Open Science

By Tim Gowers and Michael Nielsen

The video and the accompanying article talk about how science should be open and collaborative in nature. Tim Gowers solved a difficult mathematical problem by collaborating with other mathematicians and common people through his Polymath Project. This serves as an example of successful open science projects and a motivation for future projects to come.

Why should one even done in the research in the open ? Science for centuries has operated in a closed model - a lone scientist working in his lab and coming out with a research publication in five years' time. It no longer makes sense. To be able to add a novel idea to the scientific body of knowledge, one needs to be aware of the prior research. As prior research keeps increasing, it becomes increasingly hard for a lone scientist to make truly groundbreaking contributions. What we instead get is an incremental advance that makes it even harder for the next scientist who comes through. On the other hand, multidisciplinary research continues to make novel breakthroughs on a frequent basis. Basically, doing research in the open allows to one specialise in a subfield and collaborate with specialists in other subfields. Moreover , many minds = many ideas. This means that ideas can be debated, improved upon or discarded in a much more faster manner.

The authors point out that this kind of research suffers from two problems -
1. Who should contribute first ?
2. Lack of incentive alignment for contributing.

Researchers are rewarded for publishing works in peer reviewed conferences. This is what gets them grants and tenure. They are not rewarded for making the field more accessible to outsiders so as to solicit novel ideas from them. Moreover , academia's emphasis on the "publish or perish" ideology leaves researchers with very little time to do community building work even if they wanted to. We should build institutions that reward these along with publications in conferences.

Another problem is the lack of transparency in the research methodology - one only gets to see the results but not the process itself. I was a first hand witness to this during my undergrad years at IITM. One simply had no way to know how many trials were conducted and what minor assumptions were made in the process. Genome Analysis research has solved this with the help of Bermuda principles -

1. Data once generated should be immediately to the public repository.
2. Data should stay in the public domain forever.

I believe that every other field should adopt this approach.

My personal ideas in tackling these issues are -

1. Better discussion forums - Polymath project worked on a blog but if this is to become the norm rather than a one off phenomenon, we need to build discussion mediums specifically designed for this purpose.
2. Rewards for effective communication - Distill magazine for machine learning research is a good example.
3. Mechanisms to track people's contributions in an open science project.
4. Rewards for data sharing.