# OUR VISION

# **Cambridge Eye Trust Newsletter 2018**

Welcome to the 2018 edition of the Cambridge Eye Trust Newsletter.

As a Cambridge Charity we are dedicated to helping save sight. In this edition we are highlighting research, innovation, educational and patient best care initiatives that the Trust is supporting in Cambridge, East Anglia and internationally.

We would like to share with you how donations to our Charity really are making a difference now and in the future to eye patients and their families!

# Researchers, clinicians and scholars committed to creating a passion for vision research



The Peter Watson International Scholarship was initiated in 2017 by UK Researchers in Cambridge with Support from the Cambridge Eye Trust. The aim, to educate and enthuse UK teenagers with an aptitude for science and involve them in vision research at the highest level.

The prize for the 2 UK winning students, a trip of a lifetime to Washington, USA. It was not an easy prize to gain. The Scholarship was open to all UK students undertaking a science related self-directed Extended Project Qualification. Following an initial application providing a summary of their science projects, 10 short-listed students from around the country were invited to the Prize giving Day to present their work to an esteemed judging panel of internationally renowned University and Addenbrooke's Hospital ophthalmology specialists at Queens' College, Cambridge. Following excellent student presentations, stimulating discussion and the judging panel's careful deliberation and constructive feedback to the students, the winners were announced. *Turn to page 8 & 9 to find out who won*.



#### Volume 7 issue 1



Opening of laser centre at Addenbrooke's

Revolutionising eye surgery in the East of England Page: 5

#### **Retirement: Mr Paul Meyer**



Paul Meyer and wife Ruth

A Farewell Dinner was held for Dr Paul Meyer in July 2017.

Dr Meyer is best know Internationally for his diligent work establishing a regime for the management of thyroid eye disease by immunosuppression with methylprednisolone and Cyclosporin A. So successful was this regime that he said at his farewell Dinner

"Gone were the staring, blind patients. Even their disturbed eye movements often recovered" ... "I was triumphant when two of my most severely affected patients were

"For 38 years, I have spent more waking hours in Addenbrooke's Hospital than in my own home!"

threatened with expulsion from a Thyroid Eye Disease patients' group unless they could provide photographic evidence they had ever had the disease!"

He concluded "For 38 years, I have spent more waking hours in Addenbrooke's Hospital

than in my own home!" ... "there have been years of fascination, problem-solving and creativity, working with outstandingly gifted and dedicated colleagues. I have also had the opportunity to meet and help some of the most remarkable, courageous patients who attend our hospital."

"So, I could not have wished for a more satisfying career, and I thank you all for being part of it."

#### Supporting expert eye care in the West Bank, Gaza and East Jerusalem



In December 2017, Professor Keith Martin visited St John Eye Hospital in Jerusalem as a Visiting Consultant and Duke Elder Lecturer. The St John Eye Hospital group is the only charitable provider of expert eye care in

the West Bank, Gaza and East Jerusalem, treating patients regardless of ethnicity, religion or ability to pay. Professor Martin visited the main hospital in East Jerusalem and also the

St John Gaza Hospital has been providing charitable eye care for the 1.8 million residents of Gaza since 1992. Every year SJEHG sees over 30,000 patients

newly built hospital on the Gaza Strip, an area that has faced huge challenges in recent years.

St John Eye Hospital, Gaza Gaza's physical and economic isolation and the frequent outbreaks of conflict have led to high levels of poverty. Gaza has one of the highest levels of unemployment in the world, with 43% of the working population unable to find employment. This contributes to 80%

'The new St John Eye Hospital in Gaza should make a real difference to eye care in this troubled region.'

of Gazans relying on international aid to survive. With high levels of poverty and unemployment, many patients do not seek out medical care, thinking they could not afford treatment if they did. St John Gaza Hospital has been providing charitable eye care for the



Prof Martin with the Director of St John Eye Hospital, Gaza

1.8 million residents of Gaza since 1992. Every year SJEHG sees over 30,000 A conference to discuss patients in Gaza, diagnosing debilitating eye conditions such as cataracts, improving standards glaucoma, corneal scarring and diabetic retinopathy. SJEHG charges of care

subsidised prices for consultations and procedures for all and completely waives fees for those who cannot afford to make any contribution. In spite of the difficulties faced by the staff, the hospital operates with the same standards of care as any hospital anywhere in the world, conducting a busy outpatients department and performing day case surgery.

Professor Martin gave lecturers and provided small group teaching to ophthalmologists in both centres in East Jerusalem and Gaza and is planning to enhance interaction between Cambridge and St John in

the future, including collaborative studies on the genetics of paediatric glaucoma which has a very high prevalence and causes significant childhood blindness in the Palestinian population.



Gaza has been devastated by conflict in recent years but hopes for a brighter future in years to come.

#### A different way of supporting us: PayPal Giving Fund and eBay

eBay for Charity is an easy way for buyers on eBay.co.uk to support their favourite charities. Buyers can shop for items knowing they're supporting a good cause. eBay for Charity donations are administered by PayPal Giving Fund. PayPal Giving Fund distributes donations and Gift Aid to donors' chosen charities, which receive 100% of the funds raised. Visit this site to find out more about how you can support us:

http://charity.ebay.co.uk or click the Donation Account menu button in your eBay account.





# Advocating for vision research and international collaboration at Capitol Hill — A Cambridge, UK representative

Dr Tasneem Khatib received the Royal College of Ophthalmologists Ethicon Foundation Fund to attend the Association for Research in Vision and Ophthalmology (ARVO) Advocacy Day 2018. ARVO The opportunity formed part of her ARVO Science Communication Training Fellowship and she was the only UK representative.

Together with the National Alliance for Eye and Vision Research (NAEVR), members of the ARVO Annual Meeting



Program Committee and the Advocacy and Outreach Committee, the visit involved meetings with Members of Congress to ensure that policy decisions positively impact the vision science and ophthalmology research community.

Other groups joining the Advocacy Day with whom she had a chance to interact and learn from included the National Alliance for Eye and Vision Research (NAEVR), members of the ARVO Annual Meeting Program Committee and the Advocacy and Outreach Committee.

"It was a privilege to participate in the ARVO Advocacy Day alongside the other members of the group."

Tasneem was able to specifically discuss the benefits of the NIH US-UK relationship as she promoted the value of international collaboration in vision science to the Maryland Congressional Staff in light of the outreach programme she developed with an ARVO SciComm Fellow based at the National Institutes of Health (NIH), Maryland (Craig Pearson) as part of the ARVO SciComm Fellowship. Craig and she have developed a programme to promote vision research to the next generation of clinicians and scientists where UK secondary school students have the opportunity to submit

their self-directed science research projects for a competitive scholarship - the Peter Watson International Scholarship (PWIS). This scholarship has kindly been funded by the Cambridge Eye Trust and promoted nationally by the exam board OCR. See Peter Watson International Scholarship story She said "This was an outstanding opportunity and I am extremely grateful to the RCOphth Ethicon Foundation Fund committee for awarding me this grant, enabling to take full advantage of the training provided by the ARVO SciComm Fellowship and has undoubtedly helped me to develop the skills needed in my intended career as a clinician-scientist ophthalmologist. It was a privilege to participate in the ARVO Advocacy Day alongside the other members of the group and to have direct access to those responsible for finalising the NIH and NEI budget. All three Congressional offices I visited with Craig in both the House of Representatives and the Senate were strongly supportive of increased funding towards vision science despite proposed cuts and valued hearing the real-world examples and outcomes of the funding first-hand from the vision research community. I came away better equipped to enter into a dialogue with politicians and policy makers and with a strong sense that our co-ordinated efforts and shared experiences were able to make a real impact."





From top : Tasneem outside Representative Raskin's office. Tasneem with Senator Cardin's team. ARVO Advocacy Day team outside Longworth House Office Building House of Representatives and with Michael Steinmetz

#### Catcam: update on the screening for congenital cataracts research programme

Congenital cataracts are cataracts which are present at birth or soon after. Although rare in babies and children (affecting three to four in every 10,000 infants in the UK), they are potentially blinding if not detected and removed quickly, with severe cataracts requiring surgical removal by eight weeks of age. The current screening test uses a reddish reflection of light from the back of the eye (known as 'red reflex') to highlight the cataract. However, this technique can result in up to 50% of cataracts in newborns being missed, leading to delays in diagnosis and patients having less chance of improved vision.

The infant eye screening camera – previously catCam and now called neocam is being used in a huge London School of Hygiene and Tropical Medicine trial of 90,000 babies in Uganda / Kenya and Tanzania. This is due to start in the spring and will lead to commercialisation in 2019.



Picture kindly provided by Addenbrooke's Charitable Trust—Miss Allen using the neocam

Together with the University of Cambridge Computer Sciences students Dr Peter Thomas and Miss Louise Allen have developed an automated system designed to allow patients (adults and children) to test their own vision in clinic using tablet technology. The aim is to improve the patient experience by reducing waiting times and streamlining the flow through clinic whilst maintaining a high standard of care.

The DigiVis visual function testing which was funded by an MRC Innovation and CUHP innovation grant and more recently by the charity Fight Against Blindness (who are funding the infant version) is now programmed for adult and child automated visual acuity testing and they are in the process of coding the visual field tests. Clinical validation studies are planned for next year.

Retinopathy of prematurity (ROP) can cause blindness if not treated promptly. Many premature babies develop ROP but in the majority, the condition resolves spontaneously without treatment. Babies born weighing less than 1,250g (2.7lb) are at high risk of sight-threatening retinopathy. Recognising when ROP threatens sight requires years of clinical experience which is not available at general hospitals as too few babies present with the condition. Premature babies are so vulnerable that even an ambulance ride puts them at risk. Yet, if doctors suspect severe ROP, babies born in the East of England have to travel up to 70 miles to Cambridge for testing because Miss Louise Allen is the only clinician in the region with the necessary expertise. Miss Allen has received funding to equip local hospitals with specialist cameras and has trained local doctors to capture digital images of babies' retinas and email these to CUH for review and diagnosis. Only infants with a confirmed diagnosis would travel to Cambridge for urgent laser treatment. The equipment is now available in the following hospitals: Peterborough, Kings Lynn, West Suffolk, Norfolk and Norwich University Hospital, Ipswich, Colchester, Chelmsford and Harlow. This technological innovation aims to overcome the challenge of geographical distance, improving access to specialist care for vulnerable babies; eliminating the risks of patient transfers; reducing stress and disruption for families; and building expertise through clinical networks. Bridging the gap between local hospitals and specialists in Cambridge will create knowledge transfer, improving local Ophthalmologists' skills in retinal examination and understanding of ROP.

The results of this telemedicine initiative is due to be published shortly in Eye. It saved £21,000 in transfer costs in its first year and reduced the number of babies treated pre-threshold by 2 thirds.

#### Perhaps remember us in your Will

Making a Will is an important part of planning for the future. After you have provided for loved ones, you may then consider including Cambridge Eye Trust as a beneficiary.

Many local people support Cambridge Eye Trust through legacies. Legacies, large and small, have contributed significantly towards our aim to save sight. By leaving a legacy, your gift enables us to fund research into eye disease and offer eye clinics the opportunity to purchase new state-of-the-art equipment.



It is one way of making a positive difference to so many future generations.

#### Addenbrooke's launches state-of-the-art eve laser surgery

The first ultra-precision laser surgery eye service for NHS patients at a major teaching hospital officially opened at the Cambridge Eye Unit at Addenbrooke's yesterday, thanks to funding through The Cambridge Eye Trust and Addenbrooke's Charitable Trust.

The Peter G Watson Laser Surgery Suite is dedicated to the late Peter Watson, internationally renowned ophthalmologist and former Consultant Ophthalmologist at Addenbrooke's and Chairman of The Cambridge Eye Trust, who championed the new service and sadly died of prostate cancer earlier this year. The suite was opened by his wife Ann Watson, hospital Chief Executive, Roland Sinker and The Cambridge Eye Trust Chairman, Nicholas Sarkies.

In 2016, grants of £150,000 from The Cambridge Eye Trust and £41,000 from Addenbrooke's Charitable Trust funded the advanced 'Femtosecond' laser, its installation and all the The cataract service at Addenbrooke's has since been necessary building adaptations, making Addenbrooke's at that nominated for the innovation award by Health Enterprise East

"The laser brings the potential to revolutionise eye surgery in the East "of England, improving patient care, surgical training and research at Cambridge University Hospitals."

system to treat NHS patients.

the ophthalmology team to manage a wider range of complex Cambridge Eye Trust on this project to improve safety and corneal and cataract disorders in a much less invasive way accuracy when treating patients with cataract and corneal than it could with manual surgery. Patients experience fewer disorders. We supported the development of this state-of-thecomplications, recover their eyesight faster and return home art service with a generous gift left in a will to enhance care more quickly. Since the laser was introduced in 2016, over 500 for ophthalmology patients. We're very grateful for all patients have already benefitted from this advancement.

Mr Madhavan Rajan, Consultant Ophthalmologist and Clinical Lead – Cataract and Cornea Service said: "The Femtosecond (Top photo: L-R: Ann Watson, Roland Sinker, Nicholas Sarkies) laser, with its ultra-precision, is a game-changer for (Bottom photo: L-R: Nicholas Sarkies, Ann Watson, Madhavan ophthalmic surgery. What takes 15 minutes to do by hand can Rajan, Stephen Davies, Roland Sinker) be done in 20 seconds with the laser and with an accuracy and Story kindly provided by Addenbrooke's Charitable Trust repeatability that hands alone can't match."

"The laser brings the potential to revolutionise eye surgery in the East of England, improving patient care, surgical training and research at Cambridge University Hospitals. We are thankful to The Cambridge Eye Trust and Addenbrooke's Charitable Trust for bringing this technology to our patients.

"We have named the suite after Peter Watson to recognise his life-long efforts in advancing ophthalmic surgery. He has been a true friend to our department, working long after he retired to help make this possible.



"We're very grateful for all donations that help transform patients' lives day after day."

in September 2017. I am thankful to all staff at the Cambridge Eye Unit for their hard work and co-operation.

Nicholas Sarkies, Chairman of The Cambridge Eye Trust said: "We are very delighted that we could support this innovative project at Addenbrooke's Hospital. This is the first such laser time the first hospital in the UK to install this state-of-the-art given to the NHS by a charity, and we are very proud of it."

Stephen Davies, Chief Executive of Addenbrooke's Charitable The new Femtosecond laser, with its ultra-precision enables Trust said: "We were pleased to work in partnership with The donations that help transform patients' lives day after day."



#### Does Autostereoscopic Video Game Play Affect the Total Horizontal Fusional Amplitudes

#### of 7 to 11-year-old Children? Acknowledgements from Louisa Haine for support of her research

There are many people to whom I would like to offer my thanks and gratitude for all their help and support throughout this research.

First, I would like to offer my sincere gratitude to Dr David Buckley and the entire Academic Unit of Ophthalmology and Orthoptics at the University of Sheffield for their continuous support, invaluable guidance, incredible knowledge and seemingly inexhaustible patience.

Next, my thanks go to my fellow Orthoptists at the Addenbrooke's Hospital Orthoptic Department, Cambridge; specifically Emily Cottingham for conducting the clinical examinations and Diane Moore for her continued support through the entire of the Masters Degree programme.

To the Cambridge Eye Trust, I offer my thanks for their financial support via a grant, enabling the purchase equipment vital to this research.

I would like to extend my thanks to all the parents and participants who gave up their time in order to take part in this research project.

Finally, I give a huge heartfelt thank you to my wonderful family for your never-ending love, support and belief in my abilities. To my husband, Peter; thank you for standing by my side and encouraging me every step of the way. To my beautiful children, thank you for making me laugh when I really didn't feel like laughing and breaking the monotony with your stories and smiles. 'Some humans would do anything to see if it was possible. If

you put a large switch in a cave somewhere, with a sign on it saying "End-of-the-world Switch. PLEASE DO NOT TOUCH", the paint wouldn't even have time to dry." -Sir Terry Pratchett



#### The aim:

This study aimed to investigate whether the total horizontal fusional amplitudes of 7-year-old children measured at 1/3m and 6m are affected following 30 minutes of 3D game play with the Nintendo 3DS, compared to playing 30 minutes of 2D game play with the Nintendo 3DS.

#### The conclusion:

Following statistical analysis the null hypothesis  $(H_0)$  is retained. 30 minutes of 3D game play on a Nintendo 3DS did not affect the prism fusion ranges of 7 to 11-year-old children, compared with 30 minutes of 2D game play on a Nintendo 3DS. The effect of serial game play, IPD, total score attained and concentration should be investigated further to further understand the effect these factors have upon fusional amplitude and the ability to maintain binocular single vision.

#### 47th Cambridge Ophthalmological Symposium — "amazing speakers, fantastic venue"

Last September St John's College, Cambridge hosted this highly prestigious meeting which is supported by CET. The 2-day meeting entitled "Go with the Flow: Rheology, fluid flow and the eye" was chaired by Professor Einar Stefánsson, Reykjavik, Iceland. It flowed from scientific discovery to clinical breakthroughs. Presenters from around the world, including a veterinary ophthalmologist discussed how

rheology is changing our understanding and treatment of eye disease.

The CET provided 2 bursaries to young doctors who would otherwise not have been able to enjoy this unique meeting. Both felt it was the most informative and enjoyable meeting they had ever been to.

The 48th Symposium scientifically organised by Prof Keith Martin, Cambridge, UK & Miss Rachna



Prof. Einar Stefánsson



Murthy, Cambridge, UK will take place in September 2018.

The Symposium is entitled *'The Thyroid and the Eye'* The chairs will be, Prof Tim Sullivan, Queensland, Australia & Prof Marian Ludgate, Cardiff, UK

We look forward to another fascinating and highly sociable event.

The Chair for September 2019—Professor Sir Peng T Khaw, London, UK. The Chair for September 2020—Mr Rupert Bourne, Cambridge, UK

Visit: www.cambridge-symposium.org

# New appointment: Consultant Ophthalmic Surgeon and Professor of Ophthalmology joins the team at Addenbrooke's

Rupert Bourne joins Addenbrooke's Hospital full-time having been Consultant Ophthalmic Surgeon at Hinchingbrooke Hospital and Honorary Consultant at Addenbrooke's and Moorfields Eye Hospital for the past 12 years.

He is Co-Director and Professor of Ophthalmology at the Vision and Eye Research Unit at Anglia Ruskin University, Cambridge, Chair of the National NIHR Ophthalmology Specialty Group and Eastern Region Co-Regional Lead for Ophthalmology. He has a keen clinical research interest mainly in glaucoma (in particular epidemiology, angle closure, imaging, and shared care) and expedition medicine. He has written in excess of 170 research papers in peer-reviewed journals, and has co-authored several books.

He is Chief Investigator for several UK and non-UK studies, some involving major national population-based studies of eye disease ranging from Greenland to Trinidad, and coordinates the Vision Loss Expert Group of the Global Burden of Disease Study. Additionally he has been site Principal Investigator for several large UK NIHR trials.

Prof Bourne is Section Editor for Ophthalmic Epidemiology for the journal Eye and is a Faculty member for several international specialist ophthalmology organisations such as the European Glaucoma Society and the World Glaucoma Association. He started as Consultant at Hinchingbrooke in 2006 (following Fellowships with Professor Robert Weinreb in San Diego's Hamilton Glaucoma Centre and then at Moorfields) and founded the Glaucoma Service in the Department of Ophthalmology, whose team delivers a very high quality of glaucoma specialist care due in part to the integration of research, which brings the latest technology, medications and techniques.

For the past few years, in addition to his clinical duties, he led the expansion of Research and Development in the



hospital as R&D Director to a thriving 14-person team of research nurses and clinicians that resulted in the Trust being recognised as an exemplar of research integration regionally and nationally, with currently 17 active Ophthalmology portfolio glaucoma trials.

He looks forward to developing clinical research in Ophthalmology at Addenbrooke's with the Department of Ophthalmology and developing collaborative research with other specialties. A recent development has been his appointment as Chief Investigator for the UK National Eye Health Survey, which will be the first nationally representative population-based study of eye disease in the UK. This and many other research interests will embolden the links between Addenbrooke's and other UK centres and international networks.

#### Femtosecond Laser Update

Since the introduction of the femtosecond laser service in the Cambridge eye unit, more than 500 patients had benefitted from the cutting edge technology that delivers precision surgery. We became the first NHS unit in the UK to provide the femto laser service that had enabled three advanced treatments to be introduced in 2017, namely laser assisted corneal transplantation, astigmatic correction and intracorneal rings for Keratoconus (Figure 1).

We would be grateful to receive charitable donations to the on going provision of the femtolaser service to our patients with due acknowledgements to your contributions. Please see below for contact details.

Professor Madhavan Rajan, Clinical lead – Cataract, Cornea and the Femtolaser Service, Cambridge University Hospitals NHS Trust.



Figure 1

#### Amazing young minds travel to USA—the Peter Watson International Scholarship

*Continued from front page*. The Peter Watson International Scholarship (PWIS) is a collaborative initiative supported by the Cambridge Eye Trust and inspired by the Association for Research in Vision and Ophthalmology (ARVO) Science Communications Training Fellowship.

ARVO is the largest vision research organisation in the world, representing researchers from more than 75 countries. Its mission is to "advance research worldwide into understanding the visual system and preventing, treating and curing its disorders." In 2017, ARVO established the Science Communications Training Fellowship programme for its members in training. An international group of 20 graduate students and postdoctoral researchers were selected as fellows, with the responsibility of developing outreach programmes that enhance public engagement in vision research.

ARVO SciComm Training Fellows Tasneem Khatib and Craig Pearson, along with the University of Cambridge and Form the Future educational team, created the PWIS as part of an ongoing mission, with the goal of promoting interest in vision science and providing opportunities for students to gain exposure to research at the highest level.

Following a welcome speech from

Nick Sarkies (Chairman CET) and a number of inspiring talks from

Cambridge scientific patrons, 10

successful applicants presented their

work at Queen's College with dinner

in the 'Hall' afterwards, something

not usually attended until becoming



Nick Sarkies

an undergraduate at the college.

After much deliberations the winners of the Scholarship were chosen, Benjamin Schwabe from Leicester and Nathan Harmer from the Isle of Man.

In February 2018 these two young gentlemen and guardians received an all-expenses paid trip to the United States.

They visited the world-famous National Eye Institute, National Institutes of Health as well as the USA Science and Engineering Festival in Washington DC. Receiving mentorship and supervision from scientists at the NIH and take part in a specially designed programme of events including 3D printing, virtual reality demonstrations, the chance to perform and present mini experiments to the faculty. It wasn't all work and no play as there was sufficient time to visit some of the cultural highlights of the USA Capital, including a private tour of Capitol Hill specially arranged for our scholarship winners.



Nathan Harmer—PWIS winner



Ben Schwabe-PWIS Winner

"We're thrilled to be collaborating with the Cambridge Eye Trust to bring two talented and energetic young scholars to the NIH," said Craig Pearson, who cofounded the programme with Tasneem Khatib

Panel of judges representing the University of Cambridge, University of Oxford, the Wellcome Trust and Form the Future





A trip of a lifetime to National Eye Institute



Craig Pearson with the winners in Washington



"Great opportunity for students"

"It's a great opportunity to present your work to Cambridge professors!"

"The Prize giving Day was a fantastic experience that allowed me to practise presenting work to a group of experts, an invaluable skill that can be used in any career one wishes to pursue. Listening to the other projects and the experts was inspiring for any scientifically minded student, and I would highly recommend the opportunity to anyone." Ben Schwabe

"...the Prize giving Day was, for me, an excellent opportunity to meet like-minded individuals from across the country, develop my presentation skills and learn about the hard work that people have been putting into their EPQs. There was a kind and professional atmosphere that accompanied the day and this made the event enjoyable and pleasurable. It was evident that the organisers had put a lot of time and effort into it and it was a delight to be invited to attend. Winning turned out to be the icing on the cake!" Nathan Hamer





"Excellent speakers"



"Outstanding"





"Thank you very much for letting me bring 2 guests. We all really enjoyed it

take part in this event and allowing me to bring 2 guests. We all really enjoyed it and I would definitely recommend people to try and take part in this event should it run next year. I would also like to say a massive congratulations to everyone who took part as they all had amazing projects and presented them expertly." Finalist PWIS

Visit the PWIS website for more information about the 2018 scholarship and timings for the 2019 award www.pwis.org.uk

"Motivating for students"

## **Research interests—Glaucoma**

Glaucoma—update from Keith Martin's department



Glaucoma is the commonest cause of irreversible blindness in the world. The condition involves progressive death of retinal ganglion cells in the eye resulting in irreversible visual loss. Recent evidence suggests that neuronal death in glaucoma shares mechanisms with other neurodegenerative conditions such as Alzheimer's and Parkinson's disease. Thus, advances in our understanding of glaucoma may have implications for other brain diseases and vice versa.

We now have effective treatments that can dramatically slow the progress of glaucoma by lowering eye pressure. However, as the onset and progression of glaucoma are frequently asymptomatic, this detectable and treatable disease remains the leading cause of irreversible blindness worldwide. In addition, some people with severe glaucoma continue to deteriorate even when very low eye pressure is achieved.

Elevated intraocular pressure (IOP) is by far the most important risk factor for the development and progression of glaucoma. IOP-lowering treatment is therefore the current mainstay of glaucoma treatment. However, some patients with glaucoma worsen and go blind despite maximal IOP reduction. The raised IOP may therefore initiate a neurodegenerative process in RGC that is not stopped by present glaucoma treatments. At present, there is no available treatment that can restore visual function once RGC have died.

An important goal of our group is to understand better the mechanisms of RGC death in glaucoma, to develop methods to protect RGC thus slowing the progression of glaucomatous visual loss, and ultimately to restore vision in those blind due to the disease.

We have developed a novel model of glaucoma that has proven to be very useful in the investigation of glaucoma pathogenesis. The model allows RGC death to be studied both during the period of increased IOP and after IOP has fallen back to normal levels. Using this model, we have demonstrated potentially important changes in retinal glutamate transporters occurring as a specific response to elevated intraocular pressure, suggesting a new target for glaucoma therapy in the future.

#### **Current projects**

#### 1. Stem cells as a potential treatment for glaucoma

We are actively investigating the ability of different types of stem cell to integrate into the glaucomatous retina.

#### 2. Mechanisms of axonal injury in glaucoma

Axonal injury appears an important trigger of axonal and cell body degeneration in glaucoma and other neurodegenerative diseases. We have recently discovered that the Wallerian degeneration slow (*WldS*) mutation can delay optic nerve degeneration in a model of glaucoma.

#### 3. The role of disrupted axonal transport in glaucoma

We are exploring the nature of the transport block in glaucoma and developing new imaging methods to allow the study of axonal transport *in vivo* in the living eye.

#### 4. Neurotrophic factor therapy for glaucoma

We have previously pioneered new methods for highly efficient gene transfer to RGC. Using adeno-associated virus mediated expression of brain-derived neurotrophic factor, we were first in the world to demonstrate a protective effect of neurotrophic factor gene therapy in a model of glaucoma.

#### 5. Improving RPE cell transplantation by modulation of integrins

Age-related macular degeneration (AMD) is the most prevalent cause of blindness in the developed world. As failure of the retinal pigment epithelial (RPE) layer of the retina appears to be the root cause of AMD in many patients, cell transplantation is an attractive strategy, particularly at the stage of the disease where significant RPE loss has occurred but photoreceptor loss is less severe.

#### 6. Role of activated retinal glia in survival and regeneration of retinal neurons

The aim of this project is to increase our understanding of the fundamental mechanisms underpinning neuronal survival and axon regeneration in the injured CNS.



Visit www.brc.cam.ac.uk to find out more

#### New Appointment: Patrick Yu-Wai-Man joins as Consultant Neuro-Ophthalmologist

Patrick Yu-Wai-Man has recently joined us from Newcastle University where he was an MRC Clinician Scientist and Senior Lecturer based within the Wellcome Trust Centre for Mitochondrial Research. Patrick is a Consultant Neuro-Ophthalmologist with a specialist research interest in mitochondrial eye diseases and the factors that underlie the selective vulnerability of the eye in this group of patients. He is currently the Principal Investigator for two pivotal gene therapy trials (RESCUE and REVERSE) for Leber hereditary optic neuropathy (LHON), which is the most common cause of mitochondrial blindness in the

population. Patrick will complement the existing expertise within the Cambridge Eye Unit to further our ambition of a centre of excellence that will deliver cutting-edge research and treatment. He is also affiliated with Moorfields Eye Hospital and the UCL Institute of



Ophthalmology and Patrick will help develop strategic links with the MRC Mitochondrial Biology Unit from his academic base at the Cambridge Centre for Brain Repair.

## Interested in being a part of genetic eye research?



We are currently recruiting patients with inherited forms of blindness and mitochondrial diseases into a number of clinical studies, including a first-in-man gene therapy trial for Leber hereditary optic neuropathy (LHON). If you would like to get involved, please get in touch with Dr Patrick Yu Wai Man for further information (E-mail: py237@cam.ac.uk; Phone: 01223 216 700).

- Inherited optic neuropathies deep phenotyping and natural history study (Funding: NIHR)
- Identification of nuclear genes in patients with dominant optic atrophy (Funding: NIHR)
- Functional brain MRI studies of patients with mitochondrial diseases (Funding: Fight for Sight).
- Sodium valproate trial for Wolfram syndrome (TREAT-WOLFRAM; Funding: MRC)
- Gene therapy trial for LHON (REFLECT; Funding: GenSight Biologics)

## **Meet our Trustees**



Mr (Dr) Nicholas Sarkies Chairman



Mr Rod Ashby-Johnson Trustee



Dr Tasneem Khatib





Mr (Dr) Martin Snead Scientific Advisor



Prof. Madhavan Rajan Trustee



Mr Robin Bligh **Financial Advisor** 



Miss (Dr) Humma Shahid Mr (Dr) Anthony Vivian Trustee

Prof. Keith Martin



Scientific Advisor



## Thank you to our Donors

A big thank you from us to all our supporters who have donated to the Cambridge Eye Trust. We hope you can see from the articles that the funds raised are really making a difference locally and internationally. You have enabled us to support research, innovation, education and clinical best practice in ophthalmology, which will save sight.

# Like to make a donation to the Cambridge Eye?

Would you like to help us by making a donation to the Cambridge Eye Trust?

We are always grateful for any donations big or small, they will help us continue towards our vision, to save sight.

If you would like to make a donation there are 3 ways to do so:

- Sending a cheque made payable to 'Cambridge Eye Trust' to: Mr Nicholas Sarkies, Chairman Cambridge Eye Trust, Wistow, The Green, Hilton, Huntingdon, Cambridgeshire, PE28 9NB
- 2. Paying directly into the Trust's bank account: CAF Bank, Account number: 00021024, Sort code: 40-52-40. The reference, your name
- By visiting our website at www.cambridgeeyetrust.org.uk wheredonations can be made online at the click of a button.

#### DONATION FORM

I want to support research to save sight and I am making a donation of  $\ensuremath{\texttt{f}}\xspace_{-}$ 

Please treat as Gift Aid my donation and any donations I make in the future or have made in the past 4 years to the Cambridge Eye Trust, which is registered as a Charity no. 265140.

(please tick)

I am a UK taxpayer and understand that, if I pay less Income Tax and/or Capital Gains Tax than the Gift Aid claimed on all donations in that tax year, it is my responsibility to pay the difference.

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I would not like to subscribe to the Cambridge Eye Trust Newsletter.

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ADDRESS: Cambridge Eye Trust: C/O Mr Nicholas Sarkies, Chairman Cambridge Eye Trust, Wistow, The Green, Hilton, Huntingdon, Cambridgeshire, PE28 9NB. General email enquires to Louise Richards, CET Assistant: louise@healthology.eu



The Cambridge Eye Trust would like to use as much money as possible to support it's vision, to save sight.

Future editions of the Cambridge Eye Foundation newsletter can be distributed electronically via email subscription. Printed copies will be available in Addenbrooke's clinics. If you would like to receive a copy by email please send your name and email address for correspondence to **louise@healthology.eu** who will add you to our email subscription list. Thank you

If you are a UK taxpayer then the Cambridge Eye Trust can increase your donation be an extra £0.25 for every £1.00 you donate by claiming Gift Aid from HM Revenue & Customs at no extra cost to you.