TRANSCRIPTION
Tips on applying for an NSERC Discovery Grant

Voice-over: Applying successfully for research funding in a competitive environment means presenting your ideas in a compelling and convincing way.

This video offers tips on how to make your best case for financial support when applying for a Discovery Grant from the Natural Sciences and Engineering Research Council. It provides advice from the experts – members of the Evaluation Groups who review the roughly 3500 applications NSERC receives each year. They offer insight into what characterizes an effective application.

Kathleen Gilmour: A good grant starts with good ideas. You need to have really good ideas about the research you want to do and where it's going to take the field you're working in. And I think if you start with good ideas and then flesh them out, fit people into them, show how your research record has allowed you to get to that point and how it will allow you to continue in the same vein, then you're onto the makings of a good grant.

Voice-over: Discovery Grant applications are evaluated against three selection criteria:

- The scientific or engineering excellence of the researcher,
- The merit of the proposal; and,
- Contributions to the training of highly qualified personnel.

As an applicant, you need to plan carefully how you will maximize the space available to demonstrate how you meet the selection criteria.

A complete application includes Form 100 – the Personal Data Form, and Form 101 – Application for a Grant. Form 180 – Notification of Intent to Apply for a Discovery Grant – is submitted several months in advance of the full application and plays a major role in assigning your application to Evaluation Group members and referees.

Jacques Marchand: Form 100 will be used primarily to study and evaluate the quality of the applicant, whereas Form 101 will be used to evaluate the quality of the proposal. Of course, both forms will give the reviewer an idea of the applicant's contribution to training highly qualified personnel. So each form has a specific purpose.

Voice-over: The information provided in Form 100 reflects your qualifications and how you view your contributions. It is used by reviewers to form a picture of you and your work. It's your chance to clearly demonstrate how your research activities have advanced your field by creating significant impact within the research area or by influencing the activities of others.

Christian Reber: It's very good to start out with the most important contributions and I see a wide variety of formats for those five most important contributions. There are applicants who are very successful who decide they're only working on two main themes and so they give two overviews that summarize their main contributions. It's not the idea that you give a short version of your publication list and leave it at that. You need to explain what the impact, the value of those contributions is. The publication list comes later of course.

Voice-over: When completing Form 100, it's essential that applicants highlight the impact of their contributions. Applicants often tend to provide information only on the productivity of their research. They tend to forget to also discuss its impact – the impact that their research has on their scientific community. So the key word is really "impact."

Kathleen Gilmour: In the field I work in, it's typically the person who has done the work or written up the paper who is the first author. And the senior author, the last on the list, is typically the person whose research program is driving the work that's been written up. And so it's important to point that out in your application as well, to explain the conventions around authorship order. If being the last author in the list means that you are the senior author, that it's your research program, that you've come up with the ideas, you want to point that out to the reviewers because their field may not be the same.

Nigel Roulet: There's a bunch of different reasons why people pick various different journals. There may be journals that everybody knows, have extremely high impact, they're very, very widely read but you may put some of your work in some journals that actually are not widely read by a wide community but are very specific to an area that you want to have a definite impact on in directing something in a new direction. Then articulate that when you describe why you choose the journals that you choose to publish in.

Jacques Marchand: There are common elements that must be reflected in all disciplines, but in engineering I think we pay a great deal of attention to aspects such as technology transfer, industrial cooperation and the researchers' ability to obtain patents, which enhances their research through knowledge transfer from academia to industry.

Voice-over: Form 101 must demonstrate how the proposed research program has the potential to make an original and innovative contribution. Reviewers are looking for a strong, well-conceived and formulated proposal that addresses a significant research issue. They expect to see a feasible approach and awareness of other research pertinent to the issue. It's important to make a convincing argument about the impacts and significance of the anticipated contributions and to demonstrate how these will advance your long-term research goals.

Kathleen Gilmour: I think the applicant needs to start off by explaining what their research program is and outlining the long-term objectives and then go from that to what's going to be done over the next five years of grant funding. So shorter term

objectives that cover the five years. And then for each of those objectives explain the research that's going to be done, why it's significant, why it's going to advance the field and then enough experimental detail or methodological detail that the experts reading it are convinced that the work is feasible and can be carried out by the applicant. And then finally to show how students or trainees at all levels are going to be involved in the work, what their role is going to be, why one project is suitable perhaps for a PhD student but another is only suitable for an undergraduate, that kind of thing.

Nigel Roulet:　　　It articulates a new idea and it really gets us excited about some aspect of the science that this person is going to do. What you want people to go is say, wow, I never thought of that that way. This is really interesting. And I think people are really scared to kind of go that little extra way to put the higher risk elements in their proposals. But time and time again sitting around the committee table I see that that is what people are looking for when they're looking for innovation.

Normand Voyer:　　　One of the most common mistakes is to include too many projects in a five-page application without being able to provide the committee members with the entire methodology, the feasibility or all the necessary information to enable them to decide whether the project is viable and worthwhile. That's one of the major errors we encounter: too many poorly explained projects. It's better to submit fewer projects and explain them properly so we can evaluate their relevance and the impact they will have on the advancement of knowledge.

Kathleen Gilmour:　　　There has to be enough for the experts to convince them of the feasibility and the impact of the work. And often that involves referring to papers that you have published that show the techniques that can be used and setting the work in the context of the field you're working in. But at the same time, the non-expert can be overwhelmed by a wealth of experimental detail and so it's important to have in general statements about what the work hopes to accomplish and how it's going to advance the field in language or in terms that are not specific to that particular field.

Nigel Roulet:　　　I would never advocate that anybody should inflate their budget. What I would argue is that you be perfectly honest in what you put forward. So if your research is research that costs a lot of money to do, state that. State that very clearly. There are a number of things that we put in our budgets that are pretty standard across all universities, so graduate students' expenses, those types of things are all straightforward. But it's in certain techniques, it's in certain analytical things and various things where the costs really begin to separate themselves out or, for example, where you're doing your research. There are some very high cost places that people do research and those type of things. You need to put those in, put them in and justify them but do not inflate them because these committees are very, very good at finding where there's excess in budgets.

Kathleen Gilmour:　　　In the grant application, there's an area for explaining overlap with other sources of funding and that's a good spot to be very explicit about what your other sources of funding cover and how that is different from the NSERC grant. In the proposal itself, you need to focus on the work that is being proposed for the

NSERC Discovery Grant and the long-term objectives, the short-term objectives and so on. But explaining the relationship with other research support can go into this other section ...You can, for example, provide the abstract for that other grant but also provide a summary statement as to how the research that you're proposing for your Discovery Grant is different from, distinct from, perhaps complemented by the CIHR-funded research but definitely different from it.

Normand Voyer: You need a budget that is very consistent with the research being proposed. Also, it's very important that researchers who have received several grants from various sources clearly demonstrate that these grants do not overlap in terms of budgets, design or research. The committee members pay a great deal of attention to ensuring that research projects do not receive double funding.

Voice-over: Forms 100 and 101 both contain sections related to training. Form 100 can be used to demonstrate that you have trained students at all levels or all levels available to you, and that those students have produced papers, presented at conferences, won awards and gone on to related careers. In Form 101, you have an opportunity to discuss how the training will continue with the new grant, describing how students or other trainees will be involved in the research or have access to value-added experiences such as research trips, conferences and workshops.

Kathleen Gilmour: It's important to be explicit about who you've trained, where they've gone onto, how they've been involved in publications. Seeing students as first authors on the publications is really important or students that have presented at conferences. It's often not possible to list all of the conference presentations but you can still provide statistics like my 10 graduate students have given 10 conference presentations at international or national conferences over the last six years. That kind of information provides the reviewer with a statement about what you're doing for your students.

Normand Voyer: People really have to have a very good plan, demonstrate that they have an idea as to how the students will be used, how the highly qualified personnel will be used to conduct the research, but also how the research will help train these people in a very special way, including in the niche areas in which Canada needs highly trained scientists. And it's especially important that young researchers have a training plan. They can't simply say, "I want five students to conduct research."

Nigel Roulet: In many cases, you're writing papers where you're writing with students and that should be made clearly obvious in the way that you're presenting the material, in highlighting that the students are there because we know that when part of training people is – the training's not done when the science is done. The training is done when the science is out the door, when it's on its way to the peered evaluation journals. That's a really important part of the training of science. And one way to demonstrate clearly that you're accomplishing the task in training people is to get your students to publish, to get them to go through that whole referee review process that goes on with the journals so to do those types of things.

4

Christian Reber: I work at a large university so we have PhD students, master's students and undergrads involved in research. Very often nothing is said about how the undergraduates contribute, what their training is. All we get is a number, so and so many. It would be really helpful if in a paragraph or in a couple sentences the applicant would explain what the role is, what the undergraduates do and how they're involved in learning. It's not just that they work in a lab. They also need to understand what they're doing, what the background is, what the goal is of the research.

Jacques Marchand: However, I would say that the same comment applies to master's and doctoral students. If there is virtually no information on how the students are to participate in the research program, it casts doubt in the reviewers' minds and they are left wanting more information.

Normand Voyer: Also, the committee members attach importance to what the students or members of the research team do after having received their training. Do they have good jobs? That's an indication that they have been well trained and that the researcher also helps them with their future careers. That's very important.

Jacques Marchand: In general, when we review an application, and we have no information on the environment in which the students will be trained, we start asking ourselves questions. And it's really too bad because there are many applications that have very little information on this aspect of the issue, whereas in most cases, researchers have great stories to relate such as being part of a research centre, being involved in collaborations with colleagues from other disciplines, planning to send students on internships in other laboratories in Canada or abroad. These are all elements that will improve student training over the next five years.

Voice-over: Even the most brilliant idea can be diminished if a key detail is left out or if an application contains typos and spelling mistakes. It is very important to follow the instructions for each form, and to present the information as requested.

Kathleen Gilmour: Obviously the content is the most important thing but the people who are reviewing the grants have to read a lot of grants in a short period of time. And it's important to make their life as easy as possible...Follow the rules in terms of the font sizes, the number of pages, the length of the sections. It's not a tough one. Just if you follow the rules, it'll make it easier for the grant reviewers to read the grants and then they can focus on the content rather than being distracted by things that are not according to the formatting rules.

Normand Voyer: Most of the applications that we evaluate are very well prepared. Those that stand out, those that are particularly good are the ones that are clearly written and easy to read, also the ones with clear, specific ideas, whose objectives are well defined and whose approach is well established, and whose methodology is well described. It's better to submit applications with fewer projects, but that are very well organized, where we are convinced that the applicants not only know what they are doing

5

and how they will advance science, but also how they intend to implement the project. Also, if problems happen to arise, the researcher has already anticipated them and has already proposed solutions.

Jacques Marchand: Unfortunately, there is no magic formula and the characteristics of good applications will probably vary from one discipline to another, but I think one of the secrets is making sure to have colleagues read your application. That takes a lot of time and it's obvious that a good grant application, especially Discovery Grants program applications, can not be completed within a few days; completing these applications takes several weeks.

Nigel Roulet: If you have any colleagues in your department or an allied department that have sat on any of these committees, I would recommend that you ask them to review and to look at it because they will pick out the various different things, the points that may be important, the little points that you've overlooked when you're doing it because you do tend to get tunnel vision when you're writing these proposals.

Jacques Marchand: I think people should submit applications in the language in which they are most fluent. Make sure to present the information properly. Regardless of the language, the application will be evaluated properly.

Normand Voyer: The Discovery Grants competition is highly competitive. So every time you prepare a grant application for that program, you must pay close attention to all the criteria and clearly show how you meet all the criteria when preparing the application.

Nigel Roulet: Clarity, writing in simple English, telling a story in your proposal, setting it up with some clear, large-scale objectives that relate to a big picture and then scaling them down to the specific things that you want to do over the next five years and why are those important to do? What are the really exciting questions you're going to answer? What's really innovative about what you're doing? Those types of things are what a good proposal has to do. It has to hit all those elements.