

## **“Functional Optical Coherence Tomography Resource Center”**

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### **Abstract**

Optical coherence tomography (OCT) is a micron-resolution 3D imaging modality commonly used in ophthalmology. Our research group has developed novel functional OCT technologies to image and measure ocular blood flow. In pilot studies of glaucoma, total retinal blood flow measured by Doppler OCT and ONH perfusion measured by OCT angiography were both found to be highly repeatable and diagnostic, and well correlated with visual field loss. The goal of the proposed project is to demonstrate a wider range of applications for functional OCT and develop preliminary results for an NIH P41 center grant.

The specific aims are:

1. Develop functional OCT technology. Algorithms will be developed to quantify perfusion and detect retinal and choroidal neovascularization.
2. Use functional OCT to map perfusion loss. Pilot clinical studies will be performed to detect parafoveal retinal ischemia in diabetic retinopathy (DR) and choriocapillaris flow defect in age-related macular degeneration (AMD).
3. Use functional OCT to detect neovascularization. OCT angiography will be used to map retinal neovascularization in proliferative DR and choroidal neovascularization in wet AMD.
4. Use functional OCT to evaluate the role of vascular dysfunction in neurodegenerative diseases. Functional OCT will be performed in multiple sclerosis patients to evaluate loss of ONH and macular perfusion in the neurodegenerative process.
5. Use functional OCT to evaluate tumor vascularity. OCT angiography will be used to differentiate benign choroidal tumors from malignant melanomas based on their vascular patterns. Functional OCT will be used to evaluate the tumor, ONH, and retinal response to radiation treatment.