

CENTRE FOR  
**Eye Research  
Australia**

**Hope in sight®**



**Annual Review 2023**

**People in focus**

# Our story

## **Vision is precious and no one should ever lose the gift of sight.**

We're deeply committed to conducting eye research with real-life impact and finding ways to prevent people from going blind.

As an international leader in eye research, we use our world-class knowledge and expertise to achieve better treatments and faster diagnosis of eye disease.

Our goal is to prevent vision loss – and ultimately, find cures to restore sight. As true innovators, our scientists are on the brink of new discoveries every day.

With your support we can continue this world-leading research and accomplish scientific breakthroughs previously deemed unattainable.

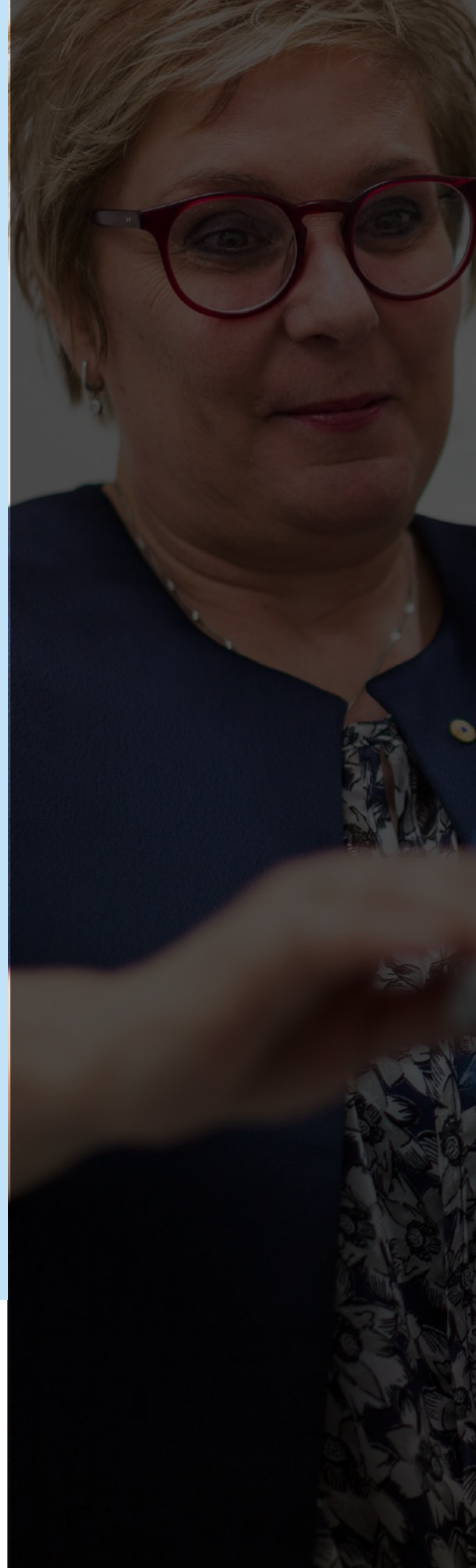
Our aim is to offer hope to people affected by vision loss and protect the sight of everyone in need.

## **With CERA, there's hope in sight.**



CENTRE FOR  
**Eye Research  
Australia**

← **COVER: Colin Willmott, who lives with age-related macular degeneration, and his daughter Sharon Oates who is raising money for research.**



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↑ King's Birthday honour: Dr Sandra Staffieri AO has been recognised for her contribution to children's eye health.

# Chair and Managing Director's message

## **After a transformative year, the Centre for Eye Research Australia is set to deepen our research impact and increase community access to sight-saving clinical trials.**

In 2023 we celebrated a \$10 million investment from Breakthrough Victoria – the Government's innovation investment fund – in our new clinical trials centre.

The new centre – Cerulea Clinical Trials – will enhance Victoria's status as a go-to location for international trials of innovative new treatments to prevent blindness and restore sight.

Cerulea will build on CERA's history of clinical research. It will be a global hub for clinical trials, create high-skill jobs, attract new research talent and grow industry partnerships.

Our aim is to give people living with vision loss and blindness increased access to advanced therapeutics.

We also plan to expand trial access in rural and regional areas by helping eye care professionals refer patients, and by conducting more telehealth trials.

The appointment of clinical trials innovator and digital health expert Michelle Gallaher as Cerulea's CEO sees us well placed to deliver on our vision.

While Cerulea is taking shape, work has been underway on CERA's new discovery labs in East Melbourne that will include a state-of-the-art genetic engineering hub.

The hub will enable us to expand our research and accelerate the translation of promising discoveries from lab to clinic.

It will boost the culture of innovation that saw several CERA teams win competitive funding or secure international research agreements in 2023, including:

- A National Health and Medical Research Council Ideas Grant for our Genetic Engineering Unit to research RNA editing and inherited retinal disease
- A partnership between our Genetic Engineering Unit and Oculus Biomed to develop 'SwitchGene', an eye drop alternative to injections for diabetic eye disease and age-related macular degeneration
- An Ideas Grant for our Ophthalmic Neuroscience Unit to collaborate with Swinburne University of Technology astronomers to develop a test to identify Alzheimer's disease
- An international collaboration led by our Visual Neurovascular Unit, backed by Fighting Blindness Canada, to repair blood vessel and optic nerve damage in glaucoma
- Our Retinal Gene Therapy Unit becoming the first Australian site for Uni-Rare – a global registry to improve understanding of inherited retinal diseases and boost potential therapies
- Medical Research Future Fund support for our Cellular Reprogramming Unit's research to regenerate damaged photoreceptors.

## People focus

In 2023 we also invested in our people. We launched our Gender Action Plan to tackle barriers affecting the career progress of women and other under-represented groups in medical research.

The plan includes our first Equity Fellowship for Excellence in Vision Research, awarded to Dr Anna Wang.

We also took steps towards embedding consumer involvement at CERA, appointing Kelly Schulz as Consumer Involvement and Advocacy Lead.

Kelly will work with consumers to co-create a program ensuring our research strategy and clinical operations meet the needs of people living with vision loss and blindness.

## Thank you

In 2023, we farewelled colleagues who have made an enormous contribution.

Founding Lions Eye Donation Service Director, Dr Graeme Pollock OAM, retired after 32 years. His work transformed corneal transplantation and helped save the sight of 15,000 transplant recipients.

Board Director Christine Edwards ended her term after nine years. Christine's expertise in health administration, philanthropy and governance has been invaluable and we are pleased that she will continue as a Director of the CERA Foundation.

We thank the Hon Justice Linda Dessau AC CVO, who ended her term as Victorian Governor, for her support as Patron. We are honoured that new Governor Her Excellency Professor Margaret Gardner AC will continue as Patron.

We are grateful to the Royal Victorian Eye and Ear Hospital and University of Melbourne for their support.

We pay tribute to our staff for their commitment to quality research and making a difference for people living with vision loss and blindness.

We are deeply grateful for the generosity of donors who make our research possible.

In 2024, we look forward to unveiling our new facilities and sharing how our supporters can help maximise the impact of the sight-saving research that happens in them.



A handwritten signature in black ink, appearing to read 'Olivia Hilton'.

**Olivia Hilton**  
Chair



A handwritten signature in black ink, appearing to read 'Keith Martin'.

**Professor Keith Martin**  
Managing Director

# 2023 snapshot

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 **244**

RESEARCH PUBLICATIONS

**\$6.84m**

IN GOVERNMENT GRANTS

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## Clinical research

 **3824**

PARTICIPANTS

**81**

ACTIVE CLINICAL  
RESEARCH STUDIES

**37**

STUDIES INVOLVING  
AN INTERVENTION OR  
INVESTIGATIONAL  
TREATMENT

**5**

ACTIVE PHASE 1  
CLINICAL TRIALS

---

**\$4.15m**

IN DONATIONS AND BEQUESTS

BREAKTHROUGH VICTORIA  
SUPPORTS NEW CLINICAL  
TRIAL CENTRE

# Cerulea

MICHELLE GALLAHER FIRST CEO OF  
CERULEA CLINICAL TRIALS



## NEW PROFESSORS

CONGRATULATIONS PETER VAN  
WIJNGAARDEN AND LYNDELL LIM



# \$2.1m

IN PHILANTHROPIC GRANTS

## 2 NHMRC Ideas Grants



EQUITY FELLOWSHIP  
FOR DR ANNA WANG



KELLY SCHULZ LEADS  
CONSUMER PROGRAM

DR HEATHER MACHIN  
NEW HEAD OF LIONS EYE  
DONATION SERVICE



## Lions Eye Donation Service

COORDINATED DONATIONS  
FROM 299 DONORS

FOR...

AND...

# 480

CORNEAL  
TRANSPLANTS

# 290

SCLERA  
SURGERIES



# A new chapter



**Clinical trials innovator Michelle Gallaher is returning to her eye health roots as the founding CEO of CERA’s new clinical trial centre.**

Gallaher, a former orthoptist, digital health entrepreneur and advocate for women in STEM, was appointed as CEO of Cerulea Clinical Trials in late 2023.

She will lead the transformation of CERA’s flourishing clinical research activities – which in 2023 included more than 80 clinical research projects involving over 3800 participants – into a global hub for innovation in ophthalmic clinical trials.

Cerulea Clinical Trials, a fully owned, not-for-profit subsidiary of CERA, is supported by a \$10 million investment from Breakthrough Victoria, the Victorian Government’s innovation investment fund.

The new centre will be based on Level 7 of the Royal Victorian Eye and Ear Hospital in East Melbourne.

It will increase community access to sight-saving clinical trials for conditions such as age-related macular degeneration, glaucoma, diabetic eye disease, inherited retinal disease and other rare genetic eye conditions.

**Continued on Page 8**

← Future treatments: (From left) Anna Hua, Michelle Gallaher, Marios Constantinou, Angelica de Guzman, Peta Holly, Czarina Obtinalla, Thuy Chau, Marinel Tuazon and Regina Callegher are part of a team delivering emerging new therapies.

**“I’m excited to be able to amplify CERA’s research impact.”  
– Michelle Gallaher, Cerulea CEO**

## From Page 7

Cerulea aims to bring more international clinical trials to Victoria for the benefit of local patients.

It also has a remit to provide Australian scientists with opportunities to trial their discoveries locally rather than taking them off-shore, and to forge global partnerships that will establish it as a world-leading centre for medical research and fighting blindness.

There will also be a strong focus on increasing access to trials for rural and regional people living with eye disease through an expansion of telehealth services and new digital recruitment systems.

As a not-for-profit centre, income from Cerulea will be funneled back into vision research – to improve the clinical trial experience of participants, research infrastructure and to support CERA’s lab-based, discovery research.

## Exciting opportunity

Gallaher says she is honored by “the exciting opportunity to build a centre that is recognised as world-leading and delivers excellence in ophthalmic clinical trials”.

“Cerulea will continue to deliver clinical trials for research undertaken at CERA, as well as deliver ophthalmic trials for local and international biopharmaceutical and medtech companies,” she says.

“We have a very experienced team with clinical trial management and implementation capabilities in advanced technologies like gene and cell therapies, biologics, and surgical medical devices.

“I’m excited to be able to amplify CERA’s research impact and create a dedicated

new clinical trials facility that will attract more major international ophthalmology trials to Melbourne, giving patients and clinicians access to the latest therapies as they emerge.”

CERA Managing Director and Cerulea Chair Professor Keith Martin says Gallaher brings a wealth of experience in life sciences innovation to her new role.

“Michelle Gallaher’s deep understanding of clinical trials, her leadership in the use of AI and digital technology to support trial recruitment and design, and her experience as a health tech entrepreneur will be enormous assets,” he says.

“Her unique mix of skills and experience are a great alignment with the culture of innovation and translating research into real outcomes for patients that we have at CERA – and our vision for Cerulea Clinical Trials.”

Professor Martin says the continued support of CERA donors had been instrumental in CERA’s vision for a new clinical trial centre.

“Without donor support of both our discovery and clinical research programs, CERA would not have been able to attract the important investment in a new clinical trial centre.”

## Full circle

The new role at Cerulea sees Gallaher return full circle to her first day as an orthoptist 35 years ago.

Since then, her career has taken many turns, from leadership roles in the pharmaceutical industry and not-for-profits such as the Australian Stem Cell Centre and BioMelbourne Network, to board roles at Cancer Trials Australia and PRAXIS Australia, to founding four start-up companies.



Throughout her career, Gallaher has been known for her advocacy for women in STEM, and in 2017 she was Telstra Victorian Businesswoman of the Year.

“I always said that one day I was going to find an opportunity to return to ophthalmology and vision science and now that time has arrived,” she says.

“I am very proud of my clinical roots.

“Together, we now have an opportunity to build an ophthalmic trials centre that is world-class, provides a great experience for users, and plays a pivotal role in trialling discoveries that will hopefully become therapies on world markets.

“I want all of Cerulea’s trial participants to have the best experience possible so that they will recommend participating in a clinical trial to everyone they know.”

## Improving eye cancer outcomes

A new clinical trial is aiming to protect vision and reduce the need for eye removal ahead of eye cancer treatment.

### **CERA's Ocular Oncology Research Unit is a leading collaborator in a global clinical trial to reduce the size of tumours in patients being treated for the eye cancer uveal melanoma.**

Uveal melanoma is malignant eye cancer that develops in the middle layer of tissue found in the wall of the eyeball. The rare cancer sometimes develops from a more common, benign eye lesion known as choroidal nevus – which affects about six per cent of the Australian population.

Current treatments for uveal melanoma require either removal of the eye or radiotherapy, which results in significant vision loss for more than half of patients.

Head of Ocular Oncology Research Dr Rod O'Day is leading CERA and the Royal Victorian Eye and Ear Hospital's involvement in a new clinical trial, which offers a tablet therapy, darovasertib, to patients.

Dr O'Day says the trial has two aims: "We want to reduce the size of tumours that are very large, which would require enucleation – removal of the eye – so that they can be treated with an eye-conserving therapy instead, typically radiation.

"And for those who are already going to be treated with radiation, we want to reduce the dose of radiation used, to try to preserve the delicate structures in the eye and maintain as much vision as possible."

### **Increasing patient access**

CERA was a collaborator in an ongoing proof-of-concept trial of darovasertib, initiated by Professor Anthony Joshua at St Vincent's Private Hospital in Sydney.

Collaborating with the Director of Oncology at Alfred Health Professor Mark Shackleton and his team, the Eye and Ear Hospital and CERA recruited six of the 15 patients to this initial trial.

The results of this study are yet to be published, but the manufacturer of darovasertib, IDEAYA Biosciences, launched an international clinical trial in November 2023.

"This is an important opportunity for our Victorian patients to have access to a new treatment that could potentially reduce the severity or the invasiveness of their treatment and improve outcomes," says Dr O'Day.

Internationally, 80 patients will be recruited to the trial. CERA has worked closely with Professor Shackleton, and with Dr John McKenzie and Dr Daniel McKay at the Ocular Oncology Unit of the Eye and Ear Hospital to enrol three patients in the first few months.



### Exploring liquid biopsies

In a separate study, Dr O’Day is also investigating whether it is possible to use fluid collected from the anterior chamber of the eye to improve the genetic analysis of uveal melanomas.

Current techniques gather melanoma cells from the tumours themselves, requiring an invasive surgical sampling technique.

“The prognosis for eye cancer patients is very much determined by the genetic makeup of the tumour cells, which have distinct signatures,” explains Dr O’Day.

“These signatures give very clear information about whether particular tumours are going to spread outside the eye.”

A liquid biopsy – collecting fluid from the eye’s anterior chamber – would provide a faster, safer, and more accessible test, as the fluid could be collected during the regular care of patients.

This research has received seed funding from the William Angliss Charitable Fund and will get underway in 2024, in collaboration with the Eye and Ear Hospital.

## On the brink of AMD answers

A major collaboration is closer to discovering who is most at risk of vision loss from age-related macular degeneration.

**Professor Robyn Guymer AM has dedicated her career to trying to stop people with age-related macular degeneration (AMD) from losing their vision.**

After several years of collaboration between diverse research groups enabled by the National Health and Medical Research Council, the Synergy High Risk Age-related Macular Degeneration Study has put new answers closer at hand.

“We’re now at the exciting stage – we are at the brink of really investigating the data we have worked for several years to accumulate,” says Professor Guymer.

“We have the genetics, the cell lines, the preclinical models ready, as well as all the eye data and specimens collected.

“We now just have to look at what we have and tie it all together.”

### **Synergy study**

Several years ago, advances in the technology used to examine people’s eyes revealed differences in the deposits that accumulate in the retinae of people diagnosed with AMD.

Deposits named reticular pseudodrusen (RPD) were found to be associated with more symptoms and were also thought to increase people’s risk of developing late-stage AMD.

“What are reticular pseudodrusen, what causes them, and how do we stop them from forming?” Professor Guymer asks.

“This is essentially a single question, but it needs a multi-skilled team to solve.”

That single question prompted the establishment of the Synergy High Risk Age-related Macular Degeneration Study, led by CERA in partnership with the University of Melbourne, WEHI and international collaborators.

Entering its final year in 2024, it is exploring the genetics associated with reticular pseudodrusen and AMD, whether this explains how these deposits develop and if knowing this could point towards new treatments.

Professor Guymer says earlier work by her team suggested there was something about reticular pseudodrusen that meant people with these deposits didn’t respond as well to interventions aimed at slowing the progression of AMD.

“This finding made us realise that understanding reticular pseudodrusen was a critical endeavour,” she says.

### **Investigating causes**

Professor Guymer says the much of the early years of the Synergy grant have been spent collecting information from collaborators around the world about AMD patients whose reticular pseudodrusen status is well-documented.

“Now that we have all the data, we are poised to look in-depth for genetic signals that correlate with the reticular pseudodrusen disease.”



As part of this work Professor Guymer’s team, led by Associate Professor Zhichao Wu, has developed an algorithm that enables the automatic detection of reticular pseudodrusen, as well as the amount of deposit, in a retinal image.

“The ability to quickly determine if the eye has reticular pseudodrusen, and the extent of the lesions, is a major step forward,” says Professor Guymer.

Other members of the Synergy grant team are using skin biopsy and blood samples to try to find additional links.

“Another idea is that reticular pseudodrusen is associated with a problem of the vessels in the body that carry blood and oxygen,” says Professor Guymer.

“AMD is associated with cardiovascular disease, but we need to work out whether cardiovascular disease is more related to those people who have reticular pseudodrusen as part of their AMD.”

While a complex challenge, Professor Guymer says it has been highly rewarding.

“Synergy has united colleagues with a range of research skills and developed new collaborations between international groups.”

↑ Synergy team (from left): Associate Professor Chi Luu, Emily Caruso, Dr Manisha Shah, Dr Himeesh Kumar, Associate Professor Zhichao Wu, Lauren Hodgson, Professor Robyn Guymer AM, Dr Kai Lyn Goh, Dr Emily Glover, Erin Gee, Professor Melanie Bahlo, Dr Una Greferath, Dr Vicki Jackson, Professor Alice Pébay AM, Jenna Hall, Dr Jan Terheyden, Professor Erica Fletcher, Dr Liam Scott, Associate Professor Matthew Rutar, Dr Brendan Ansell, Dr Maciej Daniszewski, Dr Samanah Farashi, Melinda Cain, Dr Carla Abbott, Dr Kirsten Vessey and Jessica Yuen Ma.

## Getting the good oil on AMD

Researchers are investigating the role of ‘good’ cholesterol in vision loss caused by age-related macular degeneration.

### **A new study is examining the way ‘good’ cholesterol functions in people with age-related macular degeneration (AMD), in the hope of identifying new treatments to prevent vision loss.**

Led by Dr Carla Abbott from CERA’s Macular Research Unit, the study is investigating the role of fats and lipids in the blood stream and how AMD progresses – with a strong focus on high-density lipoprotein (HDL), also known as ‘good’ cholesterol.

“Good cholesterol can protect against heart disease and stroke, but several studies have also shown it is elevated in the bloodstream in AMD,” says Dr Abbott.

“It is an anti-inflammatory that helps flush ‘bad’ cholesterol out of the body – but in people with AMD the function of the ‘good’ cholesterol appears to change.

“Our preliminary data suggests that people with AMD have a higher level of dysfunctional ‘good’ cholesterol, which means they no longer benefit from its protective properties.

“We are now testing our theory that the association between AMD and ‘good’ cholesterol is not about the amount of HDL in the bloodstream, but whether it is functioning properly.”

Dr Abbott and her team, which includes Professor Robyn Guymer AM and Dr Manisha Shah, are conducting their research with the support of a \$200,000 grant from the Macular Disease Foundation of Australia (MDFA).

“We’re grateful to the MDFA for their support,” Dr Abbott says.

### **Assessing cholesterol**

They are comparing blood samples taken from AMD patients to those of people without AMD to assess the functionality of ‘good’ cholesterol.

In addition, they are also investigating if those with the most severe and high-risk forms of AMD have higher levels of dysfunctional ‘good’ cholesterol.

“Overall, our research is aimed at helping to develop therapies that allow us to intervene at an earlier stage, so people don’t risk losing their vision,” says Dr Abbott.

“If the ‘good’ cholesterol in AMD patients is not functioning as well as that of the people without the disease, then it points to a possible cause.

“It will also provide us with a new target for developing medicines that can potentially stall the disease and prevent vision loss.”

→ **Good oil: Dr Carla Abbott is investigating the role of cholesterol in age-related macular degeneration.**







## Interrupting rare infections

**Associate Professor Rosie Dawkins, Senior Research Fellow at CERA, is working towards improving outcomes from endophthalmitis – an uncommon but sight-threatening bacterial infection.**

“Our data shows that in Victoria one in 3300 people develop endophthalmitis after an invasive ophthalmology procedure,” says Associate Professor Dawkins.

Despite often terrible vision outcomes from endophthalmitis, research in the area globally has been neglected. However, with the number of invasive ophthalmology procedures increasing there is a need for better treatments.

“Today, when people come in with an infection, we kill the bugs with antibiotics,

but we want to also stop the body’s immune response from damaging the retina,” Associate Professor Dawkins says.

With the support of philanthropic funding, she is collecting samples from patients and analysing preclinical disease models.

Her early work has already found cytokines, a type of protein, that play a role in the disease.

“We’re looking to see if targeting those cytokines can change the inflammatory response, which means we could develop an antibiotic-independent therapy,” Associate Professor Dawkins says.

She is grateful for the philanthropic funding from donors making the research possible.

↑ **Rare infections: Associate Professor Rosie Dawkins is protecting people’s sight from infections.**



## Building a consumer conscience

**CERA’s Consumer Involvement Program will provide new ways for people with lived experience of low vision and eye disease to contribute to research and clinical trials.**

“Researchers are experts in their fields and consumers are experts in their lived experience,” says CERA Consumer Involvement and Advocacy Lead Kelly Schulz.

“By bringing those two things together, we can ensure our research achieves the greatest possible impact.”

Kelly joined CERA in late 2023 and is establishing a consumer voice in all CERA’s research efforts through the new Consumer Involvement Program.

“Through a program of strategic engagement and co-design, consumers will collaborate

with researchers to provide valuable insights that strengthen the way research is planned, executed, and ultimately translated into clinical practice,” she says.

Kelly comes to CERA from a career in senior consumer-centric roles in the corporate sector and is an experienced non-executive director.

She was also born with inherited retinal disease and has been legally blind from birth, identifying as: “blind, with just enough vision to be dangerous”.

Guide Dog Velvet is Kelly’s ‘navigation adviser’.

“There’s a lot to learn on both sides of research, and the first step is getting people together,” Kelly says.

↑ **Consumer voice: Kelly Schulz and Guide Dog Velvet.**

## Opening international pathways

A global collaboration will bring more international clinical trials to Victorians living with rare inherited retinal diseases.

**With a wave of new genetic treatments for inherited retinal diseases (IRDs) on the horizon, CERA's VENTURE study is ensuring Victorians are well-placed to join new clinical trials.**

At the same time, VENTURE participants are helping researchers to understand how different IRDs progress, how they affect families, and how they are linked with other physical issues.

Their contributions are now part of an international effort.

In 2023, CERA joined more than 40 research centres in the international Foundation Fighting Blindness Clinical Consortium, which will provide new opportunities for research and clinical trials.

The consortium runs several programs, including the newly launched Universal Rare Gene Study (Uni-Rare), which is investigating rarer IRDs that may affect only a few hundred people worldwide.

VENTURE participants will have the option to take part in the Uni-Rare initiative, which will combine international data to learn more about these extra-rare genes.

“We’re currently the only Australian research institute in the Foundation Fighting Blindness Clinical Consortium and are very excited to

work with our international counterparts on learning more about these rarer IRDs,” says Associate Professor Lauren Ayton, who co-leads VENTURE with Dr Tom Edwards from CERA’s Retinal Gene Therapy Unit.

Since its launch in 2019, almost 320 Victorians have joined VENTURE.

The registry is a collaboration between CERA and the University of Melbourne, supported by the National Health and Medical Research Council, Retina Australia, the CASS Foundation and the Choroideremia Research Foundation (USA).

The team includes over 20 multidisciplinary researchers and clinicians contributing to the program.

An estimated 19,000 people in Australia have an IRD – a group of genetic conditions that cause vision loss and blindness. Associate Professor Ayton says the genetic mutations that cause IRDs can occur in any one of more than 300 genes that contribute to vision.

“By identifying the specific genes involved we can really pinpoint what’s gone wrong in the DNA,” she explains.

“And this opens opportunities for very targeted therapies.”



### Genetic findings

Associate Professor Ayton says about two-thirds of people on the VENTURE database have had genetic tests to pinpoint which of their genes carry IRD-related mutations.

As a result, some people have discovered they have syndromes that they weren't aware of.

In most cases, there is no current treatment for the IRDs involved, but in one case the tests revealed Refsum disease, which can be slowed with changes to diet.

“The finding connected the dots with other symptoms,” says Associate Professor Ayton.

“They did have some malformation of their toe joints, for example, which is typical of Refsum disease.

“But no ophthalmologist ever asks to see your toes.”

Associate Professor Ayton says this points to the power of genetic testing for people with IRDs, and the value of the counselling offered to all those who do these tests as part of the registry process.

Under the leadership of Dr Ceecee Britten-Jones, the VENTURE program is now also expanding genetic testing to try to solve more complicated cases, using newer technologies such as whole genome sequencing.

“I'm hopeful we can improve clinical trials and get more treatments underway for patients in Australia living with IRD”, says Associate Professor Ayton.

↑ Investigating IRDs: Associate Professor Lauren Ayton and Dr Ceecee Britten-Jones.

A woman with shoulder-length brown hair and black-rimmed glasses is smiling and looking upwards and to the right. She is wearing a light blue t-shirt under a beige zip-up jacket. The background is a soft-focus green, suggesting foliage. The text 'Understanding inherited retinal diseases' is overlaid in large white font on the lower left side of the image.

# Understanding inherited retinal diseases

**New research is revealing more about female carriers of inherited retinal disease. And its findings are challenging the long-held idea that they don't experience vision symptoms as severely as males do.**

Karen Woolsey has been a passionate early childhood teacher for 30 years, but her deteriorating vision forced her to consider a change in career.

“At the start of 2023, I decided that I wouldn't be able to continue teaching,” she said.

“I could still teach in the classroom, but I wasn't able to supervise the kids outside in the playground anymore.”

Karen has X-linked retinitis pigmentosa (RP), a genetic condition that results in poor night vision and the gradual loss of peripheral vision.

Like other genetic conditions, the genes that cause it are passed on from parents to their children, and Karen is not the only person in her family affected.

“My grandmother would have had RP, although back in the day she didn't talk about it,” Karen says.

“My mum was obviously a carrier, but she didn't know that.

**Continued on Page 22**

“I'm thankful that somebody is focusing their research on females with IRDs.”  
– Karen Woolsey

← Genetic links: Karen Woolsey lives with X-linked retinitis pigmentosa.

## From Page 21

“And my brother, Glenn, who is two years younger than me, exhibited symptoms earlier. We did a lot of camping growing up, and he would struggle to see at night.”

That was what prompted her parents to take Glenn to have his vision examined, which led to the diagnosis of an inherited retinal disease that other family members could potentially have.

Karen was eventually diagnosed with retinitis pigmentosa herself in her early 30s.

“One of my goals in life is to travel around Australia and see the beautiful countryside, so there was a moment I thought I was never going to see the waterfalls – the news came as a shock.”

## X-linked

X-linked retinitis pigmentosa is an inherited retinal disease (IRD) linked to genes in the X-chromosome and was once thought to not severely affect female carriers.

For males, who have one X-chromosome and one Y-chromosome, the genetic fault in the X-chromosome has significant impact.

For females, with two X-chromosomes, one healthy chromosome was thought to make up for the faulty one.

Sena Gocuk, Clinical Research Coordinator at CERA and PhD student at the University of Melbourne, says this is not always the case.

“Female carriers actually present with a spectrum of retinal disease – some have significant vision loss or even legal blindness, while in others the condition is so mild, they may not ever realise they have it,” she says.

She has completed a world-first survey, published in *Clinical Genetics*, examining the opinions and perspectives of people who live with the disease.

“Until now, inherited retinal disease carriers haven’t been tested for their knowledge, opinions, emotions or experiences about being told they have the condition,” says Gocuk. “This is the first study looking at carriers of X-linked IRDs, and the first comparing different regions from a global perspective.”

She found that while most respondents agreed that their eyecare provider and general practitioner helped them understand their condition, few carriers reported receiving psychological counselling (nine per cent) or family planning advice (five per cent).

Most respondents (78 per cent) also agreed that gene therapy should be available to carriers.

“While not every carrier will be eligible for treatment, this research shows many would certainly consider being involved and might benefit from future therapies.”

## New direction

Karen has a positive outlook and draws inspiration from her brother.

“Glenn is a lot more restricted with severe symptoms, but he’s never had a chip on his shoulder and is a positive person with a can-do attitude.

“After an initial shock, I thought, ‘let’s just make the best of it’.”

Karen has also just begun a new step in her career as an early childhood specialist teacher with Vision Australia.





“I feel extremely privileged and blessed to be able to continue working with families and children who are blind and visually impaired, and also support myself as a visually impaired person,” Karen says.

She is also grateful that research is being done into conditions like hers.

“I’m thankful that somebody is focusing their research on females, knowing how severely it has affected me.

“The actual experience of research has been positive; everyone is very open about what the research involves.

“Although people are empathetic, only you know what you’re going through yourself.

“Working with someone like Sena, who is passionate about her work, it feels like we’re on a team working together towards a goal.

“It’s a privilege that we can have this relationship together.”

↑ **Sharing experiences: Sena Gocuk is researching the experiences of females with X-linked IRDs.**

## Progressing gene therapy

Associate Professor Rick Liu is investigating the revolutionary potential of gene therapy for protecting vision.

### **When it comes to gene therapy, the eye is almost the perfect organ.**

As well as being easy to access, eyes are largely isolated from the rest of the body, which means anything introduced into the eye – such as a virus carrying a therapeutic gene – is unlikely to affect other parts of the body.

The extraordinary potential of gene therapy to halt or even reverse vision loss in patients with inherited retinal diseases (IRDs) and common eye diseases is the reason CERA's Head of Genetic Engineering Research, Associate Professor Guei-Sheung (Rick) Liu, is so passionate about his research.

“Being diagnosed with an IRD, and the prospect of vision loss, is life changing,” Associate Professor Liu says.

“Before the advent of gene therapy there was virtually nothing doctors could do for people with these devastating eye diseases, but gene therapy brings real hope.”

### **IRD improvements**

Some eye diseases are caused by a defect in a single gene passed down through family members. These are known as IRDs, and collectively they are the most common causes of legal blindness in children, young adults and working-age Australians.

Gene therapy functions by introducing normal genes to replace defective genes (gene replacement) or directly correcting

genetic mutations on defective genes (gene editing) that are responsible for impairing the function of eye cells.

One key focus of the team is how gene editing can treat IRDs, which include conditions such as retinitis pigmentosa, Usher syndrome and Stargardt's disease.

In 2023, Dr Liu's work attracted Ideas Grant funding from the National Health and Medical Research Council (NHMRC).

The funding was for Dr Liu and his team to test a new technology - 'RNA base editor' - to correct genetic errors in RNA.

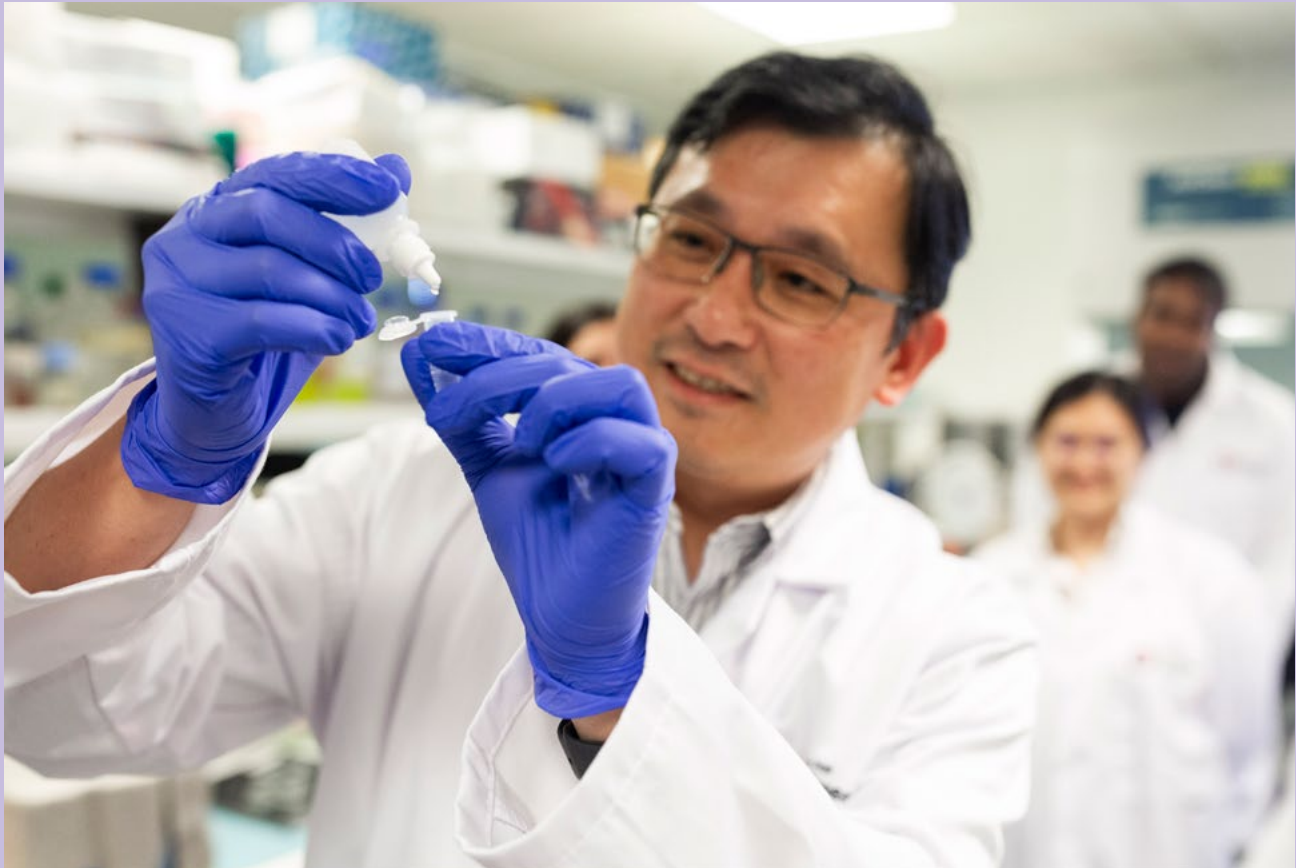
RNA plays an important role in reading the genetic instructions stored in DNA and sending them to the rest of the body.

“Much of the current research into IRDs looks at treatments that focus on gene replacement, using a safe virus to deliver the correct version of the gene to the retina,” Associate Professor Liu says.

“However, about 40 per cent of the diseases cannot be treated in that way, sometimes because they are caused by genes that are too large to fit on the delivery virus.”

Editing RNA is a way to get around this problem.

“Directly correcting the error in the genetic code means we won't be limited by the size of the mutated gene that causes the disease,” Associate Professor Liu says.



### **Goodbye, needles**

Another promising gene therapy development in Dr Liu's research is the SwitchGene, which attracted industry funding from Oculus BioMed in 2023.

Patients with conditions such as wet age-related macular degeneration and diabetic retinopathy often need to have frequent, ongoing injections to prevent vision loss.

In collaboration with Oculus BioMed, Dr Liu's SwitchGene project envisions a single gene therapy injection, enabling

the body to produce its own treatment controlled through eye drops.

"Patients now need to have injections into their eyeball perhaps every six to eight weeks, often for a couple of years or even the rest of their lives," Associate Professor Liu says.

"This can be uncomfortable, risky, and expensive to the healthcare system.

"Our work with Oculus BioMed aims to solve this issue by a novel gene therapy approach.

"No more eye injections needed."

↑ **No more needles: Associate Professor Guei-Sheung (Rick) Liu is developing new gene therapies.**



## Investing in the future of gene therapy

**CERA donors are supporting University of Melbourne PhD student Satheesh Kumar's research into a new type of gene therapy.**

He is exploring RNA base editing as a potential new type of treatment.

RNA – ribonucleic acid – plays an important role in how the body follows the ‘instructions’ that are stored in genes.

RNA reads DNA – the instructions the human body needs to operate – and acts as messengers of those instructions to the rest of the body.

Many gene therapies focus on correcting mistakes in DNA, but Kumar is looking at editing RNA instead.

By editing the message instead of the instructions, the technique has the potential to result in safe treatments for many different IRDs.

“This support will help me continue my research into RNA base editing and understand its potential for treating inherited retinal disease,” he says.

“I’m so grateful to all the donors who made this scholarship possible.

“The funding allows me to pursue research that is not only groundbreaking, but also potentially life changing.”

↑ RNA editing: PhD Student Satheesh Kumar.



## Writing a new chapter

**Journalist, public relations consultant and author Tom Valenta watched his mum's eyesight diminish from glaucoma.**

"There was virtually no treatment for glaucoma in those days," says Tom.

"In the last decade of her life, she became close to totally blind."

Years later, Tom was also diagnosed with glaucoma. However, advances in research and treatment are helping him manage his condition.

To help give back, Tom has participated in three clinical trials at CERA since 2017.

"Had there not been any treatment for me, there's no doubt my glaucoma would have progressed," Tom says.

"The more we participate, the better the chances of improved medications for glaucoma, or even possibly a cure at some stage."

Tom says he's optimistic about the future of glaucoma research, based on the significant progress he's seen in the field since he was diagnosed 12 years ago.

He hopes his contribution can keep progressing this vital research.

"I hope that future generations will be free of glaucoma."

↑ **Giving back: Tom Valenta has his eyes checked as part of a clinical trial.**

## Funding boost for sight-restoring research

Gene therapy research that aims to replace damaged cells in the retina takes a step forward with new funding.

### **A \$600,000 grant from the Australian Government’s Medical Research Future Fund (MRFF) will help to refine a new gene treatment that could restore lost vision.**

The funding from the MRFF’s Stem Cells Therapies Mission will support CERA’s Cellular Reprogramming Research, led by Associate Professor Raymond Wong.

Associate Professor Wong is working on a way to regenerate dead retinal cells using the retina’s own stem cells – the Müller glia cells.

Millions of tiny light-sensing cells known as photoreceptors line the retina at the back of the eye and send visual signals to the brain, enabling us to see.

When they are damaged or die, vision loss occurs.

The loss of photoreceptor cells is common in many retinal diseases, including retinitis pigmentosa and age-related macular degeneration (AMD).

An estimated 190 million people worldwide have retinal degenerative diseases with photoreceptor losses.

So far there is no effective treatment or cure to treat the blindness caused by these diseases.

However, Associate Professor Wong is working on a gene therapy solution.

Although some animals such as fish and birds have a natural ability to regenerate cells in the retina if they are damaged, this ability has been either lost or suppressed in humans, says Associate Professor Wong.

“Our aim is to develop a gene therapy to stimulate retinal regeneration in people.

“The MRFF’s funding provides critical support to optimise what we have learned in the lab, which we need to do before we can translate it into a therapy that can be tested in a clinical trial with patients.”

### **Reprogramming cells**

Associate Professor Wong says this new project will build on five years of promising preclinical research into reprogramming cells using genes to control how the cells behave.

“The new funding will help us to improve the technology we use to reprogram stem cells – the Müller glia cells in the retina – to become photoreceptors.

“We are using human Müller glia cells in lab dishes to optimise the best genes for reprogramming. Then we test the best genes in preclinical studies using animal models,” explains Associate Professor Wong.

“Our goal is to be as specific as we can when we deliver the gene therapy to target the retina. We are doing more experiments to optimise this, to make sure it is as safe and efficient as possible.”



### Investigating AMD

Associate Professor Wong is also leading collaborative research with the University of Melbourne, the Lions Eye Institute and other national collaborators to identify the role of different genes associated with AMD.

In 2023 Associate Professor Wong and his team published two papers that focused on two genes, *TMEM97* and *POLDIP2*, and their role in AMD.

To identify the genes' function, the team created a lab model of human retinal pigment epithelium cells (RPE) – the cells affected in AMD.

Then they used gene editing technology to 'switch off' the two genes and discovered they had a key role in maintaining cell health.

Both genes help manage oxidative stress in cells, which increases as we get older, and can damage cells in the retina, leading to vision loss.

“For the first time, we understand the function of these genes that are associated with AMD in human retinal cells. This means we have identified potential gene targets for drug treatments to delay or halt the disease,” says Associate Professor Wong.

↑ **Gene therapy: Associate Professor Raymond Wong is aiming to regenerate retinal cells.**



# Family in it together





**“Mum gets needles in the eyes every six weeks, and Dad’s AMD is at an advanced stage.”  
– Kerry Fitzgerald**

**Sisters Leesa Willmott, Kerry Fitzgerald and Sharon Oates are on a personal mission to end age-related macular degeneration (AMD).**

All three have early stages of the disease while their parents, Colin and Pam Willmott, have later-stage disease.

“Mum gets needles in the eyes every six weeks, and Dad’s is at an advanced stage and he is legally blind,” says Kerry.

Through Colin and Pam’s long-standing membership of the Wonthaggi Lions Club, Leesa, Kerry and Sharon teamed up to tackle the 29th Lions Ride for Sight.

Since 1994 the event organised by Lions District 201V3 has raised over \$1 million to support CERA’s research, and in 2023 saw riders cycle 150km through South Gippsland.

After setting an ambitious goal of \$10,000, they surpassed all expectations raising \$30,800 to support CERA’s research.

Even when the last day was cancelled due to poor weather, they returned the following weekend to finish what they started.

“We had to do it for the people who had donated – as well as for ourselves,” says Sharon.

“It’s great if we can raise some money and scientists can find a cure for AMD,” says Kerry.

“Not only for us, but for our kids too.”

↑ **Family together: Colin and Pam with their daughters (from left) Kerry, Sharon and Leesa.**

# New frontier for glaucoma treatments

A Transformative Research Grant from Fighting Blindness Canada is powering an international collaboration.

**In 2020, a chance discovery of microscopic structures in the retina that control blood flow was the launching pad for Dr Luis Alarcon-Martinez’s current research towards a potential new treatment for glaucoma.**

“Blood flow is very important for the retina, the optic nerve and the brain,” says Dr Alarcon-Martinez, Head of Visual Neovascular Research at CERA.

“If you stop blood flow, nerve cells will die, and nerve cells are what are damaged in glaucoma.

“These structures that control blood flow, which we have only discovered recently, might play a very important role in how we treat diseases like glaucoma.”

Three years after being part of the team that discovered these structures, alongside Professor Adriana Di Polo at the University of Montreal, Dr Alarcon-Martinez is now now looking to see how these might play a role in glaucoma.

“Thanks to a five-year grant from Fighting Blindness Canada, we’ve brought together international expertise in different aspects of glaucoma in a study that will hopefully pave the way toward new treatments,” says Dr Alarcon-Martinez.

## **Adventure of curiosity**

Nerve cells in the retina, optic nerve and brain are all affected in glaucoma.

Nerve cells need a constant flow of oxygen and nutrients from blood vessels to work properly.

This flow of energy is regulated by another type of cell called a pericyte, which wraps around blood vessels and controls how much blood passes through them.

By looking at a living organism in high resolution, Dr Alarcon-Martinez and Professor Di Polo discovered pericytes project microscopic structures, called nanotubes, that send signals between blood vessels to direct blood where it is needed.

When these nanotubes are damaged, this communication breaks down and blood stops flowing correctly.

“The discovery of these tunnelling nanotubes was completely serendipitous – we were observing the retina and seeing these very thin connections between pericytes and capillaries,” says Professor Di Polo.

“It was an adventure of curiosity to find out how these nanotubes communicate, how they change blood flow and, importantly, how they are affected in diseases.”

## **Future progress**

A team of leading experts is now investigating exactly how these nanotubes break, and if it could be a factor in glaucoma.



The team will use a two-photon microscopy setup based at WEHI to look at the health of nanotubes in the retina, the optic nerve head and the brain in very high resolution.

As well as Dr Alarcon-Martinez and Professor Di Polo, University of Melbourne Professor of Optometry and Vision Sciences Bang Bui will be providing a model of glaucoma that the team will use to compare to healthy examples.

“The model allows us to raise eye pressure and put it back to normal at any given time to answer whether nanotubes repair themselves,” says Professor Bui.

“We’re effectively seeing if we could potentially make a difference in their function if we intervene early enough.”

### **Exciting potential**

Professor Di Polo says she has very high hopes for the study.

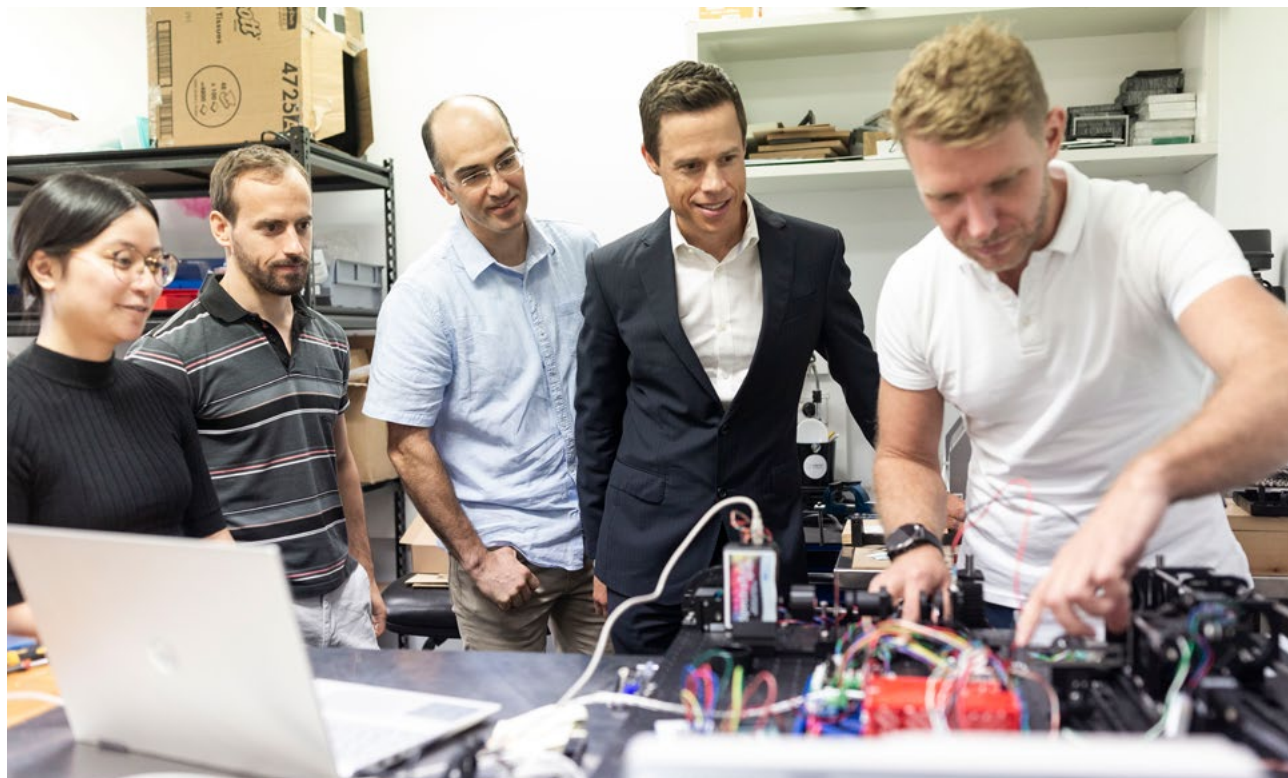
“Our ultimate goal is a new type of therapy that protects the function of nanotubes in regulating blood flow to the complex network of nerve cells from the retina to the brain.”

Dr Alarcon-Martinez says the project could potentially have an impact on research into any disease that is affected by blood flow, not just glaucoma.

“Diabetic retinopathy, retinitis pigmentosa, age-related macular degeneration and even Alzheimer’s disease are all affected by blood flow.

“We’re excited to see where this project leads us.”

↑ **Looking closer: Jesse Gardner-Russell, Dr Luis Alarcon-Martinez, Mahmoud Haddara and Dr Anna Wang.**



## Space-age scan for Alzheimer's disease

**A team led by Professor Peter van Wijngaarden has received a National Health and Medical Research Council Ideas Grant to expand research to develop an eye test to identify Alzheimer's disease.**

Three separate brain scans are currently needed to obtain three warning signs of Alzheimer's disease and information about a patient's brain health – but if the research is successful this could be replaced by a single, simple eye test.

“Our research will compare the effectiveness of our novel eye-scanning technology with state-of-the-art brain-scanning technologies to detect Alzheimer's disease,” Professor van Wijngaarden says.

To analyse the enormous wealth of data that comes from these images, his team is collaborating with astronomer Associate Professor Edward Taylor from the Centre for Astrophysics and Supercomputing at Swinburne University of Technology.

“With many emerging treatments for Alzheimer's disease on the horizon, a simple test would streamline clinical trials, and help to identify people who may benefit from early treatment,” says Professor van Wijngaarden.

↑ Better imaging: (From left) Darvy Dang, Maxime Jannaud, Francis Labrecque, Professor Peter van Wijngaarden and Dr Xavier Hadoux.



## Global eyecare mission

**CERA has a long history supporting the World Health Organization (WHO) as a collaborating centre.**

The latest efforts aim to make monitoring vision easier. The WHOeyes smartphone app – developed by CERA and released on World Sight Day in 2023 – is designed to be used anywhere in the world, particularly in developing countries.

The app works by displaying symbols like an optometrist’s eye chart, which are used to check how well their long and short distance vision is.

“Now anyone with a smartphone can download the free WHOeyes app and accurately test their long or short distance

vision wherever they are,” says Associate Professor Lisa Zhuoting Zhu, Director of the WHO Collaborating Centre for the Prevention of Blindness.

While the app isn’t a replacement for regular vision tests, Associate Professor Zhu says it can play an important role in helping people monitor their vision.

“While Australia generally has great access to eye care professionals, many countries don’t,” says Associate Professor Zhu.

“We also made the app available in six languages to ensure more people around the world can test their eyes, which is a very big step ahead.”

↑ **App test: Associate Professor Lisa Zhuoting using the WHOeyes smartphone app.**



# Bold research vision

**An emerging researcher who discovered a new class of cell that could provide clues for future glaucoma treatments is CERA's first Equity Fellow for Excellence in Vision Research.**

Dr Anna Wang will establish an innovative research program to discover new eye cells and understand how they work.

The emerging scientist has joined CERA from the University of California, Berkeley, where she worked in the lab of Assistant Professor Teresa Puthessery, leading projects investigating retinal ganglion cells that carry visual information from the eye to the brain.

In 2023, prestigious journal *Nature* published Dr Wang's research, which, for the first time, demonstrated a specific type of retinal ganglion cell was present in primates, including humans.

The cells, called ON-type direction-selective ganglion cells, play a key role in helping sight stay clear and stable when eyes move to follow movement such as looking out of the window of a moving train.

Her research used a two-photon microscope – a device that can capture high-resolution images of living eye tissue.

**Continued on Page 38**

“I've had brilliant, supportive supervisors and mentors - I'm grateful.”  
– Dr Anna Wang

← Equity fellow: Dr Anna Wang is advancing her career.

## From page 37

“We’re able to see how living cells respond to changes in the environment, which tells us a lot more about the cells than if they were static,” says Dr Wang.

Dr Wang aims to develop the same technique that she used to identify ON-type direction-selective ganglion cells in her lab at CERA to discover more new cells and learn how they change in eye disease.

“This technique lets us ask all kinds of questions – what kind of effect does a particular treatment have on cells in the retina? How do these cells respond to blue light?” says Dr Wang.

“We can test new treatments for diseases much more easily than going to a clinical trial.”

## Understanding glaucoma

Vision loss occurs in people with glaucoma when the retinal ganglion cells, which make up the optic nerve, are damaged or die.

Managing Director Professor Keith Martin says Dr Wang’s research focus brings a new dimension to CERA’s glaucoma program.

“Dr Wang has discovered a completely new class of retinal ganglion cell that responds to the direction of movement of objects in our visual world,” says Professor Martin.

“It is currently completely unknown how these cells are affected by glaucoma and, therefore, Anna’s work is both ground-breaking and exciting.

“Identifying new retinal ganglion cells, understanding how they work and what damages their function is a critical first step in developing new methods of diagnosing glaucoma earlier and formulating new treatments.”

CERA’s new Equity Fellowship for Excellence in Vision Research aims to encourage and develop the career of a researcher with high potential for future leadership in eye research. The CERA Foundation has provided funding to establish the fellowship with a view to seeking further philanthropic funding in the future.

The Equity Fellowship aims to tackle the barriers across the medical research sector that impede the career development of women and other under-represented groups from early career to more senior levels.

## Equity fellow

“The three-year fellowship will provide Anna with momentum and continuity to establish her research program so that she can be competitive in external funding schemes,” says CERA Deputy Director Professor Robyn Guymer AM.

“The Fellowship also ensures that CERA can continue to attract the best researchers and deliver world-leading research.”

Dr Wang says she has been inspired by the many people who have supported her throughout her career.

“I’ve had brilliant, supportive supervisors and mentors – I’m grateful for their support because it can be daunting to think about the things that can affect your career, like parenthood.

“This fellowship is a great initiative, and I’m very grateful to everyone who has made it possible.”

→ **Bold view: Professor Lyndell Lim and Professor Peter van Wijngaarden congratulate Dr Wang on her Equity Fellowship.**





## Cutting down waste

CERA's Community Climate Action Group is taking advantage of change to reduce waste in research.

### **A laboratory can use up to five times more energy and water than an office building.**

This high energy use, combined with the frequent use of single-use items such as latex gloves and syringes, means research has a considerable impact on the environment.

Now a new CERA Community Climate Action Group is aiming to reduce the impact wherever possible and take advantage of moving location.

Laboratory manager Sheridan Keene explains: "Our labs and offices are moving to a sustainable building, which has achieved a National Australian Built Environment Rating System Energy rating of six stars, a six-star Green Star Design and As Built Certification and a WELL gold rating for the base building."

"This is a great opportunity for us to change how we manage waste. There is a big international movement towards making health research greener, and we're working to be a part of that."

### **Simple steps**

The CERA Community Climate Action Group started when Keene and Dr Heather Machin, Head of the Lions Eye Donation Service, began discussing how they might be more environmentally sustainable across the organisation.

"We started with the simple things and found we were already doing a lot,

like recycling ink cartridges and using commingled recycling, but we wanted to step that up," Keene says.

"So we set up a system for reusing scrap paper for jotting down lab notes, to recycle pens and batteries and put up signs reminding people to turn off lights when leaving an area."

There are also more challenges unique to health research.

"The clinical trials team receive single-use electronic monitors with drug deliveries to make sure drugs are transported at the correct temperature, but weren't sure how to dispose of them," she says.

"The team contacted the company who makes them, and we were pointed towards a provider who can recycle them."

Excess equipment is also being donated to Rotary Australia's MediShare for distribution to people and organisations around the world who can use it.

### **Better practice**

Keene says single-use equipment is an issue across medical research and healthcare.

"Ophthalmology produces some of the most waste in the medical field," she says.

"The average surgery time is so short many procedures can be performed in a day, and a lot of consumables are needed for each surgery. Any changes we make can have a really big impact."



CERA's move to a new building is also an opportunity to update both equipment and practices to be more environmentally friendly.

"Our new ultra-low freezers can keep samples at minus 80 degrees Celsius more efficient than our old ones, but they still use a lot of power," Keene says.

"But we don't need to keep samples at that temperature - you can keep samples at minus 70 degrees and not affect research, which uses a lot less power."

Other new equipment includes water baths that use metal beads instead of liquid, which uses less electricity and are set on automatic timers to be on only when they need to be.

"There is an initial expense, but long term there's a financial benefit to a lot of these changes," says Keene.

The move to a new lab is also an opportunity to change habits.

"Some researchers might prefer to use a particular chemical because that is what they've used for the last 20 years, but now there might be a new chemical that is less dangerous, cheaper and easier to dispose of," says Keene.

"Change can be a slow burn, but this is a unique chance for us to really change our culture and build new habits."

↑ **Recycling equipment: (From left) Sheridan Keene and committee member Fleur O'Hare sorting lab equipment.**

## Accidental career, extraordinary outcomes

Dr Sandra Staffieri was awarded an Officer of the Order of Australia for tireless work supporting families of children.

**When an email from the Office of the Governor-General landed in her inbox in March 2023, Dr Sandra Staffieri assumed it was a mistake.**

But, as it turned out, the email was genuine, and in June, the CERA Research Fellow and Clinical Orthoptist was appointed an Officer of the Order of Australia for distinguished service ‘to medicine as an orthoptist and vision researcher, and to paediatric ophthalmology’.

“It was an incredible honour and surprise to receive the award,” Dr Staffieri says. “And like so many parts of my career, it was so unexpected.”

Now with research and clinical focuses including hereditary eye disease and eye movement disorders, Dr Staffieri entered the field by default.

She missed out on her desired physiotherapy course in the 1980s, so instead started a Diploma of Orthoptics at the former Lincoln Institute in Melbourne.

“My grandfather was blind, so I had some interest in vision, but I planned to transfer to physio after a year,” she says. “However, I absolutely loved orthoptics and I had wonderful placements, including at the Royal Children’s Hospital.”

Dr Staffieri was offered a job before she even sat her final exams, and over the next few years she worked in private practice and at the RCH, eventually becoming Chief Orthoptist. In the mid-1990s, she began managing the paperwork for very young children who were being treated for retinoblastoma, a rare but potentially devastating cancer of the eye.

“My role started out as administrative, such as making sure the children were rebooked, but emotional and social connections quickly developed as I saw the children and their parents so often,” Dr Staffieri says. “I sat with parents on one of the worst days of their lives, when they were told their child had cancer and would need multiple examinations, operations and treatment – or even need an eye removed.”

Retinoblastoma can be hereditary, so survivors’ children receive regular screenings from birth so that tumours are found early, and their eyes and vision can be saved. However, children without a family history need somebody to notice the early signs.

Dr Staffieri’s early research showed that parents often experienced multiple delays before obtaining a referral or they would completely miss the early signs such as a white pupil or a turned eye.



Despite hearing those stories, it was not until the inaugural One Retinoblastoma World Conference, in London in 2012, that the significance of delayed diagnoses hit home.

“I immediately wanted to change things when I returned to Melbourne,” she says. “I wanted to produce brochures and posters, but I was advised I would need robust evidence. The next thing I knew, I was doing a PhD.”

### **Greater impact**

While maintaining her interest in retinoblastoma, Dr Staffieri is now turning to research at CERA into a type of mitochondrial disease called Leber hereditary optic neuropathy (LHON).

In late 2023, Dr Staffieri was the recipient of a Project Grant from the Mito Foundation to focus on the experiences of people with LHON, as well as the experiences of their families.

“The aim of this project is to give a voice to the LHON community by documenting their experiences,” Dr Staffieri says.

In the next year, she hopes the addition of AO to her name will give her a ‘bigger soapbox’ to promote eye health care in children.

“It has been quite the journey – and I haven’t finished by any means, so watch this space.”

↑ **Bright light: Dr Sandra Staffieri AO checking Scarlett's vision.**



## The forefront of tissue donation

**Dr Heather Machin, the new head of the Lions Eye Donation Service (LEDS) at CERA is looking to continue the team's legacy of being at the forefront of tissue donation.**

"It's a really exciting time for eye banking, and I'm looking forward to helping bring the latest practices to LEDS," Dr Machin says.

In November 2023, Dr Machin replaced Dr Graeme Pollock OAM, who retired after more than 30 years leading the team.

Throughout her career she has played an important role in the global eye banking

community, as a member of several international organisations and groups that have shaped how eye banking is performed.

"There is a global movement towards cellular therapies in the cornea, more bioengineering, greater support for biobanking and more collaborations throughout the organ and tissue community," Dr Machin says.

"I'm honoured to continue Graeme's amazing work alongside the team he has built."

↑ Eye bankers: Dr Heather Machin and transplant coordinator Gavin de Loree.



## The power of sight

**Dr Valerie Britton-Wilson is keenly aware of the importance of her vision – whether she’s working on her next book or taking daily walks through the Botanic Gardens.**

“The power of sight is absolutely intrinsic to my life,” says Valerie.

“It allows me to read and write and experience the beauty of nature all of us want to clearly see.”

A corneal infection while she was at university, her father's vision loss from dry

age-related macular degeneration (AMD) and her sister's diagnosis of wet AMD inspired her to leave a gift in her will to CERA.

“I have a feeling that people think ‘bequest’ is a big word, but it’s very easy thing to leave a charity in your will and every bit makes a difference,” she says.

“I hope my bequest benefits current generations and future generations all over the world.”

## Generous gift boosts pregnancy and diabetes eye research

New research aiming to help women with diabetes protect their sight during pregnancy has received a major boost from philanthropists Jaqui Maree and George Stamas AM.

### **Jaqui Maree and George, of JGK Facility Services, have purchased a new AI-assisted portable camera for CERA.**

The new equipment was unveiled at CERA's International Women's Day celebrations.

The state-of-the-art camera will support an innovative trial providing eye screenings in obstetrics clinics to pregnant women who have pre-existing diabetes.

Led by CERA's Professor Lyndell Lim and Associate Professor Andrew Symons, the study aims to find new ways to help women with diabetes monitor their eye health for signs of sight threatening eye disease during pregnancy.

All people with diabetes need regular eye checks to monitor for diabetic retinopathy – a disease which causes bleeding in the back of the eye and can lead to serious vision loss if left untreated.

Pregnant women with diabetes are at even greater risk and it's recommended that they have eye tests every three months.

But previous research by Professor Lim's team found that many pregnant women with diabetes missed these critical checks because they were too busy with other medical appointments.

"Our new research will examine a more streamlined way of providing eye screening

to women with pre-existing diabetes during their pregnancy," says Professor Lim.

"We will be trialling a system where women can receive their eye screening at the same time as their obstetrics appointment using a new AI-assisted portable camera.

"Patients will receive an on-the-spot assessment of whether they need referral to an ophthalmologist for urgent care or can continue with in-clinic screening once per trimester."

The trial will be conducted at obstetrics clinics at the Royal Women's Hospital, Mercy Hospital for Women, Monash Medical Centre and Cabrini Maternity.

It will compare results of the new screening program with the current approach of requiring women to attend separate eye care appointments.

Professor Lim said that without the generosity of Jaqui Maree and George Stamas AM the research would not go ahead.

"I am deeply grateful for the generous contribution of Jaqui Maree and George Stamas to CERA's research," says Professor Lim.

"Their support will ensure that more women with diabetes experience the precious gift of seeing their new baby's face."

→ **Focusing research: George Stamas AM and Jaqui Maree Stamas with the AI-assisted portable camera.**





## Lead researchers



**Dr Luis Alarcon-Martinez**

Visual Neurovascular  
Research  
BSc, MSc, PhD



**Associate Professor Penny Allen**

Bionic Eye Project  
MBBS, FRANZCO



**Associate Professor Lauren Ayton**

VENTURE Study  
BOptom, PhD, FAAO, FACO,  
GCOT



**Associate Professor Michael Coote**

Surgical Glaucoma  
Research  
MBBS, MS, FRANZCO, FRACS



**Professor Mingguang He (until November 2023)**

Ophthalmic Epidemiology  
at the University of  
Melbourne  
MD, PhD, FRANZCO



**Professor Alex Hewitt**

Clinical Genetics  
BMedSci (Hons), MBBS, PhD



**Dr Nathan Kerr**

Glaucoma Surgical Trials  
MBChB, MD, FRANZCO



**Professor Lyndell Lim**

Uveitis Research and  
Clinical Trials Research  
MBBS, DMedSci, FRANZCO



**Dr Rod O'Day**

Ocular Oncology  
(Honorary)  
MBBS, LLB, BSc, FRANZC



**Associate Professor Ian Trounce**

Mitochondria and  
Neurodegeneration  
BSc, PhD



**Professor Peter van Wijngaarden**

Ophthalmic Neuroscience  
MBBS, PhD, FRANZCO



**Associate Professor Raymond Wong**

Cellular Reprogramming  
B. Biomed Sci (Hons), PhD



**Professor Mark Daniell**  
Corneal Research  
**MBBS, MS, FRANZCO, FRACS**



**Dr Thomas Edwards**  
Retinal Gene Therapy  
Research  
**MBBS, PhD, FRANZCO**



**Dr Jennifer Fan Gaskin**  
Ocular Fibrosis Research  
**MBChb, MD, FRANZCO**



**Professor Robyn  
Guymer AM**  
Macular Research  
**MBBS, PhD, FRANZCO,  
FAHMS**



**Associate Professor  
Guei-Sheung (Rick) Liu**  
Genetic Engineering  
Research  
**BMedSci, PhD**



**Dr Isabel Lopez Sanchez**  
Mitochondrial Biology and  
Disease  
**BSc, PhD**



**Associate Professor  
Chi Luu**  
Macular Research  
**BOrth (Hons), Grad Dip (Epi  
and Biostats), PhD, FARVO**



**Professor Keith Martin**  
Glaucoma Research  
**MA, BM, BCh, DM, MRCP,  
FRCOphth, FRANZCO, FARVO,  
ALCM**



**Associate Professor  
Zhichao Wu**  
Clinical Biomarkers and  
Macular Research  
**BAppSc(Optom), PhD, FAAO**



**Associate Professor Lisa  
Zhuoting Zhu**  
Ophthalmic Epidemiology  
**MD, PhD**

**For more details about our  
researchers visit [cera.org.au](http://cera.org.au)**

# Our Board

We extend the deepest appreciation to our Board members who give their time and expertise to provide strategic direction and governance to CERA.



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Chair  
BBus (Mkt) (Hons)



**Simon Brewin**  
Royal Victorian Eye  
and Ear Hospital  
BBus, Grad Dip HSM,  
MBL, GAICD



**Professor Peter  
Choong AO**  
University of Melbourne  
representative  
MBBS, MD, FRACS, FAOA



**Professor Andrew  
Cuthbertson AO**  
BMedSci, MBBS, PhD,  
FAA, FTSE, FAHMS



**Suwanee  
Dharmalingam**  
B.Comm (Accounting and  
Finance), LLB (UNSW)



**Christine Edwards**  
B App Sc, Post Grade Cert  
Public Sector Management,  
M Health Admin, GAICD,  
Post Grade Cert Editing  
and Publishing



**Professor Darren Kelly**  
BAppSc (MedLabSc), PhD,  
FASN



**Nuala Kilgallon**  
BComm (Hons), FCA



**Professor Keith Martin**  
MA, BM, BCh, DM, MRCP,  
FRCOphth, FRANZCO,  
FARVO, ALCM



**Wendy Miller**  
BA, LLB (Hons)

## Alternate Directors

**Llewellyn Prain**  
BA (Hons), LLB (Hons), GAICD  
(for Simon Brewin until July 2023)

**Professor Jenny Wilson-Berka**  
BSc (Hons), PhD (for Peter Choong AO)

**Associate Professor Peter van Wijngaarden**  
MBBS (Hons), PhD, FRANZCO  
(for Professor Keith Martin)

## CERA Executive team



**Leah Borsboom  
(on leave in 2023)**  
Chief Operating Officer  
and Company Secretary  
**LLB (Hons), GAICD**



**Tena Cheng**  
Chief Operating Officer  
**LLB, BSc**



**Fiona George**  
Head of Finance and  
Company Secretary  
**BBus (Acc), CPA, GAICD**



**Professor Robyn Guymer AM**  
Deputy Director  
Head of Macular Research  
Professor of Surgery (Ophthalmology)  
University of Melbourne  
**MBBS, PhD, FRANZCO, FAHMS**



**Professor Lyndell Lim**  
Head of Clinical Trials Research  
Professor of Surgery  
(Ophthalmology), University  
of Melbourne  
**MBBS, DMedSci, FRANZCO**



**Rowan Neilson**  
Head of Commercialisation  
and Legal  
**BSc/LLB (Hons)**



**Professor Keith Martin**  
CERA Managing Director,  
Head of Glaucoma Research  
Ringland Anderson Professor  
of Ophthalmology, University  
of Melbourne  
**MA, BM, BCh, DM, MRCP, FRCOphth,  
FRANZCO, FARVO, ALCM**



**Janine Sim-Jones**  
Head of Communication,  
Fundraising and Advocacy  
**BA (Journ) GradDipPR, GAICD**



**Professor Peter van Wijngaarden**  
Deputy Director  
Principal Investigator  
Ophthalmic Neuroscience  
Professor of Surgery (Ophthalmology),  
University of Melbourne  
**MBBS, PhD, FRANZCO**

# Abridged financials

## CONSOLIDATED STATEMENT OF FINANCIAL POSITION

as at 31 December 2023

	2023 \$'000	2022 \$'000
<b>ASSETS</b>		
<b>CURRENT ASSETS</b>		
Cash and cash equivalents	2,123	1,962
Trade and other receivables	1,300	1,381
Other assets	168	212
<b>TOTAL CURRENT ASSETS</b>	<b>3,591</b>	<b>3,555</b>
<b>NON-CURRENT ASSETS</b>		
Financial assets	32,035	30,893
Right-of-use assets	11,070	139
Property, plant and equipment	7,151	1,599
Trade and other receivables	121	207
<b>TOTAL NON-CURRENT ASSETS</b>	<b>50,377</b>	<b>32,838</b>
<b>TOTAL ASSETS</b>	<b>53,968</b>	<b>36,393</b>
<b>LIABILITIES</b>		
<b>CURRENT LIABILITIES</b>		
Trade and other payables	4,738	3,589
Employee benefits	2,357	2,276
Lease liability	944	252
<b>TOTAL CURRENT LIABILITIES</b>	<b>8,039</b>	<b>6,117</b>
<b>NON-CURRENT LIABILITIES</b>		
Lease liability	10,539	-
Borrowings	5,083	-
Employee benefits	205	158
<b>TOTAL NON-CURRENT LIABILITIES</b>	<b>15,827</b>	<b>158</b>
<b>TOTAL LIABILITIES</b>	<b>23,866</b>	<b>6,275</b>
<b>NET ASSETS</b>	<b>30,102</b>	<b>30,118</b>
<b>EQUITY</b>		
Reserves	19,352	17,774
Retained earnings	10,750	12,344
<b>TOTAL EQUITY</b>	<b>30,102</b>	<b>30,118</b>

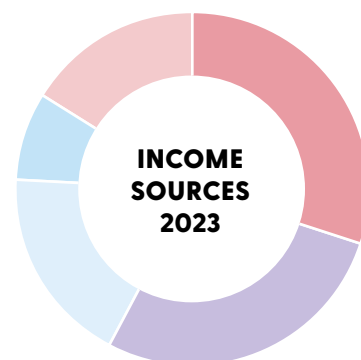
## CONSOLIDATED STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME

for the year ended 31 December 2023

	2023 \$'000	2022 \$'000
<b>REVENUE</b>		
Federal and State Government grants	6,838	6,211
Clinical Trials and contract research	6,356	6,279
Donations and bequests	4,151	3,555
Philanthropic and other grants	2,101	1,641
Investment and other income	3,608	2,321
<b>TOTAL REVENUE</b>	<b>23,054</b>	<b>20,007</b>
<b>EXPENSES</b>		
Research expenses	(14,076)	(12,879)
Research support expenses	(6,165)	(5,965)
Occupancy expenses	(371)	(15)
Depreciation	(1,649)	(661)
Finance expenses	(809)	(2,698)
<b>TOTAL EXPENSES</b>	<b>(23,070)</b>	<b>(22,218)</b>
<b>NET SURPLUS/(DEFICIT)</b>	<b>(16)</b>	<b>(2,211)</b>

*These abridged audited Financial Statements have been extracted from the full audited Financial Statements for CERA and its controlled entity. The full audited Financial Statements can be extracted from the ACNC (Australian Charities and Not-for-profits Commission) website.*

*CERA operates as a not-for-profit organisation. Accordingly, accumulated surpluses are held as reserves to support future research projects and operations.*



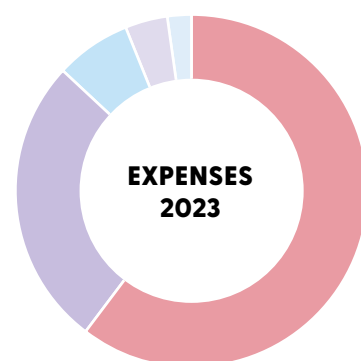
**30%** Federal and State Government grants

**28%** Clinical Trials and contract research

**18%** Donations and bequests

**8%** Philanthropic and other grants

**16%** Investment and other income



**61%** Research expenses

**27%** Research support expenses

**7%** Depreciation

**4%** Finance expenses

**2%** Occupancy expenses

## Supporters and acknowledgements

The support of these generous people and organisations enabled us to keep advancing our work towards a world free from vision loss and blindness.

**We are grateful for the many generous contributions to our research made by individual donors, along with the support of philanthropic trusts and foundations, industry, government and our member organisations.**

### Major gifts (\$10 000+)

Noel Alpins AM  
Rita Andre  
Dorothy Baylis  
Peter Clemenger AO  
Craig Kimberley OAM and  
Connie Kimberley  
Peter Lemon  
Dennis and Fairlie Nassau  
Justin and Sally O'Day  
Peto Brothers Pty Ltd  
Jaqui Maree and George  
Stamas AM

*We also pay tribute to donors who wish for their contributions to remain anonymous.*

### Trusts and Foundations (\$10 000+)

The Alcon Foundation  
Australian Vision Research  
(previously known as ORIA)  
Betty Brenda Spinks  
Charitable Trust  
BrightFocus Foundation  
CASS Foundation

Centre for Eye Research  
Australia Foundation  
Cuthbertson Family  
Foundation  
DHB Foundation  
Fighting Blindness Canada  
Foundation Fighting  
Blindness  
Fred Hollows Foundation  
Glaucoma Australia  
Gras Foundation  
Gwenneth Nancy Head  
Foundation  
Harold Mitchell Foundation  
Kel and Rosie Day Foundation  
Lions Ride for Sight - Lions  
District 201V3  
Macular Disease Foundation  
Australia  
Marjorie M Kingstone  
Charitable Trust  
Michelmore Foundation  
Mito Foundation  
Myra Stoicesco Charitable  
Trust  
National Foundation for  
Medical Research and  
Innovation

Peggy and Leslie Cranbourne  
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Perth Eye Foundation  
Ramaciotti Foundation  
Ruth Marie Sampson  
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Sir Edward 'Weary' Dunlop  
Medical Research  
Foundation  
The Danny Wallis Philanthropic  
Foundation Pty Ltd  
The Ian Potter Foundation  
The Millar Foundation  
The Yulgilbar Foundation  
Victorian Lions Foundation

### Bequests (\$10 000+)

Estate of Ahnya Chuah  
Estate of June Lois Cubbins  
Estate of Kathleen Lydia  
Fairweather  
Estate of Mavis Mary Ford  
Estate of Len John Grasso  
Estate of Beryl Haile  
Estate of Peter Ash Harley  
Estate of Noreen Marion  
McKendrick  
Estate of Harold Raymond  
Muir  
Estate of Lois Elizabeth Oliver  
Estate of Jacqueline Winifred  
Stephens



### **Corporate supporters**

Bayer Australia Ltd  
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Novartis Australia  
Roche

### **Royal Victorian Eye and Ear Hospital**

*We gratefully acknowledge  
the Royal Victorian Eye and  
Ear Hospital for facilitating  
support from the following  
donors for our research:*

H & L Hecht Trust

### **Endowments**

*We gratefully acknowledge  
the support of the University  
of Melbourne in the ongoing  
management and direction  
of the following endowed  
funds to support our research:*

Annemarie Mankiewicz-  
Zelkin Fellowship Fund

Dorothy Adele Edols  
Research Fund (managed  
by Perpetual Ltd)

Floris J & H Dallas Wiseman  
Charitable Trust

Hazel Jean Eastham Bequest  
Hector Maclean Fund

Louisa Jean de Bretteville  
Bequest

Maurice Cantlon Memorial  
Fund

Noel Curphey Fund

Ringland Anderson Chair  
of Ophthalmology Fund

The Mavis and Ivan Rowe  
Prize for Retinal Diseases  
Research

Winifred Hallam Monds  
Bequest

### **Government**

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National Health and  
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Victorian Medical Research  
Accelerator Fund  
Victorian Government  
Operational Infrastructure  
Support Fund

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Glaucoma Australia  
Royal Australian and  
New Zealand College of  
Ophthalmologists (RANZCO)  
Royal Victorian  
Eye and Ear Hospital  
University of Melbourne  
Victorian Lions Foundation  
Vision Australia

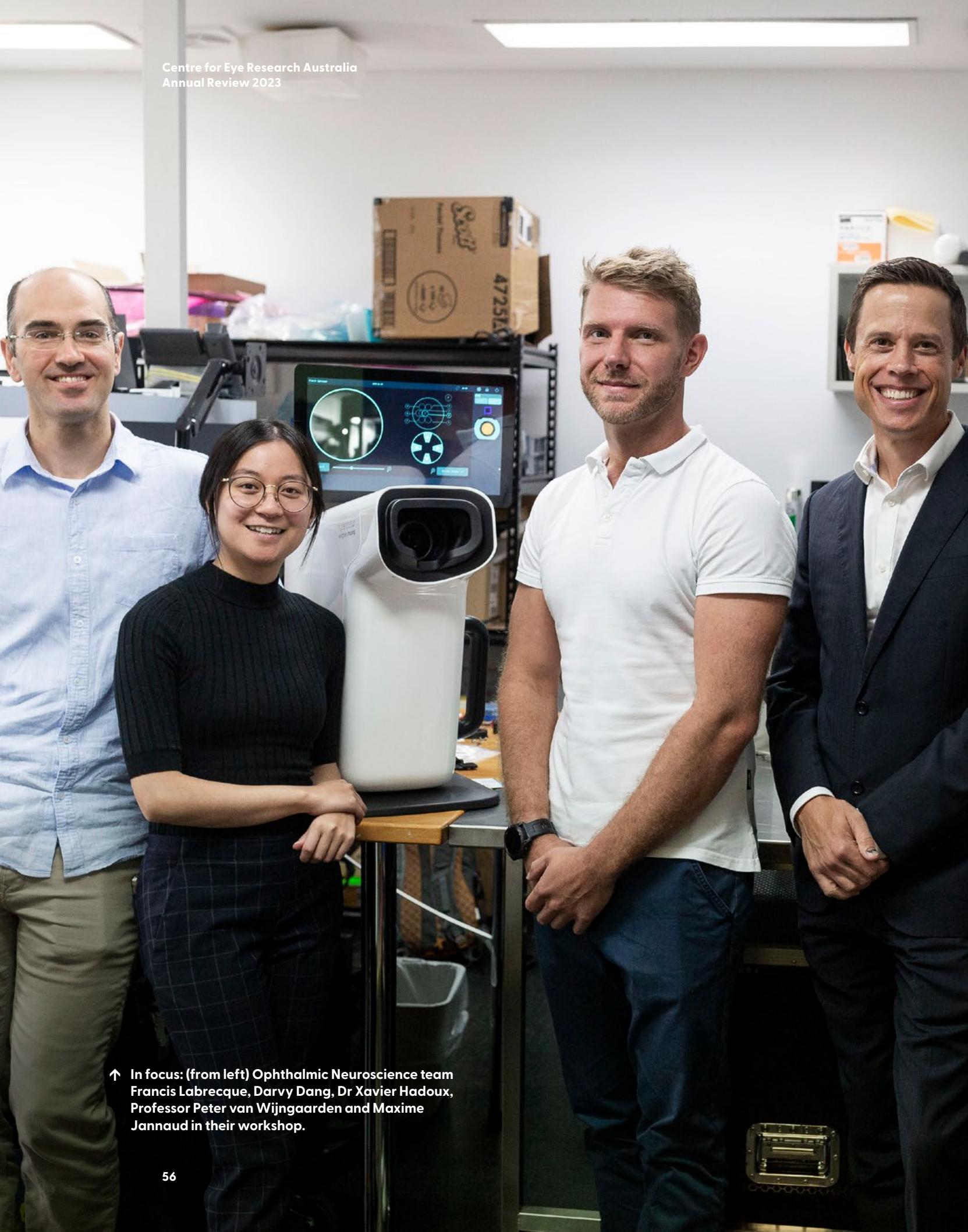
### **Partnerships and Associations**

Aikenhead Centre for  
Medical Discovery  
Association of Australian  
Medical Research Institutes  
(AAMRI)  
CCRM Australia  
International Agency for  
the Prevention of Blindness  
Medical Research  
Commercialisation Fund  
MedTech Actuator  
Melbourne Academic  
Centre for Health  
St Vincent's Hospital  
Melbourne  
World Health Organization

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The Hon Dr Barry Jones AC  
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Peter Nankivell  
Margaret S Ross AM  
Professor Hugh Taylor AC  
Professor Bob Williamson AO

CERA expresses its deepest sympathies on the passing of Harold Mitchell who made an indelible impact on CERA and was a passionate advocate for the eye health of Indigenous Australians. The Harold Mitchell Foundation supported 40 CERA PhD students and early career researchers with travel scholarships and supported the partnership between CERA and the University of Melbourne to publish the National Indigenous Eye Health Survey in 2009.



↑ In focus: (from left) Ophthalmic Neuroscience team Francis Labrecque, Darvy Dang, Dr Xavier Hadoux, Professor Peter van Wijngaarden and Maxime Jannaud in their workshop.

## How you can support us

### Donate

With your support, we can continue our world-leading research and accomplish scientific breakthroughs previously deemed unattainable.

Please visit [cera.org.au/donate](http://cera.org.au/donate)

### Leave a bequest

Make a gift in your will and leave a lasting legacy.

### Partnership and funding opportunities

As true innovators, our scientists are on the brink of new discoveries every day. For a confidential discussion about how you can partner with our researchers to help them discover new ways to prevent vision loss contact Ryan McCarthy, Senior Manager Philanthropy on [rmccarthy@cera.org.au](mailto:rmccarthy@cera.org.au) or +61 3 9929 8796.

### Register for a clinical trial

Be part of clinical research by registering at [ceruleaclinicaltrials.org.au/take-part-in-research](http://ceruleaclinicaltrials.org.au/take-part-in-research)

### Stay in touch

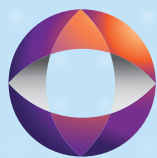
Visit our website [cera.org.au](http://cera.org.au) to receive our biannual supporter magazine *Visionary* or monthly e-newsletter *Eye-News*.

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