**Project Title:** Novel Devices to Assess Ocular Health in Diabetes  

**Host School/Institute:** NHMRC Clinical Trials Centre  
**Address:** Level 6, Medical Foundation Building, 92 Parramatta Road, Camperdown, NSW, 2050.  
**URL:** [http://www.ctc.usyd.edu.au/](http://www.ctc.usyd.edu.au/)

**Personal Supervisor:** Dr Andrzej S. Januszewski  
**Phone:** 02 8036 5211  
**Email:** andrzej.januszewski@sydney.edu.au

**Co-Supervisor:** Dr Laima Brazionis, Professor Alicia Jenkins  

**Project Type:** Data Analysis, Clinical  

**Project Category:** Technology, Endocrinology/Metabolism, Imaging, Vision

**Project Keywords:**  
1. Diabetes mellitus  
2. Retinopathy  
3. Optometry / Ophthalmology  
4. Corneal Confocal Microscopy  
5. Advanced Glycation End-Products

**Project Description:**  
Over a million Australians have diabetes, which is a common cause of working age adult onset blindness. There are both vascular and neurological damage components to diabetic vision loss. Risk factors for diabetic eye damage and the other vascular complications of diabetes are high glucose levels, an adverse blood fat (lipid) profile, obesity, hypertension, smoking, oxidative stress, and inflammation. These factors can lead to the increased formation of Advanced Glycation End-Products (AGEs). We have non-invasive devices that are or can be used in clinical practice, including retinal cameras, software to measure retinal blood vessel calibre from retinal photos, a skin and an ocular autofluorescence system (to measure AGEs in the skin and in the cornea and in the lens of the eye) and a corneal confocal microscope (which images corneal nerve fibres). We have published that diabetes is associated with increased AGEs in skin, cornea and lens and with reduced systemic vascular elasticity, and that these measures are correlated in both diabetic and non-diabetic subjects. We have also published that retinal vessel calibre differs between diabetic and non-diabetic subjects and those who have or will go on to develop diabetic vascular complications (including retinopathy). A relatively new device is able to image corneal nerve fibres, which are damaged in diabetes and are thought to correlate with nerve and vascular damage elsewhere in the body.

We hypothesise that corneal nerve damage will be worse in those with vs. without diabetes, and will be worse in those with longer-term diabetes, and will correlate with increased ocular and skin AGEs and with retinal vascular calibre. A cross-sectional study of non-diabetic and diabetic people will be conducted, including retinal photography, corneal confocal microscopy and ocular and skin AGEs. Conference abstracts and an original research manuscript are expected results. The project would be of particular interest of optometry or senior medical students.