# Written Evidence Submitted by Queen Mary University of London (DIV0099)

Dear Committee

I would like to thank you for launching this important inquiry into Diversity in STEM. I represent Queen Mary University of London – a leading research-intensive university with a clear aim to be the most inclusive university of its kind anywhere. We have a deep commitment to harness and elevate the best talent regardless of background, and demonstrate that social inclusion and academic success are not mutually exclusive. This core belief is at the heart of our recently launched strategy 2030. We are a community of 32,000 students and 4,500 staff drawn from over 170 nationalities. 25,000 of our students are based on our London Campus and the figures presented in this submission relate to this cohort. Over 90% of our home, undergraduate students are from State schools, 75% are from BAME backgrounds, 51% are the first in their families to enter higher education and 24% are from families where the taxable income is less than £10k/year. The Times Good University Guide 2021 recognised Queen Mary as the most inclusive Russell Group University, and last year the Sutton Trust named us as the best university for social mobility.

Our Faculties of Science and Engineering and Medicine and Dentistry offer a wide range of STEM provision. The Faculty of Science and Engineering consists of five disciplinary Schools including Mathematical Sciences, Physical and Chemical Sciences, Engineering and Materials, Biological and Behavioural Sciences, and Electronic Engineering and Computer Science.  In Medicine and Dentistry offers degrees in Neuroscience and Pharmacology in addition to Medicine and Dentistry. Across these two STEM faculties we have 8,170 undergraduate students, 1,179 postgraduate taught students, 862 postgraduate research students and 856 FTE of academic staff, using the HESA T&R and T only classification.

We would like to submit evidence to the inquiry as we recognise the problems of diversifying STEM are a complex mix of causes and potential solutions. We have been undertaking several initiatives to better understand and address these in our particular context. Our approach is to be open, transparent, and experimental where appropriate, in trialling new ways of delivering our vision to 'open the doors of opportunity'. Therefore, we would like to take this opportunity to outline some of the initiatives we are engaged in, to disseminate what we have learned so far, and to participate in the wider public debate.

**What we observe:**
- Our student population is separated into undergraduates (UG), postgraduate taught (PGT, i.e. Master's students), and postgraduate research (PGR, i.e. PhD students). In STEM subject areas about 80% of the UG population are UK students who pay 'home' fees. The majority (71%) of these UG students are from the London area, whereas 54% of PGR students were resident in London prior to enrolling.

*Table 1* UG, PGT and PGR student population data for students studying STEM subjects and having 'home fees' status. All counts as of 1/12/2021. *The proportion of females in STEM subjects including or excluding medicine and dentistry. †From ONS Regional population estimates 2020; and 2011 census. ††From ONS 2011 census data of London resident adults aged 16-64 with declared DDA disability.

| Home fee students | % BAME | % Black | % Female* | | % Disability declared | % Parents w/o H.E. qualification |
|---|---|---|---|---|---|---|
| | | | (incl. med.) | (excl. med.) | | |
| STEM UG | 78 | 12 | 48 | 43 | 12 | 55 |
| STEM PGT | 61 | 14 | 52 | 30 | 17 | – |
| STEM PGR | 35 | 3 | 49 | 36 | 19 | – |
| London† | 40 | 13 | 50 | – | 15†† | – |

This table summarises proportion of students within each of the listed demographics. Care should be taken in interpreting this data which hides large variations between subject areas within STEM. The last row shows data for the London area and is a benchmark for comparison. The broad conclusions which can be drawn show that:

1. The ethnic diversity of the student population changes dramatically between the UG/PGT and PGR populations.
2. The Black population of UG students is representative of the London ethnic profile, however at PGR level this group in particular is highly underrepresented.
3. The fraction of women taking up PhD studies in STEM subjects excluding medicine falls as the level of study increases.
4. Those who declare a disability on application are underrepresented at UG level compared to the adult (16-64 year old) London population. However, this fraction increases at PGR level, and mostly from those with learning disabilities or mental health needs.
5. Looking at the UG students over the last 4 years, the BAME STEM population has risen from 72% to 78%; the Black population from 9% to 12%; the disabled population has been steadily falling from 16% to 12%, and the proportion of women has remained constant.
6. Looking at the PGR students over the last 4 years, the BAME population has risen from 30% to 35%; the Black population has increased slightly from 1% to 3%; the disabled population has been constant at 13% but rose 19% in the last year, and the proportion of women has remained constant.

Some of these observations are not new and have been widely reported, others are particular to our institution.

- The attainment gap (fraction of UG students with similar entry qualifications obtaining a 1st class or 2.1 degree classification) between BAME students is 3% for the whole of Queen Mary and 7% in STEM subjects, and between men/women in STEM subjects it is 4% showing some fluctuation year-to-year

- The population of academics in STEM areas is different to the student population. 36% of academics using the HESA T&R definition are BAME and 36% are female. Over the last four years the gender split has remained constant but there has been a slight increase in the proportion of BAME academic staff from 33% to 36%.

**What we have learned:**
- More and more our student population question the lack of people like themselves amongst their lecturers and in the academic make-up of the university. Our students in particular are recognising this disparity, as our UG population is markedly different to our academic staff profile which is approximately 36% BAME in STEM areas.

- Academic research careers are impacted by systemic biases in UKRI grant awards affecting recruitment and promotion. These publicly available UKRI data show that BAME researchers tend to have lower success rates (in fellowship applications, or as principal investigators) compared to White researchers. In some funding councils the disparity is as much as 10 percentage points. This means that whereas White researchers have average success rates of 30%, this reduces to 20% for those from BAME backgrounds. This can be simplified to mean the former group on average need to submit three applications for one successful outcome, whereas the latter group typically need five applications for a successful outcome. This has direct implications for recruitment, academic workloads and promotion.

- Our own pilot studies amongst students indicate several reasons that people from underrepresented groups do not continue from UG studies into postgraduate research – part of

the so-called "leaky pipeline". The main causes for not transitioning from UG to PGR study are related to: vocational relevance, financial barriers, academic confidence (i.e. imposter syndrome), and parental advice. These seem to particularly affect women and those from BAME backgrounds.

**What we are doing**

- We have launched a number of pilot initiatives to support the uptake of postgraduate research amongst underrepresented groups. In partnership with IBM we have created a bespoke UG summer research internship programme for STEM students. The research internships are awarded on the candidate's merit and the support and mentorship offered by the supervising academic. Interns join the two-month full-time programme which is supported by a cohort-based weekly enrichment programme designed to develop a broader understanding of research, career choices, transferrable skills and academic confidence. The first cycle of the programme ran in summer 2021 and a report is in preparation.

- We have created a unique doctoral training programme for those people from non-academic backgrounds, i.e. 3+ years out of higher education, or with significant industrial experience in lieu of an undergraduate degree. This innovative pilot programme funded by the EPSRC will train 24 individuals on a 4-year research doctorate in applied research in data-centric engineering, an emergent highly multi-disciplinary field. The programme recruited its first cohort in 2021 having developed a new recruitment model to attract and support applicants through the application and assessment process. The programme is generating much insight into the decision-making process of talented individuals who did not undertake a PhD directly after their UG or Master's qualification. The programme has attracted a very diverse pool of applicants who are almost 50% women and 50% form BAME backgrounds. Early indications are that by targeting this pool of talent and offering them the particular support they need addresses some of the barriers to PhD entry faced by some of these currently underrepresented minorities. A detailed evaluation and benchmarking process will be conducted over the lifetime of the programme, and follow the cohort's careers after graduation to determine the long-term impacts. This exercise will commence in summer 2022 after the initial set-up phase is complete.

- Queen Mary was one of the first universities to offer fully funded PhD studentships specifically to UK BAME citizens. This year 2 such ringfenced studentships in Science and Engineering (with further 2 across Queen Mary) have been offered in addition to over 70 funded positions for eligible home students.

- As an institution we have recognised imbalance in the diversity of our academic and professional staff. In response, the University established a KPI specific to the gender and ethnic staff profiles to achieve 50% (± 5%) women; and 40% (± 5%) BAME staff in leadership roles by 2030. This aim will be supported by a number of specific initiatives and action plans led by each disciplinary area, including ensuring recruitment and promotion panels are aware of UKRI funding success rate disparities; ensuring those panels are diverse and representative of our student and staff cohort and the local community we are within; engaging staff in better career mentorship; and trialling new approaches to address financial barriers to PhD uptake. We are also promoting a new Equal Merit Framework, designed in full accordance with the Equality Act 2010, that facilitates the use of positive action in our recruitment processes, and which has already been used successfully in recruiting a Black Post-Doctoral Researcher in STEM. Many of our academic Schools have expressed an interest in using this framework where appropriate to in order to address areas of underrepresentation, especially in relation to women and BAME staff.

- We are formally embedding ownership and responsibility for the delivery of EDI Action Plans at academic School and Professional Service Directorate level with oversight by Equality, Diversity and Inclusion Steering Group, which is our most senior EDI Committee.

- The Academic Promotions process has been revised to include the creation of new academic career pathways that embed our values through the introduction of new criteria based on citizenship and inclusion.

- Mandatory EDI training in 'Introducing Inclusion' and 'Unconscious Bias' modules have been complemented with targeted EDI training and specialised workshops for those in decision-making roles. We also offer a broad range of coaching and mentoring opportunities as well as 360 Reviews.  We are supplementing our new Introduction to Inclusion training with a more in-depth suite of EDI training, including LGBTQ+ inclusion, disability awareness, race equality and inclusive leadership.

**Recommendations**

- **Encourage Innovation:** Addressing biases in higher education and research is complex and requires innovative actions. The appetite for action can be suppressed or deemed 'too risky' because of a lack of understanding of how to use the positive action provisions of the Equality Act (2010) correctly. By creating innovative solutions, such as an Equal Merit Framework, this can ensure that progress is achieved within the law and shared with others.

- **Illuminate with data:** Public body EDI reporting is a welcome step; for example, we greatly appreciate the UKRI data on grant success rates. However, the annual data from individual research councils often have very low participation form some underrepresented demographic groups. The data are published in anonymised form, rounding numbers and suppressing data where there are less than 5 entries. The reasons for this are clear, however the unintended consequence is that it is not possible to examine grant success rates for those with disabilities in STEM subjects, for example. A simple method to protect identities, and provide useful information would be to aggregate data in rolling 2-year (or 3-year) windows, as well as publishing annual anonymised data.

- **Culture: use positive framing to emphasise that there is no conflict between inclusion and academic excellence.** A clear, consistent, proud narrative, backed up by actions is essential to foster a culture that redefines the reasons for changing entry criteria to academia and research careers. This commitment to reviewing the use of language and the rationale for the actions that are taken to improve access routes should also be extended to defining measures of achievement and success that have hitherto militated against diverse groups and women. Thus, the use of a new positive discourse in government strategy, funding calls and other relevant documentation and communications, could achieve a genuine shift culture.

- **Invest in leadership development and promote inclusive leadership:** it is recognised that many students from Black, Asian and ethnic minority (BAME) groups do not see people like them in leadership positions and so conclude that research careers are not for them. Promote the concept of inclusive leadership, which is an essential skill if our leaders are going to optimise the talent of a diverse pool of staff and students. Active sponsorship and targeted funding for leadership programmes that will have a discernible impact on growing our pool of future diverse leaders would represent an important commitment from funders and BEIS. This could also serve to add prestige to the value of participating in these programmes, perhaps by providing a link to the aims of the R&D Road Map.

- **Demonstrate the range of opportunities that PGR study can open up:** For some BAME students and those from poorer backgrounds, we know there can be pressure to follow vocational career paths and/or those that obviously lead to secure, well-paying jobs. One way we address this is by working with prestigious, well-known companies to offer research internships to undergraduate and postgraduate taught (masters) level students. As a result of these placements, students and their parents have a greater awareness of the variety of roles and opportunities that exist in research careers in the UK and internationally, as well as understanding that research is for people 'like them'. A strong lead from government and funders to drive such programmes would give such initiatives a national profile and prominence that currently does not exist.

- **One very practical intervention to increase participation in PGR would be to increase the stipends PhD students receive through funding bodies like UKRI.** The basic UKRI stipend is £15,609. The average starting salary of a graduate in London is £30,000. For students whose families are unable to offer additional support, significant monetary differences like this makes it very difficult to choose PGR over a well-paid graduate job. Academic careers and their importance to society could be better promoted by extolling the benefits that university research brings to health and prosperity in the UK. The pandemic recovery is a prime opportunity to do this. (Roadmap: "this is not a moment to stand still. This is a moment of great reinvention".)

- **We would also welcome certainty on funding and the commitment to spending 2.4% of GDP on research.** This commitment is an important signifier of the importance the UK places on university research, and signals to potential researchers that universities offer a way for them to have meaningful and high impact careers. It is also important to note that uncertainty on funding undermines this message and may also deter people from committing their futures to a sector where there is insecurity and uncertainty. These challenges are all the more pronounced with the impact of Covid.

- **Facilitating the transition between academia and industry:** We have revised the entry criteria for our PhDs to recognise and credit relevant industry experience and provide additional classes in topics like research methods for people who have not followed a 'traditional' path to PGR. Through partnering with companies, we offer Industrial PhDs to their staff, whereby students pursue a research topic which adds value to their employer and extends the body of knowledge in the area. With support from funders and government, there would be scope to develop and trial PhD apprenticeships, which we feel could open the door to research to many more talented researchers.

I would like to thank you again for your consideration of this important matter. If you would like any further information or clarification, I would be delighted to assist.

*(February 2022)*