Institution: University of Wolverhampton

Unit of Assessment: Allied Health Professions, Dentistry, Nursing and Pharmacy

a. Overview

In 2003 the University formed a number of Research Institutes that concentrated its research funding into areas aligned with its course portfolio and where there was demonstrable strength in research activity. These units provided a platform for the promotion of high quality research and maximised opportunities for multidisciplinary collaboration. The Research Institute in Healthcare Science (RIHS, www.wlv.ac.uk/rihs) is a joint initiative between the Schools of Applied Sciences, the School of Heath and Wellbeing and the School of Sport, Performing Arts and Leisure. The Director, Professor John Darling manages RIHS on a day-to-day basis. Other members of the RI are also seconded from their academic schools.

b. Research Strategy

Over the last two years RIHS has been reorganised around five overarching themes aligning our research strengths to local, national and international priorities. A senior academic heads each theme providing leadership to the other academics with support from experienced post-doctoral scientists, technicians and graduate research students – a structure that provides a rich scientific environment for staff and supervisory experience for students.

Themes are attempting to understand disease at a biological or human level and using this knowledge to improve survivorship and quality of life. Work on cancer has been focused on cancer progression, tumour recurrence and the development of drug resistance, biological events that are directly aligned to improving outcomes for people with cancer. Metabolic syndromes like type 2 diabetes and its vascular complications are a significant medical problem nationally and particularly so in our region with a high proportion of individuals of south Asian origin who are at significantly higher risk of developing this disease and have poorer outcomes. Recruitment of staff in 2012 with an interest in COPD, a condition that affects 3 million people in the UK, has provided an opportunity to refocus our expertise in immunology, cell and vascular biology in order to try and understand the biological basis of this condition. With regard to microbiology, bacterial production of polymers, with medical and industrial applications, including novel anti-microbial strategies have evolved over the REF cycle. These themes that have considerable overlap in terms of academic interest, similar techniques and shared equipment needs and requirements are supported other individuals with skills in aspects of chemistry, molecular pharmacology and pharmaceutics providing a strong basis for translating laboratory findings into new products of practical value in combating these significant national problems. The final theme consists of a wider grouping of psychologists and healthcare researchers who have been recently co-located in the School of Health and Wellbeing. Although this occurred too recently for the full synergies to of this new partnership to be evident here, the opportunities to maximise near-patient multidisciplinary studies to develop are in place.

Cancer Research: *Darling (lead), Athanasopoulos, Huen, Morris, Tang, Weiguang Wang and Warr.* The group is trying to understand the mechanism(s) by which tumours develop increasingly malignant phenotypes in particular the development of drug resistance, tumour recurrence and the development of metastases and how these might be overcome. There is a highly developed culture of collaborative working within the group and externally. This interaction has provided opportunities to develop multidisciplinary translational research projects that have attracted significant funding. For example, in 2010 Brain Tumour UK established the Neuro-oncology Research Centre at the University directed by Darling and Warr and in addition to core interests in the pathogenesis, drug resistance and progression in malignant brain tumours this has led to the

development of new research collaborations and research projects. These include projects on metastatic brain disease (Morris and Warr) and the modulation of chemosensitivity in malignant astrocytoma, breast and hepatic cancer (Wang, Tang and Darling, Brain Tumour Charity, Breast Cancer Research Campaign and the EU). Brain tumour work has been further enhanced by the strategic alliance between scientists and clinicians at Wolverhampton and the Universities of Central Lancashire, Liverpool, Keele and Manchester called "Brain Tumour North West". This network is now coordinated by a project officer, funded by the Astro Fund which has maximised the use of scarce clinical material and other resources and provided a conduit to clinical application. The network has also secured continued funding from the Sidney Driscoll Trust to curate a brain tumour tissue bank. In order to address weaknesses in the skills available to the group, Athanasopoulos with experience of gene therapy of Duchenne muscular dystrophy and genetic vaccines for HIV/AIDs to provide expertise to deliver transgenes in a clinical setting and Huen who was part of the team that developed *"Biojava"* to provide much needed support for bioinformatics have recently been appointed.

Molecular Pharmacology and Pharmaceutics: *Howl (lead), Armesilla, Baldwin, Britland, Jones, McConville and Safrany in collaboration with Dr James Cotton and Professor David Ferry, Royal Wolverhampton NHS Trust.* Howl and Jones have developed and characterised bioactive cell penetrating peptides (coining the term bioportides) as research tools and vectors to study and manipulate intracellular signal transduction. They have developed chimeric peptides as tumour-selective delivery systems (Brain Tumour Charity) and as delivery agents in movement disorders (Michael J Fox Foundation). Armesilla's research has revealed a new role for plasma membrane calcium ATPase as a negative regulator of nitric oxide production and apoptosis in endothelial and breast cancer cells respectively as well as a novel function for the signalling molecule RASSF1A as an inhibitor of cardiac hypertrophy. Working with Cotton, Armesilla has examined the role of platelet activation and aggregation as key events in acute coronary syndrome and the role of aspirin, clopidogrel and proton pump inhibitors and near-patient testing in tailoring antiplatelet therapy. Safrany is interested in the roles of inositol diphosphates and diadenosine polyphosphates in signal transduction and sigma-1 receptor ligands in cancer and has determined that the antagonist binding of these receptors is GTP-sensitive suggesting that these receptors have two trans-membrane domains coupled through G proteins. Britland is using novel biotechnology approaches to wound healing and brings significant expertise in translational studies yielding over a million pounds of income at his previous institution. McConville has developed vaginal dosage forms for the prevention of HIV infection and the treatment of cervical cancer that are now undergoing clinical trial evaluation. Baldwin is investigating the molecular structure of food additives like gum arabic and has improved extraction methods of the functional food *Konjac* glucomannan. He has also isolated and characterized biotic stress tolerance genes in *Chimonanthus praecox* and the function of a sugar nucleoside transporter in *Arabidopsis thaliana*.

Metabolic Medicine and Immunology: *Dunmore (lead), Hooley and Kirkham in collaboration with Dr Singh and Dr Rylance at the Royal Wolverhampton NHS Trust.* Dunmore's group was the first in the world to identify the importance of UCP2 in glucolipotoxicity and has become interested in the pathogenesis of endothelial dysfunction in diabetes and cardiovascular disease, particularly the contribution of dysregulated adipokines in obese individuals to this process. They are investigating the "glycation gap" in a large cohort of diabetic patients characterised as either high or low deglycators and the genetic and functional differences of deglycating enzymes between these patients in terms of diabetic complications. Kirkham has validated P13 kinase delta as a novel target in reversing oxidative stress-induced corticosteroid unresponsiveness in COPD and identified the mechanistic link between oxidative stress and the onset of autoimmune-mediated

lung destruction in COPD. Hooley's research (with Nelson, not returned here) is focused on the contribution of human endogenous retroviruses (HERVS) to the pathogenesis of multiple sclerosis, rheumatoid arthritis and renal lupus. In rheumatoid arthritis, HERV-K10 has been identified as an accessory marker in patients with clinically active disease. Molecular mimics have been identified on both virus and immunoglobulin IgG1Fc coinciding with regions targeted by rheumatoid factors. Hooley has also postulated some biological functions of novel polyphosphate kinases in eukaryotes derived from horizontal transfer from bacteria and the identification of novel hydrophobins in *Aspergillus*.

Microbiology: *Hill (lead), Kowalczuk, Radecka, Rahman, Wenxin Wang and Williams* This theme is concerned with understanding the process of disinfection and antimicrobial chemotherapy and the use of microorganisms to synthesise new biopolymers with medical and industrial applications. Hill is interested in the growth and survival of enteric pathogens like *Listeria* and *Staphylococcus* in foods and on surfaces and the evaluation of the health risks associated with bio-aerosols of *Aspergillus* spores associated with commercial composting. Radecka, Hill and Williams have developed processes that use microorganisms to produce bioplastics with medical applications from waste cooking oil and strontium releasing injectable bone cements that prevent infections following dental implantation and enhancing bone regrowth in osteoporotic patients. Williams, an inorganic chemist with a long-standing interest in zeolite chemistry and their application in biological and industrial situations, underpins the chemical aspects of this work. These projects have secured over £260,000 in funding from BIS. In recognition of the potential for this area of biotechnology, the University has invested in two new professorial positions (Wenxin Wang and Kowalczuk) from its Research Investment Fund to evaluate the use of chemically modified biopolymers as drug delivery vehicles and industrial products. A further recent appointment of Rahman who has been investigating mupirocin biosynthesis in the treatment of MRSA and potential new drug targets in *E. coli* will allow the group to apply new molecular techniques in their projects.

Applied Social Science of Health: *Clifford, Dando, Gutteridge, Manktelow, Mercer, Rutter, Sque, Vincent and Walker.* The government has set a challenging agenda for monitoring and improving health and social care provision. Diverse care needs is a central uniting theme in our research and the boundaries of our research activity to challenge and address disparities in health and wellbeing go beyond the UK. Vincent's global comparative analysis of policy and approaches to child death and other cases of serious abuse has international reach and significance. Sque and Walker have prosecuted a programme of research in the area of organ donation and the phenomena of dying and death within the context of generalist end of life care. Sque has described the life world of individuals awaiting kidney transplantation, explained bereaved families' experiences of organ donation, suggested measures to increase the acceptability of deceased organ donation among BME groups and evaluated families' experiences of the dedicated donation facility. Rutter has driven with colleagues the development and evaluation of "Healthy Living Pharmacies" and Clifford is investigating exercise as an intervention in elderly patients with cognitive decline or Alzheimer's disease. Gutteridge has been investigating the evaluation of teaching, learning and assessment in nurse education and its contribution to the quality of nursing care.

Mercer's work is aimed at clarifying forgetting mechanisms and documented the process through which retroactive interference operates and has uncovered evidence for the notion of "trace delay" and developed a theoretical model of auditory memory whilst Manktelow has conducted complementary research on delusional thinking and its development. Dando's research is

concerned with the application social cognition and episodic remembering to influence best practice in forensic interviewing of suspects, witnesses and victims of crime.

Reflecting on the 2008 RAE submission

We have made considerable progress towards achieving aims articulated there. We have invested in staff with interests in cardiopulmonary biology and who have experience in translational clinical studies in this area (Kirkham), research in areas of metabolic medicine and cardiovascular disease have increased and the unit is poised to deploy further significant investment in this area in the next REF cycle in partnership with the Royal Wolverhampton NHS Trust which has been appointed to host the local branch of the NIHR Clinical Research Network from April 2014. Our work on brain tumours has been further enhanced through new charity investment that has allowed the relocation of a research group from the Institute of Neurology to Wolverhampton (Warr and postdoctoral colleagues) to join Darling. Our work on the molecular basis of drug resistance in breast cancer continues to grow (Weiguang Wang, Tang and Darling) with charity and EU funding and new joint translational projects with the Greater West Midlands Cancer Network (Safrany). Bioinformatic support has also been provided (Huen). To consolidate pharmacy-related research there has been further investment in staff with pharmaceutics (Tang, McConville) and pharmacology (Safrany) and this has been further underpinned by investment from the University Research Investment Fund in two professorial posts (Kowalczuk and Wenxin Wang) in the area of biopolymers as both drug delivery vehicles and industrial product development. A molecular biologist (Rahman) has been appointed to strengthen pharmaceutical microbiology and add a molecular dimension to our microbiology research. The joint appointment between Royal Wolverhampton NHS Trust and the University of Sque (supported by Walker) is a particularly important one because of the enhanced opportunities for translational research with our research-active partner NHS trust. Further joint appointments in areas of metabolic medicine are under discussion with the Trust. The appointment of staff with proven expertise in translational research and income generation within the pharmaceutical industry (Kirkham, Britland and McConville) will add further impetus to our desire to work more closely with this sector.

c. People, including:

I. Staffing strategy and staff development

The University developed a new strategic plan in 2012. The research sub-strategy is absolutely clear that research plays a central role underpinning the academic and business engagement activities of the University. Extracts of the from the research sub-strategy are shown below followed by the actions that the RI and the University have undertaken to deliver it:

"Support all academic staff (where appropriate) to become research active and become a member of either a University Research Cluster, a Research Centre or a Research Institute"
All new academic staff are invited to join RIHS. The proportion of their time in the RI is negotiated between the RI Director and the Dean of School. There are two categories of membership to the RI: Core and Associate Member. The contribution of Core Members exceeds 50% of their time and therefore research and research student supervision is their major contribution to the life of the University. This is usually recognised additionally by the award of Reader or Professor. Associate Members have a minimum of 20% of their time allocated to research within the RI.

"Provide a structured career path and appropriate training support for our academic staff so that there are more staff.... producing international quality research." The University provides a matrix of career development activities embedded in the School's and RI's day to day business that ensure that career progression is supported. Acting on the advice of the RI Director,

the research trajectory of newly appointed staff is supported by remission of teaching and administrative activity in the first years of appointment and subsequently through annual appraisal followed by regular follow up ensuring that appropriate "stretch targets" are set and monitored. There are robust progression pathways from research associate to research fellowship and subsequently to senior research fellow, reader and professor based on the delivery of appropriate outputs, income generation student supervision and other enabling activity. The University has adopted the Research Concordat, been awarded the HR Research Excellence Award and bronze level Athena Swan recognition. The University provides an early career researcher scheme as an opportunity to secure seed core grant funding and deliver a research project coupled with career development activities. The University is embarking on a new programme of staff development activities aimed at addressing the paucity of senior female research professors in STEM subjects by developing new doctoral and career development programmes in subjects where women are underrepresented and new fellowships aimed at those returning to research following maternity or other caring responsibilities.

"Provide mechanisms for improving and assuring the quality of research and associated publications including effective peer review processes, mentoring of research-active staff and the introduction of sabbatical schemes so that staff have sufficient time to target high impact journals and publications" and "Reflect the University's research needs when making university appointments and performance reviews" The University has developed two programmes aimed at supporting academic staff to develop their research career, "Routes to Readership" and "Pathways to Professorship". These allow for internal promotions to be made subject to meeting specific criteria set by the University and following internal and external peer review. Since 2008 this has led to 4 promotions to Reader (Baldwin, Morris, Safrany and Tang) and one to Professor (Howl). There is support in preparing applications for promotion through the staff development activities of the University's Research Hub and mentorship from within the University Professoriate. As a result of expansion of research through new investment, expansion of pharmacy provision and natural wastage, the University has recruited 16 of these since January 2008 Three were recruited from Aston, Bath, Birmingham, Bradford, Cambridge, Edinburgh, Keele, Lancaster, London, Nottingham, Southampton and from Perth, Australia, Galway Ireland and the Polish Academy of Sciences. Newly appointed staff receive "start up" funding from RIHS and priority allocation of PhD studentships through schemes funded by the RI or University funded research student bursaries. Early career researchers form a critically important constituency within the RI, all are mentored and appraised and have opportunities to develop new skills including securing teaching experience and a formal teaching qualification. They have full access to staff development activities and the facilities and resources of the RI in the same way as other staff.

"Undertake the strategic appointment of new Readers and Professors who are regarded as 'Research Leaders' in selected fields and capable of developing research teams" The University has provided £6 million from its Research Investment Fund from 2013 to 2016 to provide new Professorships, Readerships and associated research support posts. The funding is available on a competitive basis judged against an academic and business plan. RIHS has secured significant new funding from this source to support its activities including two new professorial posts in Biopolymers (Radecka and Hill), a Professorship in Psychological Health and Wellbeing (to be appointed, Manktelow) and a senior Postdoctoral Fellowship to develop new models for brain tumour drug testing (Darling and Warr).

c. II. Research students

In the census period, 27 PhD students completed together with 3 MPhil students. 21 practioner doctorates in Counselling Psychology completed with an additional 3 students completed shortly

after the end of census period. A further 52 PhD students are presently registered for PhD and 50 students are registered for the practioner doctorate in Counselling Psychology and a new doctoral award in Health and Wellbeing. Investment by the University, RI and Neuro-oncology Research Centre provided 11 fully funded PhD bursaries during the census period but these students will not complete until 2014. The balance has progressively shifted to externally funded and self-funding students and away from university-funded bursaries.

A team of academic staff supervises each research student. The Director of Studies is the primary supervisor and is supported by additional members of staff with appropriate subject knowledge and supervisory experience. New members of staff undergo a programme of research supervisor training and all supervisors are required to undergo periodic “brush up” sessions. The supervisory team provides an opportunity for less experienced members of staff to develop and hone their supervisory skills. Although informal supervision often takes place on a day-to-day basis, the supervisory team meets at least monthly with the student to provide strategic oversight of the project and to ensure that the student is fully appraised of their progress and provided with feedback on a regular basis.

A Doctoral College is under development that will work with Schools to clearly define and deliver the Postgraduate Research Student “offer” and provide the framework for a research community for postgraduate research students All postgraduate research students studying in the UK or with our partners abroad, part-time or full time would be members of both their Schools and the Doctoral College. The College will work closely with the postgraduate research student representatives and the Students’ Union to coordinate and advertise social activities and provide a forum for co-mentoring and developmental mentoring. One of the first actions of the College has been to introduce the Vitae Research Development Framework Planner.

Because of the importance of conference participation for graduate research students, funds are set aside to provide all such students with the opportunity to present data at one national meeting per year and the opportunity to present data and network at an appropriate international meeting in their 3rd year (or equivalent for those registered part-time). The RI also encourages travel for short periods of time for research students using the international contacts made by RI members and appropriate funding from learned societies so that graduate students can experience working in large laboratories abroad.

Staff and student development activities are underpinned by information derived from the CROS, PIRLS and PRES surveys that are now conducted annually within the University.

d. Income, infrastructure and facilities

Income has increased over the REF cycle (£15,510/fte/year vs £11,088/fte/year in RAE 2008, an approximate 40% increase per fte/year and now includes significant funding from sources with rigorous peer review. The University provides considerable support to those individuals applying for external funding a “Research Hub” opened in May 2013. This brought together the University Research Policy Unit (RPU), the Project Support Office (PSO), activities that provide training and supporting for postgraduate research students. The Research Hub is designed to maximise contact and interaction been research students, staff researchers and the support services to make sure that research is as easy as possible to undertake in the University. It is providing support for established researchers and also provides an environment to mentor and support our younger researchers trying to establish a research career and especially a track record for funding.

The RPU develops, implements and monitors the University's research strategy. It also has responsibility for research ethics and governance and operates the Doctoral College. It works with the International Centre to internationalise our research and assist with the development of networks for Horizon 2020 or other European initiatives. It is working with others in the University to address questions around gender imbalance in research leadership positions and is responsible for providing the institutional framework to support the development of researchers at all stages of their career in collaboration with the University HR Department and the University Careers Service.

The PSO provides expertise and support for the development and submission of research grants with an emphasis on European funding and opened an office in Brussels in May 2013 to enhance this activity. It also provides support for pre and post-contract management of projects.

The Research Hub develops and delivers generic research training and provides academic schools and the Research Institutes and Centres with facilities and advice about the delivery of subject-specific research training. The Research Hub with the research librarians is developing a range of electronic resources for the postgraduate research students particularly those studying part time in the UK and for the increasing number of research students who are studying overseas. The University Careers Service hold career clinics for research students and junior researchers in the Research Hub and staff from business development activity housed at the UoW Science Park hold clinics to advise on self employment opportunities for research graduates and provides support for fledgling business that arise from this activity and advise on technology transfer.

RHIS occupies laboratory accommodation in a building originally constructed in the early 1930's and refurbished in 2001. This includes general laboratory accommodation, four class II cell culture suites, a histology laboratory and offices for research staff, together with cold room facilities. Further refurbishment in 2006 provided laboratory accommodation for microbiology research, a specialised cell culture suite for manipulation of adenovirus vectors and new research facilities for pharmaceutics. Because of the age of the building, it has become increasingly inefficient to maintain and following our expansion over the last five years it is now too small to meet the aspirations of the staff and research students. Consequently, the University has committed £25 million for the construction of a new science laboratory building. Construction commenced in June 2013 and will be completed by the end of 2014. This 7000m^2 building will house both teaching and research laboratories together with laboratory and flexible exhibition space for outreach work with schools and colleges and the public understanding of science. Space for research is greatly expanded with enlarged facilities for chemistry research, cell culture, radioactive isotope work and microbiology research including class III facilities and fermentation suites and new glasshouse accommodation.

The University committed significant SRIF funding to provide major pieces of equipment. In biomedicine this included confocal microscopy with an environmental chamber, a flow cytometer/cell sorter, equipment for molecular cytogenetics and microarray techniques, a phosphor-imager, real-time PCR, a scanning electron microscope and a laser-capture dissection microscope. Around £2 million will be invested in new research equipment as part of the new building project. In line with previous policy; the equipment needs of RI are discussed with the Deans of School in order to ensure that new equipment purchases provide best value for money. To access expensive facilities, staff make extensive use of collaborative arrangements with other HEIs including transmission electron microscopy, DNA sequencing, biological services and nationally-provided NMR facilities.

The different disciplines represented by RIHS run seminar programmes and guest lecture series open to all staff and students. These are well attended and the "Lunch and Science" programme which gives PhD students the opportunity to present data to staff and their peers in a constructive and supportive atmosphere is especially popular.

e. Collaboration and contribution to the discipline or research base

International research collaboration: Shenzhen Polytechnic University China (Darling); Palacky University Czech Republic (Darling); Hebei Union University, Tangshan China (Darling and Wang); Third Military Medical University Chongqing China (Darling, Wang and Warr); University of Stockholm (Howl, Jones); Nicholas Copernicus University, University of Lodz, University of Silesia, Poland (Radecka); Emory University, Atlanta, USA, University of Navarra, Spain (Wang); Duke University, North Carolina, USA (Warr); Royal Melbourne Institute of Technology Australia (Williams).

Appointments with other universities: Visiting Professor, Yunnan Agricultural University, China (Baldwin); Honorary Senior Fellow, University College, London (Darling); Honorary Professor, Hebei Union University, Tangshan, China (Darling, Wang): Honorary Professor, Third Military Medical University Chongqing (Darling, Wang and Warr); Adjunct Professor, Sichuan University, China (Tang); Visiting Professor UTM Malaysia (Williams).

Counsellorships of professional societies: President and immediate past President, Chair Meetings Subcommittee, British Neuro-oncology Society; Programme Review Committee and Honours and Awards Committee, Society for Neuro-Oncology, CancerBackup (Darling); Council Member, European Peptide Society, Peptide and Protein Science Group, Royal Society of Chemistry (Howl); Treasurer, British Inflammation Research Association, British representative, International Association of Inflammation Societies (Kirkham); General Secretary, Central and Eastern European Polymer Network (Kowalczuk); Board Director, Academy of Pharmaceutical Sciences (Tang); British Neuro-oncology Society (Warr); International Board, International Centre for Diffraction Data, Secretary, Royal Society of Chemistry Industrial Inorganic Chemical Section (Williams).

Invited conference and keynote presentations: European AIDS Treatment Group, Brussels and European Society for Gene and Cell Therapy Meeting Hannover 2009 (Athanasopoulos); Reckitt and Benckiser annual dermatology symposium, Nice, France 2010 (Britland); 6th International Conference of the International Investigative Expertise Research Group, Maastricht 2013 and Department of Homeland Security, Washington 2012 (Dando); Invited participant to 17th, 18th and 19th International Conferences on Brain Tumour Research and Therapy, Japan, 2008, Germany, 2010 and Canada 2012 (Darling); Roche Colorado Corporation Peptide Symposium, USA 2012, TIDES Oligonucleotide and Peptide Research Conference USA 2013 (Howl); European Peptide Symposium, Copenhagen, Denmark 2010 (Jones); Japanese Psychological Society Tokyo, 2012 (Manktelow); Australian Society for HIV Medicine, Sydney 2010 and HIV Microbiocide Conference Sydney 2012 (McConville); International Symposium on Ceramic Nanotube Technology Nagoya Japan, 2nd Conference on Nanoparticles & Nanomaterials to Nanodevices & Nanosystems, Rhodes, Greece, 2009, Royal Society Africa Award/Leverhulme Trust sponsored workshop on antimicrobial activity of silver zeolites Ghana 2013 (Radecka); International Pharmacy Federation Conference, Slovenia 2010, European Association of Faculties of Pharmacy Conference, Holland 2012 (Rutter); Addressing Filicide International Conference, Prato and 3rd Australian Conference on Child Death, Sydney 2012 (Vincent); British Neuroscience Association, Festival of Neuro-science, London 2013 (Warr).

Organisation of conferences and conference sessions: Scientific Advisory Board and session chair, 19th International Conference on Brain Tumour Research and Therapy, Niagara Falls, Canada, 2012 (Darling); Diabetes Consensus Meeting on the use of pancreatic islets, London (Dunmore); Homing Peptides a component session of the 30th European Peptide Symposium, Finland 2008, Chair of Peptide Vectors and Delivery of Therapeutics, Tartu, Finland, 2011, Peptide Development and Manufacturing, Berlin 2011 (Howl); Peptide Therapeutics Lanzarote 2012,

FEBS/Biochemical Society Lecture Course in Cell Penetrating Peptides: design, synthesis and application, London, 2013 (Howl and Jones), European Respiratory Society Conference 2008, 2009, 2010 and 2011, World Inflammation Congress, Japan 2009 (Kirkham); UK Pharmaceutical Science, UK/Europe/China Collaboration 2011 (Tang).

Honours: Fellow, Society of Biology (Baldwin, Darling, Williams); Fellow, Royal Microscopical Society (Darling); Fellow, Royal Society of Chemistry (Wenxin Wang, Williams).

Prizes: Best poster prize British and US Microcirculation Society Meeting Oxford 2012 (supervisor Armesilla); Young Scientist Programme Award 21st IUBMB and 12th FAOBMB International Congress of Biochemistry and Molecular Biology Shanghai, China 2009, Young Investigator and Clingene Network of Excellence, British Society for Gene Therapy 2009 (Athanasopoulos); European Association of Psychology and Law Early Career Award 2013 (Dando); KTP with Rozone, Certificate of Excellence rated "Outstanding" and associate awarded "Business Leader of Tomorrow" 2009, KTP with Crestwood "Highly Commended" in Lord Stafford Awards 2012, KTP with Odour Services International Limited associate awarded "Business Leader of Tomorrow" 2013 (supervisor Hill); Science Foundation Ireland Prize in Regenerative Medicine 2010 (Wenxin Wang).

Evidence of impact of research on government policy and national and international practice development: MIDTECH, West Midlands NHS Innovation Hub (Board Member and Director, until 2010), NIHR West Midlands North Comprehensive Research Network Board (Darling); NHS End of Life Care Programme guideline working group (Sque); Parliamentary seminar on maximising consent rates for organ donation, House of Lords, London 2012 (Sque and Walker); Child and Youth Mortality Review Committee, Wellington, New Zealand, Member of the Scottish Government Significant Case Review Working Group 2013, Member of the Short Life Working Group on Development of Significant Case Reviews in Scotland 2009 and Member of the NSPCC External Experts Reference Group 2010 (Vincent); NCRN Brain Tumour Group, Translational Sub-Group Member (Warr).

Editorial boards: Legal and Criminological Psychology (Associate Editor Dando); Neuro-oncology (Darling); British Journal of Diabetes and Vascular Disease (Dunmore); Mycological Research (Associate Editor, Hooley); Journal of Inflammation (Editor-in-Chief, Kirkham); Biomacromolecular Mass Spectrometry (Kowalczuk); Thinking and Reasoning (Manktelow); Pharmacy Education and Pharmacy (Rutter); International Journal of Materials and Chemistry (Williams).

Grant review boards: Scientific and Medical Advisory Board, the Brain Tumour Charity (Darling); EU award evaluators (Athanasopoulos, Howl, Kowalczuk, Wenxin Wang); Vice Chair, Swedish Research Council (Materials Science) (Kowalczuk); Scientific Review Board, Scientific Research Foundation Flanders, Belgium and Romanian National Council for Development and Innovation (Wenxin Wang); Scientific and Medical Advisory Board Children with Cancer and Brain Tumour Research (Warr); EPSRC Peer Review Panel (Williams).

Other: Emerald Literati Network Award for Excellence (Dando); Contributing developer to the bioinformatic software toolkit (Biojava, Huen); Scientific advisor, MedImmune (Astra Zeneca) (Jones).

A full list of publications, 2008-2013, is available at http://wlv.openrepository.com/wlv/