VISION FOR THE FUTURE

NEW ZEALAND NATIONAL EYE CENTRE
Director’s Report

As I noted in the 2009 Director’s report the study and treatment of eye diseases has a long history in New Zealand from its humble beginnings in the late 1800s. This has now been diligently recorded by Dr Bruce Hadden in his superb new book covering the history of New Zealand ophthalmology through to the establishment of the New Zealand National Eye Centre in 2008. The New Zealand National Eye Centre meanwhile has continued in its role to bring expert clinicians, internationally recognised vision scientists and acclaimed eye surgeons together, forming a centre of excellence for education, specialised clinical assessment and care, and research and clinical improvements in the fight for sight. This report, covering 2010 and 2011, highlights ongoing success for competitive grant funding by our researchers, and continued outputs and publications (over 145 peer reviewed papers and book chapters, and three textbooks during the report period). Several international keynote lectures have been given, and many awards and accolades have been won by those associated with the centre. We hope you will appreciate reading of the industry, perseverance and dedication of those involved in finding better treatments for the potentially blinding diseases that face New Zealanders, especially within an aging population. This report is the first in our future biennial format, enabling us to focus on new directions for The New Zealand National Eye Centre as we continue to seek better ways to improve eye care and to find solutions for devastating ocular diseases.

Professor Charles NJ McGhee

At the Asia Pacific Academy of Ophthalmology (APAO) conference in Sydney, April 2011. From left to right: Rebecca Hardman, Professor Charles McGhee, Dr Dipika Patel and Natalie Austin.
NZ - NEC Research Collaborations

The Anterior Segment Research Group

Professor Charles NJ McGhee, Associate Professor Dipika Patel, Dr Sue Ormonde, and Dr Rasha Altaie

The Anterior Segment Research Group (AntSegRG) is one of the larger and longer-established research groups in the New Zealand National Eye Centre. The four key members of the group are all clinician-scientists who are busy ophthalmic surgeons as well as being active in research. The interests of the team are wide and include: cataract and cataract surgery, intraocular lens assessment, keratoconus, corneal dystrophies, corneal transplantation, stem cell transplantation, ex-vivo development of corneal tissue for transplant, corneal infections, ocular pharmacology, computerised corneal topography, and in vivo confocal microscopy of the cornea in health and disease. The group is jointly led by Professor Charles McGhee and Associate Professor Dipika Patel in conjunction with Senior Lecturers, Drs Sue Ormonde and Rasha Al-Taie. In order to facilitate a laboratory “bench to bedside” approach to research, the group work extremely closely with Associate Professor Trevor Sherwin’s laboratory team, Professor Colin Green’s Connexin Biology group and with the Genetics unit led by Dr Andrea Vincent. A mix of clinical and research fellows work in the AntSegRG including senior clinical fellows from overseas completing advanced surgical training (Drs Shanu Subbiah and Sacha Moore) and junior research fellows predominantly concentrating on research projects. In the last two years these fellows have included Dr James McKelvie, Dr Alexandra Crawford, Dr Clairton de Souza, Ms Isabella Cheung, Ms Stuti Misra, Dr Yi Wei Goh and a number of undergraduate students. Eight doctoral projects are currently being supervised and three PhD theses have recently been submitted. The group has generated more than $2.0 million in research funding in the last 24 months and has published 39 peer-reviewed papers and chapters, and presented 73 papers to international conferences in the same period. Members of the team have also been extremely active in international scientific conference collaborations including ASIA-ARVO and APAO - chairing and coordination of the scientific program for the Asia Pacific Academy of Ophthalmology conference in Sydney 2011. The successful conference attracted more than 4000 delegates.
Genetic Eye Disease Investigation Group
Dr Andrea Vincent, Dr Leo Sheck

The Genetic Eye Disease Investigation group continues to work to determine the underlying genetic mechanisms responsible for inherited eye disease, with current projects involving genotyping and phenotyping corneal disease, retinal and macular disease and mitochondrial disorders. The Ocular Genetics Fellow, Dr Leo Sheck, is undertaking his MD research thesis on mitochondria and maculopathies and has spent time in collaboration at the Centre for Eye Research in Melbourne. A summer student from Yale will join the team for 10 weeks in winter. The group continues to be supported by Retina NZ for the Retinal Diseases Database, and a fundraising walk in the Marlborough Sounds helped raise further funding. Competitive funding was obtained from the Auckland Medical Research Foundation, Save Sight Society and the School of Medicine Foundation. In addition the group had a significant research output with a total of 12 publications and 26 presentations (including posters), in international Ophthalmology and Genetic journals and at both local and international conferences.

Ocular Surface Laboratory
Dr Jennifer Craig, Ms Stuti Misra

The focus of the Ocular Surface Laboratory is the pathogenesis, diagnosis and management of tear film and ocular surface disorders. The group continues to investigate tear film and ocular surface dysfunction in dry eye and contact lens wearers, with particular emphasis at the current time on evaporative dry eye and its control. The group supervised a total of 16 honours students and 3 summer students between 2010 and 2011, evaluating mechanisms and efficacy of emerging treatments and management strategies for dry eye, as well as comparing in vivo biocompatibility of various contact lenses. Internal and external funding has been obtained to support the research activities of the group, with research contracted to the group by industry also contributing to funding. Collaboration with industry partners has also commenced to evaluate the potential of a novel therapy for meibomian gland dysfunction, a major cause of dry eye. Recognition of the work of the group resulted in invited participation in the Tear Film and Ocular Surface Society’s Meibomian Gland Dysfunction International Workshop. Research output for the group between 2010 and 2011 includes a book chapter, 11 publications in international scientific and professional journals and 25 presentations presented at national and international conferences.
Visual Neuroscience Laboratory

Dr Ben Thompson, Dr Joanna Black, Daniel Spiegel, Alice Lagas, Sandy Yu, Victor Borges, Airjit Chakraborty, Javierr Elisan, Miriam Langeslag

Work in the Visual Neuroscience Laboratory is primarily concerned with human visual cortex development and plasticity. Current projects which focus on brain plasticity include: the development of new treatment interventions for the common brain-based visual disorder amblyopia (“lazy eye”), and an investigation into the effects of impaired vision on the function and structure of visual brain areas. In a complimentary set of studies, the effects of neonatal hypoglycaemia (low blood sugar) and prenatal exposure to methamphetamine on the development of visual function are being investigated. The neonatal hypoglycaemia project has recently attracted US$1.8 million of funding from the National Institute of Health in the USA. During 2011, the Laboratory had 12 research articles accepted for publication in international journals and research from the Laboratory was presented at 5 international conferences. In addition, Dr Ben Thompson was awarded an Early Career Research Excellence Award worth $25,000 from The University of Auckland to support on-going research into the treatment of amblyopia.

Molecular Vision Laboratory (Cataract)

Dr Paul Donaldson, Dr Julie Lim, Dr Gus Grey, Dr Ehsan Vaghefi, Dr Simon Gunning, Kerry Walker, Ivy Li, Irene Vorontsova, Nancy Liu, Rosica Petrova, Ankita Umapathy

Through support from the Health Research Council, Auckland Medical Research Foundation and a sub-contract from the National Institutes of Health (USA) the Molecular Vision Laboratory has continued its progress towards the development of medical therapies to delay the onset of lens cataract. Dr Gus Grey a former PhD student has returned to the group and has secured a Foundation for Research, Science and Technology Post Doctoral Research Fellow ($226,000) to develop imaging mass spectrometry as a technology platform to develop anti-cataract therapies. A major highlight of the year has been the application of Magnetic Resonance Imaging to study the function of the lens. Ehsan Vaghefi utilised this approach in his PhD project and has been able to visualise for the first time the water and ion fluxes that, in the absence of a blood supply, deliver nutrients to the centre of the lens. These fluxes are believed to be part of the lens internal microcirculation system that has been proposed to maintain lens transparency. Understanding how this system works is a central focus of this group and will be key to the future development of therapeutic strategies to combat cataract, the leading cause of blindness in the world today.
Cell and Molecular Biology of the Retina Laboratory

Dr Monica Acosta, Cindy Guo, Clairton de Souza, Andrew Collins, Tony Han

The primary goal of the Cell and Molecular Biology of the Retina laboratory, has been to explore laboratory models and ocular therapeutic techniques intended for translational research. Research is focused on the characterisation of the molecular and cellular changes that accompany retinal diseases. We have also achieved greater insight and understanding of candidate intervention strategies for therapeutic use. With the aid of the Auckland Medical Research Foundation we have completed the study of cell death pathways in two laboratory models: glaucoma and early macular degeneration. Another line of research conducted with the support of Allergan, identified a possible role for molecules currently used in cosmetic surgery to be used as therapeutic aids. We are currently preparing publications for submission to international journals that reflect the significant research work completed in 2011 and the positive progress we have made on the characterisation of the laboratory models. In addition, five laboratory members presented their research at the Australasian Neuroscience Society meeting in January 2011 and ARVO International Cell Biology Society meeting in September which were well received by the scientific community.

Jie Zhang (supervised by Professor Colin Green and Professor Louise Nicholson) graduated with a PhD in September 2011. From left to right: Erica Chen, Isabella Cheung, Anna Van Pomeran, Jie Zhang, Ilva Rupenthal, Stuti Misra, Carol Greene and Steph Huang.
Connexin Biology Group

Professor Colin Green, Professor Helen Danesh-Meyer, Dr Ilva Rupenthal, Dr Jie Zhang, Dr Monica Acosta, Professor Charles McGhee, Dr Sue Ormonde

The group published strongly in 2010 and 2011 with 25 conference presentations and 24 papers accepted. Two papers in 2011 are in top neuroscience journals with impact factors of 10.7 and 9.2, establishing the group’s second connexin modulation platform in a translational setting. In 2010 Professor Green attended the International Society for Eye Research meeting in Montreal and visited six North American research groups. Six other international meetings were attended by team members, in addition to national meetings. In 2011 Professor Green gave four presentations at the Asia Pacific Association of Ophthalmology in Sydney, and spoke at the International Gap Junction meeting in Belgium. New collaborations were started with groups in London, San Diego, New Jersey and Sydney. CoDa Therapeutics, spun out from research work in the group, completed a successful phase II clinical trial for venous leg ulcers and a trial for ocular burns continues in Auckland led by Dr Sue Ormonde. A phase 2B venous leg ulcer trial is underway. Professor Green is a director of the company which has attracted $US90M in funding. Six research grants were funded totalling over $170,000 and Dr Ilva Rupenthal obtained a five year FORST grant to establish an ocular pharmaceutics nucleus within the NZ-NEC. Professor Green helped establish a Spinal Injury Research Facility in the Centre for Brain research, with $500,000 from the CatWalk Trust. There are now 11 PhD and MD postgraduate research students in the team (four students completed their PhD theses in 2010/2011 and three new PhD students started in 2010). Amelia Van Slooten won a SPARK* Bright Sparks Challenge award for 2010. Thilini Thrimawithana (and team) won a SPARK Ideas Entrepreneurship Challenge Award, the Chiasma Entrepreneurship Award and a UniServices Research Award in 2011. Dr Ally Chang was accepted into the Johnson School of Business at Cornell University in 2010, graduating with an MBA in 2011. Jie Zhang represented The University of Auckland as a University Post Graduate Ambassador to Beijing.
Stem Cells Group
Assoc Professor Trevor Sherwin, Jane McGhee, Judy Loh, Salim Ismail, Carol Greene

Associate Professor Trevor Sherwin’s research focuses on the use of human tissue for vision research, aiming to translate the laboratory research into the clinical setting. The research group has four main foci of research: 1) corneal dystrophies - elucidating the molecular mechanisms behind the pathogenesis of corneal diseases - 2011 has seen the identification of a family of molecules previously unsuspected to be involved in the pathogenesis of keratoconus. 2) corneal engineering - establishing methods to enable the construction of ‘artificial’ corneas in vitro. Initially these studies aim to provide a laboratory tool for evaluating new treatments prior to progressing to clinical trials but ultimately may result in improved supply of tissue for transplantation. 3) adult stem cell therapy - evaluating the plasticity of corneal stem cells for repair and replenishment of ocular tissues. Advances made in the laboratory over the past 12 months have led to the identification of specialised spheres of cells as potentially transplantable units for patients suffering severe ocular burns. 4) directed cell migration - studying an adult ocular stem cell line that displays polarised growth to study the mechanisms behind organ development and aberrant processes in cell migration that are involved in diseases such as cancer. In 2010, this novel research was acknowledged by the Faculty of Medical and Health Sciences at The University of Auckland as an area of important research potential.

Myopia Laboratory
Dr John Phillips, Dr Nicola Anstice, Dr Simon Backhouse, Andrew Collins, Phil Turnbull, Martin Loertscher

The Myopia Laboratory studies environmental and genetic factors involved in the development and progression of myopia. A range of models of refractive development (both invertebrate and vertebrate) is employed to study the basic physiological and optical regulation of eye growth. Parallel clinical research projects investigate methods of slowing the progression of myopia in children. Members of the group have developed, tested and successfully commercialised a new soft contact lens, (available as the MiSight lens) designed to slow the progression of myopia in children. The group has also obtained an on-going external grant to fund a specialist Myopia Control Clinic within The University of Auckland Clinics, which accepts referrals from eye-care practitioners. This clinic makes available the very latest evidence-based methods for controlling childhood myopia progression available to the public.
Highlights

- Success in the highly competitive HRC, Marsden and AMRF funding under the NZ-NEC umbrella. Dr Ben Thompson is part of a major grant of USD 1.8M received from the National Institute of Health, USA.

- In 2010 and 2011 members of NZ-NEC received in excess of $7 million in competitive research grants and awards.

- A growing output of scientific papers and chapters totalling more than 140 peer-reviewed publications.

- The two-monthly NZNEC research seminars continue to be hugely successful from which several new research collaborations have eventuated.

- Jie Zhang - University Post Graduate Ambassador to Beijing. Jie was also one of the four students in the medical and life sciences field to represent The University of Auckland in the International Student Forum, Graduate University of Chinese Academy of Sciences, Beijing.

- Serena Park won the William MacKenzie Medal for excellence in eye research at undergraduate level in 2010. She published on “Completing an intercalated research degree during medical undergraduate training: barriers, benefits and postgraduate career profiles” and “Medical students’ attitudes towards research and a career in research: an Auckland, New Zealand study”.

- Sarah Tait won the first prize at the 2011 annual Summer Student Symposium of the New Zealand National Eye Centre.

- Professor Charles McGhee was inducted as a member of three prestigious international ophthalmology societies; International Council of Ophthalmology (ICO), Academia Ophthalmologica Internationalis (AOI), and the International Intraocular Implant Club (IIIC) Membership to these prestigious societies is only by invitation and competitive election.
• Professor Charles McGhee featured in several interviews in leading newspapers and health magazines. Also featured on TV1 and TV3 on Close up with Mark Sainsbury and What’s really in our... respectively talking about corneal transplantations and discussing risks of cosmetics on ocular health. Professor McGhee and the hospital eye department at Greenlane Clinical Centre were featured in one episode of the series “Situation Critical” on TV1 showing how corneal transplant surgery changed the life of a young female farmer in rural New Zealand.

• Professor Charles McGhee was the keynote speaker at The University of Auckland’s Golden Graduates Alumni meeting in 2010 and Tauranga Alumni meeting in 2011.

• Professor Charles McGhee was the International Co-Chair of the Scientific Programme Committee, Asia Pacific Academy of Ophthalmology Annual Conference, Beijing 2010.

• Professor Charles McGhee was the Chair of the Scientific Programme Committee, Asia Pacific Academy of Ophthalmology Congress, Sydney March 2011 which was attended by around 4000 delegates.

• Professor Charles McGhee, Associate Professor Rob Jacobs and Sue Raynel are members of Ministry of Health NZ Manpower Committee.

• Professor Helen Danesh-Meyer was appointed as Honorary Professorial fellow in the Department of Surgery, Royal Melbourne Hospital, University of Melbourne – 2010.

• Professor Helen Danesh-Meyer was the finalist in the Health and Science category of the NEXT Woman of the Year Awards - 2010

• Professor Helen Danesh-Meyer featured in the Listener Magazine June 2010 issue. The article talked about her passion for creating awareness for Glaucoma and her cutting-edge research at The University of Auckland.

• Dr Andrea Vincent was the visiting Professor at Centre for Eye Research Australia, University of Melbourne in 2011

• Professor Colin Green was elected to the University Honours Committee of Senate in 2010.

• Professor Colin Green was the independent Chair for 3 PhD examinations and on the School Staff Advisory Panel (Senior Lecturer above bar and Associate Professor)

• Professor Colin Green was on the Grant review panel of Arthritis New Zealand

• Professor Colin Green has been invited to give the prestigious Ida Mann Lecture at the annual Royal Australian and New Zealand College of Ophthalmologists 2012.

• Dr Ben Thompson was invited to give the prestigious annual Lloyd Morgan Lecture at the Department of Ophthalmology and Vision Sciences, The Hospital for Sick Children, University of Toronto, Canada.

• Dr Ben Thompson was elected to the Program Committee for the eye Movement and Strabismus Section of the Association of Research in Vision and Ophthalmology (ARVO) annual meeting. Ben will serve a three year term chairing the session in the final year.

• The Department of Ophthalmology hosted 5 elective students in 2011 from the University of Kansas in US, Leiden University in Denmark, Medical University of Graz in Austria, Queens University in Belfast and The University of Auckland.
Awards Received

Cornea

- Dr James McKelvie, PhD Student in Ophthalmology supervised by Professor Charles McGhee was awarded a prize at the annual Royal Australian and New Zealand College of Ophthalmologists Annual Meeting in Adelaide in 2010 for the best presentation in the free paper session.

- Dr James McKelvie was the winner of the School of Medicine’s Doctoral Showcase in 2010.

- Dr James McKelvie won 3rd prize at The University of Auckland Exposure 2011 under the oral presentation session.

- Dr Dipika Patel, Senior Lecturer in Ophthalmology was awarded an Early Career Research Excellence Award by The University of Auckland in 2010.

Ocular Surface Laboratory

- Dr Jennifer Craig was awarded MSc in Cataract and Refractive Surgery from the University of Ulster, Ulster, Northern Ireland in September 2011.

- Dr Jennifer Craig was invited to participate in the Tear Film and Ocular Surface Society’s International Meibomian Gland Dysfunction Workshop.

Glaucoma

- Jinny Yoon was awarded the Biomedical Imaging Research Unit (BIRU) Best Confocal Image Award for 2010.

- Cameron Johnson’s image from his neuro-ophthalmology research was shortlisted for the finals and came 19th out of 120 finalists at the International Nikon Small World Photo Competition.

- Professor Helen Danesh-Meyer, was awarded the “most anticipated lecturer” award by 3rd year medical students.
Connexin

- Amelia Van Slooten was the SPARK* Bright Sparks Challenge winner in 2010.

- Dr Ally Chang who completed a PhD with Professor Colin Green in 2009, graduated with an MBA from Cornell University, Ithaca, New York in 2011 and now works with Cornell Life Sciences in New York.

- Thilini Thrimawithana along with Professor Colin Green, Dr Raid Alany, Dr Simon Young won various awards at the SPARK Ideas Entrepreneurship Challenge in 2011. “Scleratrans” was the idea submitted to the Spark Challenge based on Thilini’s PhD thesis. Scleratans won the commercial idea prize, the Uniservices research prize and the Chiasma Prize for best Bioscience idea.

- Elizabeth Eady (former staff member in the department of Ophthalmology) won the Biomedical Imaging Research Unit (BIRU) trophy for the best overall image for her image of the retina. The image was acquired on the ophthalmology Olympus confocal microscope and was selected from 132 entries submitted.

- Professor Colin Green was featured in the December 2011 Listener magazine for his pioneering work on cell communication and Nexagon.

Lens

- Ankita Umapathy, PhD student in Department of Optometry and Vision Science supervised by Dr Julie Lim won the Hope Foundation Fellowship for her PhD and the Health Research Summer Studentship for 2010/2011.

- Ankita also won first prize in The University of Auckland 3 minute Thesis Competition and represented The University of Auckland in the Trans-Tasman finals in Perth in 2011.

- Irene Vorontsova, PhD student in Department of Optometry and Vision Science supervised by Professor Paul Donaldson was placed second in the Biomedical category of the HealthX postgraduate student research presentation competition in 2011.

- Dr Julie Lim, Post Doctoral Research Fellow in the Department Optometry and Vision Science won the 2010 Zonta Science Award.

Visual Neuroscience

- Dr Ben Thompson was the recipient of The University of Auckland Early Career Research Excellence Award in 2011.

Retina

- Dr Monica Acosta received the CONICYT-Chile international investigator award to conduct studies at the University of Valparaiso in 2011-2012.

- Dr Clairton de Souza was awarded the prize for best presentation at the School of Medicine Doctoral Research Showcase in 2011 for his PhD research on “Anatomical and functional remodelling in the human retinal detachment”.

- 17 year old Nuan-Ting (Nina) Huang who was supervised by Dr John Phillips and Dr Simon Backhouse in the Department of Optometry and Vision Science won the Prime Minister’s Future Scientist Award for 2011. Nina’s research investigated how the pupil size of students’ eyes changed when they carried out tasks requiring different levels of concentration.
## Research Grants 2010

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<tr>
<th>Grant Type and Description</th>
<th>Recipient</th>
<th>Amount</th>
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<tbody>
<tr>
<td>National Health and Medical Research Council, Australia. Functional remodelling in the retina.</td>
<td>Kalloniatis M, Whatham A, Fletcher E, Acosta M, Haverkamp S.</td>
<td>A$616,900</td>
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<td>Sir Charles Hercus Health Research Fellowship. Antioxidant strategies to prevent eye disease: Does the lens act as a glutathione reservoir in the eye?</td>
<td>Lim J, Donaldson PJ, McGhee CN.</td>
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<td>Auckland District Health Board. Clinical Research Fellowships.</td>
<td>McGhee CN</td>
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<td>Foundation for Research Science and Technology. Ophthalmic pharmaceutics – tailoring therapeutics for ocular delivery.</td>
<td>Rupenthal ID.</td>
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<td>Foundation for Research Science and Technology, Post Doctoral Fellowship Imaging Mass Spectometry: A technology platform to develop anti-cataract therapies.</td>
<td>Grey G.</td>
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<tr>
<td>Auckland Medical Research Foundation. Antioxidant strategies to prevent eye disease: Does the lens act as a glutathione reservoir in the eye?</td>
<td>Lim J, Donaldson PJ, McGhee CN.</td>
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<td>Auckland Medical Research Foundation. Metabolic cross talk in the eye.</td>
<td>Lim JC, Donaldson PJ, McGhee CN</td>
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<td>Auckland Medical Research Foundation. Intravitreal injection of connexin 43 mimetic peptides for the treatment of optic neuropathy.</td>
<td>Rupenthal ID, Danesh-Meyer HV, Green CR.</td>
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<td>Auckland Medical Research Foundation. Genetics of keratoconus in Maori: 2 years.</td>
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<td>Neurological Foundation. Evaluating alterations in striate and extrastriate visual brain areas using structural and functional magnetic resonance imaging in patients with visual loss.</td>
<td>Thompson B, Danesh-Meyer HV.</td>
<td>$107,700</td>
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<td>The University of Auckland Faculty Research Development Fund. Novel therapies for corneal nerve regeneration.</td>
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<td>Auckland Medical Research Foundation. Corneal endothelial progenitors.</td>
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<td>The University of Auckland Doctoral Scholarship.</td>
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<td>The University of Auckland School of Medicine Foundation. (GE Duncan Trust). Connexins and Neurodevelopment.</td>
<td>Green CR, Wan C, Nicholson LF.</td>
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<td>Lottery Grants Board Health. In vivo confocal microscopy of the living eye.</td>
<td>Patel DV, McGhee CN, Sherwin T.</td>
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<td>The University of Auckland School of Medicine Foundation. Cancer of the eye program.</td>
<td>Green CR.</td>
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<td>School of Medicine Foundation. Paediatric genetic eye programme.</td>
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<td>Allergan. Optic Nerve Fellowship.</td>
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<td>Tom Cat Trust. New Zealand Corneal Project 1</td>
<td>McGhee CN, Patel DV.</td>
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<td>Alcon. Optic Nerve Research Lab.</td>
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<td>Auckland Medical Research Foundation. Extension of Doctoral Scholarship.</td>
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<td>The University of Auckland. Early Career Research Excellence Award. Corneal Neuropathy as an indicator of diabetic peripheral neuropathy.</td>
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<td>FoRST NZ. Masters Scholarship. Stability studies on anti aging skin formulations.</td>
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<td>Glaucoma Trust of New Zealand. Evaluation of glaucoma with ocular and neuro-imaging modalities.</td>
<td>Danesh-Meyer HV.</td>
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<td>Stevensons Trust. A novel neuroprotective approach for glaucoma by blocking connexin 43 channels.</td>
<td>Danesh-Meyer HV.</td>
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<td>Save Sight Society of New Zealand. Live cell imaging in ex vivo cornea.</td>
<td>Sherwin T.</td>
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<td>Maurice &amp; Phyllis Paykel Trust. Ophthalmic Pharmacutics – tailoring therapeutics for ocular delivery. Rupenthal ID, Green CR.</td>
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<td>Maurice &amp; Phyllis Paykel Trust. Evaluation of glaucoma and ischemic optic neuropathy as neurodegenerative diseases using structural and functional magnetic resonance imaging. Thompson B, Danesh-Meyer HV.</td>
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<td>Maurice &amp; Phyllis Paykel Trust. Evaluation of glaucoma and ischaemic optic neuropathy as neurodegenerative diseases using MRI. Danesh-Meyer HV.</td>
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<td>Save Sight Society of New Zealand. Cytokine profiling of corneal wound healing to improve repair. Sherwin T.</td>
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<td>Save Sight Society of New Zealand. Cell to cell communications in cells of the retina following optic nerve injury. Danesh-Meyer HV.</td>
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<td>Save Sight Society. Inherited retinal disease database. Vincent AV.</td>
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<td>New Zealand Optometric Vision Research Foundation. The anatomy and physiology of the human normal and detached retina. Acosta ML, Polkinghorne PJ.</td>
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<tr>
<td>New Zealand Optometric Vision and Research Foundation. The anatomy and physiology of the human normal and detached retina. Acosta ML, De Souza CF, Polkinghorne PJ.</td>
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<td>PJ Smith Freemasons Travelling Fellowship. PJ Smith: Establishment of a research collaboration with Professor Istvan Toth at the University of Queensland. Rupenthal ID.</td>
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<td>Teaching Improvement Grant. E-tools for laboratory teaching. Acosta M, Ross J, Bharagava A.</td>
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<td>Allergan. Botulinum A dose-effect analysis in the intervention of an animal model of retinal degeneration. Acosta M.</td>
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<td>Ombler Trust. Inherited retinal disease database. Vincent AV.</td>
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<td>The University of Auckland Hood Fellowship. Donaldson PJ.</td>
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<td>Retina New Zealand. Inherited retinal disease database. Vincent AV.</td>
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<td>New Zealand Pharmacy Education and Research Foundation. Tailoring ocular formulations for antioxidant delivery to the lens. Green CR, Rupenthal ID, Alany R Lim J.</td>
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<td>Travel Grants awarded to: Green CR, Rupenthal ID, Patel DV, Craig JP, Vaghefi E</td>
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<td>New Zealand Association of Optometrists (National Eye Research Foundation) Summer Student Scholarship. Craig JP.</td>
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<td>Hope Foundation Fellowship. Donaldson PJ.</td>
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<td>The University of Auckland Performance Based Research Fund. Establishment of an ophthalmic pharmacutics group. Rupenthal ID.</td>
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<tr>
<td>National Institute of Health RO1 Grant. Children with hypoglycaemia and their later development (The CHYLD Study). Harding J, Chase JG, Harris D, Thompson, B, Wouldes T.</td>
<td>US$1,800,000</td>
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<tr>
<td>Auckland District Health Board. Clinical Research Fellowships. McGhee CN</td>
<td>$383,786</td>
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<tr>
<td>National Institute of Health USA. The role of Aquaporin-0 in lens development and aging. Schey KL, Grey AC, Donaldson PJ</td>
<td>US$199,800</td>
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<tr>
<td>Heath Research Council. Studying eye disease in Maori, Pacific Islanders and the elderly using animal models. Acosta ML, De Souza CF, Kalloniatis M</td>
<td>150,000</td>
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<tr>
<td>Auckland Medical Research Foundation. Healing with haloclones: a defined transplantable element for long-term restoration in limbal stem cell deficiency. Sherwin T.</td>
<td>$130,489</td>
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<tr>
<td>Auckland Medical Research Foundation. Intervention of animal models of retinal degeneration: Effect of vinpocetine on the outer and inner retinal death pathways. Acosta ML, Kalloniatis M.</td>
<td>$110,195</td>
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<tr>
<td>Alcon. MIZAR clinical trial – randomised study with Auckland. Vincent AL.</td>
<td>$76,315</td>
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<tr>
<td>The University of Auckland Faculty Research Development Fund. Exome sequencing of autosomal recessive retinitis pigmentosa and establishing a SNP database in the Polynesian population. Vincent AL.</td>
<td>$74,659</td>
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<tr>
<td>Vision Science Co Ltd., Korea. Performance evaluation of a cosmetic contact lens. Craig JP</td>
<td>$40,600</td>
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<tr>
<td>Maurice and Phyllis Paykel Trust. Next generation sequencing for corneal dystrophy. Vincent AL.</td>
<td>$35,000</td>
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<tr>
<td>The University of Auckland, School of Medical Foundation. Ocular Genetic Fellowship. Vincent AL</td>
<td>$31,000</td>
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<td>The University of Auckland, School of Medical Foundation. Laboratory refurbishment. Vincent AL.</td>
<td>$31,000</td>
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<tr>
<td>The University of Auckland Faculty Research Development Fund. Developing new protocols to deliver anti-cataract drugs to the centre of the ocular lens. Donaldson PJ, Lim JC, Vaghefi E.</td>
<td>$30,000</td>
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<tr>
<td>The University of Auckland Early Career Research Excellence Award. Enhancing brain plasticity to treat amblyopia. Thompson B.</td>
<td>$25,000</td>
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<tr>
<td>The University of Auckland Faculty Research Development Fund. Characterisation and intervention in cellular communication in a model of ARMD. Acosta ML</td>
<td>$24,700</td>
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<tr>
<td>Save Sight Society. Genetics of anterior corneal dystrophy. Vincent AL.</td>
<td>$24,153</td>
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<tr>
<td>Maurice and Phyllis Paykel Trust. Characterisation and intervention in cellular communication in a model of ARMD. Acosta ML, Green CR.</td>
<td>$20,000</td>
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<tr>
<td>Retina New Zealand. Retinal Database. Vincent AL.</td>
<td>$15,000</td>
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<tr>
<td>New Zealand Optometric Vision Research Foundation. Constructing a laser ray-tracing system to map the 3D refractive index of ex-vivo lenses. Vaghefi E, Turuwhenua J, Donaldson PJ.</td>
<td>$15,000</td>
<td></td>
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<tr>
<td>Waikato Research Foundation. The effects of neonatal hypoglycaemia on visual development. Anstice N, Harris N, Thompson B.</td>
<td>$13,500</td>
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<tr>
<td>Teaching improvement Grant. E-tools for laboratory teaching. Acosta ML, Bhargava A, Ross J.</td>
<td>$13,000</td>
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<tr>
<td>New Zealand Optometric Research Foundation. Correlation of corneal nerve microstructure and function with peripheral neuropathy in diabetes mellitus. Craig JP, Misra S, Patel DV, McGhee CN.</td>
<td>$11,000</td>
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<tr>
<td>The University of Auckland Performance Based Research Fund. Elucidating molecules involved in the pathogenic pathways involved in keratoconus by using highly specific antibody arrays to screen cytokines. McGhee CN</td>
<td>$9,765</td>
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<tr>
<td>Royal Society of New Zealand Mobility Fund. Collaboration networks with Chile towards investigation, education and extension in biomedical sciences. Acosta ML.</td>
<td>$9,000</td>
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<tr>
<td>Funding Source</td>
<td>Nature of Research</td>
<td>Funding Amount</td>
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<td>The University of Auckland Performance Based Research Fund. Assessing cell reprogramming using microfluidic arrays. Sherwin T.</td>
<td>$8,412</td>
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<tr>
<td>The University of Auckland Performance Based Research Fund. Randomised controlled study assessing the effects of topical steroids on the cornea in participants with bacterial keratitis. McDonald E, Ormonde SE</td>
<td>$7,500</td>
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<tr>
<td>New Zealand Association of Optometrists. Summer Studentship. Hadi A, Craig JP.</td>
<td>$6,000</td>
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<tr>
<td>The University of Auckland Summer Studentship. Corneal cell densities in diabetes mellitus. Abeysekera W, Misra S, Craig JP.</td>
<td>$5,750</td>
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<tr>
<td>Universitas 21 Doctoral Mobility Scholarship. Sheck L.</td>
<td>A$5,715</td>
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<td>Talley Family. Retinal database. Vincent AL.</td>
<td>$5,000</td>
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<td>Travel grants awarded to: Sheck L, Acosta AL.</td>
<td>$5,000</td>
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<tr>
<td>The University of Auckland Performance Based Research Fund. 3D bioprinting pilot study. Patel DV.</td>
<td>$4,856</td>
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<tr>
<td>The University of Auckland Performance Based Research Fund. Mitochondrial genetics. Vincent AL.</td>
<td>$4,789</td>
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<tr>
<td>The University of Auckland Performance Based Research Fund. Sequencing of mitochondrial mutations in a control population to determine frequency of 4 novel mutations – primers, reagents, sequencing costs. Vincent AV.</td>
<td>$4,789</td>
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<tr>
<td>The University of Auckland Performance Based Research Fund. Investigating the ILM protein composition in humans. Rupenthal ID</td>
<td>$4,485</td>
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<td>Sir John Logan Campbell Medical Trust Award. AMRF: Controlled Release Society Conference, National Harbour, Maryland, USA. Rupenthal ID.</td>
<td>$2,500</td>
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</tbody>
</table>
Publications

Books


Book Chapters


McGhee CN, Patel DV. ‘Glucocorticoids’, Section 3, Duane’s Foundations of Clinical Ophthalmology. Lippincott Williams & Wilkins Tasman W and Jaeger EA (eds) (Accepted for publication 2011).


Peer Reviewed Publications:


Chee KN, Vorontsova I, Lim JC, Kistler J, Donaldson PJ. Expression of the sodium potassium chloride cotransporter (NKCC1) and sodium chloride cotransporter (NCC) and their effects on rat lens transparency. Molecular Vision. 2010 May; 16:800-12.


Lim JC, Donaldson PJ, Focus on molecules: the cystine/glutamate exchanger (System x(c)-). Experimental Eye Research. 2011 Mar; 92(3):162-3.


Patents


