

<https://ec.europa.eu/futurium/en/content/open-consultation-mathematics-horizon-2020-next-work-programme>

### [Reinforce peer to peer exchanges by funding infrastructures](#)

Marie Farge

CNRS and ENS Paris

01/05/2016 22:38

Research is a collaborative endeavour between peers. It should not develop as a competition for ever larger and more selective grants, as already denounced by Tim Gowers, Albert Cohen and others in previous posts. Since our research topics are highly specialised and are we are very few on a given problem, we could not afford competing between us. Indeed, to improve our ideas we share them with our peers, through discussions, seminars, workshops, long-term programs and peer-reviewed papers. The European Commission should help us to maintain such a high-level of collaboration by supporting infrastructures where we meet and discuss new ideas (e.g., Newton Institute in Cambridge, MFO in Oberwolfach, IHP in Paris...). For instance the CIRM in Marseille has played an essential role for the emergence of wavelets in the mid-80s, by offering us the possibility to organise, on short notice and without administrative burden, informal meetings between researchers from different disciplines and countries. Today, thanks to publicly-funded electronic infrastructures scientists collaborate through the Web, but they still need to meet and intensively work together for one or two weeks. I think the more international research teams will develop, the more intensive meetings in dedicated places will become necessary.

We also need another kind of infrastructures to develop open access to publications. We appreciate the ‘green open access’ policy of the European Commission, asking us to deposit our papers in an open repository (e.g., arXiv). In contrast, most of us refuse the ‘gold open access’ model, where we (or our institution) pay APCs (Article Processing Charges) to publishers, because they will thus keep their control of the publication system, by still owning the journals and fixing the price of APCs (as they are doing for subscriptions). In 2012 our group ‘The Cost of Knowledge’ proposed an alternative model, called ‘Diamond Open Access’, where neither readers nor authors have to pay. It is based on three principles:

- authors keep their copyrights and publish papers under the Creative Commons license CC-BY,
- editorial boards own the journal (title, peer-reviewing reports and other assets) for which they are responsible of the peer-reviewing task, they can then choose the publisher or publishing platform they prefer (publishers are service providers but not journal owners),
- if a journal is recognised to be useful to the scientific community and as long as its editorial board can prove good peer-reviewing practices, it could be published for free using editorial and publishing platforms, which are publicly-owned and publicly-funded infrastructures using open source software designed to service a very large number of journals from different disciplines (as the major publishers do, e.g., Elsevier Editorial System).

For many years publishers have already asked us to use their platforms and thus all our exchanged for peer-reviewing belong to them. We think that our research papers, our scientific journals and our peer-reviewing exchanges should no more be privately-owned by publishers. The Open Science Cloud proposed by the European Commission should provide us such editorial and publishing platforms, but publicly-owned and written in open source, with commercial publishers as service providers.

Concerning the funding of researchers I fully agree with Tim's remark: 'Instead of forcing mathematicians to fit their projects artificially into a larger whole, you should trust us to judge for ourselves what we need and support that.' You should a priori trust us and only a posteriori check if we have adequately used what we asked for. You should also avoid supporting someone who has already several grants and who might hire more PhDs and postdocs than s/he has time to work with. Last point, you should not forget that research requires concentration and time to understand abstract ideas and produce new ones.

Unfortunately the present situation is counter-productive since we are overwhelmed by financial and administrative tasks, for which most of us have no special talent. We are asked to respect strict deadlines to apply for research grants or to send reports when we peer-review them. The perverse effect is that the system imposes on us to give priority to fund raising, peer-reviewing and administration, while there are no deadlines to do research, discuss with students and colleagues, write papers and books... This situation, which is the same worldwide, is becoming critical.

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### **[Grant sizes, diversity in support](#)**

**Dan Kral**

**29/04/2016 16:58**

I fully share the views expressed in the reply of Pavel Exner to this post. A "big grant" may mean something else for each of us. When I joined the debate started by the post of Timothy Gowers, I had in mind grants in the order of many millions EUR for large consortia, which I indeed believe not to be appropriate for mathematics (but they might be appropriate in other areas). However, 100K EUR for a 2-year grant is clearly insufficient if that grant should support even a small group consisting of a single postdoc and a single PhD student. If mathematicians should have time for doing research rather than applying all the time to get funding for a postdoc, a student, etc. separately, the amounts mentioned in Pavel Exner's reply seem in the right range to support the PI together with say 2 postdocs and 2-3 PhD students for 5 years. I believe that the idea is that an ERC grant will be the main source of funding for the PI during the grant period to allow the PI to focus on research (similar for example to the RS URF scheme in the UK), so the PI does not need to apply for any additional funding during the grant period. Marie Curie is a good way of supporting young mathematicians - still, I have seen many strong mathematicians accepting an offer for a postdoc in US/Canada rather than waiting for the results of Marie Curie and risking the offer to be gone. Having postdoc funding on the ERC grants allows European scientists to compete

on the global market for top postdocs.

I understand that the budget is and will always be limited. I believe it is better for mathematics (and in fact, any science) in the long term to support top research in a sufficient way (and I mean sufficient, not irrationally large, e.g., multipartner international consortia in mathematics) rather than to support everybody little (in a way not sufficient to do too much). For example, I think that most of UK-based mathematicians would agree that DTCs of roughly half the current size would be much more appropriate for mathematics but DTCs five times smaller might be too small. Similarly, I can imagine ERC grant sizes in mathematics to be  $\frac{2}{3}$  of the current sizes and still be sufficient for their purpose (but the amounts should be such that the grants can still serve their purpose). Having said all these, there should always be a large amount of diversity in the topics of research supported to keep all areas alive. Because of this, I fear that identifying key research themes is dangerous as the areas that will not be identified might lack funding. So, not surprisingly we can see posts from all different areas of mathematics in this discussion.

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### [a few general remarks](#)

Pavel Exner

European Mathematical Society

28/04/2016 11:00

I feel that I should add a few words in my position of the European Mathematical Society President before this consultation closes. To begin with, I want to thank the European Commission, and in the first place to Anni Hellman personally for opening this forum at which ideas and concerns about the European support of mathematics can be voiced. The discussion brought in many specific topics worth to be pursued, from the expected ones like the big data to some far less obvious. I will not comment on them, however, and I focus on a couple of general issues.

One recurrent topic in the discussion was the size of grants, in particular, in connection with the European Research Council. As a member of the ERC Founding Scientific Council, and the only mathematician there, I always argued there that the half a million lower limit is too big for any mathematician. I was overruled, however, and looking now on what people ask for and get, you find that the average size of a mathematical grant is 0.8 million in the junior categories, and 1.3 in the advanced one, below the ERC average but way above the said lower limit.

If somebody comes here to the conclusion that ERC is not a proper tool to finance mathematics I can only say that such a point of view is fundamentally wrong. One of the sources of the ERC strength comes from the fact that all fields of science, from mathematics to history of arts, speak the same voice and share a common understanding what an excellent research is. The ERC has to be supported and helped to resume the dynamics it had during the Seventh Framework Programme, possibly on a different and more permanent institutional basis which would better shield it from political influences and administrative hurdles. Only

is such a way it can become in a long run an equal partner to the institutions such as the NSF in the United States.

What is painfully missing is a “mycelium” from which ERC results can grow, a palette of smaller funding opportunities for mathematicians with the potential to become visible personalities, temporary positions, small- and medium-scale collaborations, research conferences, etc. A part of that was once covered by the now defunct European Science Foundation the demise of which left a palpable hole. It may happen that one day this would be covered by the ERC in a way the NSF does it, but it is a long shot; one should not forget that the latter is almost ten times older than the former.

This concerns, in particular, the Marie Curie Sklodowska Programme which some of the participants of the discussion mentioned. It would certainly fit together with the ERC and other funding schemes to create a unique system covering the whole professional life of a mathematician, from the student age to the retirement, however, one serious obstacle is the fact that they belong to the portfolio of different Brussels “ministries”.

I have lauded Anni Hellman and her colleagues for opening this consultation which I see as a nontrivial act of wisdom. Sad to say, the democratic mechanism are not automatically supportive to long term vision projects; if you need an example, recall the last year attempt to cut the ERC and MSC budgets in the name of boosting the economic growth here and now. And it is our duty to repeat that strong science, and mathematics in particular, is crucial for the future of the European society.

The point is the atmosphere in the society which in a sense could be called schizophrenic. Many of our fellow citizens enjoy results of scientific research at every angle and at the same time they despise the tools. It would socially destructive to acknowledge publicly that you fail to understand basic rules of grammar, but we see scores of people saying with a pride: “I have never mastered a simple proportion and look how big I became”. Well, you are not surprised when it comes from sports or pop music stars, but sometimes you hear such things from people who feature themselves as political philosophers.

With all that in mind, the European mathematical community is prepared for a permanent dialogue with the European politicians, being convinced that a well devised support of science, and mathematics in particular, is the best way to the prosperous society we all wish at our continent.

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**Dan Kral**

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support even a small group consisting of a single postdoc and a single PhD student. If mathematicians should have time for doing research rather than applying all the time to get funding for a postdoc, a student, etc. separately, the amounts mentioned in Pavel Exner's reply seem in the right range to support the PI together with say 2 postdocs and 2-3 PhD students for 5 years. I believe that the idea is that an ERC grant will be the main source of funding for the PI during the grant period to allow the PI to focus on research (similar for example to the RS URF scheme in the UK), so the PI does not need to apply for any additional funding during the grant period. Marie Curie is a good way of supporting young mathematicians - still, I have seen many strong mathematicians accepting an offer for a postdoc in US/Canada rather than waiting for the results of Marie Curie and risking the offer to be gone. Having postdoc funding on the ERC grants allows European scientists to compete on the global market for top postdocs.

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### [oversized grants](#)

**Albert Cohen**

**13/02/2016 22:09**

All areas listed are indeed important and promising. There will be the temptation of viewing them as requiring very large scale funding. As pointed out by another contributor, the typical funding scheme proposed by the EC is not adapted to the reality of most mathematical research, even in rather applied areas. Oversized grants awarded to a very limited number of researchers leads to a significant lack of global efficiency of the funding scheme. Mathematicians are led to write artificially oversized proposals, where for example they plan to hire 10 postdocs on closely related topics. This is to my opinion extremely damaging to the development of innovative mathematics at the highest level throughout Europe, and therefore the funding schemes are missing their main objective. Discussions with distinguished colleagues confirms to me that this feeling is shared by most of them. Delivering significantly smaller grants to a larger number of mathematicians deserving them would definitely

improve the global result

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### [The size of grants](#)

**Timothy Gowers**

**13/02/2016 16:2**

I feel that your question has not been framed as well as it might. You restrict yourself to asking for recommendations of areas of mathematics that deserve special attention. But far more important, in my view, is the whole way that funding is allocated. The model is one where a few people get very large grants for projects that involve many people. This is a good model for many sciences, but it does not properly reflect the way that many mathematicians work -- in intense but small-scale collaborations. It would have a hugely beneficial effect if the money available to mathematicians were distributed to many more people in smaller amounts. For example, it would be great if one could apply for support for a single postdoc for three years. More generally, instead of forcing mathematicians to fit their projects artificially into a larger whole, you should trust us to judge for ourselves what we need and support that. (Of course, it goes without saying that proposals would still be peer reviewed and not all would be accepted.)

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### [Grants](#)

**Vincent COSSART**

**Universite de Versailles**

**14/03/2016 10:19**

Je suis entièrement d'accord avec Timothy Gowers.

Je rajouterai un argument: nous ne savons jamais si nous arriverons à atteindre nos objectifs.

Je trouve certaines rubriques hallucinantes dans les projets: on ne sait pas si nous prouverons tel théorème à telle ou telle date, parce qu'on ne sait même pas si notre intuition est bonne.

Dans les sciences expérimentales, nos collègues peuvent annoncer des expériences et des résultats correspondant ou non à leurs espoirs, mais en mathématiques, et cela m'est arrivé, le résultat d'une année de travail peut partir à la poubelle.

Amitiés à tous.

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