

Report of the IMU ad hoc committee for prizes and medals

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1 Remit and working of the committee

The committee was charged with advising the IMU Executive Committee on the following questions:

1. Should IMU prizewinners be announced at a news conference some time before the opening ceremony of the ICM?
2. Should it be possible for awards to be shared by two or more collaborators?
3. Should the age restrictions be relaxed for IMU awards?

The committee worked by email, having first agreed on the contents of a ‘pros and cons’ document (attached as an appendix to this report).

2 Recommendations

The overall advice of the committee is that *there should be no change to the current stated position of IMU on any of the above three questions*. Detailed comments on each question follow, including minority views, together with a discussion of two other questions considered by the committee.

Question 1

Should IMU prizewinners be announced at a news conference some time before the opening ceremony of the ICM?

This is of course not a substantive question about who receives IMU awards, but rather an important matter related to publicity and organization. There are clearly advantages and disadvantages to announcement of IMU awards at a news conference prior to the ICM. However, all but one member of the committee felt that on balance the IMU awards should continue to be announced and presented at the ICM Opening Ceremony. Two of the main considerations are:

Secrecy. Opinions differ as to how much leakage of the names of prizewinners there is in advance of the ICM, but a large majority of people attending the ICM probably either have no idea who the winners are, or have heard some rumours but don't know whether they are true. Nevertheless, preserving secrecy as much as possible is clearly highly desirable and increasingly difficult in the age of hacking and social media. This applies whether the awards are announced at the ICM or at a prior news conference. In both cases there is a need for the decisions to be made some time before the announcement in order to prepare the necessary press releases and associated material, with a consequent risk of leakage. However there are reasons why the decisions could be made somewhat closer to a press conference than to the ICM. In particular prizewinners need some advance notice to attend the ICM.

One can argue that currently the final decisions of the prize committees are made too early and that the final meetings could take place just 1 or 2 months before the ICM, and that this could be made known publicly. Of course a prizewinner or his/her family might then have difficulties or increased expenditure in attending the ICM, but one could anticipate that most people would even break a pre-arranged vacation to collect a Fields Medal and *in extremis* they could attend by video link. The videos of prizewinners in Seoul seem to have been a successful innovation, but presumably these could be made on a tight schedule. There may well be other measures the EC could consider to reduce the risk of leaks.

Related to secrecy is the burden that some prizewinners may feel as to how to answer direct questions about whether they have won, given that they are supposed to preserve secrecy. This would be eliminated by having a prior news conference, and eased under the current system by bringing the final decisions on awards closer to the ICM.

Publicity and attendance at the ICM. Opinions also differ as to how much the announcement of IMU awards at the ICM Opening Ceremony affects attendance at the ICM. What is not in doubt is that this makes the Opening Ceremony a much more exciting and theatrical occasion than, say, the Opening Ceremony of ICIAM. Being asked to present the awards is also a strong factor in attracting heads of state or prime ministers to open the ICM, which is a publicity bonus.

The announcement of awards at the ICM brings press attention to the ICM as a whole, which would arguably be much more difficult with a prior news conference. Experience with the Abel Prize shows that the announcement is a news item, but the presentation of the Prize is not. At the moment the IMU awards, and particularly the Fields Medals, are intimately connected in people's minds to the ICM. Changing this would risk reducing the distinction between them and the increasing number of other financially more valuable prizes such as the Breakthrough Prizes, with consequent reputational damage.

The EC might wish to consider the possibility of announcing one or more of the prizes (e.g. Chern, Gauss) at an event later in the ICM, in order to give their award more prominence.

One member of the committee strongly favoured announcement of the awards

at a news conference close to the time decisions are made, arguing that (i) secrecy is unlikely to have a major effect on attendance at the ICM, and that other measures for increasing attendance should be considered, (ii) anyone who wants to know the winners can find out in advance, (iii) many other major prizes are pre-announced without negative effects, and (iv) it is immoral to place a burden of secrecy on prizewinners.

Question 2

Should it be possible for awards to be shared by two or more collaborators?

Sharing is already explicitly allowed for the Carl Friedrich Gauss prize. The guidelines for the Chern Medal specifically mention ‘*an individual*’ and there seems to be no reason to change this (and any such change would no doubt require the permission of the family).

For the Fields medals the current guidelines do not mention sharing and the Fields Medal committee ‘*is asked to choose at least two, with a strong preference for four, Fields Medallists*’. The committee’s unanimous view is that Fields Medals are to reward individuals and should not be shared.

The committee considered what IMU would do faced by an extremely exceptional case (such as a group of several mathematicians who prove the Riemann Hypothesis). Such an exceptional case might well involve a team of mathematicians not all of whom are under 40, thus either creating a precedent for relaxing the age restrictions or appearing unjust by honouring only those members of the team under 40. The committee thinks that the guidelines should not be altered to allow for such a possibility. If it arose the IMU President would no doubt consult EC members, former Presidents etc., as to whether the award of a shared medal would be appropriate. The EC might wish to consider whether, if such a very exceptional case arose, the IMU President or EC would feel they had the right to overrule the published guidelines.

For the Rolf Nevanlinna prize, the current guidelines say that ‘*one prize should be given at each International Congress of Mathematicians*’, and that ‘*the name of the prizewinner is engraved on the rim of the medal*’, which together seem to rule out sharing. The committee’s unanimous view is again that the prize should not be shared. However it should be noted that the argument against sharing is slightly weaker than for the Fields medals, since in the case when, say, two people together jointly proved a landmark result then the current Fields Medal guidelines would allow two individual medals to be awarded.

Question 3

Should the age restrictions be relaxed for IMU awards?

This question concerns only the Fields Medals and the Rolf Nevanlinna prize, for which ‘*A candidate’s 40th birthday must not occur before January 1st of the year of the Congress*’ at which they are awarded. All but one member of the committee felt that there should be no relaxation of this rule.

It is recognized that the rule disadvantages certain people, such as those who

take time off looking after young children, those who do military service or have been ill, and some applied mathematicians. However, it would seem impossible to incorporate adjustments to accommodate such cases which would both be precise and widely accepted as reasonable. The committee also considered the significant issue of those disadvantaged by being unfavourably born mod(4), but did not see any practical way of mitigating this apart from encouraging the Fields Medal Committee to take it into account in their deliberations.

A further argument against relaxation of the rule is to help maintain the distinction between the IMU awards and the increasing number of high-profile and much more valuable prizes, such as the Breakthrough Prizes, with which IMU cannot compete financially.

One member of the committee disagreed with this position, and while not in favour of raising the age limit felt that the Fields Medal committee should be left to interpret what young means, with less than 40 being a guideline rather than a strict cut-off. With such flexibility Andrew Wiles could have been awarded a Fields Medal, for example.

Other questions.

The committee also discussed two other questions which were not explicitly in its remit.

(i) Should the Fields Medal Committee be *required* to choose four medallists, rather than this just being indicated as a strong preference?

The aim of this suggestion is to help ensure the diversity of mathematical fields that is mentioned in the current guidelines. The committee was divided on this question, with 5 members in favour of the suggestion and 3 against.

(ii) Should the qualifying subject areas for the Rolf Nevanlinna prize be reduced?

Currently the allowed subject areas are

1. *All mathematical aspects of computer science, including complexity theory, logic of programming languages, analysis of algorithms, cryptography, computer vision, pattern recognition, information processing and modelling of intelligence.*
2. *Scientific computing and numerical analysis. Computational aspects of optimization and control theory. Computer algebra.*

However the prize has never been awarded in any of the areas 2, and it could be argued that tradition has determined that the allowed subject areas are those under 1. This is not just an issue for the Rolf Nevanlinna prize, since the subject areas listed could be interpreted as not qualifying for a Fields Medal. The majority view of the committee was that the existing subject areas be retained, and that efforts should be directed towards ensuring that the prize committee and nominations have an appropriate balance.

3 Appendix: pros and cons

General issues

- What are/should be the goals of the current procedures, and of the proposed possible changes?
- Given an understanding of what these goals should be, are there other ways of achieving them besides the changes proposed?

Question 1. Should IMU prizewinners be announced at a news conference some time before the opening ceremony of the ICM?

Reasons for:

- It would help stop leaks prior to the announcement, which are now more likely, and more likely to spread, because of the internet.
- It would provide two opportunities for publicity, at the news conference and the ICM itself.
- Publicity material (e.g. films) about the prizewinners for use at the ICM could be openly prepared.
- Talks by the prizewinners at the ICM could be scheduled openly.
- It makes it easier for friends and families of prizewinners to plan to attend the ICM.
- Assuming that prizewinners were only notified immediately prior to the news conference, it would stop them being put in an uncomfortable position when asked before the announcement if they have won.

Reasons against:

- The theatre/charm/magic of the announcement of prizes at the ICM is an important element in encouraging attendance.
- It would reduce press interest in the ICM itself.
- Leaks would be just as likely prior to the news conference as they are now prior to the ICM. The real issue is how close to the ICM the decisions are made.

Question 2. Should it be possible for awards to be shared by two or more collaborators?

Reasons for:

- Much work is now done jointly, and separating individual contributions can be invidious.

- It would send a signal encouraging collaboration and openness.

Reasons against:

- How would the case of collaborators one of whom was under 40 and one over 40 be handled?
- The IMU prizes are for people, not particular pieces of work.
- There is currently the option of awarding a Fields Medal to each of a pair of collaborators (though not for Nevanlinna).
- Allowing joint awards could increase the total number of awardees and be used as a way to resolve committee disagreements, especially since there are different degrees of collaboration.

Question 3. Should the age restrictions be relaxed for IMU awards?

Reasons for:

- Mathematics is getting more complicated and it can take longer to make big advances, so the quality of the work recognized could improve.
- Theory builders, as opposed to problem solvers, are more likely to be recognized. The same applies to applied mathematicians working on complex problems, that often require establishing substantial collaborations with several people from other fields and a lengthy process of modelling, theoretical analysis, solution and feedback validation.
- There are issues related to career breaks. In particular, increasing the age limit would partially level the playing field for female mathematicians.
- At the moment a favourable date of birth mod(4) can give a significant advantage.

Reasons against:

- The age limits are what distinguishes these prizes from others. Relaxing them would be a slippery slope.
- As regards having a special provision for career breaks, it would be difficult to formulate an unambiguous set of rules, and there are many possible reasons (children, illness, military service ...) that would need considering.

Other suggestions.

- Prizes other than Fields and Nevanlinna could be announced later in the ICM programme.
- Some prizes could be announced at the ICM and some before.