Institution: University of Glasgow
Unit of Assessment: UoA4; Psychology, Psychiatry and Neuroscience

a. Context

The Institute of Neuroscience and Psychology (INP) has aimed to maximise the impact of its excellent basic and applied research on the following broad range of non-academic stakeholders:

Patient groups, **their families and carers**, **health professionals** and **3rd-sector organisations** have been targeted through our clinically-related research on stroke (*Harvey* Impact Story), autism (*Simmons*) and Cognitive Behavioural Therapy (CBT) in the context of insomnia (*Espie* Impact Story) and psychosis (*Gumley* Impact Story). In particular, *Simmons*' work on sensory aspects of autism has formed the basis for well-received presentations to the *American Academy of Optometry, Parents of Autism Spectrum Disorder Adults (PASDA)* and *Sense Scotland*, influencing both professional practice in optometry, making optometrists more aware of sensory issues when working with individuals with autism, and parents' understanding of their child's condition. This work has also influenced **Scottish Government** policy documents as part of the *Scottish Strategy for Autism*, specifically the "Guide to Interventions and Supports for people on the Autism Spectrum" which is due to be launched in November, 2013.

Our interactions with **Government agencies** have tended to focus around **security** applications such as *Pollick*'s research on CCTV operators with the *MoD***,** which has been adapted for use in classified studies used to inform security policy decisions. Research on the recognition of facial identity (*Jenkins, Burton*) has informed policy decisions in Australia and featured prominently in the Scottish Government publication "A National Strategy for Public Space CCTV in Scotland" (2011).

Our involvement with **industry** ranges from Big Pharma to local SMEs. In the context of **Pharma**, PsyRING – (Psychiatric Research Institute for Neuroscience in Glasgow) (*Morris*) has exploited the knowledge gained from the preceding YRING (Yoshitomi Research Institute for Neuroscience, Glasgow) (1997-2007: ~ £9M funding from the Japanese pharmaceutical industry) to make a major contribution to improving understanding of the molecular aetiology of psychiatric disease, to the development of translational animal models for schizophrenia and helped Pharma develop improved therapeutic agents. PsyRING research was able to develop an influential animal model of schizophrenia to reproduce key neurobiological features of the disease. Subsequent collaborations with *Wyeth*, *TMRI*, and now *Pfizer* resulted in funding of ~£1.1M (*TMRI*) and £1.2M (*Pfizer*). *Pollick* works with *Freescale Electronics*, a major international **automotive component manufacturer**, to explore effective design principles for multisensory warning signals. *Gross* has established a partnership with German company *BESA* (www.besa.de) applying his research to improve EEG and MEG analysis **software for brain imaging**. Finally, *Simmons*' and *Jenkins*' work with *voicebusiness* and *MTM Communications Skills Training* directly impacted on the practice of these companies' **media/communication skills** for coaches and trainers.

Psychology and Neuroscience are popular topics with the **general public** and lend themselves to **public engagement** projects. For example, *Jones* and *DeBruine* reach large international audiences via their website featuring face perception experiments and related material (faceresearch.org) which is accessed, on average, by over 2000 unique individuals daily. This website allows the collection of large amounts of data from a diverse range of individuals who are not typically targeted by psychological research. Users are spread across the world, with the top five countries being USA, UK, Canada, South Korea and Russia. The cross-cultural data obtained has contributed to raising awareness and interest in science for millions of individuals worldwide. From July, 2012 to July, 2013, over 76k experiments and 77k questionnaires were completed. See *Schyns* Impact Story for another example of our impact on the **general public**.

b. Approach to impact

The INP and its predecessors has a long history of encouraging its members in **Public Engagement** projects. These range from dedicated events run as part of the impact strategies of specific funding streams, through smaller scale demonstrations and data collection activities run as part of events organised by others, to activities initiated by individual researchers. For example, both "The Science of Social Interaction" (Glasgow Science Centre (GSC), March, 2009) attended

by 200+ local children and the "Symposium on Social Interactions (British Science Festival, Bradford, September, 2011) were connected with the ESRC large grant "Social Interactions: A cognitive neurosciences approach". As part of "Brain Weekend", at the GSC, August 2011, we hosted demonstrations and interactive exhibits on brain function and stroke which were visited by 2000+ members of the public over the weekend. Smaller scale events involve members being "Scientist for the Day" at the GSC to talk to members of the public about recent exciting developments in their research. Note that many of these projects take advantage of our close relationship with the GSC, including a summer internship programme for undergraduate students. Research by INP members also reaches a large international audience via media reports in printed and online journals, radio and TV in coordination with the University's media office (e.g. *Muckli*'s work on predictive coding). Members of the INP have also contributed to programmes on national television such as *The One Show* (BBC1, 2010, *Jenkins, Simmons) (*see www.psy.gla.ac.uk News section for more). In terms of institutional policy, UoG has signed up to the **Manifesto for Public Engagement** and is committed to supporting researchers to develop their confidence and abilities to engage with the public, media and policy makers. This includes providing training, support and funding for researchers to take the lead in devising their own skills development opportunities.

A more focused approach to user engagement was taken by the AHRC-funded "Watching Dance" Project (www.watchingdance.org) (*Grosbras*, *Pollick)*. This multidisciplinary research project that engaged with the dance community included a consultative forum at the beginning of the project that involved all stakeholders in dance and presentation of research results to the *UK Dance Consortium,* who programme dance events in major venues across the UK. A collaboration with the choreographer Rosie Kay (*Rosie Kay Dance Company*) influenced her choreographic practice.

INP members have **engaged with their professional communities** through the organisation of key information events. A symposium on social interactions ("The New Science of Social Interaction") at the *British Psychological Society's* Annual Conference (Glasgow, May, 2011) attracted a wide-ranging multi-national audience including practising psychologists and received extensive media coverage; *Glasgow Neuroscience* (founder, *McKay*, 2010) is a research network of neuroscientists from academia, industry and NHS in greater Glasgow. The annual "Glasgow Neuroscience day" has up to 150 attendees, 15% of whom are clinicians.

INP members have taken advantage of UoG funding Initiatives for collaboration with Industry and the 3rd Sector: Knowledge Transfer Accounts (KTAs) are intended to increase the rate and volume of ESPRC-related research outputs delivering positive impacts beyond academia while supporting the development of a more entrepreneurial culture among the academic community. *Simmons* succeeded in obtaining a KTA award in 2011 to work with local software company *Specialisterne Scotland* on a project relating to sensory environment measurements, which led to a successful collaborative studentship award. The **First Step Award Programme** offers innovation grants to SMEs, enabling them to work with UoG staff on short-term feasibility studies. The programme, offering support of up to £10k per project, aims to reduce the risk of first engagement between SMEs and the UoG and promotes longer-term relationships leading to **Knowledge Transfer Partnerships** (KTPs), consultancy, and further funding applications. There were four awards to INP in 2008-13 relating to: software development for games (*Jenkins*, *Me & the Giants*; *Hillis*, *Tern TV*), social interaction training (*Simmons/Jenkins*, *Voicebusiness*) and measurement of the sensory environment (*Simmons*, *Specialisterne Scotland*). Training in commercial awareness is offered to all younger researchers through the **Enterprise Club**, including providing opportunities for them to work alongside industry partners to solve commercial problems. Knowledge Exchange (KE) activity by individual members of staff is embedded in job descriptions for all academic staff, is measured on a personal level through the University's **annual Performance and Development Review** process and assessed on applications for promotion or change in professorial zoning.

Dedicated College **Business Development Managers** (since 2010) provide advice, initiate and maintain contact with potential partners and help produce materials for better engagement. They also run the College "Industry Days" where different research groupings are encouraged to present their latest research in an accessible form to invited extra-academic partners. *Simmons'* relationship with media training company *Voicebusiness* was initiated via the 2010 Industry Day which led to a research project and subsequent collaborative funding applications.

c. Strategy and plans

The INP has established a KE Committee with the specific remit of promoting and encouraging more effective research impact. This committee aligns with the College and UoG goals of **Understanding**, **Enabling**, **Identifying** and **Publicising** research impact. The committee has representation from the three main research groupings, plus specialists in industrial and public engagement. This committee will coordinate the support of research impacts throughout the next REF cycle by (1) identifying and distributing potential opportunities for KE, such as events, funding initiatives and enquiries from potential partners, including monitoring Technology Strategy Board activities; (2) assisting INP staff with writing impact sections of research council and other grants; (3) providing expertise in KE to facilitate the efforts of INP staff; (4) identifying suitable training opportunities; (5) organising KE events and initiatives focused around key topics to promote KE.

Further to supporting and consolidating current impact activities, specific future plans are:

1. Public Engagement: Develop media strategies to take better advantage of social networking opportunities and explore possibilities for larger scale events and extended projects like TV documentaries built around key INP research themes.

2. Industrial Links: Build a themed approach to industrial engagement around research groups.

Centre for Social Interaction: Use the "Faces, Voices, Bodies" research theme for University events to focus potential partners on social interaction research; Build on seminal work with social skills/communication companies by exploiting emerging research; Explore possibilities in the field of communication technology (i.e. companion robots and communication avatars).

Centre for Cognitive Neuroimaging: Explore applications of *Muckli's* research on predictive coding in such areas as robotic technology, driver behaviour and consumer behaviour; Explore applications of neural modelling and machine learning in novel technologies such as visual computing and voice-control interfaces.

Centre for Neuroscience: Attract commercial funding for translational research in psychiatric disease by combining analogous clinical and pre-clinical techniques, and studying patient populations and rodent models in parallel.

Other potential new application areas include:

Education: Our research on cultural differences in social perception has relevance to education in multi-ethnic environments (*Jack*, *Scheepers*); Social skills training for children and adults with ASD in partnership with our existing industrial and 3rd-sector partners (e.g. *Scottish Autism*: *Simmons*).

Public Safety: Our research on neural oscillations could be used for online monitoring to detect lapses in attention in safety-critical situations (*Thut*).

Health and Wellbeing: Build on clinically relevant research on spinal cord injury (*Riddell, Maxwell*), Pain (*Todd*), Rett's syndrome (*Cobb*, *McKay*), schizophrenia (*Uhlhaas*, *Muckli, Morris, Gumley*) via the new Glasgow Psychosis Research Group (http://www.gprn.gla.ac.uk/), Ageing/Alzheimer's (*Kilborn*, *Rousselet*), Sleep Disorders (*Biello, McKay*), OCD (*Gross*) and language development (*Scheepers*) in partnership with healthcare and 3rd-sector partners; Applications of intervention tools based on our "4-D" facial expressions research to psychiatric conditions where facial expression perception is atypical (e.g. Autism, Depression, Anxiety); Clinical trials utilising the stimulation of neural oscillations to help with sleep disorders and perceptual deficits (*Thut*); Visual (*Panzeri*) and Auditory (*Kayser*) prostheses.

d. Relationship to case studies

The case studies of **Espie**, **Harvey** and **Gumley** show the INP's commitment to achieving impact on health and wellbeing in the context of insomnia, stroke and psychosis respectively. On the other hand, **Schyns'** case study illustrates how basic research in vision science has achieved world-wide impact by maximising reach-through science stories in generalist media, and pursuing potential collaborations by industrial partners arising from media interest.