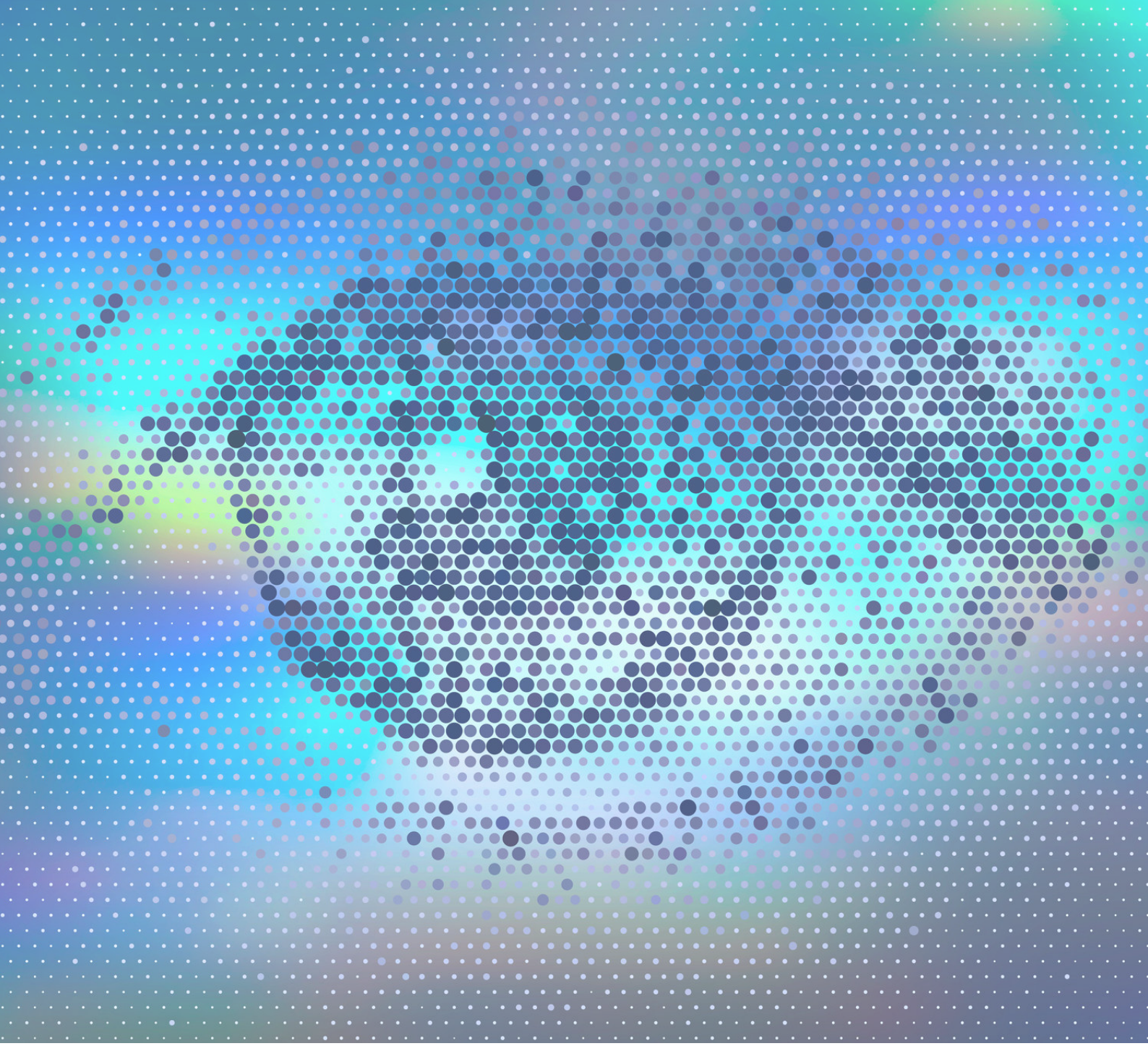
AUSTRALIAN VISION RESEARCH

70 YEARS EST. 1953

2023 Annual Report

Eye research changing lives.



Our Vision

We seek to alleviate the burden from blindness and vision impairment through research that discovers new knowledge and improves patient outcomes and clinical practice.

Our Mission

We support eye and vision research that prevents and treats disorders and discovers new knowledge in partnership with RANZCO and our stakeholders.

Contents

Chair's Report

Prof Stephanie Watson, OAM

In 2023, the Ophthalmic Research Institute of Australia, trading as Australian Vision Research celebrated its 70th year. We are pleased to present our 2023 report, a look back over the reporting period and the accomplishments of AVR, as well as an opportunity to thank those who have contributed to another successful year in ophthalmic research.

Research Grants

In 2023, the board of AVR **approved $586,095 for allocation towards 10 projects in 2024.** The amount of money available each year varies, and in 2023 AVR considered applications for grants of up to $60,000 for a research period of one year.

Priming grants were awarded to one team to support RANZCO fellows who are new to research, with the Australian Vision Research Board providing strategic advice during grant preparation.

I wish to acknowledge the wonderful work by the members of the Research Advisory Committee (RAC) led by Professor Alex Hewitt (Committee Chair) and Associate Professor Sam Fraser-Bell (Committee Secretary) for their dedication and stewardship of the grants process.

Numerous external reviewers along with the AVR executive team supported the Research Advisory Committee members. They carefully vetted the applications submitted, ensuring that AVR upheld the highest standards of governance and integrity in managing the grants program.

Independent Review of the Research Advisory Committee and Grants Process

I am pleased to share with you a summary of the independent review conducted by Emeritus Professor Keryn A Williams AC FAHMS PhD regarding our Research Advisory Committee and the grants process. Prof Williams' insights and recommendations provide us with valuable guidance to enhance our operations and maintain our commitment to excellence in ophthalmic research.

Key Findings

Grants Selection Process: The current selection process is effective, with no significant issues identified.

Process Improvements: Suggested non-onerous measures to further improve our procedures.

Adherence to "Good Practice": Acknowledged the lack of industry consensus on best practices, emphasising the importance of adhering to "good practice."

Alignment with NHMRC Practices: Encouraged aligning our practices with the National Health and Medical Research Council (NHMRC) where feasible.

Documentation Enhancement: Recommended better documentation for transparency and clarity, especially with respect to publicly listing the names of all Chief Investigators on successful grant applications, and all members of the Research Advisory Committee, in any year.

Conflict of Interest Management: Commended the effective management of conflicts of interest, especially by the Chair of the Research Advisory Committee, CEO and support staff.

External Reviewers' Conflict of interest (COIs): Identified the need for more stringent COI management at the external reviewer level.

RAC Chair's Role: Suggested that the Research Advisory Committee Chair be non-voting and refrain from submitting grants during their tenure as chair.

Grant Eligibility Policy: Praised the implementation of a policy disqualifying the previous year's grant winners from applying in the subsequent year.

Introduction of a 'Co-chair': Proposed a 'Co-chair' role to manage COIs during meetings.

External Reviewers: Move from two to one external reviewer per application.

Streamlining the Review Process: Recommended a preliminary Research Advisory Committee meeting for grant culling and nominating external reviewers.

Enhanced Engagement with External Reviewers: Suggested more active involvement of Research Advisory Committee members in engaging external reviewers through personalised communication.

RAC Terms of Reference: Advised the creation of clearer terms of reference for the Research Advisory Committee, outlining policies on COIs, quorums, and terms of office, including protocols for virtual meetings.

We are committed to continuously improving our processes to support and advance vision research in Australia. Your cooperation and contributions towards implementing these recommendations are highly appreciated. We are particularly keen to hear from people interested in serving on the Research Advisory Committee or as external reviewers.

Excellence Awards

This year, we announced the launch of the Australian Vision Research Excellence Awards at the 2023 RANZCO Congress held in Perth.

The Excellence Awards are an honour recognising members of Australian Vision Research for their exceptional contributions to ophthalmic research.

The Australian Vision Research Board of Directors encouraged all members to nominate deserving colleagues or self-nominate for any of the following prestigious Australian Vision Research Excellence Awards:

- Emerging Ophthalmic Researcher Award
- Women in Ophthalmic Research Award
- Distinguished Service to Ophthalmic Research Award

In addition to excellence in ophthalmic research, the Awards Committee will look for evidence of excellence in one or more of the following criteria:

1. Professional Accomplishments: The recipient should have made significant contributions to the field of ophthalmic research through their research, clinical practice, teaching, or leadership in the profession.

2. Impact on Patients: The recipient's work should have made a meaningful impact on patients' lives, either through improving their vision or overall eye health, advancing treatment options, or raising awareness about eye research.

3. Collaborative Work: The recipient should have demonstrated the ability to work effectively with others in the field of ophthalmic research, whether through collaborations on research projects, mentoring of junior colleagues, or involvement in professional organisations.

4. Innovation and Creativity: The recipient should have demonstrated a willingness to think outside the box and approach challenges in innovative ways, leading to novel discoveries or approaches to treatment.

5. Professional Ethics: The recipient should have demonstrated a commitment to upholding the highest standards of professional ethics and integrity, including honesty, transparency, and a dedication to advancing the field of ophthalmology for the benefit of patients.

6. Continued Excellence: The recipient should have a proven track record of continued excellence and dedication to the field of ophthalmic research, with a focus on ongoing professional development and contributions to the profession.

The first Australian Vision Research Excellence Awards will be presented at the 2024 RANZCO Congress to be held in Adelaide on 1-5 November 2024.

Governance Review

This year the AVR board also undertook a review of its constitution and skills matrix. The directors decided to restructure the board to better align with best practices in governance. The following resolutions were made:

A reduction in the number of "nominee directors" from "two" to "one" per RANZCO's request.

A change to the number of "elected directors" from "not less than 6 nor more than 14" to "not less than 6 nor more than 9" (each of whom must be an Ordinary Member).

Inclusion of "up to two independent non-executive directors to be appointed by the Board".

Donors, supporters and volunteers

Our work would not be possible without the support and donations of our members, sponsors and the community. On behalf of the board, I wish to thank the Royal Australian and New Zealand College of Ophthalmologists (RANZCO), the Perth Eye Foundation, and the Australian and New Zealand Society of Retinal Specialists (ANZSRS), along with the DW Fund, for their much-valued contributions.

Australian Vision Research continues to welcome new sponsors and corporate partners. As we enter our 70th year, we are actively seeking opportunities to partner with businesses, foundations and stakeholders who are keen to champion ophthalmic researchers. Partnership opportunities range from $1,500 trough to $100,000 with the option of tailored packages. For more information visit www.australianvisionresearch.org or please contact our team supporters@australianvisionresearch.org

Fellows and members of the public can also check out our resources page to get behind vision research while increasing patient engagement. Visit: www.australianvisionresearch.org/members

I wish to thank all the members of our board of directors, including my fellow office bearers Dr Jennifer Fan Gaskin (Company Secretary) and Clinical Associate Professor Paul Healey (Honorary Treasurer). Thank you also to all our members for their support of ophthalmic research.

Finally, I also wish to thank our AVR team consisting of Phillip Cenere (CEO), Hayley Cummings (Administration), and Betsy Pineda (Administration and Fundraising) for their efforts in ensuring that AVR delivers on its mission and strategic goals.

Professor Stephanie Watson OAM
Chair, Australian Vision Research

RANZCO's President report

Dr Grant Raymond

The past year has been another busy one for RANZCO. A year marked by significant changes to the regulatory landscape, which will impact greatly on College operations, as well as strategic direction. From the assessment of international medical graduates to the way we accredit training sites, the changes occurring will add to the resourcing burden of the College.

A future-focus has been a defining feature of RANZCO's advocacy efforts over the past year. Much has been achieved under the auspices of Vision 2030 and Beyond and the leadership of Fellows, Drs Justin Mora, Kristin Bell and Nitin Verma . These are the public faces and work horses of Vision 2030, and they have a small army behind them. The members RANZCO and AVR share provide the expertise, energy, and input into the work coordinated by these Clinical Leads. From Special Interest Groups to Collaborative Care working groups, our members have been making strides in the areas of public health, best-practice treatment, research and advocacy.

With travel coming back on line post COVID, there is the opportunity to commence travel again into the Asia-Pacific region to reignite RANZCO's sustainable international development work. While travel is occurring, technology is being increasingly utilised to share information and learning, without contributing to our carbon footprint. Of note, the WhatsApp group that assists Pacific Island doctors with clinical case management, and which is supported by many Fellows.

Many Fellows did travel to Perth for the 55th Annual Scientific Congress, while some preferred to watch the live stream from the comfort of their own homes and offices.
Congress provides a great opportunity for learning, committee work and networking.

The Global Eye Health Workshop was more popular than ever and speaks to the College's profile in the region, built off the work of dedicated Fellows. It was a privilege to preside over the Graduation and Awards Ceremony, where we saw Fellows being recognised for their exemplary contributions to our specialty, and the communities we serve.

The Perth Congress also signalled the official start of a new era of CPD for the College, with the Board approving the development and implementation of an innovative CPD ecosystem. The design of the system is based off months of work to understand what Fellows want, and do not want, from a CPD system, based on a human-centred design methodology. Since Perth, the CPD Committee and College staff from our education, member services and IT departments have been collaborating to design a system that effectively hides a complex system behind a user-friendly and simple interface. I hope to be able to report on the successful launch of this new ecosystem at the 56th Congress in Adelaide, 1-4 November 2024.

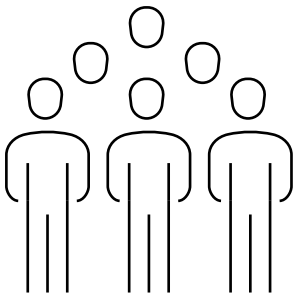
In reflecting on the year that has been, I consider RANZCO's achievements to be a team effort by the Fellows and our expert staff. Some 400 Fellows are involved in RANZCO committees and working groups. There are hundreds of Fellows involved in education as supervisors, tutors, directors of training and mentors, or involved with branches and special interest groups. Those involved in research are pushing the envelope for changes to the way we treat patients, bringing focus to prevention as well as management and cure. RANZCO's achievements also rest on the shoulders of the other organisations that strive for the prevention of avoidable blindness, like AVR.

To assist trainees to develop their ophthalmic research skills RANZCO has developed the Ophthalmic Practice Research Fundamentals Microlearning Course. This microlearning series, designed for trainees aspiring to step into the realm of research, offers a foundational exploration of the entire research process. From developing hypotheses to translating findings into clinical practice, trainees will gain insights into ophthalmology research intricacies.

They can test their knowledge and access resources to enhance proficiency.
A special thanks to the RANZCO Board, to Stephanie Watson who frequently attends our meetings to ensure alignment between our organisations, and to the College staff, ably led by CEO, Mark Carmichael.

Dr Grant Raymond
President RANZCO

Thanks to our reviewers



AVR would like to thank the external reviewers who kindly gave advice, helping with the allocation of the 2023/2024 grants. Their work is invaluable.

A/Prof Andrea Vincent

A/Prof Chameen Samarawickrama

A/Prof Daniel Peet

A/Prof George Kong

A/Prof Graham Wilson

A/Prof Guei-Sheung Liu

A/Prof Jason Lee

A/Prof Julie Lim

A/Prof Matthew Rutar

A/Prof Riccardo Natoli

A/Prof Samantha Fraser-Bell

Dr Amanda French

Dr Brent Gaskin

Dr Danial Roshandel

Dr David Alonso-Caneiro

Dr Doron Hickey

Dr Elisa Cornish

Dr Elsa Chan

Dr Fanfan Zhou

Dr Fred Chen

Dr Glyn Chidlow

Dr Graham Reeves

Dr Hamed Niyazmand

Dr Helen Chan

Dr Jennifer Fan Gaskin

Dr Jesse Gale

Dr Jie Zhang

Dr John Wood

Dr Jon Ruddle

Dr Kanmin Xue

Dr Karl Brown

Dr Katharina Bell

Dr Koushik Chakrabarty

Dr Lauren Wareham

Dr Lay Khoon Too

Dr Lewis Fry

Dr Lim Lim

Dr Lindsay McGrath

Dr Ling Zhu

Dr Lisa Nivison-Smith

Dr Lisa Zhuoting Zhu

Dr Maciej Daniszewski

Dr Mark Hassall

Dr Mark Taylor

Dr Michele Madigan

Dr Nicole Van Bergen

Dr Pietro De angeli

Dr Rajendra KC

Dr Roderick O'Day

Dr Samantha Lee

Dr Sandy Hung

Dr Sang Yoon Moon

Dr Shweta Kaushik

Dr Srujana Sahebjada

Dr Stephen Ng

Dr Thomas Campbell

Dr Thomas Gin

Dr Ting Zhang

Dr William Yates

Dr Luis Alarcon-Martinez

Mr William Myles

PhD Ivana Trapani

Prof Christina Grupcheva

Prof Jamie Craig

Prof Stuart Graham

Prof Alex Hewitt

Prof Doctor Daniel Aberdam

Prof Jodhbir Mehta

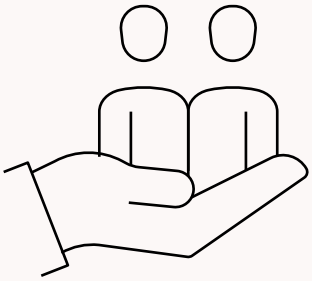
Prof Matthew Simunovic

Prof Michael Wormstone

Prof Nick Di Girolamo

Prof Rachel Martin

Thanks to our partners



The support of partners and individual supporters committed to the advancement of eye health and the ophthalmic medical practice has been vital.

We would like to offer a special thank you to all our generous partners and donors, including the DW Fund, The Perth Eye Foundation, the Australian and New Zealand Society of Retinal Specialists (ANZSRS) and RANZCO.

Enterprise Partner

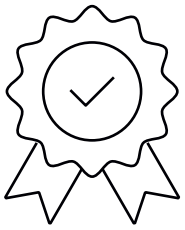
PERTH EYE FOUNDATION

Leading Partners

ANZSRS
Australian and New Zealand Society of Retinal Specialists

RANZCO
The Royal Australian and New Zealand College of Ophthalmologists
THE LEADERS IN COLLABORATIVE EYE CARE

Grants Approved 2023 for 2024



CHIEF INVESTIGATOR	RESEARCH PROJECT TITLE	OTHER INVESTIGATORS	GRANT NAME	AMOUNT
Dr Lay Khoon Too	Optogenetic Approaches For Vision Restoration	Prof Matthew Simunovic, Dr Dario Protti, A/Prof Leszek Lisowski	ANZSRS Grant	$60,000
Prof Robyn Jamieson	Discovering Novel Molecular Mechanisms For R P E65 Gene Therapy	Prof John Grigg	AVR Grant	$60,000
A/Prof Guei-Sheung Liu	A Non-invasive, On-demand Eye Drop-based Gene Therapy For Neovascular Blindness	A/Prof Chi Luu, Prof Bang V. Bui, Dr Luis Alarcon-Martinez, Dr David Cordeiro Sousa	AVR Grant	$60,000
Dr Vivek Gupta	Nuclear Receptor N R2 B1 Targeting In Glaucoma Via Nutritional Approach	Prof Stuart Graham, A/Prof Mehdi Mirzaei, Mr Viswanthram Palanivel	AVR Grant	$58,732
Dr John Wood	Probing Intercellular Metabolic Communication In The Inner Retina	Dr Michelle Sun	AVR Grant	$59,807
Dr Carla Abbott	Electrical Stimulation To Improve Gene Therapy Efficiency	A/Prof Penelope Allen, Dr Sandy Hung	AVR Grant	$60,000
Dr Jessica Tong	Dexamethasone In Orbital Cellulitis (D O C) Trial	Dr Krishna Tumuluri, Dr Thomas Hardy, Prof Dinesh Selva	Perth Eye Foundation Grant - PRIMING	$60,000
Dr Elsa Chan	Preventing Scarring In Glaucoma Surgery	Dr Jen Fan Gaskin, Dr Roy Kong	AVR Grant	$59,996
Dr Ting Zhang	Targeting Glucose-alanine Cycle To Treat Retinal Diseases	Prof Mark Gillies	NSW RANZCO Grant	$59,892
Dr Samantha Lee	Profiling The Choroidal Genetics To Determine Its Role In Myopia And Myopic Macular Degeneration.	Prof David Mackey, Prof Jeremy Guggenheim, A/ Prof Puya Gharahkhani, Dr David Alonso-Caneiro, Prof Scott Read	Perth Eye Foundation Grant	$47,668
Total approved in 2023 for 2024				**$586,095**

Our Board

Prof Stephanie Watson OAM (Chair)

A/Prof Paul Healey (Treasurer)

Dr Jennifer Fan-Gaskin (Secretary)

Dr Bill Glasson RANZCO Nominee

Prof Stuart Graham

Prof Matthew Simunovic

A/Prof Samantha Fraser-Bell

Prof Alex Hewitt

A/Prof Peter van Wijngaarden

A/Prof Richard Mills (retired 23/10/23)

A/Prof Chameen Samarawickrama (retired 23/10/23)

Dr Genevieve Oliver RANZCO Nominee (retired 23/10/23)

A/Prof George Kong (retired 23/10/23)

Prof David Mackey (retired 23/10/23)

Dr Richard Stawell (retired 23/10/23)

Our Chief Executive Officer

Phillip Cenere

Research Advisory Committee 23-24

Prof Alex Hewitt (Chair)

A/Prof Samantha Fraser-Bell (Secretary)

A/Prof George Kong

A/Prof Graham Wilson

Dr Jennifer Fan-Gaskin

A/Prof Michele Madigan

Prof Nick Di Giloramo

Dr Thomas Campbell

Dr Samantha Lee

Dr John Wood

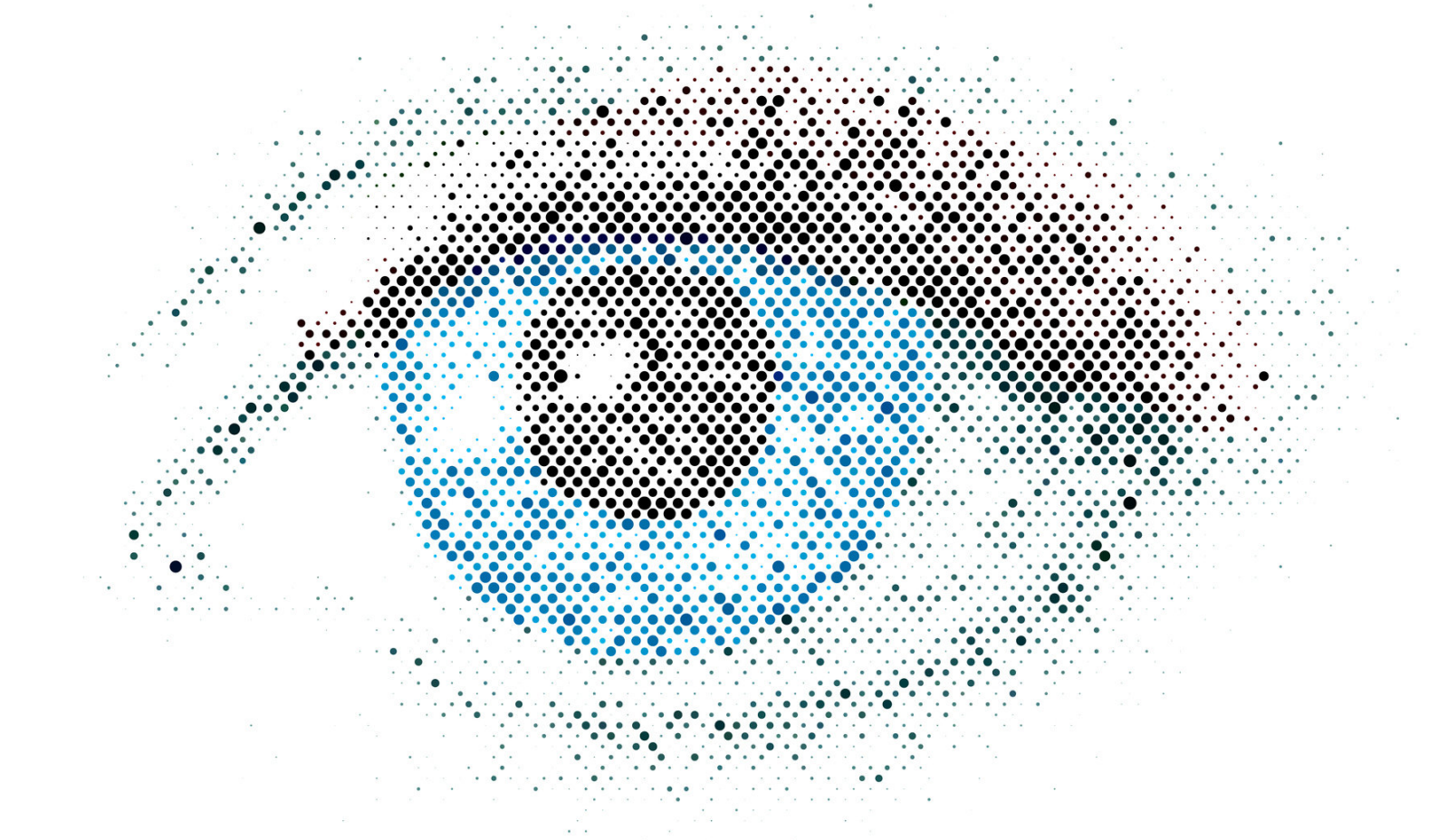
Dr Elisa Cornish

Dr Matthre Simunovic

Dr Danial Roshandel

Dr Mark Hasall

A/Prof Andrea Vincent



Progress Reports from the grant cycle 2021 – 2022

Perth Eye Foundation Grant

Establishing zebrafish morpholino as a model to study early-onset myopia

Chief Investigator: Dr Jessica Mountford
Co-investigators: Dr Livia Carvalho, Dr Patricia Jusuf, Dr Antony Clark

Aim
To examine genetic and environmental causes of childhood myopia using zebrafish.

Methods
Selected human myopia associated genes were knocked down in zebrafish larvae, to study how gene mutations affect developmental eye growth and in particular, myopia.

Key Results
We have established a rapid and reproducible platform for studying the effects of genetic mutation in the developing zebrafish larval eye. We have developed a method for imaging the larval eye using Optical Coherence Tomography (OCT) from as young as 3 days post fertilisation (dpf). We have identified the long-wavelength sensitive opsin as being a potential causative gene in the development of early-onset myopia and as a result, focusing our research on further elucidating the role of this gene in ongoing research.

Conclusion
We have established a rapid and reproducible platform for screening human myopia associated genes in zebrafish and highlighted a number of potential gene candidates.

Implications for Clinical Practice/Science and Future Research
Further studies involving this platform will help develop improved methods for screening children at risk of developing myopia and highlights potential gene candidates for gene therapy in the future. The next steps in this project involve generating knockout zebrafish lines of the genes highlighted from this project to further interrogate their role in the development in early-onset myopia.

Lay summary of outcomes
We have developed a screening platform using zebrafish as a model of childhood myopia. This platform enables us to study effects of both genetics and environmental factors such as outdoor activity and natural sunlight on the developing eye. By investigating such factors, we can develop improved methods to screen and treat myopia.

Presentations/Publications
2023 Australian New Zealand Zebrafish Meeting Conference: "Zebrafish as a model of refractive error for studying early-onset".

ANZSRS Grant

Therapies for the cone-rod dystrophies

Chief Investigator: Professor Robyn Jamieson
Co-investigators: Professor John Grigg

Aim
To investigate biomarkers of cone-rod dystrophies (CRD) in retinal organoids derived from patients with CRD, design novel therapeutic constructs to treat a form of CRD and determine efficacy of disease rescue.

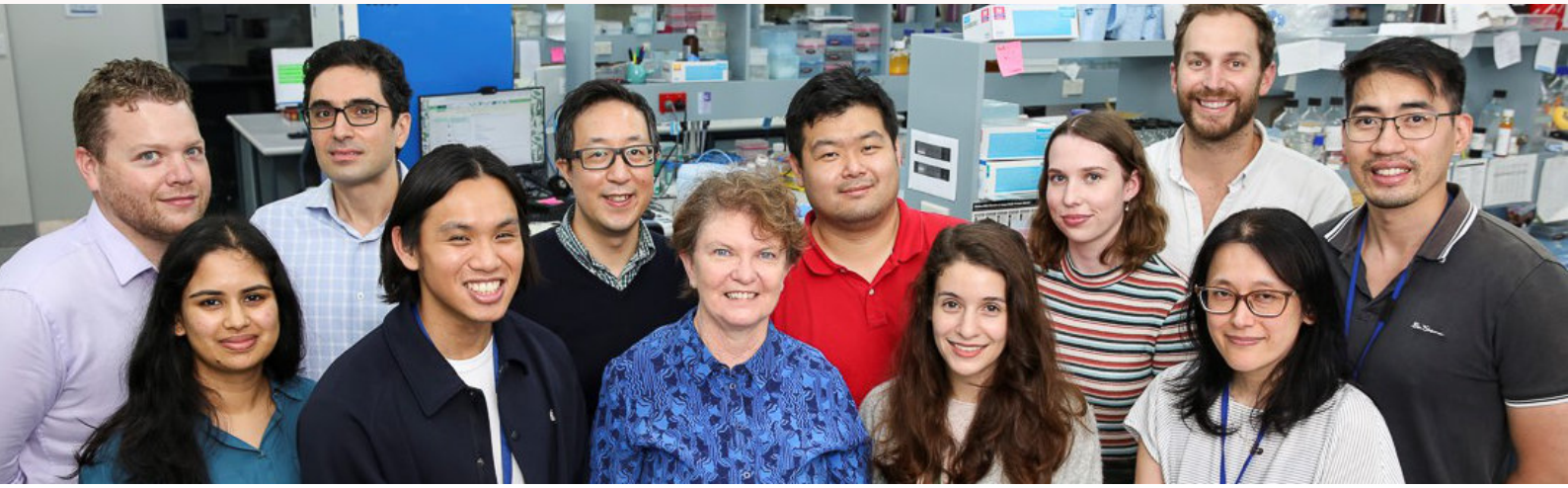
Methods
Patient-derived CRD iPSCs were created and CRISPR/Cas9 editing followed by homology directed repair was used to create isogenic control iPSCs. Patient-derived, isogenic and control iPSCs were differentiated to retinal organoids (ROs) and characterised by assessing cone and rod photoreceptor and ciliary markers. Genetic therapy constructs were created and investigated in CRD models and patient-derived ROs.

Key Results
Patient-derived iPSC lines were created from patients with two CRD genetic sub-types. In both cases, photoreceptor markers were decreased in patient organoids compared with control. Genetic therapy constructs were created for one of the CRD genes under investigation. Different therapy doses showed varying effects and preliminary results following administration of the therapy indicate rescue of the phenotype.

Conclusion
Human iPSCs differentiated to ROs provide a valuable model system to investigate biomarkers for therapy investigation in the CRDs. This project has led to valuable preclinical data regarding a novel genetic therapy for a form of CRD.

Implications for Clinical Practice/Science and Future Research
Human iPSCs differentiated to retinal organoids provide a useful system for therapy investigation in the CRDs. The biomarkers identified will also be used in genetic variant re-classification (Figure 1). Future research will further validate the therapy impact of the novel genetic therapy developed in this project, with plans towards regulatory approval and clinical trial funding.

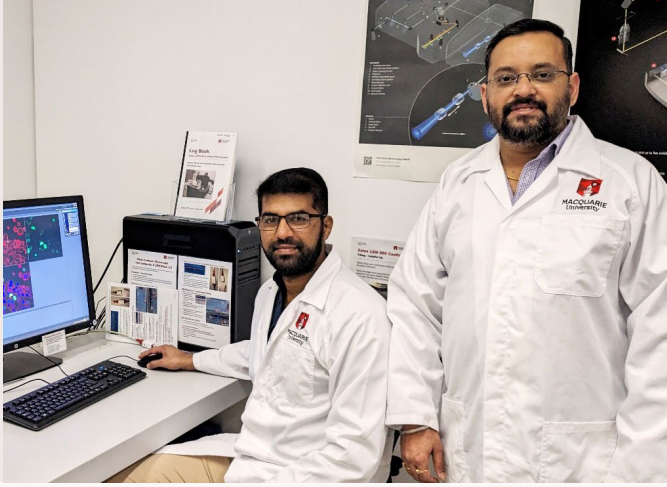
Lay summary of outcomes
Cone-rod dystrophies are a form of inherited retinal disease which lead to blindness with no current sight-saving therapy available. This research has led to development of therapeutic constructs with early indication of disease rescue.



NSW RANZCO Grant

The next generation of medicine-Gene therapy for glaucoma

Chief Investigator: Dr Devaraj Basavarajappa
Co-investigators: Dr Nitin Chitranshi, Dr Deepa Viswanathan



Aim
The primary aim of the study is to modulate sphingosine-1-phosphate receptor 1 (S1PR1) expression to study the neuroprotection effects of its signalling using gene therapy in a mouse model of glaucoma.

Methods
Modulation of S1PR1 expression in retinal ganglion cells (RGCs) was achieved by viral vector delivery. The effects of S1PR1 modulation were studied through retinal biochemical, structural, and functional analysis in the mice eyes exposed to glaucomatous injury induced by high intraocular pressure (IOP).

Key Results
Successful modulation of S1PR1 in the retina was achieved through viral vector delivery. Our results demonstrate that S1PR1 signaling plays a crucial role in protecting RGCs and optic nerve in high IOP-induced glaucoma conditions. Further, modulation of S1PR1 in glaucoma conditions suppressed the neuroinflammatory effects.

Conclusion
This study identified that S1PR1 is a potential neuroprotective therapeutic target and gene therapy-mediated S1PR1 modulation in the retina has positive implications and offers promising strategies to provide neuroprotection in glaucoma and in other CNS injury conditions.

Implications for Clinical Practice/Science and Future Research
The vision loss caused by glaucoma is irreversible, over 300,000 Australians live with glaucoma and almost 10% of the population over 80 years are affected. Current management is limited to lowering the IOP does not prevent the glaucoma progression. Therefore, understanding the molecular basis of disease pathology, in this case, the newly recognized neuroprotective role of S1P receptor modulation, will accelerate breakthrough targeted drug development for neuroprotection in glaucoma.

Lay summary of outcomes
Glaucoma is the most common cause of vision loss and despite our best treatments many patients continue to progress. We have identified a novel target protein sphingosine-1- phosphate receptor (S1PR) that plays a key role in glaucoma pathogenesis. Specific modulation of the S1PR1 will provide an innovative therapeutic target for the management of the disease.

Presentations/Publications
1. Basavarajappa D, Gupta V, Wall VR, Gupta V, Chitranshi N, Mirshahvaladi SSO, Palanivel V, You Y, Mirzaei M, Klistorner A, and Graham SL (2023). S1PR1 signaling attenuates apoptosis of retinal ganglion cells via modulation of cJun/Bim cascade and Bad phosphorylation in glaucoma. The FASEB Journal 37: e22710. doi:10.1096/fj.20220 1346R

2. Basavarajappa D, Gupta V, Chitranshi N, Wall RV, Rajput R, Pushpitha K, Sharma S, Mirzaei M, Klistorner A, Graham SL (2023). Siponimod exerts neuroprotective effects on the retina and higher visual pathway through neuronal S1PR1 in experimental glaucoma. Neural Regen Res 18(4):840-848. doi: 10.4103/1673-5374.344952.

3. Mirzaei M, Abyadeh M, Turner AJ, Wall RV,. Chick JM, Paulo JA, Gupta VK, Basavarajappa D, Chitranshi S, Mirshahvaladi SSO, You Y, Fitzhenry MJ, Amirkhani A, Haynes PA, Klistorner A, Gupta V, Graham SL (2022). Fingolimod effects on the brain are mediated through biochemical modulation of bioenergetics, autophagy, and neuroinflammatory networks. Proteomics 22(19-20):e2100247. https://doi.org/10.1002/pmic.202100247.

Humbley Foundation Grant

Genetic indicators of treatment response to anti-VEGF intraocular injections for diabetic macular oedema

Chief Investigator: Prof Kathryn Burdon
Co-investigators: Clinical Prof Nitin Verma, Dr Rajya Gurung, Clinical Prof Brendan Vote, Dr Bennet McComish

Aim
We aimed to identify specific genetic variants involved in the response to treatment of diabetic macular oedema with anti-VEGF drugs.

Methods
We sequenced exomes (all coding genes) in people who responded well to treatment and compared the sequences to people who did not respond to treatment. The data were combined with a genome-wide association study conducted in the same people.

Key Results
Several interesting variants in the gene encoding a receptor for VEGF has been identified. Further, evaluation of genes identified in the genome-wide association study conducted in these same patients has highlighted 2 rare variants, both in novel genes that may be associated. Multiple genetic variants are likely to be responsible for an individual's response to treatment for macular oedema. Additional work is required to confirm the role of variants identified here.

Implications for Clinical Practice/Science and Future Research
The project has moved us closer to understanding the genetics of treatment response and provided several genetic loci requiring follow-up. Other groups have already reached out to us on the basis of our earlier analysis to combine forces for a bigger study. Once these genetic findings are confirmed, they could form part of an individual assessment for each patient to determine the best course of treatment, or to decide to stop using an ineffective treatment earlier. This could save patients from unnecessary eye injections that do not work for everyone.

Lay summary of outcomes
This project has highlighted and specific genetic changes that may help us predict who will benefit from eye injections for diabetic macular oedema and who will not. We continue to analyse the data and combine with other studies to confirm our findings.

Presentations / Publications
The following publication uses genetic and clinical data obtained prior to this funding period, but also contributed directly to this study:

Gurung et al. Identifying Genetic Biomarkers Predicting Response to Anti-Vascular Endothelial Growth Factor Injections in Diabetic Macular Edema Int J Mol Sci 2022 Apr 6;23(7):4042. doi: 10.3390/ijms23074042

Preliminary findings for the exome sequencing data funding by this grant were presented at RANZCO 2022 in the AVR Plenary session by Prof Kathryn Burdon

AVR Priming Grant

Develop novel therapy for human Uveal Melanoma

Chief Investigator: A/Professor Fan Fan Zhou
Co-investigators: A/Prof Robert Max Conway, A/Prof Svetlana Cherepanoff

Aim
This project aims to investigate the cell killing mechanism and molecular target of NM2, a novel lead molecule identified by us, in the treatment of human Uveal Melanoma.

Methods
We explored the pharmacological characteristics of NM2 in four immortalised Uveal Melanoma and three patient tumor-derived cell lines. Our research methods include western blot, siRNA silencing, chemical inhibitor treatment, cell viability assays, flow cytometry etc.

Key Results
We found that the anti-cancer action of NM2 is eIF2α

Conclusion
NM2 is a novel drug candidate of Uveal Melanoma. It exerts its anti-cancer activity via modulating the RIPK1- and eIF2α-signaling. The ephrin receptor (Eph)/ephrin signalling may be the molecular target of NM2, which may be a novel therapeutic target of Uveal Melanoma.

Figure 1 The molecular mechanisms underpinning the anti-cancer effect of NM2 in human Uveal Melanoma.

Implications for Clinical Practice/Science and Future Research
This study revealed the molecular mechansims underpinning the anti-cancer effect of NM2 in human Uveal Melanoma. NM2 is a compound synthesized in our laboratory, which has superior anti-cancer potency in Uveal Melanoma. Our further research found that it kills Uveal Melanoma tumour cells via specific cell death mechanism. And our investigation also identified Ephrin receptor/ephrin signaling is possibly the molecular target of NM2. Such findings suggested that Ephrin receptor/ephrin signaling may be a novel therapeutic target of Uveal Melanoma. Considering there is no effective drug treatment available for this rare but deadly cancer at present, our findings suggested a new therapeutic strategy in the treatment of RIPK1-dependent and -related. We also found that several ephrin receptor isoforms are specifically involved in the anti-cancer activity of NM2 in the treatment of Uveal Melanoma. Uveal Melanoma. NM2 is warranted to be further investigated for its clinical application against this disease.

Lay summary of outcomes
Uveal melanoma (UM) is the most common eye cancer without effective treatments. Our novel agent NM2 shows high potency in treating UM. This project explored the mechanism of action of NM2 and proved its clinical potentials in the treatment of UM.

Presentations / Publications
• Liau S, Wang JZ, Zagarella E, Paulus P, Dang NH, Rawling T, Murray M, Zhou F. An update on inflammation in uveal melanoma. Biochimie. 2023 Apr 25;212:114-122.

• Shu W, Zhu X, Wang K, Cherepanoff S, Conway RM, Madigan MC, Zhu H, Zhu L, Murray M, Zhou F. The multi-kinase inhibitor afatinib serves as a novel candidate for the treatment of human uveal melanoma. Cell Oncol (Dordr). 2022 Aug;45(4):601-619

• Niu Y, Wang K, Zhu X, Zhang S, Cherepanoff S, Conway RM, Madigan M, Lim L, Zhu L, Murray M, Zhou F. The application of natural compounds in uveal melanoma drug discovery. J Pharm Pharmacol. 2022 May 20;74(5):660-680.

• Zhang S, Wang K, Zhu X, Cherepanoff S, Conway RM, Madigan MC, Zhu L, Murray M, Zhou F. The unfolded protein response and the biology of uveal melanoma. Biochimie 2022 Jan 29;197:9-18.

AVR Grant

Hyperspectral retinal imaging perfusion maps for retinal vascular diseases

Chief Investigator: A/Professor Peter van Wijingarde
Co-investigators: Dr Xavier Hadoux, A/Prof Lyndell Lim, Dr Amy Cohn, Darvy Dang

Aim

The aim of this study was to determine whether hyperspectral imaging could be used to identify areas of retinal ischaemia, as an alternative to fundus fluorescein angiography (FFA) or optical coherence tomography angiography (OCTA).

Methods

Participants: 446 participants were included in the study. 81 participants had retinal ischaemia, identified with either FFA or OCTA imaging. 365 control participants, comprised of a range of healthy people, those with glaucoma or intermediate age-related macular degeneration with no evidence of retinal ischemia, were also included in the study. All study participants underwent retinal hyperspectral imaging. The foveal avascular zone of control participants was utilised as an internal control for avascular parameter comparison.

Key Results

Overall Agreement:

• The model demonstrated high performance for the detection of retinal ischemia using hyperspectral images alone.

Ischemia Classification:
• Of a total 81 participants with known ischemia, the model correctly identified ischemia in 74 cases (91.4%).

Non ischemic Control Classification:
• In the control group (N=365), the model identified non-perfusion limited to the foveal area in 321 cases (87.9%).

Conclusion

We have successfully developed a deep learning model for the analysis of retinal hyperspectral images for the detection of retinal ischaemia. The model was developed to process spectral (multiple wavelength) and spatial information. The model is sensitive and specific (robust to comorbid retinal pathology) and may have promise in the detection of retinal ischaemia in primary eye care settings, or in specialist care as a precursor to OCTA or FFA.

Implications for Clinical Practice/Science and Future Research

We are in the process of developing an independent data set to validate and, if necessary, further refine our deep learning model. It is our expectation that the results of this study and the subsequent validation will be published and the subject of scientific presentations.

Lay summary of outcomes

We have shown that a new type of retinal photography with a rainbow-coloured flash can be used to detect areas of the retina that are not getting enough blood supply. Detecting impaired retinal blood supply can enable timely treatment of diabetic retinopathy and save sight.

AVR Grant

The Bacterial Ocular Surveillance System (BOSS)

Chief Investigator: Professor Stephanie Watson
Co-investigators: Prof Monica Lahra, A/Prof Richard Mills, Dr Steve Wiffen, Dr Maria Cabrera- Aguas,

Aim

We aim to report the type of bacteria and antibiotic resistance of bacteria isolated from corneal scrapings in bacterial keratitis (corneal infections) from 2019 to 2022.

Methods

A retrospective analysis of bacteria isolated from cornea scrapings from 12 centres in Sydney, Melbourne, Adelaide, and Perth from January 1, 2019 to December 31, 2022 was conducted. Bacteria were identified by MALDI-TOF mass spectrometry. Antibiotic susceptibilities were determined using standard methodology.

Key Results

There were 1791 organisms isolated. Of these, 1311 (73%) were Gram-positive and 480 (27%) Gram-negative organisms. Coagulase-negative staphylococci (CoNS) 32% (569/1791), Staphylococcus aureus 22% (398/1791), including 26 methicillin-resistant S. aureus (MRSA), Corynebacterium spp. 5% (83/1791); and Pseudomonas aeruginosa 14% (252/1791) were the most common organisms.

Antimicrobial non-susceptibility was found for CoNS to cefalotin 25%, chloramphenicol 12%, ciprofloxacin 7% and gentamicin 5%; methicillin-sensitive S. aureus (MSSA) to ciprofloxacin 6%, chloramphenicol 5%, gentamicin 1%; MRSA to ciprofloxacin 42% and gentamicin 8% and chloramphenicol 6%; Corynebacterium spp. to cefalotin 29%, ciprofloxacin 12%, chloramphenicol 9%; Pseudomonas aeruginosa to ciprofloxacin 2%, gentamicin 1.2%, and tobramycin 1%. All Gram-positive isolates were susceptible to vancomycin.

Conclusion

Coagulase negative Staphylococci were the main causal organisms of bacterial keratitis. Of these, one-quarter of these were resistant to cefalotin. An ongoing antimicrobial resistance surveillance program in ocular infections across Australia is needed to provide evidence-base therapy recommendations according to geographic locations.

Implications for Clinical Practice/Science and Future Research

Results from this study will inform ophthalmologists on treating patients with bacterial keratitis according to antibiotic susceptibilities in each region in Australia. It is known that antibiotic susceptibilities change according to climate and geographical regions.
Next steps are to continue this surveillance program nationwide including other sites such Tasmania, Australian Capital Territory, Queensland, and Northern Territory. We also aim to include other infectious conditions such as conjunctivitis and endophthalmitis.

Lay summary of outcomes

This study investigated the trends of bacteria and their antibiotic susceptibility from corneal scrapes from patients with corneal infection in Australia. Coagulase negative staphylococci were the main causal bacteria. Of these, 25% were resistant to cefalotin and 7% to ciprofloxacin.

Presentations / Publications

Cabrera-Aguas M, Lahra M, Daniell M, Wiffen S, Wong E, Chung-Wah-Cheong, Ingram P, Mills R, Watson S. The Bacterial Ocular Surveillance System (BOSS): preliminary results from the 2019-2020 national report. RANZCO Annual Congress. Best Paper presentation. Perth, Australia 2023

Cabrera-Aguas M, Lahra M, Watson S. The Bacterial Ocular Surveillance System. International Society for Eye Research (ISER) Biennial Meeting. Invited speaker. 2023

AVR Grant

Identifying cardiovascular disease parameters with high clinical relevance in primary open-angle glaucoma

Chief Investigator: Dr Ayub Qassim
Co-investigators: Dr Henry Marshall, Dr John Landers

Aim
To identify individual plasma lipid species, as well as ambulatory and nocturnal blood pressure markers relevant to POAG progression.

Methods
The relationship between 854 lipid species and longitudinal open angle glaucoma outcomes were investigated. Metrics derived from ambulatory blood pressure measurements were compared between glaucoma phenotypes: high-pressure, low-pressure and stable glaucoma patients.

Key Results
The serum concentration of 854 lipidomic species from 1300 participants were measured using Liquid Chromatography Mass Spectrometry. Forty-four of these species demonstrated associations with longitudinal outcomes for retinal nerve fiber layer thinning, fifteen of which were also associated with longitudinal rates of macular thinning. A multivariate lipidomic risk score derived from this analysis was then associated with rates of visual field loss in glaucoma.

Of 71 participants recruited, 52 successfully completed the full blood pressure protocol with high- quality data. Preliminary analyses showed those with normal-pressure glaucoma demonstrated higher day-time blood pressure readings, suggesting hypertension could contribute to some patients developing worse glaucoma than others. Recruitment was limited by changes in practice due to Covid-19, and network issues for safe online data storage.

Conclusion
The generous funding from this grant has provided preliminary data associating cardiovascular traits with open angle glaucoma outcomes and phenotypes.

Implications for Clinical Practice/Science and Future Research
Cardiovascular traits are modifiable risk factors for open angle glaucoma. The results of this study hope to enable better risk stratification and elucidate novel methods for treatment of this disease. Knowing that hypertension and dyslipidemia are related to glaucoma progression will allow clinicians and patients to identify and treat these comorbidities for improved glaucoma management, particularly for those that continue to develop poor glaucoma disease despite conventional glaucoma treatments.

Preliminary findings from this project have directly inspired another project. Utilizing artificial intelligence (AI), cardiovascular risk from retinal images will be calculated and tested whether this informs risk of glaucoma progression.
The results of this study also led to further publications that explored the relationship between anthropometric risk factors and of exercise in this disease.

Lay summary of outcomes
This study evaluated the association between modifiable cardiovascular outcomes and open angle glaucoma. It provides preliminary data showing that lipid species may be predictive of disease progression, and that blood pressure metrics may enable better delineation of clinical features of open angle glaucoma.

AVR Grant

Targeting Nrf2-MAFF pathway in Müller cells to treat macula degeneration

Chief Investigator: Dr Ling Zhu
Co-investigators: Prof Mark Gillies, Dr Ting Zhang

Aim
Our project was about understanding how a specific protein, MAFF, helps retina cope with harmful conditions and whether boosting this protein could prevent macular degeneration.

Methods
We did two main things: first, we reduced the amount of MAFF in retinal cells to see how they would cope under tough conditions. Then, we increased the amount of MAFF in retinal cells to observe any protective effects.

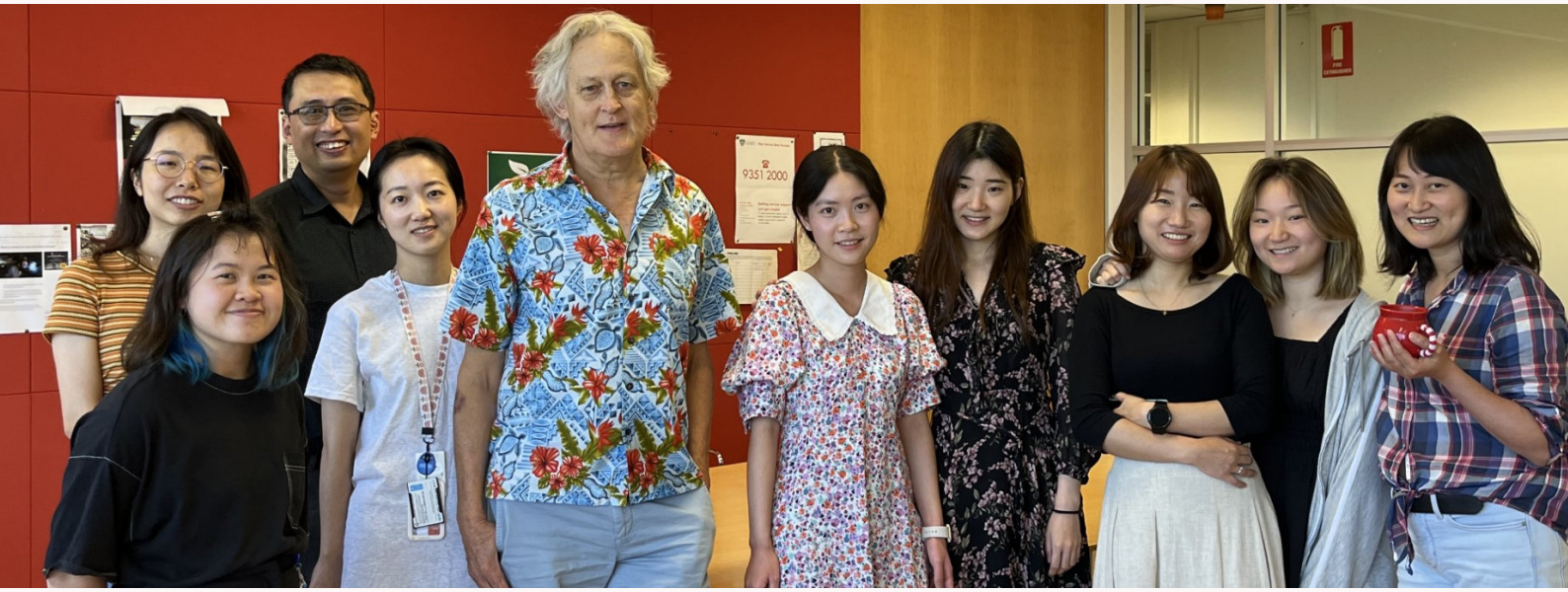
Key Results
We discovered that reducing MAFF made the retinal cells weaker and less able to function especially their energy-producing parts. However, increasing MAFF made these cells stronger and better at surviving stress.

Conclusion
MAFF turns out to be really important for keeping retinal cells healthy. By controlling how much MAFF these cells have, we might be able to protect the eyes from diseases.

Implications for Clinical Practice/Science and Future Research
Our study opens up a new possible way to treat eye diseases. We are now trying this approach in mice to see if it works in living creatures. If successful, this could lead to new treatments for eye diseases in humans.

Lay summary of outcomes
Exciting research reveals boosting MAFF protein in retinal cells could be one key to preventing macular degeneration, offering a new horizon in eye health and the potential for innovative treatments. Our findings pave the way for groundbreaking approaches in combating eye diseases.

Presentations / Publications
Zhang, J.; Zhang, T.; Zeng, S.; Zhang, X.; Zhou, F.; Gillies, M.C.; Zhu, L. The Role of Nrf2/sMAF Signalling in Retina Ageing and Retinal Diseases. Biomedicines 2023, 11, 1512. https://doi.org/10.3390/biomedicines11061512



AVR Grant

Is pseudoexfoliation syndrome triggered by viral infection?

Chief Investigator: Prof Jamie Craig
Co-investigators: A/Prof Owen Siggs, Dr Joshua Schmidt, Dr Sean Mullany

Aim
This study seeks to determine an association between a pseudo exfoliation syndrome and viral infection by using high-sensitivity next-generation sequencing techniques to isolate viral fragments in surgical biospecimens.

Interim report
This has been an ambitious and exciting project, currently still being undertaken under the approval of the RAC which granted an extention of a further 12 months for completion.

The team is currently in the process of analysing data and generating results for a total of 140 surgical samples which have been processed and genetically sequenced to generate DNA, total RNA, and microRNA datasets. For this project they have uniquely been able to sequence using each of these modalities for each individual sample type.

By applying metagenomic pipelines to DNA samples alone, the team identified 6,000,000 viral fragments across these samples which were collected from within the eyes of individuals undergoing routine cataract or glaucoma surgery.

Early results suggest that not only there may be several candidate pathogens which are associated with pseudoexfoliation syndrome, but that there is a diverse spectrum of microbial organisms within the eye.

There has been meticulous planning and execution of each step of this experiment to date. Perhaps most importantly, the final sequencing steps of generating genetic sequencing libraries was dramatically delayed by international shortages of reagents in the wake of COVID-19.

The team endeavoured to present these data at the RANZCO Congress in 2023. However, despite their efforts, they are not yet ready to present their results.

AVR Grant

Amyloid and Tau targeting to protect Retinal Ganglion Cell and Optic Nerve in glaucoma

Chief Investigator: A/Prof Vivek Gupta
Co-investigators: Prof Stuart Graham, A/Prof Mehdi Mirzaei

Aim

The aim of this study was to determine whether amyloid accumulation and Tau hyperphosphorylation are causes of neurodegenerative pathology in glaucoma. We aimed to elucidate whether the direct targeting of amyloid and tau can protect the retinal ganglion cells and optic nerve in glaucoma.

Methods

Adeno associated virus (AAV) constructs encoding amyloid precursor and tau genes were administered intravitreally into the mice. Mice were subjected to experimental glaucoma conditions using microbead injections to understand the effects of amyloid and tau protein modulation in both healthy and glaucoma conditions. The downstream effects of the modulation of these proteins on the retinal biochemical networks in health and glaucoma conditions were also examined.

Implications for Clinical Practice/Science and Future Research

The initial results are very promising. The experiments will need to be carried out using a larger animal model, which will help improve the translational potential of the study. Future studies will identify whether targeting of amyloid and tau proteins is protective only if the treatment is started before the injury or if it also protects the RGCs once the glaucoma injury has initiated.

Lay summary of outcomes

Glaucoma involves RGC degeneration along with optic nerve excavation. The mechanisms underlying this damage are not yet clear, however recent studies indicate that dysregulation of amyloid and /or tau proteins which are key pathological molecules in Alzheimer's and other neurodegenerative disorders may play a role. Our results indicate that modulating amyloid and/or tau proteins may serve as a mechanism-based strategy in vision preservation and provide new avenues for glaucoma treatment.

Role of amyloid and tau proteins in Retinal Ganglion Cell and Optic Nerve Injury in Glaucoma

Immunostaining of retinal sections and immunoblotting analysis revealed that amyloid precursor protein and tau proteins are well expressed in the retina. Amyloid and tau protein expression in different regions of the retina were assessed in human glaucoma tissues as well as in experimental glaucoma. Modulation of tau protein using adeno associated virus AAV was detrimental for the retina in healthy conditions. However, tau silencing imparted protection against retinal degenerative change sin glaucoma. Targeting amyloid precursor protein using AAV also was protective against selected degenerative markers in the retina.

Our results indicate that both amyloid and tau protein are important for maintaining retinal functional and structural microenvironment. Targeting these two molecules shows significant protective effects for RGCs in experimental glaucoma. Our results indicate that targeting of these two proteins could provide significant insights into the mechanisms underlying cellular degenerative change sin glaucoma and for future mechanism-based drug development.

Presentations / Publications

D Basavarajappa, C Galindo-Romero, Vivek Gupta, M Agudo-Barriuso, V Gupta, S Graham, N Chitranshi. Signalling pathways and cell death mechanisms in glaucoma: Insights into the molecular pathophysiology, Molecular Aspects of Medicine, 94, 2023, 101216.

Directors' Report

31 December 2023

The directors present their report on The Ophthalmic Research Institute of Australia operating as Australian Vision Research for the financial year from 1 January 2023 to 31 December 2023.

1. General information

Directors

The names of the directors in office at any time during, or since the end of, the period are:

Names	Position
Prof Stephanie Watson, NSW Chair	Chair
Dr Jennifer Fan Gaskin, Vic	Honorary Secretary
A/Prof Paul Healey, NSW	Honorary Treasurer
Prof Richard Mills, SA(Retired 24/10/2023)	Board Member
A/Prof Sam Fraser Bell, NSW	Board Member
Prof Stuart Graham, NSW	Board Member
Prof Alex Hewitt, TAS	Board Member
A/Prof George Kong, VIC (Retired 23/10/2023)	Board Member
Prof David Mackey, WA (Retired 23/10/2023)	Board Member
Dr Charmeen Samarawickrama, NSW (Retired 23/10/2023)	Board Member
A/Prof Peter Van Wijngaarden ,Vic	Board Member
Dr Richard Stawell AM, Vic (Retired 23/10/2023)	Board Member
Dr William (Bill) Glasson AO, QLD	RANZCO Nominee
Dr Matthew Simunovic, NSW	Board Member
Dr Genevieve Oliver, New Zealand (Retired 23/10/2023)	RANZCO Observer

Directors have been in office since the start of the financial period to the date of this report unless otherwise stated.

Principal activities

The principal activity of The Ophthalmic Research Institute of Australia during the financial period was to provide funds for ophthalmic research.

No significant changes in the nature of the Company's activity occurred during the financial period

Members' guarantee

The Ophthalmic Research Institute of Australia is a company limited by guarantee. In the event of, and for the purpose of winding up of the company, the amount capable of being called up from each member and any person or association who ceased to be a member in the period prior to the winding up, is limited to $ 10 for members that are corporations and $ 10 for all other members, subject to the provisions of the company's constitution.

Operating results and review of operations for the year

Operating result

The surplus of the Company for the financial period after accounting for other comprehensive income was $1,962,230 (2022: $ (774,831) deficit).

The Ophthalmic Research Institute of Australia

ABN 37 008 393 146

Directors' Report

31 December 2023

Meetings of directors

During the financial year, 3 meetings of directors (including committees of directors) were held. Attendances by each director during the year were as follows:

	Directors' Meetings	
	Number eligible to attend	Number attended
Prof Stephanie Watson, NSW Chair	3	3
Dr Jennifer Fan Gaskin. Vic	3	3
A/Prof Paul Healey, NSW	3	3
Prof Richard Mills, SA (Retired 24/10/2023)	3	3
A/Prof Sam Fraser Bell, NSW	3	3
Prof Stuart Graham, NSW	3	3
Prof Alex Hewitt, TAS	3	3
A/Prof George Kong, VIC (Retired 23/10/2023)	2	1
Prof David Mackey, WA (Retired 23/10/2023)	2	1
Dr Charmeen Samarawickrama, NSW (Retired 23/10/2023)	2	1
A/Prof Peter Van Wijngaarden ,Vic	3	2
Dr Richard Stawell AM, Vic (Retired 23/10/2023)	2	1
Dr William (Bill) Glasson AO, QLD	3	1
Dr Matthew Simunovic, NSW	3	2
Dr Genevieve Oliver New Zealand (Retired 23/10/2023)	2	1

Indemnification and insurance of officers and auditors

No indemnities have been given or insurance premiums paid, during or since the end of the financial year, for any person who is or has been an officer or auditor of The Ophthalmic Research Institute of Australia.

2. Other items

Events after the reporting date

No matters or circumstances have arisen since the end of the financial period which significantly affected or may significantly affect the operations of the Company, the results of those operations or the state of affairs of the Company in future financial years.

Future developments and results

Likely developments in the operations of the Company and the expected results of those operations in future financial years have not been included in this report as the inclusion of such information is likely to result in unreasonable prejudice to the Company.

Benefits received directly or indirectly by directors

No director of the company has since the end of the previous financial year received or become entitled to receive a benefit not disclosed in the accounts as directors' emoluments by reason of a contract made by the company or a related corporation with the directors, or with a firm in which he or she has a substantial financial interest.

Auditor's Independence Declaration

The lead auditor's independence declaration in accordance with section 307C of the *Corporations Act 2001*, for the period ended 31 December 2023 has been received and can be found on page 4 of the financial report.

Signed in accordance with a resolution of the Board of Directors:

Director: ..... DocuSigned by: Stephanie Watson .....
Prof Stephanie Watson, NSW Chair

Director: ..... DocuSigned by: Paul Healey .....
A/Prof Paul Healey, NSW

Dated 20 June 2024

Auditor's Independence Declaration under Section 307C of the Corporations Act 2001 to the Directors of The Ophthalmic Research Institute of Australia

I declare that, to the best of my knowledge and belief, during the period ended 31 December 2023, there have been:

(i) no contraventions of the auditor independence requirements as set out in the *Corporations Act 2001* in relation to the audit; and

(ii) no contraventions of any applicable code of professional conduct in relation to the audit.

DocuSigned by:
Andrew Fisher
AAF6D20261524AE...

Andrew Fisher FCA, Partner (auditor registration number 306364) on behalf of
BG Assurance Pty Ltd, Chartered Accountants
Authorised audit company registration number 294178 (ACN 115 749 598)

20 June 2024

Melbourne, Australia.

Statement of Profit or Loss and other Comprehensive income

For the Year Ended 31 December 2023

	2023	2022
	$	$
Investment Income	**727,818**	778,144
Trust Distribution Income	**31,612**	36,036
RANZCO Fee Income	**103,000**	125,035
Donation Income	**170,850**	151,000
Realised gain on disposal of investments	**-**	38,777
Bequest	**1,291,901**	-
Membership fee	**193,055**	237,200
Other Income	**127,228**	35,593
Total Income	**2,645,464**	1,401,785
Grants awarded	**(586,095)**	(498,663)
Employee Expenses	**(159,337)**	(144,220)
Administration expenses	**(253,225)**	(391,602)
Director of Research VIC	**(154,569)**	(195,000)
(Deficit) / Surplus before income tax	**1,492,238**	172,300
Income tax expense	**-**	-
(Deficit) / Surplus for the year	**1,492,238**	172,300
Net fair value movements for available-for-sale financial assets	**469,992**	(947,131)
Other comprehensive income for the year, net of tax	**469,992**	(947,131)
Total comprehensive (Deficit) / Surplus for the year	**1,962,230**	(774,831)

Statement of Financial Position

As At 31 December 2023

	Note	2023 $	2022 $
ASSETS			
CURRENT ASSETS			
Cash and cash equivalents	4	**2,102,647**	4,231,937
Trade and other receivables	5	**345,346**	313,127
Investments	6	**13,589,034**	9,390,178
TOTAL CURRENT ASSETS		**16,037,027**	13,935,242
NON-CURRENT ASSETS			
Property, plant and equipment		**2,777**	3,947
TOTAL NON-CURRENT ASSETS		**2,777**	3,947
TOTAL ASSETS		**16,039,804**	13,939,189
LIABILITIES			
CURRENT LIABILITIES			
Other liabilities	7	**1,596,830**	1,365,937
Provisions		**35,676**	25,184
Income received in advance		**-**	103,000
TOTAL CURRENT LIABILITIES		**1,632,506**	1,494,121
NON-CURRENT LIABILITIES			
TOTAL LIABILITIES		**1,632,506**	1,494,121
NET ASSETS		**14,407,298**	12,445,068
EQUITY			
Research Fund	8	**3,930,156**	2,638,254
Settled Funds	9	**472,556**	472,556
Financial Asset Revaluation Reserve	10	**1,391,235**	921,243
Capitalised Profit on re-arrangement of investments, capital distribution & transfers	11	**7,426,618**	7,426,618
Retained Surplus		**1,186,733**	986,397
TOTAL EQUITY		**14,407,298**	12,445,068

Statement of Changes in Equity

For the Financial Year Ended 31 December 2023

December 2023

	Reserves and Research Fund	Settled Funds	Realised Profits on Capital Distributions and Transfers	Financial Assets reserve	Retained earnings	Total
	$	$	$	$	$	$
Balance at 1 January 2023	**2,638,254**	**472,556**	**7,426,618**	**921,243**	**986,397**	**12,445,068**
Surplus for the period	-	-	-	-	**1,492,238**	**1,492,238**
Unrealised movement in investments	-	-	-	**469,992**	-	**469,992**
Transfer to / (from) Reserves	**1,291,902**	-	-	-	**(1,291,902)**	-
Balance at 31 December 2023	**3,930,156**	**472,556**	**7,426,618**	**1,391,235**	**1,186,733**	**14,407,298**

December 2022

	Research Fund	Settled Funds	Realised Profits on Capital Distributions and Transfers	Financial Assets reserve	Retained earnings	Total
	$	$	$	$	$	$
Balance at 1 January 2022	2,638,254	472,556	7,426,618	1,868,374	814,097	13,219,899
Surplus for the period	-	-	-	-	172,300	172,300
Unrealised movement in investments	-	-	-	(947,131)	-	(947,131)
Balance at 31 December 2022	2,638,254	472,556	7,426,618	921,243	986,397	12,445,068

Statement of Cash Flows

For the Financial Year Ended 31 December 2023

	Note	December 2023 $	December 2022 $
CASH FLOWS FROM OPERATING ACTIVITIES:			
Dividends Received		**1,890,236**	424,829
Trust Distributions		**212,773**	212,773
Other Revenue		**323,664**	590,109
RANZCO - Reimbursement of membership fees		**103,000**	362,235
Commissions		**(79,207)**	(125,741)
Research Grants Paid		**74,932**	(292,235)
Payments to suppliers and employees		**(925,824)**	(951,890)
Net cash provided by/(used in) operating activities	17	**1,599,574**	220,080
CASH FLOWS FROM INVESTING ACTIVITIES:			
Purchase of property, plant and equipment		**-**	(4,681)
Acquisition of Investments		**(3,728,864)**	2,172,304
Net cash provided by/(used in) investing activities		**(3,728,864)**	2,167,623
CASH FLOWS FROM FINANCING ACTIVITIES:			
Net increase in cash and cash equivalents held		**(2,129,290)**	2,387,703
Cash and cash equivalents at beginning of period / year		**4,231,937**	1,844,234
Cash and cash equivalents at end of financial period/ year	4	**2,102,647**	4,231,937

Notes to the Financial Statements

For the Period Ended 31 December 2023

The financial report covers The Ophthalmic Research Institute of Australia as an individual entity. The Ophthalmic Research Institute of Australia is a not-for-profit Company limited by guarantee, incorporated and domiciled in Australia.

The functional and presentation currency of The Ophthalmic Research Institute of Australia is Australian dollars.

Comparatives are consistent with prior years, unless otherwise stated.

1 Basis of Preparation

The financial statements are general purpose financial statements that have been prepared in accordance with the Australian Accounting Standards and the *Corporations Act 2001.*

The financial statements have been prepared on an accruals basis and are based on historical costs modified, where applicable, by the measurement at fair value of selected non-current assets, financial assets and financial liabilities.

Material accounting policies adopted in the preparation of these financial statements are presented below and are consistent with prior reporting periods unless otherwise stated.

2 Summary of Material Accounting Policies

2.1. Revenue and other income

Revenue from contracts with customers

The core principle of AASB 15 is that revenue is recognised on a basis that reflects the transfer of promised goods or services to customers at an amount that reflects the consideration the Company expects to receive in exchange for those goods or services. Revenue is recognised by applying a five-step model as follows:

1. Identify the contract with the customer

2. Identify the performance obligations

3. Determine the transaction price

4. Allocate the transaction price to the performance obligations

5. Recognise revenue as and when control of the performance obligations is transferred

Generally the timing of the payment for sale of goods and rendering of services corresponds closely to the timing of satisfaction of the performance obligations, however where there is a difference, it will result in the recognition of a receivable, contract asset or contract liability.

None of the revenue streams of the Company have any significant financing terms.

Notes to the Financial Statements
For the Period Ended 31 December 2023

2 Summary of Material Accounting Policies

2.1. Revenue and other income

Specific revenue streams

The revenue recognition policies for the principal revenue streams of the Company are:

Investment and Trust Distribution Income

Revenue is recognised upon receipt of the dividend and trust distribution statement is received by the investment manager.

Membership Income

Is recognised when the Company becomes entitled to it.

2.2. Income Tax

The Company is exempt from income tax under Division 50 of the *Income Tax Assessment Act 1997*.

2.3. Goods and services tax (GST)

Revenue, expenses and assets are recognised net of the amount of goods and services tax (GST), except where the amount of GST incurred is not recoverable from the Australian Taxation Office (ATO).

Receivables and payable are stated inclusive of GST.

Cash flows in the statement of cash flows are included on a gross basis and the GST component of cash flows arising from investing and financing activities which is recoverable from, or payable to, the taxation authority is classified as operating cash flows.

2.4. Financial instruments

Financial instruments are recognised initially on the date that the Company becomes party to the contractual provisions of the instrument.

On initial recognition, all financial instruments are measured at fair value plus transaction costs (except for instruments measured at fair value through profit or loss where transaction costs are expensed as incurred).

2 Summary of Material Accounting Policies

2.4. Financial instruments

Financial assets

All recognised financial assets are subsequently measured in their entirety at either amortised cost or fair value, depending on the classification of the financial assets.

Classification

On initial recognition, the Company classifies its financial assets into the following categories, those measured at:

- fair value through other comprehensive income - equity instrument (FVOCI - equity)

Financial assets are not reclassified subsequent to their initial recognition unless the Company changes its business model for managing financial assets.

Interest income, foreign exchange gains or losses and impairment are recognised in profit or loss. Gain or loss on derecognition is recognised in profit or loss.

Fair value through other comprehensive income

Equity instruments

The Company has a number of strategic investments in listed and unlisted entities over which are they do not have significant influence nor control. The Company has made an irrevocable election to classify these equity investments as fair value through other comprehensive income as they are not held for trading purposes.

These investments are carried at fair value with changes in fair value recognised in other comprehensive income (financial asset reserve). On disposal any balance in the financial asset reserve is transferred to retained earnings and is not reclassified to profit or loss.

Dividends are recognised as income in profit or loss unless the dividend clearly represents a recovery of part of the cost of the investment. Other net gains and losses are recognised in OCI.

Impairment of financial assets

Impairment of financial assets is recognised on an expected credit loss (ECL) basis for the following assets:

- financial assets measured at amortised cost
- investments measured at FVOCI

When determining whether the credit risk of a financial assets has increased significant since initial recognition and when estimating ECL, the Company considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis based on the Company's historical experience and informed credit assessment and including forward looking information.

2 Summary of Material Accounting Policies

2.4. Financial instruments

Financial assets

The Company uses the presumption that an asset which is more than 30 days past due has seen a significant increase in credit risk.

The Company uses the presumption that a financial asset is in default when:

- the other party is unlikely to pay its credit obligations to the Company in full, without recourse to the Company to actions such as realising security (if any is held); or
- the financial assets is more than 90 days past due.

Credit losses are measured as the present value of the difference between the cash flows due to the Company in accordance with the contract and the cash flows expected to be received. This is applied using a probability weighted approach.

Trade receivables

Impairment of trade receivables has been determined using the simplified approach in AASB 9 which uses an estimation of lifetime expected credit losses. The Company has determined the probability of non-payment of the receivable and multiplied this by the amount of the expected loss arising from default.

The amount of the impairment is recorded in a separate allowance account with the loss being recognised in finance expense. Once the receivable is determined to be uncollectable then the gross carrying amount is written off against the associated allowance.

Where the Company renegotiates the terms of trade receivables due from certain customers, the new expected cash flows are discounted at the original effective interest rate and any resulting difference to the carrying value is recognised in profit or loss.

Other financial assets measured at amortised cost

Impairment of other financial assets measured at amortised cost are determined using the expected credit loss model in AASB 9. On initial recognition of the asset, an estimate of the expected credit losses for the next 12 months is recognised. Where the asset has experienced significant increase in credit risk then the lifetime losses are estimated and recognised.

Notes to the Financial Statements
For the Period Ended 31 December 2023

2 Summary of Material Accounting Policies

2.5. Impairment of non-financial assets

At the end of each reporting period the Company determines whether there is evidence of an impairment indicator for non-financial assets.

Where an indicator exists and regardless for indefinite life intangible assets and intangible assets not yet available for use, the recoverable amount of the asset is estimated.

Where assets do not operate independently of other assets, the recoverable amount of the relevant cash-generating unit (CGU) is estimated.

The recoverable amount of an asset or CGU is the higher of the fair value less costs of disposal and the value in use. Value in use is the present value of the future cash flows expected to be derived from an asset or cash-generating unit.

Where the recoverable amount is less than the carrying amount, an impairment loss is recognised in profit or loss.

Reversal indicators are considered in subsequent periods for all assets which have suffered an impairment loss.

2.6. Cash and cash equivalents

Cash and cash equivalents comprises cash on hand, demand deposits and short-term investments which are readily convertible to known amounts of cash and which are subject to an insignificant risk of change in value.

3 Critical Accounting Estimates and Judgments

The directors make estimates and judgements during the preparation of these financial statements regarding assumptions about current and future events affecting transactions and balances.

These estimates and judgements are based on the best information available at the time of preparing the financial statements, however as additional information is known then the actual results may differ from the estimates.

The significant estimates and judgements made have been described below.

Key estimates - fair value of financial instruments

The Company has certain financial assets and liabilities which are measured at fair value. Where fair value has not able to be determined based on quoted price, a valuation model has been used. The inputs to these models are observable, where possible, however these techniques involve significant estimates and therefore fair value of the instruments could be affected by changes in these assumptions and inputs.

Key estimates - receivables

The receivables at reporting date have been reviewed to determine whether there is any objective evidence that any of the receivables are impaired. An impairment provision is included for any receivable where the entire balance is not considered collectible. The impairment provision is based on the best information at the reporting date.

Notes to the Financial Statements
For the Period Ended 31 December 2023

4 Cash and Cash Equivalents

	2023	2022
	$	$
Cash at bank and in hand	**2,102,647**	4,231,937
	2,102,647	4,231,937

5 Trade and Other Receivables

	2023	2022
	$	$
CURRENT		
Franking credit receivable	**288,693**	268,534
Other receivables	**56,653**	44,593
Total current trade and other receivables	**345,346**	313,127

The carrying value of trade receivables is considered a reasonable approximation of fair value due to the short-term nature of the balances.

6 Investments

	2023	2022
	$	$
CURRENT		
Listed shares	**13,589,034**	9,390,178
	13,589,034	9,390,178

7 Trade and Other Payables

	2023	2022
	$	$
CURRENT		
Other payables	**1,596,830**	1,365,937

Notes to the Financial Statements
For the Period Ended 31 December 2023

8 Research Capital Fund

	2023 $	2022 $
General		
Opening balance	**2,316,897**	2,316,897
Closing balance	**2,316,897**	2,316,897
Anselmi Estate		
Opening balance	**290,979**	290,979
Closing balance	**290,979**	290,979
Ivy May Stephenson Estate		
Opening balance	**30,376**	30,376
Closing balance	**30,376**	30,376
Oliver Mary Robinson Estate		
Funding received	**1,291,901**	-
Closing Balance	**1,291,901**	-
Total	**3,930,153**	2,638,252

9 Settled Funds

	2023 $	2022 $
D.W Research Funds	**200,000**	200,000
Esme Anderson	**124,326**	124,326
G.J Williams	**25,500**	25,500
B. Mitchell	**26,023**	26,023
Dame Ida Mann	**56,707**	56,707
Ronald & Lois Lowe	**40,000**	40,000
Total	**472,556**	472,556

10 Financial Assets Reserve

	2023 $	2022 $
CURRENT		
Opening balance 1 January	**921,243**	262,522
Revaluation (decrement)/ increment	**469,992**	658,721
Balance as at 31 December	**1,391,235**	921,243

Notes to the Financial Statements
For the Period Ended 31 December 2023

11 Capitalised Profit on Re-Arrangement of Investments, Capital Distributions & Transfers

	Balance 2023	Balance 2022
	$	$
Research Fund		
General	153,432	153,432
Anselmi Estate	54,957	54,957
Ivy May Stephenson	141	141
D.W Research Funds	5,344,969	5,344,969
Esme Anderson	1,079,844	1,079,844
G.J Williams	185,687	185,687
B. Mitchell	183,752	183,752
Dame Ida Mann	259,322	259,322
Ronald & Loise Lowe	164,515	164,515
Total	7,426,619	7,426,619

12 Members' Guarantee

The Company is incorporated under the *Corporations Act 2001* and is a Company limited by guarantee. If the Company is wound up, the constitution states that each member is required to contribute a maximum of $ 10 each towards meeting any outstanding obligations of the Company. At 31 December 2023 the number of members was 10 (2022: 10).

Notes to the Financial Statements
For the Period Ended 31 December 2023

13 Grants Allocated/ Made During the Year

	2023	2022
	$	$
A/Prof Liu Guei-Sheung	**60,000**	50,000
Dr Sandy Hung	**-**	50,000
Dr Hemal Mehta	**-**	50,000
Dr Jennifer Fan Gaskin	**-**	49,953
Dr Roderick O'Day	**-**	49,990
Dr Nick Girolamo	**-**	49,902
Prof Alex Hewitt	**-**	49,300
Dr Luis Alarcon-Martinez	**-**	49,875
A/Prof Ranjay Chakraborty	**-**	49,993
A/Prof Michele Madigan	**-**	49,650
Dr Lay Khoon Too	**60,000**	-
Prof Robyn Jamieson	**60,000**	-
Dr John Wood	**59,807**	-
Dr Carla Abbott	**60,000**	-
Dr Jessica Tong	**60,000**	-
Dr Vivek Gupta	**58,732**	-
Dr Elsa Chan	**59,996**	-
Dr Ting Zhang	**59,892**	-
Dr Samantha Lee	**47,668**	-
Total	**586,095**	498,663

14 Key Management Personnel Remuneration

The remuneration paid to key management personnel of The Ophthalmic Research Institute of Australia during the year is as follows:

	2023	2022
	$	$
Short-term employee benefits	**145,845**	134,037
Long-term benefits	**13,492**	10,184
	159,337	144,221

15 Auditors' Remuneration

	2023	2022
	$	$
Remuneration of the auditor BG Assurance Pty Ltd , for:		
- auditing or reviewing the financial statements	**12,000**	15,000
Total	**12,000**	15,000

Notes to the Financial Statements
For the Period Ended 31 December 2023

16 Contingencies

In the opinion of the Directors, the Company did not have any contingencies at 31 December 2023 (31 December 2022:None).

17 Cash Flow Information

Reconciliation of result for the year to cashflows from operating activities

	2023	2022
	$	$
Net surplus	**1,962,230**	(774,831)
Cash flows excluded from profit attributable to operating activities		
Non-cash flows in profit:		
- depreciation	**1,170**	734
- fair value movements on investments	**(469,992)**	947,131
- other non-cash movement	**-**	(82,476)
Changes in assets and liabilities:		
- increase/decrease in trade and other receivables	**(135,219)**	188,152
- increase/ decrease in trade and other payables	**152,961**	223,421
- increase/decrease in grants payable	**74,932**	(292,235)
- increase/(decrease) in employee benefits	**13,492**	10,184
Cashflows from operations	**1,599,574**	220,080

18 Events after the end of the Reporting Period

No matters or circumstances have arisen since the end of the financial year which significantly affected or may significantly affect the operations of the Company, the results of those operations or the state of affairs of the Company in future financial years.

19 Statutory Information

The principal place of business of the company is:
The Ophthalmic Research Institute of Australia
94-98 Chalmers St
Surrey Hills NSW 2010

Directors' Declaration

The directors of the entity declare that:

1. The financial statements and notes, as set out on pages 5 to 18, are in accordance with the *Corporations Act 2001* and:

   (a) comply with Australian Accounting Standards; and

   (b) give a true and fair view of the financial position as at 31 December 2023 and of the performance for the year ended on that date of the entity.

2. In the directors' opinion, there are reasonable grounds to believe that the entity will be able to pay its debts as and when they become due and payable.

This declaration is made in accordance with a resolution of the Board of Directors.

Director ..... DocuSigned by: Stephanie Watson
Prof Stephanie Watson, NSW Chair

Director ..... DocuSigned by: Paul Healey
A/Prof Paul Healey, NSW

Dated 20 June 2024

Independent Audit Report to the members of The Ophthalmic Research Institute of Australia

Report on the Audit of the Financial Report

Opinion

We have audited the financial report of The Ophthalmic Research Institute of Australia (the Company), which comprises the statement of financial position as at 31 December 2023, the statement of profit or loss and other comprehensive income, the statement of changes in equity and the statement of cash flows for the period then ended, and notes to the financial statements, including a summary of material accounting policies, and the directors' declaration.

In our opinion, the accompanying financial report of the Company is in accordance with the *Corporations Act 2001*, including:

(i) giving a true and fair view of the Company's financial position as at 31 December 2023 and of its financial performance for the period ended; and

(ii) complying with Australian Accounting Standards and the *Corporations Regulations 2001*.

Basis for Opinion

We conducted our audit in accordance with Australian Auditing Standards. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Report* section of our report. We are independent of the Company in accordance with the auditor independence requirements of the *Corporations Act 2001* and the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants (including Independence Standards)* (the Code) that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with the Code.

We confirm that the independence declaration required by the *Corporations Act 2001*, which has been given to the directors of the Company, would be in the same terms if given to the directors as at the time of this auditor's report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Directors for the Financial Report

The directors of the Company are responsible for the preparation of the financial report that gives a true and fair view in accordance with Australian Accounting Standards and the *Corporations Act 2001* and for such internal control as the directors determine is necessary to enable the preparation of the financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

In preparing the financial report, the directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

Auditor's Responsibilities for the Audit of the Financial Report

Our objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial report.

Independent Audit Report to the members of The Ophthalmic Research Institute of Australia

As part of an audit in accordance with the Australian Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial report, including the disclosures, and whether the financial report represents the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the directors with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, actions taken to eliminate threats or safeguards applied.

BG Assurance Pty Ltd

BG Assurance Pty Ltd, Chartered Accountants
Authorised audit company number 294178 (ACN 115 749 598)

DocuSigned by:
Andrew Fisher
AAF6D20261524AE...

Andrew Fisher FCA, Partner
Registration number 306364

Melbourne, Australia

Date:20 June 2024

The Ophthalmic Research Institute of Australia trading as
Australian Vision Research is registered with the
Australian Charities and Not-for-profits Commission (ACNC) ABN 37008393146

AUSTRALIAN VISION RESEARCH
australianvisionresearch.org