HOW TO SUCCEED IN THE NEW NSERC DISCOVERY GRANT COMPETITION MODEL

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THE DISCOVERY GRANT REVIEW PROCESS

Grant Selection Committees replaced by 12 discipline-based Evaluation Groups operating under conference model.

List of Evaluation Groups and Research Topics:
http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DGPList-PSDListe_eng.asp

Statistics of the 2010 NSERC Discovery Grants Competition:
http://www.nserc-crsng.gc.ca/_doc/Professors-Professeurs/2010-DG-CompStat_e.pdf

Program Selection Committee Members:
http://www.nserc-crsng.gc.ca/NSERC-CRSNG/Committees-Comites/programs-programmes_eng.asp

Discovery Grants Evaluation Indicators:
http://www.nserc-crsng.gc.ca/_doc/Professors-Professeurs/RatingScale_eng.pdf

Timeline of evaluation process:

March/April:	Announcement of Results
August 1:	Submission of Form 180 (Proposal Intent)
September/Early October:	Internal Reviewers are picked External referees are selected
November 1:	Submission of Application Package (Form 101,100, pubs)
November/December:	Readers are picked Candidate's application package is sent to external referees and committee readers
February:	Grants Competition

Evaluation Process

- Your application will be reviewed by:
    - 1st Internal Reviewer
    - 2nd Internal Reviewer
    - 3 Internal Readers (was 4)
        - the internal reviewers and internal readers are drawn from the Program Selection Committee Members
        - for some Program Selection Committees, your evaluation committee may not understand the local context unless it is made clear, e.g. no graduate program
        - For example: for physics, 17 of 33 Members are not from Canadian Universities; contrast with computer science 4 of 26, mathematics 6 of 25
    - External Reviewers
        - 5 names to be supplied by applicant
        - a mix of applicant and committee choices
        - typically 2-3 referee reports received

- 1st and 2nd internal reviewers and internal readers chosen based on comfort ratings submitted by each committee member in the fall

- September/ Early October:
    - each application is assigned by the Committee Chair to a 1st/2nd internal reviewer (readers are selected later, in November)
    - conflicts taken into consideration
    - 1st internal reviewer selects external reviewers

- November - Orientation Day
    - Calibration sessions:
        - mock competitions take place on Orientation Day in November and on Day 1 of competition week
        - a selection of applications from the previous year covering the spectrum of ratings
        - for each application, a first and second internal are assigned to present it
        - the entire group discusses them

- From mid-December to early February, each member reviews
    - 20 - 30 applications --> as 1st or 2nd Internal
    - 30 - 40 applications --> as Reader
    - 20 - 25 RTI (equipment) applications

- External Referee reports trickle in during January, incorporated into member evaluations.

External referee reports

- NSERC made a successful effort to increase the response rate of external referees (4 and 5 reports not rare, one even got 6!)
- Quality of external reports varies widely

- Committee members are supposed to only judge based on the content of the proposal and the external referee reports, not look up the Web, except to confirm the validity of information provided
- External referee reports *very important*, especially for the members who are not experts in the area of the proposal
- Check committee membership when selecting external referees; maximize the number of people who are going to say positive things about you

Lack of Memory

- In the previous (old) system:
    - Minibudget for each member, based on:
        - incoming grants of returning applicants
        - an allocation for new applicants
    - Grant amounts were explicitly discussed and adjusted up or down
    - Applications discussed in this order:
        - new applicants
        - senior new applicants
        - renewals by increasing previous grant amount

- In the *current* (new) system:
    - previous grant amount is not discussed
    - applications grouped and discussed by topic
    - all applications (new/ senior new / renewals) for a specific topic are discussed in the same session

Rating of Proposals

- Each proposal is rated on three evaluation criteria:
    - Excellence of researcher
    - Merit of the proposal
    - Impact of HQP

- Each criteria receives one of the following six ratings
    - Exceptional (E), Outstanding (O), Very strong (V), Strong (S), Moderate (M), Insufficient (I)
    - the six ratings have a numerical equivalent of 6, 5, 4, 3, 2, 1, respectively

- Electronic voting (secret) on each criteria (applicant/proposal/HQP):

- From the ratings by the 5 committee reviewers, the *median* is selected

- For example:
  - for "Excellence of researcher", the committee vote is S S M M M so the rating is Moderate (M)
  - for "Merit of the proposal ", the committee vote is V V S S M so the rating is Strong (S)
  - for "Impact of HQP", the committee vote is V S S S M so the rating is Strong (S)
  - the applicant rating is therefore MSS

- The numeric equivalents of the three ratings are "added".
- For the above example, the applicant rating of MSS = 2+3+3 = 8

- The proposal is placed into one of 16 bins.
- The bins are labelled A through to P and correspond numerically to 18 down to 3.
- Bins A and P are uniquely mapped to EEE and III but the other bins will contain a mix of numerically equivalent ratings, e.g. VSM is in same bin as SSS and MSV. The example rating of MSS would be in bin K.

- When you look at the Statistics of the 2010 NSERC Discovery Grants Competition:
  http://www.nserc-crsng.gc.ca/_doc/Professors-Professeurs/2010-DG-CompStat_e.pdf
  note that for some bins, not all entries are funded. Since the entries in the bin contain a mix of numerically equivalent ratings, some ratings groups in a bin may be funded and some will not be funded. For example, for bin J, applicants with SSS may be funded but MSV will not be funded.

- It is a myth that SSS is sufficient for funding. Cutoff is dependant on the Evaluation Group. For Computer Science or Mathematics, applicants with SSS were funded; for Physics, ratings of SSS were not sufficient for funding.

How does the Committee deliberate?

- 1st Internal presents his/her ratings on applicant/proposal/HQP with detailed rationale
- 2nd Internal adds to the summary, and own ratings
- each reader adds further comments, and own ratings
- discussion among the five reviewers follows
- secret electronic voting on each rating (applicant/proposal/HQP)
- program officer announces the outcome
- *all of the above takes at most 15 minutes*
- all ratings of moderate or insufficient receive comments from the committee, reflecting the consensus of the reviewers (highly focused)

Funding decisions

- Subcommittee consisting of current chairs, with the assistance of Program Officers, decides on:
    - exact grant amounts per bin
    - handling of early career applicants (e.g. fund a lower bin than normal applicants)
    - both of the above are Evaluation Group specific
    - both of the above vary by year of competition

- Decision based on:
    - available budget
        - varies by year
        - funds = funds brought to the competition by this year's applicants + increases or decreases in funding by government
    - desired success rate range for early career and normal applicants
    - other considerations (e.g. whether to differentiate between proposals in the same bin)

- Proposals are evaluated on funding requirements as "High", "Normal", or "Low".
    - "Normal" gets the grant amount allocated for the bin.
    - "High" and "Low" get some fixed percentage above/below the grant amount for the bin
    - BUT you *cannot* get more than you asked for!

References

- New evaluation process
http://www.nserc-crsng.gc.ca/Media-Media/NewsRelease-CommuniqueDePresse_eng.asp?ID=126

- Memorandum to potential applicants
http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DGIGP180Notice-PSIGP180Avis_eng.asp

NSERC Recommendation re: unspent balances

- The available funds may be sufficient to cover anticipated expenditures through the next fiscal year until March 31, 2011. If so, these individuals should take advantage of the automatic one year extension to use the accumulated funds prior to submitting a new request for funding.

- Postponing an application extends the life of the grant, allows the Grantee to reorganize his/her activities and postpones the renewal/re-application date by one year.

- Deferring an installment does not adversely affect the review of the Grantee's next application, but rather demonstrates good fiscal management of his/her funds and provides the opportunity for the Agencies to fund other researchers with more urgent needs.

PROFILE OF A WINNING PROPOSAL

Evaluation Criteria

1. Merit of the proposal
2. Excellence of the researcher
3. Impact on HQP

1. Proposal

"Provide details to satisfy the expert; convince the non-expert about impact and importance"
-from NSERC

- Specify the overall objective in a nutshell
- Specify short-term and long-term goals
- Indicate why the research is important --> context!
- Provide up to date literature review
- Describe the methodology in detail
- Outline a research plan and milestones
- Conclude with impact and outcome
- Use space effectively – avoid duplication
- Describe training plans clearly
- Address Evaluation Group comments (if resubmission)

An "exceptional" proposal

- Fundamental theory or system or application
- Coherent and focused research direction
- Clear evaluation plan
- Essence of proposal explained in intuitive terms, and theory and applications nicely woven into it.
- Gets to the objectives within the first couple of paragraphs
- Maximum 1 page of highly technical stuff
- Why is the proposed work significant?

An "insufficient" proposal

- Vague goals
- Lack of focus: too many distinct subproblems
- Claims to attack unrealistic sized problems
- Confusing to read, overuse of acronyms
- Lack of evaluation strategy
- Unclear that applicant has the expertise to do the proposed research

Budget

- Budget is one of the factors in evaluating the proposal

- Even though applicants get less than what they ask for (typically), a detailed and well-justified budget is a plus!
    - Identify all personnel and their salaries (funding/student/year)
    - Identify all equipment and their costs
    - Specify travel costs (which conference, where?)
    - Does the budget match the proposed work?
    - An inflated/ill-justified budget could result in a lower rating for the proposal

- Bottom line is that the budget indicates to the committee that your proposal is well-thought out and realistic; a poorly thought out budget can ruin a proposal

Relation to other support

- If you have other grant support, explain:
    - how this research is different and
    - how it ties into the other research
- Example:
    - An NSERC CRD supports applied research in X of interest to industrial partners
    - A CANARIE contract supports software development of a system incorporating contributions in X
    - The DG supports basic research and conceptual innovation in X

Examples of comments to Moderate/Insufficient proposals

- Lack of an evaluation methodology
- Did not show how results can generalize beyond one domain
- Literature review did not include significant relevant work
- Did not discuss how the proposed research will advance the state of the art
- Proposal did not have clear objectives, hence feasibility is questioned
- The applicant's prior research record does not include contributions in the area of the proposal
- Methodology was too general, making it hard to see how the potential contribution will generalize
- Methodology too sketchy.
- Not clear how the proposal will compete with established methods
- Scope of proposed research too broad
- Applicant does not have the experience needed to carry out the proposed research

2. Excellence of the researcher

If 'excellence of researcher" is Moderate or Insufficient, proposal and HPQ scores do not matter!

A researcher who is not strong is judged to be incapable of executing quality research. So it does not matter how highly ranked the proposal nor how high the HPQ score nor your bin placement; if you are not judged to be a strong researcher, the research will not be funded.

- Demonstrated expertise in the field

- Quality and *impact* of research accomplishments
  - "Assessment must be based on the quality and impact of contributions and not on the number of publications or conference presentations or the quality of the journal in which results are published. "   from NSERC
  - Publication record in high impact journals and conferences
  - Industry impact e.g. patents and collaborations
  - Use by peer community, e.g. open source software
  - Continued progress
  - Most significant research contributions (important!)
  - Make good use of the significant contribution section in Form 100

- Stature in the field
  - Invited lectures
  - Review articles
  - Program committees and service involvement

An "exceptional" researcher

- Strong research record (*most important*)
- Several of the following:
  - Interest in applications
  - Professionally active
    - Journal editor
    - Conference organization
    - NSERC committees
  - Significant research contributions in the last 6 years, or prior to this but with continuing impact
  - Strong HQP record

An "insufficient" researcher

- Many papers in unknown conferences and journals (quantity instead of quality)
- Research lacks focus (too diverse to be credible)
- Publication output insufficient in terms of significance

Assessing strength of publications

- The onus is on the applicant to make a case for the strength of his/her publications.
- Strong publications are those that are known to and used by the peer community, for example:
  - In journals that are recognized by peers as competitive and widely read.
  - In conferences with competitive acceptance
  - Used by industry
  - Used by the peer community as open source software

Quality Metrics

- NSERC discourages the look-up of impact factors / citation indices / numbers of citations / conference acceptance rates by committee members.
- NSERC encourages applicants to show strength of publications and include relevant metrics
  - aim for strong conferences and journals
  - hope for many citations
- Applicant and external referee can bring in
  - citation numbers
  - success rates of conferences
  - journal impact factor information
- If they are brought in by the applicant or external referees, they are considered with a great deal of caution by the committee.

Examples of comments to Moderate/Insufficient researchers

- Publications not in high-impact venues
- Referee points out that publications have had limited impact.
- Applicant did not take advantage of available space to explain the significance of his/her research record

3. Impact of HQP

- Past record
  - Joint publications with students (roles explained)
  - Students moving on to positions requiring the training they received (mention current employment)
  - Evidence of impact of students (e.g. startup companies)

- HQP training potential
  - Role of future students explained well in the proposal
  - Thesis topics defined

- List all HQP trained
  - PhD, Masters
  - Postdocs,
  - undergraduates,
  - research assistants, technicians

- Just a list of names is not enough, nature of contributions must be explained, especially for undergraduates (e.g. USRA)

Examples of comments to Moderate/Insufficient Impact of HQP

- Too few students supervised
- Has not published with students
- Lacking plan of how students will engage in the proposed research
- Applicant should strengthen number and quality of HQP
- Very few graduate students trained (in a school with strong graduate program)

How to create positive group dynamics during discussion of your proposal

Proposal

- clear, crisp, pleasure to read
- interesting story that will appeal to the non-expert member
- *Well* written proposal increases the chance to have one or more champions in the committee
- Tight literature review
- Clear arguments on how it advances state of the art

Proposal scope

- Proposal scope must be well thought out:
  - Too narrow:
    not a research program, but a project
  - Too broad:
    infeasible, unrealistic, applicant does not have the expertise and/or the resources
- Include enough technical substance (for the expert external referee)
- Refer to your contributions for more detail

Why it is important to have a well polished proposal

- EG members form the *first opinion from the summary* for public release
- An EG member has typically about 60 DG proposals and 20 RTI proposals to review from mid-December to end of January (note holidays in between).
  - Patience is very short for poorly written proposals that are hard to read

- EG members *cannot* wait for external referee reports to form an opinion:
    - External referee reports arrive through January
    - Incorporated into committee members' judgments in the last week or two before the competition

TAKE HOME LESSONS

- Essential to have a well polished proposal
    - Clear and readable
    - Thorough literature review
    - No loose threads
    - HQP training very important
    - Are proposed projects worth a Master's/PhD?
    - Write for the specialist and the generalist

- Follow the guidelines

- Minimize the guess work for the committee by explicitly addressing all the criteria in the proposal

- Start on your proposal early (April)

MORE TAKE HOME LESSONS

- Don't piss off the committee
    - e.g. summary of impact does not equate to a listing of 100 published paper in a micro sized font
    - use *all* five pages !

- Make it easier for the reviewers
    - e.g. relevant and tightly written quality metrics that will match the external reviewers' assessment
    - Read the "**DISCOVERY GRANTS EVALUATION INDICATORS** " so that you understand what the reviewer are looking for when they assign the evaluation
      http://www.nserc-crsng.gc.ca/_doc/Professors-Professeurs/RatingScale_eng.pdf
    - Read the Peer Review Manual as this is how you will be judged
      http://www.nserc-crsng.gc.ca/_doc/Reviewers-Examinateurs/DG-SD_eng.pdf

- Summary for public release is *critical*
    - set a positive first opinion for the reviewers
    - for reviewers who are not experts in your area, this is the most important portion of the application
    - at Laurier, use the professional writers in the Research Office to fine tune this portion of the grant