My name is Elizabeth Wynn, I'm the Equality and Diversity Manager at the Babraham Institute and today I'm going to talk about bias in academic publishing. So I'm going to cover a bit of the state of bias in publishing in terms of gender and ethnicity, as well as talk about how this arises and then a little bit on the end about what can and what is being done to try to mitigate this bias.

Starting with gender bias in publishing. This is something which has recently become a, quite a bit of interest. A lot of big journals and also smaller more niche things, more niche subjects in journals, have been doing reviews of their publishing and looking into whether the gender of the first and or corresponding author makes a difference in terms of the chance of the article being accepted and the general consensus is that yes, it makes a small but significant difference.

This figure is from the Diversity and Inclusion in Peer Reviewing report from the Institute of Physics. I chose this one just because they had a nice little figure showing that for papers with a male corresponding author it's about 43% chance of being accepted and about 40% for papers with a female corresponding author.

However, as I suggested this finding is replicated across all sorts of different journals. So eLife also did a major review, found the same thing. Royal Society of Chemistry as well. Elsevier published recently a look at the gender landscape and they found that women published fewer papers on average than men.

So some caveats about this. The way that most of these studies were designed, they use an algorithm to determine whether a name is male or female. So that's not going to be perfect. And it also doesn't take into account non binary or trans individuals. A lot of journals are putting in place processes where trans individuals who change their name can get their historical record, like their name changed on previously published papers, but that's not universal yet by any means. So those are some groups that might not be accounted for in this.

Also these types of algorithms don't always work so well on non-English language names. So the authors of these papers had different ways of dealing with that, but sometimes it meant that they just excluded papers from certain countries on the basis that they couldn't accurately determine the gender based on the names there.

There are also algorithms which exist to assign proposed ethnicity or nationality based on name, which seems like it would be much more prone to error to me but apparently it does exist. I couldn't find any good reviews that looked at this sort of thing in terms of ethnicity but I did find from, this is from a review of NIH grants. So NIH in America, when you apply for NIH funding they collect ethnic data along with all sorts of other data. So looking at that in a review paper a group was able to determine the, was able to look at the number of papers that various groups had published and found that Black people especially had fewer papers published compared to their peers.

So as of yet, there isn't a lot of wider analysis of an ethnic or racial bias in publishing. However, you can find a lot of anecdotal evidence about this, especially after the Black Lives Matter movement of this summer. Then you had things like Shut Down Stem and ~~white in the~~ Black In the Ivory talking about their experiences. So a wealth of information came out there.

Here is one example from an article, which I'll be tweeting out later, where the author point out the sort of coded language that she would find in rejections for her papers. So, "I was concerned about the sample and the incremental contribution of the paper… it might be better in a more specialized journal."

So that's just a bit of a summary of the fact that we see distinct patterns of the acceptance and the, the rate of publication varying by categories like gender and ethnicity.

Let's have a look at the publishing process and see where those biases creep in. I got this from the University of California, Berkeley: the publication cycle, as they call it. So first of all creation: research getting proposed, funded and reported on. Evaluation: so peer review. And publication, dissemination and access, preservation. And then reuse: so works getting read, cited and recombined.

Starting with creation: women and ethnic minorities are underrepresented at PI level and they also receive less funding on average, which gives them ~~less opportunity~~ fewer opportunities to publish papers.

When it comes to evaluation: women are underrepresented as reviewers even compared to the general under representation of women in a lot of fields. So in biology, like us, there doesn't tend to be a lot of under representation of women as a whole in biology, but some other fields, like physics, do have fewer women than men. But even compared to that women are underrepresented as reviewers. And there's also a lot of evidence that reviewers favour authors of the same gender and also from the same country.

Publication: as I said earlier, papers with female corresponding authors have a lower chance of being accepted.

When it comes to dissemination and access: theoretically, it should be possible to find information on the number of times a paper is viewed or downloaded or purchased, but I couldn't find a good review of that information divided by any characteristics. But one thing I do have to say on dissemination and access, a bit of good news, is that open access publishing has been shown to mitigate gender based citation bias.

So to talk about that citation bias: male author papers are cited more, especially by men, who also cite themselves more.

So these are the points in the publishing process where gender and other biases can find their way in. And a lot of the time these are really small biases, but they add up and are causing significant differences in the rates that men and women are published.

I'm going to talk more about peer review and citation next.

So when it comes to peer review, editors are more likely to appoint reviewers of the same gender as themselves. And also, they'll assign reviewers papers written by authors of the same gender. So I'm getting the data on the information on this slide from a review of eLife, of journals published by eLife, but again there are other studies which show very similar things.

The eLife review showed that these homophilic tendencies, or a tendency to prefer people of the same gender, are widespread among male editors, but there's a really small number of strongly homophilic female editors, which really skew the trend in female editors.

Men are more successful, that is their papers get accepted more often than women, when the reviewers were all male, but have similar success rates to women when there's a mixed review panel. Interestingly, the acceptance rate for female authors is the same whether the panel is all male or mixed. So it's not that men are discriminating against women, it seems to be more that men are acting, having positive discrimination towards other men. And there weren't enough all female review teams to make any comments about the behaviour of all female review teams.

On another note, papers are more likely to be accepted if at least one of the reviewers is from the same country as the corresponding author. So it's not just gender but country that we're seeing this homophilia, this preference for people who are similar to you.

These are examples of quite probably unconscious, and certainly very subtle, biases. However, there are examples of very overt biases and I have some reviewer quotes now, which I found quite shocking. I'm sure you will as well. So examples of unprofessional peer reviews.

- The author's status as a trans person has distorted his view of sex beyond the biological reality.

- Despite being a woman, the PI was trained by several leading men in the field and is thus likely adequately prepared to lead the proposed research.

- This is obviously written by a group from a lower standardized institution based on the quality of work.

- The author's last name sounds Spanish. I didn't read the manuscript because I'm sure it's full of bad English.

So, quite apart from the widespread unconscious bias which is -

[Someone else's mic is on and there is some background noise at this point.]

Sorry about that everyone.

Yes. So, apart from unconscious biases which cause small, subtle but nonetheless significant differences that add up, there are unfortunately also some individual reviewers, and it's difficult to determine how widespread this is, you have very overt biases as well.

Looking at citation behaviour now.

So this again is something which is seeing in many different fields, many different types of journals. I have some information here from selected journals. So on the left here, this is from the RSC. So looking at chemistry journals papers authored by women, so that's women who are corresponding authors, have lower number of average citations than men.

And on the right, this paper here looked at that neuroscience journals, variety of neuroscience journals and they found that papers where a man was the first and corresponding author were cited more often than expected compared to any other combination of authors, of first and last authors. When they looked in more detail, they found that the genders of the authors doing the citation was actually really important. So on the left we have where the citing authors are both men, the first and corresponding author, and we're seeing a real bias here, an over citation of men and under citation of women. Whereas having a woman as the first or corresponding or both results in much less bias.

You can also add to this the fact that men are much more likely to cite themselves. A review of papers in JStor found that men are 70% more likely to cite themselves than women. So all of this adds up. Citation, one citation leads within the next five years on average two three more citations. So when men are citing themselves more it's not just that one instance, it's the knock on effect that it has as well.

So going forwards, what can be done about this?

A lot of journals which have been made aware of, they become concerned about the bias ~~that is~~ that exists in their publications have committed to things like increasing the diversity on their editorial boards. Since that homophilia is an issue increasing diversity on the editorial boards is an obvious thing to prevent that. Providing resources and training for reviewers to avoid bias. And also avoiding non-diverse reviewer panels. Again, avoiding that homophilia.

As scientists, if you are a reviewer I think being aware of the diversity of the review group. And it's not just gender, though that's the one which is the most obvious and the one which is the most studied, but also for example country.

And finally, as scientists, I think, be mindful of who you cite.

So actually I managed to run through that in pretty record time considering we started late. So are there any questions?