



## Rigorous, Relevant Research

## Clinical Vision Sciences

### ► Introduction

The inability to focus on near (presbyopia) or distant objects (myopia) can affect individuals at any stage of life although recognition of myopia in children is increasing. In patients with myopia or diabetes and in older adults generally, there is a higher risk of eye diseases such as glaucoma, cataract and age-related macular degeneration which can lead to blindness but this risk can be reduced if the condition is detected and appropriately treated at an early stage. Research at Aston University aims to advance significantly our understanding of the development, use, preservation and restoration of ocular function by research on clinical and applied aspects of optometry and ophthalmology and feeds directly into clinical practice in the University's Eye Hospital within the Aston Academy of Life Sciences and beyond.

The approaches adopted by practicing optometrists and ophthalmologists include:

- Ocular imaging (fMRI, digital imaging, ocular coherence tomography, apparent motion photometry, blood flow);
- Mathematical derivation of novel diagnostic tests based on ocular function;
- Clinical trials and ocular biometry.

### ► Sponsors and funders

EPSRC, Charities, Regional Authorities, the NHS and ophthalmic industry. Long-standing collaborations with internationally renowned scientists, Dr Lam at Hong Kong Polytechnic University, China and Professor Tsujimura at Kagoshima University, Japan have strengthened myopia and intraocular lens research at Aston University.

### ► Key projects

- Understanding the development and improving the management of refractive error (e.g. myopia and presbyopia); managing The Aston Eye Study - the first comprehensive study on the incidence of refractive error and ocular biometry in the UK child population;
- Improving the diagnosis and management of major blinding eye diseases (e.g. glaucoma, cataract and diabetes);

- Developing novel devices such as intraocular lenses and applying therapies (anti-VEGF) to improve management of ocular dysfunction and pathology in the ageing eye (e.g. age-related maculopathy and visual impairment);
- Development of non-invasive assessment of neurodegenerative diseases using ocular biometry.

### ► Key significant findings

1. Shown that the shape of the back of the eye varies with the degree of short-sightedness. Investigative Ophthalmology & Visual Science 2004, 45; 2152-2162.
2. Identified that the effects of close work on temporary short-sightedness is related to ethnicity. Investigative Ophthalmology & Visual Science 2003, 44; 2284-2289.
3. Described lower antioxidant defences in the blood of glaucoma patients. Investigative Ophthalmology & Visual Science 2005, 46; 877-883.
4. Describe some key changes in the eye's blood supply in age-related macular degeneration which has been exploited in new therapies. Ophthalmology 2001; 108:705-710.
5. Validated a non-invasive method for measuring the corneal thickness. Journal of Cataract & Refractive Surgery 2004, 30; 1272-1277.

### ► Recent publications can be viewed in the following journals

- British Journal of Ophthalmology 2007. 92, 225-230.
- Journal of Cataract and Refractive Surgery 2007, 33, 115-121.
- Eye 2008, 22: 363-9.
- Ophthalmology and Physiological Optics 2007, 27, 194-200.
- Eye and Contact Lens 2008, 34, 35-38.

### Key contacts

**EYE STRUCTURE, MYOPIA** – Professor Bernard Gilmartin  
b.gilmartin@aston.ac.uk, tel 0121 204 3881

**AGE-RELATED EYE DISEASE, CLINICAL TRIALS** –

Professor Jonathan Gibson j.m.gibson@aston.ac.uk, tel 0121 204 3898

**DEVICES; DIAGNOSTICS** – Professor James Wolffsohn

j.s.w.wolffsohn@aston.ac.uk, tel 0121 204 4140