



Centre for Eye Research Australia

#### CENTRE FOR EYE RESEARCH AUSTRALIA

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*Cover photograph* Spontaneous fluorescence of mouse retinal ganglion cells and their axons in the CFP-Hml mouse.



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# Imagine saving sight. We do.

At the Centre for Eye Research Australia, we don't just imagine saving sight.

Our researchers have seen the devastating effects of vision loss on people and their families and want to do more to help.

CERA's staff chose a career in research to support patients, prevent vision loss and find better treatments for diseases such as:

- Age-related macular degeneration (AMD)
- Cataract
- Diabetic retinopathy
- Glaucoma
- Myopia (short sightedness)

CERA's 100-strong team conducts clinical, genetic and laboratory research into eye disease while population health research focuses on improving support and rehabilitation for people with vision loss. Their work has paid dividends this year.

People with vision loss in Australia and around the world will benefit from:

- The launch of a new collaboration to develop a 'bionic eye' for diseases like AMD
- Identification of genes responsible for short sightedness
- New corneal transplant techniques

- The discovery of a new treatment for Keratoconus
- Eye imaging technology that can identify early signs of heart disease, diabetes and stroke
- A diabetes management project to help diabetes patients preserve their sight
- Progress in eliminating trachoma from indigenous communities in Australia, the only part of the developed world where this infectious eye disease is still found.

# Imagine being a part of all that. And you can be.

CERA researchers can't and don't work in isolation. Around 40% of CERA's annual budget is funded from Government sources. The majority of our work depends on the vital support of our partners, philanthropic trusts and private donors to help eliminate major eye diseases and reduce the burden of vision loss.

You don't have to imagine being able to save sight. You can help us do it.



# **Mission**

To eliminate the major eye diseases that cause vision loss and blindness and reduce their impact in our community.

# Vision

To become a world-leading eye research institute, renowned for discovery of the causes of eye diseases and our work in improving diagnosis, prevention, treatment and rehabilitation of eye disease, vision loss and blindness through our research, clinical work and teaching.

# Affiliations

The Centre for Eye Research Australia is affiliated with major Australian and international organisations and supported by a committed Board and Foundation.

CERA is accredited as an independent medical research institute by the Australian Government's National Health and Medical Research Council. It is a joint undertaking of the University of Melbourne, the Royal Victorian Eye and Ear Hospital, Vision Australia, the Victorian Lions Foundation, the Royal Australian and New Zealand College of Ophthalmologists (RANZCO), CBM Australia and the Ansell Ophthalmology Foundation. It is designated a World Health Organisation Collaborating Centre for the Prevention of Blindness and is a core partner in the Vision Cooperative Research Centre.



# CHAIRMAN'S REPORT

In 2008, the Centre for Eye Research Australia had another good year and many successes, while also facing some challenges.

A report like this cannot hope to capture a year's worth of work of around 100 people. It puts on the record key facts and figures - grants received, researchers employed and papers published.

Judging by those indicators, the Centre for Eye Research Australia is in good shape. It was a record year for the number and quality of scientific papers published by our researchers. Income continued to grow. We are particularly pleased with the outcomes of some of the nationally competitive funding applications that were submitted in 2008. NHMRC Fellowships were awarded to Professor Jonathan Crowston and Professor Robyn Guymer, a Career Development Award to Dr Ecosse Lamoureux, and two new project grants.

Quantifiable measures of performance are important and we do pay attention to them.

Yet ultimately, research is a people business. A thriving research institute relies on its capacity to attract and retain top researchers.

In 2008, the outstanding work of Professor Jill Keeffe and Professor Robyn Guymer was recognised through their promotion to professor by the University of Melbourne, bringing the research faculty in the Department of Ophthalmology and the Centre to five full-time professors including also Jonathan Crowston, Rasik Vajpayee and Tien Wong.

Professor Sarah Hosking joined on a part-time basis. She is a recipient of a prestigious fellowship through the Victorian Endowment for Science, Knowledge and Innovation (VESKI).

And of course, Professor Hugh Taylor who retired as the Centre's Managing Director at the end of 2007 retains a part-time role as a chief investigator on some CERA projects. He was appointed to the Harold Mitchell Chair in Indigenous Eye Health at the University of Melbourne in April 2008.

Under the leadership of these key people, there was significant progress on many important projects throughout the year. A National Indigenous Eye Health Survey that Professor Hugh Taylor and Professor Jill Keeffe are leading is nearing completion. It is the first comprehensive update on the state of the nation's indigenous eye health since Fred Hollows' times some 30 years ago. The survey is an important piece of work through which our Centre, in close collaboration with the University of Melbourne and support from philanthropic partners, is helping to close the gap in health outcomes between indigenous and non-indigenous Australians.

Professor Robyn Guymer is leading the Centre for Eye Research Australia contribution to an Australian bionic eye. "Bionic Vision Australia", a collaboration with the Universities of Melbourne and New South Wales, the Bionic Ear Institute, and National ICT Australia, was officially launched in November and a business case has been presented to the federal government.

Professor Jonathan Crowston, Australia's only professor of glaucoma, worked with Access Economics on the joint report "Tunnel Vision: the economic impact of glaucoma". Launched in May 2008, this was the fourth in a series of health economics reports the Centre for Eye Research Australia has released to date.

Professor Tien Wong took on leadership responsibilities for the Centre for Eye Research Australia as the newly appointed Managing Director from 1 January 2008, parallel to an appointment as Head of the University of Melbourne Department of Ophthalmology. He made an energetic start in these challenging roles while he also continued to oversee the work of his research group. Regrettably, Professor Wong resigned from the leadership positions after only one year for personal reasons. He accepted an appointment as Director of the Singapore Eye Research Institute and returned to Singapore at the end of 2008.

The Board accepted Professor Wong's resignation with sincere regret while respecting the important family reasons that led him to make that decision. We wish him well in his new position and look forward to his continued association with our Centre as a research collaborator.

Deputy Director Professor Jonathan Crowston has been appointed Managing Director *ad interim* while the Board is selecting a new leader for the Centre for Eye Research Australia.

Let me take this opportunity to thank my fellow Directors for their support throughout the year. We welcomed three new Board members in 2008: the Honourable Mr Michael MacKellar. Professor Robert Williamson and Mr Timothy O'Leary who was nominated by the Royal Victorian Eye and Ear Hospital Board. He succeeded Mr Graeme Houghton who retired as Chief Executive Officer of the Hospital and consequently as a Director of the Centre for Eye Research Australia. Mrs Susanne Owen who was nominated by the Victorian Lions Foundation resigned as a Director in November.

Research is a people business. The purpose of medical research is to improve people's lives. The Centre for Eye Research Australia's performance as a successful research institute is only a means to an end. For someone affected by eye disease and vision loss, our Centre's work could save sight and independence. We particularly thank the patients who have agreed to let us tell their stories in this publication to illustrate why eye research matters.

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*Tina McMeckan* Chairman

# MANAGING DIRECTOR'S REPORT

# The Centre for Eye Research Australia is Australia's leading eye research institute.

CERA's greatest strengths are our people and the close link between research, clinical practice and the community.

, Translationa Research in Major Eye Diseases Our research is about patients – they are central to our work. Through regular patient contact our research findings can be quickly and seamlessly translated into clinical practice.

I am proud to say that this strength is increasingly recognised. As we are preparing this report for publication, we have just been notified that the National Health and Medical Research Council has awarded a Centre for Clinical Research Excellence (CCRE) Grant of close to \$2.5 million over five years to CERA for 'Translational Clinical Research in Major Eve Diseases'. It is one of the biggest grants the Centre has won to date. I congratulate all my colleagues who have contributed to the submission and thank in particular Dr Ecosse Lamoureux and Dr Eleanor Mitchell, and look forward to us working together to deliver this exciting work.

CERA employs some of the best and brightest people in the world to find the causes of major eye diseases, develop new treatments, apply what we know about blood vessels in the eye to improve diagnosis and outcomes for people suffering from heart disease or diabetes, or to provide innovative public eye health solutions to prevent vision loss and to increase the support for people living with low vision. We are all passionate about those goals.

Our Centre's growth and development to date is also a great Australian success story. In little more than a decade, we have established ourselves as a leader in eye research internationally. We are thankful and proud of what has been achieved to date. We know that we cannot be complacent. These are challenging times for biomedical research, not only in Australia. There is intense competition for talent and for funding, we need to respond to changes in government policy, and every organisation also has its local issues to deal with. Our challenges in 2008 included leadership transition in the Royal Victorian Eye and Ear Hospital and within the Centre for Eye Research Australia.

We welcomed the appointment of Ms Jan Boxall as the new Chairman of the Hospital and Ms Ann Clark as the new Chief Executive Officer in the second half of the year. Based on our well established relationship, we look forward to building a very productive and even closer partnership with the Hospital under their leadership.

There was limited progress on the proposed redevelopment of the Royal Victorian Eye and Ear Hospital in 2008. Practical benefits of this project are still several years away. We therefore decided on a small scale refurbishment on Level 1 of the Peter Howson Wing of the Hospital where one part of our organisation is based. We have gained additional clinical research examination space, established a processing laboratory, improved patient access and waiting areas, and created better office space for our administration team. A generous grant from the Lloyd and Kathleen Ansell Ophthalmology Foundation made this project possible, with additional contributions from the Victorian Government's Operational Infrastructure Support grant and from NHMRC equipment funds. We appreciate their support.

I was honoured to be appointed as Managing Director for the Centre for Eye Research Australia and Head of the University of Melbourne Department of Ophthalmology starting in January 2008. I would like to thank CERA Chairman Tina McMeckan and the Board of Directors and the University for entrusting me with this wonderful opportunity and for their support and encouragement throughout the year. Relinquishing this prestigious and stimulating role after only one year to return to Singapore for family reasons was a very difficult decision. Colleagues at CERA have been generous in their understanding for this decision, for which I am grateful. I also want to thank my friend and colleague Jonathan Crowston who was my deputy in 2008 and who agreed to take over the reins at CERA in the new year in an interim capacity.

I will retain a part-time senior research appointment at the University of Melbourne and CERA and will continue to lead and direct the work of my research group in the Retinal Vascular Imaging Centre, visiting regularly from Singapore.

There is a sense of excitement and energy about CERA; it is a place bursting with potential, talent and ideas. I value the many opportunities I have had since joining the Centre and the University of Melbourne in 2003 and I am pleased to have contributed to the organisation's growth and success in recent years. I now look forward to continuing my association, albeit in a different capacity.



Professor Tien Yin Wong

Managing Director, Centre for Eye Research Australia and Head of University of Melbourne Department of Ophthalmology (2008)

# GOVERNANCE

# **Board of Directors**

Professor James Angus Dr Peter Henderson Mr Graeme Houghton (retired April 2008) Mr John Jeffries Hon Dr Barry Jones AO Mr James Joughin Hon Mike MacKellar (appointed January 2008) Ms Tina McMeckan, Chair Mr Gerard Menses Mr Peter Nankivell Mr Timothy O'Leary (appointed July 2008) Mrs Susanne Owen (resigned December 2008) Professor Robert Williamson AO (appointed January 2008) Professor Tien Wong, Managing Director (appointed January 2008, resigned December 2008) Hon Dr Michael Wooldridge

Company Secretary Mr Robert Palin



#### Honorary Auditor

Mr Peter Jovic KPMG, Melbourne

#### Finance and Audit Committee

Mr James Joughin (Chair)

Ms Tina McMeckan

Mr Peter Nankivell

Professor Tien Wong (appointed January 2008, resigned December 2008)

### Research Committee

Dr Richard Stawell (Chair) (resigned December 2008)

Professor John Hopper AM

Professor Terence Nolan

Professor Robert Williamson AO

Professor Tien Wong (appointed January 2008, resigned December 2008).

## Vision CRC

Professor Hugh Taylor AC served as an Executive Director of the Vision CRC.

Professor Jill Keeffe OAM is the Program Director, Vision Care Delivery of the Vision CRC.

The Vision CRC Research Advisory Committee within the Centre for Eye Research Australia consists of the following members:

Professor Jill Keeffe OAM

Professor Terence Nolan

Dr Richard Stawell (resigned December 2008)

Professor Hugh Taylor

Professor Robert Williamson AO

Professor Tien Wong (Chair) (appointed January 2008, resigned December 2008)

## World Health Organisation (WHO) Collaborating Centre for the Prevention of Blindness

The Centre for Eye Research Australia is a designated WHO Collaborating Centre for the Prevention of Blindness. The current designation is valid until 2011.

Professor Jill Keeffe OAM is the Director of the Collaborating Centre.

The Terms of Reference for the Collaborating Centre are:

- to participate actively in the development of activities for the prevention of blindness
- to provide facilities for the training of personnel at different professional levels, especially from developing countries
- to conduct applied field research on the epidemiology, management and operational aspects of avoidable blindness
- to foster a multidisciplinary approach to the promotion of eye health and to the delivery of eye care, including rehabilitation, to all
- to participate in the collection, elaboration and distribution of pertinent information.





# Imagine...

the luck of early diagnosis.



Half the people with glaucoma in Australia are unaware they have the disease until their vision is seriously affected.

Glaucoma affects the optic nerve connecting the eye to the brain. In many cases it develops when the eye drainage system is blocked which leads to a significant rise in eye pressure and subsequent damage to the optic nerve.

Untreated glaucoma can lead to blindness. Yet many people have no symptoms until the disease has caused severe damage to their optic nerve. Which is why it is important to have regular eye tests to catch it early and prevent vision loss.

Luckily, Helen Feng isn't one of the people unaware of her glaucoma. Short sighted since she was a child, Helen has regular eye checks when she changes her glasses. Three years ago, her optometrist noticed changes indicating glaucoma and referred her to an ophthalmologist.

Helen said: "I put drops into my eyes once a day and I have had laser treatment to reduce pressure in both eyes but my vision hasn't changed since I was first diagnosed."

"I really am very fortunate that the glaucoma was spotted before it was too late," she concluded.

Helen has contributed to CERA's Glaucoma Biobank. Results from clinical examinations, questionnaires and blood samples are collated and assessed to find common risk factors that can be used to improve glaucoma care.

# CERA's research into glaucoma

Glaucoma affects 1 in 10 Australians. CERA's researchers are investigating what makes older optic nerve cells prone to damage so that therapeutic targets can be identified; finding the best methods for lowering eye pressure and regulating scar formation following glaucoma surgery; investigating the consequences of optic nerve damage; and researching the genetic links between family history and incidence of glaucoma.

# Imagine...

The Centre for Eye Research Australia's broad research capability includes laboratory, clinical, genetic and population health research programs. Eight research teams and units aim to find causes, better treatments and improved care for people with vision loss.



# sight saving research

# **Clinical Genetics**

The Clinical Genetics Unit led by Associate Professor David Mackey specialises in clinical and genetic analysis of a range of conditions including glaucoma, optic atrophy, horizontal strabismus, ptosis, congenital and familial cataracts and aphakic glaucoma.

## Twins and glaucoma

A twin study has been designed to identify the genetic basis for heritable eye disease by dissecting the genetics of glaucoma and its risk factors.

# Norfolk Island eye study

This study aims to examine the distribution of eye diseases among descendants of the Bounty Mutineers through a comprehensive eye examination of the residents of Norfolk Island to improve our knowledge of the factors causing eye diseases including glaucoma, myopia and AMD. The effect of UV light exposure on the eye will also be investigated.



The Norfolk Island eye study team: Yaling Ma, Alex Hewitt, David Mackey, Justin Sherwin and Lisa Kearns.

# Glaucoma Research

### Angle closure glaucoma

To identify and characterise the optic nerve changes that occur following acute angle closure glaucoma and to identify the risk factors for people at risk of angle closure glaucoma.

## Effect of aging and mitochondrial dysfunction on the optic nerve response to pressure-induced oxidative stress

To evaluate the effect of normal healthy aging on the functional and cellular response of retinal ganglion cells to oxidative injury induced by intraocular pressure (IOP) challenge and to determine whether age-related changes in mitochondria underlie the increase in vulnerability to IOP seen in aging. This is assessed by quantifying functional and biochemical responses of the retina to IOP-induced oxidative stress in transgenic mice.

# *Effect of fluid biomechanics on ocular wound healing*

Using an engineering-based approach we aim to determine the impact of mechanical forces on the wound healing response to glaucoma surgery.



# Glaucoma biobank (BIG) project

To phenotype, stage and collect blood samples from 200 glaucoma patients for genomics and proteomics analysis at base line and five year time points.

## Health economics of POAG

In connection with Access Economics we are assessing the health economics of primary open angle glaucoma.

# *Improvements to clinical service provision*

To identify the current practice patterns adopted in the Glaucoma Investigation Research Unit (Royal Victorian Eye & Ear Hospital) and assess how well they compare to international practice guidelines. Also, to assess whether administering prostaglandin analogues influence SLT outcomes in glaucoma patients, through a retrospective chart review.

# Current Research projects continued...



### Optic disc change in acute angle closure

To identify and characterise the optic nerve changes that occur following acute angle closure glaucoma and to identify the risk factors for people at risk of angle closure glaucoma. Study conducted through a prospective, observational study involving 20 patients presenting to the emergency department of the Royal Victorian Eye & Ear Hospital for treatment during an acute angle closure episode and a retrospective, case controlled, questionnaire and concomitant chart review.

## Optic disc evaluation project (GONE project)

Internet-based assessment of practitioner's ability to diagnose glaucoma and to determine which characteristics of discs are frequently missed. This will allow for a targeted approach to teaching optic disc exam. This study will also determine whether practitioners can differentiate glaucoma from mitochondrial optic neuropathies based on optic disc phenotype.

Above: Tenon's capsule fibroblasts, the scarring cells that cause glaucoma operations to fail.

# Mitochondrial dysfunction and phenotype in the pathogenesis of optic neuropathies

To determine whether OXPHOS dysfunction is directly correlated with vision loss in Autosomal Dominant Optic Atrophy (ADOA) and open angle glaucoma, by developing robust assays for OXPHOS enzymology, examining gene expression and mtDNA deletions and developing assays for ATP synthesis and free radical quantification.

### Ocular surface disease in glaucoma

To identify the prevalence of ocular surface disease in the glaucoma outpatient population of the Royal Victorian Eye & Ear Hospital and assess its correlation to reported treatment compliance. Clinical measures and concomitant questionnaire for this prospective, case controlled sample involving 100 experimental and 100 controls.

#### Treatment compliance in glaucoma

To explore the relationship between reading and comprehending eye drop label information, medication recall and compliance in outpatient glaucoma patients, by conducting questionnaire and concomitant chart reviews in 200 cases.

# *Treatment options for neovascular glaucoma patients*

To compare the efficacy of intravitreal and intracameral Bevacizumab (Avastin TM) to produce regression of neovascularisation and controlling IOP in patients with neovascular glaucoma. Study conducted using a prospective, randomised control trail involving 40 patients presenting to the RVEEH for treatment of their neovascular glaucoma.

# Wound healing – Anti-VEGF antibody effect on wound healing in vitro and in vivo

Post-operative scarring is a major threat to successful glaucoma surgery. This study is investigating the best methods for lowering intraocular pressure, by regulating post-operative scar formation. Using standard and novel laboratory techniques we are gaining an understanding of the cellular response to anti-scarring agents that are of potential benefit in the post glaucoma surgery clinic.

# Health Services Research

## A prospective cohort study to examine the relationship between medication adherence and ocular signs and symptoms in patients treated with anti-glaucoma eyedrops

This project aims to determine if ocular signs and symptoms could be utilised as a proxy measure of anti-glaucoma medication adherence.

# Depression in individuals with vision impairment

To investigate the severity and predictors of depressive symptoms in a sample of people with vision impairment attending tertiary eye care clinics.

## Environment and Vision Optimisation in Residential Care (ENVORC)

This project aims to determine the effectiveness of interventions targeting intrinsic and extrinsic vision factors to improve vision, independence, safety and quality of life in people living in low-level residential care settings.

## Factors associated with nonadherence to ocular hypotensive treatment

This study aims to determine the frequency and predictors of intentional and non-intentional non-adherence to anti-glaucoma medication. In particular, it aims to explore medication adherence in glaucoma patients and determine the relative frequency and reasons for both intentional and non-intentional nonadherence.



Dr Ecosse Lamoureux (left), Head of the Health Services Research Unit, and members of his team.

## Identifying depression in people with vision impairment and developing pathways to care

This study seeks to improve the eye health professional's identification of comorbid depression in people with vision impairment and develop pathways to care. The project involves: a state-wide survey of eye health practitioners to assess the current practice of identifying and managing depression in people with vision impairment; and development of a training program to help staff working with people with vision impairment to identify and respond to depression.

# The impact of low vision rehabilitation services on family and friends

This study aims to assess the impact of a significant other attending the self management program together with a person with low vision.

## Vision impairment and quality of life: The development of a new education and self-management program

This study investigates the effectiveness of a new low vision rehabilitation model. A structured course to improve participants' abilities and confidence to manage low vision is to supplement current low vision care. The program is called 'Living with Low Vision.'



# Imagine...

# A BIONIC EYE FOR THE FUTURE

Australians with AMD or Retinitis Pigmentosa could benefit from a bionic eye implant in just a few years. CERA is an integral part of Bionic Vision Australia, a research partnership working to develop an improved version of the bionic eye that has been experimentally implanted into patients in the US and Europe.



Photo courtesy of Graduate School of Biomedical Engineering, University of NSW.

## Mimicking the retina

The retina at the back of the eye converts images into nerve signals that travel via the optic nerve to the brain. Damage to the retina, caused by diseases such as Age-related macular degeneration or Retinitis Pigmentosa, causes vision loss. The bionic eye has been developed to mimic the function of the retina and restore sight.

#### How the bionic eye works

A video camera built into a pair of glasses transmits images in real time to a handheld, video-processing unit. Light patterns represented as electrical pulses are transmitted from the unit to a retinal implant containing an array of electrodes acting as artificial photoreceptors. Stimulated electrodes send signals along the optic nerve to the brain where the image is interpreted.

### A high resolution bionic eye

Current versions of bionic eyes allow previously blind recipients to see crude shapes and perceive the difference between light and dark using a small number of electrodes. While this is a great step forward, Bionic Vision Australia aims to improve on these early versions and also develop a higher resolution device, providing higher resolution with up to 1000 electrodes and a completely wireless system.

### **Bionic Vision Australia**

The partner organisations bringing diverse expertise to the project are:

- The Graduate School of Biomedical Engineering at the University of New South Wales, whose investigators have been working to develop the bionic eye for over a decade.
- The Centre for Eye Research Australia, whose investigators have expertise in vision, ophthalmic surgery, and the management of patients with low vision.
- The Bionic Ear Institute brings extensive experience in biocompatibility and electronic stimulation of auditory nerves now to be utilised in the bionic eye project.
- National Information Communications Technology Australia (NICTA) who are developing the higher resolution device including improved design and stimulation, as well as wireless communication between different units of the device.
- The Electrical Engineering department at the University of Melbourne is collaborating closely with NICTA on the project and the University provides general support for the partnership.

### Clinical partner

The Royal Victorian Eye and Ear Hospital will be the site for the first human trials of the technology that is developed through this partnership.

# Macular Research

## A functional predictive test of AMD: Recruit AMD cases and controls for testing

The aim is to develop a visual function test that looks at how the retina functions in early AMD. These tests will be used to assess the risk of progression of the visually devastating complications of AMD. Tests were also performed on patients with glomerulonephritis and drusen and in Sorsby's fundus dystrophy.

## Bionic Eye

CERA collaborates with the Bionic Ear Institute, NICTA (National Information Communications Technology Australia) and Universities of Melbourne and New South Wales in the Bionic Vision Australia (BVA) partnership to develop the first advanced bionic eye prototype ready for the human implant three – four years.

# Biomarkers in age-related macular degeneration

To identify biomarkers for age-related macular degeneration through proteomic analysis of serum/plasma/urine samples.

# *Biomarkers of AMD. A proteomic approach*

To identify diagnostic proteins in bodily fluids for AMD and develop a simple biochemical test that can predict AMD development and monitor its progression.

## Cardiovascular Health and Age-Related Maculopathy (CHARM) study

The CHARM study looks at the associations between cardiovascular disease and age-related maculopathy.

## C-02-60: Alcon

A retrospective analysis to evaluate the efficiency and treatment rationales of Lucentis (ranibizumab) in clinical practice in patients with subfoveal choroidal neovascularisation secondary to AMD.

### Delaying the progression of AMD: Age-related maculopathy statin study

The study aims to determine whether statin (cholesterol-lowering drugs) treatment given for three years to people with high risk characteristics can slow the progression of AMD. We are not only determining progression by traditional fundus but also by conducting a range of novel visual function tests.

# *Diet and age-related macular degeneration*

Investigation of associations between diet, weight and genotype and AMD, through the Health 2000 cohort.

## Determining the genetic components of AMD: AMD inheritance study

This study uses a database of AMD cases and their families as one of the largest in the world. The database is used to study genes that might influence AMD.

## Drug trials in AMD:

#### Alcon AMD prophylactic study (Anecortave Acetate)

This trial aims to demonstrate that Anecortave Acetate Depot Suspension is superior to Placebo after 60 months in preventing the development of choroidal neovascularisation, or causes a decrease of three or more lines of visual acuity as compared to baseline in the study eye.

## *Exposure to Chlamydia pneumonia infection and incidence of AMD: the Blue Mountain Eye Study*

A collaboration between three research groups in Australia and USA to test C pneumonia antibody titers in the plasma from the participants of the five-year follow up Blue Mountain Eye Study. The Blue Mountain samples have been collected, analysed and no association was found in this cohort.

# Fight Retinal Blindness project

A collaboration between members of the Save Sight Institute, CERA and Lions Eye Institute. The primary purpose and goals of the collaboration is to investigate and evaluate the clinical effectiveness; cost effectiveness and safety of the emerging therapies for treatment of AMD, with the collective aim of developing strategies to reduce retinal blindness within Australia.

# Genetic analysis in age-related macular degeneration

To undertake association studies of genes in AMD. Genetic analysis of CFH, BF, C2, PRSS, LOC. PLEK and CFHR1-5 has allowed us to better identify important SNPs in these genes and better refine their association with AMD.

## Genetic involvement in agerelated macular degeneration

To perform copy number variant studies in AMD. A number of SNPs and copy number variants have been identified associated with AMD and its subtypes.

## Genetics of AMD

To investigate the determinants of treatment outcomes in AMD by examining wet AMD.

## Genomewide association studies GWAS on Blue Mountains Eye Study

GWAS is being undertaken on individuals from the Blue Mountains Eye Study (BMES) to identify SNPs associated with myopia.

# GSK AMD

A double-masked, randomised, parallel-group study to investigate the pharmacodynamics, safety and systemic pharmacokinetics of pazopanib eye drops, administered for 28 days to adult subjects with neovascular age-related macular degeneration.

# Current research projects continued...



# Macular telangiectasis: National Eye Institute collaboration. Understanding the natural history of type 2 macular telangiectasis

This work seeks to understand the natural history of type 2 macular telangiectasis. Researchers are consulting family members for genetic studies. The study will be the first centre in Australia to begin looking at the genetics of this disease.

## Novartis anti VEGF study

All excite and sustain patients have been offered enrolment in the secure study which aims to follow patients who have had several doses of an anti vascular endothelial growth factor (VEGF) treatment.

## GAP study

To study the Natural History of Geographic Atrophy Progression (GAP) secondary to age-related macular degeneration.

### Identification of variants in discordant twins

A small number of discordant monozygotic twins for weight are undergoing genome wide analysis at the Wellcome Trust to identify changes in methylation status. If successful then this will also be applied to study discordant eye disease including myopia.

# Identification of Chlamydia pneumoniae in the macular tissue from the eyes affected by AMD

Exposure to Chlamydia pneumoniae infection has been associated with AMD progression. This study aims to examine AMD-affected and non-affected macular tissue from donor eyes for the presence of Chlamydia pneumoniae.

# *"LEAP study" Novartis: Investigator initiated drug trials in AMD*

A retrospective analysis to evaluate the efficiency and treatment rationales of Lucentis (ranibizumab) in clinical practice in patients with subfoveal choroidal neovascularisation secondary to age-related macular degeneration.

## Posurdex AMD study

A six month, single-masked, multicenter, randomised, controlled study to assess the safety and efficacy of 700ug Dexamethasone Posterior Segment drug delivery system applicator system as adjunctive therapy to Lucentis compared with Lucentis alone in the treatment of patients with choroidal neovascularisation secondary to age-related macular degeneration.

## Retinal regeneration laser treatment in early agerelated maculopathy

This study is in collaboration with Ellex and investigates the use of laser as a prophylactic treatment for early AMD. The Ellex 2RT (retinal regeneration) laser uses nanosecond duration pulses which unlike all previous retinal lasers, produce no damage to the photoreceptors in the retina.

### Small interfering RNA treatment for AMD Allergan

An assessment of the safety and efficiency of multiple intravitreal injections of AGN 211745 in patients with subfoveal choroidal neovascularisation secondary to age-related macular degeneration.

## Understanding epidemiological risk factors in AMD, Health 2000. The Melbourne Collaborative Cohort Study (MCCS)

The project aims to investigate simultaneously dietary genetic and other potential risk factors for age-related macular degeneration in a large cohort of elderly participants of the Health 2000 study.

## View 2 study

A randomised, double masked, active controlled, phase 3 study of the efficacy, safety, and tolerability of repeated doses of intravitreal VEGF Trap-Eye in subjects with neovascular age-related macular degeneration.

# Whole genome SNP analysis of a case control population

Whole genome SNP analysis using the Illumina platform of samples has begun in the Blue Mountains Eye Study and individuals with myopia will also be screened.

## National Institutes of Health (NIH) collaboration

Collaboration with Professor Greg Hageman at the University of Iowa in the USA. To standardise the clinical grading of the cases included in the genetic association studies and to subtype end stage disease to further characterise the genetics of AMD across two different cohorts.

# In-vivo confocal imaging of ocular inflammatory disease

The study involves the imaging of keratic precipitates with the HRT II and Rostock Corneal Module in various ocular inflammatory diseases, with the premise that the images obtained will have diagnostic significance. Recruitment and imaging has commenced with preliminary results expected mid-2008.

## Genetics of uveitis

This study investigates the genes associated with various ocular inflammatory diseases through an international collaboration with the Casey Eye Institute. Preliminary results from blood sample analysis are promising, with the emergence of a possible candidate gene for anterior uveitis and sarcoidosis related uveitis.

# Investigation of inflammatory biomarkers of progression in AMD

This project aims to investigate the association between systemic markers of inflammation and the prediction of

progression and overall prognosis in those with AMD. Recruitment has commenced with samples being collected for batch analysis for inflammatory marker assays.

# Intravitreal Avastin in macular oedema and uveitis

To investigate the effect of intravitreal Avastin (Bevacizumab) in the treatment of macular oedema secondary to diabetic retinopathy and uveitis; and in the treatment of choroidal neovascularisation secondary to uveitis.

## Autoimmune hepatitis and uveitis

To investigate a possible relationship between uveitis and autoimmune hepatitis.

# **Ocular Genetics**

## Linkage analysis

Three large families collected as part of the Genes in Myopia (GEM) study were genotyped the largest containing 35 people with 18 affected with myopia. Linkage analysis followed by fine mapping has allowed us to narrow the myopia gene containing region to 0.8cM (~ 800,000 base pairs) on chromosome 2 in these families. Three SNPs associated with myopia were identified under a linkage peak on chromosome 2.

# Quantitative trait linkage analysis (QTL) in twins

Genome wide association study (GWAS) using SNP chips to identify QTL genes in our twin cohort.

# SNP analysis of other candidate genes

Association of SNPs in 2 candidate genes were undertaken in our myopia case control cohort. We identified two SNPs in one candidate gene that were associated with low/ moderate myopia. Further sequencing of this gene identified eight other SNPs that showed segregation of variants with myopia.

## Age-related macular disease: Protein expression studies in AMD eyes

Donor eye tissue continues to be collected and sections from donor eyes have been analysed for a range proteins typically associated with neurodegenerative disorders, including Alzheimer's disease.

## Linkage analysis in AMD families

Three of our largest AMD families, each with a minimum of eight affected individuals have undergone whole genome scan analysis. Two gene regions have been identified through genetic linkage studies and are being fine mapped in these and other AMD families to narrow the regions of interest in order to uncover disease genes.

### Twin analysis

340 twin pairs over the age of 50 years have been recruited and examined through the Australian Twin Registry. A questionnaire, eye exam and DNA sample have been taken from each twin. Psychophysical and phenotypic features have been assessed.

## Australia – India collaboration: Developing an AMD risk assessment chip

The development of a risk assessment chip; standardisation of Indian and Australian AMD patient repositories; identification of a common molecular signature (haplotypes) for the complement gene; identification of haplotypes in other genes and correlate these with clinical phenotype and progression. The project is funded under the Commonwealth government Australia–India Strategic Research Fund.

## Analysis of SNPs in AMD genes

An analysis of SNPs in a number of AMD disease associated genes including the CFH, BF, C2, PRSS, LOC. PLEK and CFHR1-5 genes is being undertaken in case control, progression and twin cohorts in collaboration with Professor Greg Hageman, University of Iowa, USA.

# Current Research projects continued...

# **Population Health**

Impact of visual field loss on driving A simulator validation study is important to assess the impact of visual field loss on driving, involving participants with glaucoma, hemianopia/ quadrantopia, retinitis pigmentosa, and Age-related macular degeneration.

#### Personal costs of vision impairment

A documentation of the direct and indirect personal costs of vision impairment, involving an innovative approach to establishing the personal costs associated with vision impairment.

#### Lions Eye Health Program

In August 2008, LEHP launched its new website: www.lehp.org.au that provides information and resources for all Lions members. New material on diabetic retinopathy will be prepared to accompany recently released updated NHMRC guidelines on diabetic retinopathy.

# Impact of Vision Impairment questionnaire

To apply the Impact of Vision Impairment (IVI) versions to eye care and rehabilitation services in Australia and other countries. Work on the children's version of the Impact of Vision Impairment (IVI) has been completed. The IVI\_M was validated during work in Vanuatu. It is now being used in Fiji by ophthalmologists pre- and post- cataract surgery. The IVI has been translated into Chinese, Vietnamese, Italian and Greek. It is being used in the Royal Victorian Eye and Ear Hospital Low Vision Clinic and as part of other projects which include quality of life assessment.

#### Children's Eye Health Education Program in outback communities

This program aims to help prevent vision loss in Indigenous and non-Indigenous children living in outback Australia. We have, in collaboration with local health, education and community service providers developed materials including posters and brochures to promote improved eye health education. These materials are distributed to rural and remote areas in every state with the help of organisations such as the Fred Hollows Foundation, Guide Dogs SA.NT, VACCHO, and the Royal Flying Doctors' Service, among others.

# Enabling technology: Development of new non-mydriatic retinal camera

The Prototype 2 camera has progressed to field tests to assess effectiveness of the camera in detecting diabetic retinopathy and to demonstrate the camera's integration into eye and health care programs.

# RVEEH community eye care partnership

To trial a model to assist in meeting the growing demand for eye care services by linking Royal Victorian Eye and Ear Hospital care with primary eye care providers. Nine pilot sites are linked to the Hospital to provide care for patients with diabetic retinopathy, Age-related macular degeneration and glaucoma. Internet based modules are being developed for these three diseases.

### **RVEEH Community Mapping**

This project mapped the communities currently serviced by the Royal Victorian Eye and Ear Hospital and identified under-represented groups according to age, gender, cultural background including non-English speaking and Aboriginal and Torres Strait Islander people, socio-economic status, and place of residence. Usage patterns for eye and ENT patients were analysed for each of the socio-demographic variables. Consultations with community organisations and Royal Victorian Eye and Ear Hospital staff identified possible barriers and needs experienced by under-represented groups.

#### Low Vision Clinic

A new Low Vision Clinic started at the Royal Victorian Eye and Ear Hospital in May 2008 with significant input from CERA's experts in low vision. CERA's Population Health Unit has a continuing role in conducting, monitoring, and evaluation of the Clinic.

# Global mapping of low vision services in developed and developing countries

The global mapping of low vision services in 143 developed and developing countries has been completed. The data are to be entered into the WHO InfoBase. Two case studies are part of the mapping.

# Eye care delivery models: Low vision services for children in Fiji

The establishment and evaluation of a low vision service for children in Fiji including a needs analysis to gather data on vision impairment in children 0 – 18 years. The program will increase awareness of and advocacy for low vision services. The project aims to produce a global map of low vision services and evaluate existing models in developed and developing countries to identify priority work areas; identify critical success factors associated with effective low vision models of care and delivery of services in two selected countries; and inform the World Health Organisation of priorities in low vision care and services.

#### Trachoma in the Pacific

To determine the presence of trachoma in the Pacific Island Region, Trachoma Rapid Assessments were completed in Kiribati, Nauru, Vanuatu, Solomon Islands and Fiji. Active trachoma in children was present in all countries surveyed and rates averaged >10% in all countries. Rates of trichiasis surgeries being performed is evidence of a potentially blinding problem. The study also aimed to identify risk factors for trachoma in the region. A model trachoma control strategy in the Pacific Islands has been created from the results of this project.

# National Trachoma Surveillance and Reporting Unit

This Unit, funded by the Commonwealth Department of Health and Ageing, aims to improve the quality and consistency of data collection and reporting on trachoma in Australia, consistent with the Communicable Disease Network Australia (CDNA) 'Guidelines for the Public Health Management of Trachoma in Australia, 2006'.

# MINUM BARRENG - NATIONAL INDIGENOUS EYE HEALTH SURVEY

This survey to establish the prevalence, causes and impact of vision loss and blindness on quality of life in indigenous Australians was conducted in 30 randomly selected indigenous communities across urban, rural and remote Australia. One remote community selected for the survey was Kalkaringi.



Kalkaringi is a community of around 600 people some 460 km south-west of Katherine in the Northern Territory. To get there, the research team left Melbourne on a Saturday at 5pm and arrived at Kalkaringi at noon the following Monday.

The survey team including Project Coordinator Sarah Fox, Principal Investigator Professor Hugh Taylor and four volunteers set up three rooms, a corridor and the verandah at the Kalkaringi Health Centre to interview study participants, test for visual acuity, examine eyes and eye lids for trachoma or other problems, test peripheral vision for glaucoma, take retinal photos and issue reading glasses as necessary.





On the second day of the visit, the team went to the school and with the help of the teachers and staff managed to screen every child. A total of 100 children were screened, including those not at school, with sobering results – almost half of the children were infected with trachoma, even though antibiotics for trachoma had been recently administered.

The screening of adults in the community showed that distance vision was excellent in the overwhelming majority. Diabetes was very common and thus we found diabetic eye disease. Unfortunately there were many adults with scarring from trachoma, as well as some cases of advanced cataracts. Survey volunteer and CERA Graduate Research Coordinator Anna Macrae considers her participation in the Kalkaringi visit a once-in-a-lifetime opportunity to experience life in a remote indigenous community. On return to Melbourne, she reflected:

"My personal highlights of the week are almost too numerous to mention. I was honoured to meet Jimmy Wavehill, a patriarch of the community. He'd grown up on nearby stations and had been involved in the walk-off in 1966 at Wavehill Station, the site of one of the first land rights protests in Australia. Jimmy was warm and friendly and proudly told me of his seven sons, three daughters and 52 grandchildren!! From an ophthalmic point of view, we were delighted to learn he was never without his hat and sunglasses.

Another highlight was Waddy Creek. In this desert of dirt and sun and heat and shrubby trees, the creek was truly glorious, surrounded by trees and fascinating rocks moulded by wet-season floods. We were told that the locals swam there although both times we indulged we were the only ones there. For a few brief moments we almost forgot the heat as we scared each other by imagining crocodiles silently emerging..."

Anna Macrae and Jimmy Wavehill.





# Current Research projects continued...



# **Retinal Vascular Research**

## Epidemiology of retinal vascular signs

Several large epidemiological studies examine the relationship of retinal vascular signs to subclinical and clinical cardiovascular disease, diabetes and hypertension in Australia (the Blue Mountains Eye Study, the AusDiab Study, Melbourne Collaborative Cohort Study), the United States (Atherosclerosis Risk in Communities Study, the Multi-Ethnic Study of Atherosclerosis, the Cardiovascular Health Study, the Beaver Dam Eye Study) and Asia Pacific (Funagata Study, Singapore Malay Eye Study). A new NHMRC funded study is investigating genetic markers for retinal arteriolar narrowing and risk of hypertension and coronary heart disease using DNA and retinal images collected from the Blue Mountains Eye Study.

Left: Diabetic retinopathy

# *Retinal vascular imaging to predict stroke, dementia and diabetic retinopathy*

Three NHMRC funded multi-centre clinical studies are examining the predictive ability of retinal vascular signs as markers of stroke (Multi-Centre Retinal Stroke Study), dementia (Aspirin for the prevention of cognitive decline in the Elderly Study) and diabetic retinopathy (Sydney Pediatrics Study).

### Clinical diabetic retinopathy studies

Studies to determine risk factors and impact of diabetic retinopathy and early vascular changes are ongoing. A Retinal Vessel Endothelial Function Study investigates the hypotheses that retinal changes are associated with endothelial dysfunction, using the Dynamic Retinal Vessel Analyzer (Imedos, Jena Germany). The RVEEH is conducting a study to implement and evaluate a novel diabetic retinopathy screening strategy in people with diabetes. An NHMRC funded study in collaboration with Westmead Children's Hospital aims to determine the associations of retinal vascular changes and risk of diabetic microvascular complications in individuals with type 1 diabetes aged 12-20 years.

### Novel retinal imaging software

We have several developmental research projects in retinal vessel imaging (fractals, branching patterns, tortuosity) in collaboration with the Department of Computer Science and Software Engineering, University of Melbourne, and School of Computing, National University of Singapore.

# Clinical trials in retinal vascular diseases

Clinical trials in diabetic retinopathy and retinal vein occlusion (Thunderbird, Resolve, Posurdex, Advance, Macugen, BRVO Lucentis, Restore).

# *Epidemiology of age-related eye diseases*

The objectives of this research program are to describe the prevalence, incidence, risk factors and impact of major agerelated eye diseases, including myopia, angle-closure glaucoma, cataract, diabetic retinopathy and age-related maculopathy.

## Retinal Vascular Imaging Centre (RetVIC)

RetVIC is developing capability in diagnostic analysis of retinal images for early prediction of vascular diseases. We



AMD

have demonstrated that retinal vascular changes predict the risk of heart disease, stroke, diabetes, hypertension, dementia, kidney and other vascular conditions, years before their development and independent of current diagnostic methods. We are integrating this new technology with state-of-the-art computer-based imaging systems and telemedicine capability for image delivery from rural and remote areas to conduct clinical trials and community screening studies; perform cost-benefit and feasibility analyses to demonstrate the clinical utility. An NHMRC Development Grant funds a program to transform retinal vascular imaging from a research platform to a clinical practice tool that can be used as a test for screening, detecting and monitoring CVD risk in Australian populations.

# RetVIC organised and hosted the inaugural Asia-Pacific Conference on retinal image grading in September 2008.







# Current Research projects continued...



# Surgical Research

## A randomised, single centre study of the equivalence of two intraocular lenses (IOLs) used in cataract surgery

To assess the safety and efficacy of the two IOL's (Alcon IOL and Tecsoft IOL) in human eyes for the treatment.

## A comparative clinical trial of alcohol delamination versus phototherapeutic keratectomy for the treatment of recurrent corneal erosions

To investigate the clinical efficacy of alcohol delamination versus phototherapeutic keratectomy (PTK) for the treatment of traumatic recurrent corne.

# Determinants of informed consent. Why do patients enter a clinical trial?

This study seeks to understand why patients choose or decline to participate in clinical trials and what the determinants of a patient's participation in a clinical trial are.

# A prospective, randomised, clinical trial of corneal collagen crosslinking in keratoconus

To evaluate the clinical usefulness and efficacy of collagen crosslinking in people with progressive keratoconus and to confirm its safety profile. We are also investigating the effects of the treatment on corneal microstructure and keratocytes, thickness, curvature and the accuracy of tonometric measurements.

### *Reasons for admission to the corneal unit in patients with Down syndrome in a tertiary care hospital*

A retrospective analysis of hospital records of patients who had Down syndrome and microbial keratitis, evaluating clinical and microbiological profile and final outcome.

## Microbiological and clinical profile of cases of microbial keratitis residing in nursing homes

A retrospective analysis of hospital records of patients who had microbial keratitis, and were living in nursing homes evaluating clinical and microbiological profile and final visual outcome.

## Intrastromal and subconjunctival Bevacizumab for the treatment of corneal neovascularisation

To evaluate the efficacy of intrastromal Bevacizumab in the treatment of corneal neovascularisation. To compare the efficacy and safety of intrastromal and subconjunctival injections of Bevacizumab for cases of corneal neovascularisation.

# Fluidic stability testing of phacoemulsification equipment – phaco console study

To undertake side by side performance comparisons of currently available phaco consoles under a simulated "post occlusion surge" triggering event. This event was triggered by a test harness with a simulated eye chamber and data capture capabilities.

## Endothelial cell culture for transplantation matrices to support differentiation and transfer of corneal endothelial cells

We have shown that we can grow corneal endothelial cells on a new matrix called Myogel, after expansion on tissue culture plastic, we aim to expand the procedure to analyse the state of differentiation and proliferation of corneal endothelial cells on different Myogel formulations and assess their transfer into recipient sheep. Successful grafts will eventually undergo workup into human clinical treatments.

## Development of plasma coated contact lens delivery system for transplantation of limbal stem cells

To produce a surface modified therapeutic contact lens for the culture and delivery of corneal epithelial cells under serumfree conditions for treating blinding ocular surface diseases. To conduct "proof of concept" clinical trials of this cell therapy technique in order to establish the safety and efficacy of the therapy in comparison to the established technique of corneal epithelial transplantation using amniotic membranes.

# *Clinical review of corneal ulcers resulting in evisceration and enucleation*

To identify risk factors for corneal ulcers and study the clinical and microbiological characteristics of corneal ulcers resulting in evisceration and enucleation in a tertiary care hospital. A review of all patients who required evisceration or enucleation due to microbial keratitis at the Royal Victorian Eye and Ear Hospital, Melbourne was performed.

## Outcomes of unilateral penetrating keratoplasty in cases with normal fellow eyes

To assess the visual outcome of unilateral penetrating keratoplasties (PKP) in a heterogenous group of corneal disorders in cases with normal fellow eye. A retrospective review of 498 consecutive eyes that underwent PKP at the Royal Victorian Eye and Ear Hospital included all cases with a history of one or more corneal transplantation surgery in one eye and a BCVA  $\geq$ 6/12 in the fellow eye. The main outcome measures were indications for corneal graft, best-corrected visual acuity at 24 months and overall graft survival.

# Imagine...

walking into a remote Nepalese village and being asked to help people with advanced eye disease.



Peter Lemon's passion for wildlife photography has taken him to some of the most beautiful parts of the world. As a travel consultant, he has led tours in remote parts of Asia and Africa.

One trip many years ago brings back memories.

His group walked into a remote, Nepalese village and as the villagers approached them he could see several had obvious, untreated eye disease. Through gesticulation, the villagers asked his group for medical help.

"I just felt so helpless, they obviously had no access to medical care and in Australia their problems would have been treated long before they went blind," Peter explained. Peter has never had problems with his eyes, beyond wearing glasses for short sightedness but is aware how loss of vision can affect people in remote communities, forcing them to be completely dependent on their extended families.

"I wanted to do something to help, so when I got back to Australia I started making regular donations to CERA," he said. "We can't all be doctors or work in research but we can support those who do."

Peter has also made provision in his will for a bequest to support CERA.

"My hope is that the work at CERA will one day make a difference to people around the world who lack access to medical care."

# CERA's work in the prevention of blindness

CERA is a designated as a WHO Collaborating Centre for the Prevention of Blindness. CERA is working on the global mapping of low vision services in developed and developing countries to identify priority work areas.

Researchers from the Population Health Unit have recently validated a quality of life measure, the Impact of Vision Impairment (IVI) for use in English speaking counties. The IVI was adapted for use in the Melanesian islands in the Pacific, known as the IVI M. Former Masters student Dr Ana Cama is collaborating with CERA on a study of cataract surgery patients in Fiji. The IVI\_M will be used before and after surgery to better understand the effect of cataract on quality of life and to assess changes related to the surgery. This project builds on collaborations with AusAID funded postgraduate students in Fiji.



# RESEARCH PUBLICATIONS

Half of our scientific papers in 2008 were published in the highest ranked ophthalmology journals.

Left: Cover image from Investigative Ophthalmology & Visual Science. 2008;49(11). © Association for Research in Vision and Ophthalmology

Papers no. 107 and 190 in the following publications list appeared in this journal. The journal's cover image relates to paper 107.

- Amerasinghe N, Aung T, Cheung N, Fong CW, Wang J, Mitchell P, Saw S-M & Wong T. 2008. Evidence of retinal vascular narrowing in glaucomatous eyes in an Asian population. *Investigative Ophthalmology and Visual Science*. 49 (12): 5397-5402.
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- 3. Amiel H, Chohan AB, Snibson G & Vajpayee R. 2008. Atypical fungal sclerokeratitis. *Cornea*. **27** (3): 382-383.
- 4. Augusteyn R, Jones CE & Pope JM. 2008. Age-related development of a refractive index plateau in the human lens: evidence for a distinct nucleus. *Clinical and Experimental Optometry.* **91** (3): 296-301.
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- Broman AT, Quigley HA, West SK, Katz J, Munoz B, Bandeen-Roche K, Tielsch JM, Friedman DS, Crowston J, Taylor H, Varma R, Leske MC, Bengtsson B, Heijl A, He M & Foster PJ. 2008. Estimating the rate of progressive visual field damage in those with open-angle glaucoma, from crosssectional data. *Investigative Ophthalmology and Visual Science.* 49 (1): 66-76.
- 12. Bruce A, O'Day J, Mckay & Swann G. 2008. *Posterior eye disease and glaucoma*. 1 Oxford, United Kingdom: Elsevier Science.

- Burdon KP, Hattersley K, Lachke SA, Laurie KJ, Maas RL, Mackey D & Craig JE. 2008. Investigation of eight candidate genes on chromosome 1p36 for autosomal dominant total congenital cataract. *Molecular Vision*. 14: 1799-1804.
- Burdon KP, Sharma S, Hewitt A, Mcmellon AE, Wang J, Mackey D, Mitchell P & Craig JE. 2008. Genetic analysis of the clusterin gene in pseudoexfoliation syndrome. *Molecular Vision*. 14: 1727-1736.
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- 19. Carbonaro F, Andrew T, Mackey D, Spector TD & Hammond CJ. 2008. The heritability of corneal hysteresis and ocular pulse amplitude. *Ophthalmology*. **115** (9): 1545-1549.
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- Cheung N, Rogers S, Donaghue KC, Jenkins AJ, Tikellis G & Wong TY. Retinal arteriolar dilation predicts retinopathy in adolescents with type 1 diabetes. *Diabetes Care.* **31** (9): 1842-1846.
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*Continued on page 53* 

# Imagine...

CERA researchers play a leading role in sharing new findings in eye research. They help organise and chair scientific meetings around the world and are in demand as invited speakers. In 2008, CERA work was presented at major international conferences at home and abroad from Argentina to Japan, from Slovenia to the USA.

NB: The following selection lists only those meetings that included at least three CERA presentations.

## March: Australia and New Zealand Glaucoma Interest Group (ANZGIG), Melbourne

Singh D, O' Hare F, Coote M, Walland M, Ghosh S, Ruddle J, Crowston J. 'Medical therapy with topical prostaglandin does not affect outcomes with selective laser trabeculoplasty.'

Ghosh S, Ruddle J, Shiu M, Coote M, Crowston J. 'Combined cyclodiode and Intravitreal bevacizumab in neovascular glaucoma.'

Quin Q, Van Bergen N, Crowston J. 'Effect of anti-VEGF antibodies Tenon's fibroblast scarring activity.' (awarded best presentation prize)

## April-May: Association for Research in Vision & Ophthalmology (ARVO), Fort Lauderdale, Florida

Baird P, Islam A, Richardson A, Guymer R. 'Single nucleotide polymorphism (SNP) analysis of the complement C3 gene and age related macular degeneration (AMD)'. Abs: 2657.

Craig J, Hewitt, A, Sharma S, Burdon K, Wang J, Baird P, Dimasis D, Mackey D, Mitchell P. 'Ancestral LOXL1 coding variants are associated with pseudoexfoliation syndrome in Caucasian Australians but with markedly lower penetrance than in Nordic people.', Abs: 5866.

Dirani M, Shekar S, Baird P. 'Shared genes influence both refraction and axial length – the Genes in Myopia (GEM) study.' Abs: 5424.

Kawaski R, Wang J, Aung T, Tan D, Mitchell P, Sandar M, Saw S, Wong T. 'Prevalence of Macular Degeneration in a Malay Population: The Singapore Malay Eye Study (SiMES)'. Abs: 1758.

Keeffe J. Cama A, Sikivou T. 'The Prevalence and Causes of Low Vision and Blindness in Children in Fiji.' Poster presentation.

Keeffe J. Health Economics Course. Invited Faculty.

Krishnaiah S, Sekhar G, Khanna R, Senthil S, Keeffe J, Rao G. 'Risk factors for Open-Angle Glaucoma: Findings from Andhra Pradesh Eye Disease Study in South India.' Poster presentation.

Lamoureux E, Wang J, Aung T, Saw S, Wong T. 'Myopia and Quality of Life: The Singapore Malay Eye Study (SiMES).'

Lim L, Scarborough J, Thorne J, Graham E, Kempen J, Mackensen F, Nguyen Q, Prabriputaloong T, Read R, Suhler E, Schwartz J, Smith J. 'Autoimmune hepatitis and uveitis: A possible association.'

Liu Q, Crowston J, Douraghizadeh M, Ju W, Lindsey J, Weinreb R. 'An aging study of oxidative stress-related markers in the mouse retina.'

McIntosh R, Rogers S, Cheung N, Lim L, Wang J, Mitchell P, Kowalski J, Nguyen H, Wong T. 'Natural History of Retinal Vein Occlusion: Systematic Review and Meta-Analysis.' Poster presentation. Abs: 2126.

Nguyen T, Wang J, Islam F, Mitchell P, Zimmet P, Simpson R, Shaw J, Wong T. 'Retinal Arteriolar Narrowing Predicts Incidence of Diabetes: The Australian Diabetes, Obesity and Lifestyle (AusDiab) Study.' Abs: 1165.



# sharing knowledge about eye health

O'Connor P, Scarr B, Lamoureux E, Le Mesurier R, & Keeffe J. 'Adaptation and validation of a quality of life questionnaire for use in the Pacific Islands.' Poster presentation.

Qin Q, Van Bergen N, Liew D, Van Wijngaarden P, Wells A, Crowston J. 'Anti-VEGF treatment on Human Tenon's fibroblast scarring activity.'

Rogers S, McIntosh R, Cheung N, Lim L, Wang J, Wong T. International Retinal Vein Occlusion Study Group. 'Prevalence of Retinal Vein Occlusion: Analysis of Pooled Data from Population-based Studies from the United States, Australia and Asia.' Poster Presentation. Abs: 2124.

Siak J, Tong L, Saw S-M, Lamoureux E, Wang J, Rosman M, Tan D, Wong T. 'The Prevalence, Risk Factors and Impact of Symptomatic Dry Eyes in an Asian Population: The Singapore Malay Eye Study. '

Wong E, & Keeffe J. 'Low Vision Aids: Recommendations, Preferences and Acquisitions Patterns amongst People with Visual Impairment.' Poster presentation.

Wong T, Cheung N, Tay W, Sandar M, Wang J, Aung T, Saw S, Mitchell P. 'The Prevalence and Risk Factors of Diabetic Retinopathy: The Singapore Malay Eye Study.' Abs: 1160.

# June-July: World Ophthalmology Congress, Hong Kong

Crowston J. Allergan Symposium Chair. 'Prediction and clinical management of progression'

Kearns L. 'Eye Dominance, axial length and refraction.'

Keeffe J. Low Vision program workshop: Assessment of Quality of Life and Participation.

Keeffe J. Low Vision program workshop: Monitoring and Evaluating of Progress. Keeffe J. Paediatric Ophthalmology program workshop: Low Vision in Children.

Keeffe J. Vision 2020 program workshop: WHO Collaborating Centre in Melbourne: Educating International Postgraduate Students.

Keeffe J. Vision 2020 program workshop: Why Do We Need to Provide Low Vision rehabilitation?

Mathew A, Le Mesurier R, Keeffe J, Taylor H. 'Trachoma Rapid Assessment in the Pacific Island Sub-region.'

Staffieri S *et al.* 'Rock, paper, scissors. Audit of pediatric cataract in Victoria 1992-2006.'

Wang J, Nguyen T, Cheung N, Wong T. 'Potential Biomarkers for Diabetic Retinopathy and Cataracts.'

Wang J. 'Interplay of genetic and environmental influence on the risk of Age-related macular degeneration.'

Wong T. 'Current Understanding of the Epidemiology of Neovascular AMD: Populations at risk, Natural History and Racial/Ethnic variations.' (Invited plenary lecture.)

Wong T. 'Diabetic Retinopathy in Asia: Epidemiology trends & impact.' (Invited symposium lecture.)

Wong T. 'Epidemiology, Causes and Risk Factors for Low Vision.' (Invited symposium lecture.)

Wong T. 'Hypertensive retinopathy revisited.' (Invited symposium lecture.)

Wong T. 'Refractive Errors in the Singapore Malay Eye Study: Prevalence, Risk Factors and Impact.' (Invited symposium lecture.)

Wong T. 'The Prevalence, Causes and Patterns of Visual Impairment in Malays: The Singapore Malay Eye Study.' (Invited symposium lecture.)

## July: Annual Orthoptic Scientific Meeting

- Kearns L. 'Eye Dominance, axial length and refraction.'
- Koukouras I. 'Retinal Vessel Imaging: Screening for systemic vascular disease.'
- Staffieri S *et al.* 'Rock, paper, scissors. Audit of pediatric cataract in Victoria 1992-2006.'

## August: 8th General Assembly of the International Agency for the Prevention of Blindness, Buenos Aires, Argentina

Chiang P, Keeffe J, Le Mesurier R. 'Global Mapping of Low Vision Services and Identification of Critical Success Factors in Service Delivery.'

Cochrane G, Lamoureux E, Keeffe J. 'The Impact of Vision Impairment on participation in daily activities of children with low vision.'

Keeffe J. Achievements in Vision 2020 plenary: Achievements from the low vision work plan.

Mathew A, Keeffe J, Le Mesurier R, Taylor H. 'An integrated primary eye care approach to implementing trachoma control strategies: a model for the Pacific Islands.'

## October: European Association for Vision and Eye Research (EVER), Portoroz, Slovenia

Beltz J, Jhanji V, Vajpayee R. 'Sutureless DSAEK triple- The RVEEH Technique.'

Kawasaki R. Retinal Microvascular Signs as Biomarkers of Cardiovascular Disease. Imaging Techniques in Population-based Epidemiologic Studies.

Perera C, Jhanji V, Beltz J, Lamoureux E, Pollock G, Vajpayee R. 'Factors influencing the outcome of the treatment of allograft corneal graft rejection.'

# Selected conferences and presentations continued...



Internationally renowned eye surgeon Professor Rasik Vajpayee leads CERA's surgical research unit. He and his team won the "Best Surgical Video" Award for their teaching video "Deep Anterior Lamellar Keratoplasty using the Big Bubble Technique in a case with Hurler Scheie syndrome" at the RANZCO meeting in November 2008, while "The DSAEK Triple – The RVEEH technique" was awarded equal first place in the 2008 Australasian Society of Cataract and Refractive Surgeons Annual Film Festival.

# November: Annual Meeting of American Academy of Ophthalmology, Atlanta, USA

Ghosh S, Crowston J, Lamoureux E, O' Hare F, Vajpayee R. 'Assessment of Prevalence of Ocular Toxicity in Glaucomatous Patients' Poster Presentation PA046.

Titiyal JS, Agarwal A, Sharma N, Tandon R, Prakash G, Vajpayee R. 'Randomised Clinical Trial to Evaluate Living Related Limbal Allograft vs. Cadaveric Keratolimbal Allograft in Limbal Stem Cell Deficiency' Poster Presentation PO079.

Vajpayee R, Jhanji V, Sharma N. 'Selection of Appropriate Corneal Transplantation Technique for Keratoconus' Instruction course.

Vajpayee R, Jhanji V, Sharma N. 'Step-by-Step Deep Anterior Lamellar Keratoplasty Using Big Bubble Technique' Instruction course.

Vajpayee R, Jhanji V, Sharma N. 'Peripheral Ulcerative Keratitis: Diagnosis and Management', Instruction course.

## Royal Australian and New Zealand College of Ophthalmologists (RANZCO) 40th Annual Scientific Congress, Melbourne

Beltz J, Jhanji V, Vajpayee R. 'Sutureless DSAEK triple- The RVEEH Technique'.

Chong E, Robman L, Simpson J, Hodge A, Aung K, English D, Giles G, Guymer R. 'Alcohol consumption and its association with AMD.'

Chua C, Mackensen F, Xie J, Lim L. 'The Application of Confocal Microscopy in Uveitis: Comparison of Confocal Techniques in the Imaging of Keratic Precipitates.'

Crowston J. Chair Scientific Program Committee; Chair Glaucoma Free Paper session; Chair Angle Closure Glaucoma Symposium.

Dimitrov P, Vingrys A, Robman L, Baird P, Varsamidis M, Aung K, Guymer R. 'Compliment Factor H and visual function in AMD patients.'

Goh J, Langham R, Robman L, Ischenk O, Guymer R. 'Biomarkers of AMD.'

Guymer R. Neil Della lecture at the Retinal speciality day.

Kearns L. *et al.* 'Bench to Bedside: Translating genetic eye research into different reproductive options.'

Kearns L. 'Sight and Sound. When genetic testing doesn't have all the answers.'

Keeffe J, Fox S, Taylor H. 'National Survey of Indigenous Eye Health.'

Kong G, Cochrane G, Marella M, Keeffe J, Crowston J. 'The effectiveness of vision screening program for Sudanese school age children of refugee background in suburban Melbourne Australia.' Lim J, Wickremasinghe S, Devinder C, Xie J, Robman L, Richardson A, Baird P, Guymer R. 'Predictors of Anti-VEGF outcomes in neovascular AMD.'

Lim L. 'Diagnostic Challenges in the management of Posterior Uveitis.' Instruction Course.

McIntosh R, Rogers L, Lim L, Cheung , Wang J, Mitchell P, Kowalski J, Nguyen H, Wong T. 'The Natural History of Retinal Vein Occlusion.'

Mackey D *et al* 'Pilot Study into the efficacy of population cascade genetic screening for glaucoma.'

Mathew A, Keeffe J, Le Mesurier R, Taylor H. 'Barriers to Trachoma Control in the Pacific Island Region.'

Michalova K, Wickremasinghe S, Tan T, Chang A, Harper CA, Downie J, Hunyor A, Guymer R. 'Ranibizumab treatment for neovascular Age-related macular degeneration (AMD) in Australia.'

Moorthy S, Cain M, Guymer R. 'Prophylactic laser treatment for high risk early AMD: 10 year follow up of the drusen laser study in Australia.'

Ngyuen T. 'Flicker light and diabetic retinopathy.'

Rogers S, McIntosh R, Cheung N, Lim L, Wang J, Wong T. 'Prevalence of Retinal Vein Occlusion (RVO): Analysis of Pooled Data from Population-based Studies from Around the World.'

O'Connor P. Invited panelist, Vision 2020 Australia Symposium.

Robman L, Baird P, Dimitrov P, Tikellis G, McCarty C, Guymer R. 'Elevated CRP level is associated with CNV and AMD progression: CHARM study.' Staffieri S *et al*. 'Cost effectiveness of RB1 genetic testing.'

Szental J, Baird P, Richardson A, Scholl H, Issa P, Holz F, Gillies M, Guymer R. 'Analysis of Glutathione S-Traferase Pi isoform (GSTP1) single nucleotide polymorphisms and Type 2 Macular Telangiectasia.' [Judged best poster in retinal section].

Van Heerden A, Guymer R, Harper A, Wickremasinghe S. 'Ranibizumab (Lucentis) for non- AMD choroidal neovascular membrane (CNVM).'

Van Heerden A, Wickremasinghe S, Zamir E, Stawell R, Lim L, Hall A. 'Ocular Syphilis: A new phenotype?'

Wickremasinghe S, Michalova K, Guymer R, Harper A, Wong T, Qureshi S. 'Acute intraocular inflammation following intravitreous bevacizumab for treatment of neovascular Age-related macular degeneration.'

## December: The Australasian Ophthalmic and Visual Sciences Meeting, Canberra

Baird P. Symposium organiser (Genes and environment), Australasian Ophthalmic and Visual Sciences meeting (AOVSM).

Schache M, 'Finding genes in myopia.'

Sun C, Ponsonby A-L, Wong T, Brown S, Kearns L, Cochrane J, Hewitt A, Mackey D. 'Effect of Birth Parameters on Retinal Arteriolar Calibre: The Twins Eye Study in Tasmania.'

Tellis B, Keeffe J, Taylor H. 'Surveillance of the prevalence and management of trachoma in Australia.'

# Imagine...

donating to a research program that could save your daughter's sight.



Chloe was 11 when she complained that her new glasses weren't helping. By the age of 13 she could no longer see out of her right eye and her left eye was getting worse.

Chloe has keratoconus, a thinning and bulging of the cornea on the front surface of the eye that causes progressive vision loss.

"When I was 13, I had a corneal transplant in my right eye. It didn't really improve my vision but it did mean that I could wear contact lenses," she said, describing her first major operation.

Chloe wears strong, hard contact lenses but they are not ideal. "The lenses are quite painful so although I can drive with them in, I tend to avoid it," Chloe explained. But living with low vision hasn't curtailed Chloe's career plans.

This year she started a marketing degree at RMIT. She said: "I am lucky to live in the age of computers. I download all my lecture notes and books onto my laptop and enlarge the text so I can read it."

Chloe is hoping she might benefit from a new treatment for keratoconus soon. Her father, Stuart and Uncle, Brett Davies gave a major donation to fund a CERA clinical study that holds great promise for a new, non-surgical treatment to halt progression of the disease.

"I don't have many treatment options, so it is great to know that research into new therapies is underway," she said.

# CERA's research into keratoconus

CERA and the RVEEH are conducting the first Cross Linking for keratoconus clinical trial of a new treatment that involves the application of Riboflavin and UV light to strengthen the cornea. It is hoped that the treatment might soon be widely available to people with keratoconus.



# Imagine...

In 2008, the Eye Research Australia Foundation raised close to \$700,000, including three realised bequests.

We sincerely thank all our donors and friends for your loyalty and generosity.

Some 160 supporters took up invitations to attend one of four updates on CERA's work held throughout the year or a special benefactor lunch. Foundation Chairman Peter Nankivell (pictured left) and CERA staff always enjoy getting to know supporters personally (below).









Left: A cycling team from city law firm Herbert Geer raised money for CERA through their participation in the Murray-to-Moyne cycle challenge.

Far left: Supporters at the Glaucoma Lab Tour.

# making a difference

There were changes to the Trustees of the **Eye Research Australia Foundation** (ABN 25 040 435 191) and the **Lloyd & Kathleen Ansell Ophthalmology Foundation** (ABN 46 928 529 260) in 2008:

Mr Peter Nankivell (Chairman)

Professor John Funder AO (resigned April 2008)

Ms Tina McMeckan

Mr Gerard Menses (appointed April 2008)

Professor Tien Wong (appointed April 2008)

Professor Hugh Taylor AC (retired April 2008)

The Eye Research Australia Foundation approved a grant to build additional capacity in CERA's grading centre to benefit all the units that use retinal image analysis regularly in their research.

The Ansell Ophthalmology Foundation made a grant for refurbishment of CERA's "shopfront" on Level 1 of the Peter Howson Wing in the Royal Victorian Eye and Ear Hospital. The project has provided additional clinic space for research, a processing laboratory with new equipment, an improved patient access and waiting area, a meeting room fitted out for more flexible use, and better office space for the administration team. It is a great improvement to the way in which the space CERA has available is able to be used, especially by research patients and visitors.

# Student support

Scholarships and travel awards provide essential support for students. A number of student awards available for ophthalmology are generously provided through gifts or benefactions:

# Hector Maclean Scholarships

Summer studentships 2008/09 were awarded to Jonathan Hengyang Lim, Ian Luk, Ee Lin Ong and Lingwei William Tao from the Hector Maclean Scholarship Fund endowed at the University of Melbourne for research students in ophthalmology.

The award enables undergraduate students interested in a research career to spend part of their summer break in the Department of Ophthalmology working on a project.

# Hugh Noel Puckle Scholarship

Awards to University of Melbourne ophthalmology students from the Hugh Noel Puckle Scholarship Fund were made to:

Dr Anu Mathew Dr Danny Ning Cheung Dr Christine Wittig-Silva Dr Cong Sun Dr Peter Dimitrov

# Harold Mitchell Foundation Travel Fellowships

The Harold Mitchell Foundation provides two travel awards each year to help young researchers attend an international scientific meeting and visit leading institutes or laboratories overseas.

The Foundation's 2008 Postgraduate Travel Fellowship was awarded to Dr Thanh Tan Nguyen and the Postdoctoral Travel Fellowship to Dr Trish O'Connor.



# Imagine...



# Dr Elaine Chong (PhD)

Title of thesis:

Dietary risk factors for age-related macular degeneration

*Supervisors:* Robyn Guymer, Luba Robman, Julie Simpson

#### Citation:

Elaine investigated the link between diet and age-related macular degeneration, our most common cause of visual loss. She found that too much red meat and alcohol, or not enough fish, increases the risk of this disease. These findings translate into important public health messages regarding macular degeneration.

The University of Melbourne Department of Ophthalmology jointly with the Centre for Eye Research Australia offers exciting opportunities for higher degree students who are considering a career in research. In 2008, two PhD candidates and one Master of Science student had their theses passed and graduated. We congratulate Christine Chen, Elaine Chong and Ana Cama.

## Dr Christine Yi-Chin Chen (PhD)

*Title of thesis:* Eye spy: identification of genetic components in myopia: the Genes in Myopia (GEM) study

Supervisors: Paul Baird, Jim Stankovich, Katrina Scurrah, Hector Maclean, Grant Snibson

#### Citation:

Christine investigated the genetic basis of short-sightedness (myopia) through the recruitment of a large number of Australian myopia families. Her work unequivocally demonstrates a genetic basis for the development of myopia and has successfully identified the position of a gene that causes myopia.

### Dr Anasaini T Cama (MSc)

Title of thesis: Low vision services for children in Fiji

Supervisors: Jill Keeffe, Biu Sikivou

#### Citation:

This public health, operational research evaluated a clinical low vision service for children in Central Fiji. It addressed a priority area of the Fiji Strategic Eye Care Plan, while implementing part of the global initiative of Vision 2020.

The need for the service was established by a new study of the epidemiology of low vision. Baseline and follow-up assessment of children established the effectiveness of the low vision clinic.

Assessment included measures of vision and impact of low vision on participation. Results and discussion pertinent to Fiji and in the global context are explored.

# the next generation

# Other research students' work in progress

Master of Science	Title of Thesis	Doctor of Philosophy	Title of Thesis
	dysfunction on the optic nerve response to oxidative stress injury	Cong Sun	Genetic and environmental determinants of retinal vascular signs
Manjula Marella	Evaluation of community-based rehabilitation services in developed and developing countries	Gillian Cochrane	Impact of vision impairment on children with low vision
Master of Philosophy V Swetha Jeganathan	Title of Thesis Ocular associations of diabetes	Michelle Baker	Retinal microvascular signs in acute stroke and its relationship to MRI findings
Master of Epidemiology	and vascular disease Title of Thesis	Nicole Van Bergen	The role of mitochondrial oxidative phosphorylation dysfunction in optic neuropathies
Muhamed Bayu Sasongko	Retinal microvascular structural changes and the control and complication in children and adolescent with type 1 Diabetes Mellitus	Paul Sanfilippo	The heritability of optic disc shape
		Peggy Pei-Chia Chiang	Low vision services and models of care in developed & developing countries
Doctor of Medicine Anu Mathew	ctor of MedicineTitle of ThesisPeteru MathewFactors contributing to the presence	Peter Dimitrov	Predicting progression of age-related macular degeneration
of trachoma in the Pacific Islands Danny Ning Cheung Retinal vascular changes in children and adults: pathophysiological and prognostic relevance in cardiovascular disease	Stuart Cantsilieris	Genetic variants and risk factors associated with age-related macular degeneration	
	prognostic relevance in cardiovascular disease	Thanh Tan Nguyen	Novel markers in pre-diabetes, diabetes, and diabetic retinopathy static and dynamic retinal vascular calibre
Marc Sarossy	Novel quantitative outcome measures for the anti VEGF treatment of retinal diseases		



# Imagine...

suddenly losing sight in one eye.

Terrifying. That is the only way Peter Sierakowski can describe it.



"One minute my eye was fine, the next my vision was distorted and blurred. I thought something was in it, but no, after consulting a specialist, I was told I had AMD," Peter said, relating the events three years ago when he lost vision in his right eye.

AMD or age-related macular degeneration affects the central part of the retina called the macular, causing it to thin and bleed. Damage to the retina at the back of the eye can cause gradual or sudden loss of vision.

At 60, Peter was recently retired and enjoying an active life; playing tennis and golf, reading and boating on Lake Eildon. But AMD has changed all that. Peter has to take everything at a slower pace these days.

"I have grey, blurred vision in the centre of one eye and although the other eye is good at the moment, I have lost my perception of depth," he explained. "Just pouring a cup of tea takes extra concentration otherwise the water is everywhere except the cup. I avoid driving at night and it just takes longer to do everything."

Peter took part in an international multicentred clinical trial for the new drug, Lucentis which was being conducted at CERA, following his diagnosis. He said: "I was delighted to be part of the trial. I had monthly injections into my eye for eleven months and there hasn't been any progression of the AMD for the past year."

Peter is one of three sets of twins in a family of twelve who have all reached the age when AMD occurs. As Peter now knows, AMD can run in families because of genetics. He adds: "I made sure my five brothers and six sisters all went for a test. So far I am the only one though."

# CERA's research into age-related macular degeneration

AMD is the leading cause of vision loss in Australia. CERA's researchers are working to identify the genetic causes of AMD; running clinical trials of new AMD treatments: collaborating with the Bionic Eye project for the benefit of AMD patients; and researching risk factors for AMD such as high cholesterol, diet and heart disease.

# Imagine...

"There exists, at the moment, extraordinary possibility: to shape the future of eye research in Australia...The vision for CERA must be bold and encompassing and be a magnet for the best people to continue to create a world leader. In the words of Steve Jobs, we should 'punch a hole in the sky'."

A staff member's comment in the 2008 CERA employee survey.

Sushil Vasadevan, Evelyn O'Neill, Fleur O'Hare and Viney Gupta from the clinical research group.

# **STAFF LIST**

Professor Tien Wong Managing Director (until December 2008) Mrs Valma Scaf Executive Assistant to Managing Director (from April 2008)

# **Clinical Genetics Unit**

Associate Professor David Mackey Unit Head/Principal Fellow

Ms Lisa Kearns Research Orthoptist

Ms Sandra Staffieri Research Orthoptist (from February 2008)

*PhD Candidate* Mr Paul Sanfilippo (from June 2008)

# Glaucoma Research Unit

Professor Jonathan Crowston Unit Head

Mr Karl Bromelow Research Assistant

Ms Lani Gurria MD Research Assistant (from September 2008)



# Australia's top eye research team

Professor Sarah Hosking VESKI Fellow (from March 2008)

Mr Thong Le Research Assistant (from October 2008) Ms Fleur O'Hare Clinical Trials Coordinator

Ms Evelyn O'Neill Research Assistant (from August 2008)

Dr Ian Trounce Neurobiologist (from April 2008)

Ms Nicole Van Bergen Research Assistant/Laboratory Manager

Ms Lina Xiang Research Assistant

*Masters Candidate* Dr George Kong (from February 2008)

*PhD Candidate* Ms Nicole Van Bergen

Advanced Medical Science (AMS) Student Mr Houston Li Guorong (until May 2008)

Summer Research Student Ms Ee Lin Ong

# Health Services Research Unit

Dr Ecosse Lamoureux Unit Head/Senior Research Fellow

Dr Gwyneth Rees Research Fellow

Ms Eva Fenwick Research Assistant

Ms Jennifer Hassell Research Assistant

Ms Melanie Larizza Research Assistant Masters Candidate Ms Manjula Marella

PhD Candidate Ms Elke Ponczek (until February 2008)

Advanced Medical Science (AMS) Student Ms Omega Leong (until May 2008)

# Macular Research Unit

Professor Robyn Guymer Unit Head

Ms Rebecca Maxwell Executive Assistant/Research Assistant

Dr Khin Zaw Aung Research Assistant

Ms Kate Brassington Research Assistant (from December 2008)

Ms Melinda Cain Research Assistant

Ms Tania Cipriani Clinical Trials Coordinator/Research Assistant (from July 2008)

Dr Peter Dimitrov Research Assistant

Dr Chi Luu Senior Research Fellow (from May 2008)

Dr Galina Makeyeva Research Assistant

Dr Kira Michalova Medical Retina Research Fellow

Dr Luba Robman Research Fellow

Ms Mary Varsamidis Research Orthoptist

Ms Tiam Yap Clinical Research Assistant (until May 2008)

# Mankiewicz-Zelkin / Crock Fellow

Dr Lyndell Lim

## PhD Candidates

Mr Stuart Cantsilieris (from November 2008) Dr Elaine Chong Dr Peter Dimitrov

MD Candidates Dr Marc Sarossy

## Advanced Medical Science (AMS) Students

Mr Eng Kiat Ang (until May 2008) Ms Chong Chyn Chua (until May 2008) Mr Jonathan Goh (until May 2008) Mr Jonathan Lim (until May 2008)

## Summer Research Student

Mr Jonathan Lim

# **Ocular Genetics Unit**

Associate Professor Paul Baird Unit Head

Dr Mohamed Dirani Research Fellow (from February 2008)

Mr Ross Dunn Database Manager

Dr Amirul Islam Statistician

Ms Kelly Pertile Research Assistant (until April 2008)

Ms Andrea Richardson Research Assistant

Dr Maria Schache Research Fellow

Ms Melissa Leung Research Assistant

*Summer Research Student* Mr Ian Luk

# Staff list continued...

# **Population Health Unit**

Professor Jill Keeffe OAM Unit Head

Mrs Anna Macrae Executive Assistant and Graduate Research Coordinator

Ms Anna-Lena Arnold Research Assistant (from July 2008)

Mr Ross Dunn Database Manager

Mrs Leah Evans National Program Manager Lions Eye Health Program (from October 2008)

Ms Kathy Fotis Research Assistant (from March 2008)

Mrs Sarah Fox Research Assistant

Ms Kate Francis Research Assistant (from November 2008)

Dr Alex Harper Senior Lecturer

Ms Beattie lezzi Research Assistant (from April–September 2008)

Dr Cherylee Lane Research Fellow

Dr Richard Le Mesurier IAPB/Vision 2020 Regional Coordinator (until August 2008)

Mr Collin McDonnell Research Assistant

Dr Trish O'Connor Research Fellow Dr Tomer Shemesh Public Health Research Fellow (until June 2008)

Mr John Simpson National Program Manager Lions Eye Health Program (until February 2008)

Ms Rebecca Still Research Assistant (from July 2008)

Professor Hugh Taylor AC Consultant

Ms Betty Tellis Research Assistant

Dr Elaine Wong Research Fellow

Dr Jing (Sophia) Xie Biostatistician (from February 2008)

Mr Darrell Yip Research Assistant (November-December 2008)

*Masters Candidate* Dr Ana Cama (until July 2008)

*MD Candidate* Dr Anu Mathew

PhD Candidates
Mr Nigel Charles (until September 2008)
Ms Peggy Chiang
Ms Gillian Cochrane (until March 2008)
Dr Angus Turner (February-May 2008)

Summer Research Student Ms Tamara Vu

# Retinal Vascular Imaging Centre

Professor Tien Wong Unit Head

Mrs Valma Scaf Executive Assistant (from April 2008)

Ms Fulya Torun Executive Assistant (until March 2008)

Ms Jessica Alessi Research Assistant (until January 2008)

Dr Ning (Danny) Cheung Research Assistant

Ms Carly D'Sylva Clinical Trials Assistant/Research Coordinator (from November 2008)

Ms Julie Ewing Research Assistant

Dr Alex Harper Senior Lecturer

Ms Lauren Hodgson Research Assistant

Dr Amirul Islam Research Fellow

Ms Lisa Jones Clinical Trials Assistant (until April 2008)

Mr Ignatios Koukouras Research Assistant (from February 2008)

Dr Andreas Kreis Research Fellow (until May 2008)

Mrs Kim Yu Lee Research Assistant (until March 2008)

Dr Damien Louis Research Fellow (until May 2008) Ms Annie Mcauley Research Assistant (from January 2008)

Ms Rachel McIntosh Clinical Projects Manager

Ms Sophie Rogers Epidemiologist

Dr Cong Sun Research Assistant

Dr Khay-Lin Teoh Commercial Manager

Dr Gabriella Tikellis Research Fellow (until March 2008)

Associate Professor Jie Jin Wang Senior Research Fellow

### Melbourne Business School Interns

Ms Mejlina (July 2008) Ms Pamela Sio (July 2008)

### Masters Candidates

Dr Swetha Jeganathan Dr Bayu Sasongko

*MD Candidate* Dr Ning (Danny) Cheung

*PhD Candidates* Dr Michelle Baker

Dr Thanh Nguyen Dr Cong Sun

## Advanced Medical Science (AMS) Student Ms Wen Lim (until May 2008)

# Surgical Research Unit

Professor Rasik Vajpayee Unit Head

Ms Monica Mauer Executive Assistant

Mr Karl Brown Research Assistant (from September 2008)

Mr Marios Constantinou Clinical Trials Coordinator

Dr Mark Daniell Senior Lecturer

#### Lions Eye Donation Service

Dr Graeme Pollock Manager

Dr Prema Finn Senior Transplant Coordinator

Ms Adrienne Mackey Corneal Transplant Coordinator (from February 2008)

Mr Tony Ngo Research Assistant (from March 2008)

Dr David Shearer Transplant Coordinator (until February 2008)

Dr Christine Wittig Research Fellow

### Melbourne Excimer Laser Group

Mr Terry Couper Unit Manager

Ms Ilona Probyn Receptionist

Dr Grant Snibson Medical Director

Ms Faye Mach Orthoptist (from February 2008)

## Education Unit

Associate Professor Deborah Colville (until September 2008) Senior Lecturer

## *Masters Candidate* Mr David Shearer (until January 2008)

*PhD Candidate* Dr Christine Wittig

Summer Research Student Mr William Tao

# **Corporate Services**

Ms Gerlinde Scholz General Manager

Mr Muhamed Bekir IT Manager (until August 2008)

Mr Matthew Carter IT Support Officer (until December 2008)

Mr Peter Coates Finance Officer

Ms Holly Custance Human Resources Officer

Mr Stephen D'Arcy Communications Officer (until December 2008)

Ms Sue Griffin Administrative Officer (from May 2008)

Mrs Irina Kalpakidis Finance Officer

Ms Lauren Metcalfe Fundraising Officer

Mrs Kelly Mikunda Executive Assistant

Dr Eleanor Mitchell Grants and Projects Officer

Mr Robert Palin Finance and Resources Manager

Mr Sanjeewa Perera IT Support Officer (from May 2008)

Ms Emily Sim Administrative Assistant (from May 2008)

Mr David Sumner IT Manager (from November 2008)

# Imagine...

having a 50/50 chance of passing your eye syndrome on to your children.



Karolin's son was born with his eyes closed and she didn't see his pupils until he was 10 days old.

She half expected it.

When Karolin was born in Istanbul 33 years ago, her eyes were the same and when she did open them, her eyelids covered half her eyes.

Until Karolin was five, nobody knew why she couldn't open her eyes and it was not until her family migrated to Australia that she was diagnosed with Blepharophimosis Ptosis Epicanthus Inversus Syndrome.

People with the inherited syndrome can't lift their eyelids while the lower eye skin overlaps the top.

Karolin had three operations during her childhood to widen the corner of her eye and attach her eyelids to her eyebrow muscle so that she could lift her eyelids. Karolin's oldest child, Jacinta has a mild form of the syndrome and won't need treatment but her four year old son, Sassoon will need the same series of operations.

"Sassoon has to tilt his head back to see," Karolin said. "Although his first operation to cut the lower lid has helped a bit, his next operation in November will lift his eyelids and he will find it a lot easier to see."

"The comments and stares are hard to cope with sometimes but I have taught the children to shrug them off," she explained. "The syndrome makes us look different but at least we can still see."

# CERA's research into genetic eye syndromes

Karolin and her children have participated in an eye movement disorder genetic study at CERA, in collaboration with the Engle Laboratory, Boston. Samples of the family's DNA, clinical details and photos have been added to the research program database. The study aims to identify the gene causing the syndrome and environmental interactions with the gene.

# VISITORS AND EVENTS

#### January

Professor Akira Murakami, Director of Ophthalmology, Juntendo University Professor Shunichi Fukuhara, Department of Epidemiology and Health Care Research, Kyoto University Dr Masakazu Yamada, Chief of Department of Ophthalmology, National Hospital Organization Tokyo Medical Center Assistant Professor Yoshimune Hiratsuka, Juntendo University Professor Jost Jonas, University of Heidelberg, Germany



#### February

Dr Walthard Vilser, Managing Director, IMEDOS GmbH Jena, Germany

Dr Miho Yasuda-Miyazaki, Chief of the Department of Ophthalmology, Kyusyu-Kose-Nenkin Hospital, University of Kyusyu

#### March

Visitors from the LV Prasad Eye Institute, Hyderabad, India: Krishnaiah Sannapaneni, Srinivas Marmamula, Shobha Mocherla, Beula Christy



#### April

Associate Professor Kim Donaghue; Westmead Children's Hospital

#### April 17-20, Lions' Ride for Sight

CERA staff members Jenny Hassell, Eva Fenwick and Anna Macrae on the ride (pictured left).



#### May

Professor Michael Kalloniatis, Head, Department of Optometry and Vision Science, University of Auckland

Associate Professor Paul Donaldson, Head Department of Molecular Vision Laboratory, University of Auckland

Ms Sue Raynel, Manager, New Zealand National Eye Centre (NZ-NEC)

#### May 21

Launch of "Tunnel Vision: the Economic Impact of Primary Open Angle Glaucoma" (pictured left), our fourth health economics report with Access Economics.

Mr Pierre Georges and Ms Kellie-Anne Thomas, Lions NSW Eye Bank

Mr Greg Koennecke, Vision Instruments

Dr John Ravenscroft, Royal Institute for Deaf and Blind Children

Ms Sumrana Yasmin, Sightsavers International Pakistan

#### June

Mrs Margaret Ross AM (Chair), and Ms Debbie Ashboldt (Administration Officer), The John T Reid Charitable Trusts

Dr Sven-Erik Bursell, Director Diabetes Telehealth Program Telehealth Research Institute, Associate Professor of Ophthalmology, Harvard Medical School





#### July

Emeritus Professor Alan Bird (above), of Moorfields Eye Hospital, London

Mr Peter Clemenger (pictured left, with Tien Wong and Paul Baird), Joan and Peter Clemenger Trust

#### August

Dr Nigel Barnett, University of Queensland Centre for Clinical Research

Associate Professor Robert Casson, South Australian Institute of Ophthalmology, University of Adelaide

Dr Subhabrata Chakrabarti and Dr Inderjeet Kaur, LV Prasad Eye Institute, Hyderabad, India

Associate Professor Dr Su Jeong Song, Department of Ophthalmology, Sungkyunkwan University School of Medicine Seoul, Korea

Dr Timothy Sullivan, Clinical Associate Professor, University of Queensland



#### October

Ms Fran Thorn (above), Secretary, Victorian Department of Human Services Ms Lisa Buckland, Lions Eye Bank WA Ms Marisa Herson, Donor Tissue Bank of Victoria Ms Louise Moffatt, New Zealand National Eye Bank

#### November

Associate Professor David Friedman, Wilmer Eye Institute, Johns Hopkins University, Baltimore, USA Mr Nick Nuttall, Queensland Eye Bank Professor Gary Wittert, Royal Adelaide Hospital and Mortlock Professor and Head, School of Medicine, University of Adelaide

### November 13

Official launch of Bionic Vision Australia, the research partnership to develop an Australian bionic eye

Pictured left to right: Chris Williams (BEI); Stan Skafidas (NICTA); Penny Allen (CERA); Hugh Taylor, David Penington and Colin Sutton of the BVA Board; Robyn Guymer (CERA & University of Melbourne); Rob Shepherd (BEI); Tony Burkitt (University of Melbourne)



#### December

Emeritus Professor David Penington AC, Chairman Bionic Vision Australia

#### September

Ms Stacy Meuer, Department of Ophthalmology and Visual Sciences, University of Wisconsin

Dr Masahide Yanagi, University of Hiroshima, Japan Dr Gerard Sutton, Clinical Ophthalmology and Eye Health, Central Clinical School, University of Sydney



# GRANTS AND FUNDING

# State Government Grants

Department of Human Services

Department of Innovation, Infrastructure and Regional Development – Science Technology and Innovation Grant

Department of Innovation, Infrastructure and Regional Development – Operational Infrastructure Support

**RVEEH Central Funds** 

**RVEEH Research Committee** 

Victorian Endowment for Science Knowledge and Innovation

Victorian Innovation Minister Gavin Jennings. CERA receives funding from the Department of Innovation, Infrastructure and Regional Development.

# Federal Government Grants

Australian Research Council (ARC)

Department of Health and Ageing

Department of Innovation, Industry, Science and Research

National Health and Medical Research Council (NHMRC)

Vision Co-operative Research Centre

# Other income in the form of grants, clinical trials income, contracts, sponsorships and donations was received from:

- Alcon Australia Allergan Australia Ansell Ophthalmology Foundation Australian International Health Institute Australian National University Bausch & Lomb **Beyond Blue Limited** CBM Australia Centre for Vision Research Clifford Craig Medical Trust Clive & Vera Ramaciotti Foundation Diabetes Australia Research Trust Foundation for Children Glaucoma Australia Glaxo Smith Kline Harold & Cora Brennen Benevolent Trust Harold Mitchell Foundation Helen Macpherson Smith Trust
- lan Potter Foundation International Diabetes Institute Joan & Peter Clemenger Trust Juvenile Diabetes Research Foundation Kendle Pty Limited L Alan Wilson Leon Mow Nominees Lions Eye Institute Lowy Medical Research Institute Macular Vision Loss Support Margaret Miller Foundation MBF Foundation Miss Dorothy Adele Edols Trust Myra Stoicesco Charitable Trust National Ageing Research Institute Novartis Pharmaceuticals **Ophthalmic Research Institute** of Australia (ORIA)
- Opto Global Peggy & Leslie Cranbourne Foundation Pfizer Australia **PPD** Developments **RANZCO Eye Foundation** Reece Australia Ltd **RVEEH - MUST Trial** Save Sight Institute The Angior Family Foundation The Association for Technical Aids The CASS Foundation Limited University of Melbourne University of Tasmania Victorian Medical Postgraduate Foundation Victorian Lions Foundation Vision Australia Vision Group Wagstaff Fellowship

# The Centre for Eye Research Australia acknowledges the support of funding agencies, business partners, sponsors and donors with sincere appreciation.

### **Overseas Sources**

- Alcon Research Institute Allergan Inc American Health Assistance Foundation Asahikawa Medical College Canadian National Institute for the Blind Digital Healthcare International Agency for the Prevention of Blindness (IAPB) Japan Ophthalmologists Federation
- Juvenile Diabetes Research Foundation - USA London School of Hygiene & Tropical Medicine Pfizer Inc USA Royal Blind Society USA Singapore National Eye Centre The J A COM Foundation University of Iowa

# ABRIDGED AUDITED FINANCIAL STATEMENT

# The Centre for Eye Research Australia (ABN: 72 076 481 984) for the year ended 31 December 2008

INCOME AND EXPENDITURE	2008	2007
Revenue		
Federal Government	2,351,175	1,990,023
State Government	761,276	1,129,090
Clinical Trials, Donations / Sponsorships & Other Income	5,321,649	5,261,869
Total Revenue	8,434,100	8,380,982
Less Expenditure	8,838,865	6,978,629
Surplus / (Deficit) for the year*	(\$404,765)	1,402,353

### **BALANCE SHEET**

Current Assets	3,226,309	3,981,846
Non-Current Assets	1,479,918	1,302,818
Total Assets	4,706,227	5,284,664
Current Liabilities		
Payables	378,372	549,278
Provisions	454,319	355,651
Other	663,205	781,924
Total Current Liabilities	1,495,896	1,686,853
Non-Current Liabilities	87,346	70,061
Total Liabilities	1,583,242	1,756,914
Net Assets	3,122,985	3,527,750
Total Equity	3,122,985	3,527,750

\* The Centre for Eye Research Australia Limited is operated as a not for profit organisation. Accordingly, accumulated surpluses are held in the form of working capital and fixed assets to support committed and planned research projects.

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