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Flinders Centre for Ophthalmology, Eye and Vision Research

ANNUAL REPORT 2014

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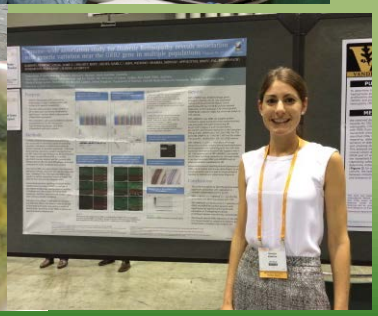
Flinders Centre for Ophthalmology, Eye and Vision Research



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Leader's Report, 2014-15

Summary of research in our Centre
Our Centre conducts research related to the eye. Based jointly in the Department of Ophthalmology (School of Medicine) and the Department of Optometry (School of Health Sciences) located within the Faculty of Medicine, Nursing and Health Sciences, our approaches include programs in clinical and translational research, strategic and applied research, and basic biomedical science.

Research higher degree student completions and current load
During 2014-5, three students (Dave, Irani and Kuot) submitted their PhD theses for external evaluation. All have been awarded their degrees and will graduate at ceremonies later in 2015. Our current PhD student load is 6 enrolled students.

Publications
From January 2014 to August 2015, members of the Centre have published (or have in press) 109 research articles, letters and editorials in peer-reviewed journals. Over the period 2009-2012, 12% of our articles and letters were in journals with impact factors of 5.0 or above. The figure has risen to 25% for 2014, and 33% for 2015 to date.

Grant funding
Centre members generated $2,470,302 in research grant income as Chief Investigators in 2014, according to the Flinders University Research Services Office, and $3,699,592 in 2014, according to the Centre's own records.

Presentations at national and international meetings
Since January 2014, Centre members have delivered over 90 presentations at international and national meetings. Of these, over 40 were by invitation.

Competitive fellowships, awards and prizes, recognition, collaborations and service
Members include one NHMRC Principal Research Fellow, one NHMRC Practitioner Fellow and one ARC Future Fellow. Centre members maintain extensive collaborations locally, nationally and internationally. Members belong to a variety of professional organizations, have organized scientific meetings, sit on national committees and editorial boards, and undertake extensive peer-review including on grant and fellowship review panels.

Research translation
The Centre operates the Centre for Clinical Eye Research in Evidence-Based Ophthalmology, the Australian and New Zealand Ophthalmic Surveillance Unit, the Australian and New Zealand Registry of Advanced Glaucoma, the Australian Corneal Graft Registry, and the Eye Bank of SA. Members ran an Evidence-based Ophthalmology Workshop in Hobart in 2015 and Evidence-based Optometry Workshops in Adelaide in 2014 and 2015.

Alignment with University Strategic Plan
We are increasing our research student load and mentoring, increasing our research outputs, growing our Centre size, increasing our collaborations, and increasing our service to the discipline and community. We are also attempting to improve, with some success, the quality of our publication outputs. We were delighted that our Centre was highlighted as a University Flagship in the recent Research Excellence publication (2015).

Mission Statement

Blindness has an enormous impact on quality of life, may shorten life-span and, according to the World Health Organization, is the most expensive of all causes of serious disablement. Our goal is to improve outcomes for patients in our community with blinding eye conditions.

Background to The Centre

Our Centre, first established in 2005 with support from Flinders University, conducts research related to the eye. Based in the Departments of Ophthalmology and Optometry, its members maintain extensive collaborations locally, nationally and internationally. Our common goal is to improve outcomes for patients in our community with blinding eye conditions. We focus on the nexus between vision and health, a major issue in Australia with its ageing population. Our over-arching goal is to improve patient outcomes. Our research programs encompass basic biomedical science, applied research, clinical research, translational research, and health services management research. Our multidisciplinary research programs are geared to:

- understanding the pathophysiology and genetic background of common eye conditions;
- developing novel ophthalmic therapeutic agents and biomaterials;
- establishing and interrogating registers for common eye disorders;
- understanding the relationships between optical quality and visual performance;
- developing patient-reported measures of quality of life and new methods of care delivery;
- improving the evidence-base that underpins effective eye and vision care.

We currently focus on:

- corneal dystrophies and ectasias;
- inflammatory and infective eye conditions;
- glaucoma;
- congenital and adult cataract;
- retinopathy of prematurity, diabetic retinopathy and aberrant ocular angiogenesis;
- central retinal artery and retinal vein occlusion;
- quality of life and patient-recorded outcomes;
- ophthalmic disease/condition registries.

Key Performance Indicators (KPIs)

- PhD and other research higher degree student load and completions;
- publications (number and quality) in peer-reviewed journals;
- award of external grant funding;
- presentations at national and international meetings;
- research translation into clinical practice;
- establishment and maintenance of collaborations;
- recognition through fellowships, awards and other esteem factors;
- service to the disciplines of Ophthalmology and Optometry; and
- ERA performance.

Our KPIs have traditionally been rolled into 5 *goals*, see overleaf.

Performance measured against our Goals and KPIs

Goal 1: Increase the level of high-quality research activity. Encourage, support and expand multi-disciplinary research teams and next generation research.
KPI: Number of publications in peer-reviewed journals will increase by 10% over three years, compared with baseline (2008-10 = 147, averaging 49 per year). The quality of the journals in which Centre members publish, as judged by impact factors, will also increase.
In 2014, we published 63 articles, reviews, letters and editorials in peer-reviewed journals. In 2015 to date, we have already published or have in press 46 such contributions. Of more importance, over the period 2009-2012, 12% of our articles and letters were in journals with impact factors of 5.0 or above. The figure has now risen to 25% for 2014, and 33% for 2015 to date. High-impact papers in 2014-5 include several in *Lancet* and others in *Nature Genetics*, and a paper in 2015 in *New Engl J Med*.

KPI: Support the next generation of researchers by increasing the number of young researchers and the number and size of our multidisciplinary research teams.
The Centre's membership now (from 2014) includes early-career researchers (ECR) Dr Mona Awadalla, Dr Jyoti Khadka, Dr Miriam Keane, Dr Shilpa Kuruvilla, Dr Shervi Lie, and Dr Yuefang Ma. Ophthalmology ECR Dr Miriam Keane was accepted in 2014 into the DVC-R's young research leaders' programme and Optometry ECR Dr Jyoti Khadka was chosen to attend an NHMRC Grants Review Panel in 2015 as an observer. Two members of the Centre, Professor Justine Smith and Professor Keryn Williams, acted as mentors in the University's mentoring Scheme for Early Career Researchers in 2014.

Our research teams include ophthalmologists, optometrists, a pathologist, biologists, a mathematician, a genetic counsellor and a psychologist, and are multidisciplinary in nature. The research team established in 2013 by Level E Strategic Research Professor, Professor Justine Smith, now an ARC Future Fellow, has grown to 8 individuals. The specialist national registries in Ophthalmology operated through the Centre have increased in size.

Goal 2: Recruit and graduate RHD students. Enhance the research environment to attract, retain and increase our higher degree research student load.
KPI: Recruit one new externally-funded postgraduate student in the next two years and increase the number of PhD students within the Centre by two, subject to available space.
One new PhD student (Mallika Prem Sathil) was recruited in 2014, and two new PhD students (Andrew Stempel and Himal Kandel) started in 2015. The current RHD student load is six PhD students and one Masters student. Three PhD students (Alpana Dave, Yazad Irani and Abraham Kuot) submitted their theses for external examination over 2014-5: all theses were passed and the degree of PhD awarded. Georgia Kaidonis and Tiger Zhou, both medical graduates undertaking PhDs, were awarded externally-funded scholarships in 2014-5.

Goal 3: Compete effectively in the external funding environment. Improve national and international recognition. Build links with industry and other external bodies.
KPI: Ten percent increase in dollar amount of external grant support over past three years, compared with baseline.
Baseline research funding in 2010 totalled $2,769,281 according to Research Services Office (RSO) figures and $2,663,296 according to our Centre's own figures (see page 28). In 2014, our research funding totalled $2,470,302 according to the RSO and $3,699,592 (>10% increase) according to our own figures (documented in detail on pages 30-33).

KPI: Increase members' attendance as invited speakers at national and international conferences.
At baseline (2008-2010), members had presented 22 invited talks at international and national conferences per year on average. In 2014, the number grew to over 40 such invitations.

KPI: Increase membership of key committees and societies by 5%, compared with baseline.
At baseline, memberships of committees and societies totalled 39. Currently, members (including student members) belong to, or serve upon, over 100 such committees and societies. Of note, Professor Smith was President of the Association for Research in Vision and Ophthalmology (ARVO), during 2013-14 and is 2015-16 President of the American Uveitis Society. Professor Williams served on NHMRC GRPs in 2014 and 2015, and the Viertel Senior Medical Fellowships Medical Advisory Board in 2014 and 2015.

KPI: Increase the number of research collaborations, compared with baseline.
The Centre manages over 85 active collaborations with individuals and groups (a substantial increase from baseline), as assessed by authorship on publications.

KPI: Increase industry contracts by two over three years.
Some contracts have been generated (e.g. with SpecSavers), but these are for purposes of clinical care or teaching. We consider that we have failed to meet this particular KPI and would welcome assistance in trying to identify new commercial opportunities.

Goal 4: Contribute to the well-being of our professions and the general community, increase the evidence-base that supports clinical care, and increase translation of our research.
KPI: Increase collaborations with external researchers in areas of community need, compared with baseline.
The FCOEVR has established collaborations with bodies such as Glaucoma Australia, The Royal Society for the Blind (community of the vision-impaired), Keratoconus Australia (community of those with the common eye disease, keratoconus), and the Multiple Sclerosis (MS) Society (community of those with MS-related eye disease).

KPI: Organise one Evidence-Based Ophthalmology Workshop on average per year.
The FCOEVR organised Evidence-based Optometry Workshops in Adelaide in 2014 and 2015, and an Evidence-based Ophthalmology Workshop in Hobart in 2015.

KPI: Centre seminar program, held weekly during University semesters, should involve speakers from outside the Centre and focus on interdisciplinary research.
The Program operates from March to December each year during University semesters and includes both internal and external speakers (see pages 44-47).

Goal 5: Achieve sustainability in the broad sense (not necessarily financial) and return value to the University on its investment.
The FCOEVR is a vibrant and productive group that has brought far more into Flinders University in terms of RIBG, SRE, RTS, patent income and the infrastructure levy, than it has cost in terms of Research Development Officer (RDO) salaries. We have increased the University's reputation through our publications, presentations, collaborations, awards, services to our discipline, as evidenced by our most recent ERA success (Ophthalmology and Optometry: ERA rank = 5).

Current Centre Membership

Professor Keryn Williams (Leader)
Dr Binoy Appukuttan (part-time)
Dr Mona Awadalla (on maternity leave from June 2015)
Dr Paul Badenoch†
Dr Veronika Bandara (to Feb 2015)
Associate Professor Celia Chen†
Professor Jamie Craig (Head of University Department of Ophthalmology)
Dr Alpana Dave (to Dec 2014; PhD awarded April 2015)
Dr David Hammond (to July 2014)
Dr Yazad Irani (PhD awarded June 2015)
Dr Miriam Keane
Dr Jyoti Khadka
Dr Abraham Kuot (PhD awarded August 2015)
Dr John Landers†
Dr Shervi Lie
Dr Yuefang Ma
A/Professor Richard Mills† (Head, FMC Department of Ophthalmology)
Professor Konrad Pesudovs (Head of Optometry)
Dr Shiwani Sharma
Professor Justine Smith
Dr Melinda Tea (to May 2014)
A/Professor Rod Watkins
Dr Jane Wells (to April 2015)

Affiliate, external and emeritus members
Dr Helen Brereton (retired)
A/Professor Kathryn Burdon (external)
Emeritus Professor Douglas Coster (retired)
A/Professor Sonja Klebe (affiliate)
Dr Colm McAlinden (external)
Dr Roman Serebrianik (external)

Clinical adjunct members
Dr Stewart Lake†
Dr Raymond Loh†
Dr Niladri Saha†
Dr Deepa Taranath†

Student members
Dr Jude Fitzgerald
Ms Sharhbanou (Shari) Javadiyan
Dr Georgia Kaidonis
Mr Himal Kandel (from 2015)
Dr Mallika Prem Sathil
Mr Andrew Stempel (from Sept 2015)
Dr Tiger Zhou

Research Associates and Assistants
Ms Susan Aldhous
Mr Liam Ashander
Mr Rhys Fogarty (to March 2014)
Dr Rachel Galettis (to Jan 2015)
Ms Ashleigh Hocking (to April 2015)
Ms Sarah Martin (to February 2015)
Ms Lauren Mortimer (maternity leave from May 2015)
Mrs Margaret Philpott (to Dec 2014)
Mr Stephen Pulbrook†
Ms Emily Pulford (from June 2015, part-time)
Ms Louise Wilson Smith (from April 2015, part-time)
Ms Emmanuelle Souzeau
Ms Jennifer Washington (from July 2015, part-time)

Adjunct members
Mr Andrew Brown (to Sept 2015, part-time)
Ms Madi Helm
Mrs Vicky Jones (part-time)
Mrs Lefta Leonardos (part-time)
Ms Bronwyn Ridge
Ms Karina Skrzpiec (part-time)

Research Development Officers
Ms Deb Sullivan
Ms Anne Cazneaux (to Oct 2014, part-time)

† SA Health/SA Pathology/FMC staff members

Governance

Governance of the Centre operates through an Executive Group comprising Professor Keryn Williams (contact for the University), A/Professor Richard Mills, Professor Jamie Craig, Professor Konrad Pesudovs, Professor Justine Smith and A/Professor Celia Chen, supported by the Centre's senior Research Development Officer (RDO), Ms Deb Sullivan.

The Executive Group meets formally twice yearly, but is convened more frequently on an *ad hoc* basis when circumstances require. Executive Group meetings are minuted and are available for review if required by the Deputy Vice-Chancellor (Research). Informal meetings are convened to organise the Centre's Evidence-Based Ophthalmology and Optometry Workshops ad to consider joint external grant applications.

Research Higher Degree Students

Current PhD students

Ms Sharhbanou Javadiyan (Ophthalmology)
Dr Georgia Kaidonis (Ophthalmology)
Mr Himal Kandel (Optometry)
Dr Mallika Prem Sathil (Optometry)
Mr Andrew Stempel (Ophthalmology)
Dr Tiger Zhou (Ophthalmology)

Current Masters student

Dr Jude Fitzgerald (Ophthalmology)

History of RHD doctoral student completions and load, 2010-2015

2010	*Completions*	Douglas Coster, DSc Sue Abhary, PhD Celia Chen, PhD by published work Sarah Brice, PhD David Dimasi, PhD	*Load*	Mona Awadalla Alison Clarke
2011	*Completions*		*Load*	Mona Awadalla Alison Clarke Alpana Dave Yazad Irani Abraham Kuot
2012	*Completions*		*Load*	Mona Awadalla Alison Clarke Alpana Dave Yazad Irani Abraham Kuot Sharhbanou Javadiyan
2013	*Completions*	Mona Awadalla, PhD Alison Clarke, PhD	*Load*	Alpana Dave Yazad Irani Abraham Kuot Sharhbanou Javadiyan Georgia Kaidonis Tiger Zhou
2014	*Completions*		*Load*	Alpana Dave Yazad Irani Abraham Kuot Sharhbanou Javadiyan Georgia Kaidonis Tiger Zhou Mallika Prem Sathil
2015	*Completions*	Alpana Dave, PhD Yazad Irani, PhD Abraham Kuot, PhD	*Load*	Sharhbanou Javadiyan Georgia Kaidonis Tiger Zhou Mallika Prem Sathil Andrew Stempel Himal Kandel

Highlights of 2014-15

Plenary Talks, Publications, Awards, Outreach, Notable Collaborations

Professor Justine Smith delivered a plenary lecture in 2014 at the Congress of the Chinese Ophthalmological Society. She will deliver the President's Symposium Talk at the 2015 International Ocular Inflammation Society Congress, and presented the 2015 Inaugural Lecture in the new Flinders Investigators' Public Lecture Series. A manuscript published in New Engl J Med in May 2015 on Ebola uveitis generated intense interest in the international and national press and was the subject of a plenary presentation at ARVO in Denver, Colorado in the same month.

Professor Jamie Craig co-authored two manuscripts, one as senior author, published in the high-ranking journal Nature Genetics (impact factor = 29.4) in 2014, and a further two in 2015. He presented two plenary talks by invitation at the 2015 International Glaucoma Congress, and two at the Tasmanian RANZCO branch meeting in 2015. He continues to establish many productive national and international collaborations, as evidenced by his publication record. His work has also received substantial media attention in 2014-15.

Associate Professor Richard Mills, as Medical Director of the Eye Bank of SA, regularly provides presentations to Lions Clubs as part of the Eye Bank's programme of community outreach. He also chairs the Centre's weekly internal seminar programme. He delivered a platform presentation at the 32nd Annual Australia and New Zealand Cornea Society Meeting, in Perth in 2015, and was participant in the Centre's 2015 Evidence-Based Ophthalmology Workshop in Hobart in 2015.

Professor Konrad Pesudovs received the American Public Health Association Vision Care Section 2014 Outstanding Scientific Paper Award, and shared an award by the American Public Health Association for publications on the Global Burden of Disease. He is currently a member of a number of international committees including the Swedish National Cataract Register Steering Group and the International Consortium for Health Outcomes Measurement (ICHOM) Ophthalmology Group. In 2015, he was elected Chairman of the Board, National Vision Research Institute.

Professor Keryn Williams continues to serve as a member of the Charles and Sylvia Viertel Medical Advisory Board, and was appointed to NHMRC Grant Review Panels in 2014 and 2015. She was an invited speaker and Member of Faculty at a Gordon Research Conference on the Biology and Pathobiology of Cornea (California) in 2014 and as Scientific Director of the Australian Corneal Graft Registry, was an invited speaker at the Global Alliance of Eye Bank Associations Scientific Meeting and at the World Cornea Congress VII in San Diego, in 2015. In May 2015, the Australian Corneal Graft Registry celebrated its 30th birthday. Since its inception in 1985, over 30,000 records of corneal transplantation from across the country have been registered by over 750 ophthalmic surgeons.

Research Outputs

Publications

Data from 2010-2013 inclusive are as provided by RSO, September 2015. Data from 2014-2015 are from the Centre's records, as documented in the list below the table.

Year	Peer-reviewed articles	Book chapters	Letters/editorials/other	Total
2010	63	3	44	110
2011	52	1	32	85
2012	66	1 (book)	44	110
2013	56	1	20	77
2014	54	0	9	63
2015	41*	0	6	47

* to date, including those in press

Publications 2014-15

Refereed journal articles, 2014 calendar year

1. **Awadalla, MS, Burdon KP, Souzeau E, Landers J**, Hewitt AW, **Sharma S**, **Craig JE.** (2014) Mutation in TMEM98 in a large white kindred with autosomal dominant nanophthalmos linked to 17p12-q12. *JAMA Ophthalmology*, 132(8) pp. 970-7. (Impact factor = 3.3)

2. Bharadwaj AS, Schewitz-Bowers LP, Wei L, Lee RWJ, **Smith JR**. (2014) Intercellular adhesion molecule 1 mediates migration of Th1 and Th17 cells across human retinal vascular endothelium. *Invest Ophthalmol Vis Sci*, 54(10) pp. 6917-25. (Impact factor = 3.4)

3. **Bandara KV**, Michael MZ, Gleadle JM. (2014) Hypoxia represses microRNA biogenesis proteins in breast cancer cells. *BMC Cancer*, 14: 533. doi: 10.1186/1471-2407-14-533. (Impact factor = 3.4)

4. Bourne RR, Jonas JB, Flaxman SR, Keeffe J, Leasher J, Naidoo K, Parodi MB, **Pesudovs K**, Price H, White RA, Wong TY, Resnikoff S, Taylor HR, Vision Loss Expert Group of the Global Burden of Disease Study. (2014). Prevalence and causes of vision loss in High-Income Countries and in Eastern and Central Europe: 1990-2010. *Br J Ophthalmol*, 98(5) pp. 629-638. (Impact factor = 3.0)

5. Crabb M, Chan WO, **Taranath D**, Huilgol SC. Intense pulsed light therapy (IPL) induced iritis following treatment for a medial canthal capillary malformation. (2014) *Australas J Dermatol*; 55(4):289-91. (Impact factor = 1.1)

6. Coster DJ, Lowe MT, Keane MC, **Williams KA**. (2014) A comparison of lamellar and penetrating keratoplasty outcomes: A registry study. *Ophthalmology*; 121(5) pp. 979-987. (Impact factor = 6.1)

7. Crawford A, **Souzeau E**, Agar A, **Ridge B**, Dubowsky A, **Burdon KP, Craig JE** (2014) Identification of a novel MYOC mutation, p.(Trp373*), in a family with open angle glaucoma. *Gene*; 545(2):271-5. (Impact factor = 2.1)

8. **Cugati S, Chen CS, Lake S**, Lee AW. (2014) Fingolimod and macular edema: Pathophysiology, diagnosis, and management. *Neurology: Clinical Practice*; 4(5) pp. 402-409.

9. Fong CS, Mitchell P, Rochtchina E, **Cugati S**, Hong T, Wang JJ. (2014) Three-year incidence and factors associated with posterior capsule opacification after cataract surgery: The Australian Prospective Cataract Surgery and Age-related Macular Degeneration Study. *Am J Ophthalmol*; 157(1):171-9. (Impact factor = 3.9)

10. Frauenfelder C. Woods CM, Hussey DJ, Ooi EH, **Klebe S,** Carney AS. (2014) Aquaporin expression profiles in normal sinonasal mucosa and chronic rhinosinusitis. *International Forum of Allergy and Rhinology*; 4(11) pp. 901-908.

11. Gharahkhani P, **Burdon KP, Fogarty R, Sharma S**, Hewitt AW, **Martin S**, Law MH, Cremin K, Bailey JN, Loomis SJ, Pasquale LR, Haines JL, Hauser MA, Viswanathan AC, McGuffin P, Topouzis F, Foster PJ, Graham SL, Casson RJ, Chehade M, White AJ, **Zhou T, Souzeau E, Landers J**, Fitzgerald JT, **Klebe S**, Ruddle JB, Goldberg I, Healey PR; Wellcome Trust Case Control Consortium 2; NEIGHBORHOOD Consortium, **Mills RA**, Wang JJ, Montgomery GW, Martin NG, Radford-Smith G, Whiteman DC, Brown MA, Wiggs JL, Mackey DA, Mitchell P, Macgregor S, **Craig JE** (2014) Common variants near ABCA1, AFAP1 and GMDS confer risk of primary open-angle glaucoma. *Nature Genetics*, 46(10) pp. 1120-1127. (Impact factor = 29.4)

12. Hysi PG, Cheng CY, Springelkamp H, Macgregor S, Bailey JN, Wojciechowski R, Vitart V, Nag A, Hewitt AW, Höhn R, Venturini C, Mirshahi A, Ramdas WD, Thorleifsson G, Vithana E, Khor CC, Stefansson AB, Liao J, Haines JL, Amin N, Wang YX, Wild PS, Ozel AB, Li JZ, Fleck BW, Zeller T, Staffieri SE, Teo YY, Cuellar-Partida G, Luo X, Allingham RR, Richards JE, Senft A, Karssen LC, Zheng Y, Bellenguez C, Xu L, Iglesias AI, Wilson JF, Kang JH, van Leeuwen EM, Jonsson V, Thorsteinsdottir U, Despriet DD, Ennis S, Moroi SE, Martin NG, Jansonius NM, Yazar S, Tai ES, Amouyel P, Kirwan J, van Koolwijk LM, Hauser MA, Jonasson F, Leo P, Loomis SJ, **Fogarty R**, Rivadeneira F, Kearns L, Lackner KJ, de Jong PT, Simpson CL, Pennell CE, Oostra BA, Uitterlinden AG, Saw SM, Lotery AJ, Bailey-Wilson JE, Hofman A, Vingerling JR, Maubaret C, Pfeiffer N, Wolfs RC, Lemij HG, Young TL, Pasquale LR, Delcourt C, Spector TD, Klaver CC, Small KS, **Burdon KP**, Stefansson K, Wong TY; BMES GWAS Group; NEIGHBORHOOD Consortium; Wellcome Trust Case Control Consortium 2, Viswanathan A, Mackey DA, **Craig JE**, Wiggs JL, van Duijn CM, Hammond CJ, Aung T. (2014). Genome-wide analysis of multi-ancestry cohorts identifies new loci influencing intraocular pressure and susceptibility to glaucoma. *Nature Genetics*; 46(10) pp. 1126-1130. (Impact factor = 29.4)

13. Hudson AL, Weir C, Moon E, Harvie R, **Klebe S**, Clarke SJ, Pavlakis N, Howell VM. (2014). Establishing a panel of chemo-resistant mesothelioma models for investigating chemo-resistance and identifying new treatments for mesothelioma. *Scientific Reports*, 4 pp. Article: 6152. (Impact factor = 5.6)

14. Jonas JB, Bourne RR, White RA, Flaxman SR, Keeffe J, Leasher J, Naidoo K, **Pesudovs K**, Price H, Wong TY, Resnikoff S, Taylor HR; Vision Loss Expert Group of the Global Burden of Disease Study. (2014). Visual impairment and blindness due to macular diseases globally: A systematic review and meta-analysis. *American Journal of Ophthalmology;* 158(4) pp. 808-815. (Impact factor = 3.9)

15. Forward H, Yazar S, Hewitt AW, Khan J, Mountain JA, **Pesudovs K**, McKnight CM, Tan AX, Pennell CE, Mackey DA, Newnham JP. Multiple prenatal ultrasound scans and ocular development: 20-year follow-up of a randomized controlled trial. *Ultrasound Obstet Gynecol*. 2014 Aug;44(2):166-70.

16. Gyawali, R., Mohamed, F.N., Bist, J., Kandel, H., Marasini, S. and **Khadka, J**. (2014). Compliance and hygiene behaviour among soft contact lens wearers in the Maldives. *Clinical and Experimental Optometry*, 97(1) pp. 43-47. (Impact factor = 1.3)

17. Jonas JB, George R, Asokan R, Flaxman SR, Keeffe J, Leasher J, Naidoo K, **Pesudovs K**, Price H, Vijaya L, White RA, Wong TY, Resnikoff S, Taylor HR, Bourne RR; Vision Loss Expert Group of the Global Burden of Disease Study. (2014). Prevalence and causes of vision loss in Central and South Asia: 1990-2010. *Br J Ophthalmology*, 98(5) pp. 592-598. (Impact factor = 3.0)

18. **Kaidonis G, Abhary S**, Daniell M, Gillies M, **Fogarty R**, Petrovsky N, Jenkins A, Essex R, Chang JH, Pal B, Hewitt AW, **Burdon KP, Craig JE**. (2014). Genetic study of diabetic retinopathy: recruitment methodology and analysis of baseline characteristics. *Clinical and Experimental Ophthalmology*, 42(5) pp. 486-493. (Impact factor = 2.4)

19. **Kaidonis G, Mills RA, Landers J, Lake S, Burdon KP**, **Craig J**. (2014) Review of the prevalence of diabetic retinopathy in Indigenous Australians. *Clinical and Experimental Ophthalmology*, 42(9); 875-82. (Impact factor = 2.4)

20. **Keane M, Coster D**, Ziaei M, **Williams K**. (2014) Deep anterior lamellar keratoplasty versus penetrating keratoplasty for treating keratoconus. *Cochrane Database Syst Rev*. 2014 Jul 22;7:CD009700. doi: 10.1002/14651858.CD009700.pub2. (Impact factor = 6.0)

21. Keay L, Palagyi A, McCluskey P, Lamoureux E, **Pesudovs K**, Lo S, Ivers R, Boufous S, Morlet N, Ng JQ, Stapleton F, Fraser M, Meuleners L. (2014). Falls in older people with cataract, a longitudinal evaluation of impact and risk: the FOCUS study protocol. *Inj Prev*; 20(4):e7. doi: 10.1136/injuryprev-2013-041124. (Impact factor = 1.9)

22. Keeffe J, Taylor HR, Fotis K, **Pesudovs K**, Flaxman SR, Jonas JB, Leasher J, Naidoo K, Price H, White RA, Wong TY, Resnikoff S, Bourne RR; Vision Loss Expert Group of the Global Burden of Disease Study. (2014). Prevalence and causes of vision loss in Southeast Asia and Oceania: 1990-2010. *British Journal of Ophthalmology*, 98(5) pp. 586-591. (Impact factor = 3.0)

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1. Aung T, Ozaki M, Mizoguchi T, Allingham RR, Li Z, Haripriya A, Nakano S, Uebe S, Harder JM, Chan AS, Lee MC, Burdon KP, Astakhov YS, Abu-Amero KK, Zenteno JC, Nilgün Y, Zarnowski T, Pakravan M, Safieh LA, Jia L, Wang YX, Williams S, Paoli D, Schlottmann PG, Huang L, Sim KS, Foo JN, Nakano M, Ikeda Y, Kumar RS, Ueno M, Manabe S, Hayashi K, Kazama S, Ideta R, Mori Y, Miyata K, Sugiyama K, Higashide T, Chihara E, Inoue K, Ishiko S, Yoshida A, Yanagi M, Kiuchi Y, Aihara M, Ohashi T, Sakurai T, Sugimoto T, Chuman H, Matsuda F, Yamashiro K, Gotoh N, Miyake M, Astakhov SY, Osman EA, Al-Obeidan SA, Owaidhah O, Al-Jasim L, Al Shahwan S, Fogarty RA, Leo P, Yetkin Y, Oğuz Ç, Kanavi MR, Beni AN, Yazdani S, Akopov EL, Toh KY, Howell GR, Orr AC, Goh Y, Meah WY, Peh SQ, Kosior-Jarecka E, Lukasik U, Krumbiegel M, Vithana EN, Wong TY, Liu Y, Koch AE, Challa P, Rautenbach RM, Mackey DA, Hewitt AW, Mitchell P, Wang JJ, Ziskind A, Carmichael T, Ramakrishnan R, Narendran K, Venkatesh R, Vijayan S, Zhao P, Chen X, Guadarrama-Vallejo D, Cheng CY, Perera SA, Husain R, Ho SL, Welge-Luessen UC, Mardin C, Schloetzer-Schrehardt U, Hillmer AM, Herms S, Moebus S, Nöthen MM, Weisschuh N, Shetty R, Ghosh A, Teo YY, Brown MA, Lischinsky I; Blue Mountains Eye Study GWAS Team; Wellcome Trust Case Control Consortium 2, Crowston JG, Coote M, Zhao B, Sang J, Zhang N, You Q, Vysochinskaya V, Founti P, Chatzikyriakidou A, Lambropoulos A, Anastasopoulos E, Coleman AL, Wilson MR, Rhee DJ, Kang JH, May-Bolchakova I, Heegaard S, Mori K, Alward WL, Jonas JB, Xu L, Liebmann JM, Chowbay B, Schaeffeler E, Schwab M, Lerner F, Wang N, Yang Z, Frezzotti P, Kinoshita S, Fingert JH, Inatani M, Tashiro K, Reis A, Edward DP, Pasquale LR, Kubota T, Wiggs JL, Pasutto F, Topouzis F, Dubina M, **Craig JE**, Yoshimura N, Sundaresan P, John SW, Ritch R, Hauser MA, Khor CC. A common variant mapping to CACNA1A is associated with susceptibility to exfoliation syndrome. *Nat Genet*. 2015 Apr;47(4):387-92. doi: 10.1038/ng.3226. Epub 2015

Feb 23. Erratum in: *Nat Genet*. 2015 Jun;47(6):689. (Impact factor = 29.4)

2. **Awadalla MS**, Fingert JH, Roos BE, Chen S, Holmes R, Graham SL, Chehade M, Galanopolous A, **Ridge B, Souzeau E, Zhou T, Siggs OM**, Hewitt AW, Mackey DA, **Burdon KP, Craig JE** (2015). Copy number variations of TBK1 in Australian patients with primary open-angle glaucoma. *American Journal of Ophthalmology*, 159(1) pp. 124-130. (Impact factor = 3.9)

3. Azzam R, **Badenoch PR**, Francis MJ, Fernandez C, Adamson PJ, Dendle C, Woolley I, Robson J, Korman TM, Graham M. Acanthamoeba encephalitis: isolation of genotype T1 in mycobacterial liquid culture medium. *J Clin Microbiol*. 2015 Feb;53(2):735-9. (Impact factor = 4.0)

4. **Burdon, K.P**., Mitchell, P., Lee, A., Healey, P.R., White, A., Rochtchina, E., et al. (2015). Association of Open-Angle Glaucoma Loci With Incident Glaucoma in the Blue Mountains Eye Study. *American Journal of Ophthalmology*, 159(1) pp. 31-36. (Impact factor = 3.9)

5. **Burdon KP, Fogarty RD**, Shen W, **Abhary S, Kaidonis G, Appukuttan B**, Hewitt AW, **Sharma S**, Daniell M, Essex RW, Chang JH, **Klebe S**, Lake SR, Pal B, Jenkins A, Govindarjan G, Sundaresan P, Lamoureux EL, Ramasamy K, Pefkianaki M, Hykin PG, Petrovsky N, Brown MA, Gillies MC, **Craig JE**. Genome-wide association study for sight-threatening diabetic retinopathy reveals association with genetic variation near the GRB2 gene. *Diabetologia*. 2015 Jul 19. [Epub ahead of print] PMID: 26188370 (Impact factor = 6.7)

6. **Coster, D.J**. (2015). History of corneal transplantation in Australia. *Clinical and Experimental Ophthalmology*, 43(3) pp. 268-276. (Impact factor = 2.4)

7. Cuellar-Partida G, Springelkamp H, Lucas SE, Yazar S, Hewitt AW, Iglesias AI, Montgomery GW, Martin NG, Pennell CE, van Leeuwen EM, Verhoeven VJ, Hofman A, Uitterlinden AG, Ramdas WD, Wolfs RC, Vingerling JR, Brown MA, **Mills RA, Craig JE**, Klaver CC, van Duijn CM, **Burdon KP**, MacGregor S, Mackey DA. WNT10A exonic variant increases the risk of keratoconus by decreasing corneal thickness. *Hum Mol Genet*. 2015 Sep 1;24(17):5060-8. doi: 10.1093/hmg/ddv211. Epub 2015 Jun 5. (Impact factor = 6.4)

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10. Gharahkhani P, **Burdon KP**, Hewitt AW, Law MH, **Souzeau E**, Montgomery GW, Radford-Smith G, Mackey DA, **Craig JE**, MacGregor S. Accurate Imputation-Based Screening of Gln368Ter Myocilin Variant in Primary Open-Angle Glaucoma. *Invest Ophthalmol Vis Sci*. 2015 Aug 1;56(9):5087-93. (Impact factor = 3.4)

11. Gonzalez-Andrades M, Arias-Santiago S, García-Serrano JL, González Gallardo MD, **McAlinden C**. Sterile Corneal Infiltrates Secondary to Psoriasis Exacerbations: Topical

Tacrolimus as an Alternative Treatment Option. *Eye Contact Lens*. 2015 Jul 28. [Epub ahead of print] (Impact factor = 1.5)

12. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015 Jan 10;385(9963):117-71. Epub 2014 Dec 18. (**K Pesudovs,** author) (Impact factor = 45.2)

13. GBD 2013 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and YLDs for 301 acute and chronic diseases and injuries for 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015 June 7. pii: S0140-6736(15)60692-4. doi: 10.1016/S0140-6736(15)60692-4. [Epub ahead of print] (**K Pesudovs,** author) (Impact factor = 45.2)

14. **Irani Y**, Tian Y, Wang M, Klebe S, McInnes SJ, Voelcker NH, Coffer JL, **Williams KA**. A novel pressed porous silicon-polycaprolactone composite as a dual-purpose implant for the delivery of cells and drugs to the eye. *Exp Eye Res* 2015; doi: 10.1016/j.exer.2015.08.007. (Impact factor = 2.7)

15. **Khadka J, McAlinden C, Craig JE**, Fenwick EK, Lamoureux EL, **Pesudovs K**. Identifying content for the glaucoma-specific item bank to measure quality-of-life parameters. *J Glaucoma*. 2015 Jan;24(1):12-9. (Impact factor = 2.1)

16. **Kaidonis G, Burdon KP**, Gillies MC, **Abhary S**, Essex RW, Chang JH, Pal B, Pefkianaki M, Daniell M, **Lake S**, Petrovsky N, Hewitt AW, Jenkins A, Lamoureux EL, Gleadle JM, **Craig JE**. Common sequence variation in the VEGFC gene is associated with diabetic retinopathy and diabetic macular edema. *Ophthalmology*. 2015 Jun 10. pii: S0161-6420(15)00429-7. (Impact factor = 6.1)

17. **Klebe S, Coster DJ, Williams KA**. Pathological aspects of the failed corneal graft. *Diagnostic Histopathology* 2015; 21: 11-18.

18. **Landers J**, Ullrich K, **Craig JE**. Ibopamine challenge testing differentiates glaucoma suspect, stable glaucoma and progressive glaucoma cases. *Clin Experiment Ophthalmol*. 2015 Jul 3. doi: 10.1111/ceo.12569. (Impact factor = 2.4)

19. **Landers J**, Hewitt AW, Straga T, **Burdon KP, Craig JE**. Screening phenotypically normal Caucasian Australians for the lysyl oxidase-like 1 gene. *Clin Experiment Ophthalmol*. 2015 Mar;43(2):189-90. (Impact factor = 2.4)

20. Law MH, Bishop DT, Lee JE, Brossard M, Martin NG, Moses EK, Song F, Barrett JH, Kumar R, Easton DF, Pharoah PD, Swerdlow AJ, Kypreou KP, Taylor JC, Harland M, Randerson-Moor J, Akslen LA, Andresen PA, Avril MF, Azizi E, Scarrà GB, Brown KM, Dębniak T, Duffy DL, Elder DE, Fang S, Friedman E, Galan P, Ghiorzo P, Gillanders EM, Goldstein AM, Gruis NA, Hansson J, Helsing P, Hočevar M, Höiom V, Ingvar C, Kanetsky PA, Chen WV; GenoMEL Consortium; Essen-Heidelberg Investigators; SDH Study Group; Q-MEGA and QTWIN Investigators; AMFS Investigators; ATHENS Melanoma Study Group, Landi MT, Lang J, Lathrop GM, Lubiński J, Mackie RM, Mann GJ, Molven A, Montgomery GW, Novaković S, Olsson H, Puig S, Puig-Butille JA, Qureshi AA, Radford-Smith GL, van der Stoep N, van Doorn R, Whiteman DC, **Craig JE**, Schadendorf D, Simms

LA, Burdon KP, Nyholt DR, Pooley KA, Orr N, Stratigos AJ, Cust AE, Ward SV, Hayward NK, Han J, Schulze HJ, Dunning AM, Bishop JA, Demenais F, Amos CI, MacGregor S, Iles MM. Genome-wide meta-analysis identifies five new susceptibility loci for cutaneous malignant melanoma. *Nat Genet*. 2015 Aug 3. doi: 10.1038/ng.3373. [Epub ahead of print] (Impact factor = 29.4)

21. Loetscher T, **Chen C,** Wignall S, Bulling A, Hoppe S, Churches O, Thomas NA, Nicholls ME, Lee A (2015). A study on the natural history of scanning behaviour in patients with visual field defects after stroke. *BMC Neurol.* 2015;15:64. doi: 10.1186/s12883-015-0321-5 (Impact factor = 2.0)

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23. Luger MH, **McAlinden C**, Buckhurst PJ, Wolffsohn JS, Verma S, Mosquera SA. Presbyopic LASIK using hybrid bi-aspheric micro-monovision ablation profile for presbyopic corneal treatments. *Am J Ophthalmol*. 2015 May 27. pii: S0002-9394(15)00306-2. doi: 10.1016/j.ajo.2015.05.021. (Impact factor = 3.9)

24. **McAlinden C**, Wang Q, **Pesudovs K**, Yang X, Bao F, Yu A, Lin S, Feng Y, Huang J. Axial Length Measurement Failure Rates with the IOLMaster and Lenstar LS 900 in Eyes with Cataract. *PLoS One*. 2015 Jun 10;10(6):e0128929. doi: 10.1371/journal.pone.0128929. (Impact factor = 3.2)

25. Naghavi, M., Wang, H., Lozano, R., **Pesudovs, K**., Vos, T., Lopez, A., et al. (2015). Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*, 385(9963) pp. 117-171. (Impact factor = 45.2)

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27. Pan Y, **Appukuttan B**, Mohs K, **Ashander LM, Smith JR**. Ubiquitin carboxyl-terminal esterase L1 promotes proliferation of human choroidal and retinal endothelial cells. *Asia Pac*

J Ophthalmol 2015; 4: 51-55.

28. Paudel P, **Khadka J**, Burnett A, Hani Y, Naduvilath T, Fricke TR. Papua New Guinea vision-specific quality of life questionnaire: a new patient-reported outcome instrument to assess the impact of impaired vision. *Clin Experiment Ophthalmol*. 2015 Apr;43(3):202-13. (Impact factor = 2.4)

29. Robinson PC, Claushuis TA, Cortes A, Martin TM, Evans DM, Leo P, Mukhopadhyay P, Bradbury LA, Cremin K, Harris J, Maksymowych WP, Inman RD, Rahman P, Haroon N, Gensler L, Powell JE, van der Horst-Bruinsma IE, Hewitt AW, **Craig JE**, Lim LL, Wakefield D, McCluskey P, Voigt V, Fleming P; Spondyloarthritis Research Consortium of Canada, Australio-Anglo-American Spondylitis Consortium, International Genetics of Ankylosing Spondylitis Consortium, Wellcome Trust Case Control Study 2, Mariapia Degli-Esposti, Degli-Esposti M, Pointon JJ, Weisman MH, Wordsworth BP, Reveille JD, Rosenbaum JT, Brown MA. (2015) Genetic dissection of acute anterior uveitis reveals similarities and differences in associations observed with ankylosing spondylitis. *Arthritis & Rheumatology* 67; 1:140-51. (Impact factor = 7.8)

30. Springelkamp H, Mishra A, Hysi PG, Gharahkhani P, Höhn R, Khor CC, Cooke Bailey JN, Luo X, Ramdas WD, Vithana E, Koh V, Yazar S, Xu L, Forward H, Kearns LS, Amin N, Iglesias AI, Sim KS, van Leeuwen EM, Demirkan A, van der Lee S, Loon SC, Rivadeneira F, Nag A, Sanfilippo PG, Schillert A, de Jong PT, Oostra BA, Uitterlinden AG, Hofman A; NEIGHBORHOOD Consortium, **Zhou T, Burdon KP**, Spector TD, Lackner KJ, Saw SM, Vingerling JR, Teo YY, Pasquale LR, Wolfs RC, Lemij HG, Tai ES, Jonas JB, Cheng CY, Aung T, Jansonius NM, Klaver CC, **Craig JE**, Young TL, Haines JL, MacGregor S, Mackey DA, Pfeiffer N, Wong TY, Wiggs JL, Hewitt AW, van Duijn CM, Hammond CJ. Meta-analysis of genome-wide association studies identifies novel loci associated with optic disc morphology. *Genet Epidemiol*. 2015 Mar;39(3):207-16. doi: 10.1002/gepi.21886. (Impact factor = 2.6)

31. Springelkamp H, Iglesias AI, Cuellar-Partida G, Amin N, Burdon KP, van Leeuwen EM, Gharahkhani P, Mishra A, van der Lee SJ, Hewitt AW, Rivadeneira F, Viswanathan AC, Wolfs RC, Martin NG, Ramdas WD, van Koolwijk LM, Pennell CE, Vingerling JR, Mountain JE, Uitterlinden AG, Hofman A, Mitchell P, Lemij HG, Wang JJ, Klaver CC, Mackey DA, **Craig JE**, van Duijn CM, MacGregor S. ARHGEF12 influences the risk of glaucoma by increasing intraocular pressure. *Hum Mol Genet*. 2015 May 1;24(9):2689-99. (Impact factor = 6.4)

32. **Souzeau E**, Hayes M, Ruddle JB, Elder JE, Staffieri SE, Kearns LS, Mackey DA, **Zhou T**, **Ridge B, Burdon KP**, Dubowsky A, **Craig JE.** CYP1B1 copy number variation is not a major contributor to primary congenital glaucoma. *Mol Vis*. 2015 Feb 11;21:160-4. (Impact factor = 2.0)

33. **Souzeau E**, Hayes M, **Zhou T, Siggs OM, Ridge B, Awadalla MS**, Smith JE, Ruddle JB, Elder JE, Mackey DA, Hewitt AW, Healey PR, Goldberg I, Morgan WH, **Landers J**, Dubowsky A, **Burdon KP, Craig JE**. (2015) Occurrence of CYP1B1 Mutations in juvenile open-angle glaucoma with advanced visual field loss. *JAMA Ophthalmol*;133(7):826-33. (Impact factor = 3.3)

34. Suttle, C., Challinor, K., Thompson, R., **Pesudovs, K**., Togher, L., Chiavaroli, N., et al.

(2015). Attitudes and barriers to evidence-based practice in optometry educators. *Optometry and Vision Science*, 92(4) pp. 514-523. (Impact factor = 1.6)

35. Varkey JB, Shantha JG, Crozier I, Kraft CS, Lyon GM, Mehta AK, Kumar G, **Smith JR**, Kainulaine MH, Ströher U, Uyeki TM, Ribner BS, Yeh S. Persistence of Ebola virus in the eye during the convalescence. *N Engl J Med* 2015; 372:2423-2427. (Impact factor = 55.9)

36. Van Essen TH, Roelen DL, **Williams KA**, Jager MJ. Matching for human leukocyte antigens (HLA) in corneal transplantation - to do or not to do. *Prog Ret Eye Res* 2015; 46: 84-110. doi: 10.1016/j.preteyeres.2015.01.001. Epub 2015 Jan 17. (Impact factor = 8.7)

37. **Wells JM, Smith JR**. Uveitis in human immunodeficiency virus-infected individuals. *Int Ophthalmol Clin* 2015; 4: 51-55.

38. **Wells JM, Smith JR**. Uveitis in juvenile idiopathic arthritis: recent therapeutic advances. *Ophthalmic Res* (in press). (Impact factor = 1.4)

39. McInnes SJP, Airaghi Leccardi MJI, Voelcker NH, Turner CT, Cowin AJ, **Irani Y, Williams KA.** Surface engineering of porous silicon to optimise therapeutic antibody loading and release. J Mater Chem B 2015 (in press 14-03-2015). (Impact factor = 4.7)

40. JJ Khong, LW Wang, GK Smyth, AA McNab, TG Hardy, D Selva, B Llamas, CH Jung, **S Sharma, KP Burdon**, PR Ebeling, **JE Craig** (2015) Gene expression profiling of orbital adipose tissue in thyroid orbitopathy. *Invest Ophthal Vis Sci.* (accepted 10/8/15) (Impact factor = 3.4)

41. Mahmud I, Kelley T, Stowell C, Haripriya A, Boman A, Kossler I, Morlet N, Pershing S, **Pesudovs K**, Goh PP, Sparrow JM, Lundström M. A Proposed Minimum Set of Outcome Measures for Cataract Surgery. JAMA Ophthalmol accepted 13/5/2015. (Impact factor = 3.3)

Letters/editorials/case reports/commentaries in refereed journals, 2015 calendar year

42. **Awadalla MS, Burdon KP, Craig JE**. Does the association between TMEM98 and nanophthalmos require further confirmation? Reply. *JAMA Ophthalmol.* 2015 Mar;133(3):359-60. (Impact factor = 3.3)

43. **Coster DJ, Keane MC, Williams, KA**. Reply to correspondence from Drs Somner, Hardman-Lea, Bourne, Burr and Shah. *Ophthalmology* 2015 Jan;122(1):e10-1. doi: 10.1016/j.ophtha.2014.06.039. (Impact factor = 6.1)

44. **Coster DJ, Keane MC, Williams, KA**. Reply to correspondence from Drs Basu and Hoshing. *Ophthalmology* 2015 Jan;122(1):e8-9. doi: 10.1016/j.ophtha.2014.07.004. (Impact factor = 6.1)

45. **Landers J**. Challenging glaucoma with a water-drinking test. *Clin Experiment Ophthalmol* 2015; 43: 200-1. (Impact factor = 2.4)

46. **Stempel AJ, Appukuttan B, Smith JR**. Detection of CXCL13 transcript in hepatitis C virus-associated mixed cryoglobinemia. [e-Letter] *Blood*; February 5, 2015. http://www.bloodjournal.org/content/112/5/1620. (Impact factor = 10.5)

Other creative works, 2015 calendar year

47. **Williams KA, Keane MC, Galettis RA, Jones VJ, Mills RAD, Coster DJ**. The Australain Corneal Graft Registry 2015 Report. Snap Printing 2015, pp 1-247. http://hdl.handle.net/2328/35402

Grant Income

Research Services Office Income Figures

Year	Income
2010	$2,769,281
2011	$2,220,137
2012	$2,157,213
2013	$2,487,934
2014	$2,470,302

FCOEVR Income Figures from our own records

Year	Income
2010	$2,663,296
2011	$2,894,842
2012	$2,952,714
2013	$3,506,068
2014	$3,699,592

Research Services Office Grant funding (external)

	2010	2011	2012	2013	2014
Category 1	$1,886,105	$1,540,195	$1,468,596	$1,468,949	$1,541,202
Category 2	$358,269	$118,248	$305,929	$197,155	$287,195
Category 3	$524,907	$561,694	$382,688	$821,831	$641,905
Category 4	Nil	Nil	Nil	Nil	Nil
Total	$2,769,281	$2,220,137	$2,157,213	$2,487,934	$2,470,302

Grant income (internal)

	2010	2011	2012	2013	2014
School (SOM)	-	-	-	-	-
Faculty (MNHS)	$170,060	$124,109	$185,000	$210,998	$209,816
DVC-Research	$100,000	$100,000	$100,000	$100,000	$182,846
Total	$270,060	$224,109	$285,000	$310,998	$392,662

NB. Figures in the table above include DVC-R and Faculty Centre funding.

Expenses

	2011	2012	2013	2014
Administrative staff (level, FTE fraction and cost)	HEO6 – 1.0FTE Cost = $66,840 HEO5 – 0.7FTE Cost = $53,054	HEO6 – 1.0FTE Cost = $85,587 HEO5 – 0.7FTE Cost = $54,176	HEO6 – 1.0FTE Cost = $87,382 HEO5 – 0.7FTE Cost = $58,000	HEO6 – 1.0FTE Cost = $92,700 HEO5 – 0.5FTE* Cost = $30,641
Total	$119,894	$139,763	$145,382	$123,341

* No expenditure on HEO5 after October 2014.

Breakdown of ARC and NHMRC, in addition to any large grants (1M and above)

* Where the grant is not led by a Flinders staff member please include the name of the primary Flinders contact and their status in brackets.

Year	Granting body	Lead CI*	Amount	Notes
2010	NHMRC Career Development Award	**K Burdon**	$377,000	
2010	NHMRC Project Grant	**K Burdon**	$970,789	
2010	NHMRC Project Grant	K Williams	$527,778	
2010	Medical Research Council (UK)	F Figueiredo (**K Pesudovs** CI-I)	$2,500,00	$0.00 to FUSA
2011	NHMRC Project Grant	**S Sharma**	$571,732	
2011	NHMRC Project Grant	E Lamoureux (**K Pesudovs** CI-E)	$612,240	
2011	NHMRC Senior Fellowship (PRF)	**KA Williams**	$795,074	
2012	NHMRC Project Grant	**JE Craig**	$546,000	
2012	NHMRC Project Grant	**JE Craig**	$502,302	
2012	NHMRC Project Grant	K Pesudovs	$823,522	
2012	NHMRC Centre for Research Excellence (CRE)	D Mackey (**K Burdon** CI-B, J**E Craig** CI-D)	$2,500,000	
2013	NHMRC Project Grant	L Keay (**K Pesudovs** CI-C)	$777,262	
2013	National Institutes of Health (USA)	**JR Smith**	$423,500	
2013	National Institute of Health (USA)	**JR Smith**	$1,309,000	
2013	NHMRC Project Grant	**KA Williams**	$456,727	
2013	NHMRC Project Grant	**JE Craig**	$956,000	
2014	NHMRC Practitioner Fellowship	**JE Craig**	$387,298	
2014	NHMRC Project Grant	**JR Smith**	$445,505	
2014	ARC Future Fellowship	**JR Smith**	$989,144	
2015	NHMRC Project Grant	JL Wilkinson-Berka (**JE Smith** CI-B)	$823,372	
2015	NHMRC Centre for Research Excellence (CRE)	A Keech **(JE Craig** CI-G)	$2,479,298	
2015	NHMRC Centre for Research Excellence (CRE)	A Brown (**JE Craig** CI-H)	$2,466,326	

Income

	2011	2012	2013	2014
Income from DVC-R	$120,000	$120,000	$100,000	$100,000
Income from Faculty MNHS			$20,000	$20,000
Total	$120,000	$120,000	$120,000	$120,000

2014/2015 Grant Income by Project

2011-2014 NHMRC Project Grant #1009844. E. Lamoureux, J. Crowston, R. Casson, I. Goldberg, **K. Pesudovs,** P. Healy, R. Thomas and E. Finkelstein. Comparing the effectiveness of selective laser trabeculoplasty with topical medication for the treatment of primary angle closure glaucoma: a multicentred, prospective, randomized controlled clinical trial. $614,240 ($153,560 pa)

2011-2015 NHMRC Principal Research Fellowship #1002044. **KA Williams**. Improving Eye Health. $795,074 ($160,522 pa)

2012-2014 National Institutes of Health, #1R21EY021583-01A1. J Coffer, **DJ Coster, S Klebe,** N Voelcker and **KA William**s. Nanostructured porous silicon / polymer composites as ophthalmic implants. US$326,680 (2012-US$175,458; 2013-US$151,222) A$313,694 ($104,564 pa)

2012-2014 NHMRC Project Grant #1031362. **J. Craig**, S. Macgregor, A. Hewitt, **K. Burdon** and P. McCluskey. Novel blood pooling methodology for genome-wide association studies to identify major genetic determinants of five blinding eye diseases. $546,000 ($182,000 pa)

2012-2014 NHMRC Project Grant #1031347. **J. Craig, S. Sharma**, J. Wood, G. Chidlow, T. Chataway and M. Ronci. Functional analysis of recently identified novel glaucoma genes. $502,302 ($167,434 pa)

2012-2015 NHMRC Project Grant #1031838. **K. Pesudovs**. A system for measurement of vision specific quality of life using item banking and computer adaptive testing (ViSBank). $823,522 (2014:$267,212)

2012-2016 NHMRC Centre for Research Excellence #1023911. D. Mackey, **K. Burdon**, A. Hewitt and **J. Craig**. Translation of genetic eye research (TOGER). $2,500,000 ($199,991 pa)

2013-2015 National Institutes of Health (USA) #EY019875. **JR Smith**. Adhesion molecules in uveitis. US$1,309,000 (A$235,184 pa)

2013-2015 National Institute of Health (USA) #EY022009. **JR Smith**. B cell trafficking to the eye. US$423,500 (A$91,302 pa)

2013-2014 Fight for Sight (UK). T. Braithwaite, R. Bourne, S. Ramsewak and **K. Pesudovs**. National Eye Survey of Trinidad and Tobago (NESTT): The impact of vision loss on patient-reported outcome measures including quality of life. $23,437 ($11,718 pa)

2013-2015 NHMRC Project grant#1048302. L. Keay, L. Meuleners, **K. Pesudovs**, P. McCluskey, S. Boufous, J. Ng, N. Morlet and F. Stapleton. Understanding the impact of cataract vision impairment on risk of falling. $775,262 ($258,420 pa)

2013-2015 NHRMC Project Grant #1046634. **KA. Williams, HM. Brereton, S. Klebe and C. Chen**. Anti-vascular endothelial growth factor-B as a biologic for treating eye diseases. $456,727 ($144,707 pa)

2013-2017 NHMRC Project grant 1048037. **J. Craig, K. Burdon**, R. Casson, **J. Landers**, S.

Graham, P. Healey and A. Agar. Towards translation of glaucoma blindness genes into clinical practice: predicting Risk Of Glaucoma: Relevant SNPs with Strong Association (PROGRESSA) Study. $956,020 ($191,204 pa)

2013-2016, European Society of Cataract and Refractive Surgery. M. Lundstrom and **K. Pesudovs**. Including patient-reported outcome measures in the EUREQUO database. $167,250 ($55,720 pa)

2013-2015 CSL Eye Antibodies Royalties. **D Coster, K Williams**, M Thiel, H Zola. $17,000 ($5,677 pa)

2013-2015, Flinders University DVCR. **K. Williams**. Flinders Centre for Ophthalmology, Eye & Vision Research. $360,000 ($120,000 pa)

2014-2018 NHMRC Practitioner Fellowship #1065433 **JE. Craig**. Disease Registry based approaches to determining molecular risk factors for glaucoma blindness, and applying them in clinical practice. $387,298 ($77,460 pa)

2014-2016 NHMRC Project Grant #1066235 **JR. Smith**. Toxoplasma gondii infection of human retinal pigment epithelium. $445,505 ($148,501pa)

2014-2017 Australian Research Council (ARC Future Fellowship). **JR Smith**. Molecular activities of retinal endothelial cells, retinal disease processes, biological therapies to address efficacy and safety deficiencies of current treatments. $989,144 ($247,286 pa)

2014-2016 Australian Organ and Tissue Donation and Transplantation Authority. **K. Williams.** Australian Corneal Graft Register. $484,786 ($242,393 pa)

2014 Perpetual Trustees. **KA. Williams**. Improving the quality of human donor corneas for corneal transplantation. $99,521.25

2014 Ophthalmic Research Institute of Australia (ORIA). **K. P. Burdon, J. E. Craig and E. Souzeau**. Identifying genetic causes of primary congenital glaucoma in Australia. $50,000

2014 Ophthalmic Research Institute of Australia (ORIA). **S. Sharma and J. E. Craig**. Molecular investigation of two novel genes associated with glaucoma blindness. $50,000

2014 Ophthalmic Research Institute of Australia (ORIA). **J. R. Smith**. Toxoplasma gondii infection of human retinal cells. $49,900

2014 Ophthalmic Research Institute of Australia (ORIA). **K. Williams, S Klebe and R Mills**. Testing new drugs to improve corneal transplant surgery. $45,500

2014 Avant DIT Research Scholarship. **G. Kaidonis**. Investigation of the genetic aspects contributing to the development of diabetes related blindness. $50,000

2014 Flinders University DVC-R Near miss grant. **B. Appukuttan, K. Williams** and M. Michael. Susceptibility to oxygen-induced retinopathy: Identification of genetic targets and therapies. $50,000

2014 Flinders Medical Centre Foundation Grant. **JR Smith.** Retinal arterial and venous endothelial involvement in posterior uveitis. $17,678

2014 Flinders University Faculty of Medicine, Nursing and Health Sciences. R Haberberger, D Matusica, C Franco, D Hussey, **S Sharma**, R Meech, H Muyderman. Inverted fluorescence microscope with simple interface, and high quality digital image capture capability. $28,951*

2014 Flinders University Faculty of Medicine, Nursing and Health Sciences 'Top Up' grant. **KA Williams**. Anti-vascular endothelial growth factor-B as a biologic for treating eye disease. $20,000

2014 Flinders University Faculty of Medicine, Nursing and Health Sciences. **S Sharma, R Mills**. Are NADPH oxidases potential therapeutic targets for preventing cataract? $17,000

2014 Flinders University Faculty of Medicine, Nursing and Health Sciences ECR/Seeding grant. **M Awadalla**. Identifying novel genes in a congenital eye disorder, nanophthalmos, in New Caledonian families. $15,000

2014 Flinders University Faculty of Medicine, Nursing and Health Sciences Equipment Grant. T Chataway, T Gordon, **K Williams**, D Keating, N Sims, E Sokoya. AB SCIEX TripleTOF® 5600+ with Nanospray III source, Eksigent Ekspert Nano HPLC 415. $30,000*

2014 Flinders University Faculty of Medicine, Nursing and Health Sciences Equipment Grant. J Carr, **KA Williams, JR Smith**. Cryogenic liquid nitrogen storage unit. $29,501*

2014 Faculty of Health Sciences Seeding Grant. **S Klebe, KA Williams**. Establishment of an animal model of malignant mesothelioma to assess the effectiveness of inhibition of VEGFA in vivo. $16,000

2014 Flinders Medical Centre (FMC) Foundation Grant. **KA Williams, HM Brereton, S Klebe, C Chen**. Anti-vascular endothelial growth factor-B as a biologic for treating eye disease. $15,686

2014 Glaucoma Australia. **JE Craig**, D Mackie. TARRGET Study pilot phase. $100,000 ($50,000 to FUSA)

2015-2018 NHMRC Project Grant #1078442. JL Wilkinson-Berka, **JR Smith**, HH Schmidt, **B Appukuttan**. Inhibition of specific NOX isoforms as a new treatment for hypertensive and diabetic retinopathy. $823,372 ($205,843 pa)

2015-2019 NHMRC Centre for Research Excellence. A Keech, A Jenkins, T Henderson, A Brown, S-E Bursell, L Brazionis, **JE Craig**, L Maple-Brown, K O'Dea, V Gebski. Diabetic Retinopathy - Closing the Loop for Diabetic Eye Care and Complication Risk Mitigation. $2,479,298**

2015-2019 NHMRC Centre for Research Excellence. A Brown, P Zimmet, E Willerslev, M Cooper, L Maple-Brown, J Shaw, N Brown, **JE Craig**, M Daniel. Predicting Renal, Ophthalmic, and Heart Events in the Aboriginal Community – The PROPHECY Study. $2,466,326 (FUSA – 2015 - $43,750, 2016 - $87,500, 2017 - $87,500, 2018 - $43,750)

2015 Channel 7 CRF. **JE Craig**, A Dubowsky, **KP Burdon, ME Souzeau, M Awadalla, O Siggs**. Improving genetic diagnosis and reproductive options for families with congenital, and developmental glaucoma. $74,800

2015 Flinders University DVC-R NHMRC near miss grant. **JE Craig**, **KP Burdon,** S Macgregor, S John, A Hewitt. Identifying high penetrance deleterious mutations in blinding glaucoma. $45,000

2015 Ophthalmic Research Institute of Australia (ORIA). **KP Burdon, S Sharma**. Development of detailed gene expression profiles for ocular tissues: The Eye Expression Atlas Project. $50,000

2015 Ophthalmic Research Institute of Australia (ORIA). **S Lie**. Defence mechanisms of specialized cells within the eye during parasite infection. $49,000

2015 Flinders University DVC-R NHMRC Near-Miss Award. **JR Smith.** Interactions between monocytes and endothelial cells in human retina. $44.846

2015 Rebecca L. Cooper Medical Research Foundation. JR Smith. Entry Route of Toxoplasma into Human Retina. $21,676

2015 Flinders Medical Centre Foundation Grant. **K Williams**. Improving the quality of human donor corneas for corneal transplantation. $38,000

* Equipment grants – not divisible but included in total.
** Allocation to FUSA still being negotiated and not included in total.

Conference Presentations

Dr Binoy Appukuttan
B Appukuttan, PA Wilmarth, Y Pan, LL David, **JR Smith**. Inflammatory and neovascular markers identified in deep shotgun proteomic profiling of human retinal and choroidal vascular endothelial cells. Association for Research in Vision and Ophthalmology Annual Meeting. Orlando, FL, USA. 2014.

B Appukuttan, L Ashander, JR Smith. Expression of intercellular adhesion molecule 1 by human retinal endothelial cells in response to inflammatory stimuli. XXI Biennial Meeting of the International Society for Eye Research. San Francisco, CA, USA. 2014.

Dr Mona Awadalla
2014: Genemappers Conference, Barossa Valley. **M Awadalla**.
The Association of TBK1 and OPTN genes with Normal-Tension Glaucoma in an Australian Cohort.

Associate Professor Celia Chen
Invited presentations
9 August 2014: SIGMA meeting. Sydney
Neuroprotection: where are we now?

20-21 June 2015. Tasmanian RANZCO State Branch meeting and Evidence Based Ophthalmology Workshop
Practicality of randomized controlled trial
Evidence of visual field therapy

16 May 2015 Australian College of Optometry
Optic neuritis - when to refer and what to look out for
Dangerous diplopia

1-4 April 2015: Asian Pacific Academy of Ophthalmology
Neuro-Ophthalmology symposium - Neuro-ophthalmology emergencies - Central retinal artery occlusion
Neuro-Ophthalmology Symposium - Challenging cases - Calcium and a grave digger
Neuro-Ophthalmology Symposium - Common diagnosis in Neuro-ophthalmology

20-21 March 2015: Taiwan Academy of Ophthalmology Annual Scientific Meeting. NTUH International Convention Center, Taipei, Taiwan.
Diplopia : a practical approach
Dangerous diplopia
Case presentation - Neuromyotonia

11-13 Sept 2015. Neuro-Ophthalmology Society of Australia and Neurovision
Disorders of the eyelid

Professor Jamie Craig

Invited talks: International and national meetings and organisations

2015 6th World Glaucoma Congress June 2015.
Glaucoma endophenotypes IOP and disc. (Invited speaker)
Update on new glaucoma genetics (Chair)

2015 Tasmanian RANZCO State Branch meeting and Evidence Based Ophthalmology Workshop, June 2015
The prophylaxis of endophthalmitis.
The role of OCT in glaucoma

Presentations at international and national meetings

2014: Association for Research in Vision and Ophthalmology (ARVO)
JE Craig, J Fitzgerald, S Ng, **M Awadalla**, AW Hewitt, DA Mackey, **R Fogarty**, KP Burdon. Epigenetic associations at the 9p21 glaucoma locus contribute to a female bias in normal tension glaucoma.

2014: Association for Research in Vision and Ophthalmology (ARVO) **G Kaidonis, JE Craig, R Fogarty,** MC Gillies, **W Shen**, **S Sharma, B Appukuttan**, B Pal, P Sundaresan, **KP Burdon**. Genetic variation near GRB2 and KCNB2 identified by a genome-wide association study are reproducibly associated with Diabetic Retinopathy.

2014: Association for Research in Vision and Ophthalmology (ARVO) C Venturini, **JE Craig**, N Pfeiffer, CM van Duijn, JL Wiggs, T Aung, DA Mackey, A Viswanathan, CJ Hammond, Internatiol Glaucoma Genetics Consortium- IGGC. Common mechanisms underlying intraocular pressure identified in functional analysis of gene lists from genome- wide association study results in IGGC cohorts.

2014: Association for Research in Vision and Ophthalmology (ARVO) NJ Van Bergen, **JE Craig**, AW Hewitt, **KP Burdon, S Sharma**, JG Crowston, IV Trounce. Mitochondrial Impairments in Primary Open Angle Glaucoma Patient Lymphoblasts.

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
JE Craig, KP Burdon, **T Zhou**, **O Siggs,** AW Hewitt, DA Mackey, P Gharahkhani, G Cuellar, S MacGregor.
Genome-wide approach to detecting copy number variation in open angle glaucoma blindness utilizing the Australian and New Zealand Registry of Advanced Glaucoma. (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
AW Hewitt, T Johnston, PJ Allen, **JE Craig**, DA Mackey, J Wang, P Mitchell, A Chandra
Investigation of common genetic variants implicated in rhegmatogenous retinal detachment (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
AJ White, U Pattamatta, Z McPherson, PR Healey, A Agar, **JE Craig**
Modulation of clinically significant genetic loci for glaucoma in a muring retinal explant model (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.

KP Burdon, Y Lu, PN Baird, **RA Mills**, Y Bykhovskaya, S Sahebjada, YS Rabinowitz, X Li, S MacGregor, **JE Craig**
Genetic variation at the GPC6 gene is reproducibly associated with keratoconus in a genome-wide association study. (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
OM Siggs, S Javadiyan, S Sharma, KP Burdon, JE Craig
Partial duplication of CRYBB1 as a novel genetic mechanism for autosomal dominant congenital cataract. (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
JC Bailey, P Gharahkhani, LR Pasquale, JH Kang, **JE Craig**, S MacGregor, **KP Burdon**, JL Haines, JL Wiggs
Sex-specific primary open-angle glaucoma loci identified in a meta-analyzed genome-wide imputed dataset (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
L Zheng, A Kifley, J Want, AJ White, **KP Burdon, JE Craig,** S MacGregor, P Mitchel, PR Healey.
Genetic susceptibility to open angle glaucoma: the Blue Mountains Eye Study (poster)

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
JJ Khong, L Wang, G Smyth, AA McNab, T Hardy, D Selva, **S Sharma, KP Burdon,** E Peter, **JE Craig**
Gene expression profiling of orbital adipose tissue in thyroid orbitopathy (poster)

Dr Jyoti Khadka

Presentations at international and national meetings

Pesudovs K, Khadka J, Fenwick EK, Lamoureux. Progress in the development of ophthalmic quality of life measuring patient-reported outcome measures. American Academy of Optometry. Nov 12-15 2014; Denver, Colorado, USA. (Scientific Paper)

Pesudovs K, Khadka J, Fenwick EK, Lamoureux EL. An update of the Eye-tem Bank project: a novel system to measure ophthalmic patient-reported outcomes. The Association of Research in Vision and Ophthalmology May 4 - 8, 2014; Orlando, Florida, USA. (Poster presentation)

Pesudovs K, Khadka J, Fenwick EK, Lamoureux EL. Psychometric assessment of the glaucoma module of the Eye-tem Bank project. American Academy of Optometry. Oct 7-10 2015; New Orleans, Colorado, USA. (Poster)

Pesudovs K, Khadka J, Fenwick E, Lamoureux E. An update of the Eye-tem Bank project: a novel comprehensive quality of life measurement system. European Society of Cataract and Refractive Surgery Conference. Sept 5-9 2015; Barcelona, Spain. (Talk)

Prem Senthil M, **Khadka J, Pesudovs K.** Seeing through their eyes: Lived experiences of people with retinal diseases. Australian Society of Medical Research June 3rd 2015. National Wine Centre, Adelaide (Poster)

Khadka J, Pesudovs K. Quality of life study in Ophthalmology and Optometry: Present status and the future expectation. The 15th International Congress of Ophthalmology and Optometry Chin, - March 27-29 2015: Shangai, China. (Invited talk)

Pesudovs K, Khadka J, Fenwick EK, Lamoureux EL. Item banking enables stand-alone

measurement of driving ability from an activity limitation item set. The Association of Research in Vision and Ophthalmology May 3 -7, 2015; Denver, USA. (Poster presentation)

Dr Miriam Keane

Presentations at international and national meetings

2014: The 31st Annual Australia and New Zealand Cornea Society Meeting, March
The influence of storage medium on corneal graft outcomes

2015 The 32nd Annual Australia and New Zealand Cornea Society Meeting, March.
Outcomes of endokeratoplasty after failed penetrating keratoplasty

Dr John Landers

Presentations at international and national meetings

2015: Tasmanian RANZCO State Branch Meeting and Evidence-Based Ophthalmology Workshop, June 2015. Tube vs trabeculectomy

Dr Shervi Lie

Association for Research in Vision and Ophthalmology Annual Meeting Denver, USA 2015
S Lie, LM Ashander, B Appukuttan, JR Smith. Expression of angiogenic regulators by human retinal cells infected with Toxoplasma gondii: understanding the clinical course of ocular toxoplasmosis. (Poster presentation; Young Investigator Award)

Associate Professor Richard Mills

Chaired meetings

2015: Tasmanian RANZCO State Branch meeting and Evidence Based Ophthalmology Workshop, June 2015
Hot topics in evidence-based Ophthalmology
The Ebola outbreak in West Africa: an intensivist on the frontline

Invited talks: International and national meetings

2015 The 32nd Annual Australia and New Zealand Cornea Society Meeting, March
Ocular surface squamous neoplasia – is surgery necessary?

2015 Tasmanian RANZCO State Branch meeting and Evidence Based Ophthalmology Workshop, June 2015. Collagen cross-linking (CCL)

2014: Mitcham Lions Club, Adelaide SA. *Eye Bank of South Australia*

Professor Konrad Pesudovs

Invited presentations

Quality of Life Methods Demystified. Vision 2014, Melbourne, April 2014.
Vision and Falls Research: The story so far. Knowledge to action in falls prevention across the care curriculum. Melbourne, April 2014.

The inclusion of quality of life measures in glaucoma datasets. World Glaucoma Congress, Hong Kong, June 2015.
How to measure QoL and PROMs for cost-effectiveness studies? World Glaucoma Congress, Hong Kong, June 2015.

Conference presentations

Pesudovs K, Khadka J, Fenwick EK, Lamoureux EL. An update of the Eye-Tem Bank: a novel system to measure ophthalmic patient-reported outcomes. Invest Ophthalmol Vis Sci 54: ARVO E-Abstract 182. Orlando, Florida, May 2014, sponsored by ARVO.

Pesudovs K, Khadka J, Fenwick EK, Lamoureux EL. Progress in the development of ophthalmic quality of life measuring patient-reported outcome measures. Optom Vis Sci 2013;91: e-abstract. Denver, Colorado, October 2014, sponsored by AAO.

Pesudovs K, Khadka J, Fenwick EK, Lamoureux EL. Item banking enables stand-alone measurement of driving ability from an activity limitations item set. Invest Ophthalmol Vis Sci 55: ARVO E-Abstract 1367. Denver, Colorado, May 2015, sponsored by ARVO.

Figueiredo F, Lako M, Bayliss O, **Pesudovs K**, Figueiredo G. Patient reported outcomes before and following ex vivo cultured autologous limbal stem cell transplantation for total unilateral limbal stem cell deficiency. Invest Ophthalmol Vis Sci 55: ARVO E-Abstract 2071. Denver, Colorado, May 2015, sponsored by ARVO.

Leasher J, Jonas JB, Bourne RR, Flaxman SR, Keeffe J, Naidoo K, **Pesudovs K**, Wong TY, Resnikoff S, Taylor HR. Number of People Blind or Visually Impaired or by diabetic retinopathy Worldwide and in World Regions 1990 – 2010. Orlando, Florida, May 2014, sponsored by ARVO.

Bourne RR, Jonas JB, Flaxman SR, Keeffe J, Leasher J, Naidoo K, **Pesudovs K**, Wong TY, Resnikoff S, Taylor HR. Number of People Blind or Visually Impaired or by Glaucoma Worldwide and in World Regions 1990 – 2010. Orlando, Florida, May 2014, sponsored by ARVO.

Naidoo KS, Gichuhi S, Basáñez M-G, Flaxman SR, Jonas JB, Keeffe J, Leasher J, **Pesudovs K**, Price H, Smith JL. Prevalence and causes of vision loss in Sub-Saharan Africa: 1990-2010. Orlando, Florida, May 2014, sponsored by ARVO.

Palagyi A, Meuleners L, McCluskey P, White A, Lamoureux E, Ng J, Morlet N, **Pesudovs K**, Ivers RQ, Boufos S, Do V, Stapleton F, Keay L. Falls and cataract: the risk to older adults on public hospital waiting lists. Royal Australian and New Zealand College of Ophthalmologists Conference. Brisbane, Australia, November 2014.

Dr Shiwani Sharma

Conference presentations

2014 NJ Van Bergen, **JE Craig**, AW Hewitt, **KP Burdon, S Sharma**, JG Crowston
Mitochondrial impairments in primary open-angle glaucoma patient lymphoblasts
The Association for Research in Vision and Ophthalmology Annual Meeting, Orlando, Florida, USA, May 4-8. Abstract: Invest Ophthalmol Vis Sci 55(13):5035. (poster)

2014 I Trounce, N Van Bergen, V Chrysostomou, **K Burdon, S Sharma**, A Hewitt, **J Craig**, J Crowston
Mitochondrial energetic impairment in glaucoma.
XXI Biennial meeting of the International Society for Eye Research, San Francisco, USA, July 21-24. (Platform presentation by IT)

2014 **S Sharma, S Martin, A Dave**, M Corbett, M Ronci, **K Burdon,** N Voelcker, **JE Craig**
The ocular lens and environmental insult: interesting novel observations.
XXI Biennial meeting of the International Society for Eye Research, San Francisco, USA, July 21-24. (poster)

2015 JJ Kong, L Wang, G Smyth, AL McNab, T Hardy, D Selva, **S Sharma, KP Burdon**, E Peter, **JE Craig**

Gene expression profiling of orbital adipose tissue in thyroid orbitopathy
The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7. (poster)

Professor Justine Smith
Invited presentations
JR Smith. Immunopathology of retinal vasculitis and intermediate uveitis. 12th International Ocular inflammation Society Congress. 2nd International Assembly of Ocular Inflammation Societies. Valencia, Spain. 2014.
JR Smith. Translational studies of ocular toxoplasmosis. 12th International Ocular inflammation Society Congress. 2nd International Assembly of Ocular Inflammation Societies. Valencia, Spain. 2014.
JR Smith. Global research in ocular infectious disease. The Symbiosis of Global Eye Research: Building Bridges between the Developed and Developing Worlds SIG. Association for Research in Vision and Ophthalmology Annual Meeting. Orlando, FL, USA. 2014.
JR Smith. Mechanisms of Toxoplasma gondii infection of human retina. XXI Biennial Meeting of the International Society for Eye Research. San Francisco, CA, USA. 2014.
JR Smith. Translational studies of toxoplasma retinochoroiditis. 17th Afro-Asian Congress of Ophthalmology. Xi'an, China. 2014.
JR Smith. Biologics and other developments for uveitis. Singapore National Eye Centre – 25th Anniversary International Meeting. Singapore. 2015.
JR Smith. Blocking mediators of inflammatory pathways. "Next Generation Thinking and Therapy for Inflammatory Eye Disease" International Meeting. Munich, Germany. 2015.
JR Smith. Future treatments for non-infectious posterior uveitis. International Ocular Inflammation Society Congress. San Francisco, CA, USA. September 2015. President's Symposium Talk.
JR Smith. Biological agents in treatment of non-infectious uveitis. Indo-China Uveitis Meeting. Yangon, Myanmar. November 2015.
JR Smith. Translational studies of toxoplasma retinochoroiditis. 19th Congress of the Chinese Ophthalmological Society. Xi'an, China. 2014.
JR Smith. Chronic or recurrent anterior uveitis. Uveitis 2014: Extinguishing the Great Fire (AAO Subspecialty Day). American Academy of Ophthalmology Annual Meeting. Chicago, IL, USA. 2014.
JR Smith. Toxoplasmosis. 27th Annual Registrars Conference and Teaching Course. Sydney, Australia.
JR Smith. Biologics and New Advances. 27th Annual Registrars Conference and Teaching Course. Sydney, Australia. Named lecture.
JR Smith. Masquerade syndromes – Autoimmune retinopathy. 27th Annual Registrars Conference and Teaching Course. Sydney, Australia.
JR Smith. Impact of Toxoplasma gondii infection on human retinal cells. 7th Chinese Congress of Research in Vision and Ophthalmology. Shenyang, China. To be presented August 2015.
JR Smith. Basic mechanisms of human posterior uveitis. 7th Chinese Congress of Research in Vision and Ophthalmology. Shenyang, China. August 2015.

Dr Deepa Taranath
Presentations at national meetings
2014 ANZ Strabismus Society meeting, Sydney. Post squint surgery – infection survey conducted at the meeting.

2014 2nd LSD (Lysosomal storage Disorders) Symposium, Sydney. Ocular disease in LSD – Disease surveillance and monitoring.
2015: Tasmanian RANZCO State Branch meeting and Evidence Based Ophthalmology Workshop, June 2015. Atropine and orthokeratology for paediatric myopia.

Professor Keryn Williams
Invited presentations
2014 Gordon Research Conference, Biology and Pathobiology of Cornea, California
Gene therapy for corneal dystrophies and disease, where are we?
2014 31st Cornea Society Meeting, Brisbane
Report from the Australian Corneal Graft Registry
2014 Oxford Medical Society Reunion, Adelaide
An influx of Australians: the NDS from 1980-
2014 Royal Australian and New Zealand College of Ophthalmologists Annual Scientific Meeting, Brisbane
With help from the ORIA, 1982-2014, with a focus on the early years
2015 30th Asia-Pacific Academy of Ophthalmology Congress, Guangzhou, China
Gene therapy in corneal and limbal stem cell transplantation
2015 Global Alliance of Eye Bank Associations Scientific Meeting, San Diego, USA
The Australian Corneal Graft Registry
2015 World Cornea Congress VII, San Diego, USA
Corneal Graft Registries: benefits and risks
2015 32nd Annual Cornea Society and Eye Bank Meeting, Perth
Report from the Australian Corneal Graft Registry
To whom should outcome registries report?

Other presentations
2014 Flinders University Early Career Researchers network
Building a CV for competitive fellowships
2014 SAHMRI Workshop
How to win competitive fellowships
2014 SAHMRI Translational Neuroscience Day, Adelaide
KA Williams
2014 Annual Scientific Meeting, TSANZ, Canberra
KA Williams, MC Keane, R Galettis, RAD Mills
Outcomes of corneal transplantation for herpetic eye disease
2015 Registries Heads Meeting, Organ Transplantation Authority (DonateLife)
Update: the Australian Corneal Graft Registry

Presentations by student members and research assistants
2014 The Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting, Orlando, Florida, USA, May 4-8.
G Kaidonis, JE Craig, R Fogarty, MC Gillies, W Shen, **S Sharma, B Appukuttan,** B Pal, P Sundaresan, **KP Burdon**
Genetic variation near GRB2 and KCNB2 identified by a genome-wide association study are reproducibly associated with diabetic retinopathy
(Poster presentation)
2014 XXI Biennial Meeting of the International Society for Eye Research, San Francisco,

USA, July 21-24.
A Dave, S Martin, R Kumar, **JE Craig, KP Burdon, S Sharma**
Molecular analysis of congenital cataract causing mutations in the EPHA2 gene.
(Selected for platform presentation; presented by PhD student AD; *Travel Fellowship awarded to AD*)

2014 International Society for Eye Research XXI Biennial meeting, San Francisco, 20th-24th July
Y Irani, Y Tian, M Wang, **S Klebe**, NH Voelcker, JL Coffer, **KA Williams**
A novel pressed porous silicon-polycapralactone composite as a dual purpose ophthalmic implant
Y Irani won a young investigator travel award

2014 Royal Australian and New Zealand College of Ophthalmologists ASM, 24 November
E Souzeau
Incidental findings from WGS/WES in research: ethical considerations.

2014 Royal Australian & New Zealand College of Ophthalmologists ASM, 24 November
E Souzeau
PITX2 and FOXC1 mutations in Anterior Segment Dysgenesis patients from the Australian & New Zealand Registry of Advanced Glaucoma (ANZRAG)
(Poster presentation)

2015 32nd Australia and New Zealand Cornea Society Meeting, Perth, 4th-7th March
Y Irani, P Scotney, A Nash, **S Klebe, KA Williams**
Anti-VEGF-B therapy in a rat model of corneal neovascularization

2015 ARVO Annual Meeting, Denver, Colorado, 3rd-7th May
Y Irani, P Scotney, A Nash, **S Klebe, KA Williams**
Anti-VEGF-B therapy in a rat model of corneal neovascularization
Y Irani won a young investigator travel award; selected platform presentation

2015 ASIA-ARVO. Yokohama, Japan
L Ashander, **B Appukuttan, Y Ma, D Gardner-Stephen, J Smith**
Transcription factor expression by human retinal endothelial cells in response to tumor necrosis factor (TNF)-α and interleukin (IL)-1β.

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
G Kaidonis, KP Burdon, MC Gillies, RW Essex, JH Chang, B Pal, M Daniell, N Petrovsky, AW Hewitt, **JE Craig**
Common sequence variation in the VEGFC gene is associated with diabetic retinopathy and diabetic macular edema in Caucasian patients

2015 The Association for Research in Vision and Ophthalmology Annual Meeting, Denver, Colorado, USA, May 3-7.
OM Siggs, S Javadiyan, S Sharma, KP Burdon, JE Craig
Partial duplication of CRYBB1 as a novel genetic mechanism for autosomal dominant congenital cataract
(Poster presentation)

Budget Acquittal and Financial Viability

Flinders Uni
43 Inc/Exp by Project (Grants Office)
Current Month December 2014

Cost Centre : 519-Opthal Eye & Vision — 31-Aug-2015 13:47:02

Entity: 01 - Flinders Uni

	Carry Forward	Income	Expenses	Commitment	Surplus / (Deficit)
Cost Centre: 519 (Flinders Centre for Opthalmology, Eye & Vision Research)					
Project: 36372 (2010/15 Op Grant ASRI Flinders Cntr Ophthalmology Eye Vision)					
Source: 009 ((URB) University Research Budget)					
Old Cost Centre/ Project:					
Income					
0987 - Research Budget Transfers	0	100,000	0	0	
9298 - Funds Brought Forward	(503)	0	0	0	
TOTAL INCOME & CARRY FORWARD	(503.34)	100,000.00	0.00	0.00	99,496.66
Salaries					
1800 - Severance Levy (Admin Contract)	0	0	920	0	
1801 - Salaries (Admin Contract)	0	0	87,403	0	
1803 - Payroll Tax (Admin Contract)	0	0	5,597	0	
1804 - Superannuation (Admin Contract)	0	0	13,320	0	
1805 - Award/SGC Super (Admin Contract)	0	0	2,921	0	
1806 - Workers Comp (Admin Contract)	0	0	1,284	0	
1807 - Annual Leave Paid (Admin Contract)	0	0	6,286	0	
1808 - Long Service Leave Paid (Admin Contra	0	0	3,143	0	
1814 - Admin Contract LSL Levy	0	0	610	0	
Total Salaries	0.00	0.00	121,485.12	0.00	(121,485.12)
Non Salaries					
2001 - Airline (Domestic)	0	0	1,607	0	
2051 - Light Meals/Snacks (Non:FBT)	0	0	13	0	
2401 - Advertising : Courses/Other	0	0	227	0	
2601 - Hire/Lease	0	0	2,588	0	
3201 - Stationery	0	0	174	0	
3301 - Postage/Freight	0	0	33	0	
Total Non Salaries	0.00	0.00	4,643.18	0.00	(4,643.18)
TOTAL EXPENDITURE	0.00	0.00	126,128.30	0.00	(126,128.30)
TOTAL	(503.34)	100,000.00	126,128.30	0.00	(26,631.64)

Flinders Uni
43 Inc/Exp by Project (Grants Office)
Current Month December 2014

Cost Centre : 519-Opthal Eye & Vision 31-Aug-2015 13:46:27

Entity: 01 - Flinders Uni

	Carry Forward	Income	Expenses	Commitment	Surplus / (Deficit)
Cost Centre: 519 (Flinders Centre for Opthalmology, Eye & Vision Research)					
Project: 36295 (2010/15 RIBG/ASRI Flinders Ctr Ophthalmology Eye Vision Rsch)					
Source: 010 (Infrastructure Funds)					
Old Cost Centre/ Project:					
Income					
0986 - Intra-Faculty or Intra-Portfolio Transfer	0	20,000	0	0	
9298 - Funds Brought Forward	(15,028)	0	0	0	
TOTAL INCOME & CARRY FORWARD	(15,027.52)	20,000.00	0.00	0.00	4,972.48
Salaries					
1800 - Severance Levy (Admin Contract)	0	0	16	0	
1801 - Salaries (Admin Contract)	0	0	1,420	0	
1803 - Payroll Tax (Admin Contract)	0	0	92	0	
1804 - Superannuation (Admin Contract)	0	0	222	0	
1805 - Award/SGC Super (Admin Contract)	0	0	48	0	
1806 - Workers Comp (Admin Contract)	0	0	21	0	
1807 - Annual Leave Paid (Admin Contract)	0	0	167	0	
1814 - Admin Contract LSL Levy	0	0	10	0	
Total Salaries	0.00	0.00	1,996.74	0.00	(1,996.74)
Non Salaries					
Total Non Salaries	0.00	0.00	0.00	0.00	0.00
TOTAL EXPENDITURE	0.00	0.00	1,996.74	0.00	(1,996.74)
TOTAL	(15,027.52)	20,000.00	1,996.74	0.00	2,975.74

Comment

The major costs for the Centre over the past 18 months have been the salaries of our Research Development Officers. Ms Anne Cazneaux moved to another (full-time) position elsewhere in the University in October 2014, given that we could not afford to continue her part-time position in our Centre with our available funds. Ms Debra Sullivan is funded until the end of 2015. Relatively small amounts of money have been used to support the Centre's Evidence-Based Ophthalmology and Optometry Workshops, which are a core undertaking for us. Without support for an RDO in 2016, the Centre is unlikely to remain viable.

Centre Seminar Program 2014 - 2015

2014

DATE	SPEAKER	PRESENTATION
11 March	Dr David Andrews RANZCO	RANZCO's role in research
18 March	A/Prof Richard Mills & Prof Jamie Craig Ophthalmology	Department Update
25 March	Dr Jane Wells Ophthalmology	Ophthalmology education: Helping students "see the light"
1 April	Dr Paul Badenoch Ophthalmology	Update on diagnostic ocular microbiology
8 April	Ms Vanessa Rowley Manager Casemix/ABF SALHN	Independent hospital pricing authority
15 April	No meeting	
22 April	Ms Angela Chappell & Mrs Margaret Philpott Ophthalmology	Where there's a will, there's a way Passage to India
29 April	Prof Keryn Williams Ophthalmology/FCOEVR	Report from Gordon Conference (Cornea) 2014
6 May	Prof Tim Neild Dep Director, Medical Program, FUSA	A Quick Guide to the MD Program
13 May	Prof Jamie Craig Ophthalmology/FCOEVR	ARVO 2014 Update
20 May	Prof Ross McKinnon	Drug Discovery and Academia
27 May	Dr Mona Awadalla Ophthalmology	Report from Genemappers 2014
3 June	A/Prof Briony Forbes Discipline of Medical Biochemistry/Centre for Neuroscience, SOM	Mitogenic Signalling via the Insulin Receptor and its Role in Cancer.
10 June	A/Prof Geraint Rogers Director, Microbiome Research SAHMRI	The Ocular Microbiome
17 June	Prof Neil Dear Director, Research Support Services, SAHMRI	Discussion on the SAHMRI Animal Facility & potential collaborations
24 June	A/Prop John Kaidonis School of Dentistry, Adel Uni	Oral biofilms in health and disease
1 July	Dr Georgia Kaidonis PhD Student, FCOEVR	ARVO 2014 review: Intravitreal injections for the treatment of Diabetic Macular Edema
8 July	Semester Break	
15 July	Semester Break	
22 July	Dr Jyoti Khadka Optometry & Vision Science, FUSA	Development of a Novel System to Measure Quality of Life in Ophthal: The Eye-Tem Bank
29 July	Dr Owen Siggs Ophthalmology	Mutagenesis & Mammalian Immunity
5 August	Mrs Angela Chappell Flinders Eye Clinic	My RetCAM Study Tour, Canada 2014
12 August	Dr Mark Hassall Flinders Eye Clinic	Retinal Gene Therapy
19 August	A/Prof David Lynn Biomedical Informatics FUSA/SAHMRI	Disease susceptibility from a network and systems biology perspective.

26 August	Dr Bastien Llamas ARC Senior Research Assoc Ecology & Evolutionary Biology, Uni of Adelaide	A few tales of a bygone age: ancient DNA studies of elephant birds, giant kangaroos, and First Americans
2 September	Dr Chris Powell Medical Student, FMCl	Photochemical Smog and Adelaide's Air Pollution.
9 September	No meeting	
16 September	Prof Melissa Brown Head, Molecular Micro Group Assoc Dean (Research)/SOBS	The promiscuity of bacterial multidrug efflux pumps- how to get around them.
23 September	Dr Jill Carr Microbiology and Infectious Diseases. Flinders Medical Science and Technology	A viral infection of endothelial cells that induces inflammation and functional changes.
30 September	Prof Neil Piller Coordinator: Advanced Studies MD Program & Electives Year 1 MD Program	Advanced Studies Component of the Medical Program
7 October	David Jacobs & Jason Booth Flinders Vision	Flinders Vision Optometry
14 October	A/Prof Lynley Bradnam A/ Professor of Physiotherapy SOHS, Applied Brain Research Laboratory, Center for Neuroscience	How can Transcranial Magnetic Stimulation improve rehabilitation?
21 October	No meeting	
28 October	Dr Peter van Wijngaarden CJ Martin Fellow & Retinal Fellow Royal Vic Eye & Ear Hospital; CERA	Rejuvenating remyelination of the central nervous system.
4 November	No meeting	
11 November	Ms Alpana Dave	Final PhD seminar
18 November	No meeting	
25 November	RANZCO Conference	
2 December	Mr Yazad Irani	Final PhD seminar
9 December	Mr Abraham Kuot	Final PhD Seminar

2015

DATE	**SPEAKER**	**PRESENTATION**
3 March	A/Prof Richard Mills & Prof Jamie Craig Flinders Ophthalmology	Department Update
10 March	Dr Jude Fitzgerald Ophthalmology	Masters Update
17 March	Dr Tiger Zhou Ophthalmology	PhD Progress Report
24 March	Dr Saulo Martelli School of Computer Science Engineering & Mathematics, FUSA	Modelling human motion and skeletal bio-mechanics for a better health
31 March	Dr Paul Badenoch Flinders Ophthalmology	Safeguarding the recipients of eye tissue from infectious disease transmission
7 April	Dr Stephen Hardy Commercial Manager Flinders Partners Pty Ltd	Making an Impact
14 April	Dr Genevieve Oliver Retinal Fellow Flinders Ophthalmology	Ophthalmology in Timor-Leste
21 April	Dr Miriam Keane ACGR	The Australian Corneal Graft Registry 2015 Report Preview

	Flinders University	
28 April	No meeting	
5 May	Prof. John A. Long President, The Society of Vertebrate Paleontology Vice President, The Royal Society of South Australia Strategic Professor in Palaeontology School of Biological Sciences Flinders University	Our deep distant origins: resolving the big steps in early vertebrate evolution
12 May	Prof. Mark Taylor Professor of Biomedical Engineering Associate Dean for Research, School of Computer Science, Engineering and Mathematics	The Performance of Hip and Knee Replacement
19 May	Dr Georgia Kaidonis Ophthalmology	ARVO Report 2015/PhD Update
26 May	No meeting	
2 June	Ms Emmanuelle Souzeau Flinders Ophthalmology	'Testing Update'
9 June	Cancelled	
16 June	Dr Deepa Taranath Flinders Ophthalmology	Update on Paediatric Myopia
23 June	Shao Jia (Jo) Zhou, PhD School of Agriculture, Food & Wine & FOOD*plus* Research Centre University of Adelaide, Waite Campus	Food fortification to prevent iodine deficiency in Australia
30 June	A/Prof Tony Phillips	A Contact Lens Update
7 July	Dr Yazad Irani & Dr Shervi Lie	Report from ARVO 2015
14 July	Semester Break	
21 July	Semester Break	
28 July	Dr Marten Snel Head, Mass Spectrometry Lysosomal Diseases Research Unit SAHMRI	Modern Mass Spectrometry – the Swiss army knife of life science research
4 August	No meeting	
11 August	Dr Richard Mills Flinders Ophthalmology	Corneal Graft 'Cross-linking'
18 August	Prof David Day Matthew Flinders Distinguished Professor Flinders University	Mitochondria and oxidative stress in plants
25 August	Prof Sonja Klebe Molecular Medicine and Pathology Flinders University	Curcumin as an adjunct therapy following cancer
1 September	Prof Rob Saint Deputy Vice Chancellor – Research Flinders University	Flying in the face of conventional cancer research: understanding the consequences of chromosomal instability
8 September	Dr Shiwani Sharma Flinders Ophthalmology	Mechanisms of cataract development and beyond
15 September	Dr Laura Weyrich Australian Centre for Ancient DNA Uni of Adelaide	Insights into human health and disease from the Neandertal microbiome
22 September	Prof Lyle Palmer Executive Director The Joanna Briggs Institute Uni of Adelaide	TBA

29 September		
6 October	Dr Gayle Roberton Senior Lecturer in Curriculum Development Health Professional Education Unit Flinders University	TBA
13 October	TBA	
20 October	Dr Karin Nordstrom Flinders Medical Science and Technology AU, Anatomy and Histology Flinders University	TBA
27 October	TBA	
3 November	RANZCO Conference	
10 November	TBA	
17 November	Shari Javadiyan	Final PhD seminar

Our People: 2014-5 in Pictures, and Media Releases

Gene discovery offers new line of defence against glaucoma

- CLARE PEDDIE SCIENCE REPORTER
- THE ADVERTISER
- FEBRUARY 24, 2015 2:30AM

A NEW gene discovery is expected to help save the sight of tens of thousands of Australians with a common type of glaucoma.

Flinders University helped guide international research across six continents and 17 countries to find the new gene that can give you glaucoma. The gene makes people more susceptible to exfoliation syndrome, a common cause of glaucoma and blindness. It does not cause glaucoma, but increases the risk of developing the disease.

Flinders University ophthalmology Professor Jamie Craig said exfoliation syndrome was responsible for blindness in 7 per cent of Australian glaucoma sufferers with severe vision loss. "In this form of glaucoma there are deposits of abnormal protein in the front of the eye. That comes on with age and causes a blockage with drainage that puts up your eye pressure," he said. "We're trying to move towards a more sophisticated understanding where we think about what's gone wrong and develop new kinds of treatments that might stop this abnormal protein depositing in the eye and that might prevent the problem." In all Australians over age of 50, at least 3 to 5 per cent have this particular deposition of protein, Professor Craig said. "But that's not to say they all will get glaucoma," he said. He said the problem was more common in other parts of the world, affecting half the glaucoma sufferers in Scandinavian countries. About 550 cases considered in the study came from the Australian and New Zealand Registry of Advanced Glaucoma, based in Adelaide. The National Health and Medical Research Council funded the initial research project, but the team soon realised they needed to join forces with collaborators around the world. The genome-wide association study is published today in the journal *Nature Genetics.* The gene discovery gives researchers fresh insight into the mechanism of disease. "It says that in some way the regulation of calcium levels in the eye has something to do with the build-up of protein," Professor Craig said. "In the future, differen drugs could be developed to balance out the effects of this problem. It might prevent the build-up of material. These are the sorts of things that we look for in these studies, to find a new direction for treatment." Professor Craig encouraged everyone over the age of 40 to have a check-up for glaucoma every two years.

FLINDERS INVESTIGATORS

PUBLIC LECTURE SERIES

VISIONARY RESEARCH: Demystifying Toxoplasmosis and its effect on vision and in pregnancy

Wednesday 24 June, 5:30 -7:30pm

Flinders University, 182 Victoria Square, Lecture Theatre 1, refreshments will be provided.
Register online: flinders.edu.au/flindersinvestigators

TOXOPLASMOSIS: A little known but surprisingly common parasite

Pregnant women of the first world have long known that cat faeces and undercooked meat are a risk to their unborn children. The stark reality is that the parasite infection behind these stories, toxoplasmosis, can be contracted in numerous ways, and primarily affects people aged between 20 and 50 years. Infecting one-third of the world's population, and at least one in five Australians, the most common condition caused by Toxoplasma is a form of uveitis, which causes serious inflammation of the retina and can lead to permanent vision loss.

The warning signs of uveitis often appear suddenly and get worse quickly. Early diagnosis and treatment are important to prevent lifelong complications. A number of antibiotics can be used to treat ocular toxoplasmosis, but side effects are common, and no drug can completely eradicate the parasite from the body.

Professor Smith will discuss the challenges faced by those treating Toxoplasma infection, and describe the research she is undertaking to help us understand how this common parasite causes serious disease around the world.

PROFESSOR JUSTINE R. SMITH

Professor Justine R. Smith is an internationally recognized ophthalmologist and vision scientist. As Research Strategic Professor at Flinders University, Principal Research Fellow at SAHMRI, and Future Fellow of the Australian Research Council, Professor Smith's work contributes to advances in treatment of a disease estimated to cause to cause 10% of blindness in Western countries, and more in the Developing World.

Professor Smith's field of study focuses on uveitis, a disease with multiple causes, which results in inflammation inside the eye. Through her research, important discoveries on the mechanisms of infectious uveitis have been made. Separately, laboratory research and clinical trials led by Professor Smith have established the use of biologic drugs to reduce vision loss from non-infectious uveitis.

In May this year, Professor Smith co-authored a study published in the New England Journal of Medicine, which found that live Ebola virus was present in a patient's eye fluid 10 weeks after the virus was no longer detectable in the patient's blood. This discovery has major implications for the treatment of Ebola Virus Disease – a disease which caused fears of a worldwide epidemic – by showing that patients who survive the disease could still be carrying the virus even after their symptoms have subsided.

Professor Smith is a strong advocate for medical research across the globe, most recently in her role as President of the Association for Research in Vision and Ophthalmology, the largest global society for eye and vision research, with an 80-year history and 12,500 members in 75 countries.

Flinders UNIVERSITY
inspiring achievement

#flindersinvestigators

PROFESSOR KERYN WILLIAMS

Hard graft

Vision science and translational researcher Professor Keryn Williams gives an insight into current corneal transplant procedures and describes the path that steered her to this field

Could you first provide an overview into your background, explaining what led you to study transplantation immunology and how this directed you to your career in ophthalmology?

My first postdoctoral position was in the Nuffield Department of Surgery at the University of Oxford, UK. My head of department there was an Australian surgeon, Professor Peter Morris, who was establishing a new renal transplant programme in the Thames Valley about the time I arrived. It was a very exciting place to be, and those of us who worked on the laboratory side of the department relished the task of trying to master transplantation immunobiology in order to help the clinical staff as much as possible.

After six years, it was time to return to Australia, and Professor Morris suggested to me that I might like to join the new Department of Ophthalmology being established at Flinders University. The Foundation Professor there, Douglas Coster, asked me to inject some science into what he described as 'the art of corneal transplantation'. These two surgeons have been wonderful mentors to me over my entire scientific career. It's impossible to overemphasise the impact of expert, visionary and kind mentors in the career of any scientist.

With whom do you collaborate and to what extent has a multidisciplinary approach proven important to the success of your projects?

Evidence suggests that collaborative research often has the biggest impact. We all collaborate widely, both nationally and internationally. For myself, I suppose in one sense my most important collaboration is with the 700-odd Australian ophthalmologists in a variety of academic and private practices who have so willingly provided a wealth of de-identified information on the outcomes of corneal transplantation in their patients over many years. Provision of this information is entirely voluntary, and it's just extraordinary that they support the Australian Corneal Graft Registry (ACGR) so graciously.

The benefit of a multidisciplinary approach is that it brings together researchers who have completely different skill-sets and ways of thinking about problems. The synergies are quickly apparent to all involved. Some of my most enjoyable and productive interactions have been with chemists and material scientists – who would have thought?

The goal of translational research – which forms a large part of your research portfolio – is to transform basic biomedical research discoveries from bench to bedside. What are the major challenges of such targeted research?

Translational research often takes an inordinate amount of time to yield outcomes of practical use. The pipeline from discovery to patient benefit can amount to a decade or more. For knowledge translation, the major difficulty after retrieving and disseminating the evidence lies in measuring changes in the pattern of practice.

Can you describe the advantages of using an evidence-based approach to measure outcomes in patients with eye disease?

The advantages are the same for any set of patient outcomes, whatever the disorder or disease: the best outcomes will be linked to therapeutic approaches that actually work. Some ineffective treatments may do no actual harm, but the individual may then

be denied a proven treatment that would have improved his or her health. Ineffective treatments are sometimes also quite expensive and waste scarce resources. Some, frankly, can be dangerous.

Although not a problem in Australia specifically, the need for human cornea donors worldwide far exceeds supply. Do you envisage a time when a corneal xenograft may be possible?

We flirted with corneal xenografts in experimental models many years ago, but found that they underwent rapid rejection. I am not particularly optimistic about the potential of full-thickness corneal xenografts, however beguiling the idea may be in theory. Despite this, I do think there may be some potential for partial thickness xenograft materials to supplement the use of human corneas.

Could you outline your research objectives for the next five to 10 years?

One of the aims of our centre has always been to promulgate the tenets of evidence-based ophthalmology as much as possible. In the past we've run workshops at which we've discussed the hierarchy of evidence, demonstrated efficient retrieval of scientific literature, summarised statistical methodologies and presented the evidence for and against topical and contentious issues of practice. For the future, we are contemplating a different model, making much more use of online, web-based material.

PROFESSOR KERYN WILLIAMS

Clear vision

Researchers at **Flinders University**, South Australia, have made significant impacts on ophthalmology, establishing new care and data facilities together with their cutting-edge research into the eye

CORNEAL TRANSPLANTATION WAS one of the first transplant surgeries to have been successfully performed; unfortunately, it has also proven one of the hardest to perfect in relation to long-term graft survival. The cornea is a unique tissue, with a very high density of nerve endings but no blood supply, and has classically been considered to enjoy a degree of immune privilege. Although one might expect these qualities would make it less vulnerable to damage by the immune system, in fact about 30 per cent of full-thickness corneal grafts undergo rejection.

Inflammation and neovascularisation also predispose towards corneal allograft failure, which affects around 10 per cent of transplants in the first few years. In the long-term, the results are even less encouraging, with fewer than half of all corneal grafts surviving past 15 years. On top of this, the procedure requires tissue from deceased donors, producing a long waiting list in some jurisdictions. Even so, 1,500 Australians require corneal graft surgery every year either to restore vision or relieve pain – after all, transplantation is still the premier treatment for corneal opacity, globally the second-leading form of blindness.

CHANGING THE GAME

One team of researchers headed by Professor Keryn Williams, leader of Flinders University's Research Centre for Opthalmology, Eye and Vision and Scientific Director of the Australian Corneal Graft Registry (ACGR), has significantly altered this picture in Australia. In addition to the ACGR, the Eye and Vision Centre has established and maintains a number of other ophthalmological registries including the Australian and New Zealand Registry of Advanced Glaucoma, the Registry of Advanced Diabetic Retinopathy, and the Australian and New Zealand Ophthalmic Surveillance Unit, all of which have a strong influence on clinical practice.

Since arriving at Flinders in 1981, Williams and her collaborators have been responsible for radical improvements, not only to knowledge in the field of ophthalmology, but also to the facilities and best clinical practice available to patients in need of corneal transplant or treatment for numerous other diseases of the eye.

In 1982, the new Department of Ophthalmology was responsible for establishing both Australia's first formal eye bank and its first ophthalmology

A human corneal graft that has undergone rejection.

Registering an interest

In May 1985, Professor Keryn Williams founded the Australian Corneal Graft Registry (ACGR), collecting de-identified information on human corneal transplants from all over Australia. After almost 30 years of operation, the Registry now contains records of more than 27,000 transplants – and is therefore an invaluable resource for clinicians.

The idea of the Registry was based on the success of others established for vascularised organ transplantation, including the one championed by Williams' mentor Professor Peter Morris for kidney transplants. "The utility of these registries was obvious, and we thought that such an approach might also be very useful for corneal transplantation," Williams recalls.

Around 700 ophthalmologists participate in the programme, supplying initial information at registration about the recipient, donor, operative procedure and practice of the eye bank, and then follow-up data at annual intervals until the graft is lost or the death or loss-to-follow-up of the patient. The information is then checked for consistency and added to the Registry's database, before ultimately being subjected to detailed analyses and compiled into a regular report.

Today, the ACGR is probably the largest repository of clinical corneal transplantation data in the world – and it certainly contains the most sustained patient follow-ups. It serves as a model for those establishing new registries around the world.

RESEARCH IN THE DEPARTMENT OF OPHTHALMOLOGY

OBJECTIVES

To improve graft survival and visual outcomes for patients who require corneal transplants to restore vision or relieve pain.

KEY COLLABORATORS

Associate Professor Richard Mills; Professor Jamie Craig; Professor Justine Smith; Associate Professor Celia Chen; Associate Professor Sonja Klebe; Dr Miriam C Keane; Dr Rachel Galettis, Flinders University, Australia

Staff of the Eye Bank of South Australia, Flinders University, Australia

The many Australian ophthalmologists who contribute information to the **Australian Corneal Graft Registry,** Flinders University, Australia

FUNDING

National Health and Medical Research Council (NHMRC)

Ophthalmic Research Institute of Australia

DonateLife (Australian Organ and Tissue Donation and Transplantation Authority)

CONTACT

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PROFESSOR KERYN WILLIAMS is Leader of the Research Centre for Opthalmology, Eye and Vision at Flinders University, Australia, as well as being Scientific Director of the Australian Corneal Graft Registry (ACGR). Williams conducted her PhD at the University of Melbourne, Australia, before undertaking postdoctoral research at the University of Oxford's Nuffield Department of Surgery, UK, where she developed her interest in transplantation immunobiology. On her return to Australia, Williams joined the new Department of Ophthalmology at Flinders University. She founded and is Scientific Director of the ACGR and is NHMRC Principal Research Fellow at Flinders University.

Flinders UNIVERSITY

Key facts

- The cornea is the transparent window at the front of the eye which, if damaged, can cause blindness
- Corneal damage is the second leading cause of blindness worldwide
- Every year 1,500 Australians need a corneal transplant, with all graft donations coming from human eyes
- 90 per cent of corneal grafts survive for one year, but fewer than 50 per cent survive longer than 10 years

day-surgery unit, increasing the availability of ophthalmologic procedures as well as donor tissues. 15 years later, Flinders scientists published a paper demonstrating for the first time that advanced donor age made little difference to graft success. As a result of this discovery, which has been duplicated in the US and elsewhere, corneal donations became far more abundant in Australia.

DATA MINING

The research being conducted at Flinders' Department of Ophthalmology ranges widely, covering topics related to clinical practice in the treatment of many diseases including retinopathy, macular degeneration and glaucoma, as well as less prevalent but equally troubling conditions such as eye diseases of newborns, intraocular infections and diseases of the ocular surface. Helping to reduce the burden of blindness and corneal disease by improving corneal transplant procedures, however, is still an enduring priority for Williams and her group; towards this end, much of the work they undertake involves drawing conclusions from ACGR data.

A successful corneal graft in a human

In recent years, the Flinders team has published a number of papers making excellent use of the ACGR database in order to guide clinical practice and inform research. These studies have revealed the heightened risk of graft failure when using corneas transported by air-freight from other states over locally-sourced tissues, as well as the increased danger, in patients with bilateral corneal grafts, of rejection episodes in one eye following rejection in the other. An increased understanding of paediatric graft survival, long-term graft survival in penetrating corneal grafts for keratoconus, and lamellar versus penetrating keratoplasty have all been achieved from mining this valuable source of information.

FUTURE PLANS

One promising route to improved graft survival being pursued by Williams and her colleagues is that of gene therapy, which involves transferring genes into the donor corneal tissue prior to transplantation. Using an ovine model, the researchers have already demonstrated that this method of immunomodulation can significantly prolong corneal graft survival. Their subsequent aims are to characterise, construct and test lentiviral vectors for the effective delivery of these therapeutic genes. The scientists theorise that it might be possible to extend allograft survival indefinitely, provided that multiple transgenes in the donor cornea are able to target several pathways of potential graft damage.

Williams and the scientists working alongside her at the Flinders Department of Ophthalmology have had an incalculable influence on the pursuit of this clinical science in Australia, as well as dramatically improving the patient outcomes clinicians are able to achieve. Although there is still much to learn – as Williams admits: "Corneal transplantation still falls well short of its therapeutic potential" – the researchers are indefatigable in their work, and if their past achievements are any indicator of future performance, this gap may well be closed in the future.

One promising route to improved graft survival being pursued by Williams and her colleagues is that of gene therapy, which involves transferring genes into the donor corneal tissue prior to transplantation

Australian Corneal Graft Registry celebrates 30th Anniversary

Ms Yael Cass, CEO of the Organ and Tissue Authority congratulates the Australian Corneal Graft Registry on reaching its 30 year milestone. The Australian Corneal Graft Registry, currently headed by Professor Keryn Williams, operates an Australia-wide register of human corneal transplants and recently celebrated its 30 year anniversary. The Australian Corneal Graft Registry opened in May 1985. The purpose of the Register is to collect information that will inform clinical practice and to identify risk factors for poor patient outcomes. The OTA commends the Registry and its staff for 30 years of service to the Australian eye sector.

Latest Stories

Forgotten Flyers

Adelaide's forgotten fliers... An elderly couple's dream holiday almost ruined... Stranded at the airport and forced to buy more tickets

ICAC whistleblowers

Because we have the nations' most secretive corruption commission you'll never really know what and who they are pursuing...

Vinyl Revival

Adelaide's vinyl revival... The musical turn around that has made all those old discs new again

Memory Loss

Beating memory loss and boosting your powers of recall… You'll never forget your pin number, people's names or lose your keys again

State Care

There's been an incredible 150% increase in the number of children in emergency care. We speak with child advocate and former foster carer Rachael Titley about the emotional and economic impact.

Adelaide zoning

Adelaide's land lotto rezoning… Making home owners into millionaires... Is your suburb about to hit the jackpot?

Classroom violence

Teachers are under attack as students as young as five turning violent in the classroom. Since 2011 more than 40 million dollars in compensation has been paid to stressed out teachers

SA Job Skills

Putting our job trainers out of a job… Will this be a massive government blunder? Plus the secret legal advice saying the scheme may be unlawful

Medicinal Marijuana Pol

Should the SA Government allow cli medical marijuana?

Yes 96%

No 4%

This poll has closed, there will be a new

Source: Research Excellence book, Flinders University

OPHTHALMOLOGY

RESEARCH FLAGSHIP: CENTRE FOR OPHTHALMOLOGY, EYE AND VISION RESEARCH

The Flinders Centre for Ophthalmology, Eye and Vision Research brings together one of Australia's largest groups of scientists and clinicians working in eye and vision research and is at the forefront of the fight against blinding eye disease.

The Centre's primary focus is the nexus between vision and health – a major issue for Australia's ageing population – and its approach includes basic biomedical science, applied research, clinical research, translational research, and health services management research. With more than 20 core researchers, the Centre boasts a multidisciplinary team comprising ophthalmologists, optometrists, pathologists, biomedical scientists, genetic counsellors and psychologists. Research programs focus on the significant physical, emotional and economic constraints experienced by sufferers.

In addition, the new Flinders Vision Clinic offers one of the most comprehensive ranges of imaging and diagnostic equipment in one location in South Australia, providing an excellent research and learning environment.

The Centre's current research projects include investigating corneal dystrophies and ectasias; inflammatory and infective eye conditions, including corneal transplant rejection and uveitis; glaucoma; congenital and adult cataract; and central retinal artery and retinal vein occlusions. Research translation underscores the Centre's ethos and is evidenced by its management of the NHMRC Centre for Clinical Eye Research in Evidence Based Ophthalmology and the Eye Bank of South Australia.

Research Higher Degree candidates are an engaged and integral aspect of this Research Flagship. Student authorship contributed to more than 20 per cent of publications in refereed journal publications produced by the Centre's researchers in 2013-14.

Centre members collaborate with more than 170 national and international researchers and have generated in excess of $3.84 million in competitive external research grant income as chief investigators since 2012. Currently the Centre manages over 88 active collaborations with partners such as CSL Ltd, Bio21, Royal Society for the Blind, Keratoconus, and the MS Society. Leading funding bodies include the NHMRC and ARC, Royal Australian and New Zealand College of Ophthalmologists, Ophthalmic Research Institute of National Institute of Health (USA), and the European Society of Cataract and Refractive Surgery.

The Centre's leader is Professor Keryn Williams, an NHMRC Principal Research Fellow with research interests in corneal transplantation, aberrant ocular angiogenesis, and novel drugs and devices for ophthalmic use. She was named one of the NHMRC's "Ten of The Best" in 2012.

Professor Williams is also scientific director of the Australian Corneal Graft Registry, which Flinders established and maintains. It contains more than 24,000 transplantation records extending over 27 years, which are used to identify risk factors for graft failure and inform parallel laboratory studies seeking to reduce the incidence of rejection using a gene therapy-based approach.

PEOPLE

PROFESSOR JUSTINE SMITH
Strategic Professor of Eye and Vision Health

Professor Smith recently returned to Flinders after 15 years at the Oregon Health and Science University, where she was Professor of Ophthalmology. She is an ARC Future Fellow and is the current President of the Association for Research in Vision and Ophthalmology, the world's largest and most important vision research organisation.

Professor Smith's research focuses on three areas: infectious and non-infectious categories of uveitis; the role of abnormal blood vessels in diabetic eye disease; and macular degeneration. In 2013 she was awarded NHMRC and ARC funding of more than $1.4 million for research into the role retinal endothelial cells play in normal eyesight and in disease states that can threaten vision.

ASSOCIATE PROFESSOR JAMIE CRAIG
Southern Adelaide Clinical School

Associate Professor Craig is a clinical scientist with expertise in molecular biology and genetic analysis of complex traits. Together with his research team he established the Australian and New Zealand Registry of Advanced Glaucoma, the world's largest national database of advanced glaucoma cases.

Associate Professor Craig continues to be a leader in the investigation and development of genetic screening tools for people most at risk of glaucoma. His team is currently conducting a five-year nationwide NHMRC-funded study aimed at identifying people who are genetically at risk of going blind from glaucoma.

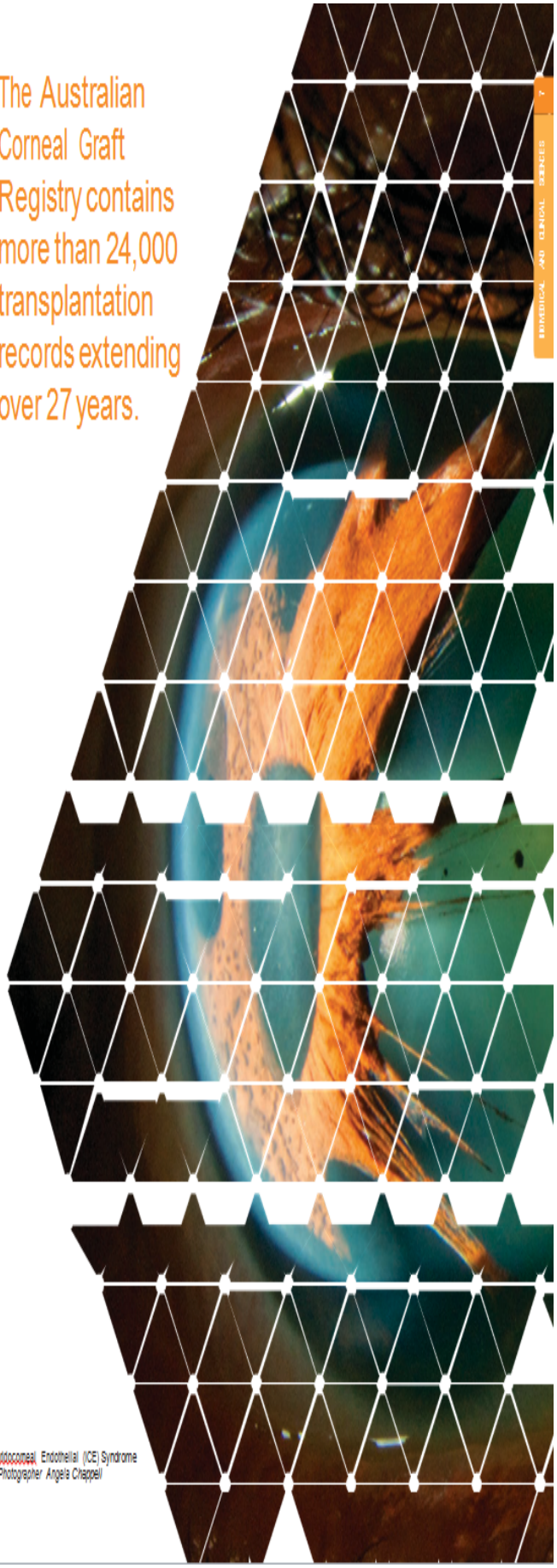
PROJECTS

GENETIC LINKS TO GLAUCOMA

Glaucoma is the second most prevalent cause of blindness and the leading cause of irreversible blindness, but it can be prevented in most cases if those at risk are treated early.

Ophthalmology Centre researcher Dr Tiger Zhou has won a prestigious Lions Medical Research Foundation Scholarship in Medicine to search for genes that cause glaucoma. He will study DNA blood samples from the Australian and New Zealand Registry of Advanced Glaucoma, which was established by Flinders and includes the world's largest collection of advanced glaucoma cases.

The Australian Corneal Graft Registry contains more than 24,000 transplantation records extending over 27 years.



Iridocorneal Endothelial (ICE) Syndrome
Photographer Angela Chappell