

**Institution: Queen Mary University of London**

### **1. Context and mission**

Queen Mary University of London (QM) aspires to achieve the highest standards of world-leading research, combined with a distinctive educational provision. The University is located in East London and has a research profile geared towards tackling the most challenging local and global research problems, by drawing on disciplinary strengths and interdisciplinary approaches across three Faculties (Humanities and Social Sciences, Medicine and Dentistry, and Science and Engineering). QM's distinctiveness derives in part from being a research-intensive university that is proud to attract students typically under-represented at similar universities: 70% of our home student population are BAME, over 50% are the first in their household to attend university, and one-quarter of undergraduate students come from households with taxable annual incomes below £10k. Over 160 nationalities are represented in our student and staff communities: QM is a truly diverse university and its inclusive vision is central to its academic mission. With its roots in four historic colleges in London, dating back to 1785 when the London Hospital Medical College was founded, the University has a long tradition of commitment to research addressing continually changing local and global challenges. In REF2014, QM was ranked 5<sup>th</sup> among multi-faculty institutions for the proportion of world leading and internationally excellent research outputs and 9<sup>th</sup> on overall GPA. This outcome resulted from sustained investment in research excellence and infrastructure which built upon the results of RAE2008 (ranked 13<sup>th</sup> overall). QM has therefore become a leading global research-intensive university, joining the Russell Group in 2012.

The University's aim in relation to research is to be "recognised for our distinctive, world-leading curiosity driven and applied research, and [to] ... continually build our research capacity for social, cultural and economic impact". QM's mission, which builds upon the University's origins in one of the most deprived areas of the United Kingdom and its commitment to social justice and widening opportunity, is "to create a truly inclusive environment, building on our cherished cultural diversity, where students and staff flourish, reach their full potential and are proud to be part of the University". Dedicated to the public good, the University aims to "generate new knowledge, challenge existing knowledge, and engage locally, nationally and internationally to create a better world."

QM is submitting to 20 Units of Assessment in REF2021, reflecting similar disciplinary areas returned to REF2014, except for Film which is returned for the first time as an independent submission. With 19,232 undergraduate and 5,995 taught postgraduate students, 1893 registered PhD researchers, and 1,041 (FTE) REF-submitted staff, the University also contributes to and co-ordinates eleven externally funded Doctoral Training Partnerships (DTPs) and Centres for Doctoral Training (CDTs). The number of doctoral awards per annum has grown from 261 to 335 between 2013/14 and 2019/20, and HESA-returned research income has grown from £87M to £115M per annum. Around one-fifth of the University's total income of over £500M was derived from research activity in 2019/20.

## 2. Strategy

QM is committed to the pursuit of world-leading research that draws on its historical strengths in social justice, public engagement and innovation to create a distinctive research mission focused on high-quality research and impact on local communities and national and global challenges. The University's research strategy (refreshed as part of the institutional 2030 Strategy) is underpinned by five key principles:

- Attract the best researchers from around the world, and develop staff and research students to become world-leaders in disciplinary and interdisciplinary research and innovation.
- Significantly increase external research funding from multiple national and international sources.
- Provide a world-class virtual and physical research infrastructure, available to all researchers, supported by internal and significant external funding.
- Produce world-leading research outputs as assessed by our peers, with a focus on global and local economic and societal impact.
- Regularly assess how we support, review and undertake research to foster diversity and inclusion and ensure that research practice is of the highest quality in terms of research ethics and integrity.

These aims have enabled a significant expansion of research activity over the REF2021 period, with the University achieving a 32% growth in research income to £115M (2019/20) and the second-most field-weighted citations in the Russell Group (2018/19). Significant strategic investment in early career researchers (ECRs) for REF2021 has involved 16 "strategic lectureships" in the Humanities and Social Sciences, 15 academic posts in Medicine and Dentistry, and the recruitment of 77 new ECRs (over £5M investment) in Science and Engineering. Research income growth and research outcomes are associated with significant institutional investment, elaborated below in Section 4 including research equipment, doctoral studentships and internal funding aligned to support and incentivise success in external research grant applications. These successes are based on the development of world-leading disciplinary research activity within the three Faculties and a strategy for enhancing interdisciplinary research across them.

**I. Enhancing interdisciplinary research.** It has been a strategic objective to promote interdisciplinary research in five targeted areas across the University since REF2014, with the aim of stronger positioning in relation to both the changing external research funding environment and contemporary challenges by building on existing strengths:

**[1] Ground-breaking research in the Life Sciences.** Developed from earlier pump-priming investment of £1M p.a. from the University and the Wellcome Trust, QM has built on recognised strengths in Life Sciences through active partnership with Barts NHS Trust (Barts Life Sciences (BLS)) and Genomics England (GeL; hosted on our Charterhouse Square campus). Our strengths include:

- high value and unique digital clinical datasets mobilised for research into direct healthcare;

- unique research access to a diverse local population, with BLS having representation of a large proportion of the world's gene pool on its doorstep (67 languages, 97 nationalities) and strong community links through QM and Barts Health Trust, which have enabled unique linked life-course health datasets;
- deeper patient characterisation, remote sensing and molecular pathology; and
- bio-medical samples suitable for clinical research studies including multi-omic research.

QM has invested further in Life Sciences research and innovation over the last 5 years, comprising:

- £58M on infrastructure at the Whitechapel campus supporting the commercialisation of research and delivering translation into prevention and treatment (£40M to create the QM Bioincubator, creating 450 jobs in 4 years).
- £15M to create a Digital Environment Research Institute in 2020 (focused on digital health and related industries).
- £3M matched investment to create a University Enterprise Zone.
- £17M driving new knowledge generation in Life Sciences (including £5M contribution on projects, studentships and centres, £5M for Life Sciences-focused Alan Turing Institute (ATI) activity, contribution towards £5.5M investment from the Wellcome Trust to train 25 Life Sciences PhDs, and contribution to the £54M Health Data Research UK project).

**[2] Strategic investment in Data Science and Artificial Intelligence research.** In 2018, QM joined the ATI as a partner and established the mechanisms to co-ordinate world-class research activity in Data Science and Artificial Intelligence across the University and with industrial partners. The ATI partnership represents a major five-year £5M committed investment in advancing the University's contribution to Data Science research. There are 46 ATI Fellows across the University and 7 ATI PIs. Our membership has already led to new grants totalling £28M arising from collaborations with the ATI, including the largest (£9.2M) and most ambitious humanities and Data Science research collaboration in the UK (PI, Ruth Ahnert (Department of English)).

**[3] Significant investment in interdisciplinary global challenges research.** Recognising the complex nature of many of the major international development challenges today, QM facilitates outstanding research across a wide spectrum of disciplines and endeavours to deliver maximum impact to developing countries, via the Global Policy Institute. Reflecting existing expertise, the strategic focus has been on (a) sustainable health and well-being, including harnessing the University's established presence in laboratories and clinics in sub-Saharan Africa, as well as involving collaborations across Medicine and Dentistry with Drama and Geography in Brazil and Zimbabwe; (b) the Resilient Futures initiative with Indian partners, including British Academy-funded research on gender-based violence; and (c) forced displacement and refugee crises, which builds upon involvement in the London International Development Centre Migration Leadership Team's formulation of a research strategy on migration and forced displacement for the Economic and Social Research Council and Arts and Humanities Research Council. QM researchers have already secured multiple Global Challenges Research Fund (GCRF) awards totalling over £30.8M.

**[4] Interdisciplinary research across Medicine and Dentistry and Science and Engineering.**

This has focused on four areas:

- Genomic Medicine research involves building closer links with GeL, which the University has hosted since 2013 and provided scientific leadership to (Sir Mark Caulfield, Co-Director of QM's William Harvey Research Institute, is Chief Scientist). GeL is transforming the application of genomic medicine in healthcare by delivering the 100,000 Genomes Project.
- In 2016, with HEFCE funding (£5M), the Centre for Population Genomic Medicine was established under QM leadership (partners KCL and UCL). Its major programme is focused on the Wellcome Trust-funded (£2.5M; renewed with £4M in 2018) East London Genes & Health consortium, one of the world's largest community-based genetics studies, improving health among local East London populations. Genomic Medicine research has been integrated with Functional Genomics establishing a group of experts in epigenetics, chromatin biology and genome-editing.
- The Materials Research Institute (MRI) is an interdisciplinary institute involving collaboration across science and engineering and dentistry fostering research and industrial collaborations, including with the Thomas Young Centre, a multi-institutional London network for materials modelling. Three MRI Fellows appointed in 2016 have attracted over £1M in research income and developed the Engineering and Physical Sciences (EPSRC) funded (£2M) CAM-IES network with Cambridge, UCL and Newcastle, leading to the award of £11.8M in new, collaborative research income.
- The cross-Faculty Centre for Inflammation and Therapeutic Innovation (CiTI) (established 2014) has led to two endowed chairs from Versus Arthritis UK, a Wellcome Trust investigator award (£1.2M), a doctoral training programme with UCB Pharma, two clinical lectureships (£1M) and a partnership with the Centre of Excellence for OA Pathogenesis with the Kennedy Institute in Oxford.

**[5] Establishment of an Institute for the Humanities and Social Sciences.** This was formed in 2018 as an interdisciplinary research platform across humanities and social science disciplines to support:

- a major investment in 16 new academic positions for leading ECRs with dedicated time for interdisciplinary research;
- a Large Grant Seed-corn Fund and an Early Career Workshop Scheme, providing competitive support to pump-prime externally funded research applications;
- a longstanding successful Distinguished Visiting Fellowships Scheme promoting visits of up to 15 non-stipendiary fellows per year, associated with the award of two prestigious British Academy Global Professorships since 2019 (Nicola Piper and Michael Gamer; £1.5M); and
- 17 interdisciplinary Faculty research centres and initiatives leading engagement with the creative economy (e.g. Network – Centre for the Creative and Cultural Economy), global development challenges through arts and cultural practice (e.g. Peoples' Palace Projects), and cultural institutions (e.g. Centre for Studies of Home).

**II. Research impact strategy.** QM's long tradition of impact stems from its original commitment to social justice and embedding research in our local communities, from becoming in 1785 England's first medical school providing healthcare to deprived communities in East London, to its 19<sup>th</sup> century origins at Mile End as the People's Palace providing culture, entertainment and education to the local population. The University supports, and is a pioneer in, the widest range of research impact: public engagement involving local communities and young people (e.g. award winning Legal Advice Centre providing free research-based legal advice to local communities, and the Centre of the Cell, the first science education centre to be set inside working laboratories), informing policy communities in government, civil service and political spheres (Mile End Institute), highly successful technology transfer and spin-out activities bringing innovations to market (Apatech and Actual Experience plc), and strategic research partnerships with cultural organisations, businesses and charities (e.g. the Centre for Studies of Home).

Since REF2014, significant investment has enhanced support for research impact (section 4). Priority areas have been in global and UK policy, public engagement, health, and technology innovation. An intellectual property policy, approved in 2014, sets out an incentive-based approach to fostering researcher innovation, ensuring that this work is both recognised and facilitated, with the benefits flowing directly to the innovators and their School/Institute, as well as the University as a whole.

**III. Research integrity.** QM is committed to producing world-leading research conducted with the highest standards of integrity. The University has adopted the commitments of the UUK's Concordat to Support Research Integrity and the Concordat on Openness on Animal Research, and is a signatory to the Animal Research: Reporting of InVivo Experiments guidelines. Research integrity is overseen by the Vice-Principal (Research and Innovation). The Ethics of Research Committee provides monitoring and approval of research ethics applications, and oversight of ethical issues to ensure that appropriate systems are in place and necessary precautions and actions are taken to preserve the very highest ethical standards. The University Council's Audit and Risk sub-committee monitors reporting on research integrity and research conduct. The University's Senate has recently reviewed QM's policy on research misconduct, and the Deputy Dean for Research Integrity in Medicine and Dentistry was appointed in 2019 to implement a proactive approach to research integrity training and mentoring for all students and staff. Underpinning our commitment to the fair and transparent evaluation of research quality, the University became a signatory of the San Francisco Declaration on Research Assessment in 2020 and has embedded its principles in all research and HR processes.

**IV. Open research.** The University is fully committed to the principle of open access to its research and underlying data. In 2015 the University developed an open access policy and an online repository to enable open access to its research outputs and data. The University's Research Data Access and Management Policy (approved 2013) commits researchers to offering such data for deposit either in an institutional or appropriate external repository, in accordance with best practice and funder/ethical guidelines. The UKRI open access publication block grant is administered via a dedicated Library research team. Open data has been a key focus on the University's membership of the Science and Engineering South Consortium (e.g. conference hosted, 2018),

and leadership on the development of UK-wide open access policy was provided via membership of the Open Research Data Taskforce by a former Vice-Principal (Research).

**V. Future strategy.** Building upon these research strengths, QM has recently developed a new strategy for research as part of its 2030 Strategy. The priorities are to deepen cross-Faculty interdisciplinary research, via the establishment of new University Research Institutes (URIs), to work with a wide range of national and international partners to achieve world-changing advances with impact, and a range of initiatives seeking to expand the inclusivity of our research agenda.

The first of the URIs, the Digital Environment Research Institute, was established in 2020 with a £15M investment in new facilities. The University is presently developing the second phase of these institutes. Each institute will have investment in core staffing and in unique research infrastructure and facilities to attract the best research teams from across the University to produce paradigm-shifting innovations.

The University will continue to drive multidisciplinary research across disciplines, also with industrial collaborators and with heritage and social enterprises, ensuring recognition for our active and leading contributions to regional innovation and place-based research engagement agendas.

### 3. People

The University's 2030 Strategy commits us to being the most inclusive university of its kind. This commitment is embedded in an approach to people in which equality and diversity are at the core of everything that we do.

**I. Staffing strategy and support.** At the core of QM's research strategy is recognition of the fundamental contribution that world-leading and high-quality research staff provide towards the University's success. Part of the University strategy is to recruit the highest calibre of researchers and to support their career development. QM is a signatory of the Concordat to Support the Career Development of Researchers, and is working towards its implementation. The University's support for research staff has been independently recognised (QM has held the HR Excellence in Research Award since 2012). In 2018, the University signed the UK Technician Commitment, underpinning commitments to career development, visibility and recognition of technician communities. Our institutional support for the career development of all researchers involves significant investment, success in external fellowship applications, and the implementation of mentoring schemes designed to support those moving to an independent research career. Funding for ECRs over the REF2021 period has involved 12 British Academy Post-Doctoral Fellowships, 29 Leverhulme Early Career Fellowships, 9 ESRC post-doctoral fellows, and 16 strategic lectureships in Humanities and Social Sciences. The School of Medicine and Dentistry has an established ECR investment programme with 14 new staff in 2014 and 15 in 2020 who have been mentored through a dedicated programme, along with externally-funded ECRs, and raised almost £10M in UKRI and other research grants. A fellowship forum in Science and Engineering provides support for more than 60 fellowship holders, including those funded by UKRI, ERC, Royal Society, Royal Academy of Engineering and Leverhulme Trust, as does a post-doc and fellows network in Medicine and Dentistry. €13M has been received to support 66 Marie Skłodowska-Curie fellows across QM over the assessment period. Regarding mid- and later-

career scholars, the University supports four British Academy research fellowships, and has secured two of 30 available British Academy Global Professorships, four UKRI Future Leaders Fellowships, one British Heart Foundation professorship, and four ERC Advanced awards.

**II. Supporting equality and diversity.** Equality, diversity and inclusion are fully embedded in the research environment. The Springboard mentoring programme supports women researchers and since 2008 Science and Engineering has been engaged in the WISE (Women in Science and Engineering) initiative - a networking platform for female students and academic staff to provide career mentoring. Staff at QM are members of the Aurora women's leadership programme. Other initiatives to promote EDI objectives include sponsoring Black, Asian and minority ethnic (BAME) staff for the Stellar HE Leadership scheme, introducing a Dignity Disclosure Officers scheme, establishing a BAME staff network, and supporting an LGBTQ+ staff network. The University has also partnered with leading London universities to establish B-MEntor, a mentoring scheme where senior academics from four London institutions mentor BAME academics. In addition, discipline-specific mentoring programmes are also organised by all three Faculties.

The diversity of our staff helps us to attract the highest calibre researchers from a wide pool. 20% of REF-submitted staff self-identified as BAME, increasing from 17% in 2017/18. The proportion of female staff has remained at 35% over the last 4 years. A revised equality, diversity and inclusion (EDI) governance structure implemented in 2019 reflects the University's commitment to supporting and enhancing EDI objectives. EDI considerations are embedded throughout University structures and processes. EDI governance is led by the Vice-Principal (People, Culture and Inclusion), Faculty academic leads and School/Institute EDI committee chairs. An EDI steering group chaired by the Vice-Principal provides strategic oversight and monitoring of EDI objectives. This governance structure has been enhanced through the development of a Values in Action framework setting out expected staff behaviours, and rolling out of Active Bystander and unconscious bias training, providing staff with the tools and confidence to intervene if behaviours do not align with QM values.

The diversity of the University's staff is strongest at mid-career levels (25% BAME and 44% female compared to 17% BAME and 31% female at senior level in 2020). Consequently, a key EDI objective is to improve the representation of women and BAME academics at senior levels. In recognition of this and earlier staff promotion outcomes, an academic promotions review undertaken in 2019 led to strengthening the diversity of promotions panels, increasing external scrutiny across the Faculties, and monitoring the consideration of EDI issues throughout the process, with further changes relating to criteria, transparency and training implemented for 2020/21 onwards. Positive action, including the use of 'equal merit' approaches, is being applied to enhance the diversity of senior appointments, alongside enhanced support for leadership development and career support across all levels.

QM holds 12 externally reviewed inclusion and diversity awards – including an institutional Silver level Athena SWAN award, 6 bronze and 3 silver Athena SWAN awards at School/Institute level – and is a Stonewall Diversity Champion. The University sees accreditation as a means to promote further action and not as an end in itself. The University has set an institutional KPI of increasing women and BAME representation at senior levels with targets in areas where they are low, such as for women in Science and Engineering and for BAME staff in Humanities and Social Sciences.

QM publishes annual reports on the BAME and gender pay gaps and has established an action plan to address gaps. The University's 2019-20 reporting showed an annual reduction in the median gender pay gap to 9.8% and a mean gap of 15.8%. The ethnicity pay gap showed an annual reduction in the median to 14.9% and in the mean to 20%. Both pay gaps reflect the over-representation of men and white staff in more senior roles. The University is building on earlier initiatives through key objectives and KPIs in its People, Culture and Inclusion plan in order to address these differences. QM has signed up to the Race Equality Charter as a further mechanism to promote change. Staff experiences are captured biennially via the Careers in Research Online Survey, and the Principal Investigators and Research Leaders Survey, as well as by the staff survey. The most recent (2019) staff survey's results are being acted on by a task and finish group chaired by a member of the Senior Executive Team.

Reflecting our commitments, the University has fully embedded EDI objectives into REF2021 preparations, including pro-active encouragement of confidential staff circumstances disclosures, recognition of this in setting of staff research expectations, ensuring the diversity of the staff base is represented as far as possible in the selection of the strongest research outputs and impact case studies, and annual equality monitoring.

A range of HR policies and programmes support staff development and EDI objectives. Academic staff are eligible to apply for sabbatical research leave (one semester in every seven), core hours (10am-4pm) working patterns have been established, and workload models reflect the needs of different disciplines in the management of staff loads and in achieving sufficient research time. Annual appraisals and personal research planning monitor progress, as all academic staff are mentored by a senior colleague who discusses research plans, publication and research funding strategies, impact and public engagement. Professional development is provided by the Researcher Development team in The Queen Mary Academy. This includes a wide range of workshops on transferable and core research skills. PhD students who engage with the recommended training are also awarded the Queen Mary Diploma of Researcher Development (Q-Dip) alongside their PhD. In addition, one-to-one developmental coaching and mentoring options are available. Annual research reviews are undertaken in Medicine and Dentistry to mentor academics in relation to research grant income and production of outputs of the expected quality, and personal research planning processes take place in all Schools.

**III. Support and training for research students.** Since 2014 a strategic aim of the University has been to achieve further growth in the PhD community and to enhance the research and training environment for postgraduate research (PGR) students. Since 2015/16 the number of enrolled PGR students has increased by 12% to 1,893 (2019/20). The number of annual PhD awards has grown over the REF2021 period by 28% to 335 (2019/20). The training and research environment for PGRs has been enhanced to ensure that the space, training and development needs of PGR students are met, a major milestone for which was the 2016 opening of the £40.3M Graduate Centre, providing a dedicated space to enable cross-institutional interactions for the PGR community and a physical home for the Doctoral College (DC).

QM's overall diversity is reflected in our PGR community. 37% of the PGR community in 2019/20 were non-EU international students (42% were UK students, 20% were from the EU), 45% were BAME (up from 40% in 2015/16), and 49% were female. This diversity contributes to providing



one of the most vibrant and stimulating settings for doctoral training in the UK. The DC provides information on fair selection, unconscious bias and EDI as part of the PhD supervisor training and directs PhD supervisors to attend fair selection training. All DC and Queen Mary Academy PhD training offered is delivered on a variety of days of the week and inside core hours to improve accessibility and participation. The University has supported the development of a more diverse PGR community, with investment in dedicated BAME MA and PhD studentships in Humanities and Social Sciences, and institutional partnerships with the Chinese Scholarship Council and the Pakistan Higher Education Commission.

The research training environment for PGRs is overseen by the Researcher Development team and the DC, with each Unit of Assessment responsible for its own discipline-specific provision. The DC is led by an academic director working with academic leads (Deputy Deans) from each Faculty and a DC Manager. The DC works alongside the Researcher Development team and with the University Careers department to provide support regarding PGR careers. The DC supports the delivery of three annual interdisciplinary cohort training days, an annual student-led Graduate Festival, and supervisor training. In 2018, QM was awarded HEFCE Catalyst Funding to support PGR mental health and wellbeing through training and support sessions. The DC also supports PGRs via the Postgraduate Research Fund (international conference attendance, research travel, networking and research facilities and equipment access) and the Initiative Fund (training activities organised by PGRs to enhance the research experience).

A central pillar of the research and training environment for PGR students is organised via participation in and training contributions to eleven UKRI DTPs/CDTs. These involve multi-disciplinary collaborations with other universities across London and the UK (e.g. AHRC London Arts and Humanities Partnership; BBSRC London Interdisciplinary Biosciences Consortium DTP; ESRC London Interdisciplinary Social Sciences DTP; MRC DTP with Southampton), and externally-funded (EPSRC) CDT programmes in: "Data-Centric Engineering" at the interface of data science, AI and engineering; media, arts and technology; intelligent games; and AI and music. All enable external funding of PhD projects and training to the value of £12.8M, supporting almost 900 PhD students annually across the partnerships. Approximately 220 funded students via the DTPs generate a funding pool of £2.3M, with additional students being externally funded through international scholarship programmes (e.g. China Scholarship Council), in addition to the £1.4M (2019/20) of institutional funding directed at PGR studentships. QM also leads or contributes to 13 Marie Skłodowska-Curie Initial Training Networks (ITNs) funding a total of 30 students at QM.

#### **4. Income, infrastructure and facilities**

Over the REF2021 period total research income increased by 32% to £115M in 2019/20. The University's 2030 Strategy commits to an additional doubling of research income, alongside significant growth in size and shape, and disciplinary expansion. Critical to this has been and will continue to be the development of interdisciplinary research areas aligned in part to the changing external funding environment and national and global challenges. This will be achieved via the establishment of University Research Institutes.

Since 2013/14 the University has invested £185M in capital infrastructure, which includes major investment in research infrastructure, including the £40.3M Graduate Centre, £32M refurbishment of Engineering (including new and refurbished laboratories), £18M refurbishment of the Mathematical Sciences, and installation of a 15T wide bore magnet and THz antenna measurement facilities (additional EPSRC capital equipment grant of £1.5M). Medicine and Dentistry has raised £6M for investment in the Charterhouse Square campus, and a £3M refurbishment of research facilities in Physics and Astronomy has occurred.

A Research Capital Infrastructure Fund was introduced in 2016 which has provided £8.4M investment in research facilities, supporting cross-Faculty investments, including Advanced Molecular Imaging Services in Medicine and Dentistry, and the CRoss-InstitutE Advanced Tissue Engineering 3-D Bio-printing Lab, plus a range of research laboratory enhancements.

Mainstream QR income (£21.6M p.a.) is strategically distributed to School and Institute budgets, based on research quality, and therefore directly supports the research environment. Strategic grant applications and DTPs are supported by significant institutional matched-funding and incentivisation (e.g. internal funding of associated PGR students; strategic distribution of grant overheads).

**Research impact and innovation** has been supported by an expansion since REF2014 in a core Professional Services impact team of 5FTE, providing support for Faculty impact activity. This central unit is managed by the Director of Research Services, and academic leadership for impact and innovation is provided by the Deputy Vice-Principal Research (Impact), the Deputy Vice-Principal Research (Enterprise), and Faculty Deputy Deans. Impact training and support mechanisms are provided across the University. 37 staff in central teams provide support for business development and innovation activity, including industrial collaborations or research partnerships in the UK and globally. Queen Mary Innovation Ltd (QMI) is the University's wholly-owned technology transfer company, responsible for commercialisation of intellectual property and the portfolio of spinout companies. Over the last five years, QMI has secured 136 commercial licenses with industry to exploit intellectual property, returning over £2.9M of commercial income. QMI runs a Proof of Concept (£560k) HEIF-funded scheme, with individual projects often co-funded via research council Impact Acceleration Accounts. QMI's growing portfolio of high-growth technology spinouts has attracted in excess of £60M of external venture capital investment. Strong performance has been in drug delivery, new bio-materials and algorithm development for commercial applications in the creative arts. Queen Mary BioEnterprises (QMB) Innovation Centre is the largest dedicated bio-incubator in London, fully occupied with a tenant waiting list, creating 450 jobs. QM has recently been named one of 24 University Enterprise Zones to enhance engagement and impact generation with innovative businesses within East London, focused on Life Sciences. £1.5M of funding will allow QMB to provide an additional 1,000m<sup>2</sup> of incubation space.

The award-winning Centre for Public Engagement (CPE) and the Global Policy Institute (GPI) enhance the dissemination of research. CPE was founded as part of a 2012 RCUK Catalyst award. The CPE provides financial support, training and advice. The University's research-informed public engagement has been recognised via the first award within the sector, from the National Co-ordinating Centre for Public Engagement, of a gold Engage Watermark. The GPI draws on

GCRF QR investment to support global policy impact and nine policy fellows. Knowledge exchange is enhanced further via the Centre of the Cell, a science education centre based in the Blizard Institute. It is one of the first science education centres in the world to be located within working biomedical research laboratories and seeks to make a positive impact on the educational, career and health choices of children, young people and families by translating medical and life sciences research (over 70,000 participants since 2013). In 2016 the Centre received an Excellence with Impact commendation from BBSRC.

In Science and Engineering, the STFC and EPSRC Impact Acceleration Accounts (IAA; £260k p.a.) support an annual portfolio of funding to leverage company and government links to deliver research. The IAA focuses on supporting research translation for economic or social impact, facilitating engagements between researchers and external collaborators, supporting early stage commercialisation of EPSRC and STFC research and creating high-value spin-out companies. Between August 2013 and July 2020, our IAA programmes (with additional support from other institutional funding streams (HEIF) which enhance knowledge exchange and impact), have supported 119 projects, resulting in 93 new company collaborations, £800k of cash and in-kind contribution, 36 licensing agreements, 7 spinouts, 9 newly developed products, £400k of income generation, and £7.2M in commercial R&D funding. IAA impact sandpits have facilitated 200+ researchers engaging with 70 external collaborators. Examples of spin-out companies include Apatech and Actual Experience plc (worth £135M; winner of UK IT industry award 2014, PraxisUnico impact award 2014). The success of technology transfer activities was recognised in the Entrepreneurial Impact Ranking (<https://octopusventures.com/entrepreneurial-impact-ranking/>) where QM ranked 4<sup>th</sup> in the UK (2019 and 2020) for production of spinout companies, and successful exits, relative to the total funding received.

Research impact in the Humanities and Social Sciences is supported by three dedicated funding streams (£150k p.a.) focused on (a) the development of new strategic impact activities, (b) investment on the development of collaborative innovative research partnerships with non-HEIs (HEIF-funded), and (c) capturing impact. Collaborative research partnerships funding has produced joint research collaborations with almost 40 non-academic partners and almost £400k in leveraged funding, much of which has been focused on relatively cash-poor arts and cultural organisations. In Medicine and Dentistry, a REF2021 specific impact fund is providing resource to a health economist post to enhance the development of submitted impact case studies.

Key research infrastructure is provided by the Library Services department, including high quality research space, academic information resources, and expert support to staff and researchers. The number of serial titles available has increased by 46% over the REF2021 period, and total spend on all information resources including research monographs and electronic databases has increased by over 53%. QM's archives service achieved accreditation from The National Archives in 2018, and hosts internationally important collections (e.g. Leo Baeck Institute London collection). Investment in staffing includes an increase in the size of a Library research support team from 2 FTE to 9.2 FTE over the REF2021 period.