biology, Journal of Vision, Investigative Ophthalmology and Visual Science, Biomedical Optics Express, Journal of Biomedical Optics, iScience, Optometry and Vision Science

Teaching Experience

Self-paced internet course on adaptive optics operation and theory **2019-2020**
Web assistance from Sara Peterson

Course Director (with Farran Briggs, PhD) **2017-2018**
Neuroscience Student Seminar (NSC 503)

Co-Course Director (with Ruchira Singh, PhD) **2016-2017**
Neuroscience Student Seminar (NSC 503)

Instructor (with Geunyoung Yoon, PhD) **Fall 2015**
Adaptive Optics for Vision Science (OPT 591)

Lectures

Cellular Neuroscience (NSC 512) **2021-2025**

Phototransduction

Director: J. Chris Holt, PhD and Julian Meeks, PhD

<i>Cell Biology of Disease (PTH 510)</i>	2019-2021
1) <i>Anatomy and physiology of the eye</i>	
2) <i>Pathophysiology of eye disease</i>	
3) <i>Innovation in retinal imaging laboratory</i>	
Director: Cheryl Ackert-Bicknell, PhD	
<i>Vision and the Eye (Optics 248/448/BCS 223)</i>	Spring 2012-2023
1) <i>Single photon response and photoreceptor sensitivity</i>	
2) <i>Ganglion cell structure and function</i>	
3) <i>Visual cortex: motion, form and color</i>	
Director: Jennifer J. Hunter, Ph.D. and Sarah Walters, PhD	
<i>Integrative and Systems Neuroscience (NSC 531)</i>	Spring 2016-2019
Visual System: Retina and retinal projections	
Director: Tatiana Pasternak, PhD., Ed Freedman, PhD	
Academic Preceptor (undergraduate TA)	2001
<i>Bioengineering Analysis of Living Systems (BEN 305/605)</i>	
Dept. of Bioengineering and Neuroscience, Syracuse University, NY.	
Directors: Steven C. Chamberlain, Ph.D. and Gustav Engbretson, Ph.D.	

Mentored Students (** indicates graduate degree conferred. Total=5)

Jin Huh , PhD Candidate-Optics-University of Rochester	2020-present
Kosha Dholakia , PhD Candidate- Biomedical Eng.- University of Rochester	2020-present
**Fei Shang , PhD Candidate-Neuroscience-University of Rochester	2019-present
Barzah Chowdhury , Undergraduate Research Fellow- University of Rochester	2023-present
**Guanping Feng, PhD -Biomedical Engineering-University of Rochester	2018-2024
Aamod Shanker , Postdoctoral Fellow- University of Rochester	2023-2024
Tanique MacDonald , BS 1 st year Neuroscience Student- University of Rochester	2022-2023
Phillip Braun , MD Ophthal. Resident, Flaum Eye Institute, University of Rochester	2022-2023
**Aby Joseph , PhD -Optics- University of Rochester	2014-2021
Lelo Shamambo , BS. 1 st year Neuroscience student- University of Rochester	2020-2021
**R. Andrés Guevara-Torres, PhD -Optics- University of Rochester	2013-2020
Emmanuel Alabi , PhD. Postdoctoral Fellow- University of Rochester	2017-2019

**Josie Lorenzo, MS -Optics- University of Rochester	2018
Joon-Bom (Albert) Kim, MD. Ophthalmology Resident- University of Rochester	2015-2018
Nicholas Sorabella. Undergrad -Stonehill College, Rochester REU summer program	2018
Jake Rudlong, BS. 1 st year Neuroscience student- University of Rochester	2018-2019
Berke Karaahmet, BS. 1 st year Neuroscience student- University of Rochester	2017-2018
Sana Idrees, MD. Ophthalmology Resident -University of Rochester	2016-2017
Neal Shah, BS. 1 st year Neuroscience student- University of Rochester	2016-2017
Gilbert Smolyak, Harley High School Senior research project.	2016
Vigneshwar Subramanian, Undergrad.- Chemistry, Cornell University University of Rochester, Center for Visual Science summer fellow	2015
Andrew Stidwill, Undergrad.- Motion Picture Science, RIT Summer Co-op student	2015
Zhenlin Xu, Masters Student.- Imaging Science, RIT Summer Co-op student	2015
Gwen Musial, Undergrad. - Biomedical Engineering, University of Rochester	2013
Geetika Baghel, Undergrad.- Neuroscience, Rutgers University University of Rochester, Center for Visual Science summer fellow	summer 2013
Christina Schwarz, PhD Candidate, visiting scholar Laboratorio de Óptica, Centro de Investigación en Óptica y Nanofísica	summer 2012
HoanVu Nguyen, Undergrad. -Biology, University of Denver, CO 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)	2012

Host to Visiting Scientists

Fulbright Faculty Associate <i>Fulbright-Nehru program, host to Earu Banoth, PhD</i> <i>Award number 2531/FNPDR/2019 LINK</i>	2019-2020
Colin Chu, MD (University of Bristol, UK)	2019
Luis Alarcon-Martinez, PhD (Hacettepe University, Ankara, Turkey)	2014

University of Rochester Service

Associate Chair and Director of Research: Dept. of Ophthalmology	2024-present
Director: Advanced Retinal Imaging Alliance (ARIA) https://aria.cvs.rochester.edu/	2022-present
Society for Neuroscience: Rochester Chapter Role: Councilor. President: J. Chris Holt, PhD	2019-2023
Center for Visual Science Executive Committee Director of Computing NEI P30 Associate Director Computing NEI P30 *assisted composition of NEI Core grant CVS: P30EY001319-44	2017-present 2025-present 2017-2025
Center for Visual Science Pilot Grant Review	2023
Thesis Committee: (†indicates chair) † Alexandra McHale , PhD Candidate- Neuroscience, University of Rochester Aby Joseph , PhD Candidate - Optics, University of Rochester Andrés Guevara-Torres , PhD Candidate - Optics, University of Rochester Kathleen Gates , PhD Candidate – Neuroscience, University of Rochester	2022 2017-2021 2017-2020 2018-2019
Reading Exam: † Kathleen Gates , PhD Candidate – Neuroscience, University of Rochester	2017
Qualifying/Reading Exam Committee: Prashant Waiba , PhD Candidate, Biomed. Eng., University of Rochester Sadia Afrin , PhD Candidate, Biomed. Eng., University of Rochester Connor Heckman , PhD Candidate, Biomed. Eng., University of Rochester † Matthew Adusei , PhD Candidate, Neuroscience. University of Rochester	2025 2024 2023 2021
Neuroscience Graduate Program Student Interviews	2016-2020
Cell and Biology of Disease Program Student Interviews	2020

Peer Reviewed Publications

1. Power D, Elstrott J, **Schallek J**. Photoreceptor loss does not recruit neutrophils despite strong microglial activation. *eLife*. 2025;13. doi:10.7554/eLife.98662.2 PMID: [PMC11160676](https://pubmed.ncbi.nlm.nih.gov/39111606/)
news links
<https://www.urmc.rochester.edu/news/publications/neuroscience/researchers-find-brain-immune-cells-regulate-vision-health>
<https://www.optometrytimes.com/view/researchers-examine-brain-immune-cell-impact-on-the-eye>

<https://www.technologynetworks.com/tn/infographics/immunopeptidomics-from-peptide-profiling-to-precision-medicine-403735>

AAAS <https://www.eurekalert.org/news-releases/1092423>

2. Shang F, **Schallek J.** Characterization of the Retinal Circulation of the Mouse. *Investigative Ophthalmology & Visual Science*. 2025;65(14):3. doi:10.1167/iavs.65.14.3 PubMed Central PMCID: [PMC11613998](https://pubmed.ncbi.nlm.nih.gov/PMC11613998/)
3. Ashbery D, Baez HC, Kanarr RE, Kunala K, Power D, Chu CJ, **Schallek J**, McGregor JE. In Vivo Visualization of Intravascular Patrolling Immune Cells in the Primate Eye. *Invest Ophthalmol Vis Sci*. 2024 Sep 3;65(11):23. doi: 10.1167/iavs.65.11.23. PubMed Central PMCID: [PMC11407476](https://pubmed.ncbi.nlm.nih.gov/PMC11407476/).
4. Feng, G., Joseph, A., Dholakia, K., Shang, F., Pfeifer, C.W., Power, D., Padmanabhan, K., and **Schallek, J.** (2023). High-resolution structural and functional retinal imaging in the awake behaving mouse. *Communications Biology* 6, 1–15. 10.1038/s42003-023-04896-x. [PMCID: PMC10227058](https://pubmed.ncbi.nlm.nih.gov/PMC10227058/)
5. Dholakia KY, Guevara-Torres A, Feng G, Power D, **Schallek J.** (2022) In Vivo Capillary Structure and Blood Cell Flux in the Normal and Diabetic Mouse Eye. *Investigative Ophthalmology & Visual Science*. 2022;63(2):18. [PMCID: PMC8842443](https://pubmed.ncbi.nlm.nih.gov/PMC8842443/)
6. Joseph, A., Power, D. and **Schallek, J.** (2021). Imaging the dynamics of individual processes of microglia in the living retina *in vivo*. *Biomedical Optics Express* [PMID: 34745728](https://pubmed.ncbi.nlm.nih.gov/34745728/)
7. Joseph, A., Chu, C.J., Feng, G., Dholakia, K., and **Schallek, J.** (2020). Label-free imaging of immune cell dynamics in the living retina using adaptive optics. *ELife* 9, e60547. [PMID 33052099](https://pubmed.ncbi.nlm.nih.gov/33052099/)
News Links:
<https://optics.org/news/11/10/3>
biomedical Picture of the Day: <https://bpod.org.uk/archive/2020/11/4>
https://www.photonics.com/Articles/Microscopy_Infrared_Videography_AI_Capture/a66272
<http://www.bpod.mrc.ac.uk/archive/2020/11/4>
https://www.novuslight.com/imaging-the-secret-lives-of-immune-cells-in-the-eye_N10974.html
<https://www.rochester.edu/newscenter/imaging-the-secret-lives-of-immune-cells-in-the-eye-455212/>
<https://www.techexplorist.com/tracking-interactions-microscopic-immune-cells-living-eye/35651/>
<https://medicalxpress.com/news/2020-10-imaging-secret-immune-cells-eye.html>
<https://www.technology.org/2020/10/08/imaging-the-secret-lives-of-immune-cells-in-the-eye/>
8. Guevara-Torres, A., Williams, D.R., and **Schallek, J.B.** (2020). Origin of cell contrast in offset aperture adaptive optics ophthalmoscopy. *Opt. Lett.*, OL 45, 840–843. [PMID: 32058484](https://pubmed.ncbi.nlm.nih.gov/32058484/)
9. Silverstein, S.M., Demmin, D.L., **Schallek, J.B.** and Fradkin, S.I. (2020) “Measures of Retinal Structure and Function as Biomarkers in Neurology and Psychiatry.” *Biomarkers in Neuropsychiatry*, June 3, 2020, 100018. <https://doi.org/10.1016/j.bionps.2020.100018> PMID pending

10. Canavesi, C., Cogliati, A., Mietus, A., Qi, Y., **Schallek, J.**, Rolland, J.P., and Hindman, H.B. (2020). In vivo imaging of corneal nerves and cellular structures in mice with Gabor-domain optical coherence microscopy. *Biomed. Opt. Express*, BOE 11, 711–724. [PMID: 32133220](#)

11. Hunter, J.J., Merigan, W.H., and **Schallek, J.** (2019). Imaging Retinal Activity in the Living Eye. *Annual Review of Vision Science* 5, 15–45. [PMID- 31525142](#)

12. Joseph, A., Guevara-Torres, A., and **Schallek, J.** (2019). Imaging single-cell blood flow in the smallest to largest vessels in the living retina. *eLife* 8, e45077. [PMID- 31084705](#)
***eLife Digest:** [“Twinkle Twinkle Little blood cell”](#)
***NakedScientist Podcast:** [Podcast Link](#)

13. Alarcon-Martinez, L., Yilmaz-Ozcan, S., Yemisci, M., **Schallek, J.**, Kılıç, K., Villafranca-Baughman, D., Can, A., Di Polo, A., and Dalkara, T. (2019). Retinal ischemia induces α -SMA-mediated capillary pericyte contraction coincident with perivascular glycogen depletion. *Acta Neuropathologica Communications* 7, 134. [PMID- 31429795](#)

14. Alarcon-Martinez, L., Yilmaz-Ozcan, S., Yemisci, M., **Schallek, J.**, Kılıç, K., Can, A., Polo, A. D. & Dalkara, T. Capillary pericytes express α -smooth muscle actin, which requires prevention of filamentous-actin depolymerization for detection. *eLife Sciences* 7, e34861 (2018). [PMID- 29561727](#)

15. Marcos, S., Werner, J. S., Burns, S. A., Merigan, W. H., Artal, P., Atchison, D. A., Hampson, K. M., Legras, R., Lundstrom, L., Yoon, G., Carroll, J., Choi, S. S., Doble, N., Dubis, A. M., Dubra, A., Elsner, A., Jonnal, R., Miller, D. T., Paques, M., Smithson, H. E., Young, L. K., Zhang, Y., Campbell, M., Hunter, J., Metha, A., Palczewska, G., **Schallek, J.** & Sincich, L. C. (2017) Vision science and adaptive optics, the state of the field. *Vision Research* doi:10.1016/j.visres.2017.01.006 [PMID- 28212982](#)

16. 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- 27867728](#)
***Editor’s Pick designation:** [Link](#)

17. 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](#)

18. **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](#)

19. **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](#)
20. **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](#)
21. **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](#)
22. **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](#)
23. 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](#)
24. 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

1. Dholakia, K. Y., Huh, J. won, Chu, C. & **Schallek, J. B.** Adaptive optics reveals early cellular and vascular changes in response to autoimmune uveitis in living mouse retina. Investigative Ophthalmology & Visual Science 66, 6142 (2025).
2. Power, D. & **Schallek, J. B.** Multi-spectral fluorescence AOSLO reveals early vascular interactions of neutrophils and monocytes in endotoxin-induced uveitis. Investigative Ophthalmology & Visual Science 66, 3537 (2025).
3. Huh, J. won & **Schallek, J. B.** Imaging arrival and clearance of transfused donor blood cells from hours to days in the living mouse eye. Investigative Ophthalmology & Visual Science 66, 1398 (2025).
4. Shang, F. & **Schallek, J. B.** Ins2Akita mice show changes in the capillaries that bridge the trilaminar plexuses of the retinal circulation. Investigative Ophthalmology & Visual Science 66, 4799 (2025).
5. Shanker, A., Majumdar, A., **Schallek, J.**, Towards in-vivo phase tomography using structured light, SPIE Photonics West, 2024 San Francisco, CA. -Talk, *postponed due to paternity-
6. **Schallek, J.B.**, and Power, D. Imaging vascular associated mitochondria in vivo using adaptive optics. IOVS (ARVO 2024, Seattle WA) -Talk-

7. Power, D. and **Schallek, JB**. Imaging fluorescent mitochondria in the living mouse retina IOVS (ARVO 2024, Seattle WA)
8. Campbell, A., Xu, Z., LaPorta, J., Walker, A., Hollar, R., Power, D., Dholakia, K., DiLoreto, D.A., Chu, C., **Schallek, J.B.**, McGregor, J.E. Visualizing immune cell dynamics in the living non-human primate eye following retinal surgery. (ARVO 2024, Seattle WA)
9. **Schallek JB**. Imaging dynamic behaviors of single immune cells in the living retina in response to inflammation. *Investigative Ophthalmology & Visual Science*. 2023;64(8):3764.
10. Braun P, Shang F, **Schallek JB**. Density of retinal circulation is unchanged in hyperglycemic mice in first year of life. *Investigative Ophthalmology & Visual Science*. 2023;64(8):560.
11. Dholakia K, **Schallek JB**. Leukocyte adhesion and release within retinal vessels imaged in vivo with label free adaptive optics. *Investigative Ophthalmology & Visual Science*. 2023;64(8):2865
12. Dholakia K, Huh JW, **Schallek J**. Contributed Session II: Immune cell speed changes over 5 orders of magnitude in response to inflammation in the retina. *Journal of Vision*. 23: 23. PMID [37733555](#) DOI: [10.1167/jov.23.11.23](#)
13. Ashbery D, Baez H, Kunala K, Power D, **Schallek J**, McGregor J. Contributed Session II: In vivo imaging of immune cell activity in primate retina after photoreceptor ablation. *Journal of Vision*. 23: 22. PMID [37733556](#) DOI: [10.1167/jov.23.11.22](#)
14. Shang F, Braun P, **Schallek JB**. Retinal Trilaminar Vascular Density in Healthy Mice. *Investigative Ophthalmology & Visual Science*. 2023;64(8):3686.
15. Power D, **Schallek JB**. Despite targeted microglial response to photoreceptor damage, neutrophils do not extravasate into the retina. *Investigative Ophthalmology & Visual Science*. 2023;64(8):2067.
16. Ashbery, D., Baez, H.C., Kanarr, R.E., Kunala, K., Power, D., **Schallek, J.B.**, and McGregor, J.E. (2023). Retinal immune activity can be visualized in non-human primate in vivo using offset aperture AOSLO. *Investigative Ophthalmology & Visual Science* 64, 1039.
17. Feng G, Kunala K, Yang Q, **Schallek J**. Quantitative phase and volumetric retinal imaging using angle-resolved AOSLO imaging. In: *Ophthalmic Technologies XXXIII*. Vol 12360. SPIE; 2023:47-55. doi:[10.1117/12.2647024](#) [VIDEO LINK](#)
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19. Huh J won, Dholakia K, Power D, **Schallek J**. In vivo flow cytometry in retina to study rare blood cells. *Investigative Ophthalmology & Visual Science*. 2022;63(7):3112. –ARVO Talk-
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24. Feng, G., Dholakia, K., Guevara-Torres, A., Aby Joseph, A., and **Schallek, J.B.** Automated detection of single blood cells in mouse retinal capillaries reveals short and long term dynamics in blood cell flux. Center for Adaptive Optics Fall Meeting. Lake Arrowhead CA, (Virtual).
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34. **Schallek, J.B.** Imaging single cell blood flow in the living mouse retina. *Microcirculation Research* TBD World Congress for Microcirculation, Vancouver, BC. 2018 –Talk-
35. **Schallek, J.B.** Imaging single cell blood flow in the anesthetized and awake, behaving mouse retina. *Microcirculation Research* TBD World Congress for Microcirculation, Vancouver, BC. 2018 – Poster-
36. **Schallek, J. B.**, Joseph, A., Yang, Q., Padmanabhan, K. & Pfeifer, C. Adaptive optics ophthalmoscopy in the awake, behaving mouse. *Invest. Ophthalmol. Vis. Sci.* 59, 732–732 (2018). –Talk-

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52. **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

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-MIT Outstanding Poster Award -Retina Research Foundation Travel Award
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55. **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-
56. **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-
57. 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.
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68. 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.

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71. 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.** (April, 2025) Title: Retina Perfusion at the Level of Single-Cells: Imaging Blood Cells and Mitochondria in the Living Eye Using Adaptive Optics
-MCW Eye Institute Distinguished Lecture- *Inaugural Student Choice Speaker*
- Schallek, J.** (November, 2024) Title: New Views in the Living Eye: Imaging the Dynamism of Blood Cells Using Adaptive Optics. University College London and Moorfields Eye Hospital, London
-Invited Talk
- Schallek, J.** (March, 2024) Title: Imaging the dynamics of single blood cells in the living eye –Casey Eye Institute, Oregon Health and Science University OHSU. **-Invited Talk**
- Schallek, J.** (December, 2023) Title: Imaging Retinal Blood Flow at the Level of Single Cells–**Center for Visual and Neurocognitive Rehabilitation, Atlanta Veterans Affairs, Atlanta GA -Invited Talk-**
- Schallek, J.** (December, 2023) Title: Imaging Retinal Blood Flow at the Level of Single Cells–Emory University Eye Center, Atlanta GA **-Invited Talk-**
- Schallek, J.** (October, 2023) Twinkle, twinkle, little cell: Adaptive optics reveals the dynamics of single blood cells and immune cells in the living retina –**Houston College of Optometry: Periopsia Series**
- Schallek, J.** (June, 2023) Retinal perfusion and blood flow quantification at the capillary level, are we there yet? –**International Ocular Circulation Society. Vienna, Austria: Invited Talk-**
- Schallek, J.** (September, 2022) AO and Flow: adaptive optics ophthalmoscopy reveals details of single blood cells in the living eye –**University of California Irvine, Distinguished Speaker Series: talk-**
- Schallek, J.** (July, 2022) Imaging that twinkle in your eye: adaptive optics imaging of single neurons, glia and blood cells in the living retina. SUNY Upstate Medical University
–Robert Barlow Vision Research Seminar Series: invited talk-
- Schallek, J.** (February, 2022) Imaging Single Blood Cells and their Behaviors in the Living Eye Biomedical Engineering Seminar Series, Johns Hopkins University
–invited talk-
- Schallek, J.** (February, 2022) State of the art in Adaptive Optics Ophthalmoscopy: Next Generation Medical Devices focusing on therapeutic and diagnostics. Department of Biotechnology and Medical Engineering National Institute of Technology, Rourkela India
–invited talk-
- Schallek, J.** (January, 2022) Imaging blood and immune cells without contrast agents in the living retina (University of Pennsylvania) **–invited talk-**
- Schallek, J.** (December, 2021) New strategies to image and measure the speed of single blood cells in the

- living retina. University of Rochester, Biomedical Engineering Colloquium Series **–invited talk–**
- Schallek, J.** (June, 2021) Beyond photoreceptors: new forays using adaptive optics to image the behaviors of blood cells in the retina. Wavefront Congress **–invited talk–**
- Schallek, J.** (March, 2021) Imaging blood cells in conditions of diabetic retinopathy. Research to Prevent Blindness “Lunch and Learn” with co-presenters Jennifer Sun, MD and Sanjoy Dutta PhD. **–invited talk–**
- Schallek, J.** (March, 2021) Rochester Institute of Optics Industrial Associates patent showcase
- Schallek, J.** (March, 2021) Imaging contained and rogue blood cells in the retina. Indiana University Oxyopia **–invited talk–**
- Schallek, J.** (December 2020) New Views in the Eye: imaging blood cells to assess the retina health and disease. Flaum Eye Institute Grand Rounds
- Schallek, J.** (December 2020) Imaging blood cells to evaluate the retina health and disease. (Research to Prevent Blindness Board of Trustees) **–invited talk–**
- Schallek, J.** (September 2019) Imaging that twinkle in your eye: adaptive optics imaging of single blood cells in the living retina (The Ophthalmic Laser Surgical & Imaging Society, NYC) **–invited talk–**
- Schallek, J.** (April 2019) Cellular and Molecular Imaging of the Retina in Health and Disease – SIG (ARVO, Vancouver, BC) **–invited talk–**
- Schallek, J.** (April 2019) Rutgers Mechanical and Aerospace Engineering Colloquium Series Seeing the invisible: adaptive optics imaging of single cell blood flow in the living eye **–invited talk–**
- Schallek, J.** (October 2018) Ophthalmic Innovation Summit, American Academy of Ophthalmology (OIS AAO) Chicago, IL **–invited talk–**
- Schallek, J.** (September 2018) *Objective measures of single blood cell flux, flow and velocity in living eye* **Loris and David Rich Lecture Series in Visual Science**, University of Alabama at Birmingham. **–invited talk–**
- Schallek, J.** (May 2018) *Adaptive optics imaging of leukocytes and microglia in the living mouse retina* Session: “*In Galileo's Footsteps: visualizing immunity*” ARVO Symposium. Honolulu, Hawaii **–invited talk–**
- Schallek, J.** (May 2018) *High resolution imaging of the retinal vasculature of the living mouse eye* Special Interest Group (SIG) ARVO. Honolulu, Hawaii **–invited talk–**
- Schallek, J.** (October 2017) *Milliseconds-to-months: functional imaging of the living retina across temporal epochs.* Center for Adaptive Optics Fall Retreat. Lake Arrowhead, CA. **–invited Talk–**
- Schallek, J, Joseph, A. Guevara, R.** (September 2016) *Blood velocity, flux and flow: Objective measurements of single cell hemodynamics in the living retina.* International Society for Eye Research *ISER* Tokyo, Japan **–invited talk–**
- 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:

2022/09/30 – 2026/09/30

NIH NEI R01 EY028293-09

Title: Imaging immune cell type and behavior in the living retina using adaptive optics
Schallek, Jesse (PI)

Collaborators: Minsoo Kim, PhD. University of Rochester

Colin Chu, MD/PhD. University College London and Moorfields Eye Hospital

2025/07/01-2026/06/30

Center for Visual Science/FEI Pilot Award

Title: The consequence of hyperglycemia on the metabolic machinery of retinal vision
Schallek, Jesse (PI)

Collaborators, Andrew Wojtovich, PhD University of Rochester

Completed:

2022/01/01-2024/01/01

Research to Prevent Blindness Career Advancement Award

Title: Imaging the behavior and identity of single retinal immune cells using label-free adaptive optics imaging

Schallek, Jesse (PI)

2021/07/27-2022/07/28

Genentech Research Collaboration

Title: *Label-free imaging of immune cells in preclinical retinal inflammation models*

Schallek, Jesse (Rochester PI)

2017/09/30 – 2022/06/30

NIH NEI R01 EY028293-05

Title: *Non-invasive, living histology of capillary structure and single cell blood flow in mouse model of diabetic retinopathy*

Schallek, Jesse (PI)

2017/09/30 – 2019/09/29

Hoffman-LaRoche (Roche pRED)

Roche Academy of Distinguished Scholars

Title: *Imaging Intrinsic and extrinsic biomarkers of vascular dysfunction and hypoxia in the living mouse eye*
Schallek, Jesse (PI)

2018/04/01-2019/03/31

NIH SBIR (Phase-I) 1R43EY028827-01

Title: *High-definition, wide field of view corneal imaging*
Collaboration with LighTopTech
(Cristina Canavesi, PI, Jesse Schallek UofR subcontract)

2017/10/01 - 2018/10/01

Flaum Eye Institute Pilot Grant

Title: *Imaging microscopic changes in the human retina before and after anti-VEGF therapy for diabetic macular edema*
Schallek, Jesse; Kuriyan, Ajay (co-PIs)

2016/01/01 – 2020/01/01 (NCE)

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

Title: *Imaging optic nerve head and peripapillary vasculature in normal pressure glaucoma*
Schallek, Jesse; Hunter, Jennifer; and Smolyak, Regina. (co-PIs)

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

(Center Grant)

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

Schmitt Program on Integrative Brain Research

Schallek, Jesse (PI-trainee status)

Dynamic regulation of capillary blood flow

References

Provided upon request