



## Society for Neuroscience–Rochester Chapter Post-doc / Faculty Seminar Series



### **Jesse Schallek, Ph.D.**

Postdoc, Center for Visual Science  
University of Rochester

*Imaging the once obscured behaviors of blood cells in the retinal circulation of mice and men:  
New insights detail ocular blood flow and its regulation in the living animal*

The neurons of the retina are one of the most metabolically active tissues in the human body. To serve this metabolic demand, a network of capillaries delivers nutrients and removes waste products from the highly metabolic neurons they serve. However, this vascular network is disrupted in retinal diseases such as diabetic retinopathy, wet form of age related macular degeneration, branch retinal vein occlusion, and others that contribute to the leading causes of blindness in the developed world. To better understand the dynamics of vascular anatomy and perfusion, we would ideally like to study these changes within the living eye.

Previously, the fine details of the microvascular network have been obscured by insufficient spatial and temporal resolution. New high resolution strategies using adaptive optics now provide a means to examine blood flow at the capillary level. In this line of work, I develop AOSLO technology to objectively report capillary blood flow by directly imaging the movement of single blood cells as they flow through the retinal circulation without the need for contrast agents. This direct and non-invasive assessment of retinal blood flow provides both structural and functional information on the vascular network of the retina. In this talk, I will describe recent work that automatically extracts blood cell velocities from large data sets containing many thousands of capillaries and large vessels alike. I will discuss several applications of this approach: 1) examining the role of capillary level neurovascular coupling in the central nervous system, 2) studying dynamic capillary changes in a mouse model of diabetes and 3) discuss how these approaches will be transitioned into the clinic within the next three years to non-invasively study vascular disease within the clinical populations served by the Flaum Eye Institute.

**Thursday, February 19**  
4:00 pm, K-307 (3-6408)  
University of Rochester Medical Center

*Refreshments will be provided*  
*Sponsored by the Rochester Chapter of the Society for Neuroscience*