Institution: University of Stirling

Unit of Assessment: A4 Psychology, Psychiatry and Neuroscience

a. Context: Our impact covers five major groups of end-users: public sector (Councils, Police, Charities and Business); health (patients, carers and medical professionals) public engagement with science (media, museums and exhibitions, including exploring the effects of science communication); legislative change (EU, UK and Scottish Parliament, influencing policy and planning) and education (nurseries and schools, language learning). The key types of impact that we engage in include influencing public policy, as evident in our "Suicide" case study, and influencing public sector practice, as evident in both our "Suicide" and "EvoFIT" case studies. We also have Cognitive, Developmental, and Neuroscience researchers working on health impacts related to specific impairments and disorders (e.g., dementia, autism, brain injury), contributing to the effectiveness of patient care via development of new diagnostic tools, by influencing care practices, or through changes to clinical guidelines. Our public engagement activity reflects a collective commitment to science communication and is an important strand of our impact, including peer-reviewed outputs assessing such activities. Lobbying and engaging with government, commissions and chartered bodies is also a key impact activity across all areas of our research, using our outputs to inform debate about policy, ranging from improving national health service practices to influencing animal welfare legislation, to improving infant and adult learning.

b. Approach to impact: We have developed an integrated approach to Research & Impact. We create impact by working directly with end-users, making contact through networking and regular dissemination via media and public events, and developing collaborative projects with our end-users. To foster impact we deliberately engage with as many opportunities for Public Engagement as we can; these activities, whilst valuable in their own right, also lead on to direct contact with end-users and these contacts can be nurtured into direct collaboration.

Profile Raising via Public Engagement: An important first step in achieving impact is to raise the public profile of the research in question. To this end, we regularly engage in public dissemination across a variety of media. For example, television: **Anderson** (BBC's Big Question on chimp responses to death); print and radio: **Roberts** (New Scientist & BBC Radio on contraceptive pill use). We also have examples of popular science books (**Dudchenko's** "Why People get Lost") and a number of museum exhibitions (**Stirratt** – Faces and Aggression exhibitions at Sensations, Dundee; Camera Obscura, Edinburgh; Glasgow Science Centre; Science Museum, London & Nickelodeon; **Caldwell** – Royal Society Summer Science Exhibition for Cultural Evolution; **Hancock** – exhibitions at Bristol Science Centre, Glasgow Science Centre, & Sensations, Dundee) supported by stakeholder/RCUK funding (e.g., EPSRC for exhibits on face recognition).

We use University training (e.g., media engagement) and support (e.g., drafting press releases) to help us achieve high levels of public recognition. Our experience is that a highly visible external profile leads to approaches from industry, resulting in commercial impact. For example, **Roberts** is well known for his work on the role of human olfaction in mate choice, which attracted interest from Unilever & British Society of Perfumers, leading to a BBSRC CASE award; **Donaldson** is known for his work in memory, which attracted interest from Goldsworthy Consulting Ltd, leading to a collaborative HEA PhD award. We also value Public Engagement for its role in shaping public debate; staff regularly feature as experts or have their outputs discussed in the media. Similarly, staff contribute actively to Scottish Government policy debates.

Direct collaboration with users: The early stages of collaboration between our researchers and end-users often involve joint capacity building as part our strategy of engagement with industry, with our staff providing research background and experience whilst the collaborator provides the impact setting and motivation. This is especially true when the collaborator has a potential commercial interest. For example, in 2011 **Dudchenko** collaborated with Janssen Pharmaceutical Companies of Johnson & Johnson, on using working memory tasks in rats as an animal model for testing the cognitive effects of drugs for Schizophrenia; this resulted in a publication in Neuroscience and Biobehavioral Reviews. **Hancock** obtained funding from the Technology Strategy Board to work with the University of Surrey and Omniperception, a face recognition company, to evaluate their image processing; this has led to a patent application and three papers submitted or in press. In 2008 **Roberts** collaborated with Unilever Research and Development, Port Sunlight Laboratory, resulting in a joint publication in the International

Journal of Cosmetic Science. In 2012 **Hancock** worked with Talent Strengths Ltd to develop a new personality assessment, with funding from the Innovation Voucher Scheme.

For impact related to public interests and specifically, engaging with clinicians, patients and the public sector, our approach involves network building. For example, **Ietswaart's** research findings from a study of motor-action are being used to directly influence clinicians in the use of mental practice via the cultivation of a network of clinical end-users. That network includes practitioners from Queen Elizabeth Hospital, Gateshead, Newcastle General Hospital, and Grampian University Hospital. The impact work of **Hancock** has involved collaborating with many individuals within public sector bodies to achieve wide reach among end-users. His collaborators include Devon & Cornwall Police, Lancashire Constabulary, the Forensic Department of Iasi County Police Inspectorate, Romania, as well as HM Prison, Peterhead.

Institutional Support and Investment: Over the REF period Stirling has provided strong support for impact. Staff are encouraged and given the time, financial resources and equipment to pursue impact as part of their research. Impact activities form part of the annual appraisal of all staff members' academic career development via Stirling's "Achieving Success" mechanism. Impact focussed training is available in grant writing, e.g., using **Donaldson's** experience of assessing 'Pathways to Impact' as a Core Member of BBSRC's Grant Committee A. The University Research & Enterprise Office ensures that academic staff conduct impact activity within a properly costed and contracted relationship. The University has also invested in Impact Fellowships, targeted at post-doctoral researchers whose research promises valuable impact. Psychology has three, each paired with mentors who have established impact credentials: **Stirrat** with Hancock; **Cornish** with Caldwell; and **Dering** with Hancock, Donaldson and Watt.

We have also invested in specific impact-focussed activities, for example, to the 'Guide' project developing an assistive living technology for the cognitively impaired, we funded a PhD studentship and staff costs for a collaborator from the Brain Injury Rehabilitation Trust. We also supported a two-year secondment to the Scottish Parliament (2008-10), embedding a psychologist in Parliament, feeding into a range of debates on health issues.

c. Strategy and plans: Our fundamental strategy for impact is to generate and sustain a strong synergy between impact and research activities, embedding impact activity into research from the outset. Our broader research strategy (situating our psychological investigations in complex real-world situations) naturally facilitates this approach. As new projects are developed staff are encouraged to identify specific (i.e., named) end-users and to engage with them at an early stage (e.g., via personal contact or by hosting workshops). Early consultation allows explicit impact objectives to be built in, based around end-user needs, with three key characteristics: (i) impact aims must be distinct from the aims of the research itself, (ii) impact aims and outcomes must be clearly communicated, using non-academic channels appropriate for the end-users, and (iii) impact aims must include specific milestones for evaluating success, with measurement built in.

We plan to continue our existing approach of improving access to partners via high public visibility and investing in impact-led projects. Our strategy is (a) to facilitate the development of research with clear impact opportunities, (b) to ensure staff have the capacity and expertise to conduct impact, and (c) to provide resources and procedures that help achieve success:

(a) Research: We maintain clear links between our research groups and end-users. Our growing and major ambitions in research and expertise in mobile cognitive neuroscience methods provide a set of novel impact opportunities and we are adding these projects to our core activity. We have also identified 2 major areas where impact can be developed into the future:

i) Sports: We have begun projects focused on sporting behaviours, working with sports governing bodies, athletes, coaches & technology companies. For example, we have found common interests with the Scottish Institute for Sport around the use of EEG in the assessment of athletes (golfers and shooters, including development of links with an EEG technology company interested in developing neurofeedback methods), and the use of motor-action measures for assessing training routines (via a collaboration with Sports Psychologists).

ii) Health and Welfare: We are planning to develop impact relating to the use of mobile cognition and other methodologies in Health and Welfare. For example, monitoring young offender outcomes as a result of behavioural interventions, a project developed via a University funded PhD. Given our research strengths and future plans, we see future impact possibilities in

Dementia and Autism (via links with Stirling's Behavioural Medicine Research Group).

(b) Staffing: We actively select staff who have impact potential (e.g., **Ietswaart**), or who complement existing impact potential (e.g., **Dering**). We are encouraging and training existing staff to explore and grow potential impact from their own research and we are looking for new impact possibilities, especially through collaborations. We have initiated weekly Research & Impact meetings, to help all staff realise the impact potential of their research. As well as sharing insight, providing impact specific training and communicating best practice, we also invite external staff (e.g., from other parts of the university, such as Sports Studies and Computing Science, or from external organisations such as health related charities and companies) to facilitate the development of wider collaborative impact. We have also added impact to the remit of our John Damien Public Lecture series (an annual event with an audience ~350 per year, on-going since 2006). Our aim is to maintain an awareness of impact at all stages of the research process.

(c) Resources and Procedures: Emerging impact possibilities are publicised on Psychology and project specific webpages, and in other social media (e.g., Facebook, Twitter), with the aim of sustaining an active media presence and fostering communication with end-users. Networking and user engagement is also facilitated via University funded Impact Workshops. Stirling has also invested in Impact Fellowships (described above) and Horizon Studentships (providing matched funding for PhDs in collaboration with external end-users). Psychology has invested in equipment, lab facilities, travel and in kind support for PhD and staff collaborations with end-users (including impact-focused collaborations with local zoos, prisons, schools and charities). As Impact projects develop the University Research and Enterprise Office makes specific expertise available, and staff with live impact projects have time made available through workload modelling.

d. Relationship to case studies: The EvoFIT case study (**Hancock**) illustrates the importance of early collaboration with end-users (in this case, industry contacts via an EPSRC/DTI Link grant, and police forces, via personal networking), which revealed a clear problem to address (low eye-witness detection rates). Direct engagement with police led to a collaborative approach, targeting specific scenarios identified by the police, and generating opportunities for real-world field-testing. EvoFIT also illustrates the key role of public engagement (e.g., via EPSRC funding for a science centre installation and presentation at a British Science Association festival) to highlight the approach and its benefits. In addition, EvoFIT demonstrates the value of targeting institutional resources (e.g., Research Postgraduates funded by Psychology, supporting workshops and collaborative meetings), including the allocation of research-leave around impact commitments.

The fundamental insight for EvoFIT was the realisation that our basic research on face perception had the potential to be turned into a practical facial composite system. One aim of our Research & Impact meetings (described in Section b above) is to help staff make this leap of imagination. For example, group discussions have led to the idea that **Dering** and **Watt's** research on heart rate variability has the potential for detecting people who are stressed and require specific additional assistance whilst interacting with technology such as bank ATMs or train ticket machines. Similarly, group discussions led to the idea that **Cornish** and **Caldwell's** research on cumulative cultural learning could be combined with **Donaldson's** research on memory retrieval, with the aim of developing more robust learning procedures for use in high-pressure high-stakes scenarios such as in-field oil-rig training, where the consequences of in effective training can be significant.

The Suicide study (**O'Connor**) illustrates the benefit of embedding impact in research from the start, in this case with policy change as an explicit goal that would drive change in practice. The impact aims were achieved by developing an extended network of end-user contacts, in particular by joining organisations (societies & government committees) interested in the prevention of suicide. These influential contacts helped bring research on suicide to the attention of those who were best placed to bring about change (for example, by asking questions or citing research in Parliamentary debates), including contributing to position papers and reports that influenced user groups and parliamentarians. This case study also highlights the importance of using appropriate communication channels, in this case social media (**O'Connor** developed a Twitter presence with over 4000 followers), to maintain a high level of public awareness and to influence end-users via their preferred medium; and the importance of institutional support to generate and sustain high-profile publicity (e.g., via continual press releases and a user-focused web presence).