

BRAVO

BRANCH RETINAL VEIN OCCLUSION DETECTION & SEVERITY QUANTIFICATION

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What is BRaVO?

Branch Retinal Vein Occlusion is a blockage of the retinal veins that can result in sudden vision loss of a serious nature



Fig1: (Fundus image of a BRVO-afflicted eye)

CURRENT OCT TECHNOLOGY

- Produces 4 layers (images) of the macular region which show the amount of blood flow through them
- The first two are the most pathologically significant
- **Fig2: Healthy Layers 1&2 (LHS)**

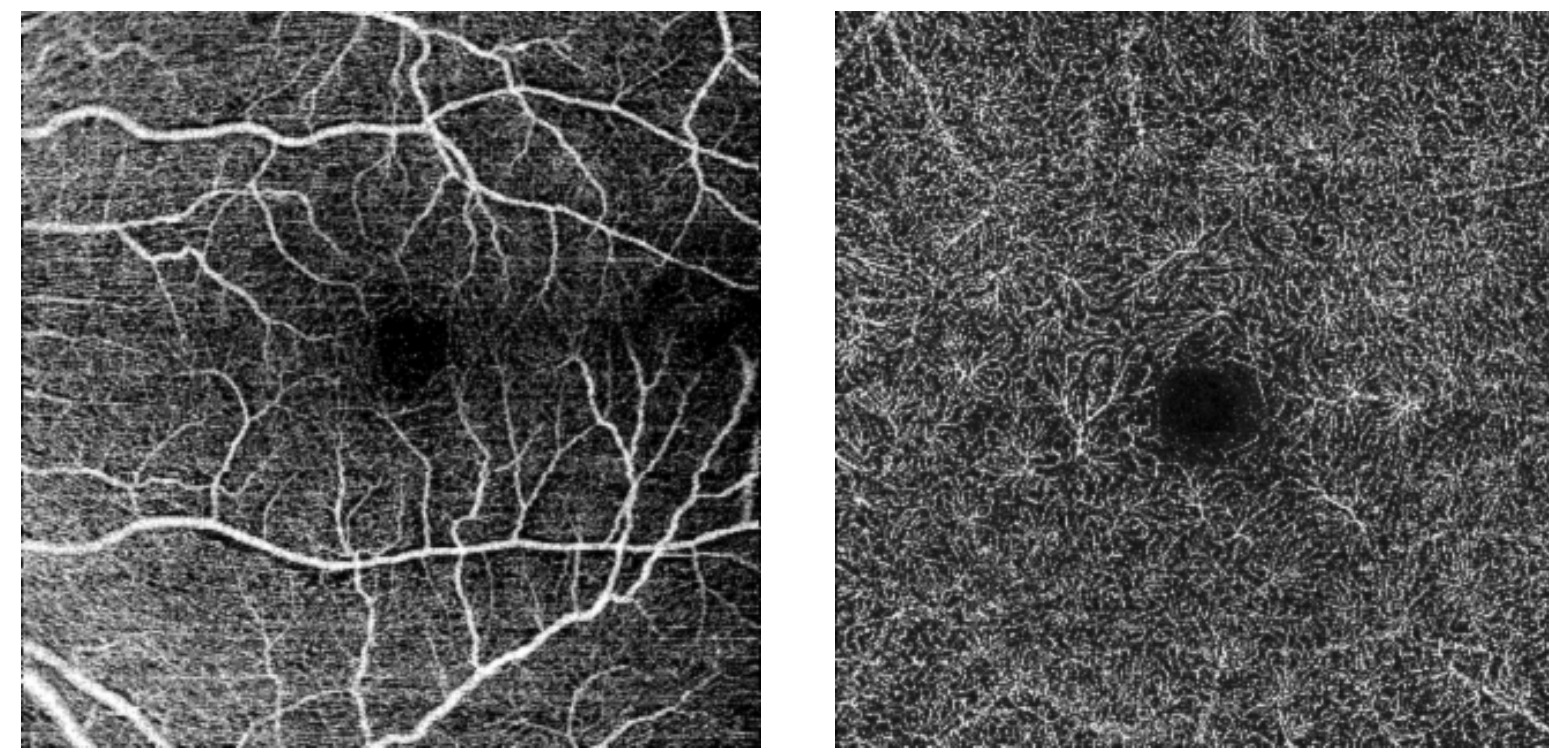
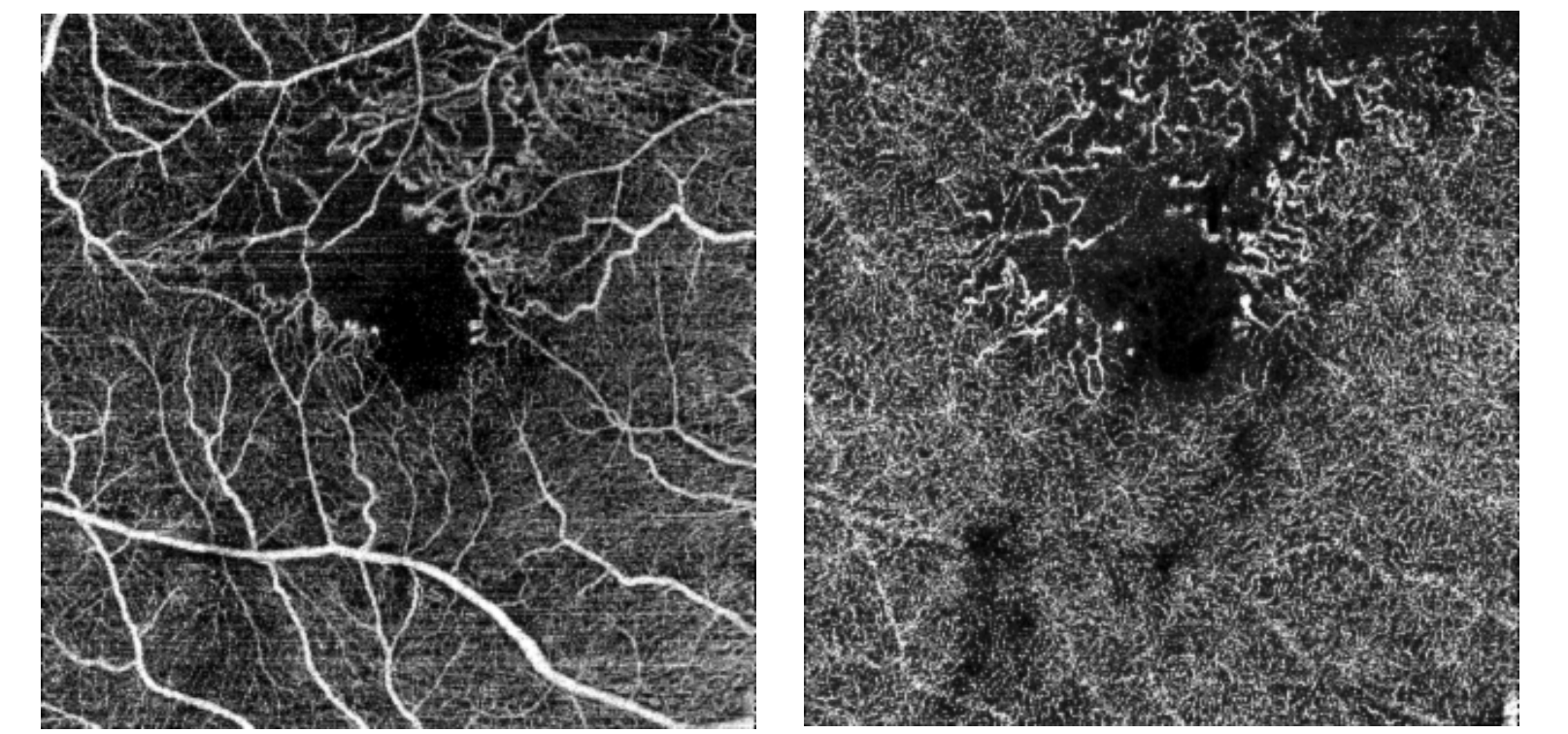


Fig3: Damaged Layers 1&2 (RHS)



IMPACT

- Rapid screening of OCT images to acquire clinically significant data, i.e. vessel density/vasculature
- Development of a system to clean images containing blink artefacts

FUTURE PROSPECTS

- Development of a standardized severity index for BRVO that correlates with Patient's Visual Acuity
- Machine Learning methods to improve upon the work done so far

What does this mean?

- Our system will allow a clinician to **conveniently harness important, meaningful, and relevant data**, to **assist** in his/her eventual **diagnosis** and **treatment plans**

RESULTS

- A threshold - based classification system has been developed to ascertain the presence of BRVO in the first 2 layers of an OCT scan

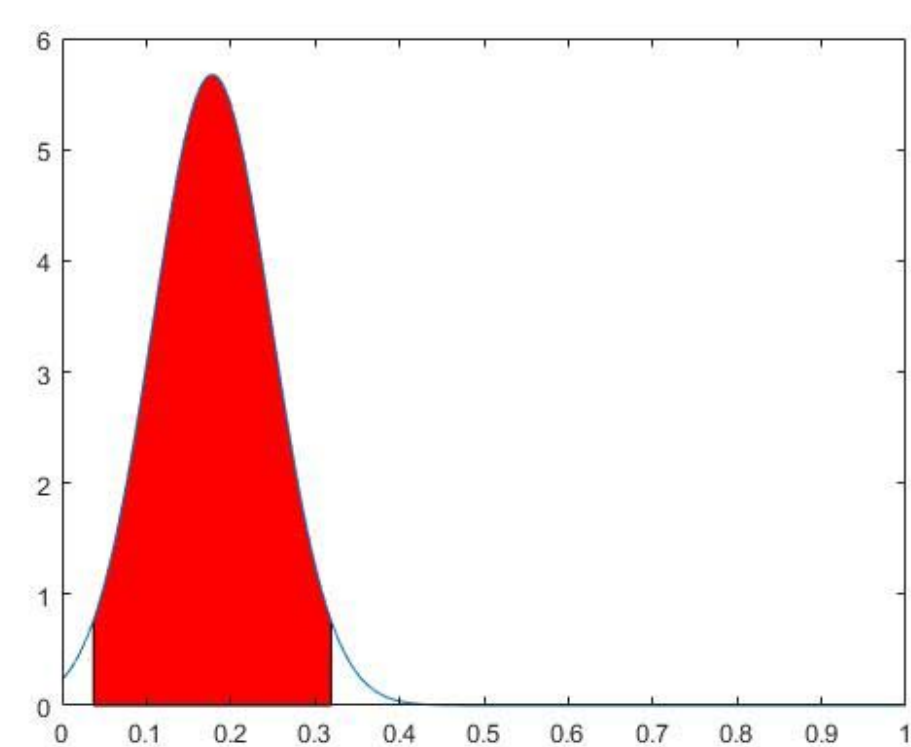


Fig6. Normal Distribution curve for Vessel Density in Healthy Eye (Layer 2)

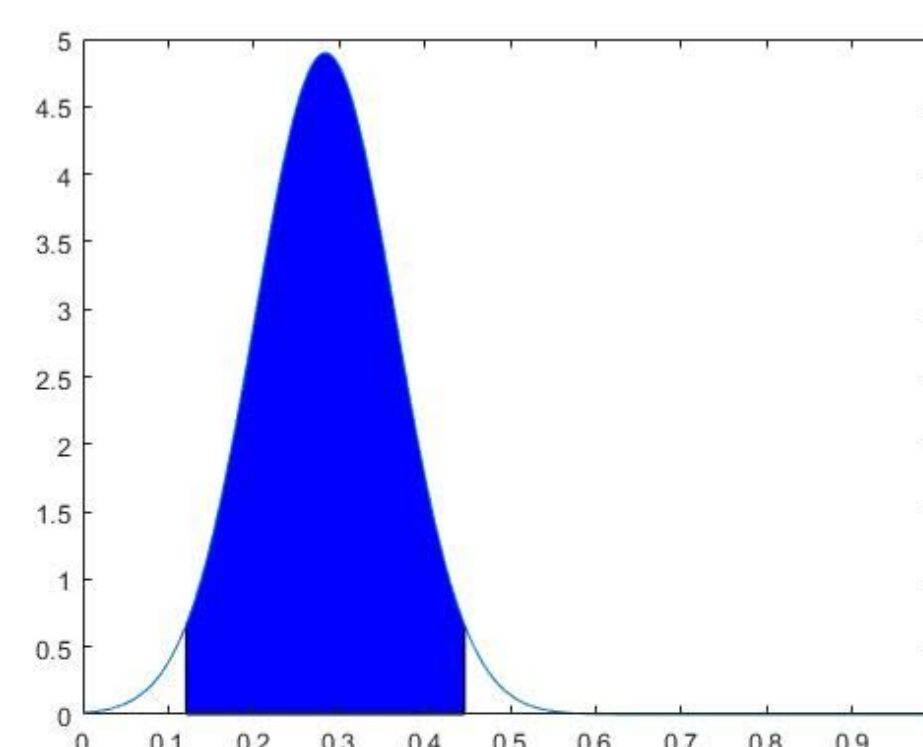


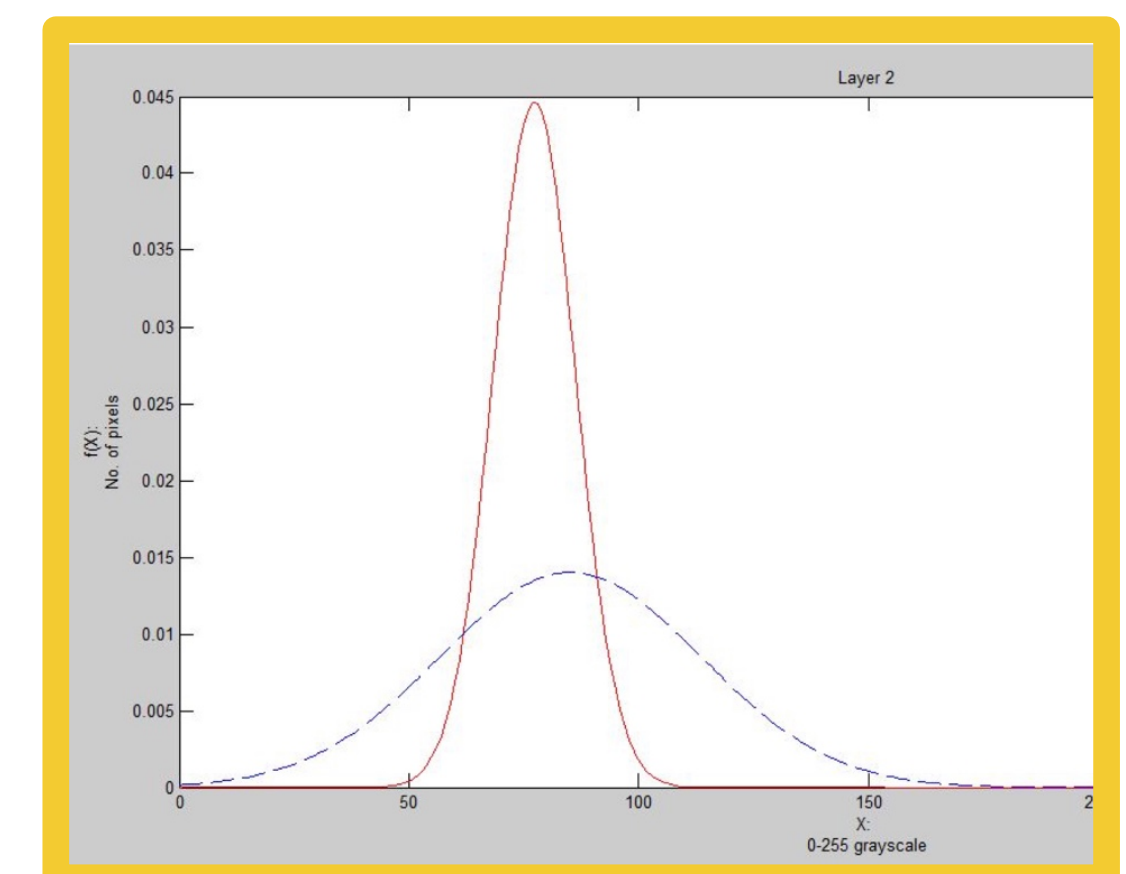
Fig7. Normal Distribution curve for Vessel Density in Diseased Eye (Layer 2)

METHODS

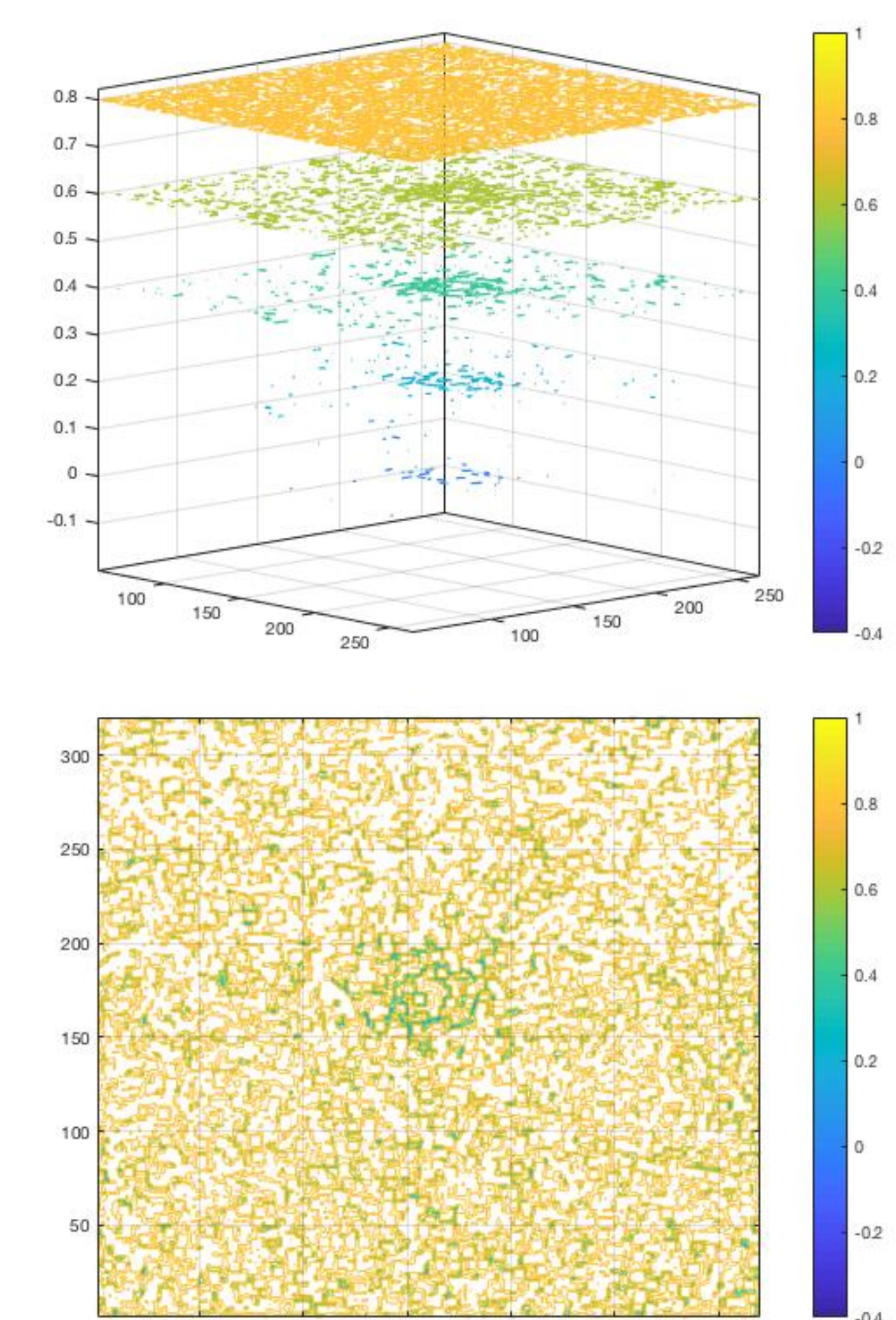
- Initial cleaning of blink artefacts from noisy data
- Two approaches to quantify BRVO applied thereafter

Statistical Approach (Fig4)

- Using frequency mapping of OCT image data to yield normal distribution curves meeting the Kolmogorov-Smirnov test for normality



Fractal Dimensions Approach (Fig5)



REFERENCES

Santosh G. K. Gadde, Neha Anegondi, Devanshi Bhanushali, Lavanya Chidambara, Naresh Kumar Yadav, Aruj Khurana, Abhijit Sinha Roy; **Quantification of Vessel Density in Retinal Optical Coherence Tomography Angiography Images Using Local Fractal Dimension**. Invest. Ophthalmol. Vis. Sci. 2016;57(1):246-252. doi: 10.1167/iovs.15-18287.