Institution: University of Leicester

Unit of Assessment: Psychology, Psychiatry and Neuroscience (UoA4)

a. Context

Research contributing to the domain of Psychology, Psychiatry and Neuroscience at the University of Leicester is located within the newly created College of Medicine, Biological Sciences and Psychology (CMBSP). Research across this College covers a broad spectrum of neuroscience, biomedical, psychological and health science topics, and draws on the expertise of multiple University departments (including Genetics, Cell Physiology, Biology, Health Sciences and Psychology). There is also close collaboration with the co-located MRC Toxicology Unit, as well as excellent relationships with local NHS services. Most of this activity is co-ordinated through the Neuroscience & Behaviour Theme – one of nine interdisciplinary research themes in the College. This approach has enabled application of fundamental research via translational pathways to a wide range of real-world challenges, ranging from development of new biotechnologies, through evidence-based improvements in mental health provision, to policy advice and training for government organisations. Researchers in this UoA have also been very active in promoting public engagement in science, community-based activities and voluntary work.

b. Approach to impact

Impact Support at the University of Leicester: The overarching philosophy is interdisciplinary: to link topics ranging from molecular and behavioural genetics to neuronal mechanisms with the social, psychological and biological processes underlying normal and abnormal brain function across the lifespan. The approach to enterprise and impact delivery has evolved from a research-based focus instigated by individual academics to a more systematic strategy, as a 'culture of recognition and support' for impact-linked research has developed. This 'recasting' of research has led to a model of translation encompassing psychology, psychiatry and neuroscience through the development of existing partnerships, new collaborations, and productive engagement with potential beneficiaries. These notable successes, which are described in the accompanying case studies, are accompanied by very promising, pre-impact, translational projects. These include: i) in auditory neuroscience, links with charity organisations (e.g. Action On Hearing Loss and Rosetrees Trust) and industrial partners (Autifony Therapeutics Ltd), ii) novel imaging methods and microscope development (patented by Prof. Nick Hartell); iii) a project to investigate molecular processes in pest-control and food security (led by Prof. Charalambos Kyriacou in collaboration with industrial partners Oxitec and Bio-fly), and iv) a Marie Curie European collaboration to develop devices for assessing potential dementia treatments (organised by Prof Ruth Luthi-Carter).

A Partnership Approach to Impact Assessment and Delivery: Our experience has shown that the full realisation of the impact potential of bio-medical and psychological sciences research often requires the formation of partnerships with external organisations that contribute complementary expertise and/or facilities. Indeed, recognition of the potential value of new research findings is also greatly facilitated by close working relationships between academics and beneficiaries such as commercial organisations, healthcare professionals, educators, practitioners and policy makers. Examples of the impacts resulting directly from these approaches are outlined below.

Community Engagement, Collaborations and Partnerships: One of the unique strengths of the research-to-practice model that operates at Leicester is engagement with community-based collaboration and partnerships. For example, research by Prof. Panos Vostanis and Prof. Graham Davies in the School of Psychology, has directly influenced policy and practice relating to support for vulnerable children (e.g., abused, living in care, domestic violence, homelessness, war, national disasters), youth and the elderly, particularly in the context of police and court-based interviewing (i.e., use of recorded evidence from a child as a substitute for the child's evidence-in-chief in a criminal court).The genetics focused Centre for Excellence in Teaching and Learning (GENIE) has a wide range of outreach activities (~ 50 events each year) attracting up to 3,000 participants annually. Dynamic DNA events have been run every year since 2006, providing ~ 600 13-14 year old children and ~ 50 teachers with the opportunity to engage with modern genetics and biology, and raising their awareness of the exciting world of medical, psychological and neuroscience and the ability of biological science to transform lives. In addition, researchers from UoA4 present

public lectures as part of the national Brain Awareness week in March each year, while the University's Press Office plays an active role in disseminating research via traditional and social media outlets including the web, TV, radio and regular Twitter feeds.

Clinical Engagement: Much of the translational research carried out across UoA4 is based upon partnerships between academics and clinicians. Examples include the development of genetic and diagnostic procedures for infantile nystagmus (IN), which have seen the Ophthalmology Group recognised as a centre of national excellence for diagnosis and treatment of IN. Last year, 66% of their referrals came from outside Leicester's service area, highlighting their growing reputation as the main referral centre for IN in the UK. As a consequence, academics from the group are directly involved in the revision of national guidelines for the Royal College of Ophthalmologists and NICE. Similarly, Prof. Terry Brugha's response to UK government funded surveys on the epidemiology of mental disorders has led directly to the Psychiatric Research Group's participation in setting up NHS diagnostic centres for adult autism and Asperger Syndrome (AS). Expertise from this group has directly influenced NICE guidelines and professional training for clinical psychiatrists and other health professionals.

Coordinated University Support for Enterprise and Impact: The CMBSP developed a strategy for research-related enterprise that is coordinated and developed through an Enterprise Committee that includes an 'enterprise champion' from each research theme, with responsibility for disseminating ideas, raising awareness of potential opportunities and fostering impact-generating research. An embedded enterprise and business development centre known as the 'Biobator', run by five University staff, supports translational opportunities arising from biological and medical research. This structure, together with the University's central Enterprise and Business Development Office (EBDO), provides researchers with support for the assessment of impact and access to expert advice on translational pathways. This coordination has catalysed interest in developing spin-out companies, with several launched in 2013. These include OpenBrain Ltd., which is a collaboration between Dr. Tom Matheson's group and the University's Diagnostic Development Unit to develop a commercially available Bayesian statistical suite using a 'Software-as-a-Service' model. The University has also provided targeted financial support to promising translational projects for proof-of-principle data, to protect intellectual property and to engage with potential partners. This includes matched funding for an MRC-sponsored project to assess the utility of hand-held optical coherence tomography devices in the diagnosis of IN, and funding for an Auditory Behaviour Suite in the newly built Central Research Facility (CRF). Technological developments include a patent for an improved optical arrangement for confocal and super-resolution optical microscopy (Prof. Nick Hartell) that has received follow-on funding from the BBSRC for commercial development with Prior Scientific Ltd.

c. Strategy and plans

Building on the track-record of impact-driven research, the University has started to implement an ambitious enterprise strategy. This is being led by a recently appointed, very experienced, Director of EBDO, and includes:

i) Restructuring and expansion of the EBDO office into teams supporting enterprise and impact priorities in the individual Colleges, including CMBSP.

ii) Strengthened leadership to provide realistic target setting, and timely support to academic staff.

iii) Targeted support for early stage enterprise and translational projects through 'Proof of Concept' and 'Prospect' Funds.

In concert with the University-wide enterprise strategy, CMBSP has developed strategies to capitalise on the translational and impact potential of its internationally competitive research. The role of the College Enterprise Committee has been strengthened by the appointment of a senior academic with a strong interest and track record in translational research (Prof. Mark Carr). This committee coordinates with EBDO services and, together with two newly appointed business development managers, will develop collaborations between researchers in the UoA and partnerships with companies, charities and other potential beneficiaries, such as the Technology Strategy Board.

The strategy for successful translation of research and impact delivery in CMBSP is based on experience gained over many years (e.g. DNA fingerprinting) and recent successes in translational

research (see accompanying Impact Case Studies). Building on these, our aim is to develop a positive and supportive environment to enable the wider impact of innovative research. This will require increased advice, training and mentoring for academic staff, which will be coordinated and delivered through the structures described above. We will also develop and implement a marketing strategy focused on industry, for example, by showcasing expertise at regional events, including those sponsored by the East Midlands Development Agency (EMDA). We will continue to maintain and develop strong links with the NHS in Leicester and the Midlands by providing the academic lead for service developments, including initiatives funded by NIHR. CMBSP has already implemented a partnership approach to R&D opportunities, and commercially sponsored clinical trials, including the establishment in 2009 of the Joint R&D office with the University Hospitals of Leicester NHS Trust. Linked to this, a partnership agreement is soon to be finalised which will streamline the management of commercial clinical trials and increase the cost-effectiveness of such activities. Exciting new research in neurodegeneration has created potentially far-reaching impact following publication of a highly original proof-of-principle therapeutic approach to the prevention of disease progression in dementia (Prof Giovanna Mallucci) which generated nationwide front-page and TV news coverage on 10 September 2013 (http://www.theguardian.com/society/2013/oct/10/alzheimers-breakthrough-key-questions-answered).

The University's commitment to translation will be communicated by encouraging academics to join relevant expert panels and advisory committees, share examples of best practice, and actively pursue opportunities for academic and public/private sector partnerships. Courses provided by the University's Staff Development and EBD units provide training in communication with non-academic audiences and encourage an entrepreneurial 'mindset' by illustrating how the impact arising from basic and clinical science can be maximised by, for example, utilising knowledge exchange mechanisms such as KTPs and Innovation Partnerships

d. Relationship to case studies

The four case studies submitted by UoA4 demonstrate the success of this approach to impact. The case from the Forensic Psychology Group is based upon a long-standing relationship between academics at Leicester and the Home Office and Police Service that started in the early 1990s and continues today. During this time, the Forensic Group's expertise has been fundamental to the development of evidenced-based procedures and practice that reflect the group's ability to respond to the issues and concerns of non-academic organisations in the UK and abroad.

The translational benefits associated with research based upon partnerships between academics and external organisations are also evidenced by the case studies from Prof. Terry Brugha's group in Social and Epidemiological Psychiatry and Prof. Panos Vostanis' group at the Greenwood Institute of Child Health in Leicester. In the former, the application of innovative methods to measure the prevalence of autism in adults in the 2007 Adult Psychiatric Morbidity Survey provided a set of recommendations that have been since been adopted by Government and local authorities in the UK to develop specialised services and support for adults with autism and learning disability. In the latter, research has advanced our understanding of mental health among looked-after children who have been exposed to trauma as well as those who are homeless or who come into contact with the criminal justice system. In both cases, the expertise of researchers in UoA4 has been instrumental in improving outcomes among vulnerable groups in society by informing professional guidelines and shaping the support offered by multiple agencies in the UK (Child and Adolescent Mental Health Service) and abroad (Save the Children).

Finally, the case submitted by Prof. Irene Gottlob's group in Ophthalmology represents more than a decade of research in which academic expertise and facilities have resulted in the development of a genetic test and novel procedures for diagnosing subtypes of infantile nystagmus. These new techniques provide tangible benefits for patients by enabling much earlier diagnosis as well as clinical treatment plans tailored to the needs of the individual and their families. The partnership between academics and researchers at Leicester has resulted in the group being regarded one of the world's leading clinical centres for the diagnosis and treatment of infantile nystagmus.