Everything you need to know about the REF

"Dear X, I am a PhD student/postdoc. I've heard of the REF, but I don't know much about it. What do I need to know?" — We invite two experienced academics to comment.

Cathy Hobbs is Associate Dean for Research, Faculty of Environment and Technology, UWE Bristol, and Professor of Mathematics. She has extensive REF experience, including of overseeing Units of Assessment at Faculty level.

The REF (Research Excellence Framework) is a mechanism for the research funding agencies of the UK Government to assess the quality of the research going on in UK universities. It is done by subject areas (called 'units of assessment'), of which Mathematical Sciences is one. It takes place every 6-7 years and is used to determine block research funding allocated to each university by the UK higher education funding bodies for the following 6-7 years. It is carried out by peer review of three aspects: (1) a sample of published outputs from each university, (2) brief descriptions of the impact our research has had on the economy and society (Impact Case Studies), and (3) a description of the research environment in each university subject area, including numbers of PhD students, funding won externally, equality and diversity actions taking place, and support for early career staff.

The REF is not an assessment of individuals so you won't need to submit a CV. It is very possible that papers you have authored/co-authored will be put forward within the sample your university will select and submit in December 2020. These can be papers you published before joining your current institution. Your university must submit a sample of outputs 2.5 times the number of full-time-equivalent staff deemed to be independent researchers in each unit (this will not include PhD students but may include postdoctoral researchers). Papers will be individually scored by the expert review panel during 2021, but only a profile of the scores for each unit at your institution will ever be public, not these individual scores. Getting a good overall score is important for your university as it will (1) determine much of its future direct funding (not including competitive funding coming via the EPSRC or Innovate UK), and (2) influence greatly its international reputation and hence its ability to attract research students and the best staff.

You may be asked to provide information about your publications since January 2014, from which your university will then choose a sample of between 0 and 5 to include within the submission.

You may find knowing the REF profile of your current university, or of another university you may be considering joining, a useful way of judging their relative research credentials. Within a subject area it is generally regarded as a reasonable proxy for research quality — not perfect, but a good indicator. But bear in mind that some less research-intensive universities or smaller departments can have pockets of real excellence that the REF score doesn't pick up. Trust your own judgement — metrics aren't everything.

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Every UK institution is concerned about their research performance in the REF, because it brings funding and (importantly) it is a very visible measure of reputation. If your career aim is to get a permanent academic position, it is definitely worth knowing what your contribution to this process will be, and how it is assessed.

You will likely contribute your best research outputs to the REF. In Mathematics, this almost always means published papers (though what counts as an output is very broad, and certainly includes patents, for example). Fortunately for you, a good collection of

outputs for the REF is very similar to a collection of outputs that will impress a recruitment or promotion panel. First, quality over quantity: REF 2021 accepts at most five outputs per researcher, produced since late 2014. Second, well-written: when you write a paper, show your work at its best by taking the time to motivate your results and point out the interesting new tricks and techniques you have come up with. Don't write just for the 20-or-so experts in your sub-area, but for the thousands of interested mathematicians out there!

An aside about writing papers: always acknowledge your funder, and quote your grant number. It is nice to say thanks, and to demonstrate the great things that are coming from the money they are giving you (and so they fund you next time you ask!).

One thing you might not be aware of: there is an open access requirement for (most) REF outputs. The full details are quite complicated (the REF 2021 website has details), but to be sure your output is eligible you should make it freely available on your institution's research repository within three months of acceptance by a journal. An exception to this rule: the journal publisher can impose an embargo period of up to 12 months for Maths submissions. I would

also make a habit of uploading your paper to arXiv: more people will read it.

Another way you might be asked to contribute is by helping to write an impact case study. A case study is a short account that starts with research you have been involved with, and ends with 'impact' (roughly speaking, non-research consequences of your research). Examples of impact might be: outreach activities; a company making or enhancing a product; an organisation changing its behaviour; the creation of innovative teaching methods. Non-examples of impact might be: lots of academic citations, or prizes, for your papers. The REF requires many fewer case studies than outputs, so most people will not be involved in preparing a case study. However, if you are, then it is very important: the impact needs to be well-documented and the links to your research convincing.

Now (I am sure you will not take offence) I am aware that I am replying to a question posed by an abstract ideal of a PhD student or postdoc: you are not a real person. But, reader, you are real. If you are also a PhD student or postdoc, I send you my best wishes for your future research career. I hope it will be as exciting and fulfilling as you hope, and as I know it can be.