**Institution: University of Lincoln**

**Unit of Assessment: 4 – Psychology, Psychiatry and Neuroscience**

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

This UoA comprises the School of Psychology (SoP) at the University of Lincoln (UoL), and encompasses all research activity in the School, which includes social, developmental, cognitive, biological, forensic and clinical psychology, as well as cognitive, computational and molecular neuroscience. The SoP has been offering British Psychological Society (BPS) accredited undergraduate programmes at the UoL since 1991, as well as taught and research master's degree programmes and doctoral qualifications including PhD and DClinPsy. The School has grown throughout this period and now offers programmes to more than 1000 undergraduate and postgraduate students taught by staff from a variety of academic and professional practice backgrounds. The School is part of the College of Social Science (CoSS), which is one of four Colleges within the University (see institutional statement). The SoP has 30 (headcount) Category A staff with significant responsibility for research (see Section 2).

The UoA has benefitted from substantial investment and as such has developed at a rapid pace. Since REF 2014 we have more than doubled the number of staff submitted in the unit from 12.8 to 29.4 FTE, increased the number of PGR students at the census point from 16 to 88, increased our research income fivefold from £283,000 to £1,468,740 and invested substantially in new facilities including the new £18.5m Sarah Swift building that now houses 22 specialist research labs in addition to staff offices and PGR spaces for the SoP. With this new investment our vision is to deliver world class, impactful research with relevance for modern society in key areas of particular strength. These include face recognition, animal behaviour and human-animal interaction, gambling, sleep and cognition, child protection and mental health therapies.

### Achievement of Previous Strategic Aims

### Research

This has been a period of extraordinary growth and development within the UoA, and this development is reflected in the achievement and surpassing of our previous strategic aims. In our REF 2014 submission we set out four key aims for research:-

- To further increase the proportion of academic staff producing research of international quality by investing in and mentoring all academic staff.
- To recruit new academic staff at all levels of experience to augment quality and breadth of research activity across the research groups.
- To sustain and expand research activity by increasing research income (target total confirmed research income from all sources during the period to exceed £1,000,000).
- To increase numbers of PhD students over the next five years, rising to an average of one PhD student per staff member.

All four of these aims have been achieved:-

- We have increased the proportion of staff publishing in Q1 journals within their field, as well as substantially increasing the overall number of citations for staff in the UoA. We have implemented mentoring programmes as well as investing in staff and facilities which have helped to achieve this.

- We have increased the overall number of staff with significant responsibility for research by over 30% (from 23, of whom 13 were submitted last time, to 30 all of whom are submitted this time), including two new appointments at Professorial level and one at Associate Professor, with a further two internal promotions to Associate Professor and one to Professor (see section 2 for more details).
- We have increased our research income fivefold to £1,468,740 from £283,000 previously and comfortably exceeded our target figure of £1,000,000 for this period (see section 3 for further details).
- We have increased our PGR students at the census point more than fivefold from 16 to 88, which is more than double our target of an average of one per staff member.

**Impact**

As well as contributing to the knowledge base through research, this unit has a strong focus on making a wider contribution through the impact of research on society. As such, we also outlined two strategic aims for impact in our previous submission (in the impact template):-

- To maximise the potential social, economic and health benefits of research in the unit.
- To influence policy and practice and enhance public awareness and understanding of psychological science through our research.

We have achieved these aims by keeping impact very much at the centre of our approach to research, utilising an impact champion and supporting staff in their research activities. This has led to some notable outcomes (see also our impact case studies):-

- During this period, research from the unit has directly led to social and regulatory change (e.g. the work of *Parke* and *Roberts* in highlighting the problems with fixed-odds betting terminals leading to changes in the regulations in this area), and health benefits (e.g. the work of *Hudson* and *Pollux* on the Cognitive Daisy project which has been used to improve the treatment of people in residential care with dementia).
- Research from the unit has also led to policy and public awareness change (e.g. the work of *Majolo* and *Marechal* on the conservation of the Barbary Macaque, which has led to changes in international trade laws, an updated assessment of conservation status and greater public awareness with regard to eco-tourism).

**Future Strategic Aims**

Following the achievement of the previous REF2014 strategic aims, we will consolidate these improvements by setting a number of important strategic goals, for both research and impact. These are as follows:-

**Research**

1. Increase the number of research outputs produced within the unit to average over 100 per year, with at least half meeting the criteria for international excellence.
2. Increase the research funding obtained to at least £2m during the next five years, with funding obtained in all of the specialist research areas to sustain this activity.
3. Increase PGR completions to at least 100 during the next five years, with PGR students recruited in each specialist area.
4. Increase the number of staff with significant responsibility for research to at least 40 within the next five years with a particular focus on key priority areas to increase their vitality.
5. Further develop collaborative research links for all staff in the UoA to increase the range, complexity and quality of the work undertaken.

**Impact**

1. Increase the proportion of staff engaged in significantly impactful research (with impact case study potential) to at least half of all UoA staff in order to achieve our goal of carrying out impactful research with relevance for modern society.
2. Develop systems to monitor the economic, social, health and policy benefits directly arising from impactful research carried out within the UoA.

In our research and impact strategies below, we outline some of the ways in which we propose to achieve these targets.

**Research Strategy**

Successful research requires personnel, facilities, funding, time and collaborators. Our strategy therefore needs to operate across a broad range of areas. These include: (1) Establishment of supportive research structures; (2) Investment in and development of research staff; (3) Investment in and development of PGR students; (4) Investment in and maintenance of high quality research facilities and infrastructure; (5) Support for obtaining research funding; (6) Supportive policies to provide time for research activities; (7) Support for interdisciplinary research; (8) Support for open research; and (9) Support for research integrity. Below we outline how each of these will be achieved.

**(1) Supportive Research Structures**

The UoA has a well-developed organisational structure to support research activity. Researchers are organised into three research groups: (a) Perception, Action & Cognition (led by *Bourke*), which includes areas such as face perception; (b) Developmental and Social Behaviour (led by *Majolo*), covering areas such as language development and human-animal interaction; (c) Forensic and Clinical Research Group (led by *Bartels*), which includes research on gambling and prevention of online child exploitation. These groups meet on a weekly rotating basis in a fixed slot which enables interested colleagues from other groups to join. The groups provide a supportive environment for researchers in a given field, but due to their size and breadth also provide opportunities for cross-skill collaborations. For example, *Pennington* and *Durrant* have collaborated on research looking at the impact of genetic variation on emotional memory consolidation during sleep, using their respective expertise in molecular neuroscience (*Pennington*) and polysomnography (*Durrant*).

Research within the SoP (and hence this UoA) is overseen by the School Research Committee, which is chaired by the School Director of Research (*Durrant*) and includes two Deputy Directors of Research (*Pennington* and *Ritchie*), three research group leads (*Bourke*, *Majolo* and *Bartels*), the impact lead (*Hodgson*), and representatives for ECRs (*Ritchie*), mentoring (*Meints*), DClinPsy (*Moghaddam*) and a PGR student, as well as CoSS research officers. The committee is responsible for overseeing research activity within the School (such as monitoring membership of the research groups) and developing policies (such as the research workload policy).

Finally, the University supports the development of interdisciplinary research centres. This includes the Autism Research and Innovation Centre (ARIC) and the Lincoln Sleep Research Centre (LiSReC), both of which involve staff from different Schools and Colleges within the University including members of this UoA (see point (7) below).

**(2) Investment in and Development of Research Staff**

There has been significant investment in research staff within this UoA and we aim to continue this during the next five years. The specific strategy for staff recruitment and development is outlined in section 2.

**(3) Investment in and Development of PGR Students**

The number of PGR students in this UoA has risen dramatically during this census period and we aim to continue this rise by recruiting students opportunistically, actively seeking PGRs in target research areas and developing research funding to include more studentships. The specific strategy for growing the number of PGR students and ensuring that the students are able to perform to the best of their ability is outlined in section 2.

**(4) Investment in and Maintenance of High Quality Research Facilities and Infrastructure**

The substantial investment in infrastructure and facilities that has taken place in this UoA is outlined in section 3. Support for sustained development of this comes from a number of sources. The SoP has research and equipment budgets to support research facilities within the UoA. For larger items of expenditure, the CoSS and the University Research Office offer support on a case-by-case basis and have previously supported expenditure in this UoA (e.g. £25,000 each for the purchase of a new Biosemi ActiveTwo EEG system to support investigations of the effect of eye movements on EEG rhythms using integrated eye-tracking).

**(5) Support for Obtaining Research Funding**

Research funding is another area that has seen substantial development during the current census period, but also an area where further substantial development is necessary to support development. As such, we have a number of mechanisms in place to support funding bids to develop research income. These are outlined in section 3.

**(6) Supportive Policies to Provide Time and Seed Funding**

Sufficient time for research is one of the most important components of a successful research strategy and staff research time must be proactively protected in an HE environment of increasing demands. Our strategy utilises two policies (see section 2): (1) a sabbatical scheme providing one semester of leave for up to three staff members per year for large scale research activities; and (2) a research workload policy providing ongoing time for general research activities.

Seed funding is also essential to maintain and develop new areas of research, and two types are offered in this UoA. The School Research Committee oversees a School research budget. This provides a fixed annual baseline amount, along with additional funds proportionate to outputs produced, to facilitate research on the basis of productivity. Funds in the scheme may be carried over for one year and yield a maximum of £2,600 per staff member. They may be used for any research-related purpose. Staff who require a larger amount can apply to the research committee for additional funds on an ad hoc basis.

Early- and mid-career staff within the UoA can apply to the CoSS Research Fund (CRF) for seed funding of up to £3,000 to carry out pilot work prior to an external funding bid, or to undertake research networking. Staff at all levels can apply for PhD studentship funding within the College. One of the key criteria for both of these schemes is the extent to which the work is interdisciplinary (see point 7 below). PhD funding, for example, was awarded for work using virtual reality to explore visual trigger conditions for migraine using EEG, which combines expertise from the SoP within this UoA (*O'Hare*, with EEG expertise) with other researchers in the fields of healthcare (to provide migraine expertise) and computer science (for VR).

**(7) Support for Interdisciplinary Research**

The CRF scheme outlined above is one example of a structure designed to support interdisciplinary research. Interdisciplinary work of this nature is actively promoted across the College and University. School DoRs are brought together in the College Research Committee and the College DoR forum, providing platforms for interdisciplinary research discussion.

Similarly, College Away Days are organised to enable staff from different schools to meet and develop plans to work together. College research seminars have an explicitly interdisciplinary focus and staff are able to request seminars in specific areas to help them develop an interdisciplinary project. The CoSS runs an annual Research Showcase event at which researchers from across the College can see their colleagues' research and develop knowledge of what research expertise is available for interdisciplinary projects.

Collaborations within the SoP are promoted through an external seminar series with guest speakers invited by staff and an internal seminar series featuring staff presenting their work to colleagues. An annual School Away Day facilitates team building and exchange of ideas. Cross-school collaborations are supported by College research seminars, internal seed funding opportunities and interdisciplinary research centres. The Lincoln Sleep Research Centre (LiSReC), for example, is led jointly by researchers from this UoA (*Durrant*) and the School of Health & Social Care. LiSReC draws core membership from Schools across the University, including Computer Science, Chemistry and Pharmacy as well as Health & Social Care and Psychology and incorporates sleep researchers from a nearby HE institution (Bishop Grosseteste University). Projects typically involve a combination of disciplines, e.g. work on the neuroscience of sleep involves psychologists (*Durrant*) providing data from Sleep Laboratory recordings, medical statisticians providing data analysis support, and computer scientists engaging in computational modelling. Set up during this census period, LiSReC represents a significant step forward by embedding interdisciplinary research within the research structures of the unit.

**(8) Support for Open Research**

In line with University policy and UKRI guidelines, members of the UoA have embraced open access for both outputs and research data. Open access outputs are supported by the ePrints institutional repository and made available in accordance with their open access agreements. The cost of open access publication for staff is covered via an agreement with some publishers (e.g. Springer) and a fund to pay for UKRI-funded open access charges. Researchers are trained and encouraged to make data open access where appropriate using Open Science Framework (OSF), with a number of members of the UoA doing so (e.g. *Ritchie* hosts seven projects there; https://osf.io/j5rdk/). Open research is an essential part of the strategy to achieve wider dissemination of research findings, increased impact and more collaborative opportunities.

**(9) Support for Research Integrity**

Research integrity is taken very seriously within this UoA and supported in several ways. During this census period, the UoL has appointed a research governance manager and implemented an institution-wide ethical review system to ensure consistency. All staff research led from the institution undergoes ethical review while research with ethical approval granted from an external body (e.g. NHS or another HE institution) is registered. Compliance with legal and regulatory frameworks such as GDPR is ensured by the involvement of data compliance officers. An ethics lead within the SoP (*Marechal*), and a representative on the institution-wide system (*Roberts*), ensure compatibility with BPS regulations and provide support for all colleagues within the UoA. In recognition of the replication problem in many areas of science (including those covered by UoA4) one of the functions of the review process is to ensure that research is sufficiently powered to generate reliable data. This is achieved by requiring justification of research designs and sample sizes used through power analysis or precedent. Peer review of proposed research studies also supports the development of high quality and replicable research.

**Impact Strategy**

In line with the University's research strategy, this UoA places research with impact at the centre of its mission. Staff are encouraged to think about impact potential at all stages of their research and this is formalised by the explicit adoption of an ***OPEN*** strategy: (1) ***O***penness to engagement beyond academia; (2) ***P***articipation in events and organisations; (3) ***E***xtending reach through specific activities; (4) ***N***urturing staff to develop impact through support and advice. This strategy is implemented through a number of specific measures:-

- Appointment of an impact lead within the SoP (*Hodgson*). The School impact lead works closely with the University impact lead and ensures that institutional support for impact is made available in the UoA. All of the impact case studies in the UoA were reviewed and supported by the impact lead.
- Weekly impact clinics in which staff can discuss their research and look for evidence of impact. For example, the impact potential of face recognition work (*Ritchie, Kramer, Flack*) was recognised and developed during a weekly impact clinic and has supported subsequent applied research within this area.
- Creation of the Lincoln Impact Literacy Institute, with which colleagues are encouraged to engage.
- Access to impact funds at both School and College level. For example, the Cognitive Daisy project (*Hudson*, *Pollux*), which is an assessment and visualisation tool for cognitive impairment, benefitted from funding to manufacture specific toolkits for distribution to partners in order to evaluate their impact within care homes. Travel and conference funding was provided to support the Online Protect impact case study (*Merdian*).
- Support for postgraduate researchers where these are clearly needed; for example, the Conservation of the Barbary Macaque impact case study (*Majolo*, *Marechal*) benefitted from PhD studentships funded by the College.
- Creation of forums where partners for impactful research can be found. For example, the ENRICH forum links care home providers and researchers and provided an opportunity for the Cognitive Daisy project (*Hudson*, *Pollux*) to find interested care homes to work with.
- Allocation of College staff to monitor and collate the impact of research. For example, the ComPACT project (*Dawson, Moghaddam*), developing a tool for measuring psychological flexibility, has been widely adopted throughout the world in a way that only became apparent as a result of this monitoring.
- An annual impact away day in which all researchers within the UoA receive training, share experiences and expertise and discuss ways in which impact can be further developed.
- Specific time allocation within the workload for impact-related activities, which enables ongoing impactful research. For example, work on the Blue Dog bite prevention project, which was an impact case study in REF 2014, has continued throughout this census period (such as in development of a new app) and time has been made available for this.
- Institution-led public engagement events. These include European LiGHTS night and an annual summer scientist event for children, both of which lead to greater public awareness of research from the UoA.
- Practical support for impact-generating events. For example, the Harm Minimisation in Digital Gambling Forms (*Hodgson*, *Roberts*) case study has benefitted from practical support in holding conferences in Lincoln and from the Lincoln Parliamentary Research Centre in engaging with Parliament to promote changes to gambling laws.

The effect of these measures is that impact has become more tightly integrated into the research process for staff in this UoA and our strategy now focuses on impactful research with relevance for modern society.

## 2. People

### Staffing Strategy and Development

The School has witnessed a rapid expansion of its research-oriented staff since 2014, with submitted FTE more than doubling from 12.8 to 29.4 (with a headcount of 30) in the current submission. Staff are strategically recruited in areas of strength, with a strong research profile in terms of outputs, research income and impact as key hiring criteria. For example, face recognition is a key strength within the School and three new members of staff (*Ritchie*, *Kramer* and *Flack*) have been recruited in this specific field and formed a successful face lab under senior staff mentorship (*Guo*). Recruitment has taken place at all levels since 2014, but with a particular emphasis on ECRs, reflecting a strategy whereby talented staff are recruited early in their careers and encouraged to develop and grow along with the School. This strategy has been successful, with two staff promoted to Associate Professor (*Merdian, Ziegler*) and one awarded a personal Chair (*Guo*).

Staff development is supported in many ways within the SoP and the CoSS:-

1. An annual development appraisal with a senior staff member. This is an opportunity for staff to review their progress, identify needs and discuss career plans with a view to future development and targeted support.
2. An annual research planning meeting with a senior researcher. All aspects of research are discussed at this meeting, including outputs, income, impact and professional esteem activities, and staff are encouraged to outline specific research plans for the next three years.
3. Access to the UoL Continuing Personal and Professional Development (CPPD) framework, which offers courses targeted at research including development of research data management plans and research risk assessments.
4. A SoP research mentoring programme. All staff are offered a research mentor from senior staff and encouraged to have regular meetings. Research mentorship provides early career staff with advice and knowledge of professional opportunities and in some cases useful contacts and networking opportunities.
5. Restricted teaching loads for ECRs, allowing them more time to focus on research. This is achieved by automatically allocating ECRs the maximum research workload time, which for other staff is directly related to research productivity measures (including outputs, funding bids and impact activities).
6. Start-up support for new staff in terms of funds or equipment to enable them to establish their research. For example, a new member of staff in 2018 (*Craddock*) was supported through the purchase of a new Biosemi Active Two EEG system allowing the development of his research programme in this area.
7. An annual sabbatical scheme which enables up to three members of staff within the School to have a semester free of teaching and administration to focus exclusively on activities such as grant writing, impact development or extended research visits. For example, *Merdian* developed an impact case study (Online Protect) during a period of research leave, while *Pennington* secured external PhD studentship funding from The Mindfulness Association.
8. A policy of providing leadership role opportunities for early- and mid-career staff. For example, *Bourke* and *Bartels* have taken leadership of the *Perception, Action & Cognition* and *Forensic and Clinical* research groups respectively. Senior staff continue

to mentor these more junior staff with the aim of ensuring that the roles are carried out effectively. This policy enables staff to gain vital leadership experience.

**PGR Students**

An integral part of the research strategy in this UoA is the development of a vibrant PGR culture. 88 doctoral PGR students in this UoA at the census date are split between PhD and DClinPsy programmes. The DClinPsy students are part of the Trent Clinical Doctorate programme, run jointly with The University of Nottingham; the students included here are only those who graduate specifically from UoL.

The vibrancy of the PGR culture in this UoA is reflected in the growth of PGR numbers. The 88 current PGR students are in sharp contrast to just 16 enrolled at the REF 2014 census point. Similarly, the number of completions has more than doubled from 32 in in the REF 2014 submission to 71 during the current period. The increase in the number of students has been driven by four key mechanisms:-

1. Funding for PGR students in Psychology, Psychiatry and Neuroscience has increased substantially. The UoL was a founder member of the Doctoral Training Alliance (DTA; a PGR funding programme) and invested in a subscription which funded PGR students in Applied Biosciences for Health (e.g. two supervised by *Pennington*). In addition to DTA funding, institutional funding has been provided by the CoSS, with up to three students per year funded within the UoA (and a total of ten within this census period). The SoP funds a full studentship each year for graduates from any of its taught programmes, and offers part-time Graduate Teaching Assistantships to a number of additional students. Finally, increased external income has included provision for PGR studentships (e.g. to *Meints*).
2. A new PGT programme offering an MSc in Psychological Research Methods was established in 2016. This programme provides training in research methods and prepares students for postgraduate research.
3. The substantial increase in research-active staff has increased the number of supervisors and the range of topics available. The increased international research profile of the UoA has led to an increase in visibility and applications from international students. Positive feedback from existing students has directly led to applications from other students (e.g. five PGR students from Saudi Arabia).
4. The substantially improved research facilities available in the Sarah Swift building (see Section 3) have made the SoP attractive to potential students, including those who self-fund. The new building has also enabled all PhD students within the School to have their own desk in dedicated PGR rooms, developing a PGR community and ensuring that they feel part of the School.

Support for postgraduate research is led by the SoP Director of Postgraduate Research (*Majolo*) and the School Postgraduate Research Committee which includes staff and PGR representatives. All PGR students have at least two supervisors, one of whom must be experienced with previous PGR completions. They can access School and College funds to support, present and publish their research (e.g. one of *Durrant's* students presented at the international *SLEEP2017* conference and published his work in the high impact journal *Cortex*). An annual postgraduate conference is organised in order to give students conference experience and boost their confidence for external conferences.

The Researcher Development Programme (RDP) from the Doctoral School ensures that all PGR students obtain the skills necessary to succeed in PGR work and the transferrable skills needed for their future careers, with the training needs of each student determined annually. Together with mandatory supervisor training every four years, these mechanisms have ensured 85% on-time completions during this census period.

**Equality and Diversity**

The UoA has a headcount of 30 staff members, with an even gender balance (15 female, 15 male), with 17 born outside of the UK. The gender balance is preserved at more senior levels, with half (5 out 10) of senior staff (Professors and Associate Professors) identifying as female. Currently 13.3% of staff members identify as BAME; this is substantially higher than the Lincolnshire average of 5.3% and broadly in line with the national population average. We are actively encouraging BAME candidates to apply for all vacancies through the use of an inclusivity statement in all advertisements:-

*"The School of Psychology recognises the positive value of diversity, promotes equality and proactively works to make our School an inclusive environment. We welcome and encourage job applications from people of all backgrounds. We particularly welcome applications from disabled and Black, Asian and Minority Ethnic (BAME) candidates, as these groups are currently underrepresented at this level."*

The Psychology Athena SWAN Working Group was established in 2013 to facilitate the promotion of good practice within the School. The School was awarded Athena SWAN Bronze in 2016 and Silver in 2020, with commendation on a number of areas of best practice. This working group is now the School of Psychology Equality Committee (SPEC) which has standing agenda items on School and leadership group meetings, and informs decision-making at every level within the School.

SPEC, chaired by the Equality, Diversity and Inclusivity (EDI) lead (*McKenzie*), comprises staff and students at all levels and a number of 'Champions' – individuals who have been identified as a first port of call for anyone who feels that they need help or advice relating to specific areas of their own identity. They are also tasked with the following specific role responsibilities:-

**Equality & Diversity Champion**: Be aware of and promote understanding of the impact that racist, xenophobic, culturally elitist or oppressive behaviours at both the individual and the institutional level can have on individuals and UK BAME groups as a whole, as well as on non-UK nationals.

**LGBTQIA+ Champion**: Be aware of and promote understanding of the impact of HBT (homophobic, bi-phobic & transphobic) behaviours can have on individuals.

**Parent/Carer Champion**: Represent parent/carer issues to senior management – such as timings of meetings/teaching to tread the line between the demands of core working hours and child care/caring responsibilities. Run our Parenting Peers mentoring Scheme.

**Mental Health Champion**: Be aware of and promote understanding of the impact that negative attitudes, implicit bias and negative stereotypes of mental health issues can have on individuals that have been affected.

**Disability Champion**: Be aware of and promote understanding of the impact prejudiced behaviours can have on individuals with disabilities, health conditions or impairments. Disseminate information about disability and long-term health support available at the University. Encourage accessibility and use of Universal Design principles in research spaces.

SPEC have ensured that equality, diversity and inclusivity (EDI) are fully woven into all areas of the School. Leadership roles are rotated regularly to give all staff the opportunity to display leadership, and vacant positions are advertised across the School to invite expressions of interest. Training of EDI for all staff within the UoA is provided through online e-learning courses (such as one on Equality and Diversity Within the Workplace) and in-person workshops (such as one on Trans-Awareness).

Practices within the School are carer-friendly; the external seminar series was moved from a 4-5pm slot to a 2-3pm slot, so that staff with childcare responsibilities are able to attend on a regular basis. Two members of staff who took a period of maternity leave were encouraged to apply for institutional-level support, which provided them with research cover and £10,000 of internal research funding to enable their research programme to continue while on maternity leave, directly addressing a key equality issue in research.

Members of the UoA are actively involved in research and outreach being conducted by the University's Eleanor Glanville Centre (focused on EDI), as well as the University's Women In Science and Engineering Scheme. Our mentoring lead (*Meints*) was awarded the international Suffrage Women in Science award in 2017 in recognition of her leadership role in science and she has subsequently supervised and mentored a number of early career female scientists with a view to increasing the representation of women in science.

Finally, the principles of EDI are reflected in our REF submission. Our outputs have been selected using the formal process outlined in the University's Code of Practice, which embeds these principles within the processes. Staff involved in output selection have undertaken appropriate EDI training specific to the process and using multiple reviewers for all outputs has helped to ensure equality. 43.2% of submitted outputs come from individuals who identify as female while 56.8% come from individuals who identify as male; 10.8% of outputs are from individuals who identify as BAME. Two of the impact case studies have mixed female and male authorship while the other is exclusively female.

## 3. Income, infrastructure and facilities

### Research Income

Research income has developed during this census period to facilitate our growing productivity and enable high quality research. We have achieved £1,468,740 of research income since 2014, in contrast to £283,000 during the previous census period, despite an increasingly challenging funding climate. We will continue with this development throughout the next REF period.

Our research income incorporates funding from UKRI, the European Union, NIH, ESRC, NHS, industrial partners and charities. The aim is to support ongoing programmes of work and target funding bids in areas of strength. For example, the School has a particular strength in animal behavioural and human-animal interaction work (*Guo*, *Meints*, *Majolo*, *Marechal*), with work in this area supported by grants to *Guo*, who received research funding (£155,470) from the EU Marie Skłodowska-Curie Action programme for a project looking at the assessment of emotional faces in dogs, and *Meints*, who received £248,496 from WALTHAM/Mars Petcare to look at animal assisted interventions for children with and without special educational needs, building on earlier work in this census period funded by an NIH grant of $99,824. This specialist research area reflects a broader institutional strength with two Chairs in this UoA (*Meints* and *Guo*) and Professor Daniel Mills, the UK's first Professor of Veterinary Behavioural Medicine, in the School of Life Sciences.

The School's strong focus on EDI is reflected in its research activities and this work has been supported by a grant of £173,510 to *Gaunt* from the Nuffield Foundation to look at re-gendered parenting. ESRC-funded projects were also carried out during this period on visual judgments of human movement (*Mather*; £286,945) and the first UK-wide language norms for young children (*Meints*; £357,952). With the establishment of the Lincoln International Institute for Rural Health, the Lincoln Medical School and two research centres with a health focus (sleep and autism) led from within the School, there has been a significant increase in research on health and well-being in the School. Funding bids to support this work have been made to healthcare research funders such as the MRC, the Wellcome Trust and the NIHR. This includes support for PGR work such as a £64,843 award to *Tovée* for CLAHRC studentship funding on a project looking at body image and healthy eating.

The research income strategy encompasses five key areas:-

1. Supporting individual researchers by providing time, mentoring and expertise to help with grant applications.

2. Increasing the proportion of collaborative bids through extended networking opportunities and researcher training.
3. Targeting funding bids in areas of key strength as identified through the research centres, groups and networks within the UoA.
4. Increasing the quality of funding bids through rigorous peer review and research planning.
5. Improving the track record of the applicant through increased outputs, feasibility studies and the generation of pilot data.

Funding bids are incorporated into annual workloading to ensure that researchers have time to write them. Time to write is further supported with the provision of writing retreats led by trained individuals, which have led directly to outputs and funding bids. Research mentors offer experienced support for bid writing (e.g. *Föcker* has been mentored by *Hodgson* and was a co-applicant on a large EU Research and Innovation Action grant application that *Hodgson* led; subsequently *Föcker* led on a funding bid to AIM-Health with *Hodgson* as co-applicant). Grant writing workshops and seminars are provided by the CoSS on topics such as charitable funding sources or writing a case for support. Identification of appropriate funding schemes, interpretation of scheme rules, and support for costings, are provided by dedicated research officers at College and institution levels and all staff are given access to the Research Professional funding website.

Collaborative bids are promoted through structures that support interdisciplinary working both within and beyond higher education (see section 1). In particular, funding is available at School, College and Institution levels which specifically supports collaborative bids. Networking is supported financially (through the School research budget, the CoSS research fund and travel grants from the Lincoln Institute for Advanced Studies) and with time (through the School research leave scheme, which can be used for extended visits to collaborators). The SoP seminar series provides an opportunity for researchers to invite prospective collaborators (e.g. Dr Caroline Dalton from Sheffield Hallam University, which facilitated a collaboration with *Pennington*).

A formal peer review scheme within the CoSS requires a draft of funding bids to be made available six weeks ahead of the submission deadline and sent for internal peer review. This provides time for researchers to make appropriate changes prior to formal submission. Submitted bids are also reviewed by institution-level research officers for correct costings and compliance with scheme rules prior to being signed off. Evidence suggests that this peer review scheme improves the quality of bids, with successful applicants identifying peer review as having helped them obtain funding (*Guo* and *Gaunt*).

To ensure that submitted bids are supported by appropriate foundation work, the CRF supports feasibility and pilot studies ahead of a funding bid, with 21 projects in this UoA receiving CRF funds during this census period. For example, *Ritchie* received CRF funding for a face perception project, which led to a successful bid (£33,153) to the British Academy for a project looking at face perception in the criminal justice system. Periodically, the University also operates an institution-level research investment fund for larger scale pilot projects with cross-school collaboration (e.g. a project headed by *Roberts* looking at UK gambling data which led directly to an external funding bid to the Responsible Gambling Trust). Researchers are also encouraged to use external small grant schemes for seed funding, with grants obtained from the Experimental Psychology Society (*McKenzie*, *Durrant, Kramer*, *Ritchie*), British Psychological Society (*Durrant*, *Bourke*, *Pennington*), and British Academy/Leverhulme Trust (*Pavan, Hermens, Van de Vyver*). Many of these have led to outputs and some to other external funding (e.g. £7,237 for *Durrant* from Innovate UK in collaboration with a local business).

**Infrastructure and Facilities**

This UoA has benefitted from strategic investment by the UoL, most notably the £18.5m Sarah Swift Building, opened in June 2017, which houses the Schools of Psychology and Health & Social Care. This move has enabled the expansion of the School and ensured that research facilities have kept pace with the increase in staff. As well as offices for staff the building now

houses 22 specialised research labs, including flagship facilities such as a 3D Body Scanner, an Infant and Child Development Lab, a Molecular Psychology Lab and a Sleep Lab. The labs are led by an academic Labs Manager (*Flack*) and maintained by a team of three technicians with their own on-site workshop for producing and maintaining equipment. The technicians also keep a repository of research equipment including laptops, cameras, response boxes and an extensive library of over 200 different psychometric tests and validated questionnaires.

In addition to this major infrastructure investment, the School has a budget dedicated to purchasing equipment and consumables, and favours proposals for collaborative inter-disciplinary research which will make the best use of any new equipment. Recent purchases from this include a Biosemi EEG system, a Neuroconn tDCS system and a BIOPAC fNIR neuroimaging system. In the period since 2014, over £250,000 has been spent at a School level supporting research costs and equipment, in addition to external research funding, College and institutional spending.

In accordance with the wider research strategy, equipment procurement is focused on areas of strength such as face perception and sleep research. As a result, the School has the following labs and key research facilities:-

1. *VR Lab* 1, with an Oculus Rift for virtual reality-based research.
2. *VR Lab 2,* with an HTC Vive Pro and Valve Index for virtual reality work using a different platform.
3. *Doppler Lab,* with a transcranial doppler system for neuroimaging.
4. *Biosensor Lab,* with a Biopac for physiological measurements.
5. *CANTAB Lab,* for cognitive testing and including a machine with a CANTAB licence.
6. *Molecular Psychology Lab,* which is a wet lab with facilities for small molecule analysis, biological sample processing and storage.
7. *Sleep Lab,* with a control room, en-suite shower room and two bedrooms each with Embla N7000 polysomnography systems, infrared video, sound capture and presentation, controlled temperature and lighting, as well as a number of Phillips actiwatches, three home Sleep Profiler PSG devices and a g.tec EEG system for closed-loop stimulation.
8. *tES Lab*, including a Neuroconn DC-Stimulator Plus tDCS system and a BrainSTIM tDCS system for research involving neurostimulation.
9. *Face Recognition Lab*, with a high spec PC and a high speed monitor for the presentation of multiple video stimuli.
10. *Psychophysics Lab*, with a specialised video camera and occlusion googles for psychophysics research into visual perception.
11. *EEG Lab 1*, with a Biosemi ActiveTwo 64-channel EEG and integrated Jazz eye-tracker and auditory brainstem response module for cognitive neuroscience work.
12. *EEG Lab 2,* with a Biosemi ActiveTwo 64-channel EEG system for cognitive neuroscience work.
13. *Eyetracking Lab 1*, with a visage eye tracker for eye tracking research, especially related to face perception.
14. *Eyetracking Lab 2*, with an Eyelink eye tracker and Tobii glasses for eye tracking research, especially related to saccades and visual deficits.
15. *fNIR Lab*, with a BIOPAC fNIR neuroimaging system.
16. *Forensic Lab*, with a Tobii eye tracker for forensic eye-tracking research.
17. *Infant and Child Development Lab*, with integrated intermodal preferential looking booth and Tobii eye tracker for paediatric eye-tracking research, EEG equipment and psychometric tests (such as the Bayley III).

18. *TMS Lab*, with a Magstim TMS system for neurostimulation research, especially related to visual processing and attention.
19. *Driving Lab*, with a custom driving simulator system and Tobii eye tracker for driving behavioural research including eye tracking.
20. *Motion Lab*, with a Mirage system, Mobile Mirage system, Minibird motion trackers and eduloggers for physiological measurements, for research related to hand perception in particular.
21. *Body Image Lab*, with a medical grade 3dMD body scanner with 12 infrared cameras, for research into body image and body composition.
22. *Quiet Room*, which is used for interviewing participants.

As well as the campus lab facilities, the School has a field site established in Indonesia in 2020 for research on social behaviour and conservation of moor macaques, as part of a collaboration with the University of Leipzig and University of Hasanuddin. This includes a range of equipment for field work, including weather stations, GPS devices, camera traps, video and sound recorders, equipment for playback experiments and hand-held computers.

These facilities have helped with recruitment of established researchers in these specialised areas (e.g. *Tovée* was encouraged to move to this institution by the purchase of the 3D Body Scanner) and ensured that staff can produce research published in Q1 journals on a consistent basis. The School also works closely with other areas of the University which have also benefitted from large investment, including the new Joseph Banks Laboratories where some School staff (e.g. *Pennington*) carry out work including genotyping, methylation analysis and cortisol analysis, taking advantage of the Human Tissue Licence obtained by the University in 2017 (see institutional statement). Finally, this UoA directly benefits from institution-level investment in software facilities (such as institutional Qualtrics and MATLAB licences which are widely used in the UoA, such as by *Kramer* who is a certified Matlab Associate).

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

Researchers in this UoA are using their expertise to contribute to society. This may be through collaborating in research networks, engaging with stakeholders or wider audiences or making a wider contribution through a variety of professional activities beyond core research. This wider academic citizenship is regarded as highly valuable and supported within the UoA through organisational, developmental and financial mechanisms. The academic workload model allows time for external professional activities and individuals are encouraged to take up opportunities where they exist and asked to identify areas of opportunity as part of their research planning.

### Research Collaborations, Networks and Partnerships

Research carried out in this UoA is largely collaborative in nature; the vast majority of outputs produced in this period, for example, have multiple authors. Combining expertise allows researchers to undertake larger/more complex projects with more advanced methods and is strongly encouraged. Collaborations are fostered locally, within the UK and internationally, with specific support mechanisms for each.

Local collaborations are promoted through research centres (e.g. ARIC, which works with local employers on placements for autistic adults) and specialist forums (such as the bimonthly NHS Research Development Forum created by *Dawson* which connects UoA members with the Lincolnshire Partnership NHS Trust). UK-wide collaborations (such as *Hudson's* collaboration with the Universities of Oxford, UCL, Lancaster and Bangor on a project looking at the causes and consequences of language lateralisation) are fostered by travel funds provided by the School research budget and the provision of one complete day per week for research where

possible to allow travel. Online video conferencing facilities provided on MS Teams and data sharing via OneDrive further aid these collaborations. These collaborations can lead to impactful research; for example, the UK Communicative Development Inventory – the first database of UK norms for early language development – was created in a partnership between the Universities of Lincoln (*Meints*), Liverpool and Lancaster, with the project funded by the ESRC. The UoA has had a substantial number of international collaborative projects during this census period, such as the project 'Facial Recognition in the Criminal Justice System' led by *Ritchie* in Lincoln, funded by the British Academy, which is a collaborative project looking at automatic facial recognition and how it is used in law enforcement in three different countries – UK, Australia and China. These are often also funded from overseas, e.g. the project on behavioural innovations in macaques (*Majolo)* with colleagues at the University of Leipzig, funded by the Deutsche Forschungsgemeinschaft.

In addition to formal research projects, researchers in the UoA are often members of broader research networks or organisations. For example, *Merdian* is a member of the Research Committee of the National Organisation for the Treatment of Abusers, while *Meints* is a member of the Society for Research in Child Development. A number of UoA members also belong to professional organisations with a research division as detailed below. Many members give invited or keynote talks (e.g. *Pennington* to the Royal College of Psychiatrists General Adult Psychiatry Annual Conference; *Meints* at the National Dog Bite Prevention and Behaviour Conference) and are involved in conference organisation (e.g. *Mather* helped to organise the Visual Science of Art conference and the European Conference on Visual Perception; *Flack* organised the North East Face and Person Perception Meeting; *Durrant* helped to organise the British Sleep Society Biennial Conference and the International Sleep Medicine Course). This UoA has taken a leadership role in these activities; for example, *Roberts* organises the annual Current Advances in Gambling Research conference funded by the Welsh Government and the Society for the Study of Addiction, which takes place in Lincoln. Major conference series belonging to external organisations have also been held in Lincoln and organised from the UoA within this census period, such as the Experimental Psychology Society conference (organised by *Hodgson* in 2015).

**Users, Beneficiaries and Audiences**

Research has been conducted in collaboration with a number of stakeholder organisations beyond Higher Education. Forensic psychologists within the UoA have strong links with the local prison service and are represented at board level on organisations such as The Centre of Expertise on Child Sexual Abuse and Yorkshire, Humberside and Lincolnshire Circles of Support and Accountability (*Hogue*). Many researchers throughout the UoA have NHS links, including those involved in DClinPsy provision (*Dawson, Moghaddam*), while other researchers have links with organisations such as the University of the Third Age (*Ziegler, Durrant*), the WESC Foundation (*Hodgson*), the Gordon Moody Association (*Roberts*) and The Mindfulness Association (*Pennington*). Applied projects can have strong stakeholder links; for example, *Merdian*'s OnlinePROTECT project includes links to police services, offender and victim services, and the National Offender Management Service. Partnerships with business and charitable organisations have specialist support at an institution level, with specific subdivisions for collaboration beyond HE and officers with specific responsibilities (such as for Innovate UK funding). These services also provide IP and contract support as needed.

Many members of the UoA are actively involved in professional bodies with a research focus. For example, *Merdian* is Vice President of the International Association for the Treatment of Abusers, while *Durrant* is the Treasurer and Executive Committee Member of the British Sleep Society as well as an appointee to The Sleep Council and *Dawson* is Director for Training in the Association of Clinical Psychologists. There is a notably strong presence from the UoA in the British Psychological Society, with *Ziegler* (Developmental Section), *Ritchie* (Cognitive Section),

*Hogue* (a Forensic Section) and *Pennington* (Psychobiology Section) all committee members and *Dawson* liaison representative for the Clinical Psychology GTiCP group.

Within the UoA, collaborations are supported in the research groups by sharing of relevant contacts. For example, within this period of assessment *Durrant* has worked closely with the U3A, putting on two workshops, giving three branch talks, a keynote talk at the summer conference, and a joint funding application with the national vice-chair. This collaboration enabled colleagues to go to the U3A for further research partnerships when carrying out research in this subpopulation (*Pollux*). Collaborations beyond HE are also supported through appropriate outreach activities with stakeholder organisations. For example, the FCRG group and the Trent DClinPsy programme organised the *ResFest17* conference at the UoL. This event showcased research undertaken within the UoA to clinicians, programme-affiliates, stakeholders and members of the public.

There is a strong drive towards public engagement from members within the UoA, with UKRI funding for a project to embed public engagement in research in Lincoln as widely as possible (*Hodgson*). Following this lead, outreach activities led from within the UoA have targeted the wider public. These include talks, activities and demonstrations on European *LiGHTS* nights (funded by the EU), pop-up science events and a new *Pint of Science* series (*Ritchie*). Researchers also regularly engage in national and international radio broadcasts (e.g. *Durrant* took part in phone-in sleep clinics on BBC Radio Lincolnshire and national radio in Spain), and national television (e.g. *Ritchie* featured as an expert on BBC1's *Crimewatch Live* and work by *Ritchie* and *Kramer* was discussed on BBC2's *QI* comedy programme while *Durrant* continued the comedy theme with an appearance as a guest panel member on *Jon Richardson: Ultimate Worrier* as well as being featured on BBC1 programme *Trust Me, I'm a Doctor*). The UK-CDI infant vocabulary questionnaire (*Meints*) was used in the BBC2 series "Babies – their wonderful world" and the BBC's citizen science experiment on language learning in infants.

**Wider Activities and Contributions**

Members of the UoA fully recognise the need for academic citizenship and to make a wider contribution within the research community and beyond. As such, staff are encouraged to engage with tasks such as peer review of grant applications and outputs. It is not possible to exhaustively list all such roles undertaken by staff within the UoA, but for funding application reviewing some representative examples are: *Durrant* (BBSRC, ESF, ESRC, German Research Foundation, Leverhulme Trust, NIHR, The Rosetrees Trust); *Gaunt* (ESRC, French National Research Agency, Israel Science Foundation, The Research Foundation - Flanders); *Heflick* (Leverhume Trust); *Majolo* (Austrian Science Fund, ESF, German Research Foundation, Leakey Foundation, NERC, Romanian Science Foundation, Swedish Research Council for Environment); *Mather* (Austrian Science Fund, BBSRC, ESRC, German Research Foundation); *Meints* (BBSRC, Canadian Social Sciences and Humanities Research Council, Carnegie Trust, ESRC College Member, Leverhulme Trust, Royal Society); *Pennington* (French National Research Agency, National Science Foundation,); *Roberts* (ESRC, NIHR, SSA); *Ritchie* (British Academy, Canadian Social Sciences and Humanities Research Council); *Ziegler* (ESRC College Member, Leverhulme Trust, National Research Foundation of South Africa, National Swiss Science Foundation).

All members of the UoA regularly review papers, covering well over 100 journals between them. This includes top tier journals such as The Journal of Neuroscience, Proceedings of the National Academy of Sciences, Trends in Cognitive Sciences and Nature Human Behaviour, as well as many more specialised journals. Staff with editorial roles at internationally respected journals include *Föcker* (Journal of Cognitive Enhancement); *Guo* (PloS One); *Heflick* (Frontiers in Psychology - Personality and Social Psychology Section); *Hogue* (The Journal of Mental Health Training Education and Practice); *Majolo* (Journal of Anthropological Sciences, Primates); *Mather* (Editorial board of Perception/iPerception, Editorial board of Proceedings of Royal

Society B); *Ritchie* (Visual Cognition) and *Tovée* (both PLoS One). Members of the UoA have been engaged as external PhD examiners at international as well as UK universities, including *Durrant* (Manchester, New South Wales, Sydney); *Gaunt* (Bar-Ilan, Kent, Tel Avi); *Majolo* (Göttingen, Gronginen, Utrecht); *Mather* (Cardiff, Cardiff Met, Nottingham); *Meints* (Liverpool); *Pavan* (Padova); *Ritchie* (City); *Roberts* (Central Lancashire, City); *Ziegler* (Lancaster). Visiting or honorary roles that staff have held during this period include both UK-based positions (e.g. Life Membership of Clare College and Associate Researcher in the Department of Social Sciences at the University of Cambridge for *Gaunt*), and overseas positions (such as a Visiting Fellow role for *Pavan* at the University of Regensburg funded by the Alexander von Humboldt Foundation, a Visiting Fellow role for *Durrant* at Xi'an Jiaotong University funded by the Chinese National Natural Science Foundation and an Adjunct Professor role for *Roberts* at AUT University in New Zealand).