

HOW TO SUCCEED IN THE NEW NSERC DISCOVERY GRANT COMPETITION MODEL

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THE DG REVIEW PROCESS

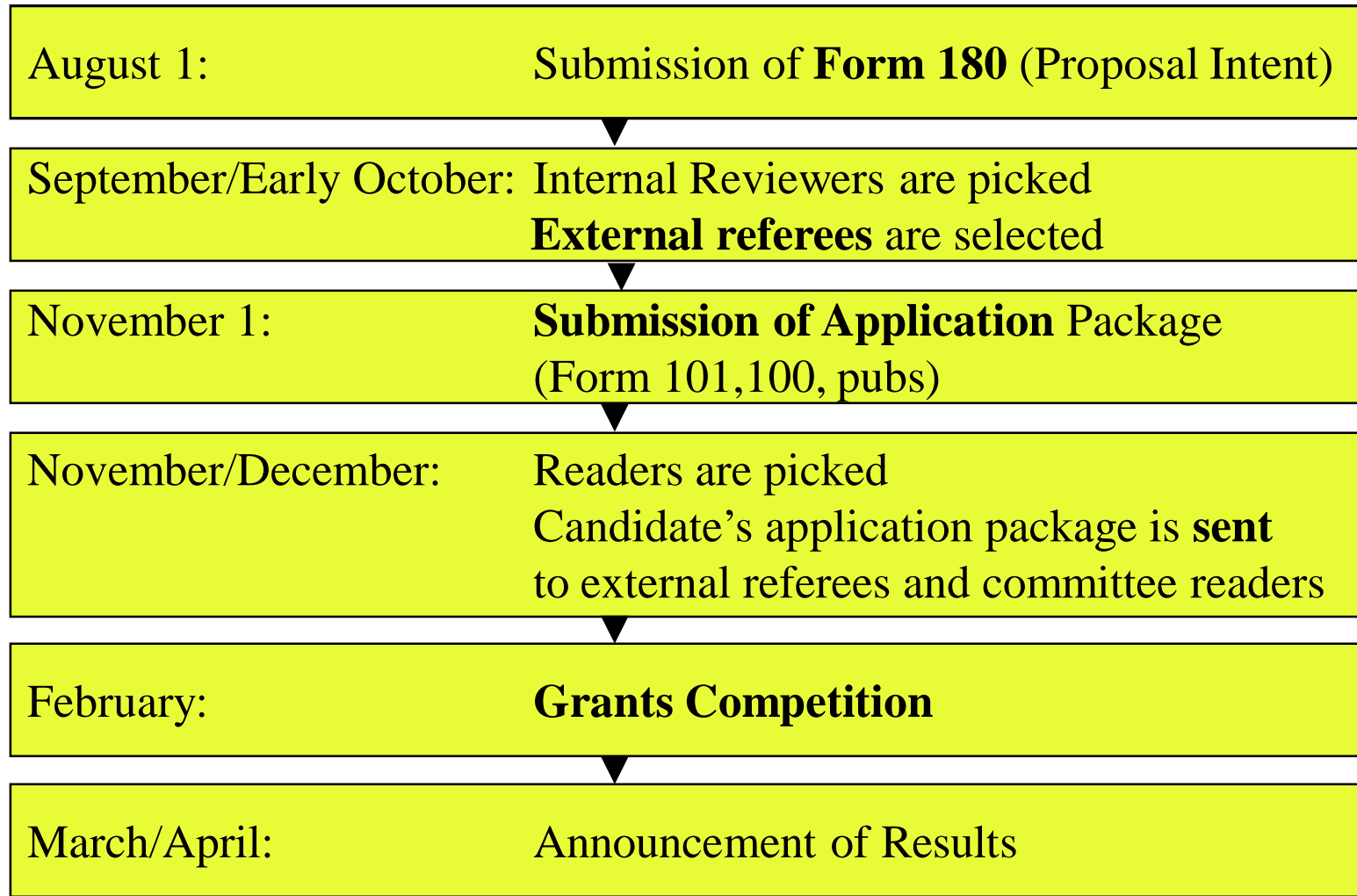
GSCs => Evaluation Groups

- GSCs were being replaced by coarser 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
- Research Topics
http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DGPList-PSDListe_eng.asp#1507
- Statistics of the 2010 NSERC Discovery Grants Competition
http://www.nserc-crsng.gc.ca/_doc/Professors-Professeurs/2010-DG-CompStat_e.pdf
- Members of the Computer Science Evaluation Group 1507 (2010) http://www.nserc-crsng.gc.ca/NSERC-CRSNG/Committees-Comites/ComputerScience-SciencesInformatiques_eng.asp

Research Topics

| | |
|------|---|
| CS01 | Web-enabled Applications and Services (e-*) |
| CS02 | User Adaptive Systems |
| CS03 | Mathematical Computing |
| CS04 | Theory of Computing |
| CS05 | Algorithms and Data Structures |
| CS06 | Computer Networks |
| CS07 | Quantum Computing |
| CS08 | Information Systems |
| CS09 | Security and Privacy |
| CS10 | Data Management |
| CS11 | Programming Languages |
| CS12 | Software Engineering |
| CS13 | Formal Methods |
| CS14 | Computing Systems |
| CS15 | Parallel and Distributed Computing |
| CS16 | Web-based systems |
| CS17 | Human Computer Interaction |
| CS18 | Artificial Intelligence |
| CS19 | Computer Graphics and Visualization |
| CS20 | Bioinformatics and Bioinspired Computing |
| CS21 | Computer Vision and Robotics |

Timeline of evaluation



Evaluation Process

- Your application will be reviewed by:
 - 1st Internal Reviewer
 - 2nd Internal Reviewer
 - 3 Readers (was 4)
 - External Reviewers
(5 requests, a mix of applicant and committee choices,
typically 2-3 referee reports received)
- 1st/2nd/readers chosen based on comfort ratings submitted by each committee member in the fall

EG members

Evaluation Process

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

Rating of proposals

Each proposal is rated on:

- Excellence of Researcher
- Merit of the proposal
- HQP

Each aspect receives one of the following six ratings by an electronic Dutch Auction of the 5 committee reviewers:

Exceptional (E)

Outstanding (O)

Very strong (V)

Strong (S)

Moderate (M)

Insufficient (I)

Example: V S S S M \rightarrow S

The three ratings are “added”, proposal placed into one of 16 bins, e.g. VSM in same bin as SSS.

Lack of Memory

- Current (new) system
 - Previous grant amount not discussed
 - Applications grouped by topic
- Previous 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/senior new/renewals by increasing previous grant amount

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.
- Dutch auction (Electronic voting - secret) on each rating (applicant/proposal/HQP)
- Program officer announces auction outcome
- **All of the above take at most 15 minutes**
- All ratings of moderate or insufficient receive comments from the committee, reflecting the consensus of the reviewers (highly focused)

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

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)
- Decision based on:
 - Available budget
 - Desired success rate range for early career and normal applicants
 - Other considerations (e.g. whether to differentiate between proposals in the same bin)

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 re-organize 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

- Merit of the proposal
- Excellence of the researcher
- Impact on HQP

1. Proposal

“Provide details to satisfy the expert; convince the non-expert about impact and importance” - from NSERC web site

- 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 EG 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 weaved 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, 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

Examples of comments to M/I 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

- Demonstrated expertise in the field
- Quality and impact of research accomplishments
 - Publication record in high impact journals and conferences
 - Industry impact - patents and collaborations
 - Continued progress
 - Most significant research contributions (important!)
- 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

Assessing strength of 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
- The onus is on the applicant to make a case for the strength of his/her publications.

Quality Metrics

- NSERC discourages the look-up of impact factors / citation indices / numbers of citations / conference acceptance rates by committee members.
- If they are brought in by the applicant or external referees, they should be considered with a great deal of caution by the committee.

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

Examples of comments to M/I 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. 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

More on HQP

- 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 M/I 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)

Relation to other support

- If you have other grant support, explain:
 - how this research is different and
 - how it ties in to 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

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

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

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)

Recommended Department Process

- Have each proposal reviewed by two faculty members
- Run a mock competition (with the two reviewers)
- Set early internal deadline (e.g. Aug. 15) to allow time for the internal review and revisions