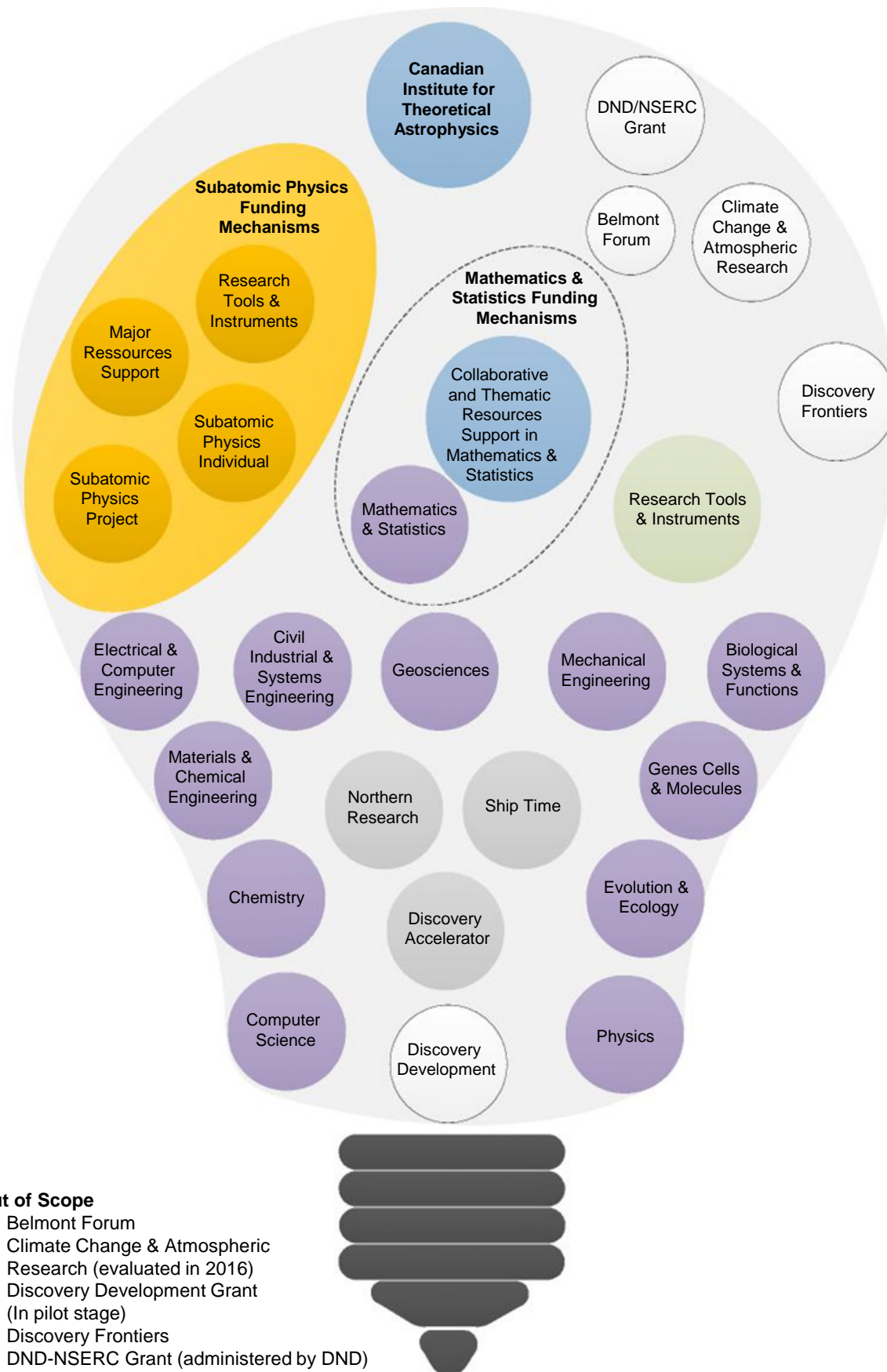


Evaluation of Discovery Research (2020) - Main Conclusions & Recommendations

Evaluation Scope



- Out of Scope**
- Belmont Forum
 - Climate Change & Atmospheric Research (evaluated in 2016)
 - Discovery Development Grant (In pilot stage)
 - Discovery Frontiers
 - DND-NSERC Grant (administered by DND)

Program description

The Discovery Research Program includes a wide range of funding opportunities which are expected to enhance the capacity of Canadian researchers to further our shared understanding of natural sciences and engineering (NSE) through the production and dissemination of high-quality research and the training of highly qualified personnel (HQP).

Evaluations Questions

1. How effectively does the Discovery Research Program support excellence in research in Canada?
2. To what extent and how effectively does the Discovery Research suite of program (supplements, Research Tool and Instruments (RTI), institutes and funding mechanisms) address the needs of the natural sciences and engineering research communities?
3. How does the Discovery Research Program support the new generation of researchers?
4. How do mechanisms and approaches implemented by NSERC support diversity among Discovery applicants?

Supporting Research excellence in NSE

In Canada, the Discovery Research Program is a pillar of the research funding ecosystem in natural sciences and engineering. During the 2013 to 2017 evaluation period, NSERC invested just over \$2 billion in the program components covered by this evaluation. In an international context where an increasing number of countries engage in fundamental and curiosity-driven research, the program enhances Canada's capacity to remain competitive, and to train, attract, and retain innovative researchers.

A well-established measure of success in fostering excellence is a research community's ability to meaningfully hire HQP. Overall, evaluation findings confirm that funding provided through the Discovery Research Program is predominantly used to hire HQP in research programs (e.g., Over one-half (52%) of Discovery Grant funding is used for students and postdoctoral fellows' salaries).

The Discovery Grant (DG) component represents an average investment of \$369 million per year. Findings strongly support the view that the program's fundamental logic – whereby a large base of researchers receive a meaningful grant-in-aid (including access to supplementary funding to address specific needs) – is sound and responds to a well documented need to sustain curiosity-driven research in Canada in the NSE. At any given time, roughly 10,000 researchers in Canada hold a Discovery Grant (average success rate 64%); approximately 2,000 researchers per year were awarded a 5-year individual Discovery Grant during the evaluation period.

RECOMMENDATION 1

Considering its fundamental role and positioning in the ecosystem of research funding in Canada, NSERC should maintain the Discovery Research Program, with the goal of ensuring its sustainability and its continued adaptability to emerging dynamics in the fields of natural sciences and engineering.

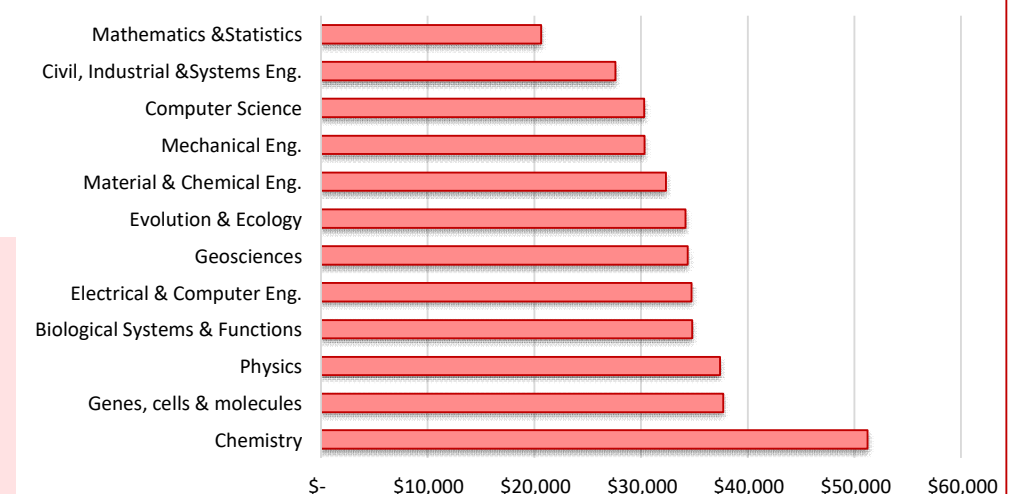
It is generally recognized that the costs of research can vary by discipline and that this may result in variations in the funding levels among different disciplines.

However, at the time of this evaluation, there was no publicly available information that could explain and justify the extent of these differences and how this translates into Discovery Grant Evaluation Group budgets and the range of average grant sizes across disciplines.

RECOMMENDATION 2

NSERC should explain the rationale for funding differences across disciplines, providing a clear description of the Discovery Grant funding levels and how they are established. This would reflect NSERC's commitment to ensuring a transparent management of the program, it would allow researchers to be adequately informed at the time of their application, and it would provide them with an opportunity to plan accordingly.

Average annual amount awarded by evaluation group for individual Discovery Grant



Source: NSERC Administrative Data 2013-2017

Evaluation of Discovery Research (2020) - Main Conclusions & Recommendations (Con't)

Supplements (DAS, NRS & ST)

The funding supplements: Discovery Accelerator Supplement (DAS), Northern Research Supplement (NRS) and Ship Time (ST) provide highly complementary support that greatly enhances the Discovery Research Program's ability to respond to researchers' needs

Discovery Accelerator Supplement

- Evaluation findings provided clear evidence that the supplements recipients are, indeed, in a position to intensify the implementation of their promising research programs, however, some uncertainties appear to remain in the research community as to the actual purpose and allocation process for DAS.
- Main benefits reported: the funding has allowed them to accelerate research; support exploration of new lines of inquiry; improve international competitiveness; increase international visibility; hire additional HQP; conduct high-risk, more collaborative & interdisciplinary research.

Northern Research Supplement and Ship Time

- The NRS and ST are directly aligned with Canada's interests in northern research and research involving oceans and other large bodies of water and help to meet the high cost of research in these environments.
- Main benefits reported: the funding has allowed awardees to cover costs unique to research in the North/access to vessels and research equipment; leverage other funding or support; engage with northerners (specific to NRS); support high-risk research; support research collaborations. It has also contributed to the advancement of research program; quality of HQP training; major advances in the discipline.

Funding Mechanisms: SAP and Mathematics and Statistics

The funding mechanisms for subatomic physics (SAP) and mathematics and statistics have emerged incrementally over time. The evaluation has found that, while there is a strong support for the current SAP funding mechanism, views diverge on the extent to which the funding mechanism for mathematics and statistics meets the current needs of that community of researchers.

SAP Funding Mechanism

- The SAP funding mechanism is long-standing and reflects the nature of the research undertaken; evidence from the evaluation has demonstrated that it is serving the specific needs of this community.

Funding Mechanism for Mathematics and Statistics

- In contrast, the funding mechanism for mathematics and statistics was implemented more recently.
- Since 2014 it has had a fixed proportional relationship between the funding for Collaborative and Thematic Resources Support in Mathematics and Statistics (CTRMS) and the funding to individual Discovery Grants.
- This approach to funding isn't serving the community's needs.

RECOMMENDATION 4

NSERC should consider separating the management of the funding for individual mathematics and statistics Discovery Grants from the management of the funding for institutes provided by CTRMS.

Equity, Diversity and Inclusion (EDI)

- Ensuring that all qualified Canadians have access to and benefit from its programs is a longstanding goal for NSERC and are the basis for the tri-agency EDI action plan.
- The Discovery Research Program is in the process of implementing changes to ensure fair access and support for underrepresented groups in all fields of NSE in the research ecosystem.
- Comprehensive data on a number of identity dimensions of program recipients is currently lacking.

RECOMMENDATION 6

NSERC should pursue the implementation of its EDI principles as they apply to activities funded through the Discovery Research Program. This includes, among other things: 1) continuing to collect and analyze new, broader data to better understand the participation of all underrepresented groups; 2) continuing to provide the required support to both grant applicants and reviewers to ensure that the activities they undertake with the support of the Discovery Research Program reflect these principles.

Research Tools & Instruments

The RTI funding complements support provided through the Canada Foundation for Innovation and other funders of equipment and infrastructure.

- The RTI funding provides critical support needed for the successful implementation of research funded by the Discovery Research Program and other NSERC programs.
- With its current level of funding, RTI only supports one fifth of the applications submitted by the community.
- RTI support is highly valued by funding recipients, but does not address the needs of most applicants who are simply unable to secure funding.
- Evaluation findings indicate that only half of the funded researchers perceive that they have the equipment required to conduct cutting-edge research. This issue is particularly felt by researchers from small institutions – where lower success rates were reported, and researchers were less inclined to indicate that their equipment was fit for cutting-edge research. As a result, RTI is not in a position to respond to the needs of those it is intended to serve.

RECOMMENDATION 3

NSERC should clarify its objectives with respect to the nature and level of support it provides for research tools and instruments that enable researchers to carry out leading edge research funded by the Discovery Research Program and other NSERC programs. NSERC should revisit the RTI budget in order to enable the program to meet the needs of the community.

Institutes

- A number of research institutes in mathematical, statistical, and natural sciences have been established in Canada. They have broadened the range of activities in which researchers can engage to collaborate, create new knowledge, enhance their skills, build their professional networks, and facilitate their transition and growth as researchers.
- Some of these institutes have received funding from NSERC, through various programs and, more recently, from the Discovery Research Program.
- There is a strong rationale for supporting the work of these institutes, as they directly contribute to research excellence and fulfill an important role that is highly complementary to the Discovery Grant provided by the program.
- The incremental approach used to date by NSERC to support these institutes has succeeded in providing them with fairly stable funding. However, the most significant gap that NSERC now faces results from a lack of a coherent vision and strategy on how to support research institutes, and to provide this funding in a manner that is consistent with the principles governing all its granting activities.

RECOMMENDATION 5

NSERC should clarify its vision and develop a comprehensive framework and guidelines that communicate how NSERC intends to provide ongoing support to research institutes in Canada, including the potential of expanding to other fields of research. Moreover, in order to improve accountability and assess impacts, NSERC should implement a more rigorous monitoring and reporting framework for the institutes that it supports.

Supporting early-career researchers

- The support to early-career researchers (ECRs) is another agency-wide priority of NSERC.
- During the period covered by the evaluation, ECRs have had comparable access to the key program components.
- Concerns were raised around the level of funding being provided in order to meaningfully assist these individuals in establishing their careers.
- Interviews with past NSERC prize winners identified how pivotal DG had been, particularly in the early stages of their career, in building research teams with a capacity to match their ambitious research programs.
- In terms of research outputs, funded ECRs outperformed unfunded ECRs.