

## Unit-level environment template (REF5b)

Institution: University of Southampton

Unit of Assessment: 04 Psychology, Psychiatry &amp; Neuroscience

## 1. Unit context and structure, research and impact strategy

## 1.1 Overview and structure

Psychology, Psychiatry and Neuroscience (PPN) at Southampton is configured to support our central aims: to understand brain and behaviour in health and disease across the lifespan, and to translate our interdisciplinary research into benefits that span mental and physical health and society. Our 49 staff (46 FTE) from across our Faculty of Environmental & Life Sciences (FELS), and Faculty of Medicine (FoM) work with research students and through established links with NHS Trust partners and service-providers that enrich our research and impact. Since REF2014 we have created 4 research clusters to increase critical mass, alignment with PGR programmes, interdisciplinary collaboration and funding success. Our strategic alignment cuts across University structures (Schools/Faculties) to build for the first time a coherent strategy that unifies Psychology, Psychiatry and Neuroscience and a new PPN community that delivers a diverse, inclusive, interdisciplinary and integrated research environment at Southampton (**Figure 1**).

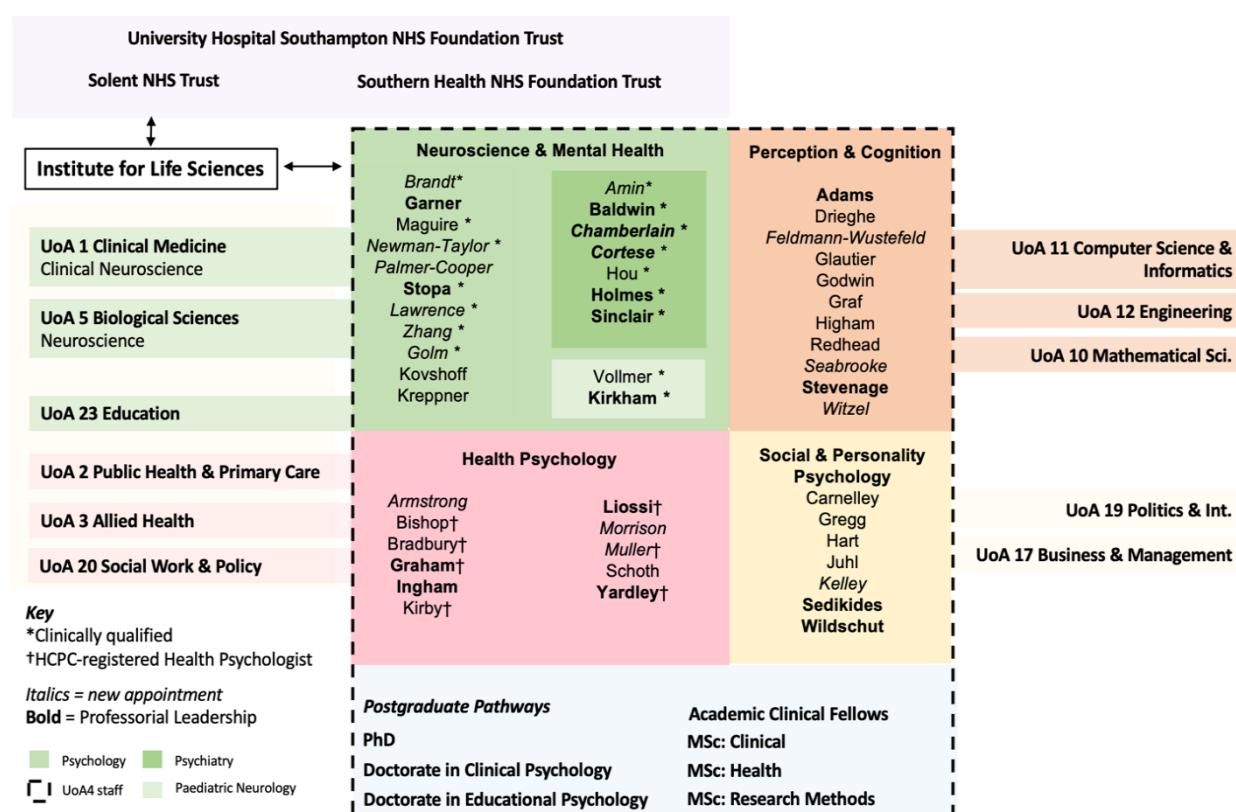


Figure 1: Psychology, Psychiatry &amp; Neuroscience at UoS

Our research is focussed around four clusters:

- **Neuroscience and Mental Health** (Centre for Innovation in Mental Health, Psychology; Academic Psychiatry and Paediatric Neuroscience).
- **Health Psychology** (Centre for Clinical and Community Applications of Health Psychology)
- **Social and Personality Psychology** (Centre for Research in Self and Identity)
- **Perception and Cognition** (Centre for Perception and Cognition)

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Each cluster includes one or more Research Centres and hosts postgraduate research (PGR) students from seven research training programmes. The Institute for Life Sciences (IfLS) supports interdisciplinary collaborations across Psychology, Psychiatry, Biological Sciences (UoS), Southampton General Hospital (UHS Trust) and between UoA4 and 11 UoAs at Southampton.

### 1.1.1 Achievement of Strategic Aims

Our strategy targets priorities identified in REF2014 to deliver programmatic research that is **excellent, impactful** and **sustainable**, with a focus on **interdisciplinarity and collaboration**. We highlighted 6 strategic aims (SA):

1. Recruit staff to grow critical mass in areas of strength and address priorities aligned with funders and government;
2. Increase funding from diverse sources to enhance existing programs of research;
3. Expand neuroscience capability with infrastructure investment;
4. Develop and maintain links with non-academic partners and maximise our translational research;
5. Maximise our international profile via international collaboration and PGR recruitment and workshops/conferences;
6. Extend our professional practice training, and engagement with the ESRC Doctoral Training Centre, to increase research and training.

Significant advances in our research environment from REF2014 to REF2021 are summarized in **Table 1** and link to Institutional priorities (**REF5a**).

Excellence	Sustainability	Training & Development	Interdisciplinarity & Internationalisation	Equality & Inclusivity	Impact
Increased FTE from 33 to 46  4 new themes strategically align UoA4 research and infrastructure across Faculties	114 appointments (76F; 3 Professorial)	233 PGR completions 33/year 5.1/FTE	Funded collaborations between UoA4 and 11 UoAs and 15 Schools at Southampton	Athena SWAN Bronze Psychology 2020  Silver Medicine 2015	Effective, evidence-based online interventions disseminated to over 100,000 patients and members of the public through NHS, public, and private sector partnerships
FW-Citation Impact increase from 1.68 to 2.05 (by end of REF period)	593 funding bids £81.1M, £11.5M/yr	PGR average time-to-complete = 3.45yrs (-0.22yrs)	PGR-International = 21% (+12% vs. REF2014)	Increased proportion of part-time PGRs = 27% (+18%), 80%F	The 'POWeR' Weight Reduction intervention has been adopted by NHS England as the weight management element of the UK diabetes education programme
21% Outputs in Top 10 citation percentile across REF period (Scopus)	169 Awards Income £15.8M  £26.9M joint awards with partner UoAs	HEE funded Centre for Workforce Wellbeing	EU + International Staff = 43% (+3% vs. REF2014).	Professoriate now 50%F (+28%)	Our ADHD research programme has generated the most rigorous body of evidence synthesis available worldwide
1352 publications across REF period (SciVal)	6F & 3M Professorial promotions	ECR Training Network to support 93 PDRA early career appointments	57% outputs with international collaborators (across REF period)	BAME staff = 14% (+7% vs. REF2014)	Research on early institutional deprivation influenced the UN General Assembly Resolution on the Rights of the Child.

Table 1: Delivery against strategic priorities

## 1.2 Research and impact strategy

### 1.2.1 Thematic Priorities to deliver Excellence and Impact

Central to our strategy is the development of programmatic research that i) asks the most important contemporary research questions to develop our models of understanding, ii) is sustained through grant funding and our large multi-disciplinary PGR community, iii) utilises the latest advanced methods and technologies, iv) develops clear pathways to impact through partnership and interdisciplinarity, and v) creates an environment and culture that embeds equality, diversity, inclusion and promotes well-being and success for our PGRs and staff. See 3.1 for funded programmatic research led by named UoA4 PIs.

#### **Neuroscience and Mental Health**

Since REF2014 we have combined excellence across PPN and made nine new appointments (**Fig.1**) to significantly increase our capacity for interdisciplinary translational mental health research (SA4) in line with Government mental health priorities (SA1) and increase our neuroscience methods expertise (SA3). Four new senior clinical-academic appointments translate research to shape clinical practice and deliver impact. Our psychologists, psychiatrists, neurologists and neuroscientists collaborate to deliver mental research across 3 themes:

- **Developmental and Applied Psychopathology** We use molecular, genetic, epigenetic, longitudinal, and experimental methods to identify mechanisms of risk and resilience and their relationships to social, emotional and educational outcomes in children. We research unique populations in collaboration with Solent NHS Trust (child and adolescent mental health services - CAMHS), MRC Lifecourse Epidemiology Unit, paediatric neurology (UHS Trust) and child/adolescent research registers developed in collaboration with pharmaceutical partners (ADHD–ShARE). Developmental research is conducted in collaboration with primary and secondary schools and specialist services (pupil-referral units), supported by our EdPsych doctoral programme (45 PGR trainees and 4 staff seconded from regional educational psychology services).
- **Clinical and Affective Neuroscience** combines neuroscience methods (i.e., structural/functional neuroimaging) and psychopharmacology to identify systems that: (i) underlie dysfunction in cognition and emotion; (ii) increase risk/resilience to mental illness; and (iii) reveal novel therapeutic targets for pharmacological and non-pharmacological treatments, developed within the TIALS theme (below). Research involves populations who access paediatric neurology services (UHS Trust), CAMHS, adult populations who access Southern NHS clinical services and research clinics for mood and anxiety disorders, alcohol/addiction, severe mental health, and dementia.
- **Therapeutic Innovation Across the Life Span (TIALS)** translates findings from basic science to influence therapeutic interventions. This includes innovations in: (i) early identification/diagnosis and (ii) therapeutic interventions (behavioural, cognitive, parent-focused, and pharmacological) for conditions in infancy, childhood, adolescence, and adulthood, including persistent, complex and difficult-to-treat disorders. We evaluate health technologies to enhance the effectiveness of existing treatments. All phases of therapeutic development are evaluated, from experimental/proof-of-concept studies to large-scale multi-centre trials. TIALS delivers translational research in collaboration with staff and students on our DClin, MSc, CBT and IAPT programmes, and PGT placements in regional mental health services and research clinics.

We are shaping evidence-based parenting programmes for ADHD, autism, anxiety, alcohol misuse and impulsivity. Our New Forest Parenting Programme (NFPP) has delivered significant

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impact for children with ADHD and their families and complements high-profile meta-analytic evaluations of pharmacological and psychological treatments for ADHD and neurodevelopmental disorders (**ICS-04-03-ADHD**). Longitudinal developmental studies have profiled social, emotional, behavioural and cognitive outcomes in children following institutional deprivation (**ICS-04-02-ERA**) and in large Chinese and Indian cohorts. Colleagues have profiled brain structure and neurocognitive function following maltreatment, hearing impairment, and in children who were born at high risk and/or have suffered adverse neurological events in the peri/neonatal period. We lead large clinical trials in psychosis, alcohol use, Alzheimer's Disease/dementia and anxiety. Our pre-clinical experimental evaluations of new treatment targets include neurostimulation in Tic disorders and OCD, neuroinflammatory mechanisms in anxiety, psychosis and dementia and cognitive-behavioural interventions in anxiety, psychosis, and vulnerable populations (e.g., homeless).

### **Health Psychology**

Researchers and practitioners collaborate to develop, evaluate and disseminate evidence-based interventions that help individuals across the lifespan self-manage medical conditions and improve their health. Research is supported by strategic links with NHS Trusts, inpatient services, Applied Research Collaboration (ARC) Wessex facility, and the NIHR Biomedical Research Centre (Behavioural science theme) and is focussed within four themes:

- **Digital interventions:** We develop and evaluate web, phone, and clinic-based behavioural interventions for self-management of health conditions (e.g. hypertension, cancer-related symptoms, stroke, asthma, pain, dizziness); improved health (e.g. weight loss, delayed cognitive decline, preventing sexually transmitted infections, stopping smoking, physical activity); and training of Primary Care Healthcare Professionals.
- **Understanding Pain:** Experimental and translational research examines the cognitive and affective factors that shape pain perception to inform our development of interventions to manage acute and chronic pain in children and adults. We combine diverse methods, including behavioural tasks, eye movement recording, neuroimaging, quantitative sensory testing, neuropsychological tests and patient reported outcomes.
- **Sexual and Reproductive Health:** Translational research investigates the barriers to, and facilitators of, improved sexual health (e.g., sexual functioning, reduced HIV/STI infection, impacts of pornography use) and reproductive health, including unintended pregnancy and abortion (UK and abroad). We develop and evaluate interventions to improve uptake and experience of contraceptive methods.
- **Contextual factors:** Qualitative, quantitative, and mixed methods research explores the role of contextual intra- and inter-personal factors in healthcare, in both naturalistic and clinical trials settings. This includes placebo effects, patients' experiences of healthcare, treatment-seeking behaviours, and the patient-clinician relationship. We develop techniques to (a) augment contextual factors in clinical practice to improve patient adherence and outcomes and (b) inform clinical trial participants about placebos.

**Yardley and colleagues'** significant external funding has pioneered the 'Person-Based Approach' to develop interventions that are accessible and engaging. Impactful large-scale trials of numerous cost-effective digital health interventions, many of which are available in the public, private and third sectors, have been used by 10k+ patients and members of the public (**ICS-04-01-LifeGuide, ICS-04-09-POWeR**).

Strategic partnership with NHS services support beneficiaries' involvement in research and efficient evaluation of interventions and policy (SA4). These include **Lioffi's** honorary

consultant paediatric psychology post at Great Ormond Street Hospital and the joint appointment of **Armstrong** with the NHS and **Morrison** with UoS primary care research centre (2).

### **Social & Personality Psychology**

At the individual level, we investigate self-concept, self-esteem, self-evaluation, narcissism, self-related emotions (e.g., nostalgia, shame, guilt), existentialism (e.g., meaning in life, death awareness), self-regulation and self-control and how these affect behaviour and wellbeing. At the relational level, we investigate how attachment influences close relationships. At the collective level, we investigate the interplay between self-interest and group interest, the discrepancy between person-to-person and group-to-group behaviour, the relevance of social identity, and the role of collective nostalgia.

- **Self-enhancement, self-regard, and narcissism** research explores the nature and effects of motives to enhance and protect views of the self. How do these motives operate in the context of narcissistic consumer behaviour? What are the limits to self-enhancement: is it constrained by a motive to verify one's identity? At a biological level, we examine the social neuroscience of self-esteem. At a functional level, we investigate self-esteem and narcissism, i.e., whether they regulate behaviour according to social position.
- **Self-control:** We have developed and tested a model of self-control that proposes that exercising self-control is aversive, engenders negative mood and can cause individuals to subsequently increase reward-seeking behaviour. By shifting the focus of self-control research and theory toward reward responsivity, this model can shape public policy and interventions to tackle some of the costliest challenges facing the UK (e.g., problem gambling, drinking).
- **Nostalgia:** We probe the neural, physiological, and cognitive underpinnings of nostalgia, with a focus on its content, antecedents, and functions across the life span. We show that nostalgia affects many facets of psychological wellbeing, including empathy, meaning in life, self-continuity, and self-esteem.
- **Attachment:** We identify factors that create successful and satisfying personal relationships and promote wellbeing. We investigate how attachment experiences with parents and romantic partners influence models of the self, others, and relationships, and how, in turn, these models influence thoughts, emotions, and behaviours in romantic relationships. Finally, we explore ways of promoting people's feelings of security in their relationships.

Programmatic research supported by the ESRC, Templeton Foundation, and Daedalus Trust has uncovered processes underlying self-enhancement, delineated the conceptual map of intellectual arrogance and intellectual humility, and examined the social behaviour of narcissists. Work supported by Alzheimer's charities and the NHS has addressed self-protective memory of persons living with Alzheimer's disease. ESRC-supported research has applied relationship science to interventions that improve wellbeing. Our recent recruitment of **Kelley**, with EEG expertise and research in self-esteem and self-control, complements our existing themes and methods (SA3).

### **Perception and Cognition**

We investigate perception, including sensory processes within vision, touch and audition, and higher-level cognitive processes, such as those involved in learning, search, memory, metacognition and reading.

- **Perception:** Methods including eye-tracking, EEG, and virtual reality (VR) presentation of vision and touch are used to understand basic and applied perception. We explore visual



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search and attention in the lab, and in applied settings such as airport security screening. We ask how threatening information grabs attention and how and why threats are missed in societally important tasks. Our work on human visual perception of 3D scene structure is combined with computer vision approaches, working alongside colleagues in the Institute for Sound and Vibration Research to develop vibro-tactile sensory augmentation for cochlear implant users.

- **Reading:** We record and analyse eye movements to understand the visual and cognitive processes that enable reading. We specialise in individual differences, parafoveal processing and task effects during reading (e.g., reading for comprehension vs. skim reading). Alongside English, we also examine reading processes in Chinese, Dutch, Finnish, Arabic and Brazilian Portuguese, and in local Polish speaking communities.
- **Learning, Memory and Metacognition** research investigates how people acquire information, retain it, and self-assess their own cognition in laboratory and applied settings. Basic research in associative learning is translated into applications that include addiction and navigation. Other research investigates our ability to learn and retrieve information in the laboratory, the classroom, and social media, and how well we metacognitively understand those abilities. ESRC-funded research explores how learning and memory can be enhanced using spacing and retrieval practice, and applies these results to the classroom. Forensic applications of our memory and metacognition research include identity recognition from faces, voice, gait, or hands, as well as research into misinformation effects.

Programmatic funding includes multiple EPSRC-funded interdisciplinary projects that combine human perception with advances in artificial intelligence e.g., development of deep neural network to achieve human-like, 3D interpretation of real-world scenes. Our behavioural experiments with machine learning to optimise human identity recognition inform forensic policy and practice. Building on work reported in REF2014, funding from DSTL and the UK Dept. for Transport have enabled us to determine how best to detect environmental threats. Our ERC-funded work on migration investigates the decision-making processes of “agents” to understand migrants’ psychological processes and characteristics (e.g., risk-taking vs. risk-aversion; subjective calibration). Other EU-funded work explores how we combine sensory information from vision and touch to understand and interact with novel objects (both real and in VR).

The recruitment of **Feldmann-Wüstefeld** has increased neuroscience expertise (SA3). **Witzel** and **Seabrooke** maintain critical mass in lower-level aspects of perception (e.g., attention, search, colour perception) and in higher-level cognition (learning/memory).

### 1.3 Research and Impact: Environment and Culture

Colleagues work in a vibrant, supportive and cross-disciplinary environment that provides critical mass and leadership and that embeds equality, diversity, inclusion and promotes well-being and success for staff and PGRs.

#### 1.3.1 Excellence through strategic investment, interdisciplinarity and collaboration

We have built on areas of strength that align with priorities of funders and Government (SA1) through strategic investment in staff and infrastructure (3.2, SA3). Strategic investment in staff and facilities has generated a 60% increase in research income, 1352 publications in prestigious journals (57% with international co-authors, Scopus) in partnership with 1308 international institutions across >60 countries (4) since REF2014. Sixteen new permanent academic appointments have built critical mass, ensured succession and supported collaboration across themes to deliver cross-disciplinary methods, outputs and income.

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UoS Institute of Life Sciences, Web Science Institute, Southampton Neuroscience Group and the Alan Turing Institute drive interdisciplinary collaborations between PPN and other Schools, Faculties and UoAs. Since REF2014 our UoA4 staff have secured £26.9M in collaboration with 15 Schools and 11 UoAs at Southampton (**Figure 2**) and published in journals that span the physical, social and health sciences (**Figure 3**).

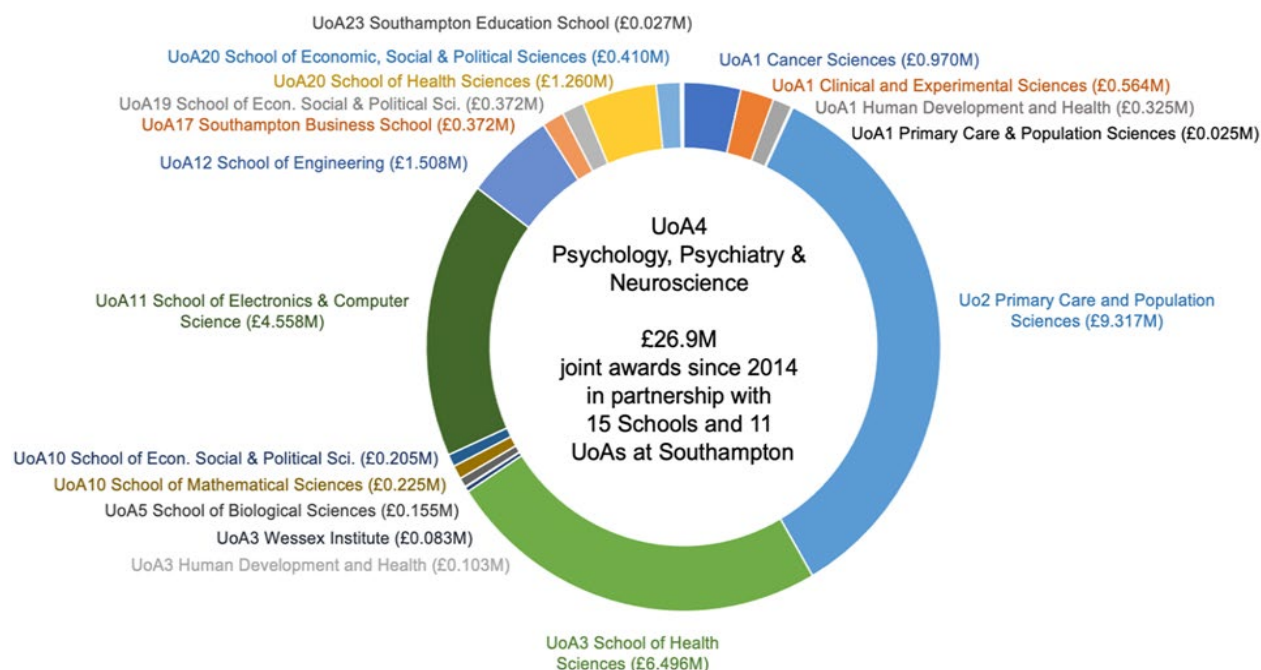


Figure 2: Joint funding awards to support interdisciplinary research and impact

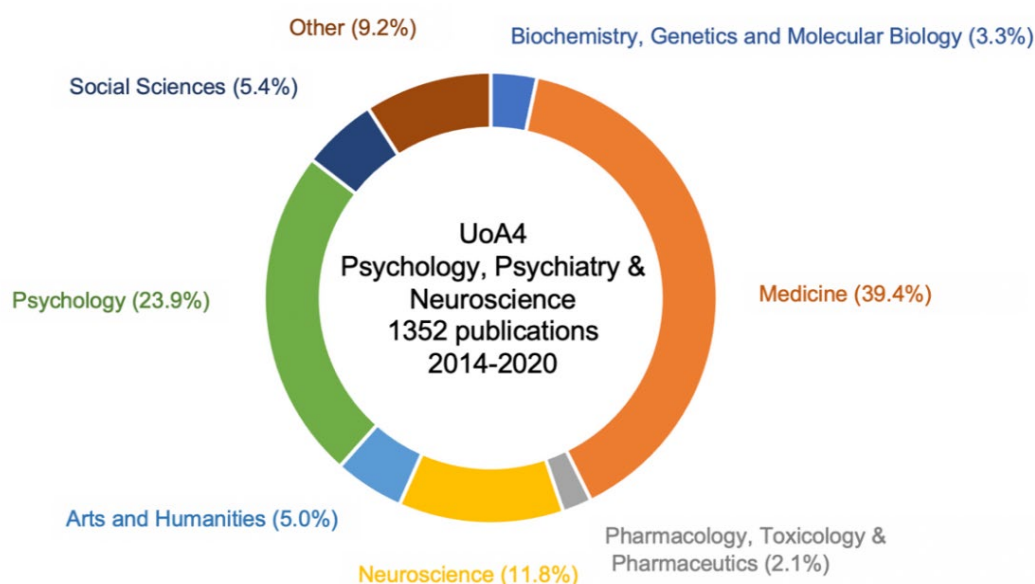
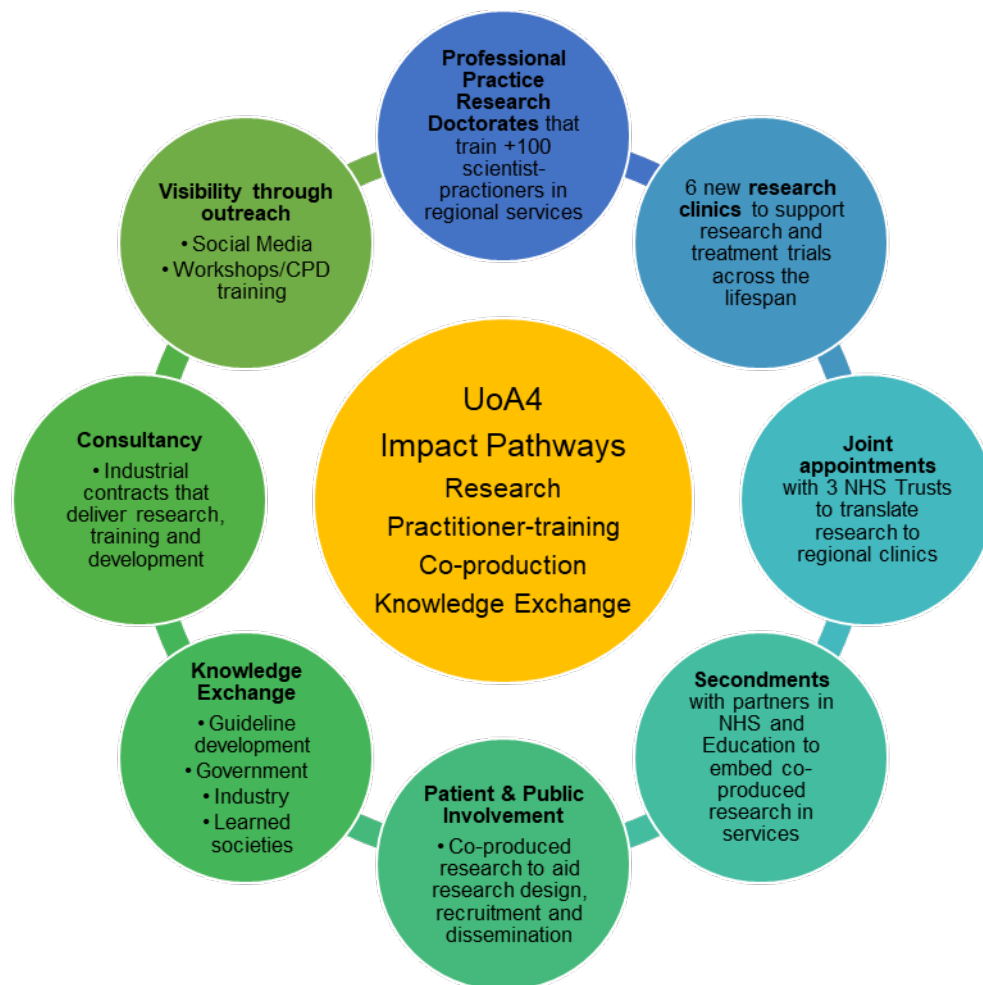


Figure 3: Publications across disciplines (SciVal 2020)

### 1.3.2 Inculcating Impact

Strategic alignment across PPN/UoA4 has improved pathways to impact (SA4) in partnership with NHS, education, government and industry (**Figure 4**).



*Figure 4: Impact Strategy and Infrastructure*

The creation of new clinical research pathways/clinics (**3.2, Figure 11**) has increased translational research in applied settings, supported through the creation of 4 new joint appointments with the NHS (**Amin, Armstrong, Chamberlain, Cortese**). Our new Centre for Workforce Wellbeing based in Psychiatry (£330k, HEE) works with national partners to generate evidence and interventions that will improve the working lives of NHS staff.

Our PGR community drives research and impact with key stakeholders. We've increased PGR recruitment and commissioned training to increase research output, outreach and impact (SA6) and to create one of the largest UK providers of PGR and scientist-practitioner training (110+/year). Since 2014 we have increased commissions for PGR training in clinical (DClin 24/yr) and educational psychology (EdPsych 14/year), increased our Academic-Clinical Fellowships in psychiatry, research studentships funded by the ESRC DTP, and our new Centre for Workforce Wellbeing. Our PGT programmes in CBT and MSc Clinical Psychology (25+ students/yr, 30% international) align with programmatic research and link with local clinical services to increase impact and provide a pathway for regional, national and international collaboration (SA5, 6). Our MSc in Health Psychology provides a research training pathway in regional health services.



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Extensive patient and public involvement (**4.3.1**) co-produces research, supports recruitment from often difficult-to-reach populations and maximises dissemination/knowledge-exchange. We second staff from NHS and education authorities to our doctoral programmes to train PGRs who complete service-related doctoral research embedded in regional NHS services and schools (**2.1.3**).

We've maximised impact through active and visible engagement with charities and their stakeholders and increased/diversified our partnerships to launch 38 projects with 27 charities (+600% non-competitive funding vs. REF2014). We've delivered 10 projects with Government (MoD, Transport, GCHQ, DSTL), 9 with industry partnership and 77 funded collaborations with NIHR and NHS/Hospitals (Solent, Isle of Wight, Hampshire Partnership, GOSH).

Our new devolved Centre budgets (£20k/yr) fund pilot/translational research, personal development, outreach/dissemination to increase impact, and are supported by Faculty, ESRC and EPSRC impact acceleration grants and impact workshops. Impact activities are reviewed at appraisal/promotion, and are a required output from all sabbaticals. We have increased the size and diversity of our knowledge-exchange activities, including hosting workshops/conferences and exchange programmes/funded networks (e.g., H2020, EPSRC, NIHR, MRC **4.1**, **4.2.3**) and senior membership of national advisory groups/societies that shape policy and practice (e.g., SAGE, Royal Colleges, Guideline development groups; **4.2**)

### 1.3.3 A Culture of Research Integrity

Research integrity is embedded through the research centres, under the leadership of centre directors, alongside a staff mentoring and appraisal process which focusses on excellence, accountability, transparency and responsiveness. Training in research integrity is provided to PGRs through Programmes and the UoS Doctoral College (**2.3.3**). All staff complete an annual register of interests in accordance with the *UoS Conflict of Interests Policy*. PDRAs/PGRs receive mentoring on publication and co-authorship, with the clear expectation they will lead-author their work, per the Vancouver Protocol.

### 1.3.4 Research Governance

Those working with human tissues, organs or data arrange sponsorship and insurance through Southampton's Research Governance Office (RGO). All research is registered on Ethics and Research Governance Online (ERGO II). **Graham** (Chair of Faculty ethics committee) and **Ingham** (Chair of Psychology ethics committee) provide training for staff/PGRs across the Faculty and inform University ethics policies. Directors of Research have responsibility for research integrity and compliance with the five commitments in the '*Concordat to Support Research Integrity*' and for managing confidential mechanisms for reporting of misconduct per University procedures, **REF5a**.

### 1.3.5 An Inclusive and Safe Research Environment

We've developed a supportive and inclusive culture recognised by new Athena SWAN Bronze/Silver awards and improved staff perceptions of (i) flexibility, (ii) support, (iii) inclusivity (iv), fair workload and (v) respect, value, collegiality and consideration of individual differences (Staff Engagement Survey, 2019). Psychology is leading on Faculty and University wellbeing strategies (**2**). Wellbeing is promoted through the Equality, Diversity and Inclusivity (ED&I) committee (**2.4**). International hires (12 of 16 non-UK) have fostered an international, inclusive research culture and global outreach.

Heads of School/Centres, experimental/laboratory managers and Health & Safety officers (**Dargie** in Psychology, **Coles** in Psychiatry) embed Health & Safety through staff/PGR induction, training and monitoring. Risk registers, inspections, training records and incidents/near-misses are reviewed at School/Faculty H&S Committees.

### 1.3.6 Committed to Open Research

We promote best practice in research, with emphasis on open science and reproducibility, supported by Institutional funding for open access publishing (**REF5a**). Staff/PGRs attend training on data management and reproducibility, analysis using open software (R) and meta-analysis. Our audit of Open Science practices shows a clear increase in sharing of materials, data, methods and/or pre-registration (**Figure 5**). Our technical team (**3.2**) use open-source platforms (e.g., jsPsych, R) to code and disseminate experimental tasks, stimuli and data. Data analysis pipelines are developed and shared widely e.g., **Godwin's** Open-source R eye-tracking analysis tool *eyeTrackR*: >6000 downloads since launch in December 2019. **Adams/Graf's** open-access Southampton-York Natural Scenes (SYNS: <https://syms.soton.ac.uk>) dataset of 3D image data from 100 rural/urban locations has 430 academic and industry users across 36 countries (>15000 downloads). Users include Apple, Adobe, Facebook, NASA, Nvidia, Hitachi. All our *ICs* are underpinned by Open Research and their resources/data shared with other institutions where permitted. Meta-research datasets, including unpublished data, are made freely available (**Cortese**).

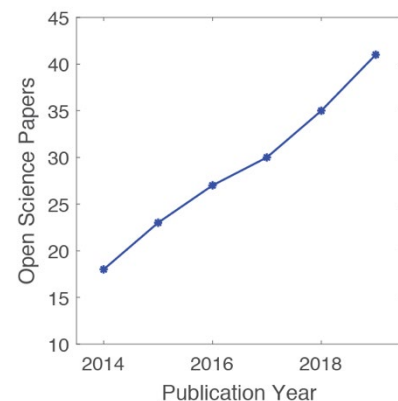


Figure 5: Publications that include pre-registration, open methods/data.

### 1.4 Future Aims and Goals

Over the next 5 years we will consolidate the integration of Psychology, Psychiatry and Neuroscience at Southampton. A cross-Faculty PPN steering group will inform strategic investment in people (funded studentships, ECR-fellowships, academic appointments), facilities, postgraduate training and external engagement with NHS, schools, industry and charities to maximise PPN research, impact and community.

Strategic priorities will build on our expertise in physical and mental health and wellbeing, with a focus on risk/prevention, and developing accessible interventions (online, parenting) to support social, cognitive, and emotional development across the early life-course (childhood through early adulthood). High quality, reproducible, open science methods will be developed in partnership with a new stakeholder advisory group to deliver impact. Research and enterprise with industrial partners will be stimulated by ongoing programmatic research in human factors/technology-interactions (autonomous systems, security).

Our EDI initiatives will improve diversity and inclusion to mirror the strides taken in gender equality, and specifically target increases in i) PGR recruitment from minority groups to our expanding DClin/EdPsych programmes, ii) outputs and funded collaborations with international partners, iii) research visits/exchanges (e.g., overseas sabbaticals/hosting international workshops). Our extensive collaborations with schools/UoAs at Southampton will target i) increased interdisciplinary funding, ii) sustained growth in income from UKRI, charities and NIHR and iii) increased knowledge-exchange and enterprise with industrial partners.

## 2. People

### 2.1 Staffing & recruitment

#### 2.1.1 Current Staff

Our return includes 49 staff (46 FTE), evenly spread across gender (52% female) and seniority. This represents substantial growth since our 2014 submission (33 FTE), and a notable improvement in gender representation, particularly at senior levels (**Figure 6**).

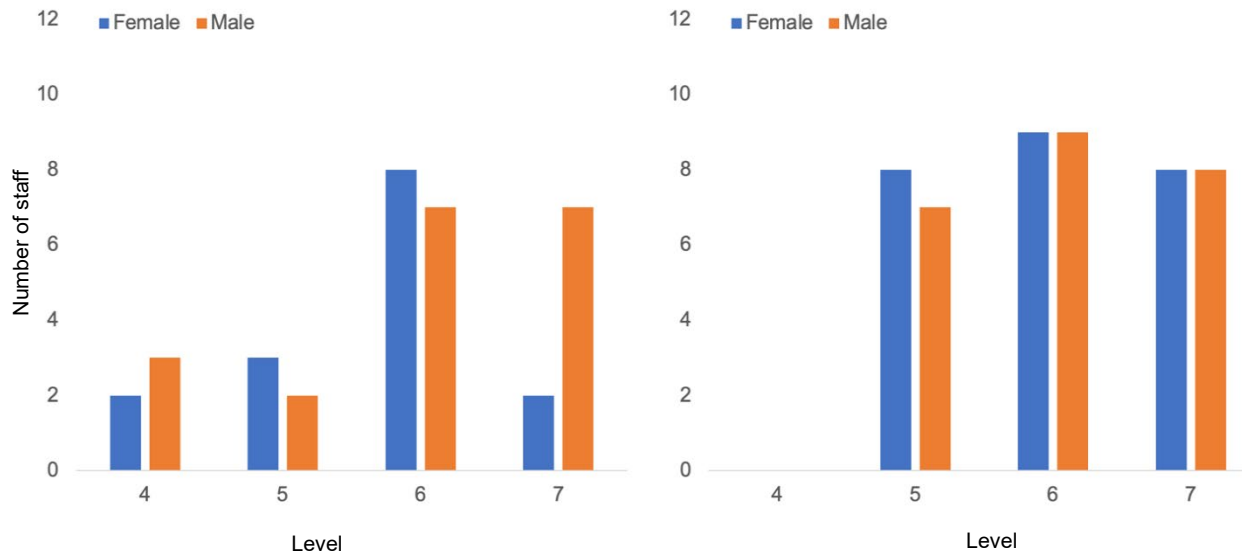


Figure 6: Academic staff returned to UoA4 in 2014 (left) and 2021 (right) by level, gender.

Several colleagues have retired (Bradley, Mogg, Lynch, Kennedy, Perry, Kingdon), moved to take non-academic posts (Cieza: World Health Organization) or professorships elsewhere (Reichle, Donnelly, Liversedge, Sonuga-Barke). All continue to collaborate (funding/publications/supervision). In the same period, we have made **16 strategic hires** (8F, 8M).

#### 2.1.2 New appointments & recruitment strategy

Section 1.2 highlights recruitment that has increased quality and impact in strategic research areas. Assistant Professorships within each theme increase critical mass and succession/sustainability.

*Joint appointments to increase translational research and impact:*

**Neuroscience and Mental Health:** **Amin** (Associate Professor) co-leads the Old Age Psychiatry network in Wessex and clinical trial portfolio at the Memory Assessment and Research Centre (MARC) and strengthens our track record in dementia and inflammation. **Chamberlain** (Professor) researches latent phenotypes (cognition/traits/imaging) conferring risk and resilience to mental disorders, impulsivity and addiction. He leads the only trans-diagnostic NHS clinic for Impulsive Disorders. He identified cross-diagnostic markers linked to brain structure and inferred gene expression, linked experimental models of brain processes through to clinical trials by translation and back-translation (e.g., glutamate system xc-), and identified vulnerability and resilience markers during pandemic lockdown (n=343,000 members of UK public). **Cortese** (now Professor and CAMHS Consultant, Solent NHS Trust) informs clinical decision-making in child and adolescent psychiatry, with a specific focus on ADHD. His expertise in advanced meta-analytic approaches, as well as large epidemiological datasets is world-renowned – ranking 2<sup>nd</sup> worldwide (Expertscape) in ADHD.

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**Health: Armstrong** is the Research Lead for NHS Solent Sexual Health Services, leading regional research in sexual health, including service evaluations of online and in-clinic STI testing (100k+ tests/yr), uptake of vaccination for HPV, Hepatitis A/B; HIV pre-exposure prophylaxis (PrEP) and new care pathways (remote consultations, treatment-by-post).

**Morrison** holds a split post within UoS (Psychology:Primary Care Research Centre) to support multidisciplinary collaboration and funding (e.g., NIHR School for Primary Care Research), translate novel method-specific expertise (e.g., LifeGuide programme, person-based approach to intervention development) and capitalise on infrastructure and capacity development (e.g., cross-cutting behavioural science theme within the NIHR Biomedical Research Centre).

### 2.1.3 Category C staff - Contribution, Integration and Development

Our professional practice research doctorates are supported by 4 category C (seconded) staff employed by educational psychology services, and 2 NHS clinical psychologists. Seconded staff have offices in our school and receive personal budgets to support research. All supervise and publish doctoral research (EdPsych/DClin) and support impact/outreach through links with education, councils and NHS services. We have mentored one clinical seconded staff to Associate Professorship and part-funded the PhD training of a seconded educational psychologist. We host NIHR Academic Clinical Fellowships in general adult, child/adolescent, old age psychiatry (5 since 2014, with **Amin** now employed as a clinical-academic Associate Professor at UoS). Clinical R&D is supported through visiting/honorary research appointments for 30+ educational psychologists, 30+ clinical psychologists, psychiatrists, neurologists (across 5 NHS Trusts and 4 education authorities), and 10+ international visiting psychiatrists support our research/clinical trials overseas.

## 2.2 Staff support and development

We are fully committed to the Concordat to Support the Career Development of Researchers, and its Action Plan. Our Centre for Higher Education Practice (CHEP) provides professional development training for all staff.

### 2.2.1 Early Career Researchers (ECRs)

ECRs receive research mentorship from staff beyond their research centre and are members of a new ECR network that supports skills training, progression and peer-support. In addition to support provided through their research grant, ECRs access devolved Centre budgets to attend workshops/conferences/CPD. The network is co-chaired by ECRs **Payne/Greenwell** and provides representation at School/Faculty/Health & Safety and EDI meetings. The ECR career development budget (£5k/yr) is used to invite speakers and fund CPD. ECRs wishing to develop their education/leadership to support applications for lectureships can apply (through open Expressions of Interest) to deliver teaching and supervision across UG/PG programmes. This contribution is formally bought-out from their employing research grant following discussion with PIs. This new model was developed following consultation with our ECRs and provides flexibility to develop academic skills that support academic employment. Since 2014 all ECRs have moved into professional employment (60% in academic positions).

### 2.2.2 Mentoring

Our Mentorship Scheme provides one-to-one advice on diverse topics e.g., work-life balance, grant writing. This is supported by a Faculty mentorship scheme that can be accessed by all staff and is coordinated by our Concordat Champion (**Chapman**). A 'new-starters network', with a budget of £1.5k per year, provides near-peer support and mentorship for new appointments.

**2.2.3 Line Management**

Staff are line managed within research centres. Annual appraisals review performance against mutually agreed objectives given job blend (Research:Education:Enterprise:Leadership/Admin). Appraisals prioritise forward-looking discussions that revise objectives and identify training and resources to support career progression, including opportunities for research leave, promotion and research leadership. Mandatory training for line-managers emphasises supportive appraisal, and >80% staff agree that these are useful. All new staff receive induction, near-peer support, start-up research budgets and complete reflective probation handbooks with line-managers to review and support research development.

**2.2.4 Research Support**

Staff, ECRs and PGRs meet regularly within each of the four research centres (typically weekly) and convene seminar series, external speakers, pitch-a-project sessions, and informal opportunities to discuss research at all stages of development (proof of principle ideas, draft manuscripts/funding applications, dissecting reviewer feedback). Meetings emphasise a culture of inclusivity, collegiality and collaboration. Devolved Centre budgets (total 20k/yr) fund workshops, external speakers, pilot projects and CPD. Monthly seminar series (both in Psychology and Psychiatry) are open to all staff, PGRs, and undergraduate/MSc students. Staff receive an annual R-budget (£900) to support conference travel and other research activities. Since 2019 research costs for UG/MSc projects supervised by academic staff are met by central funds (~£28k/yr) rather than staff R-budgets/services-rendered.

**2.2.5 Sabbaticals**

Opportunities (6 months to focus 100% on research and impact) are advertised annually to all staff on education/research contracts (including part-time/fixed-term). Our workload model 'bakes-in' sabbaticals to help colleagues plan their research leave (e.g., visits to International collaborators) and help schedule cover. Since 2014 all sabbatical requests have been granted (26 sabbaticals in total, 50%F, 77% assistant/associate professor).

**2.2.6 Support to gain research and impact funding**

Colleagues develop research funding applications and receive support within the UoA4 research centres from senior PIs (mentorship, feedback) and peers. Colleagues can view successful funding applications and we encourage staff to share unsuccessful applications with reviewer feedback. The University's Research & Innovation Services (RIS) arranges independent/external peer-review, interview training and mock-panels and supports costings (pre-award) and contracts/delivery/IP (post-award). Colleagues are supported by **Lioffi** (UoA4 Impact Champion) to apply for internal and external funding to support impact. Public Policy Southampton (PPS) and Public Engagement with Research (PERU) provide impact training and toolkits, guidance to engage with relevant stakeholders and capacity building activities. Guidance to staff is available at all stages from application for funding through to dissemination to policymakers (**REF5a**).

**2.2.7 Workload**

Since REF2014, we have introduced a transparent and detailed workload model. This ensures that all colleagues have protected time for research, irrespective of seniority or other factors. New staff, those returning from periods of leave (e.g., maternity/parenting leave, illness), and those with health problems have reductions in teaching and administrative duties to facilitate research.



### 2.3 Doctoral Research Students (PGRs)

Our PGR community totals 150+ students/yr and brings together PGRs across our Doctorates in Psychology (PhD, DClin, EdPsych) and Psychiatry (PhD, DM).

#### 2.3.1 PGR funding

PGR-studentships (stipend, training and research costs) are funded through NHS/HEE commissions (DClin), Department for Education (DEdPsych), ESRC via the South Coast DTP, EU funded training networks (Marie-Curie training networks), competitive studentships through IfLS, Presidential Scholarship scheme, government (MoD, DSTL), non-profit organisations (TK Foundation), charities (Kids Company) and industry (Lloyd's Register).

#### 2.3.2 PGR recruitment

Since 2013/14 we have recruited 270 PGRs (2019 intake +30% vs. 2013). Recruitment is governed by Faculty policy to ensure gender representation on panels and that quality criteria are met. All PGR applications are reviewed by 2 staff and all shortlisted applicants are interviewed prior to offer. Our professional practice doctorates explicitly evaluate research competencies at shortlisting and interview to confirm readiness for research training (alongside practitioner training). EDI policy and practice has increased diversity and representation in our PGR community (cf. 2013) – evidenced by increased proportions of international students (21%; +12%), and those wishing to train part-time (27%; +18%). Our PGR community is 80% female, commensurate with our gender ratio in REF2014 and undergraduate psychology programmes.

#### 2.3.3 PGR training and development

Research Directors within each programme (PhD/DClin/DEdPsych) coordinate research training and support progression. All PGR students have a supervisory team (2+ academics). The Faculty Graduate School, Doctoral College and online hub (PGR-Tracker) provide training, pastoral support, mentoring, academic skills and networking for PGRs and supervisors and monitor progression (annual reports/transfer). All PGRs have personal IT/laptop and personal desk space (PhD) – our 'Postgraduate Hub' provides workstations, soft seating, safe storage and communal space (50m<sup>2</sup> in Psychology, 30m<sup>2</sup> in Psychiatry). Our PGR senior tutors (**Kirby, Witzel**) provide pastoral support.

PGRs attend research centre presentations and present at our annual PGR conference (30+ oral presentations, 60+ posters, 150 attendees, external keynotes). PGRs receive training in data management, Open Science, Open Access publishing, writing, job search and interview (via Doctoral College) and advanced training in meta-analysis, statistical programming in R, scientific writing and trial-design (DClin/EdPsych). PGR publications have increased +40% since REF2014. PGRs have authored 16% of submitted outputs.

Personal PGR budgets support research and conferencing, supplemented with competitive society-awards (e.g., EPS, SPS, BAP, ECNP) and supported through EU network and training grants. PGRs typically attend 2 UK and 1 international conference during their training. The effectiveness of PGR supervision and student progression is evidenced by: (i) excellent completion times, and (ii) strong destinations data. PGR completion rates (UKRI definition; i.e., mean time to submit) have improved from 3.67 (2013) to 3.45 years. The PGR completion rate is 98%, with 97% students gaining professional employment.

## 2.4 Commitments to Equality, Diversity and Inclusion (EDI) and Wellbeing

Our commitments to EDI and wellbeing are embedded in everything we do, ensuring that staff development opportunities are available and promoted to all staff, irrespective of contract type (permanent, fixed-term, part-time), gender, or other protected characteristics. We mirror the University's commitment to EDI (**REF5a**). In recognition of our commitment to gender equality Psychology was awarded Athena SWAN Bronze in 2020, and Medicine (Psychiatry) Silver in 2015. Our staff community is more diverse (14% BAME vs. 7% in 2014) and international (43% EU/International vs. 40% in 2014) – mirroring improvements in our PGR community **2.3**. EDI Champion (**Kirby**) is a member of School Board and oversees Race Equality, Concordat, Athena SWAN action planning and implementation. EDI is a standing item on all committees. In line with University policy, all staff involved in hiring, appraisal and promotion have undertaken EDI/unconscious bias training and our recent staff survey confirmed that at least 80% of staff have good understanding of EDI issues, policies and practice:

- Job adverts/person specifications use inclusive language and are reviewed by UoS Equality Charters Advisor. We redact gender information/names from applications where possible prior to shortlisting. Since 2014 all staff recruitment panels include equal gender representation. In line with the University's Disability Confident Leader status, we offer an interview to all applicants with a disability. **Figure 7** shows recruitment by level and gender.

Annual workshops provide guidance on promotion. Potential applicants receive mentorship from recently promoted colleagues and have access to all successful applications. **Figure 8** gives promotion data by gender and level.

- Leadership roles are advertised to all colleagues and applied for through Expressions of Interest. Female role models now in leadership roles include Deputy Heads (Research – **Graham**; Education – **Kovshoff**), Centre Directors (**Adams**, **Stevenage**, **Lioffi**, **Graham**), Dir. External Relations (**Carnelley**), Impact Champion (**Lioffi**) and leadership of ICSs (**Yardley**, **Kreppner**).

- We support part-time, flexible and remote working, and all applications for voluntary reduced hours, in which right to return to full-time working is protected, have been supported. Group activities (meetings/seminars) occur within core hours of 10-4.
- Colleagues taking maternity leave, or taking adoption leave as primary carer are entitled to 6 months full pay i.e., substantially more than statutory pay. We support colleagues during

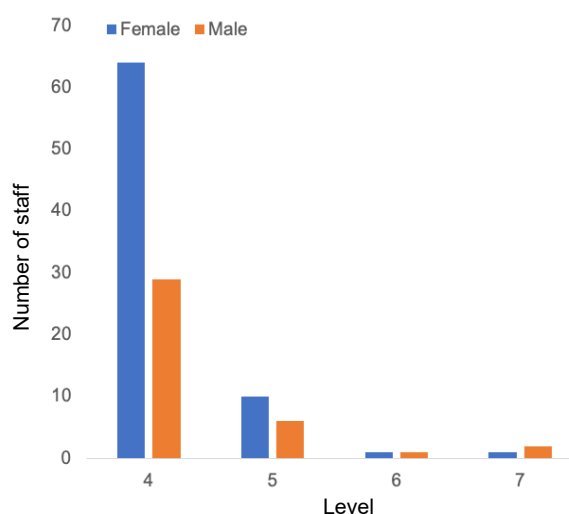


Figure 7: Recruitment by gender

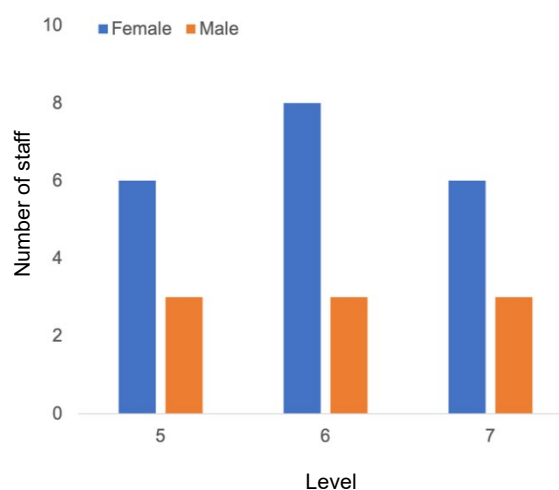
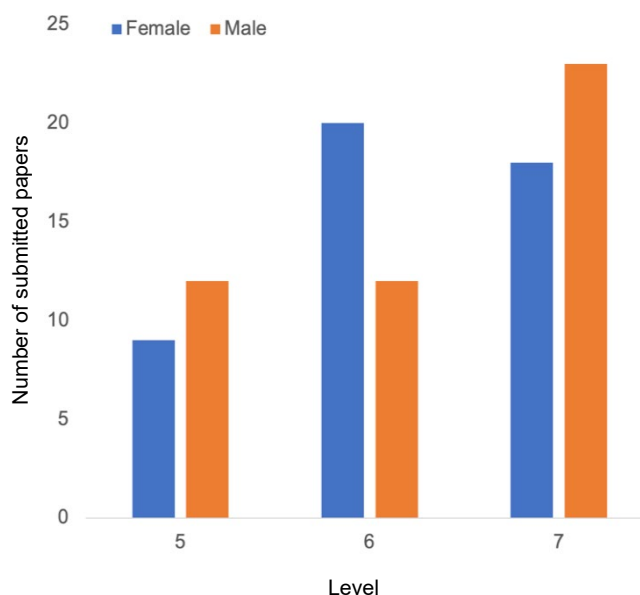


Figure 8: Promotion by gender

## Unit-level environment template (REF5b)

periods of maternity leave via KIT days and provide access to private space for breastfeeding. Staff returning from leave receive a 20% reduction in their teaching/administration for 6 months to prioritise research. Our Family and Caring Leave fund provides £3k/staff member to support research during their parental leave (e.g., to fund research assistants, opportunities to attend conference with family).

- Colleagues with mental and physical health difficulties are supported via reduced workload guided by Occupational Health. **Maguire** (UoA4) is Wellbeing lead at School, Faculty and now University-level and is commissioned to develop a comprehensive wellbeing strategy informed by staff-engagement/wellbeing survey data, focus-groups and our Centre for Workforce Wellbeing.
- Staff involved in REF decision-making have taken additional EDI training. All research staff nominated outputs for benchmarking, in consultation with centre heads (**Figure 9**). Similarly, staff at all levels contributed to our internal benchmarking - a training opportunity to understand the qualities of 3\* and 4\* research. For outputs,  $\%Female_{UoA4Staff} = \%Female_{Benchmarking} = \%Female_{submitted}$ .
- All staff members were encouraged to consider possible ICSs, and these were drafted by staff members from levels 5 to 7 across all research clusters. This highlighted the importance of, and pathways to, achieving impact to all staff and identified future impact activities/ICSs. Submitted ICSs were led by 3F and 1M, supported by **Lioffi** (Impact Champion).



*Figure 9: Number of submitted outputs from current staff by gender and level.*

### 3. Income, infrastructure and facilities

#### 3.1 Summary of Research income during the REF period

Over the assessment period our research income has averaged £2.26M per year - a 61% increase from the previous REF period (**Figure 10**). We have attracted substantial funding from diverse sources, including UKRI (EPSRC, ESRC, MRC), NIHR, Australian Research Council, charities, industry and the EU (SA2).

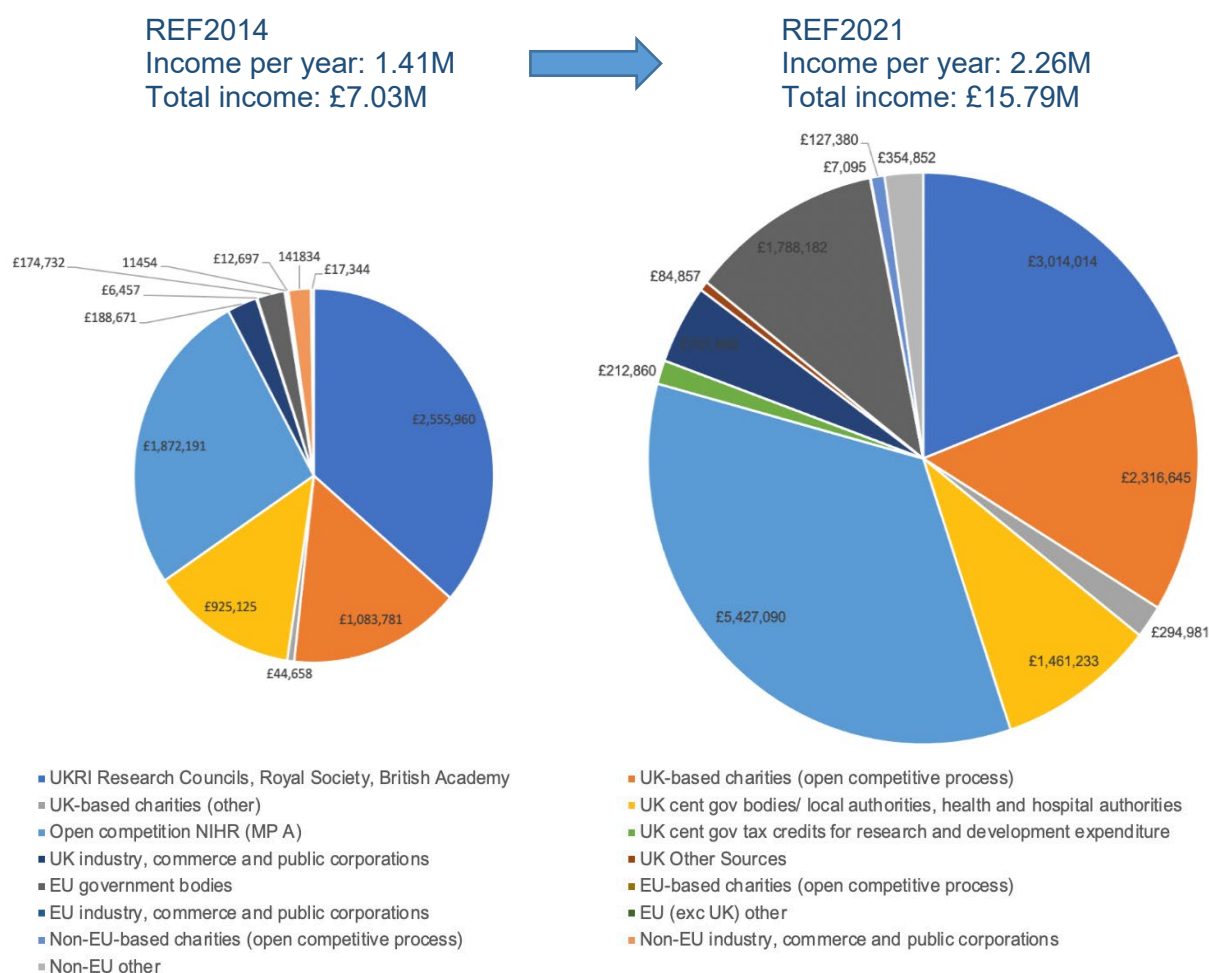


Figure 10: Research income by funder.

#### 3.1.1 Neuroscience and Mental Health

With £5M+ funding we have consolidated and extended our programmatic research. Competitive grants fund our development of evidence-based parenting programmes for ADHD (NIHR: **Kreppner, Cortese**), nerve trigeminal stimulation in ADHD (NIHR: **Cortese**), autism (Waterloo: **Kovshoff**) and anxiety (Kavli Foundation: **Lawrence**). We have profiled social, emotional, behavioural and cognitive outcomes in children who have i) experienced institutional deprivation (ESRC: **Kreppner et al.**), ii) hearing impairment (NIHR: **Kennedy, Kreppner**), iii) brain tumour (CRUK, Brain Tumour Trust) and (iv) suffered adverse neurological events in the peri/neonatal period (NIHR, Action Research: **Vollmer**). Our research in mood and anxiety disorders has validated experimental medicine models and evaluated new pharmacological targets in anxiety (3 sequential MRC awards: **Baldwin, Garner**). NIHR, NHS Trusts and industry are funding feasibility studies of pharmacological and neurostimulation treatments in anxiety and related conditions (OCD). With funds from EUFP7 and European Colleges we have established new training networks/knowledge exchange programmes in anxiety across Europe and South Africa (EUSARNAD). With funding from NIHR **Kingdon, Lynch** led the evaluation of DBT for refractory

## Unit-level environment template (REF5b)

depression, while awards from NIHR (**Kingdon, Newman-Taylor**) funded our development and evaluation of pharmacological and cognitive-behavioural interventions for psychosis. Research in alcohol and comorbid conditions includes studies of medication adherence for relapse prevention, behavioural interventions for alcohol and substance misuse and drinking behaviour/risk in breast cancer (**Sinclair**: NIHR, MRC). The ERC-funded STRATIFY study is examining neuroimaging markers of reinforcement-related disorders (alcohol disorders, ADHD, and depression) in young adults (**Sinclair**). Research in vulnerable groups led by **Maguire** has secured funding from charities and Government in the UK and USA to develop evidence-based interventions for people excluded from statutory health and social care, and to understand pathways to homelessness (Big Lottery, Oaktree Foundation, Public Health England, MHCLG, Houston Homeless Healthcare). Colleagues are currently leading a new Centre for Workforce Wellbeing, funded by Health Education England (£330k), to develop evidence-based guidelines for the National Health and Social Care workforce (**Baldwin, Sinclair, Cortese, Hou, Garner**). Clinical trials in dementia and mild cognitive impairment conducted at the Memory Assessment Research Centre (MARC) in Southampton, led by **Holmes** and **Amin**, have been awarded grant funding from commercial partners and RCUK organisations (e.g., ARUK, Alzheimer's Society, MRC, NIHR).

### 3.1.2 Health Psychology

Colleagues have been awarded £4M+ in funding since 2014. **Yardley, Morrison, Bradbury, Graham, Lioffi** and **Kirby** have secured funding (e.g., NIHR, MRC, EPSRC, Innovate UK, Stroke Association, NHS Trust, Dunhill Medical Trust, Asthma UK, The Meniere's Society, Versus Arthritis) to develop and evaluate digital interventions. **Bishop** has attracted funding (Versus Arthritis, NIHR) to explore and manipulate contextual factors (including placebo effects, treatment beliefs and the patient-clinician relationship) in healthcare. The Centre for Sexual Health Research (**Graham, Ingham, Armstrong**) has won £2M+ from MRC, NIHR, Australian Research Council, Norwegian Research Council and industry for research in sexual health. **Lioffi** has secured funding from Great Ormond Street Charity and NIHR to develop and test pharmacological and psychological interventions to improve pain management and quality of life in paediatric palliative care.

### 3.1.3 Social Psychology

The ESRC has supported research on self-evaluation i.e., whether people see self-consistent or self-enhancing information (**Gregg, Sedikides**) and interventions to improve close relationships (**Carnelley**). Research on intellectual arrogance versus humility has been supported by the Templeton Foundation (**Gregg, Sedikides**) and research on how narcissists behave in the workplace has been supported by the Daedalus Trust (**Sedikides, Wildschut**).

### 3.1.4 Perception and Cognition

£1.5M+ in external funding for impact-oriented work has been awarded since 2014. Work led by **Godwin** on detection of real-world threats (e.g., improvised explosive devices) has attracted funds from DSTL and DfT and extends our 2014 ICS. Interdisciplinary work on the estimation of 3D structure in natural scenes by humans and deep neural networks is funded by the EPSRC following on from previous EPSRC funding to produce a publicly available, natural scenes database (>300 academic and industrial users, **Adams, Graf**). Interdisciplinary work on identity recognition in humans and artificial intelligence by **Stevenage** and colleagues has been funded by GCHQ and the EPSRC. **Drieghe's** Leverhulme-funded work revealed how Arabic diacritics are processed during reading. International collaborations are further supported by two substantial current EU-funded interdisciplinary projects, one which investigates visual-haptic material perception in the real world and virtual reality (**Adams**) and another that models how



## Unit-level environment template (REF5b)

migration patterns are affected by migrants' decision-making (**Higham**). **Higham** is also funded by the ESRC to investigate the use of spaced retrieval practice in the lab and classrooms to enhance student learning. **Adams** is co-leading the £12m 'Trustworthy Autonomous Systems' research platform at UoS.

### 3.2 Key investments in infrastructure and facilities during REF period

- **Neuroimaging – functional/structural MRI:** In 2014, PPN colleagues secured £1.4M to invigorate research imaging at SGH (joint funded by UHS NHS Trust with £500k MULSER funding from UoS). Facilities include **4 high resolution multi-detector Computed Tomography (CT)** scanners (all 128-slice dual-energy systems) and **6 Magnetic Resonance Imaging (MRI)** scanners (**2 x 3 Tesla for neuroimaging** and 4 x 1.5 Tesla). Since 2015 colleagues have weekly ring-fenced scanning-time to deliver grant-funded neuroimaging research and pilot/proof-of-concept projects funded by a service-level agreement between Psychology (UoS) and UHS NHS Trust. This initiative has secured the recruitment of new staff with imaging expertise (**Golm, Zhang, Chamberlain**) and grant funding (e.g., MRC: **Baldwin, Garner**; ERC: **Sinclair**, ARUK: **Hou, Holmes**). **Vollmer** chairs the joint UoS-UHS Research Imaging Management Group (RIMG). UoS forward-pays for 25% of imaging time on a Siemens Skyra 3 Tesla to guarantee MR scanning availability (e.g., research in acute patients). Additional imaging modalities that support neuroscience research in neuroinflammation, dementia and aging include: **Two SPECT-CT systems** support diagnostic and molecular radiotherapy work; dynamic and gated acquisitions are available, including first-pass imaging. **Ultrasound** – with ultra-high resolution high frequency, compound imaging capability, **Doppler** enabled scanners with a full array of transducers. Plain **radiography** and **fluoroscopy**.
- The university's **high-performance computing cluster** (one of the largest in the UK, **REF5a**) supports data analysis, computational modelling, deep learning and computer vision. **Image processing** workstations provide teams with free access to the UoS IRIDIS supercomputing facilities ([www.go.soton.ac.uk/akd](http://www.go.soton.ac.uk/akd)). Imaging researchers can have their MR images pushed from the scanner to a server (and a mirror site) hosting XNAT (Extensible Neuroimaging Archive Toolkit), an imaging informatics platform, providing local archiving facility and the means to share anonymized imaging data with collaborators worldwide.

Since 2014 Psychology has invested **£190k** to redevelop **450m<sup>2</sup> of laboratory space** to accommodate **67 research rooms**, including:

- **18 single-occupancy computer testing stations**, and **3 multi-station rooms** configured to test 3-6 participants in parallel (e.g., social gaming studies).
- **2 Electroencephalography (EEG) labs relocated to optimise signal quality:** Our EEG laboratories are equipped with active electrode systems that have an improved signal-to-noise ratio which increases data quality and allows shorter preparation time for participants. We use 128-channel EEG data for event-related potentials (ERPs), event-related spectral perturbations (ERSPs or EEG time-frequency components), and multivariate data analytic techniques (e.g., multivariate classifiers, machine learning algorithms, and inverted encoding models) to track social, cognitive, and affective processes. Our EEG systems are linked to eye trackers.
- **Transcranial Magnetic/Direct Current Stimulation:** **Brandt** has led the refurbishment of our **TMS suite**, now equipped with a single pulse Magstim stimulator/test chair, and

“Signal” software to assess cortical inhibition and facilitation in single coil, double-pulse paradigms. Combining TMS stimulation with behavioural paradigms, as well as peripheral electrical stimulation enables investigation of neural plasticity in healthy and clinical populations (TICs). **10 portable tDCS stimulators** support experimental-lab studies of cortical function and augmentation treatments in clinics.

- **Virtual Reality:** 2 Oculus Rift labs support projects in perception and navigation and exposure-based psychological intervention in collaboration with clinicians.
- **Multisensory lab** including **hand-tracking, force measurement**, and high-performance **3D printing** supports **Adam’s** EU training network grant on perception and action.
- **New colour vision lab (Witzel)** uses **high-precision spectroradiometer** to conduct rigorous colour psychophysics on a calibrated computer setup and with coloured surfaces (standard Munsell chips) under controlled lighting.
- **Eye-tracking:** 4 refurbished labs house eye-link 1000Hz eye-tracking systems for research in visual search, reading, and clinical neuropsychology and enable co-registration with EEG and fMRI.
- The Pain Research Laboratory is temperature-controlled and hosts state-of-the-art quantitative sensory testing equipment, including the **TSA-II Neurosensory-Analyser**, a bespoke **cold-pressor** task, **Rolltemp** rollers, a handheld digital **algometer**, pinprick stimulators, and a set of von Frey hairs, among others. The lab features a private waiting area, which is especially important for parents when conducting our paediatric research.
- **4 labs** house **Biopac psychophysiology amplifiers** to measure **heart rate, skin conductance, respiration rate, and electromyography** during cognitive, behavioural and social paradigms.
- **Social observation lab** with **one-way mirror** between adjoining rooms allows us to view participants from multiple cameras and microphones positioned in the lab to measure peer-peer, parent-child and client-clinician interactions.
- Our **mobile research unit (MRU)** is a custom-fit vehicle that allows us to take carefully calibrated equipment, such as eye movement recorders, into hard-to-reach communities, schools, older adult and clinical sites (+1000miles/yr).
- **Clinical/Experimental Psychopharmacology**
  - **Pharmacological challenge** – 2 clinical research labs (Psychiatry, Psychology) host **drug-challenge** studies in healthy-volunteer and patient groups. The labs have parallel set-ups to standardize protocols (**psychophysiology, eye-tracking/pupillometry**, and **carbon-dioxide challenge**). Research teams include trained phlebotomists for **venesection**.
  - The **Clinical Biochemistry Laboratory at Southampton General Hospital** provides multiplex immunoassay human proinflammatory 9-Plex panel multi-array technology to measure blood serum levels of cytokines including, IL-1 $\beta$ , IL-2, IL-6, IL-8, IL-10, IL-12p70, TNF- $\alpha$ , IFN- $\gamma$ , and GM-CSF. The assay has ultra-low detection limits, provides up to five logs of linear dynamic range to accurately determine levels in normal and disease samples without dilutions.
  - £20k contracts with LGC (formerly Laboratory of the Government Chemist) to analyse drug levels in blood serums via **liquid chromatography with tandem mass spectrometry (LC-MS-MS)**.

## Unit-level environment template (REF5b)

- **£30k contracts with specialist pharmacy services** to manufacture medicines and placebos for double-blind placebo-controlled evaluations of duloxetine, memantine, quetiapine, amiloride and naltrexone in patients/healthy-volunteers.
- The **Southampton Wellcome Trust Clinical Research Facility** (Southampton General Hospital) hosts UoA4 research protocols ranging from early experimental medicine studies through to late-stage studies investigating the effectiveness of treatments and diagnostic tests.
- **Dedicated technical and experimental officers:** 4 research technicians (Psychology) and 2 experimental officers (Psychiatry) programme experimental tasks, co-register hardware, maintain labs and manage our **Test Library** – a centrally-funded library of bookable resources - from **standardized questionnaires/neuropsychological test batteries** to **30 research laptops** that enable data collection in community settings (nurseries through care-homes).

**Research Clinics:** Since REF2014 we have created 6 new clinical research pathways to support translational research.

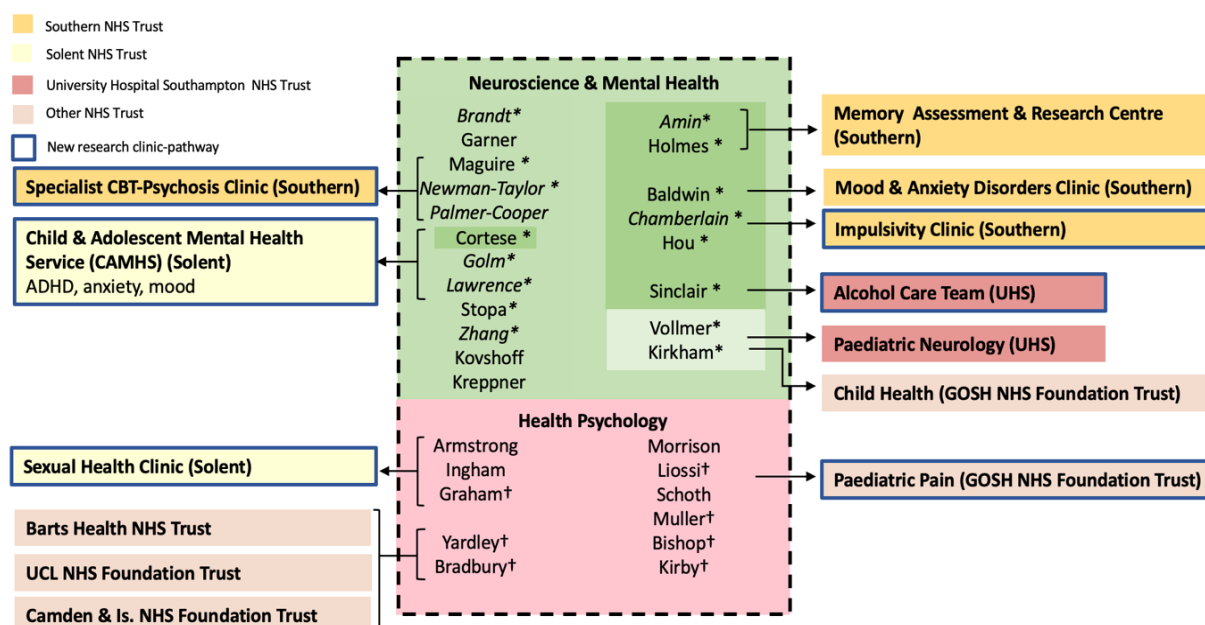


Figure 11: Clinical Research Pathways

- The IfLS has provided seed-funding to launch the **Interdisciplinary Dementia and Aging Centre** that brings together academics, NHS services, engineers and industry. **Amin** is Clinical Trials and Therapeutics Theme Lead. Southampton has an international track-record in dementia and inflammation. The MARC includes academics, consultants, research nurses, pharmacy and health psychologists to conduct clinical and basic science research supported by NIHR Clinical Research Network (and significant funding). Since REF2014 UHS-Trust has developed a new enhanced dementia care ward to support clinical research in dementia and aging.
- Specialist CBT clinic for people with psychosis:** A collaboration between UoS Psychology, and Southern Health R&D and Southampton Psychology Service, to run a specialist CBT research clinic for people with psychosis.

## Unit-level environment template (REF5b)

- iii. **Pain Pathways (GOSH): Liossi** runs an outpatient psychology clinic, participates in the MDT clinics for children with chronic pain and is the co-chair of GOSH's paediatric psychology research committee. Access to clinical populations at GOSH has supported recruitment to funded trials and provides a pathways to impact for the Pain Research Lab's translational research.
- iv. **Alcohol Care Team: Sinclair** led the development of the Alcohol Care team at UHS, developing it into a research active service, contributing to National (NIHR) and investigator led studies. The UHS Alcohol Care Team is now the South East Region's only Early Implementer Site to be awarded funding from NHSEI to optimise into a seven-day service and enhance its capacity.
- v. **ADHD Clinic: Cortese** is lead of outpatient clinical consultations for children and adolescents presenting neurodevelopmental disorders. Access to clinical populations in Solent NHS Trust has supported recruitment to funded trials (NIHR) and supported by the Solent Academy of Research and NIHR Research Capability funding (£100k+ since 2015).
- vi. **Specialist Clinic for Impulsive and Compulsive Disorders: Chamberlain** in 2020 launched the UK's first trans-diagnostic NHS clinic for Impulsive and Compulsive Disorders. The clinic provides rigorous assessment and treatment options for patients with neglected mental disorders (e.g., gambling disorder, adult ADHD, hair pulling disorder, compulsive stealing).

**Use of facilities with collaborators:** fMRI & structural MR (with NIMH, Leiden, Cambridge, Kings College London); pharmacological interventions (Cambridge); eye-tracking (e.g., Tianjin China, Ghent). 16S rRNA gene analysis (America Gut project, UC San Diego School of Medicine). We have access to large-scale and specialised samples (e.g., Romanian adoptees, with IOPPN, London) which facilitates our basic research and clinical interventions.

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

##### 4.1 International Collaborations

During the REF period 57% of UoA4 publications were with co-authors at 1308 international institutions (62 countries).

**Global collaborations** include USA (30+), Canada (10+), China (10+), Australia, South Africa, France, Germany, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Spain, Sweden, Turkey (+5). Most frequent co-authorship is with USA (436 papers), Germany (170), Canada (106), Australia (83), Netherlands (80), Italy (72) and France (57).

**UK collaborations** include Aberdeen, Bath, Birmingham, Bradford, Bristol, Cambridge, Edinburgh, Exeter, Glasgow, KCL, Newcastle, Nottingham, Oxford, Sheffield, Surrey, Sussex, York, UCL, Warwick, KCL, Oxford and others, supported by EPSRC (**Adams, Stevenage**), MRC (**Baldwin, Garner**), Horizon2020 (**Adams, Sinclair**), ESRC (**Kovshoff**) and NIHR (**Kreppner, Liossi, Bradbury, Yardley, Graham, Holmes, Baldwin, Sinclair**). Most frequent co-authorships are: KCL (119), Cambridge (114), Nottingham (87), UCL (81), Oxford (75), GOSH (75).

**Funded Exchange Networks & International visitors:** Adams' Horizon 2020 DyViTo training network includes academic/industry partners from Germany, France, Spain, Netherlands, Turkey; the EUSARNAD anxiety network (**Baldwin, Garner**) has supported 10+ exchanges between UoS and EU/South Africa. We host visiting researchers from China (Chinese Academy of Sciences), France (Syms School of Business, Grenoble), Germany (Saarland University,

## Unit-level environment template (REF5b)

University of Cologne), Japan (Kochi University of Technology), Poland (Jagiellonian University, Warsaw School of Social Sciences), Singapore (Nanyang Technological University), The Netherlands (University of Utrecht), South Africa (Cape Town), USA (Ohio, NYU, Houston) and Canada (Queen's University).

Staff hold visiting positions at Shandong University (**Sinclair, Baldwin, Hou**), Cape Town (**Baldwin**), University of Technology, Sydney (**Bishop**), NYU (**Cortese**), Nottingham (**Cortese**), The Kinsey Institute (**Graham**), KCL (**Golm**), Baylor College of Medicine, Houston TX (**Maguire**).

## 4.2 Contribution to the Research Base

### 4.2.1 Contribution to Scientific journals

28 colleagues (15F, 13M) have served on Editorial Boards (as Editors, Associate Editors, Members) of 50+ Journals. Colleagues hold Editor-in-Chief roles at: Journal of Sex Research (**Graham**), Human Psychopharmacology (**Baldwin**), and Deputy Editorships at the Journal of American Academy of Child and Adolescent Psychiatry (**Cortese**), Evidence-Based Mental Health (**Cortese**) Neuroscience and Biobehavioural Reviews (**Chamberlain**). Colleagues are associate editors/members of boards for journals across:

Neuroscience & Mental Health: Neuroscience and Biobehavioural Reviews, British Journal of Psychiatry, Developmental Medicine and Child Neurology, Frontiers in Neurology, Comprehensive Psychiatry, Alcohol and Alcoholism, Developmental Child Welfare, Acta Neuropsychiatrica, CNS Drugs, Journal of Psychopathology, Therapeutic Advances in Psychopharmacology, J of the American Academy of Child and Adolescent Psychiatry, Evidence-Based Mental Health, Child and Adolescent Mental Health, Human Psychopharmacology, European Journal of Paediatric Neurology, British Journal of Psychiatry, Cognition & Emotion, Cognitive Behaviour Therapy, Cortex, Scientific Reports, Case Reports in Psychiatry.

Health Psychology: British Journal of Health Psychology, Sexual Health, Archives of Sexual Behavior, BMJ, Health Education, Sex Education, AIDS Education & Prevention; Sexually Transmitted Infections.

Social Psychology: Journal of Personality and Social Psychology; Self and Identity, J Social and Personal Relationships, Attachment and Human Development, Personality and Social Psychology Bulletin, Personal Relationships, European J. Social Psychology.

Perception & Cognition: Psychological Science, Multisensory Research, Attention, Perception and Psychophysics, Behavior Research Methods, Scientific Reports.

### 4.2.2 National Advisory Groups, Committees and Learned Societies

- i. Colleagues hold leadership roles within the Royal College of Psychiatrists (RCPsych), including Chair of the Addictions Faculty (**Sinclair**), Chair of the Psychopharmacology Committee (**Baldwin**) and are members of the General Adult Specialist Advisory Committee (**Chamberlain**) and the Research Committee, Royal College of Paediatrics (**Lioffi**).
- ii. **Yardley** is member of the UK Scientific Advisory Group for Emergencies (SAGE). **Sinclair** is leading policy and practice as National Speciality Advisor for Alcohol dependence to NHS England. **Chamberlain** is Advisor to British National Formulary; Co-Founder, UK Network for Research into Behavioural Addictions and EU COST Action Network on Problematic Usage of the Internet. **Holmes** provides national leadership in



## Unit-level environment template (REF5b)

dementia treatment as Department of Health advisor on Dementia, as scientific advisor to Alzheimer's Society and AZ Research UK and as NIHR board member for dementia research. **Lioffi** is Chair, NIHR CRN Children | Pain & Palliative Care Clinical Research Group. **Vollmer** is on the advisory board of Global Alliance for Newborn Care. **Graham** is a member of the Advisory Council of the Kinsey Institute.

- iii. Staff are members of **5 NICE guideline groups**: ADHD (**Cortese**), Anxiety (**Baldwin**), Social Anxiety (**Stopa**), Behaviour Change (**Yardley**) and Public Health A (**Yardley**). **Yardley** is also an expert contributor to NICE on antimicrobial stewardship. Colleagues sit on international guideline groups e.g., European and Canadian Guidelines Groups (ADHD, **Cortese**), European Standards Group (Newborn Health; **Vollmer**) and co-author consensus statements in child/adolescent, adult and older adult psychiatry (e.g., British Association for Psychopharmacology, BAP – **Baldwin, Sinclair, Cortese, Holmes**).
- iv. **Baldwin** is President-Elect of the British Association for Psychopharmacology and Chair of Education, European College of Neuropsychopharmacology, and colleagues chair educational/clinical satellites of learned societies in psychiatry (BAP, ECNP; **Baldwin, Sinclair, Cortese, Chamberlain**) and clinical psychology (BABCP, EABCT, **Stopa, Newman-Taylor**). **Vollmer** is Co-Chair, British Paediatric Neurology Association (BPNA) Fetal and Neonatal Neurology.
- v. Ethics and Governance: **Baldwin** is Vice-Chair Ministry of Defence Research Ethics Committee and **Maguire** advises the Ministry of Housing, Communities & Local Government on research ethics with vulnerable populations.
- vi. **Roles in Research Councils and Funding Agencies**: Colleagues serve on the funding panels for: EPSRC (Adams), MRC (Yardley, Baldwin), HTA (Yardley), NIHR (Yardley), Alzheimer's RUK and Alzheimer's Society (**Holmes**). **Perry** was Chair of the MRC (UK) Neurosciences and Mental Health Board (2012-2017), member of MRC Strategy Board (2012-2017) and Chair of the Oversight Board of Dementias Platform UK (DPUK) (2015-2019).

#### 4.2.3. Conferences and Seminar Series

Staff have delivered 300+ invited/keynote lectures at major conferences in Universities, Governmental and NGO and learned societies, including regular contributions across psychiatry/clinical-psychology (BAP, ECNP, BABCP, EABCT, BNA), social psychology (BPS, SESP, SPSP, EASP), health (BPS DHP, Soc. Scientific Study of Sexuality, Paediatric Palliative Med) and experimental/cognitive psychology (VSS, EPS, AVA, Psychonomics). We hosted the biennial Social Psychology symposium on "Self and Identity", MRC-funded conference on anxiety (**Baldwin, Garner**), ESRC-funded workshops on Relationship Science and Interventions (**Carnelley**), and EPSRC-funded workshop on human/machine vision (**Adams**). Early-career researchers co-convened major meetings e.g., Object Perception, Attention and Memory (**Godwin**, 2014–California; 2015-Chicago).

#### 4.2.4 Academic Recognition

Our staff have been recognised for their contributions to their discipline. Major awards include:

**Distinguished Career Awards** for **Sedikides** (Society for Self and Identity - Distinguished Lifetime Career Award; British Psychological Society Distinguished Contribution to Social Psychology; Daniel M. Wegner Theoretical Innovation Prize, elected Fellow of the British Academy); **Yardley** (**OBE** in Queen's Birthday Honours, NIHR: Senior Investigator; Academy of Society Sciences: Awarded Academician), **Graham** (Society for the Scientific Study of Sexuality:

## Unit-level environment template (REF5b)

Distinguished Scientific Achievement Award and Distinguished Service Award), **Stopa** (Beck Scholar for leadership in CBT), **Baldwin** (President's Award RCPsych).

**Mid-Career Awards** for **Wildschut** (Society for Personality and Social Psychology: Mid-Career Award for Outstanding Research in Social Psychology), and **Cortese** (Kramer-Pollnow-Prize in Biological Psychiatry).

**Early-Career Awards** for **Feldmann-Wüstefeld** (German Psychological Society: Best PhD), **Armstrong** (British Association for Sexual Health and HIV, Int. Academy Sex of Research), **Lawrence** (National Doctoral Research Award – Springer Nature).

#### 4.3 Broader Contributions to the Economy and Society

Involvement of **beneficiaries (4.3.1)** and **policy-makers** throughout the research cycle maximises the quality and impact of our research.

**Security - Stevenage (EPSRC)** works with GCHQ, Centre for Applied Science and Technology (CAST) within the Home Office, National Policing Authority (NCA), National CyberSecurity Centre (NCSC), Quinetiq, Turing Centre, IBM and network of ACEs in Cybersecurity. **Godwin** works with UK government groups (e.g., Dstl, Home Office, Ministry of Defence, International Air Transport Association, Department for Transport) to evaluate and develop methods to detect threats in real-world scenarios, and to train professional staff (e.g., X-ray baggage screeners, military personnel in combat), and the public (e.g., object recognition in crowded spaces).

**Education – Policy & Practice: Higham** contributes podcasts and book/magazine articles to secondary schools/FE on evidence-based techniques to enhance student learning. **Palmer-Cooper** is a member of the BPS governing committee for A-level Psychology teaching and is developing curricula on open-science and research ethics for schools. Our **EdPsych PGR pathway** partners with schools to develop and evaluate evidence-based interventions for children and adolescents (28 service-research/doctoral projects/yr).

**Health & Wellbeing: (see 4.2.2) Lioffi** has designed new curricula in paediatric pain assessment and management for national bodies, including contributions to the e-PAIN project and the RCPCH E-learning course Pain Management in Children and Young People, designed to train NHS staff and is a member of the European Association for Palliative Care (EAPC) steering committee. **Ingham** has provided expert advice to the UK government (House of Commons Select Committee) on sex and relationships education in schools and advised the Thai government on their adolescent pregnancy policy. **Graham** was an expert member of the American Psychiatric Association's (APA) Sexual and Gender Identity Workgroup for DSM-5 and is a current member of the APA's Scientific Review Panel. **Maguire** co-wrote guidance on psychologically-informed environments, used widely by UK/USA homelessness organisations and consults to the Ministry of Housing, Communities and Local Government and Public Health England on research with vulnerable and excluded populations.

##### 4.3.1 Patient and Public Involvement (PPI)

- i. **Friends of MARC** provide focus groups to discuss journal articles, co-create and gather feedback on leaflets, websites and other materials related to dementia care, advises on assessment and research priorities and raises awareness through community outreach.
- ii. **AnxietyUK**, the largest charity and support network in the UK, support our clinical research and outreach. **Baldwin** is medical patron, chairing podcasts and forums with user groups. Members sit on our grant-steering committees and co-chair conferences.
- iii. **TICSConnect - Brandt, Palmer-Cooper** received funding from PERu to lead regional workshops for individuals and families with Tic disorder/Tourette syndrome. Supported

## Unit-level environment template (REF5b)

by Tourettes Action, regional NHS neurology, psychiatry and CAMHS TICSCoConnect co-designs research with patient groups, provides clinical-research assessments to inform treatment and support, and secured funding (AMS Springboard, **Brandt**) for basic research and to pilot a TICs/Tourette research clinic at Southampton.

- iv. **ACoRNS** – The Autism Community Research Network @ Southampton is a research-practice initiative, co-directed by Parsons (UoA23) and **Kovshoff**, that seeks to improve the lives of autistic children and young people. Funded through the University's Public Engagement and Research Unit, ACoRNS supports knowledge-exchange with local nurseries, schools and colleges who are interested in developing, researching, and sharing good practice in educational provision for autistic children and families. ACoRNS hosts PGR students and interns to conduct research in partnership with schools and families.
- v. **Adopt South** (Southampton, Portsmouth, Isle of Wight) is a recruitment partner in the Adversity Research Project (CARE; **Golm, Kreppner**) and supported discussion and dissemination of ICS-0402-ERA through ESRC Impact Acceleration Grant (**Kreppner**) to highlight how the effects of institutional deprivation on development can shape policy and practice.
- vi. **Childhood Adversity Professional Exchange (CAPE) Network (Golm)** facilitates collaboration and exchange between researchers and practitioners in different disciplines e.g., teachers, social workers, psychiatrists working with traumatised children.
- vii. **Psychosis Online Engagement Meetings (POEMs)** is an online engagement platform and resources website that shares research and practice with individuals with lived experience (**Palmer-Cooper, Newman-Taylor, Maguire**).
- viii. **PPI in Health Psychology:** We engage PPI at all stages of research, from initial funding bids to dissemination. Our **LifeGuide team (Yardley, Bradbury)** run UK workshops and online knowledge hub to disseminate the **person-based approach to health**. Colleagues engaged with patient groups and charities include: Versus Arthritis (**Bishop, Bradbury**), Asthma UK (**Kirby**). **Graham** and **Ingham** with the Wellcome Trust delivered the nationwide Sexology Songwriting project, exploring the study of sexuality through music with young people from disadvantaged backgrounds. Our annual wellbeing scheme for school pupils provides 12-week workshops, addressing mental health, relationships and sexuality.

#### 4.3.2 Industrial collaborations to enhance research and impact

**Neuroscience & Mental Health:** Colleagues provide consultancy to support clinical trial design and treatment development in anxiety/mood disorders, addiction and dementia, including: Promentis Pharmaceuticals, Shire, Leso Digital Health, P1vital, Cambridge Cognition, (**Chamberlain**), Lundbeck A/S (**Sinclair**), Mundipharma, Pfizer (**Baldwin, Garner**), Eisai Pharmaceutical (**Amin**), Novartis, Biogen, Cortexyme, Adex (**Holmes**), Unilever (**Golm**), Healios (**Garner**) and Headspace (**Hou**).

**Digital Interventions & Health Behaviour:** **Yardley** and **Bradbury** collaborate with digital tech company Changing Health to disseminate the POWeR weight loss intervention, and with Cigna Insurance (POWeR) and Vive Health (CLASP, for a cancer survivors' intervention). **Graham** collaborated with PP Products, Ltd. and condom manufacturers Durex and MyOne on large-scale intervention trials.

**Social Psychology:** With Spotify, **Wildschut** and **Sedikides** tested 150K+ users from 19 countries to develop Spotify's personalised playlist feature 'Your Time Capsule' designed to elicit

## Unit-level environment template (REF5b)

music-evoked nostalgia. Planned collaborations are developing personalised playlists to improve wellbeing in dementia.

**Cognition & Human Factors:** Adams' DyViTo EU network combines academics and industrial partners in graphical rendering and physical development of materials to translate academic expertise in material perception to consumer applications.

#### 4.3.3 Public engagement / media exposure

An excellent track record of public engagement involves schools, colleges, science festivals e.g., College-link research days, Pint of Science and Researchers' Café initiatives, Edinburgh Science Festival, Glastonbury Festival, Fulcrum Science Festival, and installations at Winchester Science Centre (190k+ visitors/yr) and Southampton's annual Science and Engineering Festival (8000+ visitors).

**TV/Radio** coverage has featured our research on health behaviour change/pandemic response (all major news channels- **Yardley**) and sexual health (BBC Horizon, Women's Hour and BBC3 - **Graham**); addiction (BBC Horizon, BBC News, Women's Hour - **Sinclair**), child and adolescent mental health (ITV - **Lawrence**); nostalgia and identity (BBC, CBS, CNN, MSNBC; Channel 4 - **Sedikides**).

**Newspaper/magazine** coverage includes the **UK** (e.g., Guardian, Guardian Science Weekly, New Scientist, The Times, Independent, Telegraph, Marie Claire; New Statesman; Observer Magazine); **USA** (LA Times, New York Times, Wall Street Journal, Scientific American, The Atlantic, The New Yorker, Time), **Austria** (Wiener-Zeitung), Chile (El Mercurio); **Germany** (Die Zeit; Welt am Sonntag; Der Spiegel, Für Sie); **Ireland** (Belfast Telegraph, Irish Times); **Italy** (Donna Maderna), **Netherlands** (NRC-Handelsblad, Psychologie), **Spain** (El-Pais); **Switzerland** (Sonntags-Zeitung).

Public engagement is evidenced by Altmetrics data (January 2021 index of online engagement). Our outputs authored during 2014-2020 have been referenced by: (i) 2660 mainstream online news outlets; (ii) 44 Wikipedia entries; (iii) 86 policy citations, and (iv) 32,063 shares or posts on social media. A total of 246 (14.2%) of our publications have Altmetrics Attention Scores (AAS), placing them within the top 5% of all research outputs tracked by Altmetrics.