Institution: University of Sunderland

Unit of Assessment: UoA3 Allied Health Professions, Dentistry, Nursing and Pharmacy

a. Overview

The University encourages research across the range of academic activity and across all Faculties and units. In 2009, the University took a strategic decision to focus its research activities into a small number of broad research areas. Four over-arching Research Beacons and three Research Centres were established to support, encourage, nurture and facilitate research, and a significant proportion of the University's QR funding has been allocated to these Beacons and Centres. They have been designed to be sufficiently broad to capture our research interests, but sufficiently focussed so as to highlight areas of strength and to act as an enabling framework. The Beacons and Centres each have management groups comprised of senior members of academic staff. They provide the context, and agree and manage targets for research grant applications, the strategic appointment of new staff, and the co-ordination and focus of research activity.

In addition to the funding allocated to the Beacons and Centres, the University has established a central Research Development Fund, which has been used to support individual staff who have demonstrated research excellence, early career researchers and to fund a small number of research studentships.

Led by Professors **Roz Anderson** and **Ann Crosland** the Health Sciences Research Beacon brings together 48 staff; this constitutes 44% of the academic staff across the three departments of Pharmacy, Health and Well-Being, Sport and Exercise Sciences and Psychology who have an interest in health research in the two areas of Mental Health and Health Behaviours, and Pharmaceutical and Biological Sciences. Of these, just over half (24.6) have been submitted in this REF submission. Our vision is to continue to provide a research-rich environment that allows the current cohort of research active staff to achieve their full potential and that all other staff who aspire to being research active are supported to become so. In 2020, we aspire to at least 50% of our total academic staff from across the three departments to be active in the Research Beacon and for 75% of these to be eligible for submission to the REF. Our other longer term aim is for the majority of our research staff to be engaged in internationally renowned research in collaboration with new and established partners in industry, healthcare and academia. It is envisaged that these collaborations will help us develop and deliver further research that has real world impact.

b. Research strategy

The University Research Plan reinforces the importance of research, and sets out the context in which units plan their own activities. The fundamental context for research is to underpin the academic standing of the University as a seat of higher learning and scholarship. The University is committed to being research active, with a research active curriculum, undertaking research which both enhances the learning experience of our students and delivers impact to the wider community.

The Health Sciences Research Beacon carries out high quality research into contemporary health issues spanning from the laboratory through to applied clinical practice and public health. Reflecting the principle that most of today's important health issues require an array of skills and expertise, research within the Beacon is carried out by multi-disciplinary teams that span the fundamental and applied sciences and commonly include healthcare clinicians and practitioners. Thus, staff involved in research in the Health Sciences Beacon embrace a wide range of disciplines including pharmaceutical sciences, chemistry, social sciences, psychology, immunology, sports and exercise sciences, microbiology and health services research, as well as pharmacy, nursing, medicine and allied health professions. We also collaborate with local, national and international partners in industry, academia, and health services ensuring that our outputs and products are both locally relevant and have international reach, and that they address the translational challenges of getting science into products and evidence into practice.

Health Sciences research is centred on two inter-related research groups, each led by a senior academic researcher. These are:

- Mental Health and Health Behaviours, led by **Prof. Ann Crosland;**
- Pharmaceutical and Biological Sciences, led by **Prof. Roz Anderson**.

Knowledge translation forms a core theme of both research groups, with a central research focus on how best to get science into products and evidence into practice. Two further connecting threads integrate our research: understanding processes to improve interventions, and investigating patient and professional barriers to uptake of interventions.

The objectives for the groups are to:

- provide a supportive environment that maximises opportunities for the production of high quality research outputs
- develop high quality externally funded projects
- develop local, national and international collaborations
- provide a supportive environment for research staff and postgraduate research students
- support and mentor less experienced staff to become future research leaders.

Mental Health and Health Behaviours

Research undertaken within this group is focused on three key areas:

1. ***Mental health and well-being,*** including work on indicators of mental distress through understanding mechanisms of attention in visual perception [**Delicato**] or responses to stress [**Ennaceur**], understanding professional decision making when dealing with common mental health problems [**Crosland**], and the impact of space on mental well-being [**Wilkie**].

2. ***Understanding health behaviours***, such as, sedentary behaviours in young people [**Soos**], alcohol use in working professionals and older adults [**Ling**] and triggers to weight gain [**Crosland**]. Developing our understanding of factors that can influence health behaviours also features strongly, with a focus here on understanding the origins, motivations and social influences on co-operation and how these may contribute to adverse health behaviours [**Farrelly**].

3. ***Patient and professional experiences of health and healthcare*** focuses on the views and experiences of patients and professionals and how these influence the development, uptake and use of healthcare interventions. Here research looks at factors that affect the uptake of diagnostic facilities for infertility [**Wilkes**], attitudes to organ donation for transplantation [**Carter**, **Ling**], surgeons' use of implants in the treatment of femoral neck fractures [**Bradley**], patient and professional views of new roles in support of patients with cancer [**Ling**] and factors that influence patients' decisions about whether to take anti-depressant medication [**Crosland**].

As a partner in Fuse, the Centre for Translational Research in Public Health, knowledge translation plays a key role in all that we do. A translational element runs through each of the key strands in this theme and looks not only at people's views and experiences of existing healthcare processes and interventions, but also offers insight into the important questions that patients, professionals and members of the public ask when faced with decisions about their health.

Pharmaceutical and Biological Sciences

The traditional 'bench to bedside' approach to target identification, drug discovery, and translation into products has been strengthened by closing the loop with 'bedside to bench' communication, such that research is directed at improvements to pharmaceutical interventions, not only through an understanding of normal biological processes and related pathobiology, but also through feedback from patients and professionals. Our research in this group is focused into two main scientific research themes:

1. ***Infection and Immunology: From pathogenesis to treatment*** focuses on developing an understanding of the difference between normal and aberrant processes in certain diseases, such as melanoma, arthritis, neuroblastoma, and the rare disease cystinosis [**Anderson, Armstrong, Carlile, Carr-Wilkinson, O'Boyle, Veuger**], and in pathogenic microorganisms [**Bingle, Paget**]. The increased understanding of cellular mechanisms and the identification of altered pathways resulting from these studies, alongside proteomic and metabolomic projects, have the goal of identifying possible biomarkers of disease and new targets for pharmaceutical intervention, with results at varying stages. Regional, national and international collaborators from other institutions, industry, and charities are actively involved with these projects, bringing further multidisciplinary expertise and international application to the work. Laboratory-based scientific evidence also underpins enhanced opportunities for high risk transplant recipients who would otherwise have been denied transplant [**Carter**] and tools for the optimisation of screw position in femoral neck fractures to achieve the best outcome for the patient [**Bradley**].

2. ***Pharmaceutical Sciences: From disease to medicines use*** brings together a drug development team that works alongside the cell and molecular biologists, using traditional molecular modelling to identify hits, with synthetic organic and medicinal chemistry to develop these into pharmaceutical leads, supported by targeted *in vitro* evaluation of activities, the results of which inform further development [**Anderson, Ashton, Blackburn, Gray**]. New automated approaches to enhancing the drug discovery process are being developed in collaboration with the Computing Department at the University and alongside SME collaborators Molplex. Within this sphere, we have expertise and results at various stages of development and translation, e.g. in the fields of psoriasis (in collaboration with Stiefel (UK) Limited and University of Sydney, Australia) and cystinosis (in collaboration with the Cystinosis Foundation UK). A similar medicinal chemistry-based project develops chemical substrates for the enhanced detection of pathogenic bacteria within an industrial / clinical collaboration (with bioMérieux and Freeman Hospital, Newcastle upon Tyne).

   The pharmaceutical journey is mirrored by research in analytical chemistry and pharmaceutics [**Chaw, Dodou, Elkordy, Nazar**] and includes projects in the improved delivery of insulin (e.g. nasal, oral), with possible application to other peptide/protein drugs, trans-dermal delivery of pharmaceuticals, and improving the oral bioavailability of microparticle formulations and inhaled formulations (in collaboration with Ulster University, Umm El Qura University (Saudi Arabia) and Tanta University (Egypt), and industrial collaborators Schwarz, UCB BioSciences and Piramal Healthcare UK).

Future directions

Future research will build on the foundations laid by the Health Sciences Research Beacon and current themes and expertise, as well as capitalising on the skills and expertise of a new cohort of research leaders as they develop. Areas already in train include projects that are in the early stages of development and not producing immediate visible outcomes; they are expected to yield results of high impact in the next 5 – 10 years. Support for these projects is considered strategically important, due to the significant input they have received to date and the anticipated weight of their potential outputs. For example, research led by **Anderson**, sponsored and informed by stakeholders through the Cystinosis Foundation UK, in collaboration with industry and supported by a team of multidisciplinary internal and external international researchers, including University Hospital Leuven (Belgium) and Paris Necker Hospital (France), aims to improve the current treatment for cystinosis patients. Orphan Drug Designation is being sought, with the aspiration of this new medicine being available to patients in considerably less than 10 years and contributing to Horizon 2020 aims. A project led by **Elkordy** is evaluating a novel formulation to improve the oral delivery of insulin; the results are sufficiently encouraging to progress to protection of intellectual property. An alternative strategy focuses on nasal delivery of insulin and is being developed in collaboration with clinicians and patients [**Nazar**]. Other examples include research with Age UK, carried out in collaboration with Fuse colleagues, which is continuing the study of alcohol use in later life [**Ling** and **Crosland**]. Further work is examining patients' perspectives of

health technologies to help understand how best to translate research evidence into practice [**Wilkes**]. Two Fuse MRC studentships will commence in 2014, supervised by **Crosland** and **Ling**, one examining processes in knowledge exchange and, in particular, the knowledge broker role, and the other focusing on alcohol use in older people.

Current work on alcohol consumption will be further developed by a multi-method investigation into alcohol and class identity. This project will investigate different patterns of drinking and how these differences can feed into public health messages. Future research is planned that will explore the 'bedside' perspective on cancer and investigate the possible relationship between cancer and altered self-identity. New and early stage collaborations with local and regional hospitals through seconded staff and shared practitioners aim to improve practice by disseminating and implementing research findings. Pharmacy staff collaborations with primary care providers, including GP surgeries, via the Sunderland CCG, practitioners, and community pharmacies (both independent and multinational), and secondary care providers, through the established hospital links and a hospice, focus on professional identity in a changing profession, sexual health and end-of-life care, with mentoring and support from senior Beacon staff [**Anderson**, **Crosland**, **Wilkes**]; these projects support the three-way communication of patients, clinicians and researchers and facilitate the route to impact and its evaluation.

Research Management

The research group leaders, along with the Associate Dean for Research, Resources and External Engagement, make up the Health Sciences Research Strategy Committee, who meet bi-monthly to discuss progress against the Beacon objectives and the University Research Plan, as well as to develop the strategic direction for Health Sciences research. Administrative support is provided by the Beacon Administrator.

A Research Governance Committee made up of the two Beacon Leads, the Associate Dean for Research, Resources and External Engagement, a management accountant, and a member of staff from University Research team also meets every two months to discuss progress against the University research plans and to ensure good financial and research governance.

A research leadership group meets monthly to help develop further capacity for research leadership and comprises the Associate Dean for Research, Resources and External Engagement, two Beacon Leads, two Beacon Research Fellows and three further aspiring research leaders.

c. People, including:

i. Staffing strategy and staff development

The success of the research plan depends critically on the quality and engagement of staff. It is desirable that all new academic staff hold a higher degree in an appropriate discipline. New members of academic staff who wish to become research active have the opportunity to discuss their plans and needs with their line manager, and are supported and mentored to develop their research activities. A range of research training programmes are available within the University. All academic staff have the opportunity to engage in research activity as part of their agreed workload.

The University values and promotes equality and diversity for staff and students. In line with our strategic aims, we work to ensure that all members of our community treat one another with respect and dignity. The University is one of the original Athena SWAN award holders and currently holds a Bronze award; it also holds Investor in People status, is a Stonewall Diversity Champion, and subscribes to the "two ticks" "Positive about Disability" scheme. The University also fully subscribes to the Concordat to Support the Career Development of Researchers, and is an HR Excellence in Research Award holder. A recent review of our support for researchers identified areas for further improvement, which have been implemented in 2012/13. These include a new development programme specifically for contract researchers and a review of careers provision to ensure researcher needs are fully met. In collaboration with the Universities of Northumbria and Teesside, Sunderland developed and piloted a Leadership Foundation funded programme

"Leading on Research Excellence", a tailor-made strategic leadership programme for Readers and Professors across the region.

Academic staff are encouraged to engage with research that complements existing research groups, in identified areas of strength and where there is a critical mass of experienced staff to offer support and leadership. Research development is discussed and supported through staff appraisal and the Beacon Leads are active members of University management structures to ensure research opportunities are maximised. The University's equality and diversity policy is observed and is reflected in the inclusive nature of the research teams within each research group. Many of the staff with full- or part-time contracts are active in the healthcare sector and benefit a range of research projects with their current knowledge. Visiting Research Fellow and Visiting Professor appointments are also made through the University's defined process.

Research active staff are encouraged and supported to become supervisors of postgraduate research students early in their academic careers and are teamed up with a more experienced researcher who has supervised to completion, providing mentorship and personal development. Each student has at least two internal supervisors and an external advisor, if necessary, e.g. when a PhD is clinically focused, a clinical supervisor would be appointed alongside the two University supervisors. Forty-one of our staff are currently supervising at least one postgraduate research student; of these staff, ten are first time supervisors being supported to develop their supervisory skills and thirty-one have had at least one successful completion over the assessment period. The steady development of new research staff enables responsibility for, and supervision of, research students to be spread. Good practice is shared across the University of Sunderland and with other regional Universities through research forums and at training events.

ii. Research students

The University aims to continue to ensure that our Postgraduate Research (PGR) students enjoy an excellent student experience, that their work is of the appropriate standard, and that they achieve their qualification within an appropriate time period. In 2012, the University undertook a review of the PGR provision at all levels which highlighted our strengths and identified areas for action. Central Graduate Research Support provides administrative support for PGR students, their supervisors and procedural aspects. Central Academic Services provide a comprehensive offering of PGR student training programmes, which spans the VITAE researcher development framework. All PGR students are required to attend this programme, as well as annual reviews of their progress. Recent PRES surveys show good scores for student satisfaction with their skills development, ranging from 73% for transferable and research skills to 85% for analytical and project management skills and 87% for independent learning. The recent university-wide PGR review identified this as "a comprehensive skills training programme." Faculties provide subject-specific training, including access to Masters' modules where appropriate.

Within the Health Sciences Research Beacon, 77 postgraduate research students are currently registered. Great care is taken in the admission of research students to ensure they are appropriately prepared for their studies and that the Faculty has sufficient resources and infrastructure to support the proposed projects. Research students are supported, tracked and monitored locally according to University procedures, meeting regularly with their supervisory team, with the production of monthly summary sheets recording discussions, achievements and targets, which are submitted to the Faculty Research Administrator for tracking. The annual monitoring exercise requires each research student to submit a full report of their activities, results and analyses over the previous 12 months, along with an oral presentation and discussion, which usually takes the form of a mock viva. A report of the meeting is submitted centrally to the University and is considered by the University Research Committee, to identify and remedy potential problems at an early stage.

Research students are engaged on a wide range of projects and many have achieved results of commercial and / or technological significance, resulting in patents and associated high quality publications. KTPs are an established means of engaging with research relevant to industry and

many lead to PhD; fully funded industrial research PhD studentships in Health Sciences research are also well established at Sunderland.

Research students are also actively supported to engage in regional research support initiatives and to become members of regional collaborations. For example, all students whose research covers public health topics are encouraged to become active in the cross university PGR Group run by Fuse, the Centre for Translational Research in Public Health. This allows them to access events run by Fuse and to participate in all student activities, alongside students from the other four Universities in the North East, i.e. Durham, Newcastle, Northumbria and Teesside.

d. Income, infrastructure and facilities

Central support for research is provided by a Research Support team, within Academic Services. This team provides support for postgraduate research students, for research active staff, research project managers, and senior management through the provision of management information. Central support is also provided for the identification of funding opportunities, bid writing and submission.

Research income for the period is over £3.1m and has been drawn from a range of research funders, including National Institute for Health Research, Research Councils, Research Charities including Cancer Research UK and Cystinosis Foundation UK, Department of Health, local NHS organisations and industry. Staff have also been co-applicants on successful research grants worth £9m with colleagues from other universities. As partners in Fuse, the Centre for Translational Research in Public Health, of which **Crosland** is Associate Director, we have been collaborators on a £10m infrastructure grant from the UK Clinical Research Collaboration. This has funded a Senior Lecturer post at Sunderland and provided a platform for greater collaboration with the other North East Universities.

The physical infrastructure for Health Science Research at the University of Sunderland has recently undergone a major redesign and renovation. Phase 1 of a redevelopment of the Sciences Complex has been completed and Phases 2 and 3 are planned for the near future. As a result of Phase I, the analytical and medicinal chemistry research labs have been fully refurbished and fitted with state of the art equipment, supporting and facilitating greater external engagement. For example, recently initiated projects using the new analytical facilities include the targeted metabolomic profiling of prostate cancer cell lines to identify biomarkers of disease in collaboration with a national cancer charity and the identification of predictive biomarkers for organ rejection and clinical outcome for renal transplant patients in collaboration with the Freeman Hospital and the School of Medicine at the University of Newcastle upon Tyne [**Carter**], while a new medicinal chemistry collaboration with regional SME Molplex is developing new methods and technology for enhancing the drug discovery process [**Anderson**, **Ashton**].

Phase 2 will update the pharmaceutics research provision and include several small incubator units, for the translation of initial results into products, alongside communication and new clinical skills labs, which will further enhance our research facilities. Phase 3 will include the category 2 microbiology and cell culture facilities, alongside the renovation of the Clean Room.

In the redeveloped Sciences Complex, academic and research staff from across the Health Science disciplines are now co-located, thus allowing for the development of a vibrant, more integrated, and multidisciplinary research culture, particularly in healthcare and professional identity research projects. There has also been significant investment into high quality sports facilities and equipment, to support the growth and further development of Sports Sciences research. Likewise, research students and post-doctoral researchers from across the Health Sciences areas have shared office space and benefit from the increased awareness and understanding of alternative research methods, and drivers and challenges for translation of results into practice and products. They also benefit from the increased peer support and mentoring that has developed from this.

e. Collaboration or contribution to the discipline or research base

We collaborate with a wide range of local, national and international research and practice partners. Collaboration is encouraged, both internally and externally and new collaborations sought. We are partners in Fuse, the Centre for Translational Research in Public Health, which brings together researchers and practitioners from across the North East in collaboration with other national and international researchers. We currently have collaborative projects underway with researchers from several Universities, including Glasgow, Newcastle, Durham, Teesside, Hull, Loughborough, Liverpool and Sussex, as well as internationally with colleagues at the Leuven University Hospital in Belgium, Necker-Enfants Malades Hospital in Paris, National Human Genome Research Institute, University of Rome, Complutence University (Madrid), New York University and City University New York (USA), and the Murdoch and Sydney Universities in Australia.

In addition to collaboration with colleagues within the HE sector, we have a strong track record of past and current research with partners in industry, including Stiefel (UK) Limited, bioMérieux, UCB BioSciences, Genentech, and Piramal Healthcare UK, and with those in the healthcare sector, including the Freeman and Royal Victoria Hospitals (Newcastle upon Tyne), Moorfields Eye Hospital (London), and Great Ormond Street Hospital (London). For example, the collaborative work funded by Age UK examined issues in relation to older people and alcohol use, led to peer reviewed journal articles, conference papers, and a commissioning brief for the development of treatment services for older drinkers [**Crosland**, **Ling**]. Research aimed at the enhanced detection and identification of bacteria in clinical and environmental samples in collaboration with the Freeman Hospital and bioMérieux has resulted in the commercialisation of results and informed clinical decision making [**Anderson**, **Gray**].

Further examples come from some of our recently appointed staff, who bring additional expertise and established research credibility. For example, an international collaboration to generate the first comprehensive analysis of the p53 tumour suppressor gene pathway in paired neuroblastoma tumours involved clinical oncologists Prof. Nai-Kong Cheung at Memorial Sloan-Kettering Cancer Centre, New York (USA), and Prof. Joachim Boos at the University of Münster (Germany) [**Carr-Wilkinson**]. A collaboration with industrial partners Genzyme and Newcastle University aims to develop new pharmacological approaches for the manipulation of pathological cell migration in terms of malignancy and auto-immunity; this work has already resulted in a first-in-field publication on metastatic melanoma and is ongoing [**O'Boyle**]. Research in collaboration with Newcastle University and industrial partners Reinnervate aims to develop an *in vitro* skin equivalent model and involves collaboration between cell biologists, dermatologists and industrial scientists [**Armstrong**].

Current projects, not yet published, and others in development include; an industry funded PhD studentship in pharmaceutics evaluating formulations primarily intended for passive diffusion controlled transdermal drug administration, aimed at a systematic time- and cost-saving strategy in the development and manufacture of drug-loaded polymer systems, and involves experts in pharmaceutics, industrial medicinal chemistry, and engineering, alongside industrial sponsor UCB BioSciences [**Dodou**], an investigation into parasite cell differentiation involving collaboration with Professors Dan Eichinger at New York University and Ed Jarroll at City University New York [**Paget**], a recently initiated collaboration with a clinical psychopharmacologist at the Newcastle University aiming to understand emotion recognition at the level of the individual using psychological methods and an emotion attentional blink paradigm [**Delicato**]. Part of an international collaborative project centred on understanding and improving the treatment of the rare disease cystinosis, funded by the US charity Cystinosis Research Network, is using proteomic methods to study how protein expression changes in cystinotic cells when treatment with cysteamine is initiated. This involves local multidisciplinary collaboration between a medicinal chemist, a molecular biologist, and an informatics statistician, with specialist proteomics input from a regional collaborator (at Newcastle University) [**Anderson, Carter**].

In addition, many staff contribute to the mentoring and development of young people to become

the leading scientists of the future by encouraging and supporting young talent, and providing role models. Some of these have led to national recognition; for example, two undergraduate students won national recognition[1,2] for their research on new methods for the delivery of gene therapy agents under the mentoring and supervision of **Elkordy**, while a school student was inspired and mentored during a summer placement with **Nazar**. Her results on a formulation for the nasal delivery of insulin for the treatment of diabetes led to a national award from the Royal Society of Chemistry[3] and nomination for the UK's Young Scientist of the Year in 2013.

Our staff have made, and continue to make, a significant contribution to the research bases underpinning Mental Health and Well-Being, and Pharmaceutical and Biological Sciences:

- Staff have acted as external examiners for doctoral students across a wide range of institutions including: UCL, Imperial College, Nottingham, London School of Pharmacy, University College Dublin, Strathclyde University, Trinity College Dublin, University of South Wales, and Northumbria and Teesside Universities.

- Two of our staff have Journal Editorships: **Wilkes** is Editor of the Journal of Family Planning and Reproductive Health, and **Ling** is Associate Editor of Integrated Pharmacy Research and Practice, while **Ennaceur** was an invited guest editor for a specialist issue of Behavioural Brain Research in 2013. **Wilkes** also leads a BMJ Masterclass on Infertility.

- Three of our staff are Fellows of the Royal Society of Chemistry [**Anderson**, **Dodou** and **Elkordy**].

- In 2011, **Crosland** was invited by the European Alcohol and Health Forum of the European Commission to act as an independent expert in appraising "Alcohol, Work and Productivity: Scientific Opinion of the Science Group".

- **Armstrong** was awarded the New Investigator Award from the European Skin Research Foundation in 2010 and the British Society for Investigative Dermatology Young Investigator Award in 2011.

- In 2013, **Anderson** was invited to join the Cystinosis Rare Diseases Working Group, reporting to the UK Renal Association. This group meets regularly to develop Good Practice Clinical Guidelines for the UK registry, linking with the European CEMARA database, and collaborates with patient societies to develop patient information, as well as promoting research and clinical trials.

We are well integrated into NHS R&D infrastructure, faculty and the regional healthcare innovation hub. **Wilkes** chairs the North East Research for Patient Benefit Committee and is Director of the Northern and Yorkshire Primary Care Research Network (NYREN). **Ling** is a Member of NETSCC College of Experts, Health Technology Assessment (HTA) Psychological and Community Therapies Panel. Others are national and international funding body expert reviewers: FP7 – Marie Curie [**Anderson**], Population Health Sciences Committee of the Health Research Board of Ireland [**Crosland**, 2012 and 2013], Royal College of GPs Scientific Foundation Board and the North East Research for Patient Benefit Committee [**Crosland**, 2007-2011].

The recognition that our staff receive from their peers within their cognate disciplines combined with their collaborative work with healthcare partners and industry ensures that our research is of the highest quality, whilst at the same time achieving maximum impact. This is an approach that we will continue to develop and grow over the next assessment period.

[1] www.sunderland.ac.uk/newsevents/news/news/index.php?nid=1351

[2] www.sunderland.ac.uk/faculties/apsc/newsevents/news/news/index.php?nid=1037

[3] www.sunderland.ac.uk/newsevents/news/news/index.php?nid=2069