Institution: Anglia Ruskin University

Unit of Assessment: 5 Biological Sciences

a. Context

***NOTE**: This is the first submission by Anglia Ruskin University to the Biological Sciences Unit of Assessment. The submitted unit is the Biomedical Research Group (BRG), established in 2008. A number of members of staff in the BRG (seven out of the eight submitted researchers) have taken up their posts only since September 2010, and five out of the eight submitted members are early career researchers (ECRs). We request that this is taken into account by the Panel (section 150, Assessment framework and guidance document).*

The BRG has achieved significant impact in three main areas:

1. The promotion of public engagement with science ('citizen science')
2. Influencing policy and practice (in industry, in NGOs, and in performance sport)
3. Standardisation (for example, in drugs identification, qPCR, physiological assessment, and research reporting guidelines)

Key non-academic beneficiaries of the research, during the period 2008-2013, are individual citizens (including children) with an interest in science; national and international NGOs (e.g. the UK Biological Records Centre and the Mammal Society); commercial organisations (e.g. the Environmental Performance Group Ltd); and athletes (e.g. the British Endurance Riders team). Our work in standardisation (e.g. defining key terms and parameters in the assessment of arena surfaces) also benefits non-human animals, in particular horses, via enhancement of their welfare.

b. Approach to impact

The BRG has a strong focus on generating benefits for stakeholders, particularly by promoting outreach and 'citizen science'. The unit is also proactive in pursuing opportunities to use its research expertise to address real-world problems in areas such as health, drugs identification, animal welfare and athlete performance. In particular, we are developing a body of expertise in the standardisation of biomedical research, analytical techniques and reporting guidelines. We have proactively recruited colleagues with a strong impact track record, and are utilising their expertise to champion impact within the unit. Both Bustin and McNally, for example, have produced outputs with significant impact relating to standardisation (the MIQE guidelines and the MIBBI project respectively). Their impact has benefitted from their previous experience, and indeed they have both, since joining the BRG, continued to develop the impact of research work they carried out in previous employment (for example, Bustin's 2013 follow-up to his testimony for the U.S. Autism Omnibus Proceedings, on PCR analysis of the vaccine strain of the measles virus in the intestinal tissues of autistic children).

We have adopted three main strategies to maximise impact from our research. These are: direct support for public engagement with science; support for staff to disseminate their research findings; and support for staff to engage with beneficiaries of our research and to develop research-based commercial partnerships. Our support for impact takes a number of forms, including direct funding (to pay for staff time, transport costs, promotional materials etc), and also technical and professional support in areas such as developing and running outreach events, and the writing of reports and guidelines for end users. The group has, from the outset, adopted a multidisciplinary approach. We believe that this inherently underpins impact: by promoting understanding and communication between researchers from different backgrounds, we are better able to communicate effectively with stakeholders.

Other support for impact includes formal recognition of the value of outreach and consultancy work within the staff appraisal system and in applications for promotion. Impact is also facilitated by investment in equipment to enable the unit to grow its consultancy work and applied research (for example, funding for the purchase of a mechanical hoof tester, for assessment of equine arena surfaces to optimise performance and reduce the risk of injury, and of a bio-impedance system for the monitoring of cardiac output and myocardial function in performance athletes).

1. The promotion of public engagement with science ('citizen science')

The BRG has provided funding and support-in-kind (e.g. staff time) to develop and maintain 'citizen science' websites (e.g. the black squirrels project website http://www.blacksquirrelproject.org/ set up in 2011). This is discussed more fully in REF3b.

Such initiatives provide benefits to the wider public via the opportunity to participate in scientific research and to gain a greater understanding of the scientific process. Several staff members in the BRG are regular contributors to outreach events (e.g. Gordon has given talks relating to VO_{2max} and the limitations to aerobic capability in athletes to both local and national audiences, including the Cambridge Science Festival, in March 2012, and the Society of Biology, in May 2012).

2. Supporting staff to disseminate their research findings

The staff within the BRG generated more than 120 news items during the period 2008-13, and gave presentations at more than 100 national and international conferences and workshops, including events where beneficiaries of the research were present. For example, Bustin was on the scientific board and conference organising committee for the 2013 qPCR & NGS event, 'Next Generation Thinking in Molecular Diagnostics', and presented his work at this conference to researchers and to representatives from government and from industry. This conference also included an industrial exhibition and applications workshop.

The BRG supports staff to disseminate their research findings by allocating funds for conference attendance and meetings with stakeholders, and by providing teaching cover to enable staff to give interviews with the media (e.g. support for McRobie's extensive work with the BBC, detailed in REF 3b). In addition, members of staff within the BRG are actively encouraged to hold positions within NGOs (e.g. the UK Equine Forum) and in industry (e.g. Illumina), and to disseminate their research findings to these organisations. Travel costs to attend meetings with stakeholders are provided, and time-in-lieu; this work to generate impact is also recognised in the academic staff appraisal and grading review (promotion) system.

3. Supporting staff to engage with beneficiaries of our research

To ensure that our research influences improvements in practice, we promote active engagement with a wide range of stakeholders and beneficiaries, ranging from industrial and commercial partners to NGOs, performance athletes, and NHS clinicians. Examples include:

- Warburton and Evans have received funding support from the BRG to carry out research into the microbial diversity of bats roosting in churches, working with the Church of England and Philip Parker Associates Environmental Consultancy. A number of other charities and organisations are involved with research on bats in churches, and are variously advising on and following this work, including DEFRA, Natural England, Bristol University, the Bat Conservation Trust, the National Trust, English Heritage and the Ecclesiastical Architects and Surveyors Association.
- Bustin has been supported (travel costs and staff time) to engage with a number of biotechnology companies, including Illumina and Life Technologies.
- Cole's research into the standardisation of methods for drugs identification (amphetamine profiling) has contributed to the establishment of methods now adopted by a number of EU member states; the BRG provided travel funds to enable collaboration to develop this work.

Institutional support for impact:

At institutional level, funding and other support for impact is provided, including writing retreats to facilitate the generation of reports for user groups. The faculty has recently appointed both a Research Income Manager (in 2010) and a Commercial Manager (in 2012), to support staff with the development of commercial partnerships and new sources of external income. The ARU marketing department has high quality design and document production facilities, and proactively generates press releases around significant research outputs, creating media and end-user interest in the research and enhancing reach. Research is celebrated and disseminated via BRG and departmental meetings, and in a number of faculty and university publications including FiRST (Faculty); Bulletin; Aspects (a journal for Alumni) and "Excellence in Research" each of which is distributed internationally, highlighting our research achievements. The Anglia Ruskin Research Online (ARRO) repository, set up in 2010, was created to showcase research outputs, and to make these publicly accessible.

Anglia Ruskin University awards honorary doctorates in recognition of activities and achievements which chime with our own research interests. For example, an honorary doctorate awarded by Anglia Ruskin to the singer and actress Kylie Minogue in 2011, in recognition of her work in promoting breast cancer awareness, attracted widespread national and international media coverage, highlighting the research work undertaken by the BRG into cellular mechanisms of disease (see http://news.sky.com/story/889459/kylie-minogue-is-awarded-honorary-doctorate).

c. Strategy and plans

Anglia Ruskin University's Research Impact Strategy, approved in June 2013, is an integral part of the university-wide Research and Scholarship Strategy, which in turn influences strategies and plans at faculty, departmental and submitted unit levels. Both of these documents are are informed by the RCUK Concordat for Engaging the Public with Research, and all research outputs are in line with the RCUK *Concordat on Publishing Ethics* (COPE). At the heart of the BRG's emerging new strategy for impact is a commitment to the Manifesto on Public Engagement of the National Coordinating Centre for Public Engagement (NCCPE), which was signed by the University in July 2013, as a public declaration of our robust institutional approach to public engagement and impact.

Working with the newly-appointed Faculty Commercial Manager, the submitted unit will be actively involved in a new commercial research and development brand, "Anglia Biometrics", within the Faculty of Science and Technology. With a proposed launch date in early 2014, this unit will be set up with the aim of providing research solutions to bioscience-based companies and users. This will further enhance the significance, reach and impact of the biological sciences research which is currently being undertaken within the BRG.

Other initiatives and targets to generate impact from future research work within the BRG include:

1. Increased offering of research-based training, targeted to meet employers' needs (our target is to increase provision from two short courses in 2013 [two-day courses in tissue culture] to five courses each year by 2016, covering a broader range of areas)
2. Enhanced visibility of our research activities through growth in the number of conferences where colleagues are members of organising committees and in which they participate (our target is an increase of 10% each year in the number of BRG staff who are members of conference organising committees)
3. The requirement to develop an impact plan for for all major new research projects within the unit, including a systematic approach to tracking and capturing evidence of impact (we will implement this from 2014)
4. Creation of a working group within the BRG to consider public engagement and impact, and to disseminate best practice (we will set this working group up in 2014)
5. Greater involvement of potential stakeholders in research planning, at an early stage in project development (our target is to implement this approach from 2014)
6. The inclusion of impact at staff appraisal meetings, starting from 2014
7. Expansion of our media activity and of the proportion of research staff who engage regularly with the media (our target is to achieve 5% annual growth in media coverage)

d. Relationship to case studies

Our two case studies illustrate how we have taken a strong and proactive approach to generating impact from research within the BRG. McRobie's work exemplifies our focus on 'citizen science' and the dissemination of our research work to a broad audience. The unit has capitalised on public interest in black squirrels to promote data collection on a national scale; this has been achieved primarily by the provision of financial support for the development and maintenance of an interactive website for the black squirrel project. This case study also provides clear evidence of the success of the BRG's approach to maximising impact via dissemination of research findings, by providing teaching cover and travel funds to enable McRobie to take part in television and radio interviews. The second case study, focussing on Northrop's work and the testing of the equestrian arena surfaces for the London 2012 Olympic Games, demonstrates how the BRG maximises impact by combining scholarship and engagement with industry. Northrop's work also illustrates our commitment to standardisation; a White Paper co-authored by Northrop and now approved by the Fédération Equestre Internationale (FEI) reviews current knowledge in this field, and describes standardised tests appropriate for assessing equestrian surfaces.