

Institution: University of Plymouth
Unit of assessment: 4 (Psychology, Psychiatry and Neuroscience)
<p>1. Unit context and structure, research and impact strategy</p> <p>Context and structure</p> <p>UoA 4 at the University of Plymouth is a vibrant, inclusive, rapidly-growing research community of 43 category A staff, 10 post-docs and research fellows, 64 PGR students, and 4 technicians. Compared to our 2014 REF submission, we have 39% more Category A staff, 85% more research income, and 152% more PGR completions. We have further developed our long-standing excellence in experimental psychology, and have substantially grown our work on neuroscience, applied psychology, and animal behaviour. We have invested £9.4m in a new Brain Research Imaging Centre and are founding members of the Plymouth Institute for Health and Care Research (opened 2020). Our applied research has impacted policy in anaesthesia, person-centred healthcare, medical alarms, and marine pollution. We have four research groups:</p> <p><i>Experimental Psychology</i> (17 Category A staff): The experimental psychology group works on basic psychological research, aiming to understand thought from low-level associative and cognitive processes, through language, to social interactions, and from birth to adulthood. Since 2014, the members of the group have led two major multi-site grants (both on language development) and were Investigators on over £4m of research grants from the ESRC, British Academy, and EU, on topics ranging from learning and memory, spatial navigation, and action perception, to multimodal person perception, and human-robot interactions. Group members also won three international Best Article awards and two international career awards. Current staff in this group are Berry, Cattani, Charlesford, Floccia, Golubickis, Heintz, Hollins, Jones, Kanngiesser, Longmore, Mileva, Mitchell, Smith, Verde, Walsh, Wills and Woike.</p> <p><i>Applied Psychology</i> (12 Category A staff): The applied psychology group works on the application of psychology to real-world issues, and has made significant impacts on policy in the areas of anaesthesia, person-centred healthcare, medical alarms, and marine pollution. It also conducts excellent applied-psychology research on online gambling, eHealth, multiple sclerosis, respiratory disease, autism, and student mental health. The group led a £900k multi-site grant on energy visualisation for greener homes (EPSRC) and is involved in a £6.7m grant to develop eHealth initiatives (EU). Two of the group's members were elected as Fellows of the Academy of Social Sciences in the current period, each also winning an additional prestigious award in their specific areas of research (anaesthesia, and medical ergonomics). All our Impact Case Studies are based on the work of the Applied Psychology group. Current staff are Andrade, Bacon, Brennan, Edworthy, Lloyd, May, Minton, Morris, Norman, Pahl, Stedmon and Whalley.</p> <p><i>Neuroscience</i> (8 Category A staff): The neuroscience group combines different neuroscientific techniques (including MRI, EEG and TMS) to provide converging evidence on questions of brain function. The group led the £9.4m investment in neuroscience infrastructure at Plymouth (see Section 2), drove the successful €4.1m EU grant on cognitive innovation and creativity (see Section 3), and were Investigators on an additional £2m of other grants from UKRI and the EU, on topics ranging from ultrasound neuromodulation to the neuroscience of reasoning, perception, adaptive learning, imagery, and deception. Current staff are Bault, Fouragnan, Ganis, Goslin, Hall, Ho, Hughes and Roser.</p> <p><i>Animal Behaviour</i> (6 Category A staff): The animal behaviour group works on ethological, evolutionary and genetic explanations of the behaviour of non-human animals, particularly in the areas of conflict resolution, and applied work on emotion and depression-like states. In the</p>

current REF period, members of the group were Investigators on **four BBSRC grants, a BBSRC partnering award, and a Leverhulme grant, totalling over £1.8m**. Current staff in this group are: **Briffa, Collins, Fureix, Herborn, Thom** and **von Engelhart**.

Management structure: UoA 4 at Plymouth is a combination of two separately-managed staff bodies. The School of Psychology makes up the larger body (85% of staff) and comprises three research groups: Experimental Psychology, Neuroscience, and Applied Psychology. All Category A staff in the School of Psychology are part of UoA 4. The School of Psychology is part of the Faculty of Health and has associations with two of the University's Strategic Research Institutes: the Plymouth Institute of Health and Care Research (PIHR) and the Marine Institute. In the School of Psychology, research line management is the responsibility of the *Senior Management Group*, in particular the Head of School (**Hollins**), Deputy Head of School (**Andrade**), and the Associate Head of School for Research (**Floccia**). Research line management in the Faculty of Health falls to the Dean (*Banerjee*), and the Associate Dean for Research (*Fern*). The remaining UoA 4 staff are from the Animal Behaviour research group, which is associated with the Marine Institute and is based in the School of Biological and Marine Sciences (SoBMS), part of the Faculty of Science and Engineering. Research line management for this group is provided by the Head of School (*Knight*), the Associate Head of School for Research (*Masselink*), the Dean (*Jones*), and the Associate Dean for Research (*Blake*).

Research strategy

Both throughout the current REF period, and over the next five years, our research strategy centres on three main strategic research goals:

Goal 1: Increase research quality

Our first goal in the current period was to increase research quality in all four of our research groups. We achieved this in the current REF period through **retaining our best research leaders and supporting their research groups with new appointments of excellent early-career staff**. In Experimental Psychology, **Floccia, Hollins, Mitchell** and **Wills** were joined by five early-career researchers, including **Golubickis, Heintz**, and **Mileva**. Heintz won the 2016 early-career award from the International Society for Humour Studies, and Golubickis won a 2017 Psychonomic Society Best Article award. Immediately on arrival, Mileva attracted sufficient research funding (from the British Association) to buy herself out of teaching for three years. In Applied Psychology, established members **Andrade** and **Edworthy** were joined by two early-career researchers, including **Lloyd**, who attracted significant research funding (from the charity GambleAware, and from the South West Academic Health Science Network); Lloyd also wrote our Impact Case Study on person-centred healthcare. In Neuroscience, **Hall** was joined by four early-career researchers, including **Fouragnan**, recipient of an **ESRC Future Leaders' award**, and **Hughes**, winner of the Anthony Mellows award. In Animal Behaviour, **Briffa** was joined by three early-career researchers (**Fureix, Herborn** and **Thom**), all of whom have attracted substantive external grant funding (from Leverhulme, BBSRC, and also the commercial sector e.g., Mars Pet Foods).

The future: Supporting the career development of this next generation of psychology researchers is a major strategic goal for the next REF period, the responsibility for which falls to the established research leaders in each group. We have several support and mentoring systems in place to achieve this (see Section 2). We are also committed to the continuing career development of mid-career researchers, as evidenced by the promotion of 11 members of staff from this UoA in the current REF period (seven to Associate Professor, and four to Full Professor).

Goal 2: Invest in neuroscience

Our second goal was to improve both the quality and the quantity of our neuroscience research through significant investment in physical infrastructure. Since 2002, our MRI-based research had mainly used spare capacity on the ageing 1.5T scanner at Exeter University, 45 miles away. The building of the University's **new £9.4m Brain Research and Imaging Centre (BRIC)**,

starting in 2019, began to change all that. BRIC has a modern 3T MR scanner, plus six additional neuroscience labs (see Section 2), and is housed in a new purpose-built facility that is largely complete, and will open in Spring 2021 (the opening having been somewhat delayed by COVID-19). BRIC is part of a larger, university-wide, initiative to grow critical mass in brain research, and will transform our neuroscience infrastructure over the next REF period. Our goals for this next period were kick-started by the recent UKRI **£900k Future Leaders' Fellowship** awarded to **Fouragnan**, for work on transcranial ultrasound neuromodulation.

Goal 3: Enhance our doctoral student community

Our third goal was to substantially grow the size of our Doctoral student community, seeing this as central to a vibrant research community, and essential to the development of the next generation of researchers. This goal was successful, with PGR completions rising from 50 in the last previous REF period, to 126 in the current period (a **152% increase in PGR numbers**).

The future: With the number of currently-enrolled PGR students now substantially exceeding the number of Category A staff, **our strategy in the next REF period** is to maintain PGR numbers at current levels, while focusing on **further increasing the quality of PGR-produced research** as measured by publication quality and post-PhD destinations. The main levers for achieving this goal are: (a) the increased research quality in category A staff (Goal 1) and (b) the increased investment in neuroscience infrastructure (Goal 2).

Impact strategy

Research impact has always been, and continues to be, central to the operation of UoA 4 at Plymouth. We have an explicitly-identified Impact Lead (**Edworthy**), we provide internal funding to support impact activities (approx. £13k/annum), and research impact is a standing item in everyone's annual appraisal. We also have an entire research group (Applied Psychology) dedicated to impactful research.

Two distinct but complementary aspects of our impact strategy are reflected in our four impact case studies (ICS). Two ICS embody a **discovery-to-application approach** – the organic development of our expertise in basic, discovery-led, science into applications to which they naturally apply. Staff are supported and encouraged to transition from discovery to application and back again. For example, several years of work by **Edworthy** have led to the adoption of a new global standard for medical alarms (IED 60601-1-8), including downloadable alarms sounds that are demonstrably superior to those currently in use. The nature of this new global standard builds strongly on Edworthy's basic and applied research since 2011.

Another example of our discovery-to-application approach to impact can be seen in our ICS on accidental awareness under anaesthesia. **Andrade's** research interests include the study of anaesthesia as a way of increasing our understanding of consciousness. Her basic-science discoveries in this area led to Andrade becoming increasingly involved in applied research on anaesthesia, specifically the problem of accidental awareness during general anaesthesia (AAGA). Her recommendations have been included in UK medical curricula and exams, and the Royal College of Anaesthetists updated their guidelines on the basis of her research.

The second, complementary aspect of our Impact strategy is the leadership of projects that address key societal problems from the outset, with researchers applying their expertise in a sub-field of psychology to a variety of pressing problems over time. This **applied-from-outset** part of our impact strategy is seen in our other two ICS and particularly benefits from the facilitatory effect of the University's Strategic Research Institutes (in particular, PIHR and the Marine Institute). For example, **Pahl** has a long track record in applying principles of behavioural change to increase pro-environmental behaviours. Since 2010, she has had a focus on reducing marine litter by changing human behaviour. With support from the University of Plymouth's Marine Institute, Pahl has converted applied research into practical advice that has led to changes in UK policy (DEFRA), EU policy, and the United Nations Environment Programme, as well as increased environmental action across the globe.

Another example of the applied-from-outset part of our impact strategy is the work by **Lloyd** on improving healthcare through a person-centred approach. Lloyd is exactly the kind of interdisciplinary researcher that PIHR strives to support. During her time at the University of Plymouth, she has held research posts first at the Medical School, and now at the School of Psychology. Lloyd works on person centered and coordinated health care (P3C). Her application of sophisticated qualitative and mixed research methods to the inherently complex group interactions in P3C have directly led to changes in UK general practice policy, through the national Quality Outcomes Framework.

The strengths of our two-component impact Strategy are further illustrated by the breadth and depth of impact activities in our UoA; activities that were not selected for an ICS in the current period, but will form the backbone of our impact strategy in the next REF period. Our strategy for the future retains the same two-component approach of supporting both discovery-to-application impact and applied-from-outset impact. For example, the appointment of **Brennan** in the current period brings strengths in applied-from-outset work on combatting child pornography, and the appointment of **Minton** and **Morris** to that group brings strengths in applied-from-outset research on bullying, and on stroke rehabilitation, respectively. Long-standing member of the Applied group **Whalley** has a developing track record in clinical trials, which we will continue to nurture and support. **Andrade**, who was key to our Impact Strategy in the current period, is developing new impacts through the application of Functional Imagery Training. The arrival of **Wyles** in 2021 brings considerable expertise in the health benefits of exposure to natural environments.

We further anticipate that our investment in the Neuroscience research group in the current period will have impact pay-offs in the next period. The appointment of **Hughes** in the current period brings applied-from-outset research on the neuroscience of pain and pain management. The appointment of **Fouragnan** in the current period, and the £900k funding she has recently attracted, will support novel work on ultrasound brain stimulation; a cutting-edge basic-science technique that is expected, in the medium-term, to have substantial clinical applications. **Goslin**, along with members of the Applied group (**Andrade, May**) has started to work on the clinical applications of robotics. Work by **Ganis** on the neuroscience of deception also seems to hold potential for impact in the coming REF period.

There are also a number of promising possibilities emerging from the increasing involvement of the Experimental Psychology research group in **discovery-to-application** impact. For example, **Floccia's** long-standard expertise on the basic science of language acquisition recently resulted in a £1.7m GCRF grant to study language development in Arabic countries. Substantial real-world impacts are expected anticipated. Additionally, ESRC-funded work by **Hollins, Mitchell** and **Wills** on test-potentiated learning has potential for enhancing learning in, for example, secondary school children.

In summary, the next REF period will see us continuing our two complementary approaches to achieving impact. We anticipate, and will nurture, substantial impact in several areas. To that end, we have put in place multi-year structures (specifically workload allocation, money, and six-monthly review) to support the strategic development of further impacts.

Interdisciplinarity

Our research impact activities are one indicator of our commitment to interdisciplinary working. Three of our impact case studies (**Andrade, Edworthy, Lloyd**) involve health care research, and we led several other healthcare projects during the current REF period, including Functional Imagery Training for obesity (**Andrade, May**), novel treatments for complex asthma (**Hyland**), determinants of altruistic kidney donation (A. Mitchell) and choosing health insurance (*Hanoch*). Our impact case study on marine litter (**Pahl**) was part of a large interdisciplinary project with marine scientists. Our environmental sustainability research, spearheaded by **Pahl**, involved working with engineers on energy visualisation for carbon reduction (funded by EPSRC). **Pahl** also had a NERC-funded project with geographers and marine scientists on building sustainable marine communities. We have many other interdisciplinary applied projects. For example, our work on imagery and creativity led to a Leverhulme-funded interdisciplinary project on dance

choreography (**May**). **Brennan**'s research on combating child pornography involves working closely with IT researchers. We're also working on the use of robots as motivational interviewers (**Andrade, May**), and on the psychology of anthropomorphic robots (**Goslin**); both projects are aimed at informing the future use of robots in caring roles.

Our training of Doctoral students is also highly interdisciplinary, as illustrated by the successful completion of a €4.1m EU Marie Curie doctoral training programme ("CogNovo"). Over twenty candidates completed their doctoral studies with the support of supervisory teams drawn not only from experimental psychology, computational modelling, and robotics, but also the humanities and creative arts. Students pursued a wide range of projects, from early cinema to game design and dance, from making robots more creative to making them sound more trustworthy, and the study of human creativity from the perspective of perception and attention, through to creativity in talent, reasoning, and 'Eureka!' moments.

Open science and research integrity

UoA 4 at Plymouth has a strong commitment to open, reproducible science that goes substantially beyond the requirements of REF2021. The best way to understand something is to teach it, so the School of Psychology started its commitment to open science by embedding preregistration, reproducibility and alternatives to null hypothesis significance testing across all its Masters and undergraduate teaching. This included a commitment to move all teaching of research methods to open-source software such as R and Open Sesame (a process we began for new students in 2017 and which will be complete by June 2021). Although one might be tempted to cast these as teaching rather than research strategies, the reality in UoA 4 at Plymouth is that almost everyone is both a researcher and a supervisor of undergraduate or Masters dissertations. **Normalising modern, open practice through including it in our teaching was a deliberate strategy to encourage changes in our research practice.** To further support this strategy, **Wills, Andrade, Longmore**, and several excellent Doctoral students, delivered a programme of lectures and workshops for staff and Doctoral students on the theory and practice of open science.

These teaching changes, and staff development sessions, paved the way for the introduction of our **Open Science Research Strategy**, agreed early in 2019. This strategy commits the School of Psychology to three key open science goals by the end of 2021. The first is preregistration of all new research that will be published. The second is open access to all research publications (not just the subset submitted to the REF). The third is open access to the raw data, stimuli, materials, and analysis pipelines of all published papers (except where so doing would cause insurmountable ethical or privacy issues). In 2020, the School of Psychology created the role of **Open Science Champion (Golubickis)**; a formally-recognised role in our workload allocation model involving responsibility for staff development, process review, and awareness raising. Compliance with our Open Science Strategy is ensured through gatekeeping in key internal approval processes (ethics applications; internal grant review).

Our research environment sustains open, reproducible science in a number of other ways. **Woike** and **Wills** develop and maintain open-source analysis tools (R packages: catlearn, FFtrees, grt), which have been download around 90,000 times. Four members of staff are signatories to the Peer Reviewers' Openness Initiative (**Bach, Walsh, Whalley, Wills**), which seeks to use peer review as a lever to improve open-science practices. **Bault** was part of a notable multiple-teams fMRI analysis, recently published in *Nature* (Botvinik-Nezer et al., 2020), and **Woike** participated in a multi-teams project on crowdsourcing hypothesis tests, recently published in *Psychological Bulletin* (Landy et al., 2020). **Wills** is the Plymouth local organiser for the **UK Reproducibility Network**.

We believe that a research environment that expects all colleagues to conduct research in an open, reproducible manner also promotes research integrity. We have two main mechanisms to enact and evaluate that belief. First, all research activities are subject to the approval of the appropriate internal (and sometimes external) Ethics Committee. Second, our supportive process of peer grant development and review (see Section 2) ensures grant-funded research closely follows our agreed open-science principles and practices. The high prevalence of co-

authorship, the general collegiate atmosphere, and the presence of several open-science advocates (**Andrade, Bach, Bault, Golubickis, Longmore, May, Walsh, Whalley, Wills, Woike**) also helps promote research integrity.

2. People

Staff in UoA 4 at Plymouth work in an environment that fosters inclusion, transparency and diversity. **Gender balance is close to 50:50**. Across the two Schools in UoA 4, there are five academic managers of research, three of whom are women (**Andrade, Floccia, Knight**). Just over half of Category A staff recruited during the current REF period were female, as were around 80% of PhD completions. We promoted eleven Category A staff in the current period, six were male. Both Schools hold a current Athena SWAN Bronze award (School of Psychology: 2018; SoBMS: 2020). **All but one of our Category A staff members are on permanent contracts and all but one of the appointments in the current period were full-time positions**. A few staff have chosen to transition to part-time during the current REF period, moves we supported as part of our commitment to flexible working. 14% of staff self-identify as BAME and 5% of staff identify as having a disability. 45% of our staff are at Lecturer grade, 30% at Associate Professor, and 25% at Professor.

Staffing strategy and staff development

In the current REF period, UoA 4 at Plymouth pursued a **strategy of appointing mainly early-to-mid career researchers within our areas of strength, as defined by our research groups**. This was achieved through a combination of job adverts focused on specific research groups, along with some additional cross-research-group adverts. This strategy attracted large numbers of applications, and we selected the best applicants who were also a good fit to our existing research groups. Senior academics in those groups then proactively supported the career development of the appointees (details below). These strategies resulted in us successfully appointing **14 new Category A staff at Lecturer grade, four at Associate Professor, and one at Professor**. None of our appointments in the current REF period has left. The current period also saw the University **promoting eleven people** in our UoA; seven to Associate Professor (**Bach, Bacon, Berry, Goslin, Lloyd, Norman, Whalley**) and four to Professor (**Floccia, Hall, Hanoch, Pahl**). At both levels, these promotions had an approximately 50:50 gender balance.

We have a broad range of formal and informal mechanisms that support the development of research careers in a fair and inclusive manner. During the current REF period, the School of Psychology created a **new Deputy Head role** (currently **Andrade**) with a specific brief to **focus on staff development and equality**, ensuring these issues remain prominent. Staff support and development in the School of Psychology starts from appointment, with all new staff now receiving a day-long School induction, introducing them to the subset of their immediate colleagues that hold key roles within the School. In response to COVID-19, this induction occurred online.

In both Schools, **all new staff members are allocated an individual mentor**, who guides them through university processes and supports their career development. There is no formal end point to this mentorship role, but support organically reduces over a number of years as the new member of staff settles in. The mentor is an established member of staff at a similar or slightly higher grade, with related research interests, who is not their formal annual appraiser. **Staff therefore have multiple, dedicated people to whom they can turn for advice about research plans and career aspirations throughout their career**: Head of School, Deputy Head of School, their mentor, their formal annual appraisal reviewer and, in the School of Psychology, the Research Mentorship Team (discussed below). As staff progress in their careers, they are encouraged to apply for promotion, through mentoring, annual appraisal, and direct approach by Head of School, or Deputy Head of School. Senior members of the two Schools are involved in the running of promotion panels by central HR - these are informal

events designed to support staff in preparing their applications for promotion. One characteristic aspect of staff development within our UoA is that **we encourage staff to volunteer for the administrative and management roles** to which they are best suited (rather than allocating them in a top-down fashion). This works well, with **multiple volunteers per role** not uncommon. We consider this one visible sign of the supportive and collegiate culture in our UoA.

In the current REF period, the School of Psychology introduced a **quantitative Workload Allocation Model (WAM)**, which helps to monitor and regulate the equitable distribution of all tasks. The WAM allocates additional time for research in a manner that recognises current research grants, funding applications, and historic publication record. The presence of eight academic staff on teaching-only contracts, and seven part-time PhD students with teaching assistant responsibilities, supports these allocations. Formal workload calculations feed into a university-wide staff appraisal process ("Performance Development and Review", PDR).

PDR operates similarly in both Schools, considering workload, research income, outputs, and impact, and sets specific achievable research goals (including 5-year goals in SoBMS). PDR meetings are held annually, with a mid-year follow-up meeting. Although informed by metrics, PDR meetings are, at heart, one-to-one discussions with a member of the School Management Group, in which career aspirations and individual circumstances are considered holistically, training needs are identified and support is offered, all with the goal of supporting the career development of all staff, regardless of their protected characteristics.

Another formal mechanism supporting career development in UoA 4 are our **study leave** schemes, in which staff are released from teaching and administration for one semester in order to pursue a specific research or impact project. Study leave must be applied for, and a brief report is required at the end. In the School of Psychology, the report is graded by a panel of senior researchers. Subject to satisfactory performance, priority for study leave in that School operates on a rota system, with those towards the top of the rota proactively reminded that they may wish to apply for study leave soon. This rota system supports equality of access to study leave. For the majority of the current REF period, two members of staff in the School of Psychology were on study leave at any given time. SoBMS also introduced a formal annual application process for study leave during the current REF period.

In the current period, the School of Psychology introduced two new approaches to protecting research time - **grant-writing retreats**, and the **Writing Sanctuary**. Grant-writing retreats are funded internally and applied for in a competitive process. The selected small teams travel to a local hotel for at least two days of uninterrupted writing time. In a similar vein, but for shorter time periods, the Writing Sanctuary is a quiet, dedicated, bookable space within our research facilities. Staff can book time in the Writing Sanctuary alone or in small groups, as a way of ensuring uninterrupted periods of time to write papers or grants.

Both Schools support staff research with money as well as time, by running an internal **research pump-priming scheme** several times a year. Staff apply for a few hundred to a few thousands of pounds to support their research activities. This money is typically spent on travel, small items of equipment, specialist training courses, participant payments, and the employment of casual labour. Around £30k per annum of pump-priming awards are made by the School of Psychology, with approximately £20k per annum in addition from the University's Strategic Research Institutes. The School of Psychology also incentivise grant success through individual **Strategic Research Accounts**. These are in-year budgets for research expenses that staff can spend as they wish, and are set at 25% of the Directly Allocated expenditure on their active grants, split between the Principal Investigator and Co-Investigators.

In the current REF period, both Schools expanded their existing internal grant peer-review schemes into a broader and more supportive **Research Mentorship** scheme. In the School of Psychology, a team of senior academics has been in place since 2016 to support grant writing from conception to submission. All staff are encouraged to contact the Associate Head of School

for Research as soon as they have a rough idea for a grant application, and well in advance of having written an application. This contact results in the allocation of a Research Mentor to that application, who helps guide it through the conceptualisation, writing, internal approvals, and submission. This mentoring works much better than the more typical gate-keeper scheme, where staff essentially complete a grant application before getting any internal feedback on its content or likely fundability. Our new proactive scheme is more constructive and is particularly valuable for the development of early-career researchers. In 2020, aspects of this proactive approach were adopted across the university in the *Award Manager Scheme*, which is supported by bespoke software. In addition to these School and University systems, the Faculty of Health provides ring-fenced funding to pay for external peer review of grant applications.

Another staff-development strength of UoA4 at Plymouth is the large number of frequent, informal **research group meetings** organised by senior research leaders. Normally pitched at topic areas more specific than our research groups (e.g., learning, imagery), researchers of all levels of seniority (including postdocs and PhD students) attend to informally discuss their own and other peoples' research. The strong and deep professional relationships developed in these meetings, often over the course of several years, fosters internal co-authorship of outputs and grant applications. In addition, whole-School research seminars, by design, have an approximately equal number of internal and external speakers. Senior internal speakers often choose to talk about topics of broad applicability, for example, practical advice on improving reproducibility (**Wills**), and developing research impact (**Edworthy**). There are also several regular workshops run by postgraduate students that support specific research skills (e.g., Coding Club, and ReproducibiliTea). Staff away-day activities are split between teaching and research, with long-term planning and capacity building a major focus on the research side. Since March 2020, and in response to COVID-19, all of the aforementioned staff-development activities have continued online through the use of Zoom videoconferencing software.

We take the development of early-career researchers, including postdocs, very seriously. The University is a signatory to the Concordat to Support the Development of Researchers. Postdocs are included in the same annual appraisal system (PDR) as all other staff, with their PDR appraiser being a senior academic who is not their immediate line manager. They are eligible to apply for the same pump-prime funding schemes as other staff and have received such funding. Providing post-PhD employment is a major motivator for securing external research funding in our Unit, and the School of Psychology has also internally funded two full-time one-year postdoc positions over the current REF period. Staff joining us as lecturers have a probation period, which is used in a supportive manner. Specific, achievable goals are set during probation, and supported through mentorship. During the current REF period, no member of staff failed probation.

UoA 4 at Plymouth is very focused on the well-being of all its researchers, including postdocs and research students (and we have received OfS research funding for a project on PGR mental health). A core principle is that doing your job well matters more than what time of day or where you do it, and working long hours is not encouraged. These principles help foster a fair and inclusive work environment. Full use of our substantial leave entitlement (35 days, plus closure days, per year) is monitored and encouraged. Since March 2020, staff have been mainly working remotely, due to COVID-19. Prior to this, working remotely for short periods (1-2 days, depending on time of year) was routine, and required only prior notification. Staff events, such as research talks, away days, and social events, are scheduled with due regard to child and other caring responsibilities.

Our approach to equality and diversity issues, discussed throughout Section 2 of this document, is one of continual improvement. The Athena SWAN self-assessment team in the School of Psychology regularly reviews data on all aspects of the appointments process (from applications through to appointments), the promotion process (applications and successes), the allocation of

key leadership roles, and the allocation of workload (both total load, and load within each of the three areas of research, teaching, and administrative tasks).

Research students

In the previous REF period (2008-2013) we awarded 50 doctoral degrees. In the current period (2014-2020), we awarded 126 (a **152% increase**), while maintaining high completion rates. This major increase was achieved through the combination of several strategic actions. First, the current period saw the successful completion of a **€4.1m Marie Curie funded Doctoral training programme** (“CogNovo”). This programme was supported with matched central funding from the University and resulted in over 20 Doctoral completions. In addition, the number of Clinical Doctorate completions associated with UoA 4 at Plymouth doubled in the current period, rising from 30 to 67. External funding of doctoral training was further increased when, during the current REF period, we joined Bristol, Exeter, Bath and UWE in the ESRC South West Doctoral Training Partnership.

We also pursued a strategy of providing major internal funding for PhD studentships, in recognition of the importance of PGR training for the future health of our discipline. In the current REF period, the School of Psychology **fully funded 30 PGR studentships internally**, at a total cost of around £1.5m; this was in addition to university matched funding for the CogNovo scheme. An additional 3 PGR studentships in the Animal Behaviour research group were funded by the SoBMS. Around 75% of the School of Psychology funded studentships were full-time positions, with the remainder being part-time positions that also included a teaching assistant role.

Our strategy for effective PGR training involves supportive and rigorous selection, training, and monitoring procedures. Following international advertising of available positions, candidates are encouraged to work with their selected supervisor to write a brief research proposal. Applicants are shortlisted by a mixed-gender panel on the basis of the excellence of their academic qualifications, relevant experience, quality of the proposed research, and fit to the supervisor’s expertise. Shortlisted candidates are then interviewed by the same panel. All PGR students have a supervisory team of at least two academics with relevant experience, and we also have a Postgraduate Tutor (**Kanngiesser**) with overall responsibility for the progress and well-being of PGR students. PGR students meet their supervisors regularly, and there are formally-recorded progress meetings eight times a year.

PGR skill development and career preparation are also supported by the regular research-topic meetings, discussed earlier, which include PGR students as full participating members. Our PGR students, along with our postdoc community, also organise their own training events, from peer-taught workshops in programming and open science through to international research conferences. Staff allocate substantial time and money to these events. The University’s Doctoral College also runs a wide range of workshops for PGR students on topics from research software to ethics applications, and from lab books to public engagement. They also provide career advice.

3. Income, infrastructure and facilities

Income

Grant income attributed to our Unit of Assessment exceeded £7.5 million in the current period, **up 85% from the previous period**. The EU CogNovo grant (€4.1m, **Denham**), discussed earlier, was the largest of three large grants led by UoA 4 Plymouth in the period; the other two were an ESRC-funded multi-site investigation of lexical development in bilingual toddlers (£800k, **Floccia**), and an EPSRC-funded multi-site project on energy visualisation for greener homes (£900k, **Pahl**). Shortly before the end of the current period, two further large grant applications

were successful in UoA 4 - a multi-site study on language development in Arabic-speaking countries (£1.7m, GCRF, **Floccia**), and a Future Leaders' Fellowship (£900k, UKRI, **Fouragnan**) focusing on transcranial ultrasound neuromodulation.

Members of the Experimental Psychology research group led several ESRC grants in the period; providing around £1.5m of funding for basic research on learning and memory (**Berry, Hollins, Mitchell, Wills**), reasoning (**Roser**), spatial navigation (**Smith**), and action (**Bach**). The Animal Behaviour research group were involved in several BBSRC grants, with a total value of around £1.7m; this included two grants on fighting in non-human animals (led by **Briffa**), one industry-linked grant on smothering behaviour in hens (**Herborn**), one grant on behavioural indicators of depression in mice (**Fureix**), and a partnering award with Brazil concerning the welfare and health assessment of managed tropical animals (also **Fureix**).

Beyond RCUK awards, Leverhulme provided funding of around £0.4m for projects on social perception (**Bach**) and on imagery in choreography (**May**). In addition to CogNovo, we attracted another €0.4m of funding from the EU (FP7, Horizon 2020, and Marie Curie) for basic neuroscience research on perception (**Schendan**), on adaptive learning (**Harris**), and on imagery and deception (**Ganis**). **Mileva** received a British Academy fellowship (£300k) to study multimodal person perception. The South West Academic Health Science Network provided around £230k for projects on person-centred care (**Lloyd**). The Gambleaware charity-funded research concerning online gambling (£150k, **Lloyd**), and the Office for Students provided funding for a project on PGR student mental health (£150k, **May**). The Association for the Advancement of Medical Instrumentation, and the Masimo Corporation, provided research funding to **Edworthy** (total £120k), which facilitated the impact of her research on auditory alarm signals.

UoA4 at Plymouth is strongly committed to interdisciplinary research. One reflection of this is that our staff were co-investigators on **a further £7.1m of grants** held by principal investigators elsewhere at the University of Plymouth. This grant income is entirely reported via the UoA of the principal investigator at the University of Plymouth and hence is in addition to the £7.5m discussed above and reported in REF4. These grants included EU-funded projects on human-robot interactions (**Goslin**) and cognitive robotics (**Cattani, Denham, Floccia**), on rural regeneration, marine litter, and energy awareness (**Pahl**), on balance in multiple sclerosis (**Harris**) and on eHealth (**Andrade, May**). We were also involved in several other health-related projects, funded by NIHR and MRC among others, on topics including respiratory disease (**Hyland**), early interventions for autism (**Whalley**), and multiple sclerosis (**Andrade**). Shortly before the end of the current REF period, Leverhulme awarded a £240k grant on the origin of psychedelics in nature, the animal-behavioural component of which is led by **Thom**.

We also received smaller amounts of funding (which are part of the reported £7.5m) from industry, charities, and professional societies, including Alzheimer's Research UK, the British Academy, the Royal Society, Waltham Mars Pet Care, Astra Zeneca, the British Renal Society, Comic Relief, National Geographic, Cornwall County Council, the Fire & Rescue Service, the Technology Strategy Board, the Experimental Psychology Society, the Association for the Study of Animal Behaviour, the Seale Hayne Educational Trust and Foster Care Associates UK.

Infrastructure and facilities

The newly-built **Brain Research and Imaging Centre (BRIC)** is the most significant improvement to our research facilities in a generation. The single largest indicator of the University's strategic investment in the future of UoA 4, BRIC is the result of a **£9.4m investment**. BRIC will operate in partnership with the NHS (specifically, the University Hospitals Plymouth NHS Trust) and the DDRRC, a diving and hyperbaric medicine research charity. The centre has sufficient dedicated research scanning time for both our current and anticipated

needs. Its location close to our local NHS hospital supports research with patient groups, and NHS contracts for clinical scanning time secure the financial stability of the centre.

A 3T MR scanner forms the basis of one of BRIC's seven research labs; other labs provide state-of-the-art facilities for brain stimulation (repetitive and single-pulse TMS, tDCS, and Focused Ultrasound), high-density EEG recording, high-rate 3D motion measurement within an immersive environment, pain modulation, and anxiety (carbon dioxide) induction. Much of this equipment is cross-compatible (e.g., MR-compatible EEG and ultrasound; TMS-compatible EEG), supporting the Neuroscience research group's focus on combining multiple methodologies. BRIC's data analysis lab has both dedicated computational resources, and high-speed links to the University's supercomputing facilities, with 2400 cores across two clusters supporting computationally-intensive research. A lab focused on behavioural testing completes the suite. BRIC also supports mobile neuropsychological assessment, with eight iPad-based test suites (including Cantab, WAIS, RBANS, WMS, CVLT, TOPF, etc.). The position of Director of the BRIC (held by **Hall**) is a dedicated 0.5FTE academic post. All labs have a dedicated academic lead (all but one based in UoA 4), and the centre is supported by a full-time onsite radiographer and emergency medical support. Strategic university investment in scientific equipment for BRIC, beyond the purchase of the MR scanner, exceeds £700k to date.

All our existing in-person testing facilities were closed during the COVID-19 pandemic. In response, we invested substantially in facilities for online testing (OpenSesame experiments on JATOS, questionnaires on Qualtrics, and participant recruitment through Prolific). The text below concerning in-person facilities largely refers to the state of play prior to the first national lockdown, but in-person facilities received some COVID-safe use between national lockdowns.

In addition to the BRIC, we maintain substantial dedicated neuroscience facilities in the School of Psychology. Located on our main city-centre campus, these facilities are ideally placed for large-sample studies of neurotypical individuals. The facilities comprise three eye-tracking labs, three 128-channel EEG labs (one suitable for infant participants), a Neural Modulation laboratory, a functional Near Infrared spectroscopy (fNIRS) lab, and a data analysis suite. The Neural Modulation laboratory provides facilities for single-pulse and rapid TMS, and tDCS, combined with 64-channel EEG recording and 3D scalp surface and electrode digitisation. These resources will remain in their current location when BRIC opens (BRIC has its own, additional resources, described above).

The School of Psychology also houses very substantial dedicated facilities for behavioural testing, with over 50 testing machines across 17 testing rooms. All in-person testing machines were refreshed in Summer 2018, thanks to a strategic University investment. Our online and in-person facilities support much of the core work of the Experimental Psychology group. There are also two dedicated 'soft labs': comfortable, relaxing spaces more conducive to the study of human interaction and counselling than standard labs. We also have three research-dedicated state-of-the-art Virtual Reality labs, supporting work on spatial navigation (**Jones, Smith**), and a newly-created anxiety-induction (carbon dioxide) lab, which supports a wide range of basic and applied research.

The Babylab provides facilities that are essential to the developmental component of our Experimental Psychology research. Babylab provides excellent, dedicated facilities for infant testing including a family-friendly reception space, two observation rooms, and six individual sound-attenuating booths. In the current REF period, the eye-tracking equipment in all six booths was upgraded with a new Tobii 300 Hz system, optimised for infant research. Research with school-age children is supported through SchoolLab, a managed network of local schools who are keen to participate in psychological research.

The School of Psychology labs also provide a wide range of other specialist equipment, including multi-channel EMG systems, respiratory belts, skin thermometers, GSR devices, and pulse meters. There are also movement-measurement devices, including force transducers,

accelerometers and laser displacement meters, and somatosensory and pain research devices that enable peripheral per cutaneous electrical nerve stimulation. These facilities are used by a range of researchers, but particularly those in our Neuroscience group. The neuroscience and behavioural testing facilities in the School of Psychology are supported by **four, dedicated, full-time, lab technicians**. A research participation arrangement with our large undergraduate programme provides over three thousand hours of participant-testing time a year for researchers, including PGR students. Further testing time is supported both by external grant funding and by internal pump-prime and PGR funds.

The School of Biological and Marine Sciences provides substantial facilities for research with non-human animals. Refurbished in 2015, the Animal Behaviour research group now has eight dedicated observation labs, including two specialist temperature-controlled facilities suitable for aquatic animals. All labs are set up for video recording and remote logging with Noldus observer. Our Animal Behaviour researchers also make regular use of shared resources in the School of Biological and Marine Sciences, including animal housing, Home Office licensed space, plus physiology and molecular biology labs. The Marine Station, refurbished in 2014 at a cost of £4.65m, supports the work of our Animal Behaviour group, as does the Plymouth Marine Institute - the first and largest such institute in the UK. The presence of the Marine Institute also substantially facilitates our research on sustainability in marine environments (**Pahl**).

For most of the current REF period, the School of Psychology was primarily associated with the Cognition Institute. The Cognition Institute had over one hundred members, drawn from across the university, including the arts and sciences. The Institute, and its Director (**Edworthy**), led our Impact strategy through the current REF period. The Cognition Institute provided pump priming for Impact activities, as well as for research more generally, and it ran an annual academic conference with international speakers. It also organised a range of events to support the public understanding of science. In 2020, the Cognition Institute was closed in a restructuring of the university's Strategic Research Institutes to the current three: the Marine Institute, the Sustainable Earth Institute, and the Plymouth Institute for Health and Care Research (PIHR). Members of the School of Psychology are among are founder members of PIHR, and we anticipate a developing and productive relationship between PIHR and the School of Psychology over the next five years, across all of PIHR's four research themes (Brain and Mind; Digital Health; Frontiers in Discovery Science; Health Across the Life Course). **Smith** was recently appointed as the lead academic for PIHR's Brain and Mind research theme.

4. Collaboration and contribution to the research base, economy and society

Research collaboration

UoA 4 at Plymouth has a strong, global research network. Our work on Functional Imagery Training (FIT) is conducted in partnership with Queensland University of Technology (Australia), where two members of staff hold honorary positions (**Andrade, May**). **Lloyd** holds an honorary position at Gothenberg University, supporting her research on person-centred health care. **Woike** is an Associate Research Scientist at the Centre for Adaptive Rationality (Max Planck, Berlin). **Hughes** is an Honorary Research Fellow at the Institute of Psychiatry, Psychology, and Neuroscience, supporting his research on the brain mechanisms of pain sensitivity. **Hollins** held an honorary position at Flinders University (Australia), supporting research on long-term memory, and **Ganis** held an honorary position at the University of Padova (Italy), supporting research on visual and social neuroscience. **Hall** held a Visiting Research Fellowship at Aston University, supporting his neuroscience of movement research. We work in partnership with over 25 different national and international universities. In the UK, these universities include Oxford, Cambridge, Cardiff, Glasgow, London (Imperial, KCL, UCL), Warwick, Bristol, and York. In mainland Europe, they include Aalborg, Amsterdam, Bielefeld, Berlin, CNRS (France), Munster, Ghent, Leuven, Madrid, Trento, Utrecht and Zurich. In North America, they include Duke and

UCLA. We also have collaborators in Australia (Melbourne, UNSW), Brazil, Canada, and Japan. **Fureix's** collaborative work in Brazil was supported by a BBSRC partnering award.

Collaboration in PGR training

Our PGR training is highly collaborative. The CogNovo programme alone involved 25 external supervisors from Belgium, France, Germany, Italy, the Netherlands, Hungary, India, and the USA. It also involved over 40 internal supervisors from Plymouth, including around 20 from outside UoA 4. This interdisciplinary and international team of supervisors included both academics and non-academic partners, drawn from Psychology, Computer Science and Robotics, Education, Health, Art and Design, Music, Dance, and Film. A follow-up programme ran a week-long GCRF-funded PGR conference in the Philippines. This conference supported local researcher development and included a pump-priming scheme.

Outside the CogNovo programme, several staff members had further joint supervision arrangements with the universities of Amsterdam, Birmingham (Aston), Bristol, Exeter, Ghent, Trento, and York; plus joint supervision arrangements at DSTL Porton Down. **Fureix** delivered and supported multiple ECR training workshops for the national Animal Welfare Research Network, and for the International Society of Applied Ethology.

Honours, awards and invited lectures

Our research expertise is recognised both nationally and internationally. **Andrade** and **Edworthy** are Fellows of the Academy of Social Sciences. **Andrade** won the 2016 Humphry Davy medal for contributions to anaesthesia, and **Edworthy** won the 2020 US Human Factors and Ergonomic Society's Distinguished International Colleague Award. **Heintz** was the 2016 recipient of the DANYS early-career award from the International Society for Humor Studies. **Hughes** won the 2019 Anthony Mellows Medal, a national health-research award, and **Seabrooke** (then a post-doc working with **Hollins**, **Mitchell** and **Wills**) won an APA Early Career award. In 2020, Plymouth student Lenard Dome (supervisor: **Wills**) won the Experimental Psychology Society Undergraduate Project Prize and started here as a PGR student. Members of staff have won an Annual Psychonomic Society Best Article award on two occasions (**Golubickis** in 2017, and **Wills** in 2020). In 2018, **Cattani** and **Floccia** won best article in the International Journal of Language and Communication. In 2014, **Andrade** won the British Medical Association Anaesthesia Book of the Year award.

Over the current REF period, members of UoA 4 Plymouth have delivered around 130 keynotes and other invited lectures at conferences, universities, and business partnerships, across the UK, Europe, China, and North America. Locations included Oxford University, the Royal College of Medicine, the Max Planck Institutes, Harvard, and UCLA. Topics included accidental awareness in anaesthesiology (**Andrade**), action prediction (*Bach*), decision making (**Bault**), language and social development (**Floccia**, *Gummerum*), pain (**Hughes**), brain injury (**Norman**), social neuroscience (*Terbeck*), and category learning (**Wills**).

Contributions to the research base

Hollins was Treasurer of the Experimental Psychology Society (EPS) and was on the governing board of the Society for Applied Research in Memory and Cognition. **Smith** was an EPS committee member. Several other UoA4 members have served on British Psychological Society Section committees (*Gummerum*, Developmental; **Minton**, Education; **Charlesford**, Social), and committees of the British Association of Brain Injury (**Norman**). **Fureix** is on the Co-ordinating Group for the BBSRC-funded Animal Welfare Research Network and ran BBSRC Writing Workshops in 2017 and 2020. **Morris** is a founder member of the Organisation for Psychological Research into Stroke. **Pahl** organised an international Environmental Psychology conference, and the Animal Behaviour group organised an Association for the Study of Animal Behaviour conference. Members also assisted with the organisation of a broad range of conferences,

including for the International Society of Applied Ethology (**Collins, Fureix**), the International Congress on Qualitative Inquiry (**Minton**), and the BPS Division of Health Psychology (**Norman**).

Our members have been on the Editorial Board for over 20 journals across the breadth of the discipline, including Addictive Behaviors (**Andrade**), Animal Behaviour, Behavioral Ecology, JEP: Applied (**Hollins**), Child Development (*Gummerum*), Frontiers in Pain Research (**Hughes**), Journal of Behavioral and Experimental Economics (*Hanoch*), Human Factors (**Edworthy**), PLoS ONE (**Smith**), Personality and Individual Differences (**Heintz**), Proceedings of the Royal Society (**Herborn**), Royal Society Biology Letters (**Briffa**), Scientific Reports (**Thom**), and Social Neuroscience (**Ganis**). We regularly review grants for five of the seven UK Research Councils. We also regularly review grants for many other major UK funders, including the Leverhulme, Wellcome and Carnegie Trusts, the Royal Society, and the British Academy. We review grant applications across Europe, for the European Commission, and for national funding bodies in Austria, Belgium, France, Germany, Poland, Romania, and Switzerland. Further afield, we have reviewed for major funders in Australia, the Far and Middle East, and North America.

Over 20 staff members externally examined PhD students in the current REF period, including at Oxford, Cambridge, several other Russell Group universities, plus universities across Europe and the Middle East (examples include the universities of Bielefeld, Haifa, Humboldt, Leipzig, Louvain, and Paris). Members of the Applied Psychology group also regularly served as external examiners for DClin Doctorate vivas across the UK, including at Oxford, Cardiff, Birmingham, and Leicester.

Contributions to society and the economy

The impact of our work on marine litter (**Pahl**), awareness under anaesthesia (**Andrade**), person-centred healthcare (**Lloyd**) and medical alarms (**Edworthy**) is outlined in Section 1 (Impact Strategy). We have also worked with patient groups in complex asthma care (*Hyland*), ophthalmology (*Harris*), alcohol dependence and weight management (**Andrade, May**), on visible differences (**Norman**), and on improving the diagnosis of nerve injury in elderly patients (**Hughes**). We are also developing tools for the applied measurement of language development in Arabic (**Floccia**). We have advised the Technology Coalition of major tech companies (including Google, Adobe, Apple, Facebook, Twitter, and Amazon) on combatting online child sexual abuse (**Brennan**). Brennan also chairs the technical advisory group for the United-Nations-funded iCOP2 project “End Violence Against Children”. **Minton** is an internationally-recognised expert in the prevention of bullying and child abuse; advising the Irish Government, a UNICEF project in Macedonia, and around 50 Irish schools, in the current REF period. **Lloyd** has advised the UK government (Department of Culture Media and Sport) on problem gambling. Members of staff also regularly discuss research with a range of regional patient groups, including those with traumatic brain injury (Headway Somerset, **Norman**), Alzheimer’s disease (ARUK, **Roser**) and Parkinson’s disease (**Hall**).

We also work hard to support our local communities. The South West is in the bottom quartile of the UK for commercial productivity; something we are helping to change. Members of our Applied Psychology group (**Andrade, May**), along with their research assistants and PGR students, have directly supported around 20 start-ups and SMEs in Cornwall and the Isles of Scilly; these companies are developing behaviour-change innovations in eHealth. This widespread local engagement was made possible by the interdisciplinary EPIC project (2017-2023), which has received £6.7m funding from the European Regional Development Fund and the South West Academic Health Science Network (within UoA 4, EPIC is led by **Andrade** and **May**). **Minton, Morris**, and **Stedmon** are involved in several mental health service-development projects with local NHS trusts, including mental health in bereaved children, benefit claimants, people with intellectual difficulties, military veterans, stroke patients, and the homeless. **Stedmon** is also Clinical Lead Trustee for Jeremiah’s Journey, a local charity that supports bereaved young people. **Roser** is involved with local autism-spectrum support services

(Derriford Autism Service; Plymouth Autism Spectrum Service; National Autistic Society Plymouth Adults Asperger's Branch). **Charlesford, Longmore**, and **Norman** work with Devon and Cornwall police on issues such as mental health triaging, and knife crime. **Norman** also sits on Plymouth City Council's Maternity and Infant Nutrition Committee. The Applied Psychology group has applied Functional Imagery Training to soccer performance at Plymouth Argyle FC. **Fureix** has advised a local RSPCA shelter (West Hatch) on the relation between inactivity levels and life enthusiasm in domestic dogs.

Members of UoA4 also contribute substantively to the public understanding of science locally, nationally, and internationally. Locally, the SoBMS hosts several major public talks each year in Plymouth, with attendance exceeding 150 people, including large numbers of the general public. Speakers in the current REF period have included John Bradshaw (Bristol University; BBC Cat Watch) and Christine Nicol (Royal Veterinary College; Radio 4 presenter) and Nicola Clayton (Cambridge University, FRS). The School of Psychology organises several psychology-themed public events in Plymouth, from the CogTalk public lecture series, and the Celluloid Psychology film seasons (organised by **Smith**), through to participating in more informal events, such as the "Psychology in the Pub" discussion series (**Bach, Lloyd and Norman**), guest lecturing at the Plymouth College of Art (**Smith**), and at City College Plymouth (a local FE provider). **Herborn** participated in the Sidmouth Science festival, including running a citizen science event on gull behaviour. **Smith** and **Minton** participated in events for the ESRC Annual Festival of Social Science at Plymouth, and **Fureix** participated in the Science and Technology Showcase at Plymouth, and in the FUTURES European Researchers' Night event at Bristol (both public understanding of science events). **Herborn** has appeared on BBC Spotlight, ITV West Country, and Radio Devon, discussing bird behaviour. In 2020, **Homer** regularly appeared on BBC Spotlight South West to discuss mental health and well-being in a time of global pandemic.

Nationally and internationally, members of staff have appeared on television to discuss their research on plastic pollution (**Pahl**; BBC News), hemispheric asymmetry (**Roser**; PBS and BBC4), phobias (**May**; BBC4), infant development (**Floccia**; BBC2), fighting in non-human animals (**Briffa**; BBC, ABC Australia), and bird behaviour (**Herborn**; BBC). **Collins** and **Briffa** have also discussed their work on BBC Radio 4, and the World Service. Several other members of staff have had their research covered in national and international newspapers and magazines, including work on the harmful effects of relative-performance feedback in the workplace (**Woike**; wide coverage including The Economist), research on the neuroscience of lying (**Ganis**; Guardian, Science Magazine), research on reducing cheating in adolescents (**Kanngiesser**, wide-coverage, including Times of India, 2.5m readership), and research on using virtual reality for pain research (**Hughes**; Telegraph, Mail, Scotsman). **Berry** was a key contributor to the London Science Museum's "Who Am I?" exhibit (2018). Over 1000 people of all ages took part in experiments as part of this exhibit; some of the data were recently reported in *Psychological Science*.