Pennywise, Pound Foolish

Major Resources Support Program Moratorium Impact Report

Office of Kennedy Stewart, MP
Official Opposition Critic for Science & Technology
August, 2012

Executive Summary

In 2012, the Conservative Government placed a moratorium on the Natural Sciences and Engineering Research Council of Canada's (NSERC) Major Resources Support Program (MRS). Brought forward without consultation, it may force as many as one third of the facilities receiving MRS funding in 2011 to close, mothballing at least $80 million in unique scientific equipment. Surviving facilities will have to fire staff and reduce services, with many unable to repair or upgrade multi-million dollar equipment. The New Democratic Party is calling for immediate reversal of the MRS cuts.

Background and Study Specifics

The MRS provided $35 million in 2010-2011 to unique scientific facilities, assisting with salaries for research support staff, operations, maintenance, and international facility access. Prompted by widespread objections to MRS funding termination, the NDP worked with senior Canadian scientists to construct a questionnaire which was then distributed to the principal investigators at MRS funded institutions. This report contains the results of this survey.

Survey Results from All Facilities

Questionnaires completed by scientists working at 28 of 39 (72%) facilities receiving MRS support in 2011 show these 28 facilities:

- Represent $2 Billion in total capital investment
- Employ 533 staff members
- Trained a total of 5667 post-doctoral fellows, students, and technicians in 2010-2011
- Assisted 9390 users in 2010-2011

All reporting facilities indicated funding cuts would greatly hamper current operations, including the *Canadian Coast Guard Ship Amundsen* and *the Canadian Neutron Beam Centre*. Many staff will be laid off, with training and research assistance impaired or eliminated.

Results from Closing Facilities

Barring any new sources of funding, at least eight institutions may permanently close, including: 1) The National High Field Nuclear Magnetic Resonance Centre; 2) The National Ultrahigh-Field NMR Facility for Solids; 3) The Canadian Centre for Isotopic Microanalysis; 4) The Canadian Charged Particle Accelerator Consortium; and, 5) Advanced Laser Light Source. These eight closing facilities collectively require just $1.3 million in MRS funding to remain operational and:

- Represent $81 Million in total capital investment
- Employ 51 staff members
- Trained 236 post-doctoral fellows, students, and technicians in 2010-2011
- Assisted nearly 500 users in 2010-2011

Major Resources Support (MRS) Background

The Major Resources Support (MRS) program provided grants through the Natural Sciences and Engineering Research Council of Canada (NSERC).[1] The main objective of the program was to support national Canadian scientific facilities which are unique nationally or internationally. MRS grants assisted with salaries for research support staff, operation and maintenance, and international facility access. Since 2001, NSERC has allocated $230 million to MRS, with $35 million provided during the 2010-2011 fiscal year.[2]

Since 2006, 69 facilities have benefitted from MRS funding, with 39 facilities currently receiving MRS funding (see appendix 4 for complete listing of current grant holders).[3] On April 19, 2012, NSERC announced the MRS program would no longer be accepting MRS applications, citing budget concerns from the federal government as the main reason for the moratorium.[4]

Report Rationale and Survey Development

This study was initiated in response to letters of concern from members of the scientific community concerned with cuts to basic scientific research funding. These scientists suggest the MRS cancellation will adversely impact Canadian research capacity. One letter (see appendix 1) signed by Professor David Bryce of the University of Ottawa and 46 other scientists states:

> ... this action will have drastic and irreversible effects on fundamental science and engineering research across Canada and internationally....There are now no funding streams dedicated to the purchase of scientific equipment or to operate nationally and internationally unique resources. The loss of the MRS program in particular means that resources built up over many years could be lost or made inaccessible due to loss of personnel needed to sustain the resource. As well, millions of dollars of equipment purchased through taxpayers' money will sit idle and gather dust due to a lack of operating funds... The loss of these programs is nothing short of a disaster for science in Canada.

Developed with input from senior scientists, a questionnaire was sent to scientists working at facilities receiving MRS grants during the 2010-2011 fiscal year, and fielded between June 6 and 18. A total of 28 of the 39 facilities (72%) receiving MRS funding responded. Participants were given the option of responding on the condition of anonymity. The cover letter (appendix 2) and questionnaire (appendix 3) are included in the report.

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[1] In 2006, MRS replaced the Major Facilities Access Program - a similar program in place since 1998.

[2] See NSERC "Facts and Figures" 2010-2011 <www.nserc-crsng.gc.ca/NSERC-CRSNG/FactsFigures-TableauxDetailles_eng.asp>.

[3] See NSERC "Awards Search Engine (1991-2011)" <www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais>

[4] NSERC's "Major Resources Support Program" page <www.nserc-crsng.gc.ca/Professors-Professeurs/RTII-OIRI/MRS-ARM_eng.asp> states: "As part of the Government of Canada's efforts to return to balanced budgets, the NSERC Major Resources Support (MRS) Program will no longer be accepting new applications at this time. Commitments for existing instalments will be honoured, however there will be a moratorium on the MRS Program."

Overall Survey Results

Tables 1 and 2 show responses for all 28 participating facilities.[5]

Table 1: Operations and Funding for all Responding Institutions (n=28)

Average years in operation	22 years
Total MRS funding received over lifetime	$67 million
Total capital investment	$1.8 billion
Facilities charging user fees	27/28
Facilities to close due to lack of MRS funding	8/28

Table 1 data show facilities receiving MRS funding have been operating an average of 22 years, receiving $67 million in total MRS funding. Total capital investment in these 28 facilities is close to $2 billion from public and private sources – including user fees charged at all but one facility. Most alarmingly, eight of the twenty-eight surveyed facilities – almost one-third – will close, or be put into extreme risk of closure, without continued MRS funding.

Table 2: Staffing, Training and User Participation for all Responding Institutions (n=28) [6]

		2011	**Total**
Training	Postdoctoral fellows	1802	**5667**
	Graduate students	2677	
	Other (e.g. technicians, undergraduates)	1188	
Staff	Part time	447	**533**
	Full time	86	
Users	Academic institutions	6699	**9390**
	For-profit organizations	390	
	Government research labs	227	
	Non-profit organizations	42	
	Foreign institutions	2032	

Table 2 shows data for the 2010-2011 funding cycle. Results show the 28 responding facilities trained 5667 post-doctoral fellows, graduate students, technicians or undergraduates in 2010-2011. They also employed 533 staff members, the vast majority of working part-time. Finally, these 28 MRS funded facilities assisted 9390 users in 2010-2011 – most from Canadian academic institutions or foreign institutions.

[5] Results are shown in aggregate to protect those participating on the condition of anonymity.

[6] Staffing numbers were reported by survey respondents and may reflect different accounting practices in counting users, staff, and trainees.

Survey Results from Closing Facilities

Of the 28 facilities completing surveys, 8 stated losing MRS funding may force closure.[7] These include: 1) National High Field Nuclear Magnetic Resonance Centre; 2) National Ultrahigh-Field NMR Facility for Solids; 3) Canadian Centre for Isotopic Microanalysis; 4) Canadian Charged Particle Accelerator Consortium; and, 5) Advanced Laser Light Source.[8] Tables 3 and 4 contain data provided by the eight closing facilities.

Table 3: Operations and Funding for all Closing Institutions (n=8)

Average years in operation	19 years
Total MRS funding received over lifetime	$12 million
Total capital investment for all closing facilities	$81 million
Total MRS funding received in 2010-2011	$1.3 million
Closing facilities charging user fees	8/8

Table 3 data show the eight facilities forced to close due to MRS funding cuts have been operating for an average of nineteen years and have collectively received twelve million dollars in lifetime MRS funding. Total capital investment in these eight facilities is over eighty million dollars. All closing facilities currently charge user fees.

Table 4: Staffing, Training and User Participation for all Closing Institutions (n=8)

		2011	Total	Lifetime	Total
Training	Postdoctoral fellows	46	236	247	**1549**
	Graduate students	105		556	
	Other (e.g. technicians, undergraduates)	85		746	
Staff	Part time	32	51	69	**166**
	Full time	19		97	
Users	Academic institutions	206	474	863	**1940**
	For-profit organizations	50		337	
	Government research labs	43		138	
	Non-profit organizations	1		35	
	Foreign institutions	174		567	

Table 4 shows aggregated results for the 2010-2011 funding cycle as well as lifetime staffing, training, and user statistics. Results show the eight closing facilities trained 236 post-doctoral fellows, graduate students, technicians or undergraduates in 2010-2011, but 1549 trainees over the life of the institutions. These eight facilities employed 51 staff members in 2010-2011, and

[7] The Polar Environment Atmospheric Research Laboratory (PEARL) is ceased full-time year-round operation in April 2012 because of the loss of funding, and although this facility also receives MRS funding, the loss of MRS funding is not the primary cause for its closure.

[8] Three of the eight closing facilities requested their survey information remain anonymous.

166 in total. Finally, these eight MRS funded facilities assisted 474 researchers in 2010-2011 and 1940 since they were created.

It is this last set of statistics regarding facilities slated to close due to lost MRS funding that shows the real impact of the funding cuts. The $1.3 million in government savings will result in the loss of over $80 million in capital investment, and the closure of facilities that have trained, employed or assisted 3655 researchers over the course of their lifetime. As these are unique facilities, the specialized training will not be replaced by other institutions within Canada. Collections may not be preserved and highly specialized equipment will fall into disuse. A significant, but intangible, value housed within these facilities is the collective experience and expertise of its staff, users and trainees. This resource requires long-term funding security during which the reputation and sense of community of a facility can develop.

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What Canada is Losing with MRS Cuts

Facilities receiving MRS funding house unique resources used by Canadian scientists and which attract users from outside of the country. As such, many facilities represent Canada's leadership role in diverse fields such as climate and deep-ocean science. Major consequences across the scientific and research community caused by the MRS moratorium include reduction in services and access, and the closure of facilities. Short descriptions are provided below to illustrate impacts on specific facilities. The Canadian Coast Guard Ship Amundsen and the Canadian Neutron Beam Centre provide examples of facilities severely hampered by the loss of MRS funding. The National Ultrahigh-Field NMR Facility for Solids, Advanced Laser Light Source and the Canadian Charged Particle Accelerator Consortium provide examples of what services are provided by closing facilities.

Canadian Coast Guard Ship Amundsen

Canadian Coast Guard Ship Amundsen has received $2.8 million in total MRS funding and is Canada's only icebreaker dedicated to research. Pictured on the new Canadian $50 bank note, the Amundsen can house a crew of up to 40 people and has a pool of state-of-the-art scientific equipment valued at $28 million. Researchers from 22 Canadian universities and 11 countries participate in the multidisciplinary research program jointly managed by the Canadian Coast Guard and Laval University. The MRS grant was the main funding source for the maintenance of the Amunsden's scientific equipment, and when funding ends in early 2013, seven of ten core technical positions will be terminated. The Amundsen's principal investigator expects:

> ... (1) the scientific yield of the Amundsen to decline; (2) the costs of chartering the icebreaker to increase substantially; (3) the frequency of instrument failure at sea to increase; (4) our ability to establish research partnerships with the private sector to weaken; (5) our capacity to train highly qualified personnel in a strategic field for Canada to erode; (6) the on-going consolidation of the arctic science community in preparation for the inauguration of the polar-class research icebreaker Diefenbaker (2017) and the Canadian High Arctic Research Station (2018) to halt; and, (7) the overall international competitiveness and reputation of Canada in Arctic science to plummet.

Canadian Neutron Beam Centre (Chalk River, ON)

The Canadian Neutron Beam Centre enables researchers to use neutron beams as tools for world-class materials research, which provides new understandings of materials and improves products for businesses. It is the only major neutron beam facility in Canada, and is part of an international network of about 20 such facilities around the world. This facility is a world-leader in the application of neutron beams to industrial research, working with researchers in heavy industries such as automotive, aerospace, defence, metal production, nuclear power, oil and gas, and rail to improve safety and performance of their products and services. In operation for 54 years, it was also home to Bertram Brockhouse, one of only three Canadians awarded the Nobel Prize in Physics, for his work in the 1950s developing neutron beams into research tools. Without MRS funding, the $30 million of installed capital in the neutron beam laboratory will be greatly underutilized, and the $500 million National Research Universal reactor that generates the neutrons will be further underutilized. The principal investigator outlines how the loss of MRS funding will affect educational and training opportunities:

> The educational mandate associated with NSERC funding has allowed us to broaden the mission of the Canadian Neutron Beam Centre to include extensive outreach activities. Every two years we run a 5-day neutron summer school with 40-50 attendees where the students are introduced to neutron beam methods… The staff expends considerable efforts to assist new users to design and carry out their experiments and then follows through the analysis phase to make sure that experiments work and yield published results. It is this consistent commitment to the users' success that has enabled us to grow the Canadian neutron user community. Falling back on the more limited (both in amount and scope) NRC support will leave us without the ability to carry out the user-training missions, but it will also constrain us as NRC's mission does not include a strong teaching or outreach component.

National Ultrahigh-Field NMR Facility for Solids (Ottawa, ON)

The National Ultrahigh-Field NMR Facility for Solids features the only Canadian-based 900 MHz Bruker Nuclear magnetic resonance (NMR) spectrometer - the most powerful instrument in the world dedicated exclusively to the study of solid materials. The facility will close without MRS funding, resulting in what the principal investigate describes as a "waste" of $10 million in capital equipment – including the spectrometer. The facility has trained 350 postdoctoral, graduate and undergraduate students over its seven year history as well as hosted 150 Canadian and international users.

Advanced Laser Light Source (Varennes, QC)

Advanced Laser Light Source (ALLS) is the first and only large-scale laser user facility in Canada, and the first of only a handful of similar facilities in the world. ALLS continues to demonstrate excellence in ultrafast science and its applications, allowing Canadian scientists to exercise a world leadership in numerous fields, including physics, chemistry, medicine, and biology. ALLS is also open to researchers from the private sector, helping to promote innovation in Canadian industries. In turn, the increased worldwide visibility brought about by ALLS is attracting excellent researchers, postdoctoral fellows and students to Canada. The MRS has been used mainly to support the salary of the technicians and engineers that operate and maintain ALLS.

"…the sudden cut of the MRS is just a bullet to the head…"

Therefore, without another source of funding to replace the MRS, this $21 million facility will close in early 2014. The principal investigator notes:

> ...what also came as a shock to us was the manner in which these cuts were announced. One would think that with the experience and know-how of NSERC, that a reasonable and gradual fading out of the MRS would be put in place. This would at least have allowed ALLS to search for other sources of funding to support its operation and maintenance. To the contrary, the sudden cut of the MRS is just a bullet to the head, and many of my colleagues at ALLS are currently running around to search for funding sources to replace the MRS.

Canadian Charged Particle Accelerator Consortium

The Canadian Charged Particle Accelerator Consortium (CCPAC) provides charged particle beams for analysis and modification of materials to a wide variety of academic and other users from Canada and abroad. These services provide invaluable support to fields such as fundamental condensed matter physics. MRS grants pay for the salary of highly trained and specialised technicians who maintain the facility and operate equipment. CCPAC's closure will have heavy impacts within the material sciences community, with its principal investigator reflecting:

> ...in materials science, a project consists of many steps: a new material to be investigated needs to be designed, made, tested, modified, characterized and analyzed. Many of these steps require access to special facilities such as computing facilities, electron microscopes, synchrotrons, or particle accelerators. Each of these facilities provides a little piece of the puzzle. Without these essential pieces, the whole puzzle becomes unsolvable.

Appendix 1: Letter of Concern

May 3, 2012

Re: NSERC MRS and RTI programs

To: The Honourable Christian Paradis, MP, Minister of Industry
Dr. Suzanne Fortier and the members of NSERC Council
Prof. James Blatz and the members of the NSERC Committee on Grants and Scholarships

cc: The Right Honourable Stephen Harper, MP, Prime Minister
The Honourable Gary Goodyear, MP, Minister of State (Science and Technology)
The Honourable Thomas Mulcair, MP, Leader of Her Majesty's Official Opposition
The Honourable Bob Rae, MP, Leader of the Liberal Party of Canada
The Honourable Kennedy Stewart, MP, NDP critic for Science and Technology
The Honourable Hélène LeBlanc, MP, NDP critic for Industry
The Honourable Ted Hsu, MP, Liberal critic for Science and Technology
Dr. Gilles G. Patry, President and CEO of the Canada Foundation for Innovation

In her recent statement on *Economic Action Plan 2012*, Natural Sciences and Engineering Research Council (NSERC) president Dr. Suzanne Fortier "welcome[d] continued dialogue and exchange with the research community as we move forward". As researchers in many fields of natural sciences and engineering, we are writing to express our deep concern over the elimination of both the Major Resources Support (MRS) and the Research Tools and Instrument (RTI) programs of NSERC. This action will have drastic and irreversible effects on fundamental science and engineering research across Canada and internationally.

MRS and RTI are broad-based programs that support unique national (and international based in Canada) research facilities and the purchase of equipment critical to the discovery, innovation, and training capability of Canadian researchers. They are crucial to the support of research in many areas ranging from theoretical astrophysics, through polar research, through DNA barcoding, to materials research: in short, the full gamut of the research and innovation enterprise. These are programs so foundational to research in Canada that one would think that eliminating them was inconceivable. The funding provided enhances the training of thousands of highly qualified personnel in science and engineering.

The federal government and NSERC, through cuts to Tri-Council funding, have now killed these programs. Along with NSERC's Discovery Grant, these are the programs which supported fundamental research. There are now no funding streams dedicated to the purchase of scientific equipment or to operate nationally and internationally unique resources. The loss of the MRS program in particular means that resources built up over many years could be lost or made inaccessible due to loss of personnel needed to sustain the resource. As well, millions of dollars of equipment purchased through taxpayers' money will sit idle and gather dust due to a lack of

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operating funds. The negative impact on the training of the future generation of scientists cannot be overstated.

NSERC suggests that the Canada Foundation for Innovation (CFI) may pick up the slack in these two areas. However, the reality is that CFI is a different organization with different objectives and application requirements. CFI programs do not compensate for the loss of two core programs at NSERC.

Similarly, investments by the government in industrial and/or targeted research programs at NSERC do not compensate for the loss of the two core programs which enable a broad spectrum of research.

The loss of these programs is nothing short of a disaster for science in Canada. It continues the selective reduction and elimination of programs that support fundamental and discovery-driven research. This will drag down the entire research enterprise as the fundamental research of today produces the applied knowledge of tomorrow. We urge you to reconsider this direction and reaffirm NSERC's commitment to these vital programs.

Sincerely,

Prof. David L. Bryce
Department of Chemistry, University of Ottawa, Ottawa, ON K1N6N5
MRS funding: National Ultrahigh-Field NMR Facility for Solids
dbryce@uottawa.ca
613-562-5800 ext 2018

On behalf of:

Judy Acreman
Canadian Phycological Culture Centre, University of Waterloo

Prof. Bradley R. Anholt, CRC
Department of Biology, University of Victoria
MRS funding: Bamfield Marine Sciences Centre

Prof. Michèle Auger
Département de chimie, Université Laval
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Benoit Beauchamp
Department of Geoscience, University of Calgary
MRS funding: Kluane Lake Research Station

Prof. Jules Blais
Biology and Environmental Toxicology, University of Ottawa
MRS funding: Laboratory for the Analysis of Natural and Synthetic Environmental Toxicants

Prof. Michael Brett
Electrical and Computer Engineering, University of Alberta
MRS funding: Nanofabrication facility support

Prof. David R. Bundle, FRSC
Department of Chemistry, University of Alberta
MRS funding: NANUC: a national facility for high field NMR resource for applications in chemistry

Prof. Michael D. Buschmann, Canada Research Chair
Department of Chemical Engineering and Institute for Biomedical Engineering, Ecole Polytechnique
Member of MRS Selection Committee

Prof. Ian D. Clark
Department of Earth Sciences, University of Ottawa
MRS funding: IsoTrace AMS Facility
MRS funding: Hatch lab: isotope and noble gas geochemistry for earth and environmental sciences

Prof. Brian Colman
Emeritus Professor of Biology, York University
MRS funding: Canadian Phycological Culture Centre: a facility supporting research on algae and cyanobacteria

Prof. Christian Detellier
Department of Chemistry, University of Ottawa
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Anne de Vernal
GEOTOP & Département des sciences de la Terre et de l'atmosphère, Université du Québec à Montréal
MRS funding: Canadian participation in the integrated ocean drilling program

Prof. James R. Drummond, FRSC
Department of Physics & Atmospheric Science, Dalhousie University
MRS funding: Polar Environment Atmospheric Research Laboratory (PEARL)

Prof. Marc Ekker
Department of Biology, University of Ottawa
MRS funding: Canadian resource center for zebrafish genetics

Prof. Pierre Francus
Centre Eau Terre et Environnement, Institut National de la Recherche Scientifique
MRS funding: Canadian Participation in the International Continental Drilling Program

Mark Gallerneault, PhD, PEng
Member of MRS Selection Committee

Prof. Kalle Gehring
Department of Biochemistry, McGill University
MRS funding: Quebec/Eastern Canada high field NMR facility

Prof. Gillian Goward
Department of Chemistry, McMaster University
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Elizabeth Hampson
Department of Psychology, University of Western Ontario
MRS funding: A neuroendocrinology assay laboratory at the University of Western Ontario

Prof. Larry M. Heaman
Department of Earth & Atmospheric Sciences, University of Alberta
MRS funding: Infrastructure support for the Canadian Center for Innovative Geochronology

Prof. Paul Hebert, FRSC
Biodiversity Institute of Ontario, University of Guelph
MRS funding: Canadian centre for DNA barcoding

Prof. Hani Henein
Department of Chemical and Materials Engineering, University of Alberta
MRS funding: Resource for the Innovation of Engineering Materials

Prof. Yining Huang
Department of Chemistry, University of Western Ontario
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Edward A. Johnson
Department of Biological Sciences, University of Calgary
MRS funding: Biogeoscience Institute

Prof. Kim Juniper
School of Earth and Ocean Sciences, University of Victoria
MRS funding: Access to the Canadian Scientific Submersible Facility

Prof. William E. Kieser
Department of Physics, University of Ottawa
MRS funding: IsoTrace AMS Facility

Prof. Scott Kroeker
Department of Chemistry, University of Manitoba
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Albert E. Litherland, FRSC, FRS
University Professor Emeritus, Department of Physics, University of Toronto
MRS funding: IsoTrace AMS Laboratory

Prof. Scott MacDougall-Shackleton
Departments of Psychology and Biology, University of Western Ontario
Advanced Facility for Avian Research

Prof. Sylvain Moineau
Département de biochimie, de microbiologie et de bio-informatique, Université Laval
MRS funding: Félix d'Hérelle reference center for bacterial viruses

Prof. Dariush Motazedian
Department of Earth Sciences, Carleton University
Portable Observatories for Lithospheric Analysis and Research Investigating (POLARIS)

Prof. John Preston
Engineering Physics, McMaster University
MRS funding: Brockhouse Institute for Materials Research

Prof. Robin W. Renault
Department of Geological Sciences, University of Saskatchewan
Chair, MRS Grant Selection Committee, 2009-2010

Prof. John A. Ripmeester, FRSC
Adjunct in Department of Chemistry, Carleton University
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Heather Roshon, M. Sc.
Technical Curator, Canadian Phycological Culture Centre, University of Waterloo

Prof. Dominic Ryan
Physics Department, McGill University
MRS funding: Canadian Neutron Beam Centre

Prof. Robert Schurko
Department of Chemistry and Biochemistry, University of Windsor
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Simon Sharpe
Molecular Structure and Function, Hospital for Sick Children
Department of Biochemistry, University of Toronto
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Robert Sheath
Department of Biological Sciences, California State University San Marcos
Member of MRS Selection Committee

Prof. Lynne Sigler
Devonian Botanic Garden, University of Alberta
MRS funding: University of Alberta microfungus collection and herbarium (UAMH)

Prof. Brian D. Sykes, FRSC
Department of Biochemistry, University of Alberta
MRS funding: NANUC: a national facility for high field NMR resource for applications in chemistry

Prof. George J. Sofko
Institute of Space and Atmospheric Studies, Department of Physics and Engineering Physics, University of Saskatchewan

MRS funding: The Canadian SuperDARN/PolarDARN facility

Prof. John Vederas, FRSC
Department of Chemistry, University of Alberta
MRS funding: NANUC: a national facility for high field NMR resource for applications in chemistry

Prof. Roderick E. Wasylishen, CRC, FRSC (Member of MRS Committee, 2007-2010)
Department of Chemistry, University of Alberta
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Prof. Dominique Weis, CRC
Department of Earth and Ocean Sciences, University of British Columbia
MRS funding: Pacific Centre for Isotopic and Geochemical Research

Prof. Mary Anne White
University Research Professor of Chemistry and Physics, Dalhousie University
MRS funding: Atlantic Regional Facilities for Materials Characterization

Prof. Gang Wu
Department of Chemistry
MRS funding: National Ultrahigh-Field NMR Facility for Solids

Appendix: List of MRS-funded projects (2010-2011) listed by province where the principal investigator is located

Ontario

Fields Institute for Research in Mathematical Sciences
Laboratory for the Analysis of Natural and Synthetic Environmental Toxicants
National ultrahigh-field NMR facility for solids
Hatch lab: isotope and noble gas geochemistry for earth and environmental sciences
IsoTrace AMS facility
Canadian Phycological Culture Centre: a facility supporting research on algae and cyanobacteria
Polar Environment Atmospheric Research Laboratory (PEARL)
Canadian resource center for zebrafish genetics
A neuroendocrinology assay laboratory at the University of Western Ontario
Canadian centre for DNA barcoding
Portable Observatories for Lithospheric Analysis and Research Investigating (POLARIS)
Canadian Institute for Theoretical Astrophysics/Institut Canadian d'astrophysique theorique
Brockhouse institute for materials research
St. John's centrifuge modelling facility

Quebec

Canadian participation in the integrated ocean drilling program
The canadian research icebreaker Amundsen: a national resource with an international mandate
Canadian participation in the international continental drilling program
Quebec/Eastern Canada high field NMR facility
Félix d'Hérelle reference center for bacterial viruses
CRM's major 5-year plan: Investing in people and intellectual capacities, supporting cutting edge mathematical research, exceptional new opportunities, partnerships and synergies
Canadian Neutron Beam Centre
The Compute/Calcul Canada (CC)
Access to the national advanced laser light source (ALLS) facility
Station de recherche de Whapmagoostui-Kuujjuarapik

Alberta

Kluane Lake Research Station
Nanofabrication facility support
NANUC: a national facility for high field NMR resource for applications in chemistry
Infrastructure support for the Canadian Center for Innovative Geochronology
Resource for the Innovation of Engineering Materials
Biogeoscience Institute
University of Alberta microfungus collection and herbarium (UAMH)

British Columbia

Pacific Institute for the Mathematical Sciences
Bamfield marine sciences centre
PNCSRF Pacific Northwest Consortium Synchrotron Radiation Facility
Access to the Canadian Scientific Submersible Facility
Centre for molecular and materials science at TRIUMF
Pacific Centre for Isotopic and Geochemical Research

Nova Scotia

Canadian cosmogenic nuclide exposure dating facility
Major resources support for the aquatron laboratory
Atlantic Regional Facilities for Materials Characterization

Saskatchewan

Canadian light source inc.
Canadian Light Source Inc. - Additional Support
The Canadian SuperDARN/PolarDARN facility

Appendix 2: Invitation Letter

Dear Principal Investigator,

You are receiving this email because you are listed as the Principal Investigator of a Major Resources Support Program Grant. Please find attached a link <http://fluidsurveys.com/s/NSERC-MRS-survey/> to a short online survey designed to estimate the impacts of abolishing the MRS program.

The survey is being conducted by my office in my capacity as official opposition science and technology critic and has been designed in consultation with a number of prominent Canadian Scientists including David Bryce, Ian Clark, Paul Hebert and Dominic Ryan.

Survey information will be made public in aggregate form, with information about individual facilities only made public with your express consent. Copies of the final report will be posted on my website and emailed to all invitees. Survey responses received before Sunday June 10th are especially appreciated.

Thank you for your consideration,

Kennedy Stewart, Ph.D.
Official Opposition Critic for Science & Technology
Member of Parliament for Burnaby–Douglas
Ottawa Office: (613) 996–5597
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Appendix 3: NSERC Major Resources Support Survey Questions

Introduction

This short survey concerns the impacts of abolishing the Major Resources Support Program, formerly called the Major Facilities Access Program. It has been designed to accommodate a very wide range of facility types and includes questions about your facility considered over two time periods: current and lifetime. For questions regarding the current operation of your facility, please including information based on 2011 operations. If 2011 data are not appropriate, please substitute information from another single year. The year used will be asked at the conclusion of the survey. Estimates are sufficient for lifetime questions as data may be difficult to precisely determine for some facilities.

Facility Information

1. Do you wish the details of your survey to remain anonymous?
2. Name of Facility:
3. Name of Principal Investigator:
4. For how many years has your facility been in operation?
5. Please provide a brief description of your facility:
6. What have been some of the major or unique scientific contributions of your facility?

Funding, Equipment and MRS cut impacts

7. Start Date for current MRS grant:
8. End Date for current MRS grant:
9. What is the approximate total amount of capital invested in your facility over its lifetime?
10. For how many years has your facility received MRS/MFA funding?
11. What is the approximate value of total MRS/MFA funding your facility has received over its lifetime?
12. What is the approximate value of unique assets and/or equipment?
13. Please list and briefly describe unique assets and/or equipment, including whether they are unique in Canada, North America or the world.
14. Barring any new sources of funding, will the loss of MRS funding lead to the closure of your facility?
15. Barring any new sources of funding, what will be the impacts of the loss of MRS funding? (e.g. facility closure, reduction in service available)
16. Does your facility charge user fees?
17. Why does your facility charge or not charge user fees?

Training of Highly Qualified Personnel (2011)

18. Number of postdoctoral fellows who have undergone training at your facility during 2011:
19. Number of graduate students who have undergone training at your facility during 2011:
20. Number of other people (e.g. undergraduate students, technicians) who have undergone training at your facility during 2011:

Training of Highly Qualified Personnel (Lifetime)

21. Number of total postdoctoral fellows who have undergone training at your facility during its lifetime:
22. Number of total graduate students who have undergone training at your facility during its lifetime:
23. Number of total others (e.g. undergraduate students, technicians) who have undergone training at your facility during its lifetime:

Employed Staff (scientists, researchers, technicians, etc)

24. How many full-time staff did your facility employ in 2011?
25. How many part-time staff did your facility employ in 2011?
26. What is the approximate total number of full-time staff your facility has employed over its lifetime?
27. What is the approximate total number of part-time staff your facility has employed over its lifetime?

Facility User Base (2011)

28. Users, excluding facility staff and trainees, from Canadian academic institutions during 2011:
29. Users from Canadian for-profit organizations during 2011:
30. Users from Canadian government research laboratories during 2011:
31. Users from other Canadian non-profit organizations during 2011:
32. Users from foreign institutions during 2011:

Facility User Base (Lifetime)

33. Total approximate users, excluding facility staff and trainees, from Canadian academic institutions over the lifetime of your facility:
34. Total approximate users from Canadian for-profit organizations over the lifetime of your facility:
35. Total approximate users from Canadian government research laboratories over the lifetime of your facility:
36. Total approximate users from other Canadian non-profit organizations over the lifetime of your facility:
37. Total approximate users from foreign institutions over the lifetime of your facility:

Further Information

38. Please select the year used to respond to survey questions about current operations.
39. Please add any further information you wish to provide.
40. May we contact you directly for more information?

Thank you!

Survey information will be made public in aggregate form, with information about individual facilities only made public with your express consent. Copies of the final report will be posted on my website and emailed to all invitees. Please press "submit" to complete survey.

Appendix 4: Facilities Receiving MRS funding in 2011-2012[9]

Project	Amount ($)
Canadian Light Source Inc.	20,600,000
The Compute/Calcul Canada (CC)	2,000,000
Fields Institute for Research in Mathematical Sciences	1,300,000
Canadian neutron beam laboratory	1,274,000
CRM's major 5-year plan	1,200,000
Pacific Institute for the Mathematical Sciences	1,100,000
Canadian Institute for Theoretical Astrophysics	1,100,000
Canadian participation in the integrated ocean drilling program	712,500
Centre for molecular and materials science at TRIUMF	664,200
Banff International Research Station	636,000
Bamfield marine sciences centre	600,000
Canadian Scientific Submersible Facility	600,000
Access to the national advanced laser light source (ALLS) facility	545,850
Canadian participation in the international continental drilling program	327,600
Canadian centre for DNA barcoding	300,000
Resource for the Innovation of Engineering Materials	272,900
The Canadian SuperDARN/PolarDARN facility	272,800
Polar Environment Atmospheric Research Laboratory	265,700
IsoTrace AMS facility	250,000
Aquatron laboratory	218,400
Nanofabrication facility support	218,300
Canadian charged particle accelerator consortium (CCAPC)	200,000
The Canadian research icebreaker Amundsen	199,250
PNCSRF Pacific Northwest Consortium Synchrotron Radiation Facility	132,800
Brockhouse institute for materials research	131,600
Biogeoscience Institute	116,000
Station de recherche de Whapmagoostui-Kuujjuarapik	105,660
Kluane Lake Research Station	100,000
St. John's centrifuge modelling facility	100,000
Canadian cosmogenic nuclide exposure dating facility	91,000
National ultrahigh-field NMR facility for solids	88,600
Canadian resource center for zebrafish genetics	88,600
Portable Observatories for Lithospheric Analysis and Research Investigating	77,900
Pacific centre for isotopic and geochemical research	76,840
Laboratory for the analysis of natural and synthetic environmental toxicants	75,000
Quebec/Eastern Canada high field NMR facility	72,040
Neuroendocrinology assay laboratory at the University of Western Ontario	57,000
University of Alberta microfungus collection and herbarium (UAMH)	54,600
Canadian Phycological Culture Centre	43,230

[9] 40 MRS grants were awarded in 2011-2012 to 39 institutions. Two grants received by Canadian Light Source Inc. are summated in this table.