OCTA is a non-invasive technique that can image blood flow in the retina and choroid in 3 dimensions. Commercially, the instrument automatically segments the vasculature into 2 separate layers, but histologically, there are 3 different layers of blood vessels. My summer project was focused on determining the reliability and repeatability of the vascular flow density in the intermediate capillary plexus (ICP) layer using OCTA in normal eyes and eyes with cystoid macular edema (CME) and retinal vasculopathy. 86 eyes in 44 patients were imaged with OCTA. The images included a 3x3 mm and a 6x6 mm scan each performed twice by the same personnel using the same machine on the same day. The ICP was obtained through custom segmentation, with manual inputs for layer size and depth. The measurements were then compared to determine the repeatability, presented as the intraclass correlation coefficient (ICC).

The repeatability of the vascular density for the custom segmented thinner intermediate layers is reduced in eyes with CME and/or retinal vasculopathy using the larger 6x6 mm OCTA scans. This is likely attributed to the custom segmented ICP being thinner than the automatically segmented layers, thus being more susceptible to errors from morphologic changes seen in the retina associated with CME and retinal vasculopathy. From these findings, we can recommend that using a higher resolution with the smaller 3x3 mm scans yields more reliable results, especially when measuring the vascular density of the ICP in eyes with retinal vasculopathy and/or CME.

Special thanks to Dr. Susanna Park, Dr. Park’s team (Dr. Lekha Mukkamala, Dr. Melinda Chang), Mrs. Ann Kohl and the Kohl Scholarship, and the UC Davis Eye Center for the opportunity to conduct research in ophthalmology. This work is included in a paper in press in the journal Clinical Ophthalmology.