

MATHEMATICS AND COMMUNICATION

Interview of F. Thomas Bruss



How do you consider the communication in mathematics?

In our department of mathematics, the communication between colleagues is in general very good. The interdisciplinary communication should be better.

A great asset for our department - and I think, for the entire field of mathematics in Belgium - is the UREM team of the ULB. This group is very active and provides an excellent service, as many people know. Obviously, their effort focuses by definition on the important contact with students and teachers of secondary schools.

Generally, I think, mathematicians should try to communicate more with the outside world. There is a tendency to focus on just what we do and not to look for communication and interaction. However, we should not criticize this lack because this is also a comprehensive tendency caused by the nature of our domain. Mathematics itself can be very difficult, and communication of Mathematics can be already difficult on a medium or even elementary level.

What are your personal experiences concerning the ways of communication in mathematics ?

My personal experiences in scientific communication are good. I wrote my first paper addressing the general public in 1998. It appeared in the DMV-Mitteilungen of the German Mathematician's Association. Since 2000, I have published general-public papers with a certain regularity, always trying to choose very visible journals.

For such papers, there are two sides to the coin. On one side, the gratification or recognition within our discipline is modest because these papers are typically not referenced in the « *Mathematical Reviews* » or in any other classical indicator of scientific activity in our domain. In a certain sense, this lack of recognition is not justified. According to my experience it

can be more demanding and take more effort to publish in « *Pour la science* » or « *Spektrum der Wissenschaft* » (National editions of the Scientific American), say, than in « *Annals of Probability* », say, which is a real top journal in my domain. The other side of the coin is however really positive. The reactions of the readership are more numerous than what we receive as reaction to a publication in a scientific journal in a classical sense. Suddenly, there is a laboratory here, or a group of researchers there, who are interested in our work. Some readers will phone and come to see you.. In other words, we can receive interest and attention from outside, a certain notoriety.

And the conferences ?

Scientific conferences are for the mathematicians, as in all other scientific disciplines, necessary to have an efficient interaction. It is true that interaction still remains difficult between mathematicians during conferences because of the intrinsic difficulty of mathematics in several domains at the research level. The advantage of conferences is nevertheless that we can talk with colleagues which is better than just e-mails. In summary, going to conferences (not too many of them) and having an active participation, is in my point of view, indispensable.

What ways of communication do you use most ?

For my research these are the classical ways, as the majority of my colleagues would use, i.e. giving talks and publishing in scientific journals. Then, and I think this is your true question, I also publish papers for the general public: in national editions of *Scientific American* (*German, French, Chinese*), in newspaper like “Die Welt” or “Le Soir”, in the Newsletter of the European Mathematical Society, in several Bulletins of national mathematical societies, and others. It is not rare that editors simply ask me the permission to re-publish a paper in translation, and this is easiest for me if I do not speak the language. Then those do everything! This explains why I have such publications also in Chinese, Japanese, Spanish, Polish, and Arabic. Also to mention my participation at two article competitions in scientific communication (European Mathematical Society), a lecture at the Royal Academy, another one at the Collège Belgique, some interviews in Belgian and German newspaper and on radio (BBC, RTBF, Radio Contact+ and others), and two round-table-debates on television (BEL-RTL and RTBF). Finally, there were invitations as expert in probability ... and some expertise requests.

What are your experiences in the communication between mathematicians and other scientists or industries?

It happened twice that companies (one chemical, one pharmaceutical) contacted me, surprisingly, after articles of which I first thought that they have little to do with their problems. But they were both right, and this was fun. Recently one of them approached me again, and perhaps this will be more fun. I also had discussions with a political party, a couple of engineers, even with a German professor doing research on control of rocket orbits (of which I know nothing as you can guess)... but in particular with several physicians. Hence, as I said, the second side of the coin can be really rewarding. But it is also time consuming and cuts in your time for real research.

Importance of that kind of communication ?

Yes, this type of communication is, to my point of view, very important. In particular for the motivation of mathematics and for its image in public. We should be open to the outside world.

Possible improvements ?

Indeed, it should be possible and rewarding to improve communication. There was, by the way, a meeting of a commission of the European Mathematical Society in May in Brussels, just discussing this objective.

People have to communicate with other scientifics in all domains of mathematics, even in pure mathematics. For the latter, I understand this can be very difficult.

Are there communication differences following the different domains in mathematics?

There are good and bad communicators everywhere. In some domains of Pure Mathematics, communication is, I agree, and will stay probably really difficult. But even there one should be able to improve communication.

What are your personal experiences in communication with the large audiences ?

Do you mean in public speeches?

I gave commencement speeches in Berlin and Wiesbaden, and others in Brussels, Maria Laach, Leiden, ... This asks for a lot of preparation. I find it not easy at all to speak about Mathematics to people with no interest in

Mathematics or a low level of mathematical education. But sometimes it's really these people you would like to win, in particular if their position and/or power of decision is in contrast with their ability in rational reasoning. And it is worth to try.

Is the communication between mathematicians and the large public sufficient ?

No, as I said I think it is not, but this is not or not only the fault of mathematicians. The pressure to do so many things does not allow us to devote enough time to it,, neither to research nor to communication of research. Decision makers should hold this in mind.

Is it always possible for you to disseminate your researches?

No. I can do this only for a part of it. In my subject of probability I also encounter problems where my interest is just "pure". Then, there are technical details in the demonstrations taking often a long time. Here I see usually nothing worth communicating to the public. This is normal, this is the problem of mathematics, as every mathematician knows it. After all, "pure" or "less pure", "applied" or less "applied", a mathematician is a mathematician. We work with the same deltas and epsilons. And this is exactly what all mathematicians should do when we have to.

Interviewed by
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