

Institution: The Open University
Unit of Assessment: A3
<p>1. Unit context and structure, research and impact strategy</p> <p>1.1. Context</p> <p>The mission of The Open University's (OU) Unit of Assessment A3 (hereafter 'the Unit') is to advance understanding of biomedical and societal health and wellbeing, and deliver beneficial change to current health discourse, policy, and practice. Our interdisciplinary research ranges from laboratory-based biomedicine through to nursing/healthcare policy and clinical practice, is aligned with national/international health and wellbeing priorities, and delivers impact via clearly delineated links to policymakers, practitioners, and communities. The Unit has enhanced professional practice and interagency working and has developed support materials for service providers and users. The Unit spans:</p> <ul style="list-style-type: none"> • The '<i>bench</i>' - science underpinning disease (e.g., cancer genetics) • The '<i>bedside</i>' - practitioner-based investigations (e.g., research into frailty and dementia care) • The '<i>beyond</i>' - studies of co-morbidity, mental health, and wellbeing in communities (e.g., work with LGBTQ+ young people). <p>1.2. Unit Structure</p> <p>The OU's REF2014 A3 submission largely consisted of Science, Technology, Engineering and Maths (STEM) Faculty undertaking biomedical research. To develop collaboration across disciplines, the OU aligned quantitative and qualitative health and wellbeing research within the University. This led to amalgamation of staff within the School of Health, Wellbeing and Social Care (HWSC; Faculty of Wellbeing, Education and Language Studies; WELS) and the School of Life, Health and Chemical Sciences (LHCS; STEM) under the auspices of this new A3 Unit (32 staff, 31.2 FTE; see Section 2.1) that better represents the OU's strengths in these areas.</p> <p>The Unit's key research themes are depicted in Figure 1, within which the Unit's research is organised via focussed groups. All Unit staff belong to one or more research group(s) that convene regularly under the leadership of coordinators. The groups have individual terms of reference that focus on sustaining and developing their specific research activities, environments, and infrastructure.</p>

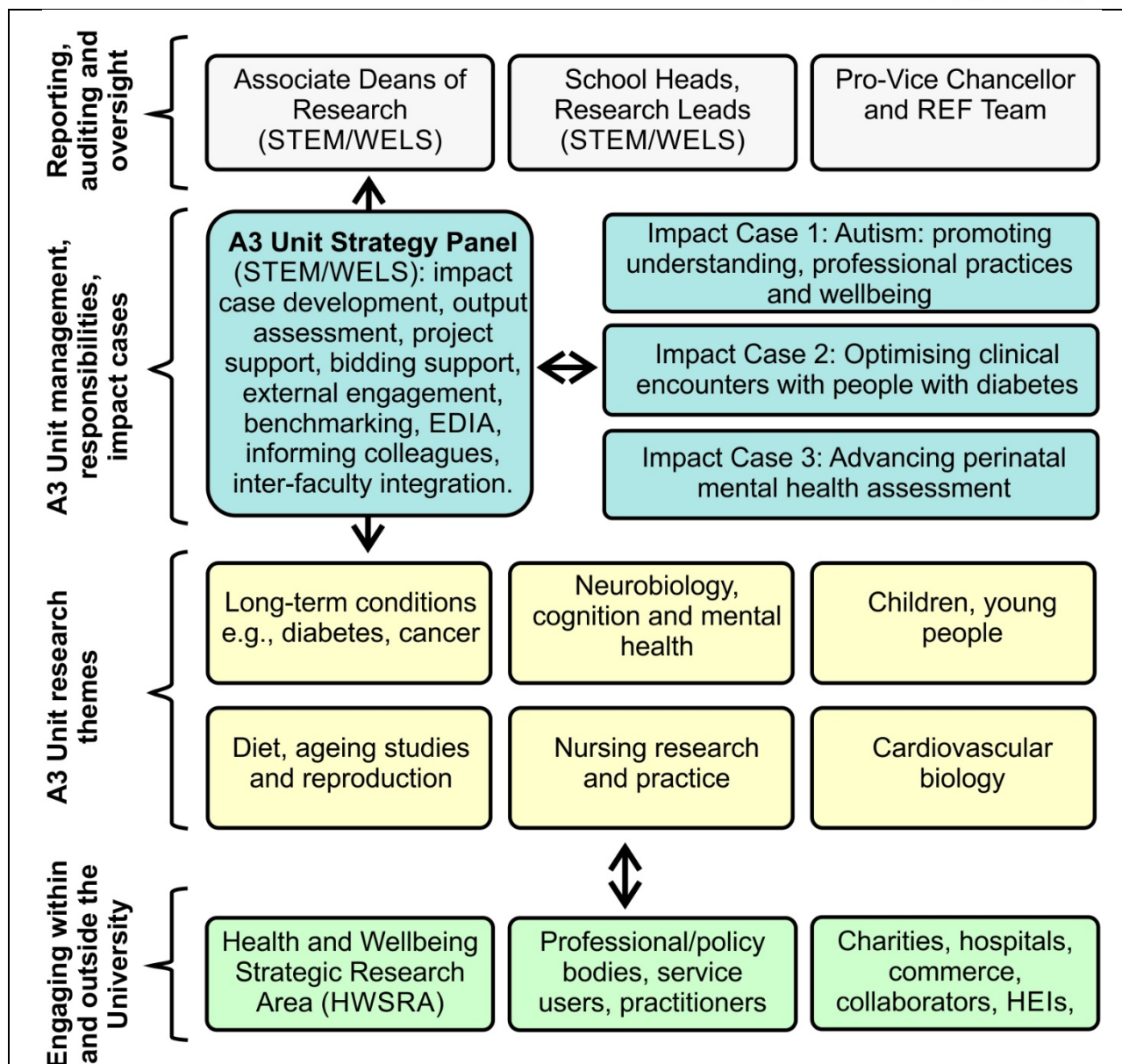


Figure 1: Summary of Unit management, reporting structure, research themes and internal/external links. EDIA: equality, diversity, inclusion, and accessibility.

Unit staff participate in the [Health and Wellbeing Strategic Research Area](#) (HWSRA), a key pan-University structure that was introduced post-REF2014 to promote and coordinate OU health and wellbeing research. The HWSRA supports staff in several UOAs, including A3, A4, B11 and C20. The HWSRA offers seed funding for workshops and pilot projects, enabling bid development in new research areas. **Bootman** and **Banks** have served on the HWSRA's Management Committee since its inception. HWSRA participation has promoted the Unit's interfaculty and external research by enhancing interdisciplinary links (examples given throughout).

The Unit is managed by a Strategy Panel (5 male / 5 female) drawn from STEM and WELS. The Panel has met regularly since REF2014 to enact a strategy supporting research excellence,

publications, bidding, impact, and engagement activities. The Panel reports to Faculty (via Associate Deans of Research), School management (HWSC and LHCS) and University management (via the PVC-Research, Enterprise, and Scholarship). The Panel informs colleagues about REF procedures and responds to university research audits (Figure 1).

1.3. Achievement of Strategic Aims for Research and Impact following REF2014

Since REF2014, the Unit's overarching vision has been to increase sustainability and interdisciplinarity, to expand the breadth, agility, and significance of our research, and to ensure that the novel biological, nursing and health knowledge generated is translated into impactful outcomes, including new diagnostics, policies, investigative tools and interventions for health and wellbeing. The mechanisms by which this vision has been realised primarily involve recruitment of staff in key areas and implementation of processes to support research development. Specifically, the Unit focussed on the following activities.

1.3.1 Promoting a supportive research environment and making academic/societal contributions

The Unit supports research excellence by underpinning the development of bidding pipelines, peer support for publications and research proposals, collaboration, postgraduate research student (PGR) supervision and early career researcher (ECR) mentoring (see Section 2). The research groups within the Unit deliver local, peer-based expertise to assist colleagues at all career stages. The Unit provides focussed support for staff with high teaching and admin constraints, including writing retreats and one-to-one mentoring to maximise returns on their more limited research time.

The Unit has contributed to national and international healthcare policy, statutory and professional guidance and practice design and delivery. We have positively impacted service users' access to, and experiences of, care in the wider community, leading to enhancements in physical and psychosocial health and wellbeing. For example, **Boyle's** research into decision-making by people with dementia led to the development of practical guidance for those living with the condition, and their carers. This guidance was widely disseminated to service users, carers, and via services (e.g., memory assessment clinics, advocacy forums, support groups), enhancing awareness of their rights, facilitating their decision-making abilities, promoting their ongoing social participation, and assisting care planning.

The Unit has also contributed significantly to fundamental biological understanding of debilitating and fatal medical conditions, developed new diagnostic and therapeutic technologies, and participated in numerous events to promote the public understanding of wellbeing, health policy and basic health science. For example, a HWSRA-funded project supported **Banks** working with colleagues in the OU's UOA B11 and in Milton Keynes University Hospital (MKUH) on automated assessment of cardiovascular risk factors leading to coronary artery disease.

1.3.2 Increasing funding

To promote bidding activity, staff are assisted with horizon scanning, finding project partners, and bid development. Over this REF cycle, the Unit has enhanced peer mentoring, increased grant-writing support, and provided strategic funding for pilot studies and novel synergy projects to enable staff to explore new research areas, partner with colleagues, generate outputs and access new funding streams.

These strategies have opened new research areas (e.g., **Crea/Bootman/Rigas** outputs on signalling in cancer progression) and facilitated new industrial collaborations (e.g., **Crea** with Volition; described in Section 2). The Unit, in association with the HWSRA, keenly supports bidding through mentoring and shared expertise, e.g., a research grant surgery scheme led by **Wallace**, which has facilitated several prestigious funding awards (examples given below). Research groups provide specific expertise for peer support, internal review, and encourage collaborative bids. More detail on bidding strategy is provided in Section 3.

1.3.3 Enhancing outputs

The Unit has developed mechanisms to support staff across the research lifecycle, from designing projects, to publishing their findings and maximising impact. Drawing on longstanding experience of staff with publication track records, the Unit has facilitated internal peer review, mentoring and writing workshops/retreats. In this REF cycle, the Unit published 519 peer-reviewed journal articles (~17 per FTE) and 320 non-journal outputs (e.g., theses, conference proceedings and book chapters), including outputs in *Nature Communications*, *Nature Neuroscience*, *Science Translational Medicine*, *Science Signalling*, and *Diabetic Medicine*. Our outputs have generated press releases, training opportunities for health care staff, policy changes, Faculty of 1000 recommendations, and prizes. For example, [Singer's Journal of Neuroscience article](#) on rodent addiction-like behaviour led to the [Matilda White Riley Behavioural and Social Sciences Paper Award](#) (National Institutes of Health).

1.3.4 Maximising impact

The Unit keenly supports the development of impactful research across the breadth of its activity. The Panel includes impact (**Lucassen, Heath**) and research and engagement (**Boyle, Crea, McMullan**) leads who work with colleagues to facilitate the development of strategic partnerships (e.g., with charities and clinicians), targeted impact planning and delivery (e.g., knowledge exchange events with practitioners and user groups) and dissemination. The Panel also works with staff to develop plans for integrating impact metric collection, such as surveys, feedback forms and focus groups, into their routine research operations (see Section 1.4). Beyond the input of the

Panel, communications staff based in the STEM and WELS Faculties support colleagues with dissemination via media and public engagement events (see Sections 3 and 4).

The three submitted impact cases (Figure 1) provide examples whereby the Panel facilitated the design, delivery, and support of impact activities in the context of longstanding academic research projects. The impact potential of these research programmes was recognised at an early stage in the REF cycle via an in-depth Strategy Panel review. Engagement with the Panel led to the attribution of financial and human resources, and the development of action plans for each case. For example, **Roth** developed interactions with clinical practitioners and expanded her engagement with the autism support charity sector; **Oates**, in addition to sharing his mental health assessment tools with clinical colleagues, began to explore how these tools impacted clinical practice and developed an online community of practice to support more effective implementation; **Lloyd**, in addition to disseminating guidance on appropriate language for clinical interactions, engaged closely with practitioners and service users to determine the extent to which the recommended changes improved interaction and satisfaction.

The Unit has established a forward-looking strategy for impact development. For example, through discussions with the Panel, **Crea** has established an impact workflow that is projected into the next REF cycle for his research investigating incurable prostate cancer. Impact activities for this project to date include [new clinical guidelines](#) in association with oncologists, a collaboration with a commercial partner ([Volition](#)) to develop a novel blood-screening assay for prostatic malignancies, and an OU-hosted workshop involving both cancer researchers and oncologists.

The OU's Business Development Office facilitates interactions with industry and third parties, and innovation vouchers for £10,000 can be obtained to organise networking events targeted at specific businesses. These interactions are assisted by the Unit's Enterprise Lead (**McMullan**).

1.3.5 Extending interdisciplinary collaborations

The interdisciplinary ethos within the Unit has resulted in new areas of activity. For example, a project investigating human disgust, a topic of major interest during the pandemic in the context of understanding motivators for modifications to human social behaviours. This involved **McMullan** (a molecular geneticist) working with **Heath** (a behavioural neuroscientist) to develop a bidirectional translational pipeline between humans and a nematode model that can identify the genetic variants that modulate disgust and the associated behaviours in humans. The Unit has strategically used PhD studentships to facilitate novel interdisciplinary research between its members. For example, a PhD project between **Lloyd** (WELS) and **Rostron** (STEM) investigated the difficulties individuals experience in living well with type 2 diabetes. The Unit has also used PhD studentships and pilot funding to extend interdisciplinary research across the OU campus.

An example is a PhD studentship examining the neuronal basis of chronic organophosphate-induced neuropsychiatric disorder in lab-based models and humans with supervisors in both STEM (**McMullan**) and the Faculty of Arts & Social Sciences. Of the 78 outputs selected for REF2021 submission, 21 (~27%) are co-authored by two or more staff from this Unit or another OU UOA, demonstrating our commitment to collaborative research.

Enhancement of interdisciplinary research was also realised through 13 permanent staff appointments that both strengthen and broaden the Unit's research base. For example, **Wallace**, a health psychologist who serves on the Health Services and Development Research NIHR Funding Review Committee, has brought research expertise in health behaviour interventions and a wealth of experience in bidding for health project funding. **Crea**, a medical doctor, has strengthened the Unit's cancer research grouping and understanding of clinical practices in oncology. Since arriving, **Crea** has established a collaboration with the Surrey Cancer Research Institute examining novel long non-coding RNAs as diagnostic prostate cancer biomarkers.

1.3.6 Developing international research links

The Unit has focussed on developing international links through conferences, networking and facilitating introductions to external stakeholders via OU units such as the Business Development Unit (BDU) and the International Development Office. Unit staff can apply for funding that provides opportunities to work alongside these enterprises, and thereby promote international delivery of research outcomes. Examples are:

- The free online course '[Mental Health: Resources for Community Health Workers](#)', developed in association with the BDU. This guide derived from long-standing autism and mental health research expertise within the Unit (**Roth**). The Unit and BDU worked in tandem to promote its dissemination to international health workers.
- An interdisciplinary collaboration with the University of Guyana identified local factors promoting community mental health resilience and sustainable improvements in Guyana (**Mitchell**).
- Work in Kenya, Uganda, Ethiopia, and Tanzania funded by an Academy of Sciences Global Challenges in Research networking grant that brought together OU and international bodies, including the African Mental Health Research Foundation (**Lloyd**).
- Translation and cultural adaptation of perinatal mental health assessment tools for use in countries including Hungary, Russia, Belgium, and Australia (**Oates**).
- Development of educational materials that address the stigma surrounding diabetes and depression in rural communities of Kenya (**Lloyd**).
- Partnership in an EU-funded programme in Hungary, based on the British Sure Start model, establishing local centres for disadvantaged and impoverished children and their families (**Oates**).

- Membership of a 14 nation, multi-continent consortium of research centres and hospitals, funded by the Association of Improvement of Mental Health Programmes (**Lloyd**).

1.3.7 Enhanced post-graduate researcher (PGR) recruitment and training

In addition to Faculty-awarded studentships (Section 2.4), the Unit has participated in several external partnerships and collaborations that have promoted PGR recruitment and supervisory roles, including:

- Membership of the Horizon 2020 International Training Network (BtRAIN), wherein PGRs have a host institution but can visit participating HEIs/commercial organisations for training secondments (1 male).
- Agreement with AstraZeneca initiated in 2019 enabling their staff to register for a part-time OU PhD whilst in post, with Unit staff providing supervision (3 female / 2 male, to date).
- Membership of the ESRC Grand Union Doctoral Training Partnership, in collaboration with Oxford and Brunel Universities, providing funding for PGRs within the Society and Wellbeing Pathway since 2017 (5 female / 1 male, to date).
- The Unit's PGR cohort was enhanced via part-funding from external sources (e.g., NHS, MRC, other HEIs) matched by the OU to provide full studentships (7 students since 2014).

The OU's proactive approach to flexible part-time PhD studies has enabled the Unit to support PGR career development for individuals both within and outside the University. For example, **Bootman** and **Romero** supervised a part-time PGR based in the Department of Pathology, Oxford University, who dovetailed her PhD research with her research assistant job. Similarly, one of the Unit's lab managers is also a part-time PGR, supervised by **Taylor**.

1.4 Future Strategic Aims for Research and Impact strategy

The Unit will continue to support and expand our broad interdisciplinary expertise to facilitate understanding of, and develop agile solutions for, the challenge of improving societal health and wellbeing, and implement them in sustainable modes through close engagements with key stakeholders. The Unit is committed to increasing its focus on interdisciplinarity to optimise its pipeline of 'bench to bedside and beyond' research. Furthermore, the Unit continues to strengthen links with clinical providers such as MKUH, with whom we are negotiating a memorandum of understanding around sharing research data and training. The Unit's strategic plans are bi-annually reviewed and discussed with senior research managers to maintain coherence with University strategy.

The Unit's future research and impact strategies are specifically focussed on the following aims:

- Responding to unmet health and wellbeing needs in national and international contexts through proactive horizon scanning, external engagement, and an agile approach to assembling interdisciplinary and collaborative teams.
- Increasing translation of our fundamental biomedical science and health research into impactful outcomes.
- Ensuring a sustainable research environment through grant bidding and commercial interactions.
- Enabling Unit staff to engage in activities that facilitate impact and deliver societal change.
- Recruiting, training and mentoring PGRs and ECRs, along with development opportunities for existing staff.

1.5. Open research environment and supporting research integrity

Unit staff and PGRs uphold the OU's institutional open access (OA) and research integrity policies. All outputs are deposited in compliance with Research England's instructions on our institutional OA repositories: ORO for outputs and ORDO for data (see REF5a). ORO entries are automatically synchronised with researchers' ORCID accounts. Unit staff annually update Researchfish entries with the outcomes of UKRI-funded projects and are encouraged to publish in OA and open review journals (support is given for publication costs). Researchers deposit research data in international public repositories such as [Gene Expression Omnibus](#) for biomedical data and the UK data archive for social, economic and population research. Many aspects of the Unit's research have generated free resources on the OU's [OpenLearn](#) platform (examples in Section 4).

The Unit's researchers apply a range of statistical tools (e.g., power calculations) for experimental design to establish the optimal number of participants in animal/human studies and maximise reproducibility. Key studies or reviews, including systematic reviews and randomised controlled trials (RCTs), register their protocols initially in registries such as Prospero, the International Prospective Register of Systematic Reviews. Research protocols in clinical trials and major intervention studies are registered in a public database prior to commencement (e.g., an NIHR registry if NIHR funded).

The OU Human Research Ethics Committee (HREC) provides ethical review of planned and ongoing studies (**Banks** is Deputy Chair). It leads research integrity and ethics training workshops for staff at all career stages and has issued guidance to academics on adapting research to fit within COVID-19 restrictions. Studies relating to patients or service users are submitted to the Health Research Authority where required. Academics adhere to the requirements of relevant professional and ethical codes of conduct drawn up by professional bodies (e.g., Nursing and Midwifery Council; for Unit researchers studying nursing practice). The UK Policy Framework for

Health and Social Care Research, published by the NHS, has been adopted as a more general framework for the Unit's health and social research.

The Unit, and the wider University, benefits from **Oates** who has national and international expertise in research ethics. He is a member of the British Psychological Society (BPS) Ethics Committee and Chair of the working party for the BPS Code of Human Research Ethics. Unit staff follow the guidelines provided by the international Declaration on Research Assessment, recognising the need to improve how the outputs of scholarly research are evaluated.

OU staff complete compulsory training on data collection, and GDPR. Research projects involving personal data collection are reviewed by the institutional data protection team to ensure GDPR compliance. Personnel who conduct research with animals are trained and licenced as required by the UK Animals (Scientific Procedures) Act and require approval by the OU's Animal Welfare Ethical Review Body, which comprises stakeholders and independent participants from within and outside the University.

2. People

2.1 Unit staffing

The Unit cohort submitted to REF2021 encompasses 32 researchers (31.2 FTE):

Staff Grade	Gender Balance
Professor	2 female / 3 male
Senior Lecturer/Reader	6 female / 7 male
Lecturer	10 female / 4 male (inclusive of 5 ECR & 8 in first post)

The Unit appointed 12 new lecturers (7 female / 5 male) and a professor (female) in the assessment period. Of these, one was an OU-funded research fellow (**Rietdorf**), and another joined the OU with a Wellcome Trust Fellowship (**McMullan**); both were appointed to lectureships via open recruitment processes. The characteristics of the Unit's staff are:

	Number	%
Full time	42	93
Part time	3	7
Female	26	58
Male	19	42
UK	35	78
European	7	15
Other	3	7
White	40	89
BAME	4	9
Not declared	1	2
Declared disability	2	4
Age range:		
25 - 34	4	9
35 - 44	19	42
45 - 54	12	26
55 - 64	7	16
65 - 74	3	7

Note: this table includes details of all staff (in post, retired or relocated) whose outputs were considered for submission.

2.2 Staffing strategy

Academic appointments within the Unit are made to support both teaching and research needs, with all staff expected to contribute to curriculum delivery and development. Fit with Unit research strategy is strongly considered. In particular, the Unit assesses applicants' potential to integrate within current research themes and enhance outputs, income, and impact. Whilst the Unit's staffing strategy seeks to sustain key research strengths, appointments are also made to develop new strategic research areas. Examples include **Wimalarathna**, an epidemiologist who has increased the Unit's expertise in infectious diseases; **Rigas**, who has contributed to the Unit's increasing focus on cancer bioinformatics; **Ryan**, a registered nurse exploring the impact of social networks and social media in healthcare and healthcare education.

2.3 Staff development

The Unit supports staff working towards academic promotion via pathways involving research and knowledge exchange. Since REF2014 fourteen Unit staff have been promoted to senior lecturer (4 male / 10 female) and five to professor (1 male / 4 female). OU Faculties have mechanisms to recognise and reward staff members for sustaining research excellence and/or achieving impact, including commendations and monetary awards. At University level, there are competitive annual OU Research Excellence Awards. Four Unit staff have won OU Research Excellence Awards in this assessment cycle.

We work collaboratively with the HWSRA and the wider University to provide an annual suite of training activities. In addition, all staff receive individual mentoring provided by more experienced staff in the Unit and their School to develop research plans. Staff at all career stages can seek advice on aspects of academic activity including bidding, horizon scanning, and innovation/engagement via the [OU's Research and Enterprise Development Team](#) and their relevant Faculty and School.

All staff from post-doctoral to professorial levels have an annual appraisal involving discussion with a senior colleague to reflect on the previous year's research, teaching and scholarship activities, and to set achievable and inspiring goals for the forthcoming year. Staff work with their appraiser to identify training needs and opportunities that will support their development. Mid-year reviews identify challenges in meeting those goals and enable working plans to be adjusted.

Nursing staff can undertake doctorates (PhD or a professional doctorate) to facilitate their research career development. Study at this level enables these practitioner-researchers to marry their professional practice and research knowledge/skills and use them as the basis for more effectively informing professional education and healthcare improvement.

Research and technical support staff within the Unit can work towards professional qualifications including Science Council Registration, the NEBOSH Certificate in Occupational Health & Safety, and the Biosafety Practitioners Certificate, thereby furthering their professional contributions to research standards.

2.3.1 ECR career development

Both the Unit and the University provide ECR training and development opportunities, including in research methods, bidding for funding, and peer reviewing. The Unit's staff benefit from mentoring schemes whereby experienced academics support others to develop research and scholarship plans, which are supported by appropriate workload allocation. For example, **Lopez-Cruz** (ECR

Lecturer) was mentored by **Heath** (Senior Lecturer) in the preparation of her first independent grant application: a successful bid to the Royal Society.

The research groups underpin ECR development within the Unit. For example, **Vasiliadou** and **Johnson** were both appointed to their first lectureships and independent research positions in 2020, but due to the pandemic neither could initiate lab-based research. Both are active members of Unit research groups and have been supported in drafting manuscripts and in preparing early career research grant applications via internal peer review and detailed discussions with colleagues that have relevant expertise.

All new academics undergo a probationary period (up to 4 years) while their research and teaching progress is monitored, and benefit from protected time for research and personal development. ECRs are prioritised for start-up funds and to join PGR supervisory teams. A buddy system exists to provide inexperienced researchers with the opportunity to join appropriate on-going research projects to develop their skills in project management and research leadership. Post-doctoral researchers and research fellows are fully integrated members of one or more of the Unit's research groups, which provide support for research methods, publications, and bidding. The University provides broadcast- and social-media training to staff to support the development of relevant skills and to maximise the reach of research and impact activities.

2.4. Postgraduate Research Students (PGRs)

In this REF cycle, the Unit has registered 48 PGRs, with 31 graduating to date:

	Number	%
Full time	36	75
Part time	12	25
Female	26	54
Male	22	46
UK	32	67
European	14	29
Other	2	4
White	37	77
BAME	11	23
Declared disability	2	4

Note: these data relate to PGRs where Unit staff are lead supervisor. Unit staff have also co-supervised >25 PGRs with members of other OU UOAs and external HEIs.

Following REF2014, the OU awarded funding for 10 PhD studentships to the Unit, which assisted newly appointed lecturers to develop their research portfolios, as well as support for interdisciplinary collaborations between Unit staff. In addition, the Unit has benefitted from the annual allocation of 2 internally funded studentships since 2015.

The Unit has also registered an additional 11 PGRs who are either self- or employer-funded (e.g., the AstraZeneca PGRs noted in Section 1.3.6). The industry funded PGRs (and in some cases self-funded students) conduct their studies on a part-time basis in their workplace, with their employer's support.

2.4.1 PGR recruitment

Recruitment of PGRs is undertaken as a competitive process with positions advertised on the OU and external websites (e.g., findaphd.co.uk). An Open Day is held each October, providing potential applicants with information and support on PGR study. Initially, students are registered for an MPhil. To progress to PhD registration, students produce a written report of their research in the style of a mini-thesis and undergo a *viva voce* examination with two independent academics at the end of their first year. If progress is not satisfactory, remedial mechanisms (e.g., detailed plan with increased supervisory contact and meetings) are instigated, and another progress assessment occurs at an agreed time. If a student is unable to progress, or they decide to leave, they can submit their research for an MPhil degree.

2.4.2 Training

Following registration, students complete a detailed skills audit based on the Vitae Researcher Development Framework. Students use this initial audit as the basis of training needs discussions with their supervisory team to develop a bespoke training plan, incorporating a timetable for engagement with Unit- and University-provided training activities. This audit forms a 'live' document representing training and development throughout the studentship and is biannually reviewed. All new students are required to participate in induction training workshops on lab orientation, safety, research integrity and ethics before starting their research.

Students submit a biannual *Progress Monitoring Report* that is scrutinised by the postgraduate director within their School, their Faculty, and the Graduate School. Within this report students reflect on the progress they have made, the skills they have acquired, and their future work and training plans. Students and supervisory teams both contribute to the report and it forms an agreed

statement of progress and plan of action. These reports allow timely intervention if the student shows signs of a lack of progress. If needed, additional training, equipment, or the addition of another supervisor can be arranged. Where possible, supportive interventions are put in place at the inception of a student's research. However, the Unit is responsive to issues arising during a studentship, and ensuring students are appropriately supported to succeed is a priority.

Students give presentations as part of a regular research seminar series. This develops presentation skills, facilitates practice in responding to questions and provides an opportunity to receive feedback from independent academics. Typically, students will give 2 or 3 presentations per year in the series. 'Skills Seminars' are also offered whereby Unit academics provide training and guidance on matters including statistics and experimental design, use of software packages, scientific publishing, manuscript preparation and reviewing and grant application practices. The Unit supports an annual Postgraduate Research Day, including a Q&A on post-doctoral career options where people from different career backgrounds external to the OU are invited and provide insights into various sectors and roles. The Unit also supports the University's Introduction to Teaching Scheme, whereby PGRs can gain teaching experience, with mentoring from academics, for example by participating in filmed labcasts, or in lab schools for OU undergraduate students, by working on OU courses, or by mentoring visiting students and new PGRs.

In their final year, students give a formal pre-viva seminar describing their research to the Unit and participate in the University-wide 'Three-minute thesis' competition. The University also holds an annual poster competition open to all PGRs across the campus. PGRs within the Unit have won awards in various poster categories including the 'People's Choice' category for public understanding of science. Unit PGRs have also won prestigious external awards and invitations to speak. For example, a student supervised by **Taylor** [won an award from the Society for Reproduction and Fertility](#) leading to an international exchange with the student giving a lecture at the Society for Reproduction and Fertility Annual UK Conference in 2015, and a repeat lecture in Australia. A student supervised by **Rietdorf/Bootman** [won a competitive fellowship from the Japanese Society for the Promotion of Science](#) in 2020 to work for 3 months at the University of Yamanashi. A student supervised by **Romero** was invited to speak at the 2018 Gordon Research Conference on [Barriers of the Brain](#).

Support for full-time PGRs includes financial assistance with research-related costs, training via external providers if needed, and conference attendance (at least £1,000 per PGRs per year). All Unit PGRs since 2014 have found meaningful employment in academic or related non-academic fields, with positions including lecturer, research manager, medical writer and many under-taking post-doctoral research.

2.4.3 Supervision and mentors

Each student has a supervisory team consisting of at least two internal supervisors, selected to provide a balance of expertise for the project. Colleagues new to the role are matched with more experienced academics. All supervisors are required to complete a training workshop within 12 months of beginning the role. Supervisory teams can be expanded or changed if additional expertise is needed or circumstances change (e.g., supervisory illness or relocation). External supervisors can be added to allow the student to benefit from specialist expertise, industrial liaison, or additional facilities. Students and their supervisory teams have a minimum of 10 formal meetings per year with written minutes being agreed by all parties. Students are allocated third-party monitors who are independent of the supervisory team to provide confidential support and pastoral care.

The OU's Graduate School provides events and resources to support students' ongoing engagement and promote their mental health. In addition, PGRs have access to the free Employee Assistance Programme (EAP) (available to both full-time and part-time students), which provides proactive ideas for encouraging good physical and mental health, as well as support from a 24-hour helpline. Students with additional needs have access to extra support including the University's Mental Health and Disability Processes Adviser.

Our diverse PGR community is a testament to our inclusive culture and reputation for openness and equality and reflects our commitment to investment in capacity building for students with lived experience to become the social and healthcare researchers of the future. The quality of the Unit's approach to PGR skills training and wider research environment is evidenced by the results of the recent Postgraduate Research Experience Survey (PRES 2019) which awarded the OU first place for Research Skills and Research Culture in the Biological Sciences to which the Unit is the major contributor.

2.5 Equality, diversity, inclusivity, and accessibility (EDIA)

EDIA is central to the OU's mission to be open to people, places, methods, and ideas, and is core to our academic endeavour. An Equality Scheme was introduced in 2018 and since then every Faculty has appointed an Equalities Lead who is responsible for an annual Equality Action Plan. Both Schools (HWSC and LHCS) that contribute staff to the Unit have dedicated EDIA leads (**Simons** and **Loughlin**) who proactively ensure that EDIA principles inform and support business and practice, including allocation of workload for research, access to facilities, and diversity of all panels and committees. Annual institutional staff satisfaction surveys and, more informally, discussions at regular School meetings, also provide channels for issues to be identified and resolved, and/or best practice shared. HWSC is currently applying for Athena SWAN Bronze. LHCS was awarded Bronze in 2016 and has applied for Silver.

2.5.1. Recruitment and support of diversity

Our commitment to EDIA principles begins with staff and PGR recruitment processes which, through interview and selection procedures, establish the EDIA commitment of candidates. Recruitment panel chairs and members are all required to undertake equality and diversity training before they can engage in recruitment activity. Unconscious bias training is being rolled out throughout the University.

Female academics are encouraged to participate in AURORA (Advance HE's women-only leadership programme); supported by central funds and workload allocation. Female colleagues in LHCS have quarterly 'Women in Science' meetings that discuss issues relevant to their research, workload, and career development, and relay redacted minutes of their meetings to senior School management on issues arising. WELS hosts 'Inspiring Women' seminars.

2.5.2. Flexible and remote working

The Unit is open to flexible working requests, whether this be changes to working time or remote working. The general expectation is that such requests are granted. Standard policy is to supply a computer to each staff member or PGR for home use. This strategy has been effective in the extensive homeworking necessitated by the pandemic. In addition, extra contingency leave has been offered to support staff with increased caring responsibilities (for example childcare/home schooling demands). Even before the pandemic, the Unit supported flexible working arrangements to allow for caring duties, religious beliefs and/or other requirements. Remote working has long been facilitated, with all Unit meeting rooms equipped with video conferencing allowing off-campus attendance. Job adverts/further particulars include a statement that welcomes enquiries about part time working. The Unit currently has academics with workloads spanning 0.6 to 1.0 FTE, reflecting personal circumstances or the adoption of new roles. Study leave is usually taken during the academic year, but requests to carry over (up to 10 days) and consolidate blocks of research time can be made. Study leave is also accumulated during maternity and sick leave.

2.5.3. Career pathways for part-time and fixed-term staff

Part-time and fixed-term staff are afforded the same rights and privileges, including pro rata study/research leave and holiday allocations, and are closely mentored through our research groups. They have the same opportunities for promotion and other formal recognition. The University's academic promotions system rewards research, teaching, and knowledge exchange equally, and there are robust systems to consider individual circumstances, including part-time worker status or maternity leave.

We recognise that obtaining research funding with a contract that may be less than 3 years can be challenging. Such staff are encouraged to apply as co-investigators to help them to establish their research in the Unit and build a case for a permanent contract. The route from fixed-term to permanent employment has applied, for example, to **Chatterton** who was appointed as a fixed-term lecturer to support chemistry teaching and was supported in maintaining his research in dietary iron availability and drug delivery mechanisms. **Chatterton** is now permanent staff within the Unit and has an active lab and PhD student.

2.5.4. Support for research

The Unit has a dedicated research budget to support staff and PGRs. Requests for travel funding to research conferences or workshops may include extra costs, for example those incurred due to disability or caring responsibilities. To ensure fair allocation, the awarding panels are regularly trained in unconscious bias and fair selection. The diversity of staff being put forward for promotion, recognition, and new senior roles is regularly monitored. In the case of caring responsibilities, temporary or permanent workload reductions are accommodated. Up to 15 days' contingency leave per annum is available for cases of sudden and unexpected caring needs (or bereavements, etc).

In the event of long-term absence (e.g., due to sickness), staff and PGRs can use 'Keeping in Touch' (KIT) days and, following their return, have a 'return to work' interview, which ensures that all necessary support is in place. The teaching allocation for academic staff is reduced in such instances, consistent with Institutional policy. Staff and PGRs also commonly have a phased return. Staff health and well-being is paramount, and the Unit seeks to facilitate healthy return to work.

2.5.5 Support for Returning/Disabled Staff

Staff returning after sick leave (including during the pandemic) are offered a phased return over a 4-week period, supported by their line manager and, if required, the OU's occupational health team. The Unit is committed to fully supporting disabled staff and those returning to research following substantial leave, with arrangements agreed on an individual basis and following the OU's agile working policy. This includes support for equipment and software, office space and workload considerations. Individuals also have access to the EAP which offers a range of confidential external support.

2.5.7 Staff wellbeing

The Unit has undertaken several specific actions to create an inclusive and supportive working culture. Organised social activities are inclusive to all staff, post-docs, and PGRs. All Schools have regular informal refreshment break times at least once a day, annual away days, and other social

events. Recent events included workshops on “Grief during COVID-19: supporting our colleagues to return to work and thrive following loss” and “Handling Challenges in COVID-19 for parents and children”. In addition to the EAP, colleagues are supported by Wellbeing Champions. These are staff members (academic and non-academic) who provide a range of support to bolster staff wellbeing. Unit staff are also supported via monthly contact with their line managers to ensure wellbeing.

Due to the pandemic, the OU campus closed in March 2020 and remained so until a phased return programme began in July when individuals could present a business case for permission to work on site that was assessed in terms of criticality and safety. Priority was given to time- and resource-dependent work, such as that of final year PGRs, who were allowed on site for lab-based work. The Unit introduced a range of mitigations to help staff and students cope with these circumstances, including:

- Provision of IT equipment to enable home working and to maintain PGRs supervision continuity.
- PGRs and post-docs unable to work or struggling financially were assisted with paid consultancy projects aligned with their studies, [such as contributing guidance articles on COVID-19](#) and performing survey work.
- Staff mental health and wellbeing has been monitored through regular personal calls and informal online ‘coffee meetings’.

2.5.8 Equality and Diversity in the REF submission

The ten-member A3 Strategy Panel reflects the diversity of the Unit’s staff in terms of gender, career experience, and research discipline, and was audited on inception to ensure representation of Unit cohort diversity with respect to protected characteristics. All Unit staff involved in REF decision making attended mandatory Equality & Diversity workshops led by Advance HE in 2019 that included:

- Equality Legislation
- Embedding equality and diversity in REF2021
- Unconscious bias (particularly in selecting staff and outputs)
- Developing individual and institutional actions and strategies to minimise bias in REF2021 decision-making.

The Unit staff submitted to REF2021 were identified as having significant responsibility for research and research independence through the University’s REF2021 Code of Practice. Staff had opportunities to submit information about personal circumstances that impacted on their ability to undertake research during the REF period. All the outputs from every member of the Unit were equitably assessed for submission. Each research output was evaluated by at least two Panel

members and two external consultants using published REF guidance. Of the outputs selected for submission, 38/78 (49%) were published by female colleagues.

3. Income, infrastructure and facilities

3.1 Income

During this assessment cycle, the Unit has generated £88k income per FTE. The Unit has had particular success with charity sector bids (e.g., Wellcome Trust, Autism Speaks, Bardett Trust for Nursing, Well Child, Association for the Improvement of Mental Health, The Batten Disease Foundation). In addition, the Unit has received funding from Research Councils (EPSRC, BBSRC and MRC), as well as EU/UK Government bodies and industry/other. The Unit has implemented several strategies to increase both bidding activity and success rates, including:

- Enhanced peer mentoring.
- Internal peer-review of research grants.
- Strategic provision of seed funding for pilot projects.
- Focus on interdisciplinarity.
- Drawing on HWSRA support (see below).

An example of enhanced peer mentoring and pilot funding that generated follow-on funding is a grant surgery scheme led by **Wallace** (Professor, who mentored **Lucassen**; Senior Lecturer) with HWSRA pilot funding (~£4,000) for an [LGBT+ youth mental health pilot project](#). This pilot led to a successful Medical Research Council (MRC) Public Health Intervention Development Scheme application to co-design an online rainbow wellbeing toolkit to promote wellbeing and resilience in LGBT+ adolescents. **Wallace** will continue to mentor **Lucassen** (first UKRI grant) for the duration of the project.

Examples of funding which evidence the breadth of Unit research activity and funder diversity include:

Crea:

- Cancer Research UK (CRUK) Early Detection Grant (Epigenetic enrichment of circulating tumour DNA for prostate cancer detection; £100k).
- CRUK Drug Discovery Grant (lncRNAs as novel therapeutic targets in neuroendocrine prostate cancer; £238k).

Male and Romero:

- EU Innovative Medicines initiative Im2pact consortium partner (Examining 3D hydrogel models for transcytosis of drugs, nanocarriers and viral capsids; €9M).
- EU PGRs training program (Btrain; £174k).

Bootman and Rietdorf:

- MRC Crack-it consortium partners (Examining alveolar macrophage function in response to particulates; £1M).

Lucassen:

- Canadian Institutes of Health Research (CIHR) e-therapy project partner (Making I-SPARX fly in Nunavut; CAN\$1,258,424/£700k).

Mitchell:

- British Academy participatory action study (Improving mental health and wellbeing within marginalised communities in Guyana; £50k).

The Unit's efforts to diversify funding sources have also led to increased commercial partnerships. For example, **Male** and **Golding** are collaborating with Midatech Ltd on the use of gold nanoparticles for drug delivery across the blood-brain barrier and irradiation of cancer cells, with Midatech providing a one-year research assistant salary and a PhD studentship (~£250k). This collaboration has resulted in 7 peer-reviewed publications so far and a patent covering the use of nanoparticles for CNS therapeutic agent delivery with **Male** as a co-inventor.

A patented brain endothelial cell line, developed by **Romero**, has been distributed freely to more than 200 research groups worldwide to investigate pathogenic mechanisms of diverse neurological conditions including Alzheimer's disease and multiple sclerosis. This '*in vitro* human blood-brain barrier model' has generated >£225,000 of royalty income in 2014-2018 through licences and/or agreements with commercial companies.

A pan-university Research, Enterprise and Scholarship team facilitates OU bidding strategy. It oversees the OU's bid management system and works closely with Faculty-based research management teams, which support the bidding process (e.g., budget preparation, infrastructure needs, etc.) and post-award administration and impact development.

3.2 Infrastructure

The OU has made significant investment in research during this assessment period, particularly in initiatives (e.g., HWSRA) that support collaboration across the University as well as externally. The Unit has received £567k from the Faculty to support PGR work, new equipment, conference travel and publishing, and £150k from the University to develop impact arising from research.

The Unit has well-equipped molecular and cell biological laboratories, and an electron microscopy suite that supports both biomedical and materials science within the OU and collaborates with external users. New equipment obtained in this assessment cycle includes touchscreen chambers for behaviour monitoring, a high-throughput multi-colour plate reader, refurbishment of an

electrophysiology suite with new equipment, and a high-speed fluorescence imaging system. The Unit has a dedicated animal unit with staff who, working with **Taylor**, have made significant contributions to [improvements in animal welfare and the 3Rs](#).

The OU supports laboratories through a centralised system. Apart from positions explicitly funded through research grants, all laboratory staff are centrally supported and managed. This arrangement promotes interdisciplinary collaboration, increases efficiency, and enables technical support staff to diversify their expertise. A dedicated Head of Laboratory Facilities oversees laboratory operations, and within the Unit, four laboratory managers have responsibility for seventeen permanent technical staff and two fixed-term apprentice technicians. All facilities are equitably available to staff via web-based booking forms that are monitored by lab managers. The effectiveness of our centralised system was proven during the rapid changes required to keep laboratories running during the pandemic.

3.3 Collaborative use of research infrastructure and benefits in kind

During this assessment period, the Unit has set up an imaging facility to support widefield, confocal and super-resolution imaging of living cells and tissues. The imaging facility has been used as a demonstration site for companies including Leica and CoolLED, which has led to equipment loans or purchases at significant discount. In addition, access to confocal microscopes within the imaging facility has been given to researchers at other HEIs (e.g., Anglia Ruskin University). The Unit has benefitted from in-kind assistance, including:

- Free provision of a novel LED-based fluorescence microscopy illumination system (~£10k) by CoolLED Ltd following training of their staff by **Bootman**.
- **Banks'** access to early versions of wearable technology via collaboration with Samsung.
- **Golding's** open access to X-ray irradiation machines at Northampton General Hospital
- Assistance with publication charges for collaborative outputs with industrial partners.

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

4.1 Research collaborations

Support mechanisms for research collaboration development are detailed in Sections 1.3 and 3.1. Unit staff are supported through the HWSRA as well as funding within Schools and the Unit, and have developed high profile research partnerships with national and international colleagues including:

- **Waights:** EU-funded PROGRESSIVE PROJECT, which includes academic partners (UK, Italy), client organisations (AGE PLATFORM EUROPE, European Health Telematics Association (EHTL), and numerous standardisation committee partners.

- **Heath:** NC3Rs CRACK-IT Solution team collaborating with the Universities of Durham, St. Andrew's, Edinburgh and Bristol and an industrial partner (Certain Indexes, Ltd) evaluating automated behavioural analysis techniques.
- **Lucassen:** CIHR-funded e-therapy project with York University, the University of British Columbia and University of Ottawa in Canada, and the University of Auckland and Massey University (New Zealand) as well as First Nations communities in Nunavut.

Unit staff support the OU's Affiliated Research Centre (ARC) programme, whereby research institutes that do not have degree-awarding powers adopt OU PGR policies and register students with the University. The Unit's staff scrutinise PhD project proposals in their area of expertise, student applications, monitoring forms, chair vivas, and conduct regular on-site visits to ensure compliance with UK QAA regulations. In this REF cycle, 23 ARCs across 4 continents were supported with 355 doctoral degrees awarded.

4.2 Development of impact

The Unit's forward-planning approach to impact development is detailed in Section 1.3, resulting in staff routinely mapping impact progression as part of their research programme development. The Unit's approach to generating impactful interactions with users of its research and other stakeholders is showcased in the impact cases submitted to REF2021. In addition to the submitted impact cases, the Unit's impactful research includes the following examples:

Golding has established quarterly research exchange meetings with MKUH, which have led to a clinical trial using a fluorescent dye that accumulates in cancerous cells and allows breast cancer margin detection during surgery. Similarly, **Banks** has developed a network centred around cardiology at MKUH, which has led to collaborative work on [detection of cardiac arrhythmias in patients](#). These efforts have broadened the clinical conduit available to the Unit.

Crea has developed an extensive collaboration with the biotech company Volition. This began with enquiries from the company about products used in **Crea's** research programme and has developed into a partnership developing a research evidence base for new products in preparation for their marketing. **Crea's** engagement has led to developments of Volition's business model and an expansion of their product range.

Through [cross-faculty engagement with colleagues interested in mobile health](#), **Banks** began developing interactions with manufacturers of wearable health monitoring devices to help optimise and evaluate the robustness of their measurements.

Being at the UK's principal online HEI, the Unit's staff have longstanding expertise in developing research-informed distance teaching and training materials. For example, **McMullan's** research expertise in host-pathogen interactions informed a Dangoor-funded online Badged Open Course 'Understanding Antibiotic Resistance' (2,789 enrolled learners). This led to **McMullan** participating in a project, funded by the Fleming Fund, to provide and test approaches to antimicrobial resistance (AMR) education that would change working practices amongst professionals in AMR surveillance-related roles in low- and middle-income countries (LMICs).

Following a pilot project in Bhutan and Ghana, **McMullan** became the academic director of content on a successful bid (£556,916) to the Fleming Fund to develop, deliver and evaluate online learning materials that address key knowledge and information gaps across 24 LMICs in Africa and Asia. This supported the AMR surveillance capacity building that is critical to tackling the global AMR crisis. Working with the Department of Health, subject experts from universities in 4 countries, and the OU's International Development Office and Institute of Education, **McMullan** developed a broad, online AMR surveillance learning curriculum for use by people (e.g., clinicians, veterinarians, policy makers) working in AMR-relevant roles in the 24 LMICs participating in the project.

4.3 Wider contributions to the economy and society

Examples of impactful contributions to the economy and society that are not captured in the impact case studies include:

- **Lucassen's** long standing research designing interventions to better meet the needs of LGBT+ youth – for example in relation to the SPARX project (www.sparx.org.nz) – which has resulted in further international collaboration with researchers in New Zealand, the Netherlands, Australia, Canada, as well as the UK. The SPARX intervention is available in First Nation languages as well as English, Japanese and Dutch. SPARX has also been recommended as an intervention in the latest [NICE guidelines](#) for the treatment of child and adolescent depression.
- **Oates** led on the development of 'Early Developmental Support' - a module in the NHS Healthy Child Programme (HCP), funded by Health Education England. He was also a co-author of several other modules in the HCP.
- **Oates'** role as the ethics co-investigator on a [project funded by the Lumos Foundation](#) producing evidence for the UN Committee on the Rights of the Child Day of General Discussion (DGD) on Children's Rights and Alternative Care.
- **Crea** has engaged with prostate cancer patient support groups in the Milton Keynes, Bedfordshire, and West Midlands areas to explain emergent understanding of prostate cancer development.

- **Hirst** is a scientific advisor to the UK Fragile X Society, providing expertise on questions and queries arising from published papers and trial results.
- **Ryan's** research funded by the Burdett Trust, in collaboration with the University of Derby, investigated the concept of e-professionalism in the healthcare professions. This research led to two OpenLearn resources: '[The internet, social media and you](#)' and '[A scenario on e-professionalism for nurses](#)'.
- Unit Staff and PGRs are encouraged to make STEM education presentations in local schools and become STEM tutors via the Brilliant Club.

4.4 Engagement with Diverse Communities

Consistent with the OU's societal mission, a fundamental part of the Unit's ethos is to ensure that awareness of our research activity is as broad as possible, and to ensure that the widest range of groups and communities can benefit from it. The Unit therefore actively considers all opportunities and channels through which to engage with different communities, including the importance of appropriate cultural and linguistic adaptation for such interactions. Examples include:

- Production of a user-friendly handbook on the Mental Capacity Act and decision-making developed with people with dementia, also made available in Urdu and Polish, as part of an ESRC-funded research project (**Boyle**).
- **Lucassen's** work on the SPARX project which has produced a self-help intervention for adolescents with depression and subsequently refined this for under-served populations (e.g., LGBT+ youth and First Nations youth in Canada).
- Co-production of mental health resources with different communities in Guyana, including the Indigenous community of Yupukari; an urban group of women in a domestic violence refuge and a rural Indo Guyanese coastal community (**Mitchell**).
- **Garcia's** collaboration with health care professionals and bereaved mothers, focused on reducing perinatal mortality in Pakistani, Bangladeshi and White British mothers that is influencing clinical practice via collaborations with the East of England Clinical Networks.
- Unit members have supported 65 engagement activities since 2015, including public events such as 'Soapbox Science', annual stands at science festivals, 'Pint of Science' presentations, speaking at support groups for patients and families, and articles for [The Conversation](#).

Unit staff have academic advisory roles on numerous media productions resulting from the University's unique 50-year relationship with the BBC, and have generated related freely available content on OpenLearn, for example:

TX date	Channel	Title	Academic(s)	Audience (millions)	Visitors to associated OpenLearn asset
Mar 2014	BBC2	An Hour to Save Your Life	Banks	6.18	18,149
Sep 2014	BBC2	The Wonder of Dogs	Hirst	8.68	9,919
Nov 2015	BBC1	The Hunt	Taylor	39.18	143,685
2015/16 onwards	Radio 4	Inside Science	McMullan Chatterton Johnson	143.17	57,867
2016 to 2020	BBC2	Hospital	Lloyd	22.21	32,578 for 'How healthy are you?' interactive quiz
2016	BBC1	The Big C and Me	Lucassen Draper	5.28	8,529
Sep 2017	BBC2	The Human Body: Secrets of Your Life Revealed	<u>Rostron</u>	5.86	55,857
May 2019	BBC1	Our Dementia Choir with Vicky McClure	Boyle	4.88	3,541
Sep 2019	BBC1	Child of Our Time (co-production spanning >20 years)	Oates	1.36	15,420 for the latest broadcast of Child of Our Time: Turning 20
2018 & 2019	BBC World Service	Health Check	Lucassen	8.0	N/A
2017 - 2020	Radio 4	All in the Mind	Lucassen	8.74	8,545 (for April 2019)
2020	Radio 5	Regular contributions on pandemic and public health	<u>Wimalarathna</u>		N/A

IT and media technicians support events such as practitioner workshops, seminars, webinars and co-production. Web development staff support project websites and archives (e.g., the 'Collecting positive mental health stories' site for the [ARCLIGHT project on community mental health in Guyana](#)). Communications staff assist with stimulating public and policy debate via news items in web, print, TV/radio, and social media.

4.5 Contribution to sustainability

The Unit has a strong track record of contributions to research discipline sustainability, both internally and externally. Within the OU, strategic new appointments, investments in laboratory infrastructure and in digital resources support long-term Unit sustainability. Externally, our

researchers contribute to national and international funding panels, committees, and advisory boards (see Section 4.6), shaping decisions on evolving research priorities and EDIA initiatives that identify and resolve leaks in research career pipelines.

The Unit's agile and contemporary research environment is illustrated by its timely and significant contribution to the COVID-19 crisis with new research projects, educational materials, and national media engagement, which addressed key issues brought to bear by the pandemic. In addition:

- **Golding** initiated a HEIF-funded project involving MKUH and the University of Buckingham investigating risk perception of COVID-19 in healthcare workers. This stemmed from regular research meetings with MKUH in which it became evident that staff who had received a positive antibody test were more likely to ignore social distancing, believing themselves to be non-susceptible. The project will inform staff and patient safeguarding.
- **Romero** is developing a SARS-CoV-2 sewage testing system in Milton Keynes.
- Unit staff have also helped maintain wider research networks, such as establishing a regular [webinar series for the European Calcium Society](#).
- Unit staff have also contributed to the provision of hand gel (made at OU and distributed locally, including to MKUH) and undertaken lab work at COVID-19 testing sites and laboratories.

4.6 Wider influence and contributions to the research base

Journal editing, editorial board membership and publication reviewing include:

European Editor, *Health and Social Care in the Community*, and Editorial Board member, *Disability and Society* (**Boyle**); Associate Editor, *Diabetic Medicine* (**Lloyd**); Editor, *Scientific Reports* (**McMullan**); Editorial Board member, *Action Research* (**Mitchell**); Editorial Board member, *Journal of Child Health Care* (**Simons**); Editorial Board member, *Journal of Cellular and Molecular medicine* and *Biochim. Biophys. Acta* (**Bootman**); Editorial Board member, *Athenian Academic Periodical* (**Vasiliadou**); Academic Editor, PLoS One, and Associate Editor, *Frontiers in Physiology* (**Johnson**); Editorial Board member, *Genes and DNA* (**Hirst**).

Reviewing for journals including: *Science Signaling*, and *eLife* (**Bootman**), *International Journal of Molecular Sciences* (**Crea, Bootman, Golding, Johnson**), *Scientific Reports* (**Hirst, Heath**), *Journal of Behavioural Medicine* (**Lucassen, Lloyd**), *Childhood and Society*, and *British Journal of Developmental Psychology* (**Oates**) *International Journal of Pharmaceutics* (**Chatterton**), PLoS One (**Heath, Johnson, Rietdorf**), *BMJ Open* (**Garcia**), *European Journal of Neuroscience* (**Heath**), *Diabetes Care* (**Lloyd**), *Journal of Psychiatric, and Mental Health Nursing* (**Mitchell**), *Endocrinology*, and *British Journal of Nutrition* (**Taylor**); *Journal of Pain Research* (**Simons**), *BMC Pregnancy and Childbirth* (**Garcia**), *Journal of Affective Disorders* (**Lucassen**), *Journal of*

Advanced Nursing (Wrights), Cancers (Golding), International Journal of Environmental research and Public Health (Vasiliadou), British Journal of Pharmacology, and International Journal of Cancer (Rietdorf).

Membership of professional organisations, prestigious bodies, research funding and review committees include:

British Psychological Society (**Rostron**) Society for Reproduction and Fertility, and Universities Federation for Animal Welfare (**Taylor**); Royal Society of Biology (**Hirst, Loughlin**); Royal Society of Chemistry (**Chatterton, Vasiliadou**), World Psychiatric Association Comorbidity Working Group (**Lloyd**), British Neuroscience Association (**Heath, Banks, Lopez-Cruz**); British Society of Genomic Medicine and Genetics Society (**Hirst**), The British Society for Cell Biology and American Society for Microbiology (**McMullan**); European Networks: BtRAIN and IM2PACT (EU labs) (**Romero**); European Centre for Social Welfare Policy and Research (**Boyle**, expert contributor); European Calcium Society (**Rietdorf, Bootman**); British Society for Nanomedicine (**Golding**); Federation of European Neuroscience Societies and Spanish Society of Psychological Biology (**Lopez-Cruz**), The Physiological Society (**Johnson, Bootman**), European Society of Cardiology Working Group of Cellular Cardiac Electrophysiology (**Johnson**), British Society for Immunology (**Male**), Genetics Society, British Association for Cancer Research, European Association for Cancer Research (**Rigas**).

Membership of review committees/application reviewers, including for RCUK grants and charities such as the NIHR Health Services and Development Funding Committee (**Wallace**); The Neurological Foundation (**Heath**); The Health Research Council of New Zealand (**Lucassen**); Diabetes UK (**Lloyd**); Prostate Cancer UK (**Crea**); King's Health Partners/Guy's and St Thomas' Charity Multiple Long-Term Conditions Challenge Fund (**Lucassen**); the Government of Spain's National Plan for Drugs of Abuse (**Lopez-Cruz**); UNESCO and Newton Fund (**Banks**); NIHR Global Research Fund (**Lloyd**); The Royal Society Newton Award (**Male**); Member of the Society for Reproduction and Fertility Education & Grants sub-committee (**Taylor**) and the Economic and Social Research Council (**Boyle**).

Selected keynotes and invited lectures include:

The Second Digital Child Mental Health Conference, Barcelona, (**Lucassen**); The World Congress of Psychiatry, Lisbon, (**Lloyd**); The British Association of Psychopharmacology (BAP) Annual Conference, Manchester, (**Heath**); The International Conference on Cerebral Vascular Biology, Paris, (**Romero**); The International Symposium 'Atomic Cluster Collisions', Canterbury, (**Golding**); UK-China Mini-Symposium on Electrospinning for Drug Delivery (**Chatterton**); The International Conference on Palliative Care, Belfast, NI (**Banks**); The Horizon 2020, ECMED International training network workshop, Marseille, France (**Romero**); The Diabetes UK Annual Professional

Conference (**Lloyd**); the Technology in Psychiatry conference (**Lucassen**); European Behavioural Pharmacology Biennial Meeting 2019, Braga, (**Lopez-Cruz**); Invited Faculty and speaker - European Society of Cardiology Annual Meeting 2020 (**Johnson**); 2016 Conference of Nursing Homes Ireland Association (**Boyle**); European Society of Paediatric Immunology, and The Peruvian Society for Immunology, Lima (**Male**).

Unit staff have won the Knight's Cross Order of Merit of the Republic of Hungary (**Oates**), the Herald Lifetime Achievement Award (**Roth**), and the Matilda White Riley Behavioural and Social Sciences Paper Award (**Singer**).

The Unit has hosted conferences such as an ECR-focused symposium on the blood-brain barrier in 2019 (**Romero**) and an annual cellular signalling conference (**Rietdorf**, **Bootman**). Unit staff hold honorary academic posts and maintain collaborations at other universities, for example the University of Auckland, (**Lucassen**), Institute of Cancer Research and Barts Cancer Centre, London (**Crea**), Oxford University (**Wimalarathna**), University of Pittsburgh (**Lloyd**) and the New University of Lisbon (**Golding**).