



CENTRE FOR  
Eye Research  
Australia

# visionary

SPRING 2017

Saving sight. Changing lives.



*Dr Tom Edwards*

## IN THIS ISSUE

Lions Ride for Sight breaks fundraising record

AMD app developed

Glaucoma surgery advances

Remote testing in the Outback



## 5 minutes with... Dr Isabel Lopez Sanchez

Dr Isabel Lopez Sanchez is a Research Fellow at CERA.

### Have you always been interested in the eye?

Most of my work has so far focused on mitochondrial biology and genetics. Vision is a complex and fascinating biological function, and mitochondria, as the powerhouses of cells, are critical in generating the energy that the cells in the eye need to function correctly.

### How did you come to study mitochondria?

I did my PhD in Aleksandra Filipovska's Mitochondria Medicine and Biology Laboratory, in Perth WA, which is considered one of the best mitochondrial basic research groups in the world. After finishing my PhD, I was fortunate to join A/Prof Ian Trounce's Mitochondria and Neurodegeneration Laboratory at CERA.

### What is the most important thing you have learnt about doing research?

I have learnt that it is very important to involve the broader community in the research we do, to improve the quality of life of patients with eye disease and find efficient ways to prevent vision loss.

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## Letter from the MD

2017 has been tremendously productive so far and looking through the pages of Visionary, I am delighted at the achievements of our research team.

Our research, whether it be to understand the causes of age-related eye disease, or developing new treatments, is focused on transforming the lives of people suffering from eye disease and vision loss.

In this issue, you can read about the amazing support we received this year from our friends participating in the 2017 Lions Ride for Sight, who raised \$60,000 for CERA, and our annual Tax Appeal which raised a record amount for our research.

**I would like to personally thank everyone who continued to this outstanding result – without you, our life-changing research would be impossible.**

Thanks to you, there is hope for a brighter future for those who suffer from eye diseases such as glaucoma, diabetic eye disease and aged-related macular degeneration.

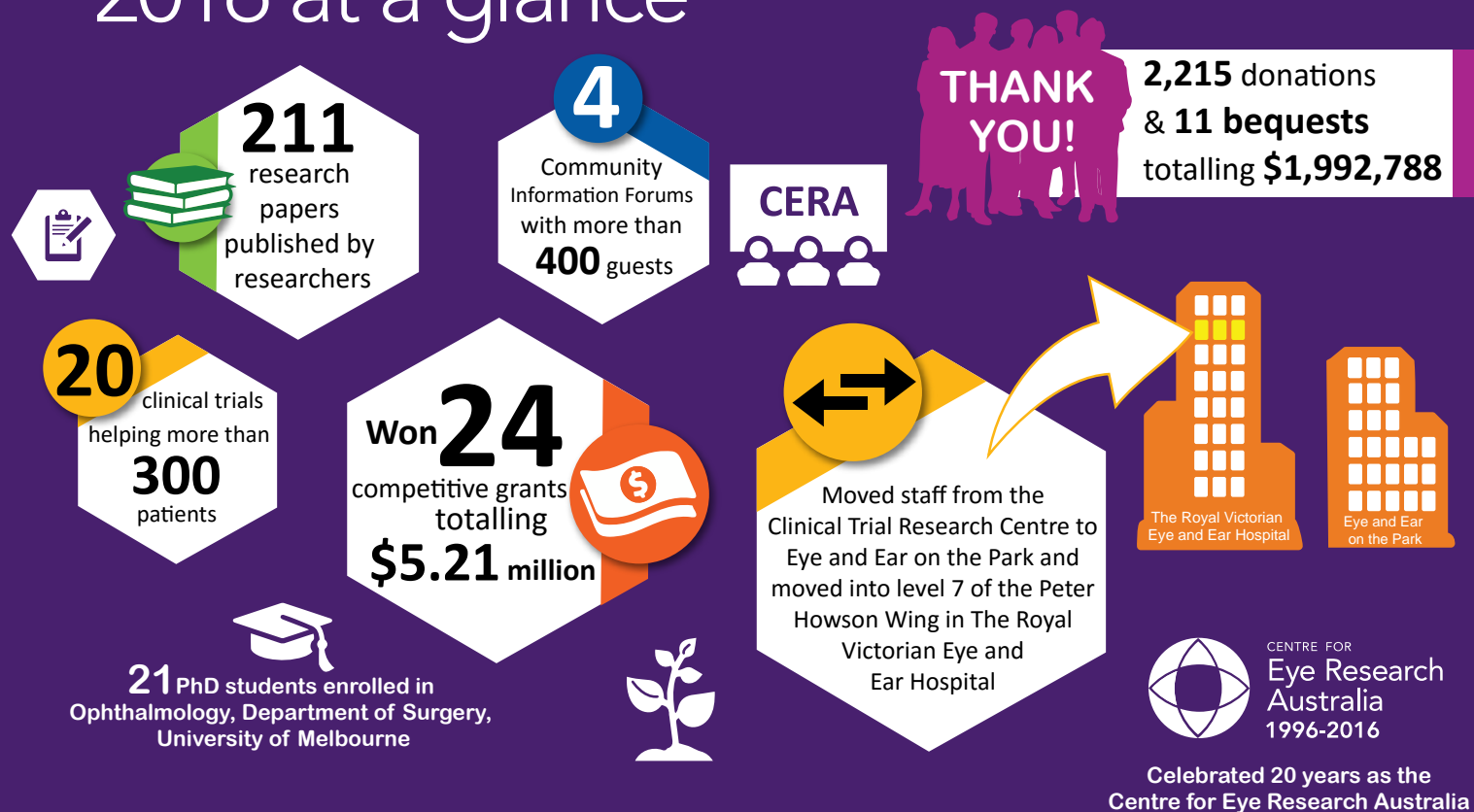
Sincerely,



Prof Jonathan Crowston  
Managing Director  
Centre for Eye Research Australia

P.S. On 25 October, A/Prof Angus Turner, Director of Lions Outback Vision and an expert on eye testing in remote regions, will present the 9th Annual Gerard Crock lecture. This will be a fascinating lecture and I hope to see you there.

# 2016 at a glance



Read our 2016 Annual Report or watch the summary video on our website: [cera.org.au/about/annual-report](http://cera.org.au/about/annual-report)

## Ranking reveals CERA's global research strengths

CERA's research strengths in ophthalmology have been revealed in the latest Center for World University Rankings (CWUR) annual global university rankings report.

According to the report, CERA, in combination with ophthalmology at the University of Melbourne, is 4th in the world for academic output in its field, ranking just below the much larger ophthalmology departments of Johns Hopkins University, Harvard University and University College London.

The CWUR rankings measure the quality of education and training of students, the prestige of the faculty members and the quality of their research, without relying on surveys and university data submissions.

In 2016, CERA celebrated 20 years as an independent centre of vision research and in recent years, its research program has expanded significantly. The latest CWUR results confirm CERA's global impact and quality of research.

CERA is now poised to take a major step forward as a leading centre for integrated vision research, translation and innovation – where clinicians, patients, researchers and industry come together to develop treatments and technologies that transform patient lives.

"I sincerely thank all our researchers, students, staff and supporters who have put us in this excellent position," Prof Jonathan Crowston, CERA's Managing Director said.



2017 CERA Award winners at our Scientific Exchange in May





## App joins the fight against vision-threatening AMD

Not only are thorough, regular eye tests important to effectively detect eye disease, they also help us determine what to do next.

“When someone is diagnosed with the early stages of age-related macular degeneration (AMD), they are asked to monitor their vision by observing a piece of grid paper, called an Amsler grid, which they usually stick on their fridge or behind the toilet door,” said CERA Deputy Director and Principal Investigator Prof Robyn Guymer. The aim is to detect any sudden changes in the appearance of the graph.

Unfortunately, many people don’t test their vision with the paper test properly, nor do the test often enough and the test is not actually very good at detecting early change. Additionally, they often take no action, even if they notice a change in their test results.

Now, Prof Guymer and her team are hoping to change all this by moving monitoring for AMD into the 21st Century. They have been investigating if people over the age of 50 years will use a tablet device, such as an iPad, to monitor their vision and the findings have been very positive. “In a controlled study, we found that people in an older age group were happy to use the tablet-based technology to measure their vision and

that the reminders did lead to more frequent testing,” Prof Guymer said.

“We want to develop a tablet-based test that not only detects changes in the ability of the retina to detect a small spot of light shown on the tablet, but also allows us to remotely monitor the results of the testing so we can alert the patient, via an email, to potential problems before they notice it themselves,” explains Prof Guymer. After developing an initial prototype with colleagues from the University of Melbourne, Prof Guymer is now working with a tablet based application developed by Glance Optical.

Once a number of Prof Guymer’s research patients are tested with the application to ensure that the results that are obtained in the clinic can be reproduced at home, she aims to adapt the test into an electronic game form, as it is well recognized that people tire of performing tests that are tedious and non-engaging.

“By gamifying a tablet-based test, it will use all the psychological tricks game-makers employ to hook people onto playing the game over and over. This is what we need to achieve with the monitoring tool to make it successful in the long run,” Prof Guymer said.



Want to know more? Listen to a podcast of Prof Guymer describing the app and its functions on our website:

[cera.org.au/2017/05/podcast-app-to-detect-vision-threatening-amd](http://cera.org.au/2017/05/podcast-app-to-detect-vision-threatening-amd)

# Glaucoma surgery: Fixing the 'plumbing' of the eye

Glaucoma is the leading cause of blindness in the world, affecting 1 in 200 40 year olds - a number which sky-rockets to 1 in 8 for people in their 80s. These are grim statistics however progress in research is being made.

Surgery to tackle this scourge has advanced in leaps and bounds in recent years and it is being pioneered by CERA researchers.

In June, a packed audience at the 2017 Glaucoma Community Information Forum heard about some of these fascinating advances with presentations from Managing Director Prof Jonathan Crowston, Dr Nathan Kerr and Dr Catherine Green.

Prof Crowston presented on the relationship between ocular surface disease and glaucoma treatment. Research has found that 15% of Australians over the aged of 50 have signs of ocular surface disease but this increases to 30% for people on glaucoma medication.

Dr Kerr presented on the tiny new implant devices revolutionising the way the disease is being treated. One of the devices he spoke about started life in

Australia, the Xen implant, a flexible tube thinner than the width of a human hair.

Dr Catherine Green presented her latest research into glaucoma monitoring. A lively question and answer discussion rounded off the morning that was thoroughly enjoyed by those in attendance.



*Dr Nathan Kerr with a guest at the event*



Full recording and images of the event are available on our website: [cera.org.au/events](http://cera.org.au/events)

## "One aspect of glaucoma is a plumbing deal," says A/Prof Michael Coote

In a podcast interview, also available on the CERA website, glaucoma specialist A/Prof Michael Coote talks about some of the changes he has seen over the course of his 25-year career and explains the latest technology and techniques to fix what he colourfully calls the 'plumbing' of the eye.

"We have a certain amount of fluid we need to remove from the eye within a certain pressure tolerance.

"There are three bits to the problem; you need to get fluid out of the eye; you need to get fluid to traverse the space underneath the surrounding tissue, and then you have to get it absorbed. That's how the pressure is lowered," he says.

"To our surprise, we found that distributing fluid and the tissue porosity to allow that to happen ended up being the most difficult problem and the focus for a lot of our research."



*A/Prof Michael Coote*



Listen to a podcast featuring A/Prof Coote on our website: [cera.org.au/category/news](http://cera.org.au/category/news)



# Tax Appeal 2017: Giving them the tools to finish the job

The CERA 2017 Tax Appeal was the most successful to date, raising over \$200,000.

Dr Tom Edwards, the face of the CERA campaign, said he was “...overwhelmed by the response of our amazingly generous and thoughtful donors.”

“I not only feel extremely grateful, but also very responsible to put the funds we have raised to good use, and I am really pleased we have projects lined up and can quickly begin research.”

The focus of Tom’s work is probing the causes of Bietti’s crystalline dystrophy (a type of retinitis pigmentosa (RP)), a blinding eye disease caused by a rare genetic disorder.

Why did this year’s appeal resonate so well with donors?

“I am fortunate to have experienced gene therapy research during my time at the University of Oxford. It is a very exciting and fast-evolving area of research in medicine, so I think I am the beneficiary of the public’s interest in this field,” said Tom.

In addition to unravelling the causes of this rare condition, Tom’s research may elucidate clues about more complex diseases of the eye.

“We can use rare diseases, such as Bietti’s crystalline dystrophy to test the strategy of gene therapy in the eye, before potentially moving on to tackling diseases such as age-related macular degeneration and glaucoma which have a more complex genetic basis.

“The work we will be doing is aimed at assessing whether this variety of RP may be amenable to gene therapy.”

Tom said he was extremely grateful for the time given by patients who are participating in the clinical trial.

“It’s a rare condition but we are already finding people in Melbourne who are suffering from it.”

To the donors who gave to the appeal Tom said, “I want to thank them for their generosity and assure them that we will be working hard on this research...Together with my colleagues at the CERA and the Baker Institute, we will put that money to good use in the laboratory.

“To have my project as the recipient for this year’s tax appeal and for it to have raised so much was genuinely a surprise, and I cannot thank our supporters enough,” said Tom.



Dr Tom Edwards



For more information about clinical trials research at CERA visit our website: [cera.org.au/clinical-trials-research-centre](http://cera.org.au/clinical-trials-research-centre)



*Ms Agnes Martha Skillin*

## Building a legacy: Agnes' extraordinary gift

CERA recently received a bequest from the estate of Ms Agnes Martha Skillin. Ms Skillin, who passed away at 103 years of age, suffered from age-related macular degeneration for over 40 years and eventually became legally blind.

"Far from letting her disease triumph, she taught herself Braille at 86 and became a writer of poetry and short stories, and played Bridge almost until the end," said her daughter Ms Patricia Wallis-Smith.

Bequests such as Agnes' are gifts to CERA left in a Will, and they can be targeted to a research area of specific interest.

"Every dollar that is pledged and spent on research, does an enormous amount of lasting good," said Mr Benjamin Nuttall, Philanthropy Coordinator for CERA.

**Do you want to find out more about bequests and the extraordinary and positive impact they can have on building research for saving sight?**

In November, CERA will be holding a special event to raise awareness of the ongoing importance of bequests. Leading researchers will be present to explain how bequests help them do their work and why your support is so necessary.

For more information contact our Philanthropy Coordinator Mr Benjamin Nuttall on 03 9929 8424.

## Anna's story

Ms Anna Fratta of Brunswick, Victoria, was one of the many kind people who generously donated to the CERA 2017 Tax Appeal.

"I saw the change in my mother when she developed macular degeneration in her late 80s," said Ms Fratta.

"She really enjoyed gardening and reading the newspaper at the end of the day, but once the disease struck her life completely changed - and for the worse," she said.

"AMD may affect me - therefore I am more than supportive of research and programs which address this affliction."

Ms Fratta is now taking care of her own eye health making sure she gets regular eye exams to catch any sign of developing disease.

**"I appreciate and value  
the indispensable research and  
goals you pursue.  
I wish you every success,"  
said Ms Fratta.**

# Improving care for pregnant women with diabetic retinopathy

**"Behind every healthy child is a healthy mother"**



"I can't wait to see my baby's face for the first time; it's something that I've been dreaming about since I first found out I was pregnant," said Dr Jaclyn Neo, who is expecting her first child in September.

Jaclyn has every reason to be excited – seeing her child grow and develop is something most women take for granted. For women with diabetes, however, pregnancy can bring additional medical complications, including a risk to their eyes.

"Although it is thought diabetic retinopathy is worsened by pregnancy, there are major gaps in our understanding," said A/Prof Lyndell Lim, Principal Investigator of Clinical Trials Research at CERA.

A/Prof Lim and her team have been awarded seed funding to assist in the creation of a retinopathy screening program and clinical database to improve the care of pregnant women with diabetic retinopathy.

Diabetic retinopathy is the leading cause of legal blindness among people of reproductive age in developed countries such as Australia.

A/Prof Lim said she was delighted by the award from the Alfred Felton Bequest, which supports the development of ideas and catalytic projects that have the potential to enhance the physical and emotional health of women, children and young people in Victoria.

Australian guidelines recommend pregnant women with diabetes undertake a comprehensive eye check in their first trimester, but less than 50% take the check.

"Our project aims to improve the immediate access of pregnant diabetic patients to recommended eye care to prevent the development of this sight-threatening disease. We are also aiming to address the knowledge gap about the effect of pregnancy on the disease so that improved treatments can be developed for this special group of patients," A/Prof Lim said.

"The generous support from the Alfred Felton Bequest will allow us to progress our clinical research at CERA into optimal screening programs during pregnancy to allow critical early intervention. Behind every healthy child is a healthy mother," A/Prof Lim said.



# Stopping leaky blood vessels

## PhD student discovers novel drug target

For the past decade, patients with eye diseases associated with leaky blood vessels in the eye, such as macular degeneration and, more recently diabetic macular oedema (DMO), have been treated with antibody-based medications. These medications target a growth factor known as vascular endothelial growth factor (VEGF).

Although considered a first-line treatment, not everyone responds to these 'anti-VEGF' therapies, so CERA researchers are looking for genes that promote the growth of new and leaky blood vessels (neovascularization), so that they can block these genes with novel treatments.

A rising star at CERA, PhD student Jiang-Hui (Sloan) Wang, has recently identified a new pathway that appears to drive abnormal blood vessel formation in the eye. His discovery, which was awarded Best Poster at the world's top ophthalmology conference (ARVO) in the US, may help us find new drugs to treat these eye diseases, which may be cheaper or may benefit those patients who don't respond to existing therapies.

In his experiments, Sloan induced neovascularization in young rats by exposing them to cyclic high levels of oxygen and room air. This procedure alters the normal

development of blood vessels in the eye and leads to the growth of new leaky vessels that model those seen in diabetic eye disease.

Sloan found that four different gene regulators (called microRNAs) were down-regulated in the eyes of these rats, meaning they were not able to appropriately control their target genes. One of these, miRNA-143, is known to control a gene called TAK1 which promotes blood vessel growth.

"The gene regulator acts like a car brake. In our eye disease model, the car brake is out of order, meaning that TAK1, a gene that drives blood vessel growth, is out of control," said Mr Wang.

Sensing a major advance, Sloan went on to test a medication (called Oxo) known to inhibit TAK1 and found that it blocks new blood vessel formation, both in the petri dish and in the eyes of rodents. "It inhibited abnormal vessel growth by as much as 50%. This work opens up a new potential avenue for therapy of blinding eye diseases," said Sloan.

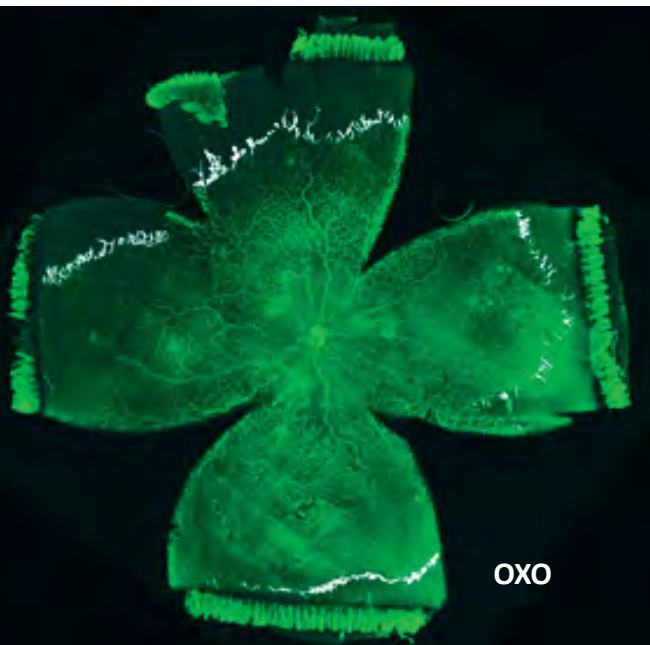
*Images below of rat retina treated with the medication targeting TAK1 (right), compared to control (left).*

*Abnormal retinal blood vessels are highlighted in white.*

**Abnormal retina without Oxo medication**

**Abnormal retina with Oxo medication**

Neovascularization





*Visiting Optometry Scheme Optometrist, Stephen Copeland, and patient, during a telehealth consultation with A/Prof Angus Turner*

## Eye care in the Wild West

How do you deliver best practice eye care to someone who lives 2,000km away from the nearest major hospital? What if you had to wait 10 months to see a visiting specialist about your eyes, only to be told that yes, you need surgery, but there's no time to do it this visit, you'll have to wait another year?

When A/Prof Angus Turner established Lions Outback Vision in 2010, this was the reality facing many West Australians in regional, remote and Indigenous communities. Together with a small but passionate team of eye health professionals, A/Prof Turner is utilising innovative technology such as telemedicine to deliver eye health care to tens of thousands of people who would otherwise have fallen through the cracks.

"Telemedicine allows the patient, accompanied by a GP or optometrist, to access a consultation via video with an ophthalmologist thousands of kilometres away," explains A/Prof Turner. "People were worried about the infrastructure required to do this but it's actually very simple; all you need is a smartphone and a platform such as Skype or FaceTime."

Lions Outback Vision also offer outreach services via the mobile Vision Van, which according to A/Prof Turner "has better equipment than the city public hospitals" and completes two circuits per year throughout regional and remote WA.

A key to success for A/Prof Turner's team has been collaborating with local communities and services, such as the Aboriginal Medical Sector. "Previously when a patient needed referral to a city hospital, we found that attendance was poor; only 50% in some cases. Now that

we partner each individual with an Aboriginal health worker, who supports the patient through every stage of the appointment and treatment journey, attendance has risen to nearly 100%."

The Centre for Eye Research Australia is proud to host A/Prof Turner in October when he will present the 9th Annual Gerard Crock Lecture. Prof Jonathan Crowston said, "I'm very much looking forward to welcoming Angus back to Melbourne and hearing all about his inspiring work in the Wild West of the West Australian Outback!"



*A/Prof Angus Turner*

The 9th Annual Gerard Crock Lecture will be held on Wednesday 25 October 2017 (see back page for more details).

To book your place, please call 03 9929 8360 or email [cera-rsvp@unimelb.edu.au](mailto:cera-rsvp@unimelb.edu.au)



# Lions Ride for Sight raises \$60,000 for vision research

Over four days in early April (5-9 April), many intrepid members of the Lions Clubs and their support crew set off to do battle with the elements in Gippsland and to physically challenge themselves to the max, all in the name of vision research.

"It was the 24th annual Lions Ride for Sight, and the 60 or so riders each completed a total distance of 400km over three and half days," said Prof Paul Baird, one of the team of six from the largest CERA contingent ever, who participated in this year's event."

"Nobody fell off and nobody gave up, we all did it!" he said, and that included Mr. Jim Allan a 79 year old dairy farmer from Gippsland (pictured with Prof Baird).

"Every time I felt a bit weak or tired, I thought about Jim who has done the ride many times. He really inspired me and others in the team," said Prof Baird.

Since its inception, the Lions Ride for Sight has raised a total of \$500k in funds for CERA vision research and the Lions Eye Donation Service. An amazing \$60,000 was raised this year a big leap from the \$48,000 raised in 2016 and next year the Lions are promising to set the bar even higher to commemorate the 25th anniversary of the ride.

"Every year it's an incredible achievement and on behalf of CERA, I want to again thank all the riders and local Lions Clubs both for their perseverance and generosity," said Prof Jonathan Crowston, Managing Director of the Centre for Eye Research Australia.

The ride was very kindly hosted in each town by local Lions Clubs and CERA researchers had an opportunity to share the work they do with the community.

"The local clubs went out of their way in terms of hospitality and the logistical arrangements they made were superb. The CERA team can't thank them enough," said Prof Baird.



CERA riders

L-R Melinda Cain, Mark Pearce, Melanie Larissa, Benjamin Nuttall, Joseph Paul, Paul Baird



Jim Allan and Prof Paul Baird



Lions Ride for Sight riders and supporters - Image courtesy of Lions Ride for Sight, District 201V3



# 2017



CENTRE FOR  
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Australia

## Make a difference - Volunteer for a Clinical Trial

### How do I get involved?

If you are interested in participating in a trial at CERA you could become involved in several ways:

- Discuss with your eye health care professional. Details of our current trials and how to refer to us are on [cera.org.au](http://cera.org.au)
- You can register all of your details on our 'Web Sight' and we will be in touch if a suitable trial becomes available
- Email [cera-trials@unimelb.edu.au](mailto:cera-trials@unimelb.edu.au)

## What's on at CERA?

### 2017 Gerard Crock Lecture - Wednesday 25 October

The 9th Annual Gerard Crock Lecture will be held at the Melbourne Brain Centre, Kenneth Myer Building, 144/30 Royal Parade, Parkville.

Presented by A/Prof Angus Turner from Lions Outback Vision, the lecture will focus on "Eye Care in the Wild West".

A/Prof Turner is utilising innovative technology such as telemedicine to deliver eye health care to tens of thousands of people who would otherwise have fallen through the cracks in rural and regional West Australia.

Please book your place by Friday 20 October by emailing [cera-rsvp@unimelb.edu.au](mailto:cera-rsvp@unimelb.edu.au) or calling 03 9929 8360.



For more information, visit [cera.org.au/events/2017-gerard-crock-lecture](http://cera.org.au/events/2017-gerard-crock-lecture)

2018 will mark the tenth anniversary of the Gerard Crock Lecture. Mrs Jacqueline Crock, the wife of the late Prof Gerard Crock, expressed her appreciation to CERA for launching the lecture series back in 2008.

"Gerard would have been delighted to have these inspiring lectures named in his honour. Every year they just keep getting better and better. Myself and my family love attending the lecture each year and hearing from fascinating presenters across all aspects of ophthalmology."



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