The Research Wiki
A proposal for open scientific inquiry

Background

Science is ideally a process of open, unfettered inquiry, in which all observers are welcome to question received wisdom and present evidence for contrary claims. In practice, however, only a privileged few are allowed to become credentialed scientists, and only they have access to university positions, grant money, academic conferences, and especially to publishing in peer-reviewed journals, which is how scientific claims become believable.

Peer review is comparable to the electoral college: it is intended to prevent chaos by giving veto power to an elite class. Anyone can submit a paper, but it won't be published unless a panel of established academics approve it, just as anyone can run for president, but even if an outsider is elected they won't be inaugurated unless the electors give their assent. The purpose of peer review is to improve the quality of published papers, remove errors, and weed out misguided, unfounded or frivolous work. In practice it can also be a potent controlling process that brings about the suppression of viewpoints that contradict the prevailing paradigm.

The success of open online projects like Wikipedia suggests that a more open process can also provide quality and protect against being swamped with bad material. While peer review is extremely useful and should not be abandoned, the rise of open-access publishing, preprint servers and collaborative environments like the Quantum Wiki (qwiki.stanford.edu) is evidence of a demand for faster, more open exchange among researchers.

If we compare the generation of scientific knowledge to the generation of software, the successes of open-source software, counterintuitive to those who believe that secrecy and economic reward are prerequisites for successful software product development, point the way to similar opportunities in the research world. Science, believed to be driven by the promise of fame and veneration, and pursued in closed labs that protect their investigations from the eyes of competitors, may actually be hampered by these traditions. If science were practiced fully in the open and credit were widely shared among many collaborators, like software it would probably become stronger, more reliable, and more responsive to people's needs instead of being tailored to serve the self-interest of the few who control its direction. As in the software world, "open-source research" may even be able to outcompete closed research and ultimately replace it.

Proposal

We propose to create a medium for open, real-time online collaborative research. Specifically, we envision an open wiki site devoted to a particular subject of research, in which, unlike Wikipedia, users are encouraged to post open questions, new ideas, and notes on original research in progress. In contrast to the current model in which university lab groups do research in secret and announce results to the world when

they are finalized and verified in order to secure credit and researchers' reputation, our proposed site would knit together a dispersed virtual research group, potentially all working together on a daily basis. Credit could be guaranteed by secure recording of times and authors of wiki submissions, and the collaborative wiki editing process would take the place of peer review. Results arising from this process could be gathered into papers and published in peer-reviewed journals, at least those that accept open-licensed submissions, while still appearing on the wiki site as well.

If such a project were successful, it could ultimately come to include virtually all the researchers working on a given set of problems, all participating equally without regard for institutional affiliation. It could easily encompass divergent perspectives and even mutually contradictory lines of inquiry.

The Quantum Wiki (qwiki.stanford.edu) is the closest thing we know of to an open, real-time collaborative online research environment. That site gathers references, knowledge and "lab lore" about quantum physics. It appears to be focused, like most wikis, on collecting established knowledge rather than on working as a sandbox for generating new knowledge. As such, it works with the existing closed-labs model, where our proposal would challenge that model by encouraging existing research labs to open up their process to outside collaboration.

Such an open research wiki might be vulnerable to exploitation by researchers who would follow the online research process and keep their own process to themselves, and potentially publish more and better results in this way. In fact, almost everyone would probably do this to varying degrees. It should be possible for wiki participants to demonstrate priority for anything published on the wiki, however, since dates and authors would be verifiably recorded, so their work would not be stolen. Hopefully, authors of peer-reviewed papers would come to be required to cite wiki-published results when they draw on them. Also, if these online fora become popular there will be a strong sense of social pressure to contribute to them rather than be a "free rider." Again, the success of Wikipedia can be taken as a demonstration that this kind of "cooperation" really is viable.

Ultimately, this open model might turn out to be a potent "disruptive technology" changing the way science is done, by leveling the playing field for gifted scholars without connections and prestigious appointments, and integrating and accelerating the process of collective inquiry.

Flagship project

To test and debug this concept we propose to establish an open, collaborative wiki site dedicated to modeling research (mathematics and simulations) on collective decision making [or collective intelligence?], which is a field we are working in. This would potentially include studies of consensus formation in networks, swarm behavior, and coordination, and might include modeling projects from biology, physics, political science, economics and computer science. Results from anthropology and social psychology would also be relevant. There is also the

possibility of using the wiki to investigate itself, since it is an example of a collective decision making process. [this section could be changed a lot]

Preparatory work

Before kicking off such a project we would need to establish who will do the work, and do substantial work on investigating wiki software and how to guarantee securely-recorded ownership of contributions, drawing clear boundaries around what subjects are to be encompassed by the wiki, deciding on a system of governance for the online community, and negotiating what kind of organization should be created to manage the project and what kind of funding is needed and wanted.