Open Science - Tim Gowers and Michael Nielsen

Links -

1. https://www.ted.com/talks/michael_nielsen_open_science_now
2. https://gowers.wordpress.com/2009/01/27/is-massively-collaborative-mathematics-possible/

This is a reading response to Tim Gowers' article and Michael Nielsen's TED talk on open and collaborative science.

Tim Gowers managed to solve a mathematical problem dubbed 'The Polymath Project ' in the open by collaboratively working with a lot of other mathematicians and common people through a forum. A lot of observations can be made from this. This project also had to suffer the 'chicken or egg' problem - who would contribute first. However , this was soon averted and the project picked pace very quickly. The group of mathematicians managed to solve a harder generalisation of the problem with their rapid cycle of propose - debate - improve/reject.

Firstly , what are the benefits of doing research in the open in a collaborative manner - 1. You are exposed to more ideas than you otherwise would be. 2. Ideas that aren't fruitful can be discarded much more quickly. 3. This allows for specialisation i.e. you can continue doing what you are good at while parts that aren't exactly your expertise can be relegated to people who are good at it. Research done in such a manner will be much faster and productive.

While the benefits are very clear , such an approach has failed more often than it has succeeded. For instance , Quantum Wiki was a project to

consolidate all the knowledge about Quantum Mechanics in a grand repository. It failed because of two reasons - 1. The dilemma of who would contribute first 2. What is the incentive for me to contribute ?

The second reason is a major issue in almost all fields of research. Researchers are rewarded for publishing papers and not for making the research knowledge public or accessible. There is no incentive for them to contribute although they acknowledge that it is a good idea. They could instead be working towards their own research publications. This is a very conservative way of thinking - “Publish or Perish” should go away. Researchers should be recognised for their contributions to making science more open and accessible.

There is also the problem of lack of sharing of data and code among researchers - while some fields have managed to solve this issue to an extent some fields have literally done nothing to do so. I know this from first hand experience during my undergrad at the department of Civil Engineering in IIT Madras. While the research was top notch , there simply was no transparency about the data generated , trials conducted etc. One only had access to published results and papers.

What we should be doing is to create a sense of consciousness among researchers that any publicly funded research should be open i.e. it is the duty of the researcher to make sure that data and results are shared in a transparent and open manner. It is the duty of the funding agencies and the government to enforce this. Human Genome Analysis researchers managed to solve this in the form of **Bermuda Principles - 1. Data immediately uploaded to a public repo 2.Data stays in the public domain.** Every other field should be doing this too.

These are the ways I personally believe the problem can be taken on -

1. Build better discussion places - Tim Gowers managed to do the Polymath Project with a blog but if this is to become a norm rather than a one off instance , we should build mediums that are specifically tuned for this purpose.
2. Build reward mechanisms for effective science communication - A Patreon like project to reward scientists who share data or make research more accessible. Distill magazine is a good example.
3. Build better mechanisms to track people's contributions in an open project.
4. Build reward mechanisms for data sharing - A blockchain based platform where people upload datasets from their experiment and get rewarded when someone uses their datasets.