Institution: Brunel University

Unit of Assessment: 3 – Allied Health Professions, Dentistry, Nursing and Pharmacy

a. Overview

With the overall aim of improving health and clinical practice, 'bench to beside' is the hallmark of allied health research in the School of Health Sciences and Social Care. Developments described below have enabled the School to increase the quality and quantity of its publications, to triple the research grant income won, to increase the PhD student graduations and to increase the public benefit arising from its research. Allied health research at Brunel is led by three Divisions that are closely aligned with five established Research Centres:

1. Occupational Therapy – Centre for Professional Practice Research (Director – Dr Atwal)
2. Physiotherapy – Centre for Research in Rehabilitation (Director – Prof De Souza)
3. Biosciences
   a) Centre for Cell and Chromosome Biology (Director – Dr Kill)
   b) Centre for Infection, Immunity and Disease Mechanisms (Director – Dr Kishore)
   c) Brunel Institute for Cancer Genetics and Pharmacogenomics (Director – Prof Newbold)

The Divisions provide leadership, mentorship and a range of research stimulation activities that facilitate both disciplinary and cross-disciplinary research. Staff also drive interdisciplinary research by leading cross-University initiatives bringing together research communities in areas including

- Ageing Collaborative Research Network (formerly the Brunel Institute for Ageing Studies).
- Centre for Systems and Synthetic Biology.

b. Research strategy

CHANGES AND ACHIEVEMENTS

Changes

A thorough qualitative and quantitative assessment of the RAE2008 led to a number of key developments:

1. The School Research Committee was restructured and the research centres were more closely aligned with our Divisions. The School Research Committee now has a representative from each Division and each Research Centre, and the number of meetings was increased from two to four per year. An Associate Deputy Head Research was appointed to support the Chair/Deputy Head Research and facilitate an increase in monitoring, mentoring and support of research activity. Examples of increased quality enhancement include the requirement that all grant applications require a minimum of two peer reviews, plus school approval from the Deputy Head Research, before they can be submitted. In addition, research leads were appointed for each Division and the leads were tasked with working closely with the Division Heads to support staff at all levels of the research process. Finally, the post of Impact Champion was created. This restructuring led to a significant increase in the number of successful grant applications and an increase in the volume and quality of publications.

2. We established a new interdisciplinary Centre for Systems and Synthetic Biology. The new centre, headed by Prof Nigel Saunders, is a joint enterprise with the School of Information Sciences, Computing and Mathematics.

3. We invested significantly in the development of the two research centres outlined in RAE2008, namely the Centre for Infection, Immunity and Disease Mechanisms (CIIDM) and the Brunel Institute for Ageing Studies (BIAS). Over the assessment period £2 million was spent on the Containment Level 3 laboratory for CIIDM; it is now licensed and work started in late 2012. BIAS attracted significant grant income (over £2 million in its first two years) leading to the award of Collaborative Research Network (CRN) status by the University in 2009. Since 2009 two appointments were made (one at professorial level) to strengthen our ageing research. The award of Collaborative Research Network status is facilitating interdisciplinary research in ageing within the School and more broadly across the University. An important resource for ageing research developed in the current REF period is the Brunel Older People's Reference Group (BORG). This is a group of older people (n>100) who have volunteered to take part in research and serve as

chairs and members of advisory committees. [Members of staff in gerontology have been submitted to Unit of Assessment 22.]

Achievements as a Unit of Assessment – Staff in the submission have won over £7 million of research grant income since 2008, a large increase on the £2.4 million reported in RAE 2008. Over the assessment period the expenditure on grants has been £4 million. The two main sources of our funding are UK charities, such as Ataxia UK, and EU government bodies, reflecting the nature of our health research.

Achievements by Division

Occupational Therapy – Our Occupational Therapy Division has significantly increased both the quantity and quality of its research since 2008. We have published in more international and prestigious journals and all the outputs submitted represent empirical research; 108 Frascati unique outputs were published. The number of grant awards increased; £700k in grant income was awarded to 9 principal investigators for 18 projects and 7 co-investigators have collaborated on projects worth £2.7 million.. 3 new members of staff were recruited, one at reader level and one who obtained a doctorate during the assessment period. Significant impact was achieved via our research on professional decision making. 10 PhD students graduated.

Physiotherapy – We have significantly increased the quality and number of research outputs since RAE2008. 83 scholarly outputs were obtained, many of which were published in highly respected international journals in their fields. 8 grants were awarded to PIs in physiotherapy, with a value of £500k. 4 new members of staff were appointed and 4 staff members obtained their doctorates. We graduated 11 PhD students in the REF period. Our research has had an impact on practice internationally through the development of clinical guidelines, health service policy and medical insurance policies which used our evidence to guide their recommendations. (De Souza, O'Connell).

Biosciences – 77 grants, totalling £6 million, were obtained to support biosciences research. At total of 266 unique journal articles were published between 2008 and 2013, including a paper in *Nature*. 10 new academic staff members were appointed, 3 at professorial level. To support the Division's research 4 technicians/laboratory assistants and 9 research fellows were appointed. Rudolf was awarded a BBSRC New Investigator Award worth £505k and another new member of staff (Vagnarelli) obtained a BBSRC responsive mode grant in round three. 26 PhD students graduated.

FUTURE GOALS AND MECHANISMS FOR REACHING THEM

Our 2012-2020 I^8 Strategy and Action plan builds on the University plan to place the University in the top third of UK higher education institutions. We aim to be amongst the world's leading occupational therapy and physiotherapy research departments; significant progress was made towards this goal during the period of assessment, both in terms of grant income, journal articles and research impact. Our Biosciences Division aims to be in the upper quartile of UK biosciences departments within the next 8 years and globally amongst the top 200 biosciences departments.

The I^8 Plan has 8 forward-looking imperatives, all aimed at accelerating our research successes: (1) *investing* in staff and infrastructure, (2) *improving* our research skills base, (3) *innovating* in research and methods, (4) *internationalising* our research, (5) *interdisciplinising* our projects, (6) *informing* the public and our stakeholders in our research, (7) *impacting* on policy and allied health practice, and finally, (8) *implementing* our strategy and action plan. Occupational therapy and physiotherapy are relatively young areas of research; thus, developing these disciplines requires a long-term strategic plan.

The 8 strategic imperatives are aimed at increasing and broadening our grant income portfolio, consolidating our publications into high quality academic journals with a global readership, and enhancing the research capacity of our staff. The I^8 Plan is helping the School to more closely align its research with RCUK priority areas.

Mechanisms and Structures for Implementing the I^8 Strategic Plan

Investing in structure and staff *(please see page 8 for detail of past investments)*

New posts – Current investment in new staff is targeted on areas for strategic development. We are recruiting a Reader and a Senior Lecturer to develop public health research and are actively

recruiting professorial level posts in biosciences to lead the research of the three biosciences research centres. Three posts in occupational therapy are currently being advertised. A new early career member of staff will be developing our physiotherapy research on cerebral palsy and cardiovascular disease.

Research leadership investments – The University invests in developing research via two research professors who act as Deputy and Associate Head of Research. A Reader (McKay) was appointed during the assessment period to provide research leadership in occupational therapy.

Innovating, interdisciplinising and internationalising

Annual School research meetings – We facilitate interdisciplinary research via our annual staff and student School research meeting which brings together biosciences (housed in the Heinz Wolff Building) and the other Divisions (housed in the Mary Seacole Building).

Public lectures and seminars – The Ageing Collaborative Research Network runs monthly public seminars/lectures/conferences for the public, researchers from across the University and members of the Brunel Older People's References Group (BORG).

International research collaborators – Over the next 8 years we intend to grow our cross-national research by targeting staff development funds towards international conference attendance. Support from the Research Development Fund (travel and pilot project funding) will facilitate the establishment of new interdisciplinary projects targeted towards external funding calls.

Contemporary Media – We aim to make greater use of modern media to facilitate international networking, for example by regularly contributing to blogs. This arises from the work of O'Connell, who uses www.bodyinmind.org, to communicate contemporary pain research to clinicians. We are training staff to make greater use of these new media to facilitate knowledge exchange.

Modern techniques and facilities – University support for state-of-the-art facilities and equipment has promoted innovation by enabling and encouraging research at the forefront of modern techniques (e.g. Cat 3 Laboratories, Bioimaging Suite, Systems Biology lab, ImageStream X imaging cytometer, transmission electron microscope).

Improving our research skills and knowledge base

Training in quantitative methods – A high proportion of staff in physiotherapy and occupational therapy mainly has skills in qualitative methods. Moreover, in biosciences training is needed in the use of more sophisticated statistical techniques. As a consequence, in 2011/12 we hired a statistician to institute a new series of workshops on quantitative methods, including use of secondary data sets, and to provide individual statistical support to staff and research students.

Knowledge base – We keep up to date with a range of internal seminars, both general and specialised. The Biosciences Division runs weekly seminars presented by external speakers and there is a biosciences journal club for research students to help them develop critical thinking skills. The Centre for Rehabilitation Research and the Centre for Professional Practice each run seminars on a monthly basis. The Centre for Cell and Chromosome Biology runs mini-symposia every 6 weeks showcasing the latest research from members. The University facilitates high quality seminars via competitive funding for seminars; the School has been very successful in obtaining such funding.

Grant writing training – Training in grant writing is delivered via a series of workshops involving small groups. The first workshop involves a mock exercise simulating a research council panel reviewing real grant applications. Panel members read the applications, make decisions and then compare their decisions and comments with those of the real reviewers. Subsequent workshops involve members of staff presenting their applications to a small committee for review and comments, plus workshops on writing style.

Informing and Impacting

Hosting national and international conferences – Divisions are supported to bid for and host international conferences. Examples of conferences run by members of staff since 2008 include the following: Brain Awareness Week and the annual conference of the Association of Radiation Research. The Ageing CRN ran the British Society of Gerontology annual conference in 2009 and plans to bid for the 2016 BSG conference. The CRN also co-host, along with the Progeria Research Group, the first UK Progeria Research Day. Brunel is hosting the 2013 Nuclear

Envelope and Chromatin Organization meeting. Brunel hosted a meeting of the Institute Brazil Europe (IBE) in May 2013, which led to work on future joint grant applications. Another IBE meeting is planned for 2014.

Presenting our findings at more international and national conferences – Our staff development budget, originally one budget for the School, has been devolved down to the Divisions based on staff numbers, enabling Divisions to decide which areas of research are to have the highest priority for dissemination.

Creatively engage in new methods of disseminating our findings to policy makers – To ensure that policy makers are apprised of our research, we are substantially increasing the number of knowledge exchange meetings. Our ageing research network reaches policy makers via its monthly meetings. The University provides funding to hire rooms, pay for lunches, hire poster boards, etc., to facilitate these events. In addition, central funding is provided for administrative support for research centres to run knowledge exchange activities.

Open access publishing – The University has an open-access mandate and a centrally controlled open access publishing fund. The Brunel University Research Archive (BURA) further ensures that our findings reach a wide international audience and have a greater probability of making a difference. BURA ensures that our collaborators in the NHS have access to our research as well as helping us develop new collaborative enterprises.

Championing Impact – The School appointed an Impact Champion (Harries) in 2010 and established an Impact Management Executive (IMagE), a sub-committee of the Research Committee. The committee not only helps grant applicants that they have strong 'pathways to impact', but helps facilitate impact upon completion of research. The University funds seminars and conferences and the printing of brochures and briefing notes to allow researchers to disseminate their findings to non-academic audiences.

New and Strategic Areas of Research

We will continue to build on our research successes in clinical decision-making, stroke rehabilitation, neurorehabilitation, progeria, telomeres, cancer genetics and ageing. New topics for supported research are based on continuous monitoring of research council priorities, Division level knowledge of gaps in the knowledge base, and collaboration with colleagues in other Schools and universities. Importantly, the co-creation of new areas of research with our key stakeholders drives future research. Our research centres play a key role in developing new areas of research. Below are examples of new areas of research being developed:

Centre for Professional Practice

Driving Assessment – A new programme of research with colleagues in Australia has recently begun. Our School intends to be in the forefront of the move to have driving assessments led by occupational therapists. Driving assessments need to be firmly underpinned by high quality research of the type we are developing.

Centre for Research in Rehabilitation

Fitness and activity in cerebral palsy – Young adults with cerebral palsy are at increased risk of developing cardiovascular disease and type II diabetes mellitus. In the summer of 2013 a new programme of research began into the effect of inactivity on body composition, cardiorespiratory fitness, and cardiometabolic risk factors in adults and children with cerebral palsy. This research will be followed up with research into the identification of effective screening methods and strategies for physical activity promotion amongst this population.

Centre for Cell and Chromosome Biology

Genomic instability – Cancer has an enormous impact on the wellbeing and economy of the UK. A key step in cancer development is a stage of genomic instability in which mutations accumulate in the genome. Normally cell division is controlled by a multitude of barriers and control mechanisms. An unexpected cause of genomic instability follows the collision of replication forks. This new area of research on the causes of genomic stability will exploit bacterial and yeast model organisms to build basic understanding, with the ultimate aim of opening new possibilities for the treatment and prevention of cancer.

Brunel Institute for Cancer Genetics and Pharmacogenomics

Translational exploitation of epigenetic mechanisms – The focus of the BICGP's future research will be the translational exploitation, in drug development, of key epigenetic mechanisms contributing to cancer and human genetic diseases such as Friedreich's ataxia (FA). Genes epigenetically altered in breast cancer (e.g. *p16* & *hTERT*), neuroblastoma (e.g. *mycn*) and FA will be targeted by novel agents (including small molecules) that selectively modulate gene expression by altering DNA methylation and/or chromatin structure.

Centre for Infection, Immunity and Disease Mechanisms

Host pathogen interactions – Using as models respiratory enveloped viruses of concern to Public Health this new area of research is investigating host pathogen interactions. The research will focus on the role of influenza virus M2 and coronavirus E ion channel proteins, their interactions with cellular machineries and implications for pathogenesis.

Centre for Systems and Synthetic Biology

Synthetic sugar bioengineering – Bacteria are capable of making a wide range of sugars to protect themselves from, and as a basis for interaction with their hosts and their immune systems. This is being exploited to develop a set of resources for the deliberate design and assembly of synthetic sugars with a wide range of potential applications, from food to platform chemicals, and potentially new drugs.

Ageing Collaborative Research Network

Dementia – A 4-year programme of research on Posterior Cortical Atrophy will begin in January 2014. This is a collaborative study with UCL's Institute for Cognitive Neuroscience and the University of Toronto. Funded by the ESRC/NIHR (£2.6 million), the project involves key stakeholders such as the Pocklington Trust and the Canadian Dementia Resource and Knowledge Exchange.

c. People, including:

i. Staffing strategy and staff development

Recruitment

Investing in people with strong research programmes or, in the case of early career researchers, people with demonstrated potential for research leadership, is the cornerstone of the School's recruitment strategy. In line with our emphasis on health research we are actively recruiting medical doctors to the School including a specialist in health policy and a medical researcher with interests in systems and synthetic biology. These appointments have broadened our disciplinary perspective. We have recruited 17 new members of staff in allied health; 3 are at professorial level and 1 at reader level.

When appointing people from clinical practice – a requirement in physiotherapy and occupational therapy - we facilitate registration for a PhD and ensure that time is given for the doctoral research. Since 2008 we have appointed 6 members of staff on 50% research/50% teaching contracts in order to recruit clinicians into doctoral research. Our research plan aims to grow this programme of enhanced PhD studentships as a key mechanism for sustainable staffing in occupational therapy and physiotherapy. Although given freedom of choice of a research topic, those on enhanced PhD studentships are, where skills match, integrated into on-going research projects in order to ensure completion within 5 years.

All appointments in biosciences are made within the broad area of human health, with themes cognate to the three biosciences research centres. The long term strategic goal in biosciences is to maintain a major research focus upon human health but move towards more translational and pre-clinical research, while maintaining a strong foothold in basic research.

Staff Development

Early Career Researchers

The School has a large proportion of staff considered to be 'early career researchers'. This is partly due to a significant increase in recruitment in biosciences, and partly because many members of staff in occupational therapy and physiotherapy have only recently completed doctorates. Our early career researchers are developed via a number of School mechanisms, including a mentor/buddy system; workshops specifically tailored for early career researchers (grant writing, financial

management, etc.) hosted by the Research Support and Development Office, new joint proposals with established colleagues and involvement of new staff in PhD supervision as members of Research Advisory Committees, and encouragement to attend the recently established monthly statistics seminars. Staff training by Brunel University in the Concordat has enabled our Division research leads to support staff. The training led to the establishment of an allied health network of early career researchers who meet regularly and who receive extra mentoring. NIHR training in research mentorship has facilitated members of staff to help others on fellowship schemes. The University recognizes and values its research staff and holds a European Commission HR Excellence in Research award for its commitment to supporting its researchers. The following are examples of the schemes that the University offers:

Brunel Research and Innovation Fund – 9 BRIEF awards were made to staff totalling £130k. The BRIEF awards are competitive and aim to provide staff within 3 years of their arrival at Brunel with support to enable them to start research projects and seek external funding to support on-going research costs. 12 external grant applications were submitted by the staff awarded BRIEF awards, 6 of which were successful. Rudolph used his award to develop a collaboration with Nottingham that led to a research letter in Nature, and later to funding from the BBSRC and Royal Society.

ESRC Future Leaders Scheme – This scheme aims to support outstanding early career researchers to carry out excellent research and to develop all aspects of their research and knowledge exchange skills. For example, participants are facilitated to develop ESRC grant application skills through mock peer-review panels where they consider one another's successful and unsuccessful proposals. Senior academics within Brunel provide mentorship and expertise to participants in the scheme. Dr Kramer-Roy was selected as one of 14 Brunel ECRs for membership of the 'Future Research Leaders' ESRC Scheme.

Research Development Fund – This provides pump-priming funding for new, less experienced researchers to enable them to develop grant applications or conduct pilot studies. During the REF period two RDF awards were made to staff in allied health.

Mid-career development and leadership training

Identification and mentoring of successors for our current research leaders has been strengthened since 2009. Senior management provides advice on promotion and Human Resources runs a large range of courses for staff at all stages of career progression. Leadership training is provided via the following competitive awards:

ASPIRE – The ASPIRE leadership programme, is a selective University programme providing unique opportunities to work with 4-5 other emerging researchers on a strategic issue, with the outcome being a report and action plan to the University. Bridger and Pook have both taken part in the last 3 years.

Athena SWAN Research Awards – Tempest won an Athena SWAN Research Award in 2013 to carry out a secondary data analysis on breast milk donation in collaboration with Queen Charlotte's and Chelsea Hospital Milk Bank. These new awards support members of academic staff who have recently returned from a period of maternity leave, statutory adoption leave or additional paternity or adoption leave in the continuation of their research career.

Support for equality and diversity

A wide range of ethnic backgrounds is represented in the School and a high proportion of staff in physiotherapy and occupational therapy is women. In 2011 the School set up an Equalities and Diversity Research Committee to ensure that our research strategy does not inadvertently discriminate against people because of their gender, ethnicity, or any other characteristic. Because most of the members of the Senior Management Group are women the committee is particularly charged with ensuring that the male members of staff do not experience discrimination in relation to research resources. Senior managers have undergone special training in equalities and diversity issues in research. All members of staff are required to attend equality and diversity training sessions upon appointment and to update their understanding of equality and diversity via an annual web training exercise. The Head of School is the University's Equality and Diversity Champion.

ii. Research students

Doctoral research culture and training

The Graduate School provides a strong social and training programme for our research students. Staff members facilitate this training by participating in training workshops run by the Graduate School: for example, the Deputy Head Research runs annual workshops on grant writing for final year research students with the Deputy Director of the Research Support and Development Office. We introduce our research students to the Graduate School at induction and encourage engagement with other research students at the Graduate School. We also ensure that our students engage in the annual Graduate School Poster Conference. Our students consistently win more of the prizes at this conference than any other School.

Funding for national and international conferences for research students is provided via the Vice-Chancellor's bursary scheme; there is a call twice a year for applications. The Library provides expert help on database searching, reference management and statistics. The statistician appointed in 2012 helps research students. Appointments can be made on an individual basis for specific statistical problems and workshops are run on statistical techniques.

Although the School does not have research council doctoral training centre status, we ensure that our doctoral students receive training equivalent to that offered to students in DTCs. We have new systems that shadow the progression and quality procedures of DTCs in other universities.

We have achieved 47 PhD completions since 2008, compared with 40 in the equivalent period from 2001.

Full-time PhD Students

Biosciences students work closely in the laboratories with their supervisors and are considered to be central to all of the ongoing research projects. Hence, the students are fully integrated into the research of the Division. Weekly lab meetings are held for the research groups and PGR students are expected to attend. The three biosciences research centres run seminar programmes involving internal presentations, with PGR students actively participating. Grant funding allocated for national and international conferences is prioritized for research students attached to grants. The students run an annual research conference. Second and third year students (or the equivalent for part-time students) give oral presentations, with first year students doing poster presentations. There are prizes for the best oral and poster presentations. We currently have one biosciences research student on a BBSRC CASE award.

Dr M Davies won the Walduck Prize in 2012 for the PhD project making the greatest public benefit. Davies' research contributed to the development of a training resource to educate health, social care and finance professionals.

Part-time PhD Students

Part-time research students are encouraged to contribute to the annual School Research Day (verbal presentations for those completing and poster presentations for those still collecting data). Supervisors meet with part-time research students at least every 6 weeks for documented supervisory sessions, and often much regularly. Since 2008 6 clinicians were given 50% research/50% teaching posts to enable them to do doctoral research. This has been a very successful programme of facilitating research training for occupational therapists and physiotherapists. We plan to continue this programme in the future.

d. Income, infrastructure and facilities

Since 2009 we have invested significantly in facilities and staff. This investment has led to an increase in grant income and, in biosciences in particular, an increase in self-funded PhD students. We now have first class biosciences laboratories which are helping us to recruit leading researchers. The Mary Seacole Building was built only 7 years ago, providing our occupational therapy and physiotherapy staff with impressive research facilities.

GRANT INCOME

We have won over £7 million in external research grant income since 2008. Our largest grants have been to staff in biosciences, with, for example, a grant of £564k to Pook from the European Friederich's Ataxia Consortium for Translational Studies and a grant to Newbold of £418k to study the development of mechanisms-based human epithelial cell transformation assays for carcinogen

screening, employing defined phenotypic endpoints mechanistically representative of rate-limiting events in human carcinogenesis. Importantly, we significantly increased our grant income in OT with substantial awards from the NDA/ESRC (£326k) for research and the UKOTRF/ College of Occupational Therapists (e.g. Harries £80k, and Spiliotopoulou £80k).

INFRASTRUCTURE INVESTMENT

Laboratories and equipment

Since 2008, £9.6 million was spent refurbishing the Heinz Wolff Building where the Biosciences Division is based. In addition, we invested over £4 million in 1770m^2 of wet and dry research laboratories. This included provision of Cat 3 laboratories, 200m^2 of bioimaging facilities and the refurbishment of the ground floor service area housing -80^o freezers and to provide safe storage for liquid nitrogen containers.

Other investments since 2008 include:

- Acquisition of equipment to facilitate new research projects including the ImageStreamX for high throughput imaging-in-flow technologies (£120k, University donation) and the Metafer automatic image acquisition workstation (value £118k, Progeria Research Fund).
- Acquisition of a new real-time florescence microscope to facilitate our research on the molecular basis of the coordination between chromosome structure/dynamics in mitotic exit and the reformation of a functional G1 nucleus.
- The neuroscience laboratory used by Nowicki has been provided with new equipment for research on transcranial direct current stimulation in incomplete spinal cord injury for the treatment of neuropathic pain.

The Mary Seacole Building was completed in 2006 and provides state of the art teaching and research facilities for staff in the allied health professions (total cost was £9.7million). New computers are currently being installed to replace those purchased when the building was completed.

FACILITIES

Shared use of research infrastructure

Within the University, four facilities are shared:

- A new, £2.43 million transmission electron microscope is shared with the Experimental Techniques Centre.
- The current animal research facilities, which are shared with the Institute for the Environment, enable collaborative research on the impact of chemicals and hormones in water on fish, as well as research using mice. Work is about to start on the provision of new facilities for whole animal research focussing mainly on facilities for rodents at a cost of £1.75 million, including an in-vivo imaging system.
- The resources of the Centre for Systems and Synthetic Biology are shared with the School of Information Science, Computing and Mathematics. The Heinz Wolff Building was refurbished, at a cost of £300k, to provide dedicated research and meeting space for Prof Saunders and his team.
- The University shares a functional magnetic resonance imaging (fMRI) scanner with Royal Holloway, which has just benefited from a £400k upgrade.

Facilities for Research Students

- Four large offices in the Heinz Wolff building accommodate the biosciences postgraduate students. A research associate provides equipment training.
- The Mary Seacole Building provides a large room with computers for research students.
- The Graduate School provides social facilities for research students. Located in the main quad, the Graduate School is a welcoming place for postgraduate students to go for advice, quiet study, and to socialize. Space is set aside exclusively for postgraduate students, accessible 24/7 by a

proximity card. The lower level includes the Common Room, a kitchen, a Quiet Study Room, a Conference Room, and internet kiosks. Away from the main building, the Postgraduate Study Centre, Bannerman Centre, is a computer room accessible only to postgraduate students. Postgraduate students are entitled to borrow a Graduate School laptop for a one week loan, free of charge. Small storage lockers are also available for use.

Policy and Practice in Relation to Research Integrity

Research Ethics – The School Research Ethics Committee (REC) has a Chair, a School Research Ethics Officer, two Deputy SREOs and 14 members; its work is supported by an administrator. The Deputy Head of Research sits on the REC; the REC reports to the Research Committee, as well as the University Research Ethics Committee. Although technically the REC only addresses issues associated with research ethics, it is common to provide advice on research methods to students and members of staff.

School Research Committee – The Research Ethics Committee and the PhD Studies Committee formally report to the School Research Committee and the School Research Committee reports to the School Board. The Deputy Head for Research and Associate Deputy Head for Research also regularly run workshops on aspects of research integrity associated with both staff and PhD student research.

Peer review of grant applications and mentoring – Our new system of peer review of grant applications is being strengthened, greatly improving the quality of our grant applications. All applications need a minimum of two peer reviews in order to be considered for School approval; applicants must demonstrate that they have taken account of peer reviewers' comments. All grants, no matter how small, must have Head of Division and School approval before they can be submitted. Applications for over £1 million go to a University committee for approval.

e. Collaboration or contribution to the discipline or research base

COLLABORATION

Collaboration with our colleagues in the NHS has always been central to our research strategy. Continued collaboration between our staff and other universities, in particular universities in the European Union and India drive the development of our research. Collaboration with users of our research is key to our successful dissemination and impact and has been crucial in helping us during the period of assessment to increase the number of successful grant applications. Our collaboration with organizations such as AgeUK and the National Trust helped us to obtain a high proportion of the grants in the New Dynamics of Ageing programme.

Mechanisms to promote collaboration and responsiveness to research priorities

The mechanisms which enable us to respond to new calls for research also facilitate interdisciplinary collaborative research:

Tracking initiatives – At University level our Research Support and Development Office tracks all new calls and initiatives, sending targeted information to members of staff. The Deputy Head Research and Associate Deputy Head Research, along with Division Heads and Directors of Research Centres bring to the attention of staff calls which are known to be directly related to School research.

Brainstorming meetings – Research Support and Development Office runs brainstorming meetings in collaboration with the School to develop grant applications. Over the REF period these brain storming meetings led to grant applications to the EPSRC Design for Living Programme, the Life Long Health and Ageing Programme, the JRF Rights and Risks programme, the NDA/ESRC programme, and the LOLA (BBSRC) programme. Collaboration with other universities is also facilitated via the Research Support and Development Office with small grants to hold networking meetings and to pilot research ideas. Collaborative research with our colleagues in the NHS is facilitated via regular meetings. It is School policy to ensure that all grant applications to funding councils include only collaborators from leading research centres, to ensure that our research is of high quality. Now that the research councils allow collaborators in other countries this has also provided another mechanism to ensure high quality, internationally relevant research.

Examples of National and International Collaborative Research

Decision-making Research – A very strong programme of research in decision making has developed under the leadership of Harries, a programme involving cross discipline collaborators within the University, with universities in the UK and abroad. Studies of decision making in relation to referral prioritisation were conducted with Imperial College London. This has led to collaborative research on referral prioritisation for community mental health services with academics and community mental health practitioners in Australia and New Zealand. The decision making research was extended with two grants from the NDA/ESRC to investigate decision making in detecting financial elder abuse by health, social care and banking professionals; these grants involved researchers at Sheffield, Plymouth, and Hertfordshire Universities. A web-based training tool was also developed for allied health professionals.

Post-poliomyelitis Syndrome – Our growing programme of research on the health and well-being of polio survivors was initially funded by the British Polio Fellowship, with current funding from the United Kingdom Occupational Therapy Research Foundation. Led by Spiliotopoulou, Atwal and McIntyre this recent project involved collaboration with the Disabled Living Foundation.

Stroke and low back pain – Our research into innovating and improving stroke rehabilitation involves internal collaborations with the Health Economics, Sports Sciences and the School of Engineering and Design on the Action for Rehabilitation from Neurological Injury project (ARNI) project. There are long established external collaborations on the ReWiiRe project with colleagues from the University of London, Exeter University and Plymouth University, including the Peninsula Medical School, and clinical partners in multiple clinical centres in London, Luton and the South West. Similarly, recent exploratory work into novel therapies for chronic low back pain and pain following spinal cord injury, involves collaboration with clinical physiotherapists at the local Hillingdon Hospital NHS Trust and Stoke Mandeville Hospital.

Investigating the lived experience of people with chronic illnesses – We have on-going collaborations with clinicians at Tower Hamlets and Northwick Park Hospitals NHS Trust to explore the experience of stroke and rehabilitation for stroke survivors from ethnic minorities, including staff from St George's and Kings College hospitals. Our research on electronic and assistive technologies (EAT) in rehabilitation involves medical and physiotherapy colleagues from the Royal National Orthopaedic Hospital, Stanmore, the Alderbourne Unit, Hillingdon Hospital and social scientists from the London School of Economics. Future research is planned with the EAT Special Interest Group of the British Society of Rehabilitation Medicine (BSRM) to re-evaluate the scope of EAT use in rehabilitation and to develop novel assessments to assess the benefits of EAT provision to individuals and their families.

In vivo model of Friederich's ataxia – Our laboratory for neurodegenerative diseases has generated and maintained a colony of mice that are used as an in vivo model of Friederich's ataxia (FA). Researchers from all over the world are able to access these mice for collaborative research. Significant collaborative grant funding from the EU, Welcome Trust, etc. is generating prestigious publications.

Surfactant proteins as a treatment for lung infections – Collaboration with India on surfactant proteins (proteins which line the lung and which are the primary arm of the innate immune system) has led to clinical trials of the protein as a treatment for reducing lung infections, infections which are increasing worldwide.

CONTRIBUTION TO DISCIPLINE AND RESEARCH BASES

Grant committees, editorial boards and influence on the discipline base

Occupational Therapy – Key roles within the College of Occupational Therapists are occupied by members of staff: Dr Atwal is on the COT R&D Committee, Lim is on the European Masters in Occupational Therapy Advisory Group and on the World Federation of Occupational Therapists Steering Group Member (UK Representative) on Diversity Matters: Guiding Principles on Diversity and Culture Document, and is a Board Member on the Kawa Model International Research and Collaboration Group. McIntyre has been on the COT working party on electronic record keeping. Harries was Chair of the Editorial Board of the College's journal, *The British Journal of Occupational Therapy*. In 2012 Harries was invited to be a member of the ESRC Peer Review College and the NIHR CAT Mentorship Scheme. Between 2008 and 2013 members of the Division

reviewed grants for the EU-FP7, MRC, NIHR, ESRC, BUPA, Big Lottery and Mental Health Commission (Ireland)

Physiotherapy – Prof De Souza represents the University on a number of prestigious national and international committees. She is the Chair of the Care Development Panel of the Motor Neurone Disease (MND) Association. The Panel commissions cutting-edge care development in NHS multidisciplinary care centres with the aim of improving the standard of care for people living with MND. She is also a member of the Department of Health Task group on Health Informatics for allied health professions. Dr Kilbride is the lead national physiotherapist on the Intercollegiate Stroke Working Party at the Royal College of Physicians which is responsible for developing national clinical guidelines and national audit of stroke services throughout the UK. Dr Kilbride has also been invited to sit on the European NeuroRehab Guidelines party. She is a founding member of International Neurology Physical Therapy Association (WCPT subgroup), a past Chair of the Association Chartered Physiotherapists in Neurology and one of four appointed facilitators on London hub of Allied Health Professions Research Network. Harvey was involved in developing the British Thoracic Society guidelines on the physiotherapy management of the adult medical patient and bronchiectasis and continues to be involved in the updating and further development of BTS clinical guidelines. Dr Cassidy and Dr Kilbride worked with Ataxia UK to develop a best practice guideline for the treatment of ataxia.

Biosciences – Dr Slijepcevic - Co-Editor-in-Chief *Genome Integrity*; Editorial Board Memberships: Dr Slijepcevic – *Acta Medica Academica*, Dr Anderson – *Genome Integrity*, Dr Bridger – *PloS* One, Chromosome Research, Dr Harvey – J. Cancer Research, Dr Rand-Weaver – General and *Comparative Endocrinology*, Dr Karteris – *The Scientific World Journal*, Prof Sala – *Clinical Medicine Insights, Frontiers in Oncology*, Dr Nal-Rogier – *World Journal of Virology, Frontiers in Molecular Innate Immunity*, Dr Kishore – *Frontiers in Immunology, Frontiers in Bioscience*, Prof Newbold – *Int. J. Cancer*. Grant Committee Membership: Drs Harvey and Themis – Breast Cancer Campaign, Dr Rand-Weaver – Norwegian Research Council.

Contribution to health policy and practice

With 'bench to bedside' as a driving vision for our research, influencing policy and practice is a key measure our contribution to the knowledge base. The following are examples of ways in which we are making major contributions to the research and knowledge base of allied health:

Occupational Therapy – Our research related to occupational therapy for people who have had lower limb amputations, has been used to create the evidence base for clinical practice. The research and policy guidance, funded by the College of Occupational Therapists 'Specialist Section – Trauma and Orthopaedics', was written and produced in collaboration with the Division's Research Centre for Professional Practice. Our research on measuring for minor assistive devices has also been recently funded by the College; the research will provide the evidence base for the development of national practice guidelines for measuring home furniture and fittings for people with disabilities.

Physiotherapy – Our research on chronic pain has influenced clinical guidelines and medical insurance policy in the UK, the USA and South Africa. Our research in multiple sclerosis has influenced clinical guidelines and policy documents in the UK and internationally, with key clinical guidelines and evidence based resources for clinicians, patients and government agencies citing our work. Our research into users of electric powered indoor/outdoor chairs (EPIOCs) has been used to shape health service policy; as a result enhanced clinical standards have been implemented. These will ensure more appropriate assessment of users and prescription of EPIOCs are provided by wheelchair services.

Biosciences – Our cancer genetics laboratory has developed a Monochromosome Library which researchers from around the world are exploiting for gene discovery in a range of genetic diseases. Our research on diagnostic biomarkers, in particular the work by Parris evaluating markers for predictive testing of radio sensitivity and chemotherapy over-responders during cancer treatment, is currently being trialled and has already been shown to be a valuable tool for diagnosing sensitivity to radiotherapy.