

# Biomedical Discussion Group

## “Amyloid as a Biomarker of Alzheimer's Disease in the Retina”

Thursday November 17, 2016

2:30 –3:30 pm, Science Teaching Complex (STC) Room 1019



### Dr. Melanie Campbell

PhD, Professor Physics and Astronomy, University of Waterloo.

#### **Abstract:**

As a biomarker of Alzheimer’s disease (AD), we compare amyloid deposits in the neural retina in human and in an animal model of AD and their visibility in differing imaging modalities. Post-mortem retinas were flat mounted and stained with fluorescent amyloid markers. Atomic force, confocal and polarization microscopies were used to image amyloid positive areas and negative areas of positive retinas and control retinas. After IV injection, retinas were imaged *in vivo* in amyloid fluorescence and clinical optical coherence tomography (OCT).

Amyloid fluorescence occurred in association with Alzheimer’s disease with similar high sensitivities and lower specificities in human retinas and those of an animal model. Retinal amyloid deposits showed contrast in polarized light, similar to that of pure amyloid beta deposits. The sensitivity and specificity of polarized light in identifying amyloid in association with Alzheimer’s disease were similar to the more invasive fluorescence imaging. A fluorescence marker for amyloid crossed the blood retinal barrier *in vivo* in the animal model of AD and imaged presumed amyloid deposits which showed no contrast in Optical Coherence Tomography (OCT) images.

This work strengthens the utility of amyloid deposits in the neural layers of the retina as a biomarker of Alzheimer’s disease. These results are consistent with the retinal deposits containing a high concentration of amyloid beta. Polarization imaging is promising for non-invasive imaging of retinal amyloid deposits as a biomarker of AD.

#### **Biosketch:**

Dr. Campbell leads a highly multidisciplinary research group where they study ocular development, eye disease, and linear and non-linear optics of the eye. They investigate the fundamental refractive properties of the eye's components to improve diagnosis and therapy for various ocular conditions.

If you are interested in meeting with Dr. Campbell, please [email CBB](#), or visit [cbb.uwaterloo.ca/events](http://cbb.uwaterloo.ca/events) for information.

**Keywords:** *imaging, biomarker, Alzheimer's disease, amyloid deposits, retinas, non-invasive imaging, optical coherence tomography*



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