

**A Survey of Quantum Information Processing Funding  
in Canada, 2001 – 2010**

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&  
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The authors have made every effort to obtain information from reliable sources. However, we assume no responsibility or liability for any decisions based upon the information presented.

The authors welcome information on activity omitted from this report.

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## Executive Summary

Quantum information science and technology is an area of research that is developing a set of revolutionary tools. It combines basic and applied research aimed at developing new applications and technologies where control of information in quantum systems is critical. The field is in its infancy. In the last ten years a large proportion of the work has been theoretical but is becoming increasingly experimental, with demonstrations of control over quantum devices moving from the blackboard to the laboratory.

This growing toolkit uses quantum mechanics to process information. Quantum mechanics describes the fundamental laws of physics at very small scales. These physical laws are increasingly difficult for traditional (“classical”) technologies to be engineered around. Quantum information processing (QIP) actually takes these laws and uses them to our advantage by processing information differently, yielding advantages that are not feasible or even impossible with classical technologies.

Canada has an established excellence in QIP research, with an enviable history of innovation in the field and a world-leading position at present. One factor in this success has been the substantial financial support the field and its researchers have received in the last decade. Approximately \$308M has been spent on QIP research in the first decade of this century: \$292M in funding already distributed and a further \$16M is committed for distribution by 2014.

While this support has positioned Canada as a world leader in this emerging and disruptive field, increased support will be required to maintain that role as the QIP field continues to expand into new areas of application, including the health, financial, and manufacturing sectors.

## Total Funding Summary

Table 1 summarizes the cumulative quantum information processing (QIP) funding for all sources, both distributed and publicly committed, for the fiscal years ending (FYE) 2001-2014. Figures are given by year in Table A1 in the Appendix.

Funding Source	Amount
NSERC	\$31,078,721
CFI	\$26,180,318
Industry Canada	\$59,500,000
CIPI	\$648,800
MITACS	\$1,998,000
CIFAR	\$4,643,000
Alberta	\$6,296,647
Ontario	\$74,701,279
Quebec	\$2,618,519
Private Donations	\$100,000,000
<b>Total</b>	<b>\$307,655,285</b>

Table 1: Grand totals of financial support, distributed and committed, of quantum information processing research in Canada by source, FYE 2001-2014.

## Federal Government Funding

### *Natural Sciences and Engineering Research Council (NSERC)*

NSERC is a federal granting council that “make[s] investments in people, discovery and innovation to increase Canada’s scientific and technological capabilities for the benefit of all Canadians [1].” NSERC is a major funding source for academia-based research, especially for personnel such as undergraduate and graduate students and postdoctoral fellows.

In the decade with fiscal year ends (FYE) 2001-2010, NSERC has spent just over \$31M on quantum information processing research. Included in this figure is \$6M for a national network in quantum information processing, QuantumWorks, launched in 2006 [2].

NSERC's support has grown each year of the past decade, and by FYE 2010, spending was up roughly ten times from the levels at the beginning of the decade.

<b>NSERC Support of QIP Research</b>			
<b>FYE</b>	<b>Number of awards</b>	<b>Unique Recipients per year</b>	<b>Total Amount</b>
2001	13	10	\$681,570
2002	15	12	\$1,035,014
2003	22	15	\$1,461,850
2004	30	24	\$1,688,969
2005	39	33	\$1,876,350
2006	64	57	\$2,601,220
2007	78	66	\$3,553,427
2008	113	93	\$5,408,409
2009	118	97	\$5,847,734
2010	138	110	\$6,924,178
<b>Total</b>	<b>630</b>	<b>183</b>	<b>\$31,078,721</b>

Table 2: NSERC support of QIP research. The total of the "Unique Recipients" is not the sum of the individual years' numbers because individuals often receive funding in multiple consecutive years

This 10-fold increase is roughly consistent across several metrics: cash earmarked for grants (*i.e.*, projects), cash earmarked for scholarships (*i.e.*, student salaries), total number of awards distributed, and number of individuals receiving these awards. This trend reflects the fact that the population of Canada's quantum community has grown substantially in the last ten years.

<b>NSERC Support of QIP Research by Type</b>				
<b>FYE</b>	<b>No. of grants</b>	<b>Grants Amount</b>	<b>No. of scholarships</b>	<b>Scholarships Amount</b>
2001	12	\$646,570	1	\$35,000
2002	14	\$1,017,514	1	\$17,500
2003	20	\$1,409,350	2	\$52,500
2004	23	\$1,540,550	7	\$148,419
2005	25	\$1,560,650	14	\$315,700
2006	38	\$2,036,220	26	\$565,000
2007	49	\$2,876,827	29	\$676,600
2008	71	\$4,688,728	42	\$719,681
2009	71	\$5,054,519	47	\$793,215
2010	78	\$5,995,906	60	\$928,272
<b>Total</b>	<b>401</b>	<b>\$26,826,834</b>	<b>229</b>	<b>\$4,251,887</b>

Table 3: NSERC support of QIP research broken down by grants (usually held by faculty) and scholarships (usually held by students and postdoctoral fellows)

### *Canadian Foundation for Innovation (CFI)*

CFI was founded in 1997 and has a mandate to “build [Canada’s] capacity to undertake world-class research and technology development to benefit Canadians,” by “attracting and retaining the world’s top talent, training the next generation of researchers, supporting private-sector innovation and creating high-quality jobs that strengthen Canada’s position in today’s knowledge economy [3].”

CFI funds large infrastructure projects, thus the number of awards each year is small but the amounts are substantial. The \$26M CFI has spent on QIP research is therefore sporadically distributed. This data shows that there has been a consistent need for substantial infrastructure to support the growing QIP community in Canada.

<b>CFI Support of QIP Research</b>		
<b>FYE</b>	<b>Number of Awards</b>	<b>Amount</b>
2001	2	\$302,795
2002	5	\$3,709,299
2003	1	\$300,000
2004	1	\$229,992
2005	4	\$1,160,253
2006	6	\$19,365,044
2007	4	\$463,752
2008	1	\$119,998
2009	2	\$404,185
2010	1	\$125,000
<b>Total</b>	<b>27</b>	<b>\$26,180,318</b>

*Table 4: CFI support of QIP research, including number of awards. CFI awards are support infrastructure and so are large, leading to spikes in figures.*

The 27 CFI grants were awarded from different funds: 10 were from the Leaders Opportunity Fund for projects associated with an NSERC Canada Research Chair, nine were from the Leaders Opportunity Fund for research infrastructure alone, six were from the New Opportunities Fund, and single grants were from the Innovation Fund and Leading Edge Fund.

### *Industry Canada (IC)*

Industry Canada is a federal government Department whose mission is “to foster a growing, competitive, knowledge-based Canadian economy.” As a government Department, IC does not generally fund research directly, but relies on its entities (including NSERC and CFI) to engage researchers directly.

However, twice in the last decade IC has made direct awards for QIP research. In 2005, IC invested \$9.5M in D-Wave Systems Inc.[4], a company whose aim is to build quantum computer powerful enough to hold commercial value.

This was followed by a \$50M investment in 2009 to further the mandate of the Institute for Quantum Computing (IQC) at the University of Waterloo. The funds were given with the expectation that the IQC would “build, purchase and recruit the resources needed to lead the world towards the next generation of computer technology [5].”

## Provincial Government Funding

Provinces are listed alphabetically.

### Alberta

The Institute for Quantum Information Science (IQIS) [6] at the University of Calgary is made up of eight Faculty and six Affiliated Faculty members. This multidisciplinary group has backgrounds in computer science, mathematics, and physics. The IQIS can be considered to be the centre and main hub of QIP research in the province of Alberta.

The IQIS has had three significant sources of funding: the Alberta Ingenuity Fund (AIF) [7], the Alberta Science and Research Investments Program (ASRIP) [8], and the Alberta Informatics Circle of Research Excellence (iCORE) [9]. In total, these three sources have contributed approximately \$6.3M to QIP.

Government of Alberta Support of QIP Research				
FYE	AIF	ASRIP	iCORE	Total
2004	No data	No data	\$496,800	\$496,800
2005	No data	No data	\$450,000	\$450,000
2006	\$124,000	\$0	\$460,000	\$584,000
2007	\$228,503	\$627,644	\$910,770	\$1,766,917
2008	\$258,764	\$0	\$776,500	\$1,035,264
2009	\$50,667	\$0	\$739,000	\$789,667
2010	\$46,000	\$0	\$1,128,000	\$1,174,000
<b>Total</b>	<b>\$707,933</b>	<b>\$627,644</b>	<b>\$4,961,070</b>	<b>\$6,296,647</b>

Table 8: Alberta's Support of QIP research

### Ontario

The Government of Ontario's Ministry of Research and Innovation (MRI) was founded in 2005. Several existing programs were brought under the MRI umbrella at that time and the MRI is currently the main source for basic QIP research in Ontario. This is punctuated by a \$50M commitment from the MRI to the Institute for Quantum Computing [10] in 2006 [11].

Other sources of funding for QIP research include the Premier's Research Excellence Award, since renamed Early Researcher Award (PREA/ERA) [12]; Premier's Innovation Award, since discontinued (PIA) [13]; and the Ontario Innovation Trust/Ontario Research Fund (OIT/ORF) [14]. In total, the Government of Ontario has spent just under \$57M in the past decade.

<b>Government of Ontario Support of QIP Research</b>					
<b>FYE</b>	<b>PREA/ERA</b>	<b>PIA</b>	<b>OIT/ORF</b>	<b>MRI</b>	<b>Total</b>
2001	\$0	No data (did not exist)	\$0	\$0	\$0
2002	\$100,000	No data (did not exist)	\$3,656,379	\$0	\$3,756,379
2003	\$100,000	No data (did not exist)	\$300,000	\$0	\$400,000
2004	\$0	No data (did not exist)	\$0	\$0	\$0
2005	\$0	No data (did not exist)	\$310,591	\$0	\$310,591
2006	\$299,740	No data (did not exist)	\$50,000	\$50,000,000	\$50,349,740
2007	\$0	\$0	\$600,571	\$18,000,000	\$18,600,571
2008	\$200,000	\$500,000	\$119,998	\$0	\$819,998
2009	\$100,000	\$0	\$0	\$0	\$100,000
2010	\$0	\$0	\$164,000	\$0	\$164,000
2011	\$200,000	\$0	\$0	\$0	\$200,000
<b>Total</b>	<b>\$999,740</b>	<b>\$500,000</b>	<b>\$5,201,539</b>	<b>\$68,000,000</b>	<b>\$74,701,279</b>

Table 9: Ontario's support of QIP research. Awards from MRI to IQC were assumed to be lump sums

### Quebec

The province of Quebec's main funding body for basic research is Le Fonds de recherche du Quebec – Nature et technologies (FQRNT) [15]. Relevant programs within the FQRNT are the Établissement de nouveaux chercheurs (ENC) [16], Projet de recherche en équipe (PRE) [17], and Programme regroupement stratégiques (PRS) [18]. In total, the Government of Quebec has spent or committed approximately \$2.6M on QIP research.

<b>Government of Quebec Support of QIP Research</b>					
<b>FYE</b>	<b>ENC</b>	<b>PRÉ</b>	<b>PRS</b>	<b>Misc</b>	<b>Total</b>
2002	No data	\$66,000	\$0		\$66,000
2003	No data	\$66,000	\$0		\$66,000
2004	\$57,620	\$66,000	\$0		\$123,620
2005	\$34,540	\$15,000	\$0		\$49,540
2006	\$95,812	\$0	\$0		\$95,812
2007	\$44,540	\$49,000	\$0		\$93,540
2008	\$0	\$98,060	\$385,000		\$483,060
2009	\$51,114	\$0	\$385,000		\$436,114
2010	\$30,000	\$78,400	\$385,000	\$240,185	\$733,585
2011	\$20,000	\$131,248	\$150,000		\$301,248
2012	\$20,000	\$0	\$150,000		\$170,000
<b>Total</b>	<b>\$353,626</b>	<b>\$569,708</b>	<b>\$1,455,000</b>	<b>\$240,185</b>	<b>\$2,618,519</b>

Table 10: Quebec's support of QIP research



## Public/Private Funding

### *National Centres of Excellence (NCEs)*

NCEs fund “research partnerships between academia, industry, government, and not-for-profit organizations [whose] programs turn Canadian research and entrepreneurial talent into economic and social benefits for all Canadians [19].” NCEs are independent, not-for-profit research organizations that have broad scopes and have strong relationships with non-academia based firms, especially industry. In this way, NCEs can be considered public and private funding. For the purposes of this report, only the publicly reported funds were counted.

There are two NCEs whose scope at least partially encompasses QIP: Canadian Institute for Photonic Innovations (CIPI) and Mathematics of Information Technology and Complex Systems (MITACS).

### *CIPI*

The research program of CIPI consists of 15 projects in three topic areas [20]. Of those 15, one qualifies as a QIP focused project: IT3 (Information and Telecommunications Project 3) [21]: Scalable absolutely secure optical fibre networks using quantum cryptography. This project’s budget was just under \$650k over its four-year lifespan.

CIPI Support of QIP Research	
FYE	Amount
2005	\$206,400
2006	\$206,400
2007	\$150,000
2008	\$86,000
<b>Total</b>	<b>\$648,800</b>

Table 5: CIPI support of QIP research via its IT3 project

### *MITACS*

The MITACS NCE ran from 1999-2011 and the research network component has rebranded itself as the Mprime Network. The group that still carries the Mitacs name is now focused solely on developing programs to build bridges between industry and academia [22].

During its initial incarnation, MITACS had a project titled Quantum Information Processing that ran from 2002-2011. The total budget for this project over that period was just under \$2M.

<b>MITACS Support of QIP Research</b>	
<b>FYE</b>	<b>Amount</b>
2002	\$200,000
2003	\$200,000
2004	\$225,000
2005	\$225,000
2006	\$213,000
2007	\$193,000
2008	\$193,000
2009	\$193,000
2010	\$173,000
2011	\$173,000
<b>Total</b>	<b>\$1,988,000</b>

Table 6: MITACS support of QIP research via its Quantum Information Processing project

#### *Canadian Institute for Advanced Research (CIFAR)*

CIFAR is a private, non-profit institute of advanced study. CIFAR is supported by multiple sources: individuals, foundations, and corporations as well as the Government of Canada and provincial governments of Alberta, British Columbia, and Ontario [23]. The research interests of CIFAR cover a broad spectrum of topics. These areas are mostly in the natural and life sciences, but social sciences and humanities programs have been recently funded and more are being explored [24].

One program that has been established is the Quantum Information Processing program [25]. The budget for this program over the course of its lifetime has been approximately \$4.6M. CIFAR also funds a program entitled Quantum Materials. While there is overlap in concepts between QIP and quantum materials, their work is of a different scope and thus excluded in data presented in this report.

<b>CIFAR Support of QIP Research</b>	
<b>FYE</b>	<b>Amount</b>
2003	\$133,000
2004	\$365,000
2005	\$513,000
2006	\$663,000
2007	\$720,000
2008	\$682,000
2009	\$733,000
2010	\$834,000
<b>Total</b>	<b>\$4,643,000</b>

Table 7: CIFAR's support of QIP research via their Quantum Information Processing program

### *Perimeter Institute for Theoretical Physics (PI)*

PI is a basic research centre focusing on the fundamental questions about the universe. Their research program groups span several areas of theoretical physics, one of which is Quantum Information Theory. With this large breadth, it is difficult to estimate how much is spent on quantum information. Future updates of this report may investigate this further.

### **Private Donations**

#### *Mike & Ophelia Lazaridis*

In 2002, Mike and Ophelia Lazaridis donated \$100M to support quantum information processing at the IQC in Waterloo. This generosity is reflected in the IQC's new home, the Mike & Ophelia Lazaridis Quantum-Nano Centre. These funds were spent from 2002 through 2010, inclusive. As a private donation, no further breakdown is available.

The IQC has also received \$500k from the Bell Family between 2005 and 2010. These funds have been used primarily for graduate student scholarships.

### **Methodology**

The scope of this report is very specifically quantum information processing and not various other scientific investigations of systems at the quantum scale. This excludes areas of research including quantum materials, as outlined in the "CIFAR" section above. Unless the distribution of an award was clearly reported to be otherwise, it is assumed that the entire amount of funding was given in the year it was reported and not distributed across multiple years. The spike in funding in 2006 is due to this convention.

NSERC and CFI have publicly available awards databases, located at [26] and [27], respectively. The NSERC database was searched for the words "quantum" and "quantique" and results were further filtered by hand. The CFI awards spreadsheet [28], outlining all awards by CFI, was small enough that items were selected directly by hand.

Industry Canada's two awards were tracked via press releases.

Figures for projects in CIPI, MITACS, and CIFAR were all compiled via direct email with administration within those organizations.

Government of Alberta spending was assumed to be focused in Calgary. The IQIS' annual reports are posted online [29] and were used for provincial spending figures.

Government of Ontario numbers are scattered throughout the MRI's website. While the MRI now oversees the "grandfathered in" programs, there does not exist a

centralized aggregate database. Several figures were confirmed via phone calls with MRI.

Government of Quebec figures were sourced through the FQRNT's website.

Terms of private donations were known to R. Laflamme in his role as Director of IQC.

### **Outstanding Sources**

As mentioned previously, this report acknowledges but does not quantify funding provided by the Perimeter Institute for Theoretical Physics.

There are private companies actively funding quantum information projects. These include General Dynamics Canada in Calgary, Lockheed Martin in Halifax, and D-Wave Systems in Vancouver. Due to the sensitive nature of private R&D initiatives, we acknowledge but do not attempt to quantify these activities.

There are other quantum information activities in British Columbia that were not acknowledged in this report. These activities are thought to be ad-hoc but will be investigated further in future versions of this report.

### **Disclaimer**

This report is a lower-bound attempt at finding the state of quantum information funding in Canada. It does not claim to be exhaustive and makes no attempt at compiling purely private investments (e.g., industry), nor does it estimate classified activities by government agencies. Given some of the most popular activities in QIP, including encryption, it is reasonable to assume that there is spending on QIP topics that is not available to the public. Finally, this report excludes university support (lab space, salaries, etc.).

### **Acknowledgements**

S. Collins would like to thank Ms. Sara O'Donnell for her assistance in preparing this report.

## Appendix A

Table A1 is a compilation of all data in this report, by funding source and year.

FYE	Federal			Provincial			Private/Public			Private Donations	Total
	NSERC	CFI	Industry Canada	Alberta	Ontario	Quebec	CIPI	MITACS	CIFAR		
2001	\$681,570	\$302,795									\$984,365
2002	\$1,035,014	\$3,709,299			\$3,756,379	\$66,000		\$200,000			\$8,766,692
2003	\$1,461,850	\$300,000			\$400,000	\$66,000		\$200,000	\$133,000		\$2,560,850
2004	\$1,688,969	\$229,992		\$496,800		\$123,620		\$225,000	\$365,000		\$3,129,381
2005	\$1,876,350	\$1,160,253	\$9,500,000	\$450,000	\$310,591	\$49,540	\$206,400	\$225,000	\$513,000		\$14,291,134
2006	\$2,601,220	\$19,365,044		\$584,000	\$50,349,740	\$95,812	\$206,400	\$213,000	\$663,000	\$100,500,000	\$74,078,216
2007	\$3,553,427	\$463,752		\$1,766,917	\$18,600,571	\$93,540	\$150,000	\$193,000	\$720,000		\$25,541,207
2008	\$5,408,409	\$119,998		\$1,035,264	\$819,998	\$483,060	\$86,000	\$193,000	\$682,000		\$8,827,729
2009	\$5,847,734	\$404,185		\$789,667	\$100,000	\$436,114		\$193,000	\$733,000		\$8,503,700
2010	\$6,924,178	\$125,000	\$16,500,000	\$1,174,000	\$164,000	\$733,585		\$173,000	\$834,000		\$26,627,763
2011			\$17,000,000		\$200,000	\$301,248		\$173,000			\$17,674,248
2012			\$5,000,000			\$170,000					\$5,170,000
2013			\$5,500,000								\$5,500,000
2014			\$6,000,000								\$6,000,000
<b>Total</b>	<b>\$31,078,721</b>	<b>\$26,180,318</b>	<b>\$59,500,000</b>	<b>\$6,296,648</b>	<b>\$74,701,279</b>	<b>\$2,618,519</b>	<b>\$648,800</b>	<b>\$1,988,000</b>	<b>\$4,643,000</b>	<b>\$100,500,000</b>	<b>\$308,155,285</b>

Table A1: Total research funding for QIP from all sources, by year.

## Appendix B

Recipients of funding for quantum information research are alphabetically listed below; 187 scientists have received some sort of funding for quantum information research in the first decade of this century. This list does not include awards to institutes.

Name	Institution(s)	Name	Institution(s)
AbouRisk, Nicholas	Alberta	Erven, Christopher	Waterloo
Akhvlediani, Andrey	Oxford	Feder, David	Alberta/Calgary
Ambainis, Andris	Waterloo	Fernandez, JoseManuel	Ecole Polytechnique
Anderson, Ashton	Stanford	Ferrie, Christopher	Waterloo
Apperley, Thomas	Calgary	Fung, ChiHang(Fred)	Hong Kong
Avis, David	McGill	Gangloff, Dorian	MIT
Babcock, Nathan	Calgary	Godbout, Nicolas	Ecole Polytechnique
BarilRobichaud, Patrick	Montreal	Gottesman, Daniel	Perimeter/Waterloo
Batuwantudawe, Jamie	Waterloo	Gour, Gilad	Calgary
Baugh, Jonathan	Waterloo	Gutoski, Gus	Waterloo
Blais, Alexandre	Sherbrooke	Haljan, Paul	Simon Fraser
Blancher, Sean	Calgary	Hall, Kimberley	Dalhousie
Boaknin, Etienne	Yale	Han, Xiao(Sherry)	D-Wave
Boileau, JeanChristian	Waterloo	Hawrylak, Pawel	Ottawa/NRC
Boissonneault, Maxime	Sherbrooke	Hayden, Patrick	McGill
Bolduc, Adam	Sherbrooke	Helmy, Amr	Toronto
Bourassa, Jérôme	Ottawa/Sherbrooke	Hilke, Michael	McGill
Brannan, John	Calgary	Holbrook, John	Guelph
Brassard, Gilles	Montreal	Hoyer, Peter	Calgary
Broadbent, Anne	Montreal/Waterloo	Hubbard, Adam	Waterloo
Buhr, Dylan	Winnipeg	Hughes, Stephen	Queen's
Bussi�eres, F�elix	Ecole Polytechnique/Montreal	Hutchison, Chantal	Waterloo
Cadieux, Catherine	Ecole Polytechnique	Hynes, Kevin	Calgary
Chan, Philip	Calgary	Ilic, Nikolina	Waterloo
Cheng, Oliver	Toronto	Inglis, Stephen	Waterloo
Cheung, Donny	Waterloo	Jennewein, Thomas	Waterloo
Childs, Andrew	Waterloo	James, Daniel	Toronto
Chisholm, Nicholas	Harvard	Johnston, Nathaniel	Guelph
Chr�etien, Alexandre	Montreal	Judson, Steven	UPEI
Cleve, Richard	Calgary/Waterloo	Kallin, Ann	Waterloo
Coish, William	McGill	Keet, Adrian	Calgary
Corredor, Felipe	NYU/Stanford/Toronto	King, Brian	McMaster
Crann, Jason	Guelph	Knapp, Edward	Waterloo
Cr�epeau, Claude	McGill	Kothari, RobinAshok	Waterloo
Criger, Benjamin	Waterloo	Kribs, David	Guelph
DallaireDemers, PierreLuc	Waterloo	Ktari, B�echir	Laval
Dattani, Nikesh	Western Ontario	Kupchak, Connor	Calgary
DeSousa, Rogerio	Victoria	Kycia, Jan	Waterloo
Dickinson, Paul	Waterloo	Kyriakidis, Jordan	Dalhousie
Dickson, Neil	D-Wave	Lacroix, Suzanne	Ecole Polytechnique
Dinshaw, Rayomond	Toronto	Laflamme, Raymond	Waterloo
Dion, Carolyne	Ecole Polytechnique	Laforest, Martin	Waterloo
Doiron, Charles	Sherbrooke/Basel	Lalumi�ere, Kevin	Sherbrooke
DSouza, Adam	Calgary/Waterloo	LandonCardinal, Olivier	Montreal/Sherbrooke
Dumais, Paul	McGill	Lang, Alexandre	Ecole Polytechnique (France)
Dupuis, Fr�ed�eric	Montreal/ETH Zurich	Leung, Debbie	Waterloo
Eltony, Amira	D-Wave	Lidar, Daniel	Toronto
Emerson, Joseph	Waterloo	Lo, HoiKwong	Toronto

<b>Name</b>	<b>Institution(s)</b>	<b>Name</b>	<b>Institution(s)</b>
Lundeen, Jeffrey	Oxford	Salfi, Joseph	Toronto
Luong, David	Waterloo	Salvail, Louis	Montreal
Lupascu, Adrian	Waterloo	Sanctuary, Bryan	McGill
Lutkenhaus, Norbert	Waterloo	Sanders, Barry	Calgary
Lvovsky, Alexander	Calgary	Sanghera, Hardeep	D-Wave
MacRae, Andrew	Calgary	Savov, Ivan	McGill
Magesan, Easwar	Waterloo	Schreiter, Kurt	Waterloo
Majedi, AmirHamed	Waterloo	Selinger, Peter	Dalhousie
Marzlin, KarlPeter	Calgary/St. F-X	Shalm, Lynden	Toronto/Waterloo
Mayers, Dominic	Sherbrooke	Sikora, Jamie	Waterloo
McIntyre, Sean	Calgary	Silva, Marcus	Sherbrooke/Waterloo
McKague, Matthew	Waterloo	Simmons, Stephanie	Waterloo
Medendorp, Zachari	Toronto/Waterloo	Sivakumaran, Thiru	Waterloo
MeyerScott, Evan	Waterloo	Slater, Joshua	Calgary
Mirkovic, Tihana	Toronto	Slot, Graham	D-Wave
Mohseni, Masoud	MIT	Smith, Graeme	Caltech
Mosca, Michele	Waterloo	Smith, Jamie	Waterloo
Moussa, Osama	Waterloo	Soudagar, Yasaman	Ecole Polytechnique
Napoleone, Marc	Toronto	Spekkens, Robert	Perimeter
Nayak, Ashwin	Waterloo	Stang, Jared	Calgary
Nguyen, John	Calgary	Stanley, Geoff	Waterloo
Nie, Xiaoxi	Toronto	Stebila, Douglas	Waterloo
ODell, Duncan	Queen's	Steinberg, Aephraim	Toronto
OHalloran, Amanda	Toronto	Stotz, James	Queen's
Olivier, Laurent	Sherbrooke	Studenikin, Sergei	Ottawa/NRC
Passante, Gina	Waterloo	Sussman, Benjamin	NRC/Oxford/Queen's
Pelchat, Emilie	Sherbrooke	Tafliovich, Anya	Toronto
PioroLadrière, Michel	Sherbrooke	Tapp, Alain	Montreal
Poole, Simon	Calgary/Sherbrooke	Thomas, Ryan	Calgary/Simon Fraser
Poulin, David	Sherbrooke/Waterloo	Thompson, Kyle	Waterloo
Power, William	Waterloo	Tittel, Wolfgang	Calgary
Pulwicki, Julia	Calgary	Underwood, Michael	Calgary
Qian, Li	Toronto	Uysal, Murat	Waterloo
Rangan, Chitra	Windsor	VanVeggel, Frank	Victoria
Raussendorf, Robert	UBC	Wang, Grace	D-Wave
Reichardt, Ben	Waterloo	Wang, ToutTaotao	Harvard
Resch, Kevin	Waterloo	Watrous, John	Calgary/Waterloo
Rosgen, William	Calgary/Waterloo	Weihs, Gregor	Waterloo
Roy, Aidan	Calgary	Wilhelm, Frank	Waterloo
Rozema, Lee	Toronto	Williams, Robin	Ottawa/NRC
Rvachov, Timur	Toronto	Wolf, Stefan	Montreal
Ryan, Colm	Waterloo	Yamakami, Tomoyuki	Ottawa
Sachrajda, Andrew	McGill/Sherbrooke/NRC	Young, Carolyn	McGill
SafaviNaeini, AmirHossein	Caltch/Waterloo	Zeng, Bei	Guelph
SafaviNaini, Arghavan	Toronto	Zhang, Ran	Toronto
		Zhao, Yi	Caltech

*Table B1: Listing of recipients of quantum information research funding*

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