Long Range Plan 2012
Mathematics and Statistics

July 19, 2011

Consultations, winter 2011

2

- Visits to mathematics and statistics departments across the country
- Call for discussion documents April 18
- Extended deadline for department chairs May 15
- Steering committee in Montreal, January 29 -- 30
- Regular conference calls
- Steering committee in Edmonton, June 1 -- 3

Next steps

3

- Presentations to summer meetings: CMS, SSC, CAIMS
- Writing first drafts of pieces (all)
- Review and editing by writing subcommittee (RK, EB, NR) with advice from science writer
- Ongoing discussion with NSERC over parameters of envelope and stable funding
- Work with NSERC and with Liaison committee (large and small) on recommendations for next competition
- Aim for (completed) draft by early November

Concerns, winter 2011

4

- aspects of evaluations
  - HQP counts for 1/3 of total points; separate this from assessment of quality
  - HQP assessment needs to consider size of the department and existence of graduate program
  - Merit evaluation seems to be unstable
- the trend to fewer, larger, grants
  - Mathematics needs broad base of support
  - Undergraduate research at small places important to the pipeline
  - Research capacity built at small places in danger of disappearing
  - Possibly larger negative impacts on women in mathematics

Concerns, winter 2011

5

- envelope model might lead to further shrinking of DGs
  - Institutes are important but shouldn't encroach on grant money
  - How will DGs be protected
  - How will new activities, e.g. new institutes, be funded
- Interdisciplinary work is at risk of falling through the cracks
  - Biostatistics, actuarial science, machine learning, …
  - Mathematicians leaving EG 1508 for groups with higher grant sizes

Concerns, winter 2011

6

- Institutes not having as much impact in statistics
  - NPCDS created a better sense of community
  - Model for support better suited to statistics
  - How can this fit into envelope without damaging DG funding
- April – current evaluation system is broken
  - Several factors conspired to damage competition results this year
  - Secrecy and rigidity at NSERC made things worse
  - election hampered flow of information

Applied Maths submissions

7

- Advances in research often driven by advances in other fields, e.g. instrumentation
- Importance of large data sets, globally curated, and IT infrastructure to support this
- Serious barriers to interdisciplinary research – evaluation committees still firmly set within conventional disciplines
- The difficulty of interdisciplinary research
- "Interdisciplinary research with a primarily mathematical core is being threatened"
- Funding barriers between health research and NSERC-supported research; between SSHRC and NSERC

… Applied Maths submissions

8

- Major concerns about end of MITACS
- Pressure on math-finance researchers for fundraising, professional training
- Suggestions for improved support from institutes; thematic programs don't always work
- Strong support for the institutes; some criticism of overlap

Math Dept, UBC; Math biology, U Alberta; Math Finance, McMaster, U Toronto, U Calgary; Individuals; Math Dept, UA

Draft outline

9

1. Executive Summary & Recommendations
2. Context and Opportunities
3. Infrastructure in Canada: Discovery grants
4. Infrastructure in Canada: Institutes
5. Infrastructure in Canada: People
6. Building Canada's research capacity
7. Building to the future
8. Recommendations

- Appendices

Goals for the LRP

10

- Promoting mathematical and statistical sciences: innovation, training, fundamental research, interdisciplinary research
- Recommendations for managing the existing envelope
- Guidelines for evaluation
- Strengthening the pipeline
- Ideas and platforms for creating a much larger envelope
- Ongoing involvement of scientists at NSERC, beyond the peer review group

Input from Applied Mathematics

11

- Data on mathematical researchers supported by other EGs at NSERC
- Suggestions re institute programs well-suited to AM
- Examples of success stories in Canadian AM research
- Thoughts on opportunities for funding through NSERC's partnership programs
- Ideas for working with MPrime to ensure we don't lose what we've built in industry-related research
- "big ideas" for strengthening math sciences research

Draft outline

12

2. Context and Opportunities
   - Highlight performance in math and stat in Canada
   - Success stories, outstanding contributions
   - Importance to Canada's S&T strategy
   - Impact on economy and quality of life
   - "sea change" in the demand for and importance of mathematics in other research areas
   - blurring of the boundaries between disciplines
   - data deluge and demand for new statistical science
   - new recognition of the importance of STEM from government, industry, and education
   - Overview of research infrastructure in Canada: CRCs, CFI, NPCDS, MITACS, institutes, DGs, ...

Draft outline

13

3. Infrastructure in Canada: Discovery grants

The 'bread and butter', preservation of basic research, importance of dialogue with community, suggestions for current problems

- Importance of discovery portfolio
- Data on historical funding, demographics; pressures on budget
- NSERC's international review and DG program review
- International comparisons
- Need to address current structural problems
- Exacerbated by secrecy and rigidity
- Build in sensitivity to systematic ranking differences between math and stats in a transparent way
- Build in accountability to total funding available, while maintaining separation of merit evaluation from amount of award

Draft outline

14

4. Infrastructure in Canada: Institutes

- Impact on research, expanded opportunities, Institutes as facilitators
- Explain the national structure – 3 + 1; the leveraging
- International comparisons – esp. NSF
- Mechanism for evolution, guidelines for evaluation
- Program(s) for supporting isolated researchers
- Independent framework for Statistics; use existing infrastructure
- Improve national coordination
- The Discovery envelope: fix a percentage institute activity, as at NSF; suggestion 18%
- BIRS is a unique facility – review and renewal coordinated with four funding agencies

Draft outline

15

5. Infrastructure in Canada: People

- Demographics, recruiting
- PGS and PDF at NSERC (part of the envelope)
- New types of training
- HQP as a cost of research
- International comparisons
- Proposals for changes in Team Grants, USRAs
- Proposals for "RUI" type programs, possibly through institutes
- Global connections – MITACS/MPrime, Accelerate, …
- Building the pipeline from K-12 and on; PromoScience

Draft outline

16

6. Building research capacity

- Implementing the long range plan
- Ongoing scientific oversight
- Ongoing scientific input on best practices
- Liaison with institutes
- Growing the envelope: RPP, tri-council initiatives, international initiatives
- Commitment from NSERC to consultation with community
- Scientific leadership in continuing dialogue with NSERC and other funding agencies

Draft outline

17

7. Building to the future
   - Outside the envelope – computational sciences, new initiatives on global problems
   - New international initiatives
   - NSERC RPP programs
   - Building with MPrime and its successor
   - Building the pipeline
   - New scientific initiatives – sustainability, planet earth (2013), "challenge problems"
   - Our chance for the big ideas

Challenges

18

- Current funding on the edge, likely to decrease
- CCA report on performance indicators – timing quite unclear, possibly summer 2012
- Lack of support for/belief in fundamental research
- Need detailed evaluation guidelines
- Mechanisms for oversight of plan
- Need to avoid 'divide and conquer'
- Scope of the plan

Vision

19

- "What would success look like?"
- Engagement of scientists across the spectrum
- NSERC as excited about mathematics as we are
- Conveying the strength in breadth and diversity
- Expanded opportunities for research funding
- Existing opportunities better suited to the discipline and more effective
- Use stories to show how our strength supports current priorities of government, society