Peer review on ArXiv

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Being a scientist means being a referee. Peer review is a task that is normally fulfilled individually and anonymously — you critically read the paper, do the required background research and write a report. Peer review is also subject to limited scrutiny and, in spite of the American Physical Society having introduced the "Outstanding Referees" programme, in general comes with little freedom and little credit for the referee.

I wondered how this could be improved. Here is an idea for making a start.

ArXiv opens peer review. Everyone with an ArXiv account is a referee, with the obligation to review a minimum of *x* and a maximum of *y* papers per year (*x* and *y* may depend on academic position, number of years active on ArXiv etc., and are set such that the amount of expected reports is a few times the amount of expected papers over a certain period). Referees are free to choose which papers they review and ArXiv introduces an additional line upon submission in which authors can "advertise" their paper to potential referees.

A review round proceeds as follows. After submission of a paper, the ArXiv server collects reports during a limited time interval. At the end of this period, all reports received are sent to the authors who, again within a certain period, have the opportunity to comment on each of them. Both the reports, the author's comments, and the revised manuscript are then published on ArXiv. Unless they request otherwise, referees' names appear on their reports.

I think there would be many advantages to this type of open peer review. For authors, knowing the identity of their referees will make the review process more transparent and the direct communication with them is likely to lead to interesting (open access) scientific discussions. Reviewers can publicly distinguish themselves as high-quality referees (soon, a new index will be invented, quantifying ArXiv reviewers' abilities). Readers will benefit from having additional information on each paper and journals are free to use the reports submitted to ArXiv. For the scientific community as a whole, review on ArXiv will likely reduce the power of journal's editorial boards.

But… isn't there the danger of "review favoritism", i.e. referees preferentially reviewing their friends' papers? Or that referees refrain from being sufficiently critical, e.g. if they are familiar or have collaborated with authors in the past? How do we deal with belligerent referees, that write disrespectful reviews? And what about the additional technical challenges for the ArXiv infrastructure?

Sure enough**,** all these challenges can be mastered: the referee's relation to the authors could be published alongside his or her name. Extending the ArXiv infrastructure likely does not form an insurmountable obstacle. And as to outrageously belligerent referees — authors could for example be given the right to request their identity being made public under certain conditions.

I am convinced that the advantages of open peer review will outweigh the possible drawbacks. It is time for introducing preprint review and creating more freedom and credit for referees.

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