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Professor David Delpy FRS FREng FRMedSci
Chief Executive
Engineering and Physical Sciences Research Council
Polaris House
North Star Avenue
Swindon SN2 1ET
United Kingdom

Dear Professor Delpy,

This letter comes from the sixteen panelists who, at EPSRC's invitation, conducted the 2010 International Review of the Mathematical Sciences (IRMS) in the United Kingdom. EPSRC describes one role of our report (published by EPSRC in March 2011) as 'helping to inform the development of future strategies by EPSRC and other key stakeholders'. In this regard, by October 2011 EPSRC intends to publish an action plan to 'take forward the issues and recommendations identified in the report'. Nonetheless, rather than waiting until October we have decided to write to you now in the hope of making a constructive contribution to two recent developments that, as we see it, diverge from important principles in our report:

- (1) EPSRC's announcement in July that EPSRC fellowships in the mathematical sciences at all levels—postdoctoral, early career, and established career—will, at least during an initial period, be limited to researchers working in statistics and applied probability; and
- (2) EPSRC's intent to 'shape capability' by prioritising a set of specific sub-fields of the mathematical sciences to decide whether funding for those sub-areas will grow, be maintained, or shrink.

To provide context, we summarize two of the main points (the first strategic, the second practical) in our report:

Unity of the mathematical sciences. Our report strongly emphasises that, in the overall context of science and engineering, the mathematical sciences must be viewed from a unified perspective:

Major contributions to the health and prosperity of society arise from insights, results and algorithms created by the entire sweep of the mathematical sciences. . . .¹

The not-to-be-missed point is that the contributions of the mathematical sciences community should be *considered as a whole* [emphasis in original].²

¹IRMS report, page 10.

²IRMS report, page 12.

The need for improved communication. Our report stresses the need for a rapid improvement in communication between the UK mathematical sciences research community and EPSRC:

Communication between the mathematical sciences research community and EPSRC is less open and clear than it should be, especially in light of the likely future funding environment.³

The associated recommendation⁴ urges establishment ‘as soon as possible’ of a new structure for communication between EPSRC and the mathematical sciences community.

We turn now to the two already-mentioned recent developments.

First, the limitation imposed on fellowship sub-areas is inconsistent with both the emphatic ‘unity’ viewpoint in our report and with our expressed concerns about weaknesses in the UK mathematical sciences career pipeline. Your letter to Frank Kelly (posted on the CMS website) about the fellowship area constraint notes that the IRMS report highlighted the fragility of UK statistics, as indeed it did. But the report’s suggestions about statistics are structural, advocating greater flexibility in grant programmes and an in-depth study of academic structural issues. If asked, no panel member would have favored limiting the research areas of fellowship applicants to statistics and applied probability. We believe that fellowships in all areas—especially postdoctoral fellowships—are among the best investments in the UK research enterprise, given their relatively low cost, their contributions to both academia and industry, and their potential for advancing EPSRC’s goal of developing leaders.

In addition, the decision to limit EPSRC fellowships to statistics and applied probability appears to have been taken without consultation with the mathematical sciences community, according to a letter sent on 2 August 2011 by the Council for the Mathematical Sciences (CMS) to EPSRC. The announcement ‘EPSRC fellowships—a new approach’ states that the new approach ‘has arisen from extensive discussions carried out in 2009’. Although these discussions predate our recommendation of strengthened communication, the announcement of the new approach (in July 2011) was made several months after publication of our report, as well as after the CMS-EPSRC annual meeting of 7 March 2011 and the Mathematical Sciences Strategic Advisory Team (SAT)–CMS meeting on 23 May 2011. The minutes of these meetings (posted on the CMS website) give no sign that community members were informed about, or given an opportunity to discuss, EPSRC’s plan to restrict the areas of fellowships. Your above-cited letter to Frank Kelly indicates that the limitation in fellowship areas applies only during the initial period of applications; we hope that these restrictions will be removed as soon as possible.

With respect to the second development—the yet-to-be-determined procedure for shaping capability in the mathematical sciences—of course we understand that EPSRC must make unavoidably painful decisions about reductions in funding. Even at the time of our review, panel members were fully aware of the likely imminent constraints on research support; this was an important backdrop for our report’s stress on good communication between EPSRC and the mathematical sciences research community. Given that budget choices will be made soon, we strongly urge that, again in keeping with the ‘unity’ message of our report, the procedure for making these decisions should reflect the unified, inextricably interwoven nature of the mathematical sciences.

To repeat what you have heard before (which we do because it is an essential point), our report notes the undesirability, in an overall context of science and engineering, of focussing on differences between mathematical sub-fields, such as those depicted in colored circles on the EPSRC website. Making a meaningful assessment of the relative contributions of these identified sub-fields is, in our view, essentially impossible for two reasons: a large proportion of the best research in the

³IRMS report, page 6.

⁴Recommendation R-2; IRMS report, page 6.

mathematical sciences fits in more than one of these sub-areas, and there is a longstanding pattern in which an unexpected breakthrough and new insights in one sub-field lead to transformative progress in other sub-areas.⁵

Our suggestion for shaping capability is to begin with the following principles articulated by EPSRC:

The Mathematical Sciences portfolio will be actively shaped by considering the need to maintain an excellent and effective capability in mathematics and the needs of other disciplines and non-academic research users.

[EPSRC will] aim to maintain core research funding across the broad scope of mathematical sciences but simultaneously improve balance in the portfolio through *agreed methodology for shaping* [emphasis added].

With this foundation, we are confident that, working together, EPSRC and the community can devise an agreed methodology well-suited to the mathematical sciences.

Ending on a positive note, we hope that EPSRC will soon decide to open EPSRC fellowships to all areas of the mathematical sciences, and that communication and consultation with the community will quickly improve, especially with respect to the urgent issue of how to shape capability. All of us are, as you know well from our report, deeply impressed by the international excellence of UK mathematical sciences research and by efforts that EPSRC has made to strengthen research, the community, and educational programmes. Even with the expected funding crunch during the next few years, we remain hopeful that the UK mathematical sciences enterprise will prosper.

Sincerely,

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On behalf of the IRMS panel:

Anthony Davison	Robert MacPherson
Stephen Fienberg	Dusa McDuff
Andrew Granville	Stefan Müller
Peter Hall	Cheryl Praeger
Gary Horowitz	David Ryan
Patrick Huerre	Andreas Schuppert
Willi Jäger	Ruth Williams
Zhi-Ming Ma	Margaret Wright

cc: Council for the Mathematical Sciences

⁵IRMS report, page 19.