Institution: University of Plymouth

Unit of Assessment: 33 (Music, Drama, Dance, Performing Arts, Film and Screen Studies)

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

Context and structure

This Unit comprises 8 researchers (7.2 FTE) in music, dance, theatre and performance studies. Located in The House, a dedicated performing arts centre on the University campus that opened in 2014, it is part of the School of Humanities and Performing Arts in the Faculty of Arts, Humanities and Business. Our activity is organised and managed through two research groupings: the **Interdisciplinary Centre for Computer Music Research (ICCMR) and Performance.Experience.Presence (P.E.P)**.

ICCMR has an international reputation for innovative research at the crossroads of science, technology, and music in the following, often overlapping, areas: healthcare, neuroscience, artificial intelligence, and music composition and performance with computers. ICCMR is distinctive in that it does not simply seek to develop research in the field of digital or electroacoustic music that is inspired or informed by science but works to impact both science and music. It publishes its findings in peer-reviewed scientific journals (e.g., *Journal of Neuroscience Methods*) as well as music journals (e.g., *Perspectives of New Music*). ICCMR makes science with art and art with science.

P.E.P's research focuses on the following inter-related areas: the performing body and embodiment, site-specific performance, and training practices for and through performance. Its expertise and research outcomes are inflected by the formation in 2017 of **Plymouth Conservatoire**, a partnership with Theatre Royal Plymouth, through which all of the University's undergraduate and taught postgraduate programmes in dance, theatre and performance are now co-delivered. While influenced by the largely vocational and industry-oriented nature of these programmes and their professional and collaborative environment, P.E.P's research is collectively intended to stretch understandings and expectations of performance and discrete genres. The group develops and champions the value of rigorous, reflexive practice-as-research and embodied knowledges at all levels of a research career.

As a whole, the Unit nurtures a dynamic and sustainable research culture and environment by capitalising on broad commonalities and shared resources, effectively allowing for economies of scale and vital synergies, while recognising the specific expertise and unique priorities of each of the two groupings. Researchers in ICCMR and P.E.P co-supervise interdisciplinary research PhDs together, mentor and peer-review funding applications for each other, and collaborate on research and artistic projects. There is a leader for each of these groupings (**Miranda**, **Miller/Matthews**) and a co-ordinator for the Unit as a whole (**Mock**), who work together to steer, mentor and support research and researchers in the performing arts at the University.

Progress against REF2014 Research Strategy

The primary aim of our REF2014 research strategy was to *enable cross- and interdisciplinary research and exchange* to develop novel projects with further reach. One of the ways this has been achieved is through engagement with the University's thematic institutes and centres. The Unit actively collaborates, for instance, with colleagues in the Cognition Institute and the Centre for Health Technology. The latter has led directly to the Unit's EPSRC-funded research project, RadioMe (see below), developed and now conducted with leading dementia researchers in the University's Peninsula Medical School. Another example is our collaboration with the Sustainability Institute on pedagogic research focusing on community engagement and applied performance. Moreover, the Unit's research is conducted within the thriving transdisciplinary environment of the University's Arts Institute (established in 2016) which supports the research activities of more than 200 academics across the arts and humanities, fostering excellence and

reputation by developing and promoting strategic partnerships, collaborations and networking: by offering opportunities for the training and career development of researchers, as well as for public engagement. As its founding Director, **Mock** launched the Arts Institute's research programming with a stand-up comedy performance that explored voice and cultural memory.

Since our last REF submission, the Unit's research has been significantly enhanced through *investment* in infrastructure, human resources, and physical environment; these include a robust and transparent sabbatical programme, increased support for research activity by specialist administrators and research assistants, and a new dedicated building. The opening of **The House** (see Section 3) has been central to the development of the Unit's research culture, and our embodied and applied knowledge generation and presentation. These resources have enabled the Unit to meet its strategic aims to *support the practical application of research findings and methodologies* (see, for instance, discussions of Brain-Computer Music Interfacing [BCMI] technologies and Artificial Intelligence throughout this document) and to continue to *develop and share practice-as-research (PaR) expertise*. During the current REF period, Unit members have composed music for string quartets, orchestra, and individual instruments (**Miranda**, **Matthias**, **Kirke**), two of which have been broadcast on BBC radio; released 3 music CDs (**Miranda**, **Matthias**); produced 3 sound installations (**Matthias**, **Kirke**) and 6 films that have been selected for international festival screening (**Way**, **Mock**, **Kirke**); performed and created at least a dozen live solo or partnered performances (**Smith**, **Mock**, **Miller**); published creative scores and guidebooks, performance writing and novels arising from large scale walking art and heritage projects (**Smith**); and directed, dramaturged, adapted or written 10 theatre productions (**Smith**). We have presented keynote presentations and published extensively on these projects and PaR more generally; have been invited to participate in the Erasmus-funded ADiE (Artistic Doctorates in Europe) project and the EUA Council for Doctoral Education consultation on Doctorates in the Arts, University of Lausanne (2014); and have presented on PaR to the UK Council for Graduate Education Conference on the Future of Arts & Humanities Doctoral Research (2016), as well as leading PaR training workshops at numerous UK institutions, including for the AHRC-funded White Rose Doctoral Training Partnership (2017-2019).

Our prioritisation of cross- and interdisciplinary working and consolidated development of PaR expertise has also been fundamental to meeting our strategic aim to *build a critical mass of postgraduate researchers and supervisory capacity, by developing excellent cohort training and research environment for doctoral students*. The Unit provided leadership in the establishment of the AHRC-funded 3D3 Centre for Doctoral Training, launched in 2014, in collaboration with UWE Bristol and Falmouth University. 3D3 focuses exclusively on practice-research projects in digital arts, design, and performance. The Unit has provided the primary supervision for eight 3D3 PhD candidates (and are supervisory team members for 5 others, based within and without the University), as well as organising annual full cohort residentials in Berlin (2015, focusing on Bauhaus and the Vilém Flusser Archive), Austria (2016, with a focus on Ars Electronica), and Lapland (2017, with a focus on collaborative 'slow' research methodologies). Additionally, since 2014, the Unit has supported three research masters (ResM) programmes, which act as a pipeline for our PhD programmes; 3D3 funded four ResM students within the Unit, 3 of whom have gone on to funded PhD studies at Plymouth or elsewhere. Four Unit members acted as supervisors for the University's Marie Składowska Curie Actions-funded interdisciplinary doctoral training programme, Cognovo (2014-2018), which supported research projects at the intersection of creativity and cognitive sciences. Members of the Unit ran annual workshops as part of the Cognovo training programme, focusing on group creativity, scientific mythologies, practice-research, and collaboration.

Progress against REF2014 Impact Strategy

Our primary strategic aim was *to strengthen the impact culture within the Unit*, which we have done by including discussions of impact potential in research mentoring at all levels; ensuring that 'pathway to impact' statements are integral to personal research plans and internal funding applications; providing both seed-funding and teaching relief for impact activity and evaluation;

employing research assistants to support activities and collect feedback from participants; and resourcing and embedding impact documentation and monitoring procedures (in particular, via the use of VV Tracker software) as an everyday research practice. Importantly, we have also worked as a team to develop clearer understandings of how the Unit's distinct areas of research expertise (in particular, in *music and assistive technologies, site-specific performance, and performance training*) might underpin our engagement with a range of beneficiaries.

Our other aims were:

1) *To strengthen existing and create new partnerships to develop outreach activities and extend the audiences with access to our research and expertise.* During this REF period, the Unit established numerous partnerships, including a formal agreement with Rigetti Computing (Berkley, USA) to develop approaches to making music with quantum computers and to create bespoke programming tools for musicians; this relationship led directly to the QuTune project (see Section 4 below). The Unit led weekly somatic workshops for Age Concern UK to tackle loneliness for two years; partnering additionally with the National Trust, this developed into **Way**'s site-specific, intergenerational dancefilm, *Florentis* (2019), which aesthetically documented a process that combined mindfulness, somatic engagement and movement, and sensorial heritage landscape to promote well-being for elder participants.

2) *To fully exploit University and Faculty-level expertise and resources, including the leverage of internal funding.* In 2019, the University launched The Bridge, to increase the growth, productivity and resilience of the creative economy in South West England. This initiative, for instance, supported the early stages of our Plymouth Labyrinth project (**Smith & Billinghurs**t, 2019), leading to its match-funding by Arts Council England. Through performance walks, workshops, exhibitions and publications, Plymouth Labyrinth facilitated community expression and civic ownership; this led directly to a series of collaborations with a socially engaged arts organisation, Take A Part, and Plymouth Community Homes in areas of deprivation. The Bridge and the Faculty's Small Grants Scheme also seed-funded Compassionate Arts (2018-present), a project which applies **Cahill**'s research on forum theatre to train participants in college and business settings to be more compassionate to peers experiencing bereavement. Working in partnership with St Luke's Hospice as part of their Compassionate City Charter, we have so far trained over 400 people.

3) *To enhance the reach and ambition of our performances and public-facing events by exploiting new, purpose-designed performance spaces and laboratories*. The House is now one of our primary research interfaces with non-academic audiences and participants. For instance, the CD of **Miranda**'s computer-aided symphony, *Mind Pieces*, was recorded at the University in a performance for a general audience (Da Vinci Classics, 2018). We also organise and host events in which overlapping constituencies of artists/performers, researchers and research-users can engage in dialogue and knowledge exchange. These have included the East West Somatics 5-day workshop (**Way**, 2015) and our 'Walking's New Movement' conference (**Smith & Billinghurst**, 2019).

Research & Impact Strategy 2021-2026

In addition to sustaining and building upon the strategic aims of the current REF period, the Unit's *combined* research and impact strategic priorities for the coming cycle are:

1) *To enhance the breadth, quality and impact of our research outputs with a specific focus on **well-being and sustainability**.* To do this, the Unit will prioritise its resources to develop excellent research with a dual focus on resilience and preparing individuals and communities for future challenges (including climate crisis, changing demographics, migration, and social and digital isolation). We will build, for instance, on the knowledge gained through the AHRC-funded scoping project, Sustainable Materials in the Creative Industries (2020-21), for which **Mock** is Co-Investigator. Using and further increasing our extensive range of academic and industry partners, including organisations that represent local communities and stakeholders, we will collaborate on interdisciplinary

research that imbricates research outputs and impact through applied research methodologies and that result in the generation of novel data and demonstrable real-world applications and outcomes.

2) *To consolidate and extend our research about and through **digital technologies**, leading to increasingly discursive public engagement and knowledge exchange through co-production and partnerships*. The Unit will harness our involvement in the outcomes and cohort development of the 3D3 Centre for Doctoral Training; fully exploit the Faculty's new Digital Fabrication and Immersion Lab (See Section 3) and the resources of the South West Technology Creative Network (SWTCN); and capitalise on the opportunities created by the iMayflower project for which Plymouth was awarded £3.5m (£800K to University) by the Department for Digital, Culture, Media and Sport (DCMS) Cultural Development Fund in 2019, to build the city's creative industries sector, its international visibility, and community engagement. The University is working in partnership on this project with Plymouth City Council, Destination Plymouth, Mayflower 400, Plymouth College of Art and the Real Ideas Organisation (RIO), which focuses in particular on establishing a local long term, sustainable strategy for work in and with immersive and digital technologies. Members of the Unit are already benefiting from networking opportunities with the project's key stakeholders and training events that develop cultural leadership and creative entrepreneurship.

3) *To foster an increasingly **diverse, inclusive, productive and inspiring research environment***. The Unit will further establish our profile and distinction in world-leading socially, culturally and technologically engaged research, welcoming visitors and collaborators, and hosting conferences and events, in place and virtually. We will continue to promote co-authorship and collaboration within the Unit, between colleagues with different skill sets and expertise and at different stages of their research careers. We will promote and role-model computer music research for women, to rebalance the gender composition of our PGR community, and hence, the pipeline to professional research careers in the field. We will reflexively decolonise our research practices, and work with the University's Equality and Human Resources Teams, and as members of the Race Equality Charter Self-Assessment Team (SAT), to attract, recruit and support Black and Global Majority heritage researchers.

2. People

The Unit comprises 2 Professors (1 male/1 female), 3 Associate Professors (2 male/1 female) and 3 Lecturers (1 male/3 female). It is slightly smaller than it was in REF2014 when we submitted 9 individuals (8.2 FTE), 4 of whom are also included in this submission; the remaining 5 people have either left the institution or else reduced their contracts to less than .2 FTE. Of the new researchers included in this REF submission, 3 are Early Career Researchers (ECRs) hired during this census period (**Cahill**, **Braund**, **Williams**); the fourth, who was not returned in the last REF, has benefited from careful mentoring, a sabbatical, and internal funding to support their research and impact activities. Members of the Unit work closely and collaborate artistically with 5 colleagues (3.8 FTE) on 'teaching and scholarship' contracts in theatre, dance and music, four of whom were employed since the establishment of Plymouth Conservatoire (some of these posts are part-funded by Theatre Royal Plymouth). They are invited to and made welcome at, all research events, including those focusing on training and career development. When agreed at either the point of employment or during subsequent appraisal processes, they are mentored to develop their research skills and profile; one ECR colleague is currently supported, via teaching relief, to complete a PhD. This also often includes co-authoring and collaboration with other members of the Unit, specifically focusing on professional or pedagogic practise (for instance, **Matthews** has co-authored 3 articles with Ladron de Guevara for the journal, *Stanislavski Studies*, reflecting on Plymouth Conservatoire auditioning practices). During this REF period, **Braund** has transitioned from a doctoral student in the Unit to Deputy Head of School, having published a dozen co-authored outputs.

We actively seek to attract postdoctoral research assistants (PDRAs) to further enrich our research culture. In addition to PDRAs recruited to work on specific funded projects, the Unit has

hosted and mentored two National Productivity Investment Fund (NPIF) Creative Economy Engagement Fellowships (2017-18), including one that focused on immersive environments and serious play to enhance patient-health practitioner interaction. Researchers on fixed-term contracts are members of the University's Researcher Forum; they receive guidance on career options, mentoring toward applications and interview preparation, and benefit from a range of workshops for postdoctoral researchers on all aspects of professional practice provided by the University's Doctoral College. Two of our PDRAs (**D. Williams**, **Moffatt**) were subsequently employed as Lecturers in the Unit since 2014 (including one since the REF census date). Additionally, the Unit appoints Visiting Research Fellows and Professors to extend and complement our expertise. During this REF period, they have included researchers from South Africa, Lithuania, the United States, Brazil, Guam, and Finland, as well as more local appointments (such as applied performance practitioner, David Oddie MBE); all visiting researchers liaise regularly with a named contact within the Unit.

Our research environment coalesces in the two research seminar series organised by ICCMR and P.E.P, in which all members of the Unit (including staff, PDRAs, Visiting Fellows and research students) participate and present ongoing research. Each series meets regularly during term time; 'PEP Talk' seminars have been live streamed since 2017, and both series have run remotely since March 2020.

The School of Humanities and Performing Arts has overarching responsibility for the research planning, budgeting, and monitoring of the Unit and provides a framework for career and leadership development. It funds research, conference presentation and hosting, impact activity, postdoctoral and postgraduate research (PGR) projects and studentships; supports PGR recruitment and completion rates (both of which are among its Key Performance Indicators); monitors and takes action leading to greater equality and inclusion; and, working with a range of institutional departments and initiatives, facilitates an outward-facing culture that can reach and meet the needs of a range of research users. The Unit Coordinator and Leads of ICCMR and P.E.P work closely with the Associate Head of School (AHoS) for Research; these individuals are core members of Research and Innovation; Research Ethics and Integrity; Equality, Diversity and Inclusion; and Doctoral Committees at School, Faculty and institutional levels.

Our staffing strategy triangulates and negotiates the Unit's thematic and methodological priorities, the individual needs and goals of its researchers, and succession planning. We operate a confidential **mentoring system**, with ECRs and new researchers assigned a research mentor on appointment; this is kept separate from appraisal and management processes. All staff produce individual annual and 5-year **research plans**, facilitating the planning of sabbaticals, internal seed-funding, external grant applications, consideration of work/life balance and time management. Research progress is monitored by the relevant research group lead and through a formal annual appraisal system, or Personal Development Review (PDR). Research activity is rewarded through **promotions** processes; during the current REF period, two members of the Unit were promoted to Associate Professor (**Miller**, **Matthews**).

All research staff in the Unit are entitled to a six-month sabbatical every four years, enabling them to undertake primary research and complete major projects. This has directly resulted in three monographs (**Miller**, **Matthews**, **Purkayastha**) and two edited collections (**Williams**, **Miranda**), in addition to several PaR projects, during this REF period. A **workload management scheme** explicitly accounts for research and impact activity, PGR supervision and examination, and research council activity. New staff members receive **remission from administrative duties** for the purposes of research for one year (extended to 2 years for ECRs). Competitive funding is available to support research – for example, to attend conferences, for travel for primary research, reproduction fees, and to seed impact activity; the application process for staff includes identifying alignment with on-going research plans and the Unit's strategic priorities. Professors also receive annual research budgets to develop research outputs, partnerships, networks, public engagement, and funding applications.

The University is committed to complying with the Concordat to Support the Career Development of Researchers and the European Charter for Researchers; our European Commission's HR Excellence in Research Award was renewed in 2017 and reviewed in 2019. Three Unit members (**Williams**, **Miller**, **Matthews**) have participated in the University's year-long **Research Leadership Programme**, developed with, and led by external consultants. Launched in 2018, it comprises a three-day intensive course, four half-day workshops, and a series of one-to-one meetings with the instructors. Additionally, one member of the Unit has been sponsored to complete AdvanceHE's Senior Women's Leadership Development Programme. Complementing the wide range of sessions run by the University's Research & Innovation Directorate and as part of the Researcher Development Programme (e.g., on research ethics and integrity, project management, grant applications and sources of external funding), **training and career development** organised specifically within and for the Unit in this REF period has focused on data management, open access research, knowledge exchange, and media communication. All PGR supervisors, examiners and viva chairs complete mandatory training, including 'refreshers' every two years. To enhance the development of ECRs within the Unit, they are allocated to supervisory teams at the earliest opportunity, working with experienced Directors of Studies who act as mentors.

Acting ethically is fundamental to our approach to respect those with whom we research and collaborate. Research that involves human subjects requires approval from the Faculty Research Ethics and Integrity Committee, which is overseen by a University level committee. All staff and research students are committed to and responsible for ensuring that their work complies with the University Code of Practice on Ethics and Data Integrity, as well as subject-specific ethical guidelines.

In 2019, the School gained the Athena Swan Bronze Award. The submission offered a detailed analysis of the Unit's gender composition and included a review of our REF2014 submission in which only 30% of submitted researchers (36% by FTE) identified as women. The increase to 50% (56% by FTE) in this return reflects the recruitment strategy, leadership development and mentoring practices developed in this cycle. Members of the Unit participated in the establishment of, and remain active in, the University's Women's Network and Mentoring Scheme, and host events for women researchers for the Arts Institute. The University also runs forums to support and empower staff, including Menopause Support, LGBTQ+, Grief and Bereavement, Staff with Disabilities, and Parents and Carers' Networks; a Black and Minority Ethnic network is currently being developed. We work closely with HR to provide support and advice governed by the University of Plymouth's Equal Opportunities Policy on recruitment and promotion, and the Flexible Working Policy. Research managers with responsibility for staff appointments and PGR studentships must complete a 2-day equality, diversity, and inclusion training programme; all other staff complete an online module. 'Unconscious Bias' training is also mandatory for all staff. However, we recognise that we must do much more to raise diversity across our staff cohort as no researchers submitted within this Unit identify as BAME; this is reflected in our priorities and research strategy for the next cycle (see Section 1).

Research students

During this REF period, there have been 16 PhD completions in the Unit (18% greater than in REF2014), with another student completing shortly thereafter. They are currently employed in academic posts at McGill University (Canada), Luleå University of Technology (Sweden), Sheffield Hallam, Plymouth College of Art, Plymouth Marjons, and Leeds Beckett, in addition to 3 at the University. 4 were funded by the AHRC, 1 by the Leverhulme Trust and 7 received University Research Studentships (including stipends at UKRI rates). Additionally, 7 students have been awarded ResMs during the REF census period. 65% of these PhD and 57% of ResM completions in the Unit identify as male; our need for greater gender diversity, within ICCMR, is acknowledged in our 2021-26 research strategy. There are currently 24 active PhD and 14 ResM candidates in the Unit (15% of whom identify as BAME and 62% male), split equally between ICCMR and P.E.P. Unit members also co-supervise interdisciplinary projects submitted elsewhere (in particular, History, Psychology and Art, Design & Architecture).

In 2017, the University's Graduate School transitioned into a Doctoral College under the leadership of **Mock**, with a strategic focus on cohort building in addition to quality assurance and administration functions. The Doctoral College has initiated mandatory supervisor training, mechanisms and timelines for formative feedback, the requirement for gender consideration on studentship interview panels and examination teams, paid parental and illness leaves for PGRs in receipt of studentships, and regulatory changes to further facilitate innovative PaR and enable co-produced theses (two of the Unit's current PhD projects are co-authored PaR enquiries). PGR student progress is monitored through a range of processes including staged milestone assessments, Annual Monitoring, and an online record system called GradBook.

To facilitate postgraduate PaR, the Unit runs an annual series of training events and workshops focusing on documentation, embodied and situated knowledges; students receive technical and resourcing support, and we remain flexible about the presentation of theses in 'non-traditional' forms. PhD candidates have been supported in organising two PaR conferences (including the innovative 2017 conference 'On the Moor') and in curating the PaR Gallery at the 2019 Theatre and Performance Research Association (TaPRA) conference. The Unit also organises interdisciplinary training events (for instance, P.E.P's comedy and climate crisis workshop, hosted with the University's Sustainability Institute, 2019).

Research skills and career development training for PGRs in the arts and humanities is provided by the Faculty, which offers over 30 hours of workshops each year. These activities complement the discipline-specific training sessions that are offered by both ICCMR and P.E.P (compulsory for ResM students) as well as the Researcher Development Programme run by the Doctoral College. The latter currently offers approximately 120 sessions per year specifically for PGRs (all of which have been online since March 2020) and is mapped against Vitae's Researcher Development Framework. During the first 'lockdown' in 2020, the Unit worked with the Doctoral College to offer a range of regular online well-being workshops for PGRs that centred on somatic practices; PEP Talks ran weekly for 4 months, featuring informal sharing of research and discussions of challenges.
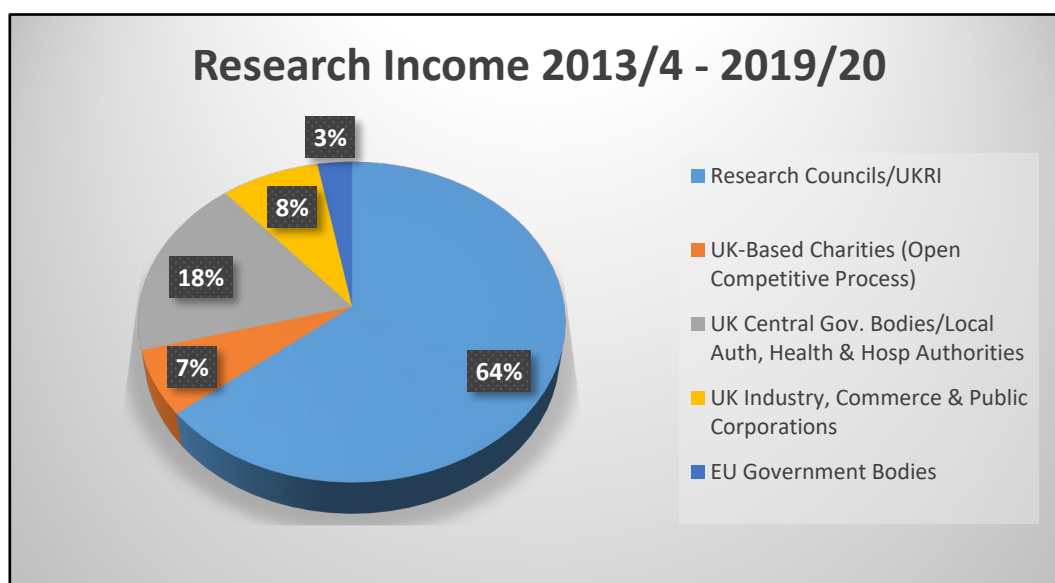
PGR candidates in this Unit participated in the University's Research England Catalyst-funded project (2018) developing peer-support for mental health. Wherever possible, we facilitate teaching opportunities for postgraduate researchers, all of whom are encouraged to undertake training leading to Associate Membership of the Higher Education Academy (HEA). The latter is mandatory for the 4 current researchers in the Unit in receipt of School-funded Doctoral Training Associate (DTA) scholarships, which combine undergraduate teaching and part-time PhD study. All our PhD graduates are entitled to become Alumni Research Fellows for 2 years, continuing to access mentoring, resources and career and skills development support.

The School offers competitive funding opportunities for PGRs to attend conferences (with or without presenting papers) and training events, and to undertake primary and/or collaborative research. For example, Richards was supported to attend the Université Grenoble Alpes' Doctoral Spring School, and Skuse undertook a 3-month placement in the Networked Imagination Laboratory at McMaster University in Canada; Paige participated in an AHRC-funded international placement at the Library of Congress, USA. PhD researchers also benefit from the Unit's partnerships. Antoine was hosted by both the Institute for Research in Acoustics and Music (IRCAM) at the Pompidou Centre and the Laboratory for Research in Computer Science at University of Bordeaux; the latter was part of a long-standing collaboration in which Plymouth contributes expertise in Artificial Intelligence and Bordeaux in audio signal processing. Visi was awarded a Santander scholarship by the University to collaborate at the David Geffen School of Medicine (UCLA) and the Università di Bologna; Visi contributed music and motion-sensing technology for an installation to educate audiences about Amyotrophic lateral sclerosis. Bonet was awarded funding from the American Musical Instrument Society, matched by the University's Roland Levinsky Memorial Fund, to undertake original fieldwork in China and Hong Kong (2018); this enabled her pioneering investigation of the *suona* and the Chinese Orchestra, of which the AMIS had no prior documentation.

3. Income, infrastructure and facilities

Income

The Unit was awarded £911,575 during this REF period. This is approximately 2.5 times greater than the amount reported for the REF2014 census period when 73% of our funding came from UK Research Councils and 19.5% from EU government agencies. Since then, we have worked at both increasing and diversifying our research income. While remaining our greatest source of income at 63% of the total, the amount awarded by UKRI has increased during this REF period; in contrast, in line with our strategic intention, EU funding has largely been replaced by UK charity and government income.

Research Income 2013/4 - 2019/20

- Research Councils/UKRI — 64%
- UK-Based Charities (Open Competitive Process) — 7%
- UK Central Gov. Bodies/Local Auth, Health & Hosp Authorities — 18%
- UK Industry, Commerce & Public Corporations — 8%
- EU Government Bodies — 3%

The Unit's success in increasing and diversifying income is due to several initiatives, including a series of staff development grant-writing workshops with external consultants organised by the Arts Institute; the establishment of a revised internal peer review and mentoring system for all external grant applications; the annual allocation of a strategic seed-funding budget to the Unit by the School to establish partnerships; and teaching relief awarded competitively to individuals to prepare bids. All colleagues have access to a professorial research consultant employed by the School, who has been instrumental in advising on successful bids, as well as a dedicated member of the University's Research and Innovation team, who advises on sources of funding and collaborative opportunities. This Research Funding Manager works closely with us on matters such as costing, the presentation and submission of grant applications, project management, IP and commercialisation. Additionally, the University's KTP Team supports and facilitates our interactions with business, furthering applied research potentials. During this census period, for instance, the Unit worked with Ideal Final Results Consultants, Bristol on the KTP-funded project "Intelligent music composition tools" (2014/15).

In 2019, **Miranda** (PI) was awarded £2.7m (£1.13m of which to the University) from the EPSRC for the project 'Radio Me: Real-time Radio Remixing for people with mild to moderate dementia who live alone, incorporating Agitation Reduction, and Reminders'. It involves three other academic partners (Glasgow, Sussex, and Anglia Ruskin) as well as private and public sector partners (Alzheimer's Society, CereProc Limited, Bauer Media, MHA Care Group, the BBC, Sussex Partnership and NHS Foundation Trust). Employing a commercial bio-bracelet to measure physical signs like heart rate, RadioMe uses Artificial Intelligence to produce personalised reminders, information, and bespoke music to transform the lives of people living alone with dementia. In November 2013, **Miranda and Kirke** were awarded £120k by the Leverhulme Trust to develop a data-driven multi-agent model for studying whale song with colleagues from the University's Marine Institute and St Andrews University. The project

contributed a valuable understanding of how grammars evolved by whales to communicate geographical displacement relate to human languages. The team is now further developing the model to track the migratory behaviour of whales in relation to increasing ocean plastic pollution. In 2020, the School provided funding for the Unit to engage in focused discussions with community stakeholders and socially engaged artists in Devon and Cornwall; this led directly to our Coxside Smoke Signal Project, funded by the Being Human Festival (**Smith**), to co-produce and test place-based social-making practices within the limitations of Covid-19 in a community that lacks digital access and a history of digital engagement.

During this REF period, the Unit engaged in several ongoing funded projects. These include the EPSRC-funded **'**Brain-Computer Interface for Monitoring and Inducing Affective States' project (£370k), completed in 2018 and discussed in Section 4 below; an AHRC ECR Fellowship for **Matthews**' 'Anatomy of Performance Training' project (resulting in the publication of a monograph, 2014); and EU Culture Programme funding for a project with partners in Greece, Spain and Turkey, entitled 'Heaven on Earth?' (**Mock and Way**) which resulted in a film made in partnership with Plymouth's LGBT advocacy organisation, Pride in Plymouth, a symposium, and a book chapter on community filmmaking. **Williams** was awarded the inaugural Jazz Research Fellowship (2015) by the Ella Fitzgerald Charitable Foundation and the Jazz Education Network. **Matthias** received funding from Arts Council England (ACE) for the *Fathom Project* (2018), a large-scale sonic installation which immersed visitors in a living underwater sound-environment. **Smith**'s PaR performances, events, creative writing and guidebooks have been funded by ACE, the National Trust, Carleton College (USA) and Tracing the Pathway (Milton Keynes). Unit members benefit from the University's partnership in the Research England-funded South West Creative Technology Network (SWCTN: https://www.swctn.org.uk), which brings together academic and industry organisations to expand the use of creative technologies in South West England. As a SWCTN Automation Fellow (2019-20), **Braund** received a £15k R&D bursary to investigate the ethics of developing new types of computers to create music with biological materials.

Infrastructure and facilities

We have excellent facilities in which to develop and present practice-led and art-science interdisciplinary research in the performing arts. The House, a £7m investment by the University, was built to the highest technical and sustainable specifications to provide world-class facilities in South West England. It features a flexible, fully accessible 200 seat theatre, a white box studio and rehearsal studios, offices for staff members in the Unit, and research laboratories. The latter include computer workstations configured for music research, a state-of-the-art Brain-Computer Interface laboratory, and a bio-lab equipped to develop bio-processors. The Unit is supported by three dedicated technicians (with specialist expertise in lighting, digital technologies, or sound). Since the outbreak of the Covid-19 pandemic in 2020, the theatre and rehearsal studios have been further enhanced with video technologies to enable multi-perspective remote and physically distanced performance work.

The facilities in The House are supplemented by additional music rooms on campus, and the resources in the iconic Roland Levinsky Building, which include three further theatre and dance studio spaces, a cinema, a large public atrium in which performances take place, and a Digital Fabrication and Immersion Lab. The latter, which opened in 2019, features virtual reality suites and is available to industry and civic organisations to support our partnerships in the city and regionally. The University provides up-to-date IT infrastructure, both in terms of hardware and often highly specialised software, for each staff member. The Seale Hayne Library on campus has substantial print, digital and online resources and provides regular e-resource training sessions for staff and research students. The Unit works with a dedicated subject librarian and benefits from an allocated acquisitions budget and unlimited interlibrary loans.

One of the main ways we develop and sustain relationships with research users is by working with the public engagement and programming element of the Arts Institute (formerly Peninsula Arts: https://www.plymouth.ac.uk/students-and-family/arts-institute-public-programme). Our

annual Contemporary Music Festival – described as "an epicenter for musical experimentation and research into far-out sonification and musification techniques" (*Vice*, 2015) – is a platform for Unit members to showcase their research. Examples include the performance, *Fast Travel* (**Kirke**, 2015), arising from the Leverhulme-funded 'Whale Song' project, in which computer-models of humpback whales interacted with live musicians. In 2019, the Festival featured the premiere of *Lampedusa* by **Miranda**, performed by the BBC Singers, and directed and choreographed by theatre and dance colleagues. This opera – which was recorded live in The House and subsequently broadcast on BBC Radio 3 – includes materials composed with software developed by ICCMR to sonify high-energy particles collision data from CERN's Large Hadron Collider, thus opening accessible, public conversations about how the blurring of art and technology might contribute to the development of new musical languages. In 2020, when it was not possible to hold the Festival, the Unit hosted an online event in the Arts Electronica 2020 AI x Music Festival, organised in collaboration with the European Commission as part of the STARTS initiative, for a global audience.

The Arts Institute is pivotal to the music scene in South West England. In addition to the Contemporary Music Festival, it plays an active role in university/community musical organisations (such as the Choral Society and Doctors' Orchestra) and leads workshops and lectures for Children's University. In 2019, the Musical Director of the Arts Institute, Robert Taub, launched the Musica Viva Concert Series, presenting world-class musicians in public performances, open rehearsals, and informal talks; the inaugural concert was by the London Mozart Players. During the pandemic, Taub has hosted live streamed Music Forums featuring performances and informal conversations.

The city of Plymouth is currently undergoing a remarkable cultural regeneration, and the University is a major partner in this process. A new, multi-million-pound, high profile arts and heritage centre, The Box, opened in 2020 (funded by a consortium including the University, Heritage Lottery Fund, Arts Council England, Wolfson Foundation, Interreg and the BFI). Located across the street from The House, it features 13 galleries and exhibition spaces, and research facilities that include a dedicated room for the University. Here, researchers in the Unit can access the collections of Plymouth City Museum and Art Gallery; the Plymouth and West Devon Record Office; the Local History Collections of the Central Library; the South West Film and Television Archive (SWFTA); and the South West Image Bank. Members of the Unit are involved in the curation of The Box's contemporary programme of exhibitions, installations, and performances, which is informed by academic research.

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

Collaboration

The Unit contributes to the health of our disciplines in key areas such as practice-as-research, art/science/technology, and training and techniques for well-being and enhanced quality of life, often in the context of civic engagement. Central to this vision is the extension of its **international network of research collaborations** to further enrich the creative culture of the region in both its own interest and for the wider stakeholder community. During this REF period, for instance, we have collaborated on **interdisciplinary research projects** with Tchaikovsky Moscow State Conservatory, focusing on music and biology, which led to a concert at the Symmetry Festival in Vienna in 2016. **Miranda**'s residency at the University of Regensburg's Institute of Medical Microbiology and Hygiene (2017), which included the musification of DNA molecules, led to the development of software used to compose a piece called *Artibiotics* for percussion ensemble and electronics, premiered by Ensemble Bash in The House (2018). In December 2020, ICCMR was awarded £200k by the UK National Quantum Technologies Programme to develop QuTune, a bespoke Quantum Computing programming toolbox to help musicians engage with emerging, transformative technology. This is a collaboration with the Computer Science department at the University of Oxford, and industry experts at Rigetti Computing, inMusic, and Spotify.

The EPSRC-funded "Brain-Computer Interface for Monitoring and Inducing Affective States" project with the University of Reading, University of Bordeaux I and the Norwegian Center for Technology in Music and Art (NORTAM), led to the creation of a system made with gtec, a manufacturer of biotechnology, which enabled individuals suffering from severe motor impairment to participate in musical performance. Using this technology, **Miranda**'s composition, *Activating Memory* (2014) was performed by the Bergersen String Quartet together with 4 patients from the Royal Hospital for Neuro-disability in London, with which the Unit continues to collaborate. The piece won a special mention by the jury of Medicine Unboxed Creative Prize (2014) and was shortlisted for a BASCA Composer's Award (2016). Subsequent funding from Volvo facilitated the development of a prototype for and with Rosemary Johnson, a former violinist of the Welsh National Opera Orchestra. Paralysed in an accident, this BCMI system enabled her to play music for the first time in 30 years. Johnson's performance using this technology, broadcast in a documentary about the research project for Sky Arts, contributed to her receiving an MBE for services to music (2017).

We also develop and sustain relationships with partners by **hosting and organising events, symposia, and conferences**. During this REF period, these have included 'The Jean Genie: Why Jean Genet Still Matters. In Plymouth (And Lots of Other Places). Right Now' (2014) with Plymouth Arts Centre as part of the EU funded 'Heaven on Earth?' Programme with Odysseia theatre company (Greece), LaMov theatre company (Spain) & Symia dance company (Turkey); the International Symposium on Computer Music Multidisciplinary Research (2015), jointly organised with CNRS - Laboratoire de Mécanique et d'Acoustique (France), as well as a Brain-Computer Music Interfacing satellite workshop; #dataAche, the annual Digital Research in the Humanities & Arts (DRHA) conference (2017); East West Shin Somatics Workshop (Italy, 2017); and the 'Material Medicine: Objects and Bodies' conference with the Association for Medical Humanities (2019).

Contribution to research base

Our Unit contributes to the development of our disciplines by **leading and participating in national and international networks and organisations**. In 2018, **Mock** was elected Chair of the Theatre & Performance Research Association (TaPRA), the leading research organisation for the field in the UK, since when she has responded on behalf of the discipline in national consultations; pursued an agenda of de-centring, anti-racism, accessibility, and increasing support structures for precarious and independent researchers; and overseen its transition to a limited company with robust international connections. **Williams** is a member of several AHRC and Canadian Social Sciences and Humanities Research Council networks including 'Jazz and Everyday Aesthetics', 'Collaborative Sound Recording and Music Marking', and 'Songwriting Studies.' **Purkayastha** was elected to the Executive Committee of the International Federation of Theatre Research (IFTR) in 2015. As a PhD candidate, **Bonet** was the Royal Musical Association's Research Skills Officer.

We contribute through **research council activity** as members of the UKRI Future Leaders, AHRC, EPSRC, Danish Council for Strategic Research, and Austrian Science Fund (FWF) Peer Review Colleges, as well as the AHRC Translating Cultures Research Innovation Grant Panel (2014). We have reviewed funding applications to Fundação para a Ciência e a Tecnologia (Portugal), Fonds Wetenschappelijk Onderzoek Research Foundation and Fund for Scientific Research (both Belgium), and the AHRC Collaborative Doctoral Partnerships scheme (2015).

Unit members have undertaken **PhD external examining** for 36 different universities since 2014, including 4 universities in Australia and one in Ireland. Other activity includes external consultancy for the Research Quality Review at University College Cork (2015) and institutional review of postgraduate research at University of Central Lancashire (2017), and as external member of the professorial appointment panel at Middlesex University (2016-2019); we have also provided reviews for 12 professorial applications at other institutions. We have been **Programme Committee members or paper reviewers** for 15 international conferences, including Biotechnology (Rome, 2019); the International Conference on Evolutionary and

Biologically Inspired Music, Sound, Art and Design (Leipzig, 2019); Workshop on Functional Art, Music, Modelling and Design (Missouri, 2018); International Workshop on Musical Metacreation (Paris, 2016); International Symposium on Electronic Art (Vancouver, 2015), and the International Joint Conference on Artificial Intelligence (Buenos Aires, 2015).

We actively participate in editing and publishing contexts. Until the end of 2014, **Mock** was the **series editor** of Intellect Books' Playtext list of plays & theatre writing. We have reviewed book manuscripts for 7 publishers. **Williams** is the co-editor of *Jazz Research Journal.* Unit members serve on the **editorial advisory boards** of 12 peer-reviewed journals, including *Choreographic Practices*; *Organised Sound*; *Leonardo Music Journal*; *International Journal of Unconventional Computing*; *Journal of Sonic Studi*es; *Contemporary Music Review*; and *Studies in Theatre & Performance (STP)*. During this REF period, Unit members have edited special issues of *STP* and *Scandinavian Journal of Tourism and Hospitality* and have **peer-reviewed articles** for over two dozen journals including *Journal of Colloid and Interface Science*; *Theatre, Dance & Performance Training*; *Journal of Dance and Somatic Practices*; *Computer Music Journal*; *Theatre Research International*; *Journal of Interdisciplinary Voice Studies*; *International Journal of Performance Arts & Digital Media; Contemporary Theatre Review; Research in Drama Education*; and *Modern Jewish Studies*.

Members of the Unit have presented 24 **keynote presentations** during this REF period. *Internationally*, these include invited lectures and workshops in France, Brazil, Italy, Germany, Ireland, Spain, Portugal, the United States and Lithuania. *Nationally*, they include keynotes at conferences on horror and tourism, computer simulations of musical creativity, psychogeography, queering ritual, interspecies creativity, and feminist interpretations of Woody Allen, in addition to PaR methodologies. **Mock** was appointed Distinguished Speaker in the Humanities, University of Windsor, Canada (2015). **Miranda** has presented invited papers and research seminars at many institutions including Tufts, Berkeley, Harvard, Northeastern, Oxford and Milan Universities, University of the Basque Country, Juan Crisóstomo de Arriaga Music Conservatoire, and Laboratoire Bordelais de Recherche en Informatique.

Contribution to culture, society and creative economy

Members of the Unit develop **critical and creative engagement with non-academic audiences** by discussing their research in contexts such as b-side Festival (2015), NeuroTechX, London (2016), the Royal Institution (2017), London Jazz Festival (2017), Cut Festival, London (2017), The Hypatia Trust (2018), Welsh branch of British Computing Society (2018), and the British Film Institute (2019). ICCMR has raised **public awareness of Unconventional Computing** for musical applications, such as the development of electronic components grown out of biological material, including a slime mould known as Physarum polycephalum. Our creation of, arguably, the first-ever musical biocomputer was showcased in performances in the award-winning documentary*, The Creeping Garden* (2014), and extensively featured in the **international press**, popular science magazines like *New Scientist* (2017), and arts and culture programmes, such as Jarvis Cocker's on BBC Radio 6 (2015). In 2016, **Miranda** was an invited speaker at the EG Conference (USA), joining Sir David Attenborough and Nicholas Negroponte, founder of MIT Media Lab, to discuss boundary-pushing technologies that reveal insights into the natural world.

We **contribute to regional, national, and international cultural ecologies and economies via the presentation of our applied creative and practice-as-research**. Unit members often perform at high profile and prestigious *international* venues. In 2019, **Miranda** performed at the Ars Electronica Festival (Austria), for which he was awarded an Honorary Mention by Prix Ars Electronica (out of 8000 entries from 82 countries) in the Artificial Intelligence & Life Art category, and by STARTS for the European Commission's grand prize for projects integrating science and technology. He has performed concerts at Beyond Festival, Karlsruhe, Germany (2018); Mainly Mozart, San Diego (2015, 2017); Festsaal of TU Wien, Vienna (2015); Sunset Center, Carmel-by-the-Sea, USA (2016); and Das Musikinstrumenten-Museum, Berlin (2014).

Smith has been dramaturg, co-writer, or co-adaptor for 10 productions by TNT Theatre/American Drama Group Europe (Munich) since 2014, each of which has toured extensively (including to China, Turkey, Peru, Hungary, Japan, Slovenia, Singapore, Israel, Vietnam, Spain, Cambodia, Austria, Columbia, and Chile). These productions – such as, *Dracula and the Eco-Warrior* (2016) and *Free Mandela* (2019) – have played in over fifty countries to audiences of approximately 200,000 (half of whom are estimated to be between the ages of 16-18), and give expression to social-critical thinking, often in countries where anti-democratic and authoritarian forces play significant roles. *My Sister Syria* (2017), a thriller co-written by Smith drawing attention to the refugee crisis provoked by the war in Syria, was a collaboration with Arab artists; it was performed in English and Arabic on a 7-month tour for schools and general audiences across Europe, focusing on locations where Islamophobia is rife.

Films made by the Unit have similarly aimed to affectively share minoritised or marginalised lived experiences, including neurodivergence, to foster discussion and empathy. **Kirke**'s film *Buddha of Superposition* (2017), made in collaboration with mental health professionals about the experience of psychosis, was an official selection at 8 international festivals, a finalist at the Alternative Film Festival and Philip K. Dick European Film Festival, and semi-finalist at Los Angeles Cinefest (2017). **Kirke**'s short narrative film, *The Boat* (2018), about early-onset dementia, was an official selection at the FICSAM International Mental Health Film Festival and the Cutting Edge Film Festival. **Mock and Way**'s film, *Heaven is a Place* (2014), screened at festivals in Germany, Poland, and the United States, as well as on the 'big screen' in Plymouth while the city's inaugural Pride parade processed underneath (2014). **Way**'s other collaborative, intergenerational dance films, which focus thematically on social inclusion and ageism, have been screened at the Kino der Kunst Festival, Munich (2017), On Art Film Festival, Poland (2020) and the InShadow Festival in Lisbon (2020).

On a *national* level, **Miranda** has performed the outcomes of his research at the Music Tech Festival, London (2014) and **Kirke** at the Victoria and Albert Museum (2014). **Smith** has led hundreds of participants in numerous performance walks and talks, including for Tracing the Pathway (Milton Keynes, 2016), Bethlem Gallery (Kent, 2016), Cultural Action (Llandudno, 2017), Pacitti Company (Ipswich, 2017), Porthmeor Studios (St Ives, 2018) and, with Billinghurst (P.E.P Alumni Research Fellow), for Common Wealth Theatre (Cardiff, 2019) and Celebrating Island Culture (Isles of Scilly, 2019). The Unit contributes to international festivals and events that take place locally, including the Port Eliot Festival (e.g., **Kirke**'s *Sonification of David Bowie*, 2016), Atlantic Festival, and Mayflower 2020, as well as for important local arts events such as the Plymouth Fringe Festival and Plymouth Art Weekender (both of which feature significant programming in the House, as well as practice-as-research by members of the Unit).