

Recommendations for EG 1508

In July NSERC staff asked the Long Range Plan (LRP) steering committee and the chair of the NSERC Mathematics and Statistics Liaison Committee for input on the policies and operating procedures of Evaluation Group (EG) 1508. We were in particular asked to comment on the community's tolerance around the bin levels themselves¹ and on priorities if difficult decisions have to be made regarding trade offs; i.e. guidance around maintaining bin levels vs. maintaining success rates. The attached document is our response. It was developed following consultations with the Mathematics NSERC Liaison Committee (MNLCL), and revised following discussions with the LRP steering committee, who also consulted with the statistics representatives to the NSERC - Mathematics and Statistics Liaison committee. However this letter should be viewed as reflecting the views of the signatories, following consultation with the above various groups, as several members expressed concern with some of the more detailed recommendations. We were guided by the following principles, for which there is a general consensus among those consulted.

1. Openness and transparency: It is important that the process of proposal assessment permits EG members to form a global perspective of the spectrum of dossiers in the competition, at least within the three sections. EG members should be informed by NSERC about the budget constraints they will be operating under, at least approximately.
2. Fairness: The proposal evaluation process should provide sufficiently detailed comparisons of all proposals in the competition, and should result in grant award amounts that reflect research merit that are equitable across the EG.
3. Professionalism: The members of the Evaluation Group require appropriate tools for their deliberations, and respect for their judgements when reviewing dossiers.

We are including more detailed recommendations below for adapting the procedures of EG 1508 to more closely reflect these principles in future Discovery Grant competitions. We divide these into two sets: (1) changes for the upcoming 2012 Discovery Grant competition, and (2) aims for EG practice in future competitions. We feel that implementation of the suggestions would not entail major changes in policy or practice.

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¹E.g. this bin should not go below \$X

Recommendations for the 2012 DG competition

We are recommending the following for the upcoming Discovery Grant competition.

1. Openness and transparency.

(i) Evaluation group members are given the right to participate in the discussion and to review the dossier of each DG proposal, aside from direct conflicts of interest. This would normally apply to EG members of the same section.

(ii) The EG should be given some idea of the budget allocated for the competition before beginning the process of rating proposals. The purpose of this is so that the EG members have an understanding of the funding consequences of concentrating many proposals in the same bin.

2. Fairness.

(i) As the process of proposal proceeds during the evaluation meeting, all rankings/bin assignments are made available to the full EG. The bin rankings could be posted during the evaluation week as they are made.²

(ii) Each section should review the rankings of all of its dossiers before they are finalized into bin ratings.

(iii) Major budget decisions should be made by the full EG, as representatives of the communities of mathematics and statistics. On the last day of the evaluation meeting, the full EG should remain to take part in decisions on bin funding.

3. Professionalism.

During their deliberations, relevant web-based reference materials should be available for consultation by EG members.

4. Success rates.

It is important that top researchers be given adequate funds to maintain their research program, while at the same time it is vital to maintain high-impact research programs at institutions with smaller graduate programs. In practical terms, the success rate should not be hostage to unacceptable rigidity with regard to a misplaced precept of indivisibility of a bin. In the 2011 competition the success rate was highly constrained by the large number of proposals in bin J and the inability to either split the bin or revisit the ratings. Thus the choice seemed to be a success rate of either 48% or 66%. We recommend below relaxation of this rigidity in part to avoid this crisis in future. Success rates of 45% would be unacceptably low, given the quality of the proposals, and in relation to both success rates in EG 1508 since 2009, and success rates in other EGs in 2011.

5. Bin values.

This is very difficult to address in isolation: the average grant size in EG 1508 is the lowest among the evaluation groups, and the bin levels must be set within the competition budget set by NSERC. This budget varies from year to year, and has experienced serious (and unexpected) decreases in recent years. Thus we have recommended above that all the members of EG 1508, who are the communities' representatives for the DG competition, should be the advocates for mathematics and statistics and in a position to discuss fair bin levels, given the constraints of the competition budget. In order for this to be acceptable the NSERC would need to ensure that the EG appointments do indeed reflect a broad representation of the mathematics and statistics communities.

Under fair and equitable budget conditions the ranges should fall reasonably close to the other theoretical physical sciences. The following is a tabulation of the approximate 2011 bin ranges for Computer Science and Physics, onto which we place an approximate projection of the range that

²This is much as it is in practice in NSF Grant Review Panels.

we expect should be the norm for mathematics and statistics, at least within \$5K on either side of these amounts.

bin	ABC	D	E	F	G	H	I	J
Computer Science EG	> \$60K	\$49K	\$42K	\$33K	\$29K	\$24K	\$20K	\$14K
Physics EG	> \$98K	\$69K	\$57K	\$48K	\$37K	\$28K	\$22K	\$15K
Math & Stats EG	> \$80K	\$60K	\$50K	\$40K	\$34K	\$26K	\$22K	\$15K

Until the Mathematics & Statistics budget can accommodate at least this range, some pro-rating will be needed.

Many senior members of our communities felt that in the circumstances of a large cut in the competition budget, such as occurred in 2011, a proportional cut in all grants would have been preferable to large changes in some bin levels from previous years. In the happy event of an increase in the competition budget, the goal would be to work towards a distribution consistent with the numbers above.

Recommendations for future DG competitions

1. Openness and transparency.

(i) Early in the ranking process the NSERC staff should present to the EG an outline of the budget available for the competition, at least in approximate terms, relating it to the mathematics and statistics budgets of the past several years.

(ii) The evaluation process of the competition should allow each EG member to form a global view of the spectrum of dossiers that are submitted to the 2012 competition, including access to each dossier and a review of the final rankings.

(iii) While responsibility for reading and reporting on individual proposals is assigned to a smaller subset (a committee) of each of the three sections (pure mathematics, applied mathematics, and statistics), members of the EG (aside from those with direct conflicts of interest) should be able to participate in the discussion of the merits of each dossier.

(iv) The final ranking of each dossier should be supported by a written summary outlining the basis of the EG's decision. This summary is to be returned to the applicant along with the mail reviews of their proposal.

(v) During the evaluation process NSERC should explain the basis of the calculation of the available budget for the present year. This disclosure should take place before the EG enters into its final rating process of the dossiers under consideration.

2. Fairness.

(i) The EG should make multiple passes through the proposals in the competition, avoiding the inequities that result from one pass/serial rating methods³. We recommend that a full day is set aside for an overall review, after the detailed evaluations are made and also after NSERC has disclosed the approximate budget figures for the competition.

(ii) We recommend that there be finer grading of the proposals (e.g. in the form of marks such as $J^- < J^0 < J^+$), at least in the critical bins in which it is possible that the funding cutoff will fall.

³We recommend that each dossier be addressed at least three times: (1) a preliminary coarse-grained rating, (2) the detailed evaluation and (3) a global comparison and adjustment of rankings. In fact the first step of this evaluation can already be made in the late fall term, at the point when the proposals are submitted and are ready for evaluation. The final step (3) is critical in making fair judgements on the dossiers after EG members have acquired a global perspective of the competition as a whole, and after having made a detailed scrutiny of all of the dossiers and understanding the impact of the budget on the funding level.

Such a multiple-scale analysis will help in making sensible final budget outcomes, when difficult decisions have to be made by the EG, by allowing bins to be appropriately subdivided.⁴

(iii) The full EG should be consulted in decisions on dollar amounts assigned to bins, early career researcher awards, and other major grant awards under the aegis of the EG.

(iv) In fact many people in our community feel that the quality and impact of a grant proposal should be judged independently from the HQP element, and the latter is better treated as a function of cost of research.

3. Professionalism.

(i) Members of the Evaluation Group are professional scientists, and the exercise of their scientific knowledge and judgements made from their scientific experience needs to be treated as important information, and taken into account in the proposal rankings.

(ii) During the EG meeting, its members should have the tools available to them to make important decisions about the quality of the research they are evaluating. This includes the ability to consult reference texts and any other professional material that will aid them in their work, which is to evaluate and compare research proposals as diligently as they can.

Additional comments.

Points of particular sensitivity to the mathematics and statistics communities are the following.

(i) The EG should be sensitive to systematic rating differences between pure mathematics, applied mathematics, and particularly statistics. Recent experience indicates that the calibration process may not be as effective as it is intended to be, and this needs to be considered in discussion of budget decisions as suggested in 2(iii) above.

(ii) If in going forward the NSERC adopts separate budgets for mathematics and statistics, the basis of forming these budgets should be treated openly and permit broad consultation. Careful attention will be needed with respect to proposals in probability and in mathematical finance, in particular.

(iii) The possibility of having separate budgets for mathematics and statistics has already raised the question in the community about whether or not it may be appropriate to have separate budgets for pure and for applied mathematics; any decision on this would require broad consultation.

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⁴In the 2011 competition, the fact that bins could not be reopened nor split, combined with the fact that populations of the bins are normally largest in the middle of the distribution, led directly to budget decisions that resulted in anomalously low grant allocations for dossiers in the middle bins in pure mathematics and applied mathematics.