

Science: The perils of sharing

BY FLORIAN FISCH

Can scientists do all their work in the open?
This dream may be too good to be true.

In his book "Reinventing Discovery," Australian quantum physicist Michael Nielsen describes his dream of using online collaboration to "speed up the rate of all scientific discoveries." In his view, publications should be freely available not only for download ahead of print, but the whole process of scientific research should also be completely opened up. It sounds good on paper, but on closer examination this therapy might have some undesirable side effects on science and innovation.

THE IRREVERENCE OF YOUTH

In Nielsen's dream, scientists would model their process on the success of open-source projects such as Wikipedia or the Firefox web browser, in which preliminary results are shared and discussed online. This approach has already had a few successes: a group of mathematicians managed to prove a difficult mathematical theorem collectively on a blog (the Polymath Project).

University of Sydney chemist Matthew Todd has demonstrated that this process can work even for experimental science. With the help of numerous scientists from academia and industry using an online platform, he came up with an improved drug to fight the tropical disease schistosomiasis. Although most of the contributions were improved formulas for intermediate steps in the synthesis of the molecules, par-

ticipants occasionally suggested new ideas. "The project's direction changed by 90 degrees because of a constant flow of advice coming from people with expert knowledge in the area," says Todd. The final paper listed six authors, but acknowledged 28 more, some of whom used only nicknames. One of these, "Guest," is an apt reflection of the anonymity of this particular scientific crowd.

By allowing ordinary citizens to get involved, Todd hopes to harness a new source of creativity. "We all know the best ideas come from people with a fresh eye, a different perspective or the irreverence of youth." Todd's schistosomiasis project, however, is loaded with chemical jargon. His helpers were clearly dedicated specialists who speak the language – not anonymous, irreverent youngsters.

While it's noble to welcome motivated citizen scientists into the process, experience shows that not all of them follow the unwritten rules of proper, rational, "scientific" behavior. Climate and evolutionary scientists are often on the front lines of these particular skirmishes. John Moore, an immunologist at Cornell University who is studying how the HIV virus enters immune cells, is regularly confronted with so-called AIDS deniers – people who claim that AIDS is caused not by the HIV virus but by immoral behavior. Not surprisingly, Moore is opposed to open science, in

which he sees "a greater potential for abuse by the lunatic fringe."

TRANSPARENCY, SPEED – AND POSSIBLE CONFUSION

Advocates of open science emphasize the approach's two huge advantages: transparency and speed. Without a lengthy peer-review process, research can reach the scientific community more quickly. But this acceleration might be wishful thinking. Todd's project took 16 months; a traditional, well-connected research group could well have achieved similar results in the same time.

Open science's transparency imperative – the "open" lab notebook – has major implications for intellectual property. Because patents must be filed prior to publication, leaving lab notebooks in the open essentially precludes a patent on any research within them. Jean-Louis Reymond, a chemist at the University of Bern, made his description of all theoretically possible molecules up to 13 atoms freely available. He is convinced that science is drifting towards openness, but remains opposed to open lab notebooks: "Lab books often contain data that is not reproducible or mislabeled." Making them available unedited could cause confusion and waste time.

Science is clearly opening up, and will continue to do so. But how exactly this should happen still needs to be worked out – openly. ■