Institution: University of Bradford

Unit of Assessment: 3

a. Overview

The University of Bradford has an extensive portfolio of high quality provision in Allied Health unified by the common research theme of seeking to improve human health and wellbeing. Consistent with the University's mission of *Making Knowledge Work*, our Allied Health provision embraces the principles of translational research through development of fundamental science, and critical social analysis, into practical applications with tangible health benefits. Our research has two major themes: (i) concept to clinic (ii) patient safety and wellbeing; channelled through five expert collaborative groups, each making a contribution in the path from innovation to clinical impact:

- Cancer Therapeutics
- Skin Sciences
- Medicines Development
- Vision Science
- Healthcare Practice

Achievements range from: laboratory modelling, design and formulation of novel compounds for the treatment of cancer; the use of biomechanical research to investigate the visual contribution to falls in the elderly; adopting new approaches to redress inequality that directly impact on the lives of people with dementia and offer new insights into variation in infant health. Partnerships are vital to the success of our research and we have fostered strong collaborative links with academics, clinicians and carers in the NHS and in the broader community. The partnership with the Bradford Institute for Health Research (BIHR) has been forged through development of shared planning, delivered through alignment of research interests and supported by appointment of co-funded posts. This approach supported the initiation of the *Born in Bradford* birth cohort study – a major project of local relevance with global reach.

b. Research strategy

The pathway from discovery and development through to the application of products, policy and processes is at the core of our approach to delivering research with the potential to enhance the quality of life for individuals and communities. We have adopted an open innovation approach to research, enabling researchers and practitioners to work in supportive interdisciplinary environments where parity of esteem is promoted and valued by all contributors and participants. Our current research environment reflects a mature portfolio that demonstrates a continuity of activity since RAE2008 (UoAs 11, 12a, 12b and 13). The stated strategy of focusing on our strongest research has been successful in areas including Cancer Therapeutics, Cutaneous Biology (now Skin Sciences), Dementia, Health Care Quality, Medicines Development, Neuropharmacology and Optometry (now Vision Sciences). In other areas (vascular biology, toxicology) activity has diminished, largely due to staff retirement and subsequent, strategic appointment of new staff in areas that have enabled us to build on core strengths. The research culture is well-developed, supported by interdisciplinary seminars, research group meetings, conference attendance and hosting of major international conferences. Developments, achievements and ongoing strategy of each research group are summarised below:

Cancer Therapeutics *(Falconer, Loadman, Patterson, Phillips, Rigas, Shnyder)*

The Institute of Cancer Therapeutics (ICT) houses a multi-disciplinary team in the fields of drug design, synthesis, cancer pharmacology, tumour biology and cancer proteomics. It represents a continuation of the *Cancer Therapeutics* group who have undertaken cancer research for over 35 years and who are housed in a purpose built facility allowing integration of all aspects of the preclinical drug discovery process. The fundamental research aim is to develop new cancer medicines from concept to clinic. *ICTBiosciences* was established to oversee industrial research collaborations

and manage the exacting requirements of industrial partners. The ICT is a partner in the St James's University Hospital, Leeds NICR/CRUK funded Experimental Cancer Medicines Centre, providing an enhanced level of pharmacokinetic support and development of novel pharmacodynamic endpoints to the phase I/II chemotherapy and molecular therapeutic studies in Leeds and Bradford hospitals. Key oncologists (Twelves, Chester, Anthoney, Hull) and surgeons (McCaul, Linford) inform the clinical context of research and are integrated into our research activities. Knowledge transfer activities have been facilitated by the establishment of *Incanthera Ltd*. - a University spin-out set up to progress new therapeutics discovered in-house into clinical settings, attracting £3M of external investment. Our research plans are to:

a) increase interaction with clinicians to inform the clinical context of research.
b) increase engagement with the pharmaceutical and healthcare sector.
c) exploit IP through company spin-out and licensing opportunities.

Skin Sciences *(Anderson, Baumgartner, Botchkarev, Botchkareva, Boyne, Fessing, Mardaryev, Randall, Thornton, Tobin)*

Skin science has a 30-year history at Bradford and was returned in RAE2008 as a Cutaneous Biology research group. However, in 2009 targeted University investment facilitated the reorganization of skin & hair sciences into a focused research & knowledge transfer delivery group via the establishment of the Centre for Skin Sciences (CSS). CSS is the largest academic base in Britain for fundamental and applied skin and hair follicle sciences and is becoming the leading academic skin sciences centre in Europe. It includes core expertise in biochemistry, cell biology, pharmaceutical sciences, molecular biology, endocrinology, and clinical dermatology, with associates working in bioinformatics, forensics and pharmaceutics as well as collaborations with dermatologists and plastic surgeons. CSS incorporates the *Plastic Surgery & Burns Unit,* through which plastic surgery registrars study for MPhil/PhD in association with consultant surgeons, and hosts the laboratory of Wittmann (CSS Associate Director-Clinical 0.4FTE) a dermatologist operating out of Bradford Royal Infirmary and the University of Leeds. The Unit's activity is a consequence of the devastating Bradford City FC Fire in 1985 and it remains the official charity of the club. Research activity is focused on skin development & regeneration; skin & hair pigmentation; hair growth regulation; wound healing and wound care. All are considered in the context of healthy and disease states. Our research plans are to:

a) increase interaction with the personal-care and devices industry related to skin and hair care product innovation.
b) increase engagement with the dermatological healthcare sector.
c) exploit IP through company spin-out and licensing opportunities.

Medicines Development *(Betmouni, Correa, Kantamneni, Leusen, Mobasheri, Nasim, Paradkar, Rattray, Roberts, Scowen, Shang, Wheelhouse, Williamson)*

Since RAE 2008, there have been major changes within the area formally known as the *Institute of Pharmaceutical Innovation*. The University has supported this transition through significant investment in infrastructure, equipment and staff, including the Centre for Pharmaceutical Engineering Science (CPES), an interdisciplinary research centre linking the pharmaceutical sciences, polymer and process engineering. We have strength, critical mass and excellent technical capacity in a range of areas important to medicines development, pharmaceutical sciences and pharmacology. These include expert chemistry approaches to modelling and predicting crystal structure, structural analysis and crystal engineering through to green technologies and smart solutions to formulation of preparations containing medicinally important compounds. In this way, fundamental physico-chemical evaluation of materials leads to enhancement of product performance e.g. improving solubility, dispersion and bioavailability and directing active species to biological target tissues. Interdisciplinary research with colleagues in ICT and CSS helps develop strategies for targeting of therapeutics in the skin, cancer and neuro-degeneration areas. Bradford is known internationally for its expertise in particle

engineering, and this expertise continues, both in production of particles for a range of applications (including on-going development of the University's spin-out companies, *Crystec Pharma* and *Lena Nanoceutics*), and in the development of novel coatings using rheological techniques. Our pharmacologists are focused on target identification and drug discovery in disease areas, including neuro-degeneration (Alzheimer's Disease, Motor Neurone Disease, Parkinson's Disease), cardiovascular disease (pulmonary hypertension, platelet biology) and musculoskeletal disease. There is an emphasis on collaboration for impact around shared technologies, particularly cell-based models, to identify disease processes, drug targets and discover tool compounds. Our research plans are to:

a) expand work in complex materials and formulation of multi-component and complex products to include problem-solving for industrial applications.
b) overcome complex barriers for functional performance including design and formulation to optimise CNS availability, skin delivery and targeting of medicinally important compounds.
c) identify potential therapeutic targets for disease through genetic and cell biological approaches.
d) identify lead compounds from libraries of chemical diversity and known bioactivity to provide proof of concept data for therapeutic intervention into important disease areas and develop these compounds further through chemical optimisation and preclinical screening, in association with industry and collaborating networks.
e) further develop multidisciplinary collaborations through the interdisciplinary, industry-facing CPES.

Vision Science *(Barrett, Bloj, Chisholm, Elliott, Heron, Mallen, McIlhagga, McKeefry, Whitaker)*

The Vision Science (VS) research group comprises a cohesive, multi-disciplinary team representing a direct continuation of the RAE2008 (Optometry) building on 35 years of vision research at the University. Research embraces a broad range of disciplines including; ophthalmology, optics, ocular imaging, machine vision, psychophysics, biomechanics and visual neuroscience. Our aim is to further our understanding of the basic mechanisms of human vision in health and disease, as well as the functional consequences of visual loss. In pursuing this aim we have prioritised a strong translational research dimension and have developed an excellent track record of applying basic research to address clinical problems. The group has achieved a diversity that is naturally collaborative and multi-disciplinary, working with optometrists, ophthalmologists, orthoptists, medical engineers, physicists, psychologists and neuroscientists at local, regional, national and international levels. The research strategy is to pursue fundamental and applied research into the basic mechanisms of human vision with the goal of developing new techniques for the assessment of visual function in disease processes and in provision of novel testing and amelioration strategies to help individuals deal with functional visual loss arising from poor development, ageing or disease in the home, workplace or other environments. Our research plans are to:

a) build upon funding success and develop capacity in 'Vision in the Environment, Work and Sport' (VIEWS).
b) develop functional and structural ocular imaging technologies for patient benefit.
c) increase collaboration with healthcare professionals to translate basic and applied vision research for wider patient benefit.
d) continue to enhance our reputation for support of early career vision scientists.

Healthcare Practice *(Alldred, Bagley, Blenkinsopp, Downs, Fairley, Mason, Mohammed, Petherick, Scally, Small, Smith, Stewart-Knox, Wright)*

Healthcare at Bradford has a strong applied dimension that demonstrates engagement with service providers and users at local, regional, national and international levels. A consistent theme is that of improving the patient experience and enhancing health service quality. There is an additional emphasis on addressing

failures in care and advancing patient safety. Strongly embedded in our research is a concern with health inequality. This concern underpins research at both ends of the age spectrum with a focus on dementia and on infant and child health. A priority in NHS research is recognition of the importance of networks that include academic and NHS organisations. Members of the group have been involved in the Academic Health Sciences Network, in both the CLAHRC nearing completion and in the newly established CLAHRC for Yorkshire and the Humber (this will include joint PhD supervision with White Rose Universities). Strategic partnership with the BIHR, an Institute that includes all local NHS trusts, Clinical Commissioning Groups and the Universities of Bradford, Leeds and York, has generated an active community of practice. Three main themes emerge, consistent with our plans in RAE2008:

Dementia – Building upon over two decades of research into person-centred care this area continues to grow in strength with substantive levels of funding from NIHR, charities and Research Councils. It includes a spectrum of concerns beginning with the conceptual underpinnings of understanding dementia, developing research to consider ways of enhancing care delivery, supporting the use of dementia care mapping that has international reach as both a training heuristic and a method of assessing care practices.

Born in Bradford – This study is a birth cohort study including 13800 babies born in the city between 2007 and 2011, and their parents. It is supported by substantial funding from the NIHR, Research Councils, Charities and the EU. Half the babies in the cohort are of Pakistani origin (and of these, half are the children of migrants who were themselves born in Pakistan). Thus, the cohort allows the exploration of social disadvantage, ethnicity and migration status in relation to infant (and now child) health and well-being. Both the present Chief Medical Officer and her predecessor have taken a close supportive interest in the study. Sir Liam Donaldson said, “Born in Bradford is an exciting and diverse research project covering the city’s fast growing, ethnically and culturally mixed population. It will help researchers to understand the causes of ill health and, more importantly, the NHS to find better ways to improve health." Professor Dame Sally Davies said, “Born in Bradford sets new standards of real community support. From this research we will learn about what factors contribute to disease that we inherit and what factors we get from our environment. This will open new doors for treatment and care.” Joint academic appointments with BIHR and the introduction of new senior University posts support the collaboration.

Quality and Safety – This area brings together a group of multi-disciplinary health service researchers possessing a wide range of methodological expertise. They have an established record in quality and safety research including the minimisation of practitioner error, and the optimisation and safety of medicines. Particular strengths are patient involvement in safety, incorporating both co-design (research) and co-production, (e.g. health service information) and the measurement of safety and quality. Experience of analysing large data sets, including hospital mortality statistics and data linkage across sectors, represents a key feature in both identifying need and developing interventions in quality and safety. Enhancement of service design from the perspective of both service users and providers is embedded in our work which impacts on policy (e.g. evidence to House of Commons Select Committee, citation in recent Munro Report (DfE, p83, 2011) on Improving Child Protection processes), and on practice (implementation of enhanced reporting scheme for medication errors across Children’s Hospice Sector). We have a multidisciplinary patient-centred research group in Medicines Management & Patient Safety, with a focus on ‘Efficiency, Safety and Continuity in medicines management for patients discharged from hospital’. Involvement of regional clinicians in this group ensures its research addresses NHS priorities and provides direct access to practice. Shared investment in PhD studentships and practitioner research from the University, BIHR and Bradford Hospitals has provided an effective model both for capacity building and generating impactful research that makes a difference to patients and the NHS. Our research

plans are to:

a) progress our vision of *Transforming and enhancing the safety and quality of care and services for all persons within a diverse society.*
b) strengthen new and developing relationships through the targeting of catalyst topics while continuing to support networks that bring together academic and NHS organisations to enhance the translation of research into services.
c) bring together patient safety and dementia care as the next step in multi-disciplinary research across public and private sectors, building on innovative flagship collaborations with national independent providers of residential care.
d) monitor and report on the health of the Born in Bradford cohort, with development into a concern with wellbeing and with the links between health and educational attainment as the children begin school as well as the evaluation of interventions through clinical trials in the local community.
e) enhance links with BIHR via further joint appointments and research collaboration.

c. People:

Staffing Strategy and Staff Development Research groups contain a blend of senior staff, providing research leadership, and high-calibre early career staff working alongside each other in a highly supportive environment. We are aware of the need to maintain this balance moving forward. Early career researchers enjoy reduced teaching and administrative duties and prepare a research development plan with the support of an experienced mentor, including start-up monies allowing them to develop their independent research career. New staff are inducted into all areas of University life, including the maintenance of high ethical standards, and a commitment to the University's *Equality & Diversity Strategy 2011-2014.* The University is committed to promoting equality, diversity and inclusion within a supportive environment as part of its Charter, and all staff complete a mandatory e-Learning Certificate on *Diversity in the Workplace*. Research performance is monitored and developed through annual performance review with their line manager, with research-specific input from the relevant Associate Dean for Research. A workload model includes a research element for all staff, the extent of which is determined by recent performance indicators including research income and publication quality. The sustainability of our staff structure is dependent upon retention of the best researchers. We are therefore proactive in recognition of staff excellence in research, as evidenced in the current return by 10 internal promotions to personal chairs during the period.

Research Students There is a vibrant postgraduate community of more than 100 research students supported by a mixture of research council studentships, health charities, industrial partnerships, government sponsorship and internal investment. Shared investment in PhD studentships and practitioner research between the University, White Rose Universities, BIHR and Bradford Hospitals has provided an effective model both for capacity building and generating impactful research. All PGR students are assigned a supervisory team including a Principal and 1 or 2 Associate supervisors. Monthly meetings between student and supervisor are documented, and annual progress monitoring procedures are in place. The University Graduate School provides a programme of induction and generic research skills training, whilst subject-specific training is provided by the relevant Schools. All students are registered with the Vitae Researcher Development Framework Planner, an online tool for researcher career development and reflection that feeds into student Annual Progress Reports. PGR development is encouraged with annual support of up to £3K for each student towards the cost of meetings, external training events or outside laboratory work. Research students develop presentation skills as an integral part of seminar series run by each group, with cross-UoA publicity of events. The University's *Statement of Principles Relating to the IPR of Student Research* contains a commitment to include students as authors where they have contributed to the findings of a paper. The success of our research students is demonstrated by 30 prizes at major national and international conferences during the period.

d. Income, infrastructure and facilities

Researchers benefit from access to the University's £4M *Analytical Centre* (including a *Bio-imaging Suite*) which offers a range of sophisticated and specialist analytical equipment dedicated to fundamental and applied research. Analytical techniques include Chromatography, Elemental Analysis, Particle Characterisation, Electron Microscopy, Confocal Microscopy, Cell sorting laboratory, Thermal Analysis, Particle Analysis, Mass Spectrometry, X-Ray Diffraction, NMR and Vibrational Spectroscopy. It employs highly skilled staff to facilitate research method development, maintain and develop instrumentation to industry standards, control and monitor access and operate a quality management system. A variety of support is provided for academic staff and research students, from one-to-one training through to Level 6/7 short-courses. The Analytical Centre generates commercial revenues through contract research and commercial services and this underpins reinvestment in the facility and broadens the collaborative base for the University. We also have a *Biological Services Unit* (BSU) - a purpose built research facility containing 19 animal holding rooms, 3 theatres, cage cleaning and storage rooms, and staff facilities. All areas of BSU meet the requirements of the Home Office 'Animals (Scientific Procedures) Act 1986 Code of Practice for all licensed establishments for the care and accommodation of animals'. Four full-time animal technicians are employed in the facility.

Cancer Therapeutics

ICT draws its financial support from research councils, medical charities and industry. Examples include: MRC, EPSRC, Yorkshire Cancer Research (YCR), Prostate Cancer UK, Neuroblastoma Society, Unilever and SMEs. The ICT is a founding partner in the RCUK China Science Bridges programme originally funded by EPSRC and MRC and has formally established a Joint Laboratory of Drug Discovery with the Southwestern Hospital Cancer Centre, Third Medical Military University, and Southwest University, Chonqing, PRC. We are also joint partners in a Laboratory of Taste Sensomics with the Traditional Chinese Medicine University, Shanghai and have formal links with the Shanghai Institute of Materia Medica, CAS. The ICT research and knowledge transfer activities are housed in a 2600 sq m^2 purpose built and dedicated cancer research building within the science quarter of the University with significant infrastructure support from YCR. All aspects of *in vitro* and *in vivo* research studies are catered for including cell and tissue culture, molecular and cell biology for mechanistic cancer pharmacology, pathology, imaging and cytometric analysis using FACS and confocal microscopy and several LCMS and LCMSMS instruments to enable drug analysis for pharmacokinetic and pharmacodynamic elucidation. A mass spectrometry proteomics facility focused on cancer target elucidation is also housed within the ICT. A floor is dedicated to molecular modelling and medicinal chemistry within a 20 fume hood facility with state of the art organic synthesis equipment. The ICT also makes maximum use of the University's Analytical Centre, BSU and Bio-imaging Suite. We also access the Cell Sorting laboratory within CSS. Access to human matched cancer/normal human tissue is via Ethical Tissue, housed within the ICT building and which is a unique, cost recovery resource to support the use of human tissue within the ICT research base, wider university and nationally.

Skin Sciences

CSS operates on a broad funding portfolio, including MRC, BBSRC, TSB, NIH-US, Wellcome Trust, Pharma and Personal Care Industry (eg., Fiveprime (US), Obj Ltd, P&G (US), Unilever (UK), Alliance-Boots (UK), BASF (Fr), L'Oreal (Fr), LVMH (Fr), Reckitt Benckiser (UK), Allergan (US), Philips (NL)). Other funding streams include working with RCUK Science Bridges China partners and METRC (a collaboration of leading research-based universities in the North of England). An important feature of CSS is that industrial partners are also sought for blue-skies research leading to high impact outputs (see current submission), as well as more applied research leading to product development but with also a published output/patent expectation. In 2013

CSS was awarded an €800K Marie Curie Action Research Doctoral training grant (partnered with Philips in the Netherlands) to support 3 early career research assistants (staff contracts) who will also register for PhD degrees at Bradford. CSS operates from seven well-equipped laboratories for cell culture, human tissue handling, microscopy, molecular biology, and biochemistry. CSS are major users of the University's Analytical Centre and Bio-imaging Suite. Our researchers source skin specimens from Ethical Tissue Bank and from a local network of private aesthetic surgery clinics. CSS hosts a Cell Sorting laboratory containing a triple-laser Moflo system as well as FAC cytometer (total cost £400K).

Medicines Development

The group occupies a research building (Norcroft building - 6 x 600m^2 floors) which houses the University's Analytical Centre, a computational chemistry laboratory, equipment for development and specialist evaluation of pharmaceutical preparations (e.g. GLP-compliant stability cabinets and specialist impactor units for inhaled formulations) as well as cellular biological facilities for drug development, in particular cell-based assays. This building also houses bioincubator space for a number of University spin-out companies including *Pharma*, *Lena Nanoceutics*, *Oncascan Ltd* and *Arterius Ltd* allowing staff to operate in an environment which directly encourages translational activities. The pharmacology subgroup operates around core cell culture facilities set up for early-stage drug discovery activities. This has benefitted from an investment of £300K in laboratory refurbishment and new equipment. The pharmacology subgroup are major users of the University's Bio-imaging Suite, and also benefit from access to proteomic facilities (ICT) and cell sorting (CSS). The group is currently developing a central electrophysiology facility. Funding within the group comes from a variety of Industry sources, EPSRC, the EU, Amyotrophic Lateral Sclerosis Association, and funded studentships from Alzheimer's Society, Motor Neurone Disease Association and BBSRC.

Vision Science

This group enjoys funding from a wide range of national bodies, including BBSRC, EPSRC, NIHR, The Wellcome Trust, The Thomas Pocklington Trust and the Rail Standards Safety Board. Significant intra-professional research support has also been obtained from the College of Optometrists, Federation of Ophthalmic and Dispensing Opticians as well as support from within the optical industry. The group derives additional funding from clinical services (reading clinic, electrodiagnostic service) which address a clinical need whilst at the same time producing an overhead which can be re-invested into research. Key research facilities include a Vision and Mobility laboratory funded by Department of Health, The Health Foundation, PPP Healthcare and NIHR, allowing the evaluation of visual contributions to gait and mobility, including stair negotiation. An Adaptive Optics laboratory, funded by EPSRC, houses the world's first binocular adaptive optics system for the study of accommodation and oculomotor function. Funding from the BBSRC supports a Transcranial Magnetic Stimulation (TMS) laboratory, a leading facility for the fMRI-guided neuro-stimulation of the human brain.

Healthcare Practice

This group is based in the School of Health Studies, a recently constructed £10m new building on the main campus housing state-of-the-art facilities to support teaching and research. Research is supported by funding from the NIHR and is carried out through close collaborations with health care providers either in the NHS or in the voluntary sector. Alongside the Universities of York and Leeds we are members of a CLAHRC network – an initiative designed to bridge the gap between health research and clinical practice, ensuring that clinical research is effectively translated to frontline NHS services. That network will be continued in a new CLAHRC across Yorkshire and the Humber (now including Sheffield University) from 2014. Links with nearby BIHR are important components of many studies, not least because of the access

such links facilitate with clinicians and with clinical settings. Our research is also supported by charities, research councils and by the EU. Key components of Healthcare practice research include close links with service providers reflecting the applied nature of much of this research (e.g. between dementia research and BUPA Care Homes and the Alzheimer's Society) and we have developed excellent links with service users. There is also a strong component of user engagement with the concerns of the city of Bradford, best exemplified in the Born in Bradford study which is closely linked with public health and education agendas in the city and with the links between the Dementia group and Bradford's commitment to being a Dementia Friendly City.

Research Governance. Research Strategy is overseen by the Deans with the support of advisory groups consisting of Associate Deans for Research and Research Group leaders allowing a two-way progression of research strategy. Global strategy is conveyed to Research Groups who then operationalise these goals, whilst the aims of individual Research Groups feeds upwards for consideration. The global strategy is to support excellence in targeted areas within the broad portfolio of research in this Unit of Assessment, as exemplified by the establishment of the *Centre for Skin Sciences*. The University's *Research and Knowledge Transfer Strategy Committee* promotes and monitors campus-wide research activity, including planning for REF2014.

e. Collaboration or contribution to the discipline or research base

We have well-established partnerships and collaborations providing a clinical outlet for our research findings. This includes a strategic collaboration with St James's Hospital Leeds Oncology Wing to enable early phase clinical trials since 2000. We are partners in the Yorkshire and Humber AHSN, providing access to collaborative expertise across a variety of commissioning groups, NHS Trusts and other regional Universities. Our most strategic collaboration is with BIHR, established in 2007 as a unique research partnership between regional NHS Trusts and the Universities of Bradford, York and Leeds. Our collaboration is formalised by joint staff appointments, shared PhD projects, reciprocal board membership and a mutual interest in the problems of health inequality in the city and region. Both the AHSN and the CLAHRC seek to bring together NHS service providers and commissioners with a view to supporting translational research both by encouraging research that is relevant to NHS needs and by the speedy implementation of research findings into practice.

In addition to a plethora of national and international collaborative activities, grant reviewing and peer-review for academic journals, our researchers are engaged in the following contributions to their research disciplines:

Journal Editorships: **Elliott**, *Editor-in-chief, Ophthalmic & Physiological Optics* (2010-); **Tobin**, *Executive Editor, International Journal of Trichology* (2009-); **Blenkinsopp**, *Deputy Editor*, *International Journal of Pharmacy Practice* (2011-); **Rattray**, *Deputy Chief Editor, Journal of Neurochemistry* (2011-).

Editorial Boards: **Botchkarev**, *Journal of Investigative Dermatology* (2012-); *Experimental Dermatology* (2007-). **Elliott**, *Optometry and Vision Science* (2008-2010); *Clinical & Experimental Optometry* (2008-2010). **Tobin**, *Experimental Dermatology* (2008-); *International Journal of Cosmetic Science* (2006-); *Dermatology Research and Practice* (2010-). **Whitaker**, *Vision Research* (2008-2010); *Ophthalmic and Physiological Optics* (2008-2011). **Phillips**, *British Journal of Pharmacology.* **Anderson** serves on numerous Editorial Boards including *Mutation Research Reviews*, *Environmental Toxicology*, *Frontiers in Cancer Epidemiology*. **Stewart-Knox**, *ISRN Nutrition* (2012-). **Mobasheri**, *Histology and Histopathology (Cellular and Molecular Biology)* (2003-); *The Veterinary Journal (Elsevier)* (2007-); *Frontiers in Bioscience* (2010-). **Rattray**, *Nutrition and Aging* (2011-); *Frontiers in Experimental Pharmacology* (2010-present); *Journal of Drug and Alcohol Research* (2012-). **Downs** *Ageing and Mental Health* (2000-); *Dementia the International Journal of Research and Practice* (2000-); *Journal of Dementia Care* (2000-). **Williamson**, *Frontiers in Neurodegeneration* (2010-).

Funding Committees: **Bloj, Patterson, Falconer, Wheelhouse** are Members of the

EPSRC Peer Review College. **Bloj** was on the *EPSRC ICT Programme Grant Interview* (2013) and *EPSRC ICT Prioritisation* (Technology, 2009) funding panels. **Botchkarev** is a member of the *NIH (US), Arthritis, Connective Tissue and Skin Study Section* (2011-); *British Skin Foundation* (2009-2010). **Mobasheri** serves a member of the *BBSRC CASE Studentship committee* (2012-). **McKeefry** currently serves as *BBSRC Core Panel Member for Grant Committee A* (Animal Health & Welfare) (2012-2015) and along with **Barrett** and **Mobasheri** also serves on the *BBSRC Pool of Experts*. **Blenkinsopp** is a member of *Pharmacy Research UK* 's funding panel. **Barrett** *NIHR Comprehensive Clinical Research Network Ophthalmology Specialty Group*. **Small** was on *Epilepsy Actions Research funding committee* until 2011 and is currently a member of the *National Institute for Health Research, Research for Patient Benefit* funding committee (2010-). **Rattray** is a member of the *Motor Neurone Disease Association Biomedical Research Advisory Panel* (2013-). **Whitaker** was a *Specialist Assessor*, RAE2008, UoA12b and is a *Sub-panel Member*, REF2014, UoA3. **Downs** was on the Research Strategy Council and Awards panel for the *Alzheimer's Society*.

Contributions to the Discipline: **Mallen** is Chairman of the *Research Committee of the College of Optometrists*. **Loadman** is a Member of the *Experimental Cancer Medicine Centre Bioanalytical QA group* and was a Member of the *British Association for Cancer Research National Executive committee*, providing travel awards and fellowships. **Tobin** is Vice President of the *Institute of Trichologists;* previously officer, *European Hair Research Society* (2005-2010); member of *UK TREND (Translational Research in Dermatology) (*2012*-);* member of the *NIHR-funded Health Care Technology Cooperative in Wound Care and Treatment* (2012-); member of the *Alliance-Boots International Skin Advisor Panel* (2011-). **Alldred** was an associate member of the NIHR Health Technology Assessment (HTA) programme committee (February 2010-April 2013). **Small** is a member of the International Work Group on *Death, Dying and Bereavement* (2007-) and is a Member Scholar of the *International Institute for Qualitative Methodology* (2009-). **Rattray** is a board member of the International *Drug Abuse Research Society* (2004-).

Fellowships and Awards: **Blenkinsopp** is a *Charter Gold Medal Holder of the Royal Pharmaceutical Society* and was awarded *OBE for services to Health Care* in 2010. **Elliott** was honoured with the *Glenn A. Fry Award* from the *American Academy of Optometry (*2013*).* **Botchkareva**, received the 2012 *Jürgen Schweitzer Award* for the best original research presentation at the European Hair Research Society Meeting, Barcelona. **Tobin** is a *Fellow of the Society of Biology* (2003-); *Fellow of the Royal College of Pathologists* (2004-); *Fellow of The Institute of Trichologists* (1999-) and was awarded the 'John F Ebling Medal' (*European Hair Research Society,* Jerusalem 2011) and the 'John Pawelek Medal Winner' (*Asian Society for Pigment Cell Research*, Seoul 2011). **Mobasheri** was joint recipient of the 2012 Harvard Prize $50,000. **Barrett** won the 2013 Bernard Gilmartin prize for 'the most highly regarded paper over the past 5 years' in the journal *Ophthalmic and Physiological Optics*. **Patterson** was winner of the 2012 Royal Society of Chemistry Team Innovation Award and the 2012 Kohn award from the British Pathology Society.

Collaboration with External Bodies: **Patterson** is a co-investigator on the NIHR-CR-UK Experimental Cancer Medicine Centre (2007-2017: £3.4 Million). **Loadman's** work ensures that the ICT acts as a central hub for MRC/NIHR funded clinical trials involving more than 50 hospitals across the UK. **Bloj** was Member of the *EPSRC funded cluster project* (2008-2009) working on virtual reality systems that involved several industrial partners (BBC, ARUP, IBM, AutoDesk) (£184K). **Stewart-Knox** is an expert member of the European Food Safety Authority (EFSA) sub-working group on Mental, Cognitive and Nervous System (2008-). **Small** is a collaborator on the NIHR Collaboration for Leadership in Applied Health Research and Care (CLAHRC) programme – phase 1 involved Leeds, York and Bradford Universities (funding for whole collaboration £7m plus matching funding from NHS trusts).

Effective Academic Collaboration: Cancer therapeutics researchers have forged

collaborations with the *Hannover Medical School*, *Sanford-Burnham Institute* and *Cardiff University* to study novel anti-metastatic agents, aided by funding from the Neuroblastoma Society (**Falconer**, £105k), EPSRC (**Falconer**, £60k) and Fundacao para e Cienda e Tecnologia (**Falconer**, £95k). Endoprotease-targeted therapeutics have also been investigated in conjunction with *Durham University* and *UEA*. Clinical input is through *Cardiff University* and *Southampton Teaching Hospitals*. This has been facilitated by funding from Prostate Cancer UK (£256k, **Loadman**). A novel theranostic agent has been developed with *Stanford University*. **Phillips** has joint funding and publications with *University of Leeds* (YCR £56K), *York* (YCR £128K), *Warwick* and *Oxford*. **Loadman and Phillips** have joint funding with *Leeds* (YCR, 234K). **Loadman** is part of the *Leeds Experimental Cancer Medicine Centre* and is supported by substantive grant income (MRC £238K, EME/NIHR/MRC £938K). Vision Science researchers have strong national links with the *University of St Andrews* in the form of two separate research projects funded by the EPSRC (£754K, **Bloj**) and BBSRC (£500K, **Barrett**). **Bloj's** research with *Herriot-Watt University* and *Bangor University* is supported via EPSRC-funded Network (£186K) and Feasibility studies (£43K). Through the CPES, **Paradkar** successfully collaborates with colleagues in Engineering (EPSRC £495K). **Scowen** has participated in pre-biotic chemistry collaborative project with Universities of *Leeds*, *Sheffield Hallam* and the *Natural History Museum* (EPSRC £120K). **Botchkarev** is a co-applicant on NIH grants with colleagues in the Department of Dermatology, University of Boston (School of Medicine) USA. **Stewart-Knox** is part of a multi-centre EC Framework 7 Integrated Project 'Food 4Me'. Supported by an Association for Cancer Research mid-career award, **Wheelhouse** has developed productive collaborations in North America with the *Brown Cancer Centre, KY, University of Massachusetts Medical School* and the *Mayo Clinic, Rochester*. **Mobasheri** is the Co-ordinator of the European Commission FP7-HEALTH "D-BOARD" Consortium (2012-2017: €5,996,451) and a UK partner in the FP7 project ANGIOSCAFF. **Small** is an investigator on a Wellcome Trust Biomedical Resource, Technology Development and Multi-user Equipment Grant. £1.53 million, 2013-2018 led by the *University of Bristol* and collaborates with BIHR on an NIHR Applied Programme Grant (2008-13) £1,999,300 to study obesity in infancy. **Small** also collaborates with the *University of Leeds* on New Generis: newborns and genotoxic exposure risks. **Downs** collaborates with colleagues at *Bangor* (£417K, MRC) and *UCL* (£97K, NIHR).

Responsiveness to Priorities and Initiatives: **Botchkarev** responded to a *UK-China Stem Cell Partnership* as recipient of MRC-NSFC grant with research partners in Changzhou. **Patterson** and **Falconer** share co-applicant success in the *MRC's UK-China Bridge call* (2009-2012). **Tobin** is a member of a *NIHR-funded Healthcare Technology co-operative on Wound Healing* (2013-). **Elliott** responded to an initiative on prevention of falls through *NIHR Research Grant* (£200K) and **Barrett** contributed to NHS research staffing priorities through a *NIHR Research Capacity Studentship Award* (£250K).

Wider Influence: **Alldred** is a member of the *Department of Health working group Integrated Approach to Medication Safety in Care Homes* and a member of the *NICE Guideline Development Group for Good Practice Guidance* for managing medicines in care homes. **Elliott** has provided expert advice to the *College of Optometrists*, *NICE* and the *British Geriatrics Society and Royal College of General Practitioners* on the role of vision in preventing falls in the elderly. **Blenkinsopp** has provided expert advice to the *Royal Pharmaceutical Society's* Independent Commission on Future Models of Care (2013) and co-led the RPS report on joint working with general practice (2010). She is Deputy Chair of the *British National Formulary Committee*. **Mohammed** is academic advisor to the *AHSN* and its *Improvement Academy* for the Yorkshire & Humberside region. **Downs** was a member of the working group for the *World Health Organisation* (2013) report on Dementia: A public health priority. She serves on a large number of national advisory groups and networks relating to Dementia.