Institution: Anglia Ruskin University

Unit of Assessment: UoA 3 (Allied Health Professions, Dentistry, Nursing and Pharmacy)

a. Overview

The Vision and Eye Research Unit (VERU) provides a multidisciplinary research platform comprising a team of core staff from the Postgraduate Medical Institute (PMI) of the Faculty of Health, Social Care & Education (FHSCE), together with staff from the Departments of Vision & Hearing Sciences, Life Sciences, Psychology, and Computing & Technology of the Faculty of Science & Technology (FST). The team is further strengthened by public and private stakeholder partners from the NHS and Industry.

VERU was established in 2009 as part of our newly formed PMI. Created in response to our successful RAE2008 submission, the Unit's aim is to focus on and grow the excellent vision and eye research at Anglia Ruskin University. All vision and eye research at Anglia Ruskin is now coordinated by VERU, which has enjoyed considerable growth during this assessment period. This is evidenced by a doubling in the number of academic staff, a doubling in the number of PhD student completions, and more than a two-and-a-half times increase in research income when compared to the vision research activity of our RAE 2008 submission. VERU has benefitted from significant institutional investment, amounting to £787,000 over the past four years.

VERU's strategic aims include: (i) to support the growing size and reputation of vision and eye research across our University; (ii) to enhance the vibrancy and culture of interdisciplinary vision research; and (iii) to increase collaboration with the NHS, private sector and government.

b. Research strategy

Anglia Ruskin's core research strategy is to grow research excellence in key strength areas. This features prominently in our University's Research and Scholarship Strategy 2012-2014 and Corporate Plan 2012-2014. Extant research areas with an international reputation are concentrated into five research institutes which purposefully straddle different academic departments. The research institutes promote collaboration between academic staff from different backgrounds, and foster relationships with external centres and industry. The PMI is our flagship research institute, and within it, VERU is the largest research unit. VERU places substantial emphasis on driving innovation by bringing together researchers from different backgrounds. We support researchers in projects which have a high potential for changing healthcare practice, providing a focus for funding from research bodies, charities, the NHS and the private sector.

We have exceeded all our objectives in this assessment period. Our key aims, stated in our RAE 2008 future research strategy, were: to enhance research in key areas; to move into emerging high-impact research areas; to attract new staff and new collaborators; and to increase our funding base. Substantial growth is evidenced by the appointment of two new Professors in strategic key research areas, ten Research Fellows, an increase in returned staff from 7 to 14, a growth in vision research income from £382,935 to just under £1 million, a new state-of-the-art research centre, and 14 PhD student completions (one jointly supervised with UoA15 and partly credited there) compared to 7 returned in RAE 2008. We have developed new collaborations with international research centres in USA (Berkeley, Houston) and Hong Kong via visiting professorships, Australia (via grants), India (via PhD students), and Trinidad & Tobago (via a nationwide research grant). In addition, all of our established (non-ECR) researchers have REF outputs co-authored with international collaborators. Collaborations with clinicians have led to a number of NHS-funded clinical studies. Successful engagement with industrial collaborators is evidenced by two successful Knowledge Transfer Partnerships (KTPs).

VERU has a clear strategy to facilitate high quality "near-market" applied health research. To achieve this we provide research and technical expertise, clinical and laboratory facilities, administrative support, networking and research funding opportunities for the growing number of vision researchers both within our University and externally. Through the PMI's £300,000 investment in the Anglia Ruskin Clinical Trials Unit (ARCTU), we have in–house research support services with expertise in research design, statistics, health economics, financial controls, data and performance monitoring, project and data management and ethical considerations.

Our strategy has to been to focus on key research areas, each led by a Professor or Reader, many entailing UK and overseas collaborators (see section e), in the following main categories:
(i) *Clinical Vision Research* (**Pardhan**): Responding to the objectives of VISION 2020, we focus

on age-related macular degeneration (the largest cause of blindness in the elderly), glaucoma, and myopia (the single largest cause of reversible blindness in the world). Our research has deepened the understanding of how loss of vision affects everyday activities. Responding to recent National Institute for Health and Care Excellence (NICE) guidelines, we designed new evidenced-based care pathways in glaucoma, which have been adopted by various Clinical Commissioning Groups (CCGs) in North London and Essex. A KTP with industry evaluated a new contact lens design that enhanced company revenue. Myopia research, funded by Vision CRC and carried out as part of an international consortium with partners in the USA, UK and Australia, identified various optical parameters that influence myopic progression.

(ii) *Ophthalmic Epidemiology* (**Bourne**): VERU leads a worldwide consortium to ascertain the global burden of visual impairment and blindness. In partnership with the World Health Organization (WHO) and working with 79 ophthalmic epidemiologists around the world, new estimates of the global burden of eye disease and trends over the past 30 years have been established. Published in a special edition of *The Lancet* (2012) as part of the Global Burden of Disease (GBD) study, the vision loss data are used by UK and overseas governments to plan healthcare programmes. Recent funding by the Brien Holden Vision Foundation Institute will enable the GBD vision database to be updated and maintained for the next five years.

(iii) *Psychophysics and Fundamental Vision Research* (**Waugh**, **van der Linde**). We have identified factors that influence eye-gaze control, face processing, visual short-term memory, image quality assessment, and colour vision. We have investigated the underlying spatial interactions between luminance and contrast modulated images and crowding, with the aim of improving children's visual acuity charts for earlier detection of amblyopia.

(iv) *Improved Treatment of Eye Diseases (***Rajan***,* **Bron***,* **Buckley***)* is our newest area of research. We have improved the surgical treatment of keratoconus using micro-thin endothelial keratoplasty, which has already shown evidence of improved recovery time and prognosis. Dry eye research, using our state-of-the-art environment chamber, investigates homeostasis of tear osmolarity and the effect of feedback disruption on dry eye outcomes in extreme environmental conditions.

Our strategic objectives over the next five years are to:

1. *Enhance VERU's reputation as a world class research centre.* We will:

(i) Build on key areas in which we have an established international profile, including: (i) *ophthalmic epidemiology*, through our research on the Global Burden of Eye Disease Study (**Bourne**) which has been published in a special edition of *The Lancet*; (ii) *visual impairment* in collaboration with Cambridge University (**Pardhan**); (iii) *myopia* supported by research funding from Vision CRC in Australia (**Allen**); (iv) *glaucoma* by working with Care Commissioning Services (**Bourne**); (v) *visual cognition* by improving the understanding of fundamental visual processes (**van der Linde**); (vi) anterior eye diseases through new appointments of Professors **Bron** (Professor Emeritus, University of Oxford) and **Rajan** (Addenbrooke's Hospital) in collaboration with Professor **Buckley**.

(ii) *Increase collaboration with world-class research centres of excellence* by expanding our visiting professoriate of **Chung** (Berkeley), **Bedell** (Houston) and **Lam** (Hong Kong); this will be facilitated by supporting research staff exchanges.

(iii) *Develop our research infrastructure and facilities:* having secured a further capital investment of £900,000 from Anglia Ruskin, we are set to relocate to a larger, purpose-built research centre in Cambridge (Dec 2014), which will further enhance our research capabilities and reputation.

2. *Translate our research into improved patient outcomes* by disseminating findings through the unique infrastructure of the PMI's 21 health and social care partners, NHS clinicians working in VERU, University College London Partners (UCLP) Academic Health Science Network (AHSN) and North Thames Collaboration for Applied Health Research and Care.
3. *Respond to global initiatives, such as VISION 2020,* through collaboration with overseas governments and non-governmental organizations (NGOs) such as the International Agency for the Prevention of Blindness (IAPB) and Royal National Institute of Blind People (RNIB). This will build upon our recent success with the government of Trinidad and Tobago who commissioned a national study with VERU to ascertain the burden of visual impairment in order to develop healthcare policies and establish funding priorities.
4. *Respond to national priorities* though our close collaboration with NHS clinicians (who form part

of our professoriate) and visiting staff, to quickly identify and respond to new NHS initiatives, such as enhancing sustainability. Our project with the North East London, Central London, and Essex Health Innovation & Education Cluster (NECLES HEIC), in collaboration with University College London Partners (UCLP), led to the development of more efficient glaucoma referral pathways. These have been adopted by a number of care commissioning groups in Essex and London. We aim to extend this to other eye diseases including dry eye and diabetic retinopathy.

5. *Engage industry partners* by capitalising on the expertise acquired through two KTPs (Medisoft Ltd and Ultravision PLC). We will facilitate clinical trials with our NHS partners in Essex, Cambridgeshire and Hertfordshire, through ARCTU, and also through Quintiles, the world's largest Contract Research Organisation (CRO) with whom ARCTU has secured a prestigious academic partnership.

In order to measure our strategic objectives, our targets are to:

1. Increase our research outputs in key research areas by 100%
2. Increase our postgraduate research student population by 50%
3. Increase our strategic partnerships (NHS and Industry) by 100%
4. Increase our research income by 10% per annum
5. Increase our research staff base by 50%

Mechanisms for the development, promotion and dissemination of research include regular meetings with researchers and practising clinicians who are aware of patient needs and current healthcare practices. This symbiotic relationship enables laboratory-based researchers to gain vital clinical experience, and gives clinicians a forum to 'brainstorm' evidence-based research ideas that are tangibly focussed upon improving clinical practice. This has lead to a number of clinical and NHS portfolio projects. Research is disseminated via University-wide internal seminars and hospital research seminars, as well as international conferences (i.e. ARVO and VSS) and academic journals. Among other events, VERU hosts an annual Cornea and Cataract Symposium for ophthalmologists (supported by an educational grant from Bausch and Lomb Pharmaceuticals) that attracts prestigious international speakers and is attended by more than 100 delegates.

Multidisciplinary collaborative research projects include: (i) visual short-term memory (with Psychology, Computing & Technology); (ii) tissue culture (with Life Sciences); (iii) visual and auditory research (with Computing & Technology); (iv) face perception (with Psychology and Computing & Technology); (v) visual impairment (with Vision and Hearing Sciences, Psychology, Computing & Technology); (vi) myopia (with Vision and Hearing Sciences); (vii) learning difficulties (with Psychology, Vision and Hearing Sciences).

c. People:

i. Staffing Strategy and Staff Development:

Our University holds the European Commission HR Excellence in Research Award which underpins the support and career development offered to our researchers. This is evidenced by the exemplary career progress of our postdoctoral researchers: all of our post-doctoral research fellows who have moved on have progressed to substantial academic or hospital posts: **Timmis** and **Price** now hold academic positions in our Departments of Life Sciences and Vision & Hearing Sciences respectively; **Kolarik** joined Cambridge University; **Jessa** joined Moorfields Eye Hospital and **Ratnarajan** joined Aylesbury NHS Trust.

Effective development of research for staff is achieved through University-led support mechanisms. The Deputy Vice Chancellor (Research, Scholarship and Development) operates the Research Enhancement Fund (£1 million per annum) that offers pump-prime funding for research development. In this REF period, we have benefited from 8 internally funded summer studentships, 2 research assistant bursaries, 7 summer studentships, 6 PhD studentships, and 5 research enhancement awards (£59,000). A central sabbatical fund enables staff to suspend teaching and administrative duties for a period of 6-12 months to develop their research (**van der Linde**, 2011; **Cirstea,** 2011). Promotion to Readership and/or Professorship is achieved through the Readers and Professorial Panel. Promising staff are identified early and offered formal mentorship by a senior staff (Readership to **van der Linde**, 2013). Travel support is provided for staff presenting research at international conferences (up to £1,500).

Anglia Ruskin's Research, Development & Commercial Services (RDCS) provides in-house training, advice and online guides that cover all aspects of the research process from funding

applications, ethics, research design, analysis and dissemination. Mentoring by 'critical friend' is built into the grant application process for junior staff, and funding applications are peer reviewed by senior staff with a track record in winning research funding. All non-NHS research is reviewed by the Faculty Research Ethics Panel, a sub-committee of Anglia Rukins's Research Committee, who provide detailed guidance on referred applications. Comprehensive equality training is mandatory for all staff. It covers all aspects of diversity including the Equality Act (2010) and expands on factors such as accent, social class and appearance that are not explicitly covered by law. The results of Anglia Ruskin's Careers in Research Online Survey (CROS) have revealed 100% agreement that there is no reported discrimination. Annual events, including University and Faculty Research Conferences and PhD Supervisor's Conference, enable 'best practice' to be disseminated, and provide career development and networking opportunities for both established and new researchers.

Our University has made research excellence a priority for staff at every level. Staff workloads are monitored with Heads of Departments through a Work Balance Model to support researchers attain their individual research goals. Support is identified and monitored through appraisals and regular meetings. In instances where staff are unable to achieve their agreed research and scholarly goals, support is quickly put in place, including: mentoring, collaboration, leave, buy-out from other duties, and the prudent targeting of internal funds to kick-start projects.

VERU ensures equity of access to our laboratory resources for all collaborators. Technical support and IT infrastructure, University-wide initiatives that support research (including pump-priming schemes), internal studentships and sabbaticals are open to all researchers. Continuing professional development is encouraged, including training in research methods, statistics, knowledge transfer, scholarly writing and grant preparation. Research seminars are marketed throughout faculties and all staff are encouraged to attend. All staff have access to all European and other funding opportunities through RDCS.

All our Early Career Researchers (ECRs) are supported through formal staff development procedures. This includes mentorship by a Professor, Reader or a senior research colleague to help develop new research areas or support integration into existing research projects, which may lead to co-authorship of publications, co-supervision of PhD students, and joint funding applications. All ECRs have reduced teaching in their first year to promote the development of research. They are encouraged to submit funding applications geared to ECRs (such as First Grant Scheme bids) and are eligible for summer studentship funding. ECRs are encouraged to join existing PhD supervisory teams to gain experience of the supervision process.

VERU engages with national initiatives including the HIEC and AHSN, enabling us to create links with NHS Trusts, industry and government. To strengthen and sustain these links, VERU's professoriate (**Bourne**, **Bron**, **Buckley**, **Rajan**) are GMC-registered consultant ophthalmologists who collaborate with laboratory-based researchers in Anglia Ruskin including optometrists (**Allen**, **Aydin, Crossland**, **Pardhan**, **Latham**), psychologists **(Bright, Hills**), computing and behavioural scientists (**Cirstea, van der Linde**), human movement scientists (**Timmis, Scarfe**) and biomedical scientists (**Rolen**). In addition, a number of NHS clinicians are appointed as Visiting Research Fellows: **Keenan** (Addenbrooke's NHS), **Shiew** (Peterborough NHS Trust), **Thomas** (Ipswich), **Ratnarajan** (Aylesbury General Hospital), **Patel** (Colchester NHS), **Silvester** (Countess of Chester NHS) and **Das** (Yorkshire Deanery). This formal partnership with NHS clinical researchers provides a dynamic platform for our laboratory-based researchers to 'brainstorm' ideas and to facilitate the impact from their research. It also promotes the development of new ideas for the clinical staff, and has led to VERU being awarded a number of NHS grants.

ii. Research Students:

Our PhD student completions have doubled in this REF period compared to RAE 2008 (vision research). An additional 21 PhD students are currently in different phases of their research programme. All training and supervision of postgraduate students is underwritten by our University's Research Degrees Regulations and Equality Policy Framework, which reflects the Quality Assurance Agency (QAA) Quality Code. Research degrees are regulated and monitored by our University's Research Degrees Committee and its Faculty Sub-committees. At Faculty level, the Director of Research & Scholarship takes responsibility for the implementation of all research strategies/policies and student welfare. Anglia Ruskin has robust quality assurance and enhancement procedures to support and monitor research at Faculty and University level,

including an Annual Monitoring Scheme and First Year Review (co-ordinated by an independent chair) and a Confirmation of Candidature examination for progressing to the final phase of the PhD programme. In 2013, the online 'Progress Platform' system was introduced to capture student progress and improve information flow across the offices responsible for research students.

Research students benefit from comprehensive training and opportunities to enhance their skills in preparation for work, both inside and outside academia. All students are required to complete a mandatory, three-stage postgraduate research training programme. The VITAE Researcher Development Framework is used to guide students on how to identify skills which need to be developed. They are encouraged to attend training courses run by RDCS, as well as access a number of online Epigeum research skills training courses, and other resources such as the Alternative Guide to Postgraduate Funding and NVivo. Many of our current PhD students have given papers at national and international conferences. They also present at the University's annual research student conference. Two of our research students were awarded the first prizes at the Faculty of Science & Technology's Research Conference (2013). **Hairol,** a former PhD student who completed his PhD in 2010, has been named one of the five "Outstanding International Scientists" in Malaysia. Students can apply for up to £1,250 over a three-year period to support international travel and conference fees. Close proximity to the University of Cambridge has enabled our researchers to regularly attend talks given by world-class scientists at Craik Club, Zangwill Club, MRC Cognition and Brain Sciences Unit events. All research students have full access to VERU laboratory facilities and have a desk, computer and storage space.

The growing PhD student population at Anglia Ruskin provides a sense of community that is supported by a number of networking events organised by the postgraduate student society (Grad Soc). Feedback from students participating in the Postgraduate Research Experience Survey (PRES) (2009, 2011, 2013) has shown that the student experience has improved significantly from 2008-2013. In both PRES 2011 and in 2013 our respondents rated their overall experience of their research programme at Anglia Ruskin more highly than the sector average.

d. Income, Infrastructure and Facilities

The income submitted in this return is derived entirely from vision and eye research activities. Hence comparisons are made only against the 'vision research' income data submitted in RAE 2008. VERU has successfully won open competitive funding from UK and overseas grant awarding bodies. Our research income is just under £1 million, representing a growth of 2.5 times the income returned in RAE 2008. Sources of funding include:

1. *International charities*: Melinda and Bill Gates Foundation, International Society for Low-vision Rehabilitation and Research (ISLRR)
2. *International governmental and NGOs*: The Government of Trinidad and Tobago, The Vision CRC Australia and the Brian Holden Institute Foundation in Australia
3. *UK Charities:* the College of Optometrists, Fight for Sight, International Glaucoma Society, Evelyn Trust, Ménière's Society, The Wellcome Trust, The Nuffield Foundation, The Leverhulme Trust, The Royal Society
4. *Knowledge Transfer Partnerships:* Technology Strategy Board. Industrial partners include Medisoft Ltd and Ultravision PLC
5. *NHS:* Flexibility and Sustainability and Comprehensive Local Research Network (CLRN) grants
6. *NECLES HIEC:* partnership grant with UCLP and Queen Mary's Hospital
7. *Government:* Home Office Scientific Development Branch (HOSDB)

In addition, an Economic and Social Research Council (ESRC) grant and an Action Medical grant have been awarded after the REF 2014 census date.

VERU has full access to all Postgraduate Medical Institute's (PMI) facilities. The PMI was developed via a significant investment of £12m in 2008 (as proposed in our RAE 2008 strategic plans) and has attracted an extensive network of inter-disciplinary collaborators. It has partnered with 21 external member organisations, including all NHS acute hospitals, primary care and mental health trusts and specialist tertiary care (St. Andrews Centre for Burns and Plastic Surgery and the Essex Cardiothoracic Centre) in Essex, along with Essex County Council, Ramsay and Nuffield Hospitals, numerous hospices and the Royal Society for Public Health. With a footprint encompassing five counties, VERU has unfettered access to a population of 10 million potential patient beneficiaries. Other initiatives include the fast-developing Anglia Ruskin's MedTech campus, launched by Lord Howe in 2012. This private sector-led initiative offers 1.7m square feet of innovation space in partnership with three local councils. An additional investment of £300,000

in 2012 enabled the PMI to set up ARCTU.

VERU research facilities, which were built using an initial capital investment of £431,000 (principally through capital grants and SRIF), include state-of-the-art laboratories and clinical areas. Key facilities include: (i) *The Low-vision Suite* featuring a new Vicon mobility analysis system; (ii) *The Diagnostic Suite* which includes anterior (Zeiss) and posterior (Spectralis) OCTs, Microperimeter (MP1), fundus camera, Keeler-Konan Pocklington wide-field specular photomicroscope; (iii) *An Anterior Eye Research Suite*, incorporating a room-sized environmental chamber which allows independent manipulation of temperature, wind speed and humidity; (iv) *The Contact Lens Research Suite*, which features a Shack–Hartmann wavefront sensor, IOL Master and a power refractor; (v) *The Psychophysics Suite* with Cambridge Research Systems Visage and SR Research EyeLink 1000 eye tracker. In addition, four dedicated clinical testing rooms enable clinical projects including the glaucoma referral refinement project in collaboration with Addenbrooke's Hospital.

Researchers also have full access to research facilities in our newly-built Eye Clinic, which includes the Evelyn Trust Anglia Vision Suite, containing state-of-the-art colour vision diagnostic tools, such as the Heidelberg multi-colour anomaloscope, Cambridge Colour Test and a custom-built visual evoked potential research suite with an Espion Visual Electrophysiological Suite. Full access to Tissue Laboratories in the Department of Life Sciences which include a specular microscope for observation and analysis of the corneal endothelium, flow cytometer for cell surface protein expression studies and polymerase chain reaction for DNA amplification. In the PMI, our researchers investigate mobility and co-ordination in low vision patients using the most advanced gait lab in the UK, modelled on one in the Hospital for Special Surgery, New York.

All vision and eye researchers have free access to all research facilities irrespective of their academic departments. The growth in our research profile has been rewarded by a further institutional investment of £900,000 for a new purpose-built VERU research facility, as part of Anglia Ruskin's £21 million investment in a brand new building in Cambridge (December 2014).

e. Collaboration and Contribution to the Discipline or Research Base

Our Collaborative Networks Include:

- VERU's largest international collaboration relates to the Global Burden of Disease (GBD) Study Vision Loss Experts Group (VLEG), led by **Bourne**, for which we lead 79 ophthalmic epidemiologists across all five continents, in partnership with the World Health Organisation.
- All of our established research staff have authored at least one research output in collaboration with an international researcher. We collaborate with Akhtar (Saudi Arabia), Argueso (USA), Bach (Germany), Bedell (USA), Bergmanson (USA), Bovik (USA), Chase (USA), Chung (USA), Cormack (USA), Georgiev (Bulgaria), Gonzalez-Alvarez (Spain) Irkec (Turkey), Jaschinski (Germany), Legge (USA), Macedo (USA), Pult (Germany), Sailoganathan (Malaysia), Theagarayan (Finland), Van Nispen (Netherlands), Watson (Australia), Yokoi (Japan) and Zuidoek (Netherlands).
- Crossland provides research expertise as consultant on a NIH grant held at the University of Minnesota (USA). We supervise our PhD students jointly with international researchers from McGill University (Canada) and Elite School in Chenai (India), and have collaborated with the University of Finland and Palacky University (Czech Republic) through EU Erasmus projects.
- In the UK we have published and/or held collaborative research grants with the Universities of Bradford, Glasgow, Sussex, Birmingham, Imperial College, University College London, City, Essex, and Manchester. Collaboration with King's College London led to a successful ESRC research grant. Collaboration with Moorfields Eye Hospital, City University and UCLP led to a joint HIEC grant. We also collaborate with the Tissue Bank and Brain Research Centre at the University of Cambridge, and Histopathology and Clinical Engineering at Addenbrooke's University Hospital. Our myopia researchers are part of a new consortium hosted by Aston University.

Editorial and Reviewing Activities:

- We have reviewed national and international grants, including BMRC Singapore (**Pardhan**), BBSRC (**Pardhan**), College of Optometrists (**Allen**, **Pardhan**, **Waugh**, **Crossland**), EPSRC (**Allen**, **van der Linde**), Research Grant Council of Hong Kong (**Allen**), Guide Dogs for the Blind (**Rajan**), NERC (**Allen**), NIHR (**Latham**, **Pardhan**), Wellcome Trust (**Latham**), Fight for Sight (**Latham**, **Bourne**, **Rajan**), Nuffield Foundation (**Waugh**) and Society of Biology (**Waugh**).
- We have served as Editorial Board members or guest editors for: Feature issue of Vision and IT

displays in Ophthalmic and Physiological Optics (**Crossland**); Contact Lens and Anterior Eye (**Buckley**); Anatomy 2004-present (**Bron**); The Ocular Surface (**Bron**); Ophthalmologica (**Bron**); Journal of Ophthalmology (**Bron**); Ophthalmology and Therapy (**Bron**); Optometry in Practice (**Myint**); Intellectual Disability Diagnosis (**Allen**); Journal of Behavioral Robotics (**van der Linde**).

- Our contribution to national and international conferences and workshops include: (i) Consultant member of the Executive Committee for the International MGD Workshop in 2011 (**Bron**); (ii) Consultant Member of the Steering Committee for the International Contact Lens Discomfort Workshop in 2013 (**Bron**); Organising Member of a Special Interest Group (SIG) at ARVO in 2012 (**Bourne**); (iv) Organising Member and Chair of the 9th General Assembly of the International Agency for the Prevention of Blindness, Hyderabad India 2012 (**Bourne).** VERU hosts a high-profile annual conference, the Cambridge Cornea and Cataract Symposium for Ophthalmologists with over 100 delegates from NHS hospitals and Universities worldwide. We have peer-reviewed for 37 high-impact journals, and have served as examiners at 15 UK and overseas universities.

Response to National and International Priorities:

We have responded to initiatives such as NHS Sustainability and VISION 2020, by developing projects to facilitate the eradication of blindness. These include our research with the GBD, in collaboration with WHO, to ascertain the burden of eye disease globally. VERU's response to NHS initiatives on sustainability led to improvements in the efficiency of glaucoma referral pathways that have since been adopted by various CCGs in North London and Essex. As part of our aim to improve the care of frail adults we are currently investigating higher risk of falls in diabetic patients who suffer from both diabetic retinopathy and neuropathy.

Collaboration with External Bodies:

Collaboration is exemplified through: (i) A national guidance document produced by the Ophthalmology Subgroup of the Government's Advisory Committee on Dangerous Pathogens/Transmissible Spongiform Encephalopathy and disseminated by the MHRA "Managing CJS/vCJD in Ophthalmology" (**Buckley**); (ii) The College of Optometrists Clinical Management Guidelines, initiated by the College of Optometrists to VERU and City University, to provide support for optometrists seeking independent prescribing status. NICE accreditation is currently being sought for this (**Buckley**); (iii) Leading the Optometric Low Vision Group of the European Academy of Optometry (**Crossland**); (iv) Committee Membership of the International Society for Low Vision Research and Rehabilitation (**Crossland**); (v) Honorary Medical Adviser to the British National Formulary (Joint Committee of the BMA and the Royal Pharmaceutical Society) (**Buckley**); (vi) **Myint** is the only optometrist in the UK to be accredited as a Classifier for the International Paralympic Committee (IPC) in Visual Impairment and is currently to evaluate new methods for the robust classification for athletes; (vii) 'End-users' play a substantial role as members of Steering groups in our research grants (Ménière's Society, the Evelyn Trust, RP Fighting Blindness, Cam Sight Low Vision Services, and Macular Degeneration Society); (viii) **Buckley** holds the Presidency of the Keratoconus Group, a national patient self-help organisation.

Fellowships, Awards and Prizes:

- **Buckley** held a Professorship sponsored by Bausch and Lomb (completed November 2008). A Leverhulme Trust Visiting Professorship was awarded to **Bedell** from the University of Houston (2012-13). Fellowships of the College of Optometrists have been awarded to **Myint** (2011), **Latham** (2013) and **Allen** (2013).
- In this REF period our researchers have received numerous awards: (i) Bernard Gilmartin Award for the most highly regarded paper published in Ophthalmic & Physiological Optics over the preceding five years (**Calver** *et al;* 2011); (ii) George Giles Postgraduate Research Prize for the most outstanding postgraduate project in optometry (**Tabrett**; 2011); (iii) First Prize in the Spotlight Competition (Medical Technology Category) for improving current equipment for corneal transplant surgery for faster recovery of vision (Health Enterprise East, **Buckley** & **Rajan** 2011); (iv) Best Paper Prize in Ophthalmology Congress (**Rajan**), 2012; (v) "Highly Commended" poster at EAOO meeting, Malaga (**Latham**, 2013); (vi) "Outstanding Young International Scientist" of Malaysia (**Hairol,** 2012) (vi) Neil Charmans' Medal for Research Excellence from the College of Optometrists (**Allen**, 2013).