

# INSTITUTE INNOVATION PLATFORM

## SUMMARY OF NSERC RESEARCH PARTNERSHIPS APPLICATIONS RELATED TO MATHEMATICS AND STATISTICS

### INTRODUCTION

This document summarizes an analysis of applications and awards to NSERC's Research Partnership grants and scholarships that have been identified as related to mathematics and statistics<sup>1</sup> areas of research. It has been prepared to assist in determining how this participation level has evolved. The intention is to update this analysis annually to support the progress and final reports to be prepared by the recipients of the Institute Innovation Platform funding. Any use of this information beyond the scope of that purpose should be discussed with NSERC.

### RESEARCH PARTNERSHIPS

NSERC Research Partnerships aims to connect university researchers with the industrial sector to address R&D challenges of benefit to Canada and offers grant types that are differentiated based on the scope of the challenges to be undertaken. Researchers in mathematics and statistics have participated in eight different Research Partnership Grant types since 2009, with the most frequent being through Engage Grants.

Table 1: Participation of mathematics and statistics researchers in NSERC Research Partnership grant types

	2009	2010	2011	2012	2013	2014	2015	Total
Collaborative Health Research Projects					1			1
Collaborative Research and Development Grants	2	2		4	1			9
Engage Grants	1	11	10	8	21	14	7	72
Engage Plus Grants						2		2
Connect Level 1	1	1	1					3
Connect Level 2 – Atlantic		1						1
Connect Level 2 – Pacific			1					1
Connect Level 2 – Prairies			1					1
Connect Level 3 (Workshops)						1		1
Industrial Research Chairs			2	1				3
<b>Total</b>	<b>4</b>	<b>15</b>	<b>15</b>	<b>13</b>	<b>23</b>	<b>17</b>	<b>7</b>	<b>94</b>

Applications from mathematics and statistics researchers have been submitted from 24 unique universities, from most of the provinces across Canada. Missing since 2009 are participants in Manitoba, New Brunswick and Prince Edward Island.

<sup>1</sup> Applications have been attributed to Mathematics and Statistics based on the grantee's principal department and the Evaluation Group that supports the grantee's Discovery Grant. Either factor is sufficient for the application to be identified as one related to mathematical sciences.

Table 2: Participation by institution of mathematics and statistics researchers in NSERC Research Partnership grants

	2009	2010	2011	2012	2013	2014	2015	Total
Ryerson		2		2	3	3	1	11
Thompson Rivers		2	1	1	3	1		8
Guelph	1	1	2	1	1	1		7
Simon Fraser		3	2			1		6
British Columbia	1		2			1	2	6
Carleton			1	3	2			6
Waterloo		2		2	1	1		6
York					2	3		5
Windsor				1	3	1		5
Western Ontario			3		1			4
Toronto		1			2	1		4
Acadia		1	1		1		1	4
École Polytechnique de Montréal				1		2		3
Montréal				1	1		1	3
Calgary				1	1	1		3
Laval			2				1	3
Wilfrid Laurier					1		1	2
Memorial Univ. of Nfld		2						2
Ontario Institute of Technology	1							1
McMaster	1							1
HEC Montréal						1		1
St. Francis Xavier			1					1
Saskatchewan					1			1
Northern British Columbia		1						1
<b>Total</b>	<b>4</b>	<b>15</b>	<b>15</b>	<b>13</b>	<b>23</b>	<b>17</b>	<b>7</b>	<b>94</b>

The grant types listed in Table 1 have been held by 61 unique professors who are either in a mathematics/statistics-oriented department or have their Discovery Grant applications awarded through the Mathematics and Statistics Evaluation Group. Notably, some applicants are using Partnership grant opportunities to a greater extent with four individuals having each undertaken four or more projects since 2009.

Table 3: Participation by mathematics and statistics professors in NSERC Research Partnership grants

	2009	2010	2011	2012	2013	2014	2015	Total
Adem, Alejandro			1					1
Ashlock, Daniel			2		1			3
Barron, Ronald					1			1
Bohun, Christopher	1							1
Caron, Richard				1	1	1		3
Cheung, Kevin				1				1
Chipman, Hugh					1			1
Davison, Matthew			2					2
De Sterck, Hans					1			1
Dean, Charmaine					1			1
Duchesne, Thierry							1	1
Feng, Zeny						1		1
Ferworn, Alexander		2			1	1		4
Forsyth, Peter				1				1
Fortin, André			1					1
Green, James			1		1			2
Gualtieri, Marco					1			1
Hamel, Angele					1			1
Heffernan, Jane						2		2
Hlynka, Myron					1			1
Horrocks, Julie		1						1
Huang, Changcheng				1				1
Jao, David		1						1
Jeffrey, David			1					1
Jungic, Veselin						1		1
Karsten, Richard		1	1					2
Kempf, Achim						1		1
Kohandel, Mohammad				1				1
Kumar, Pranesh		1						1
LeMay, Valerie						1		1
Liao, Wenyan					1	1		2
Liu, Juxin					1			1
Loepky, Jason							2	2
Lopez-Ortiz, Alejandro		1						1

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Makarov, Roman							1	1
McNicholas, Paul	2			1				3
Moghadas, Seyed					1	1		2
Morales, Manuel					1		1	2
Mulayath Variyath, Asokan		2						2
Murty, Vijayakumar		1			1			2
Nekka, Fahima				1				1
Nigam, Nilima			1					1
Partovi Nia, Vahid				1		1		2
Plante, Jean-François						1		1
Pralat, Pawel				2	2	2	1	7
Prudhomme, Serge						1		1
Punnen, Abraham		2						2
Routledge, Richard			1					1
Salakhutdinov, Ruslan						1		1
Schwarz, Carl		1						1
Stevens, Brett				1				1
Tawhid, Mohamed		2		1	1			4
Urquiza, José M			1					1
Wang, Qiang					1			1
Wang, Xu			1					1
Ware, Antony				1				1
Wetton, Brian			1					1
Wu, Jianhong					1			1
Yu, Qinglin			1		2	1		4
Zhang, Ying							1	1
Zidek, James	1							1
<b>Total</b>	<b>4</b>	<b>15</b>	<b>15</b>	<b>13</b>	<b>23</b>	<b>17</b>	<b>7</b>	<b>94</b>

Table 4 lists the 78 unique companies that have supported Research Partnership awards involving mathematical sciences researchers. These companies represent a range of sectors: finance, manufacturing, information technology, and natural resources, among others.

Table 4: Companies participating with mathematics and statistics researchers in NSERC Research Partnership grants

	2009	2010	2011	2012	2013	2014	2015	Total
<i>None</i> <sup>2</sup>	1	2	3					6
BlackBerry		1			1			2
Compusense Inc.	1			1				2
Cyborg Trading Systems			2					2
Geo-X Exploration Services Inc.					1	1		2
Magna International Inc.			1		1			2
Michelin North America (Canada) Inc.			2					2
Teck					2			2
William T Ziemba Investment Management Inc				1	1			2
<i>Consortium</i> <sup>3</sup>				1	1			2
1564959 Alberta Ltd		1						1
A2b Fiber Inc.		1						1
Advanced Micro Devices		1						1
Aero-X Aerospace Exploration Systems					1			1
AQL Management Consulting Inc.	1							1
Arcana Studio Inc.						1		1
Bluink Ltd.				1				1
Canadian Ctr for Swine Improvement Inc.						1		1
Canfor Pulp Limited Partnership		1						1
Can-Technologies Inc.			1					1
CenterLine (Windsor) Ltd					1			1
Charter Press Ltd.							1	1
Chrysler Canada Inc.						1		1
CIBC Global Asset Management Inc					1			1
Cistel Technology Inc.				1				1

<sup>2</sup> "None" indicates no specified supporting partner for that grant type

<sup>3</sup> "Consortium" indicates multiple supporting organizations for that grant type

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ComLinked Corp.		1	1
Conair Group Inc.			1
CTS Forex	1		1
Dream Qii		1	1
DSA Ltd	1		1
Emerging Star Investment Group Inc.			1
ESSA Technologies Ltd	1		1
Factory Trend Inc.		1	1
FPIInnovations	1		1
Fundy Tidal Inc.	1		1
GE Digital Energy	1		1
GeneYouIn		1	1
GenomeDx Biosciences Inc		1	1
Global Intellectual Strategies	1		1
HealthWizer Inc.		1	1
Huawei Technologies Canada	1		1
Hutchinson Acres			1
InfoMagnetics Technologies Corporation		1	1
Infonaut Inc.	1		1
InteraXon Inc.	1		1
Irdeto Canada Corporation		1	1
ISIS Health Informatics Resource Group Inc.		1	1
Keen Projection Media Ltd.		1	1
LuminUltra Technologies Ltd		1	1
Mako Invent	1		1
Mathtoons Media Inc.			1
Matricis Informatique inc.		1	1
MDA Ltd	1		1
Mesh Consultants		1	1
Mistik Management Ltd		1	1
National Bank of Canada			1
ODOTECH Inc.		1	1
Pelesys Learning Systems Inc.	1		1
PluraPix Inc.		1	1
Prosyna Communication Inc.	1		1
Rio Tinto Alcan			1
Sales Choice Inc.		1	1

Sanofi Pasteur Limited								1	1
Scotiabank							1		1
SILKAN Solutions Inc.								1	1
Slyce Inc.								1	1
Sober Steering Sensors Canada Inc.							1		1
Solink Corporation								1	1
Sprung-brett RDI								1	1
TCI Stamps							1		1
Teck Resources Limited								1	1
Thales Canada Inc							1		1
The Globe and Mail								1	1
The Pressure Pipe Inspection Co. Ltd							1		1
The Smile Epidemic Inc.								1	1
Tim Horton Inc.							1		1
Vimich Traffic Logistics								1	1
William Ziemba Investment Management Inc							1		1
Winston Inc.								1	1
Yaletown Trading Group								1	1
<b>Total</b>	<b>4</b>	<b>15</b>	<b>15</b>	<b>13</b>	<b>23</b>	<b>17</b>	<b>7</b>	<b>94</b>	

## ENGAGE GRANTS

As Table 1 demonstrates Engage Grants are the most frequent grant type, participation of mathematics and statistics researchers is further broken down in this section.

Table 5 indicates that Engage Grant applications from researchers in mathematics and statistics fair slightly more favourably than other disciplines, with 5% more being awarded.

Table 5a: Participation rate in Engage Grants – all disciplines

Award Status	2009	2010	2011	2012	2013	2014	2015	Total	
Awarded	57	476	735	943	1180	1312	166	4869	80%
In Progress							442	442	7%
Not Awarded	9	43	74	109	134	163	39	571	9%
Rejected/Withdrawn	1	6	20	43	46	69	16	201	3%
<b>Total</b>	<b>67</b>	<b>525</b>	<b>829</b>	<b>1095</b>	<b>1360</b>	<b>1544</b>	<b>663</b>	<b>6083</b>	<b>100%</b>

Table 5b: Participation rate in Engage Grants – mathematics and statistics

Award Status Type	2009	2010	2011	2012	2013	2014	2015	Total	
Awarded	1	10	9	7	19	14	1	61	85%
In Progress							6	6	8%
Not Awarded		1		1	1			3	4%
Rejected/Withdrawn				1	1			2	3%
<b>Total</b>	<b>1</b>	<b>11</b>	<b>9</b>	<b>9</b>	<b>21</b>	<b>14</b>	<b>7</b>	<b>72</b>	

Of the grantees outlined in Table 3 above, 42 unique individuals have participated in Engage projects, collectively holding 61 grants as shown in Table 6.

Table 6: Unique professors in mathematics and statistics participating in awarded Engage Grants

Grantee	2009	2010	2011	2012	2013	2014	2015	Total
Pralat, Pawel				2	2	2	1	7
Ferworn, Alexander		2			1	1		4
Caron, Richard				1	1	1		3
Ashlock, Daniel			1	1				2
Davison, Matthew			2					2
Green, James			1		1			2
Karsten, Richard		1	1					2
Moghadas, Seyed					1	1		2
Murty, Vijayakumar		1			1			2
Tawhid, Mohamed		1			1			2
Yu, Qinglin			1		1			2
Barron, Ronald					1			1
Cheung, Kevin				1				1
Chipman, Hugh					1			1
De Sterck, Hans					1			1
Dean, Charmaine					1			1
Feng, Zeny						1		1
Gualtieri, Marco					1			1
Hamel, Angele					1			1
Heffernan, Jane						1		1
Horrocks, Julie		1						1
Jeffrey, David			1					1
Jungic, Veselin						1		1



Kempf, Achim						1		1
Kumar, Pranesh	1							1
LeMay, Valerie						1		1
Liao, Wenyuan					1			1
Liu, Juxin					1			1
Lopez-Ortiz, Alejandro	1							1
McNicholas, Paul	1							1
Morales, Manuel					1			1
Partovi Nia, Vahid						1		1
Plante, Jean-François						1		1
Prudhomme, Serge						1		1
Punnen, Abraham	1							1
Routledge, Richard			1					1
Salakhutdinov, Ruslan						1		1
Schwarz, Carl	1							1
Stevens, Brett				1				1
Wang, Qiang						1		1
Ware, Antony				1				1
Wetton, Brian			1					1
<b>Total</b>	<b>1</b>	<b>10</b>	<b>9</b>	<b>7</b>	<b>19</b>	<b>14</b>	<b>1</b>	<b>61</b>

As Engage Grants are intended to foster new collaborations between academia and industry, one of the indicators is the role of these grants in attracting professors and companies to undertake NSERC Research Partnership (RP)-supported projects for the first time, as evidenced by the participation history in RP grants. As shown in Table 7, mathematics and statistics professors are more likely to have never before participated in an application to RP.

Table 7a: Participation history of professors in Engage Grants – all disciplines

Grantee new to RP	2009	2010	2011	2012	2013	2014	2015	Total	
Not New	27	260	552	822	981	1172	316	4130	68%
New	40	265	277	273	379	372	103	1709	28%
Not specified							245	245	4%
<b>Total</b>	<b>67</b>	<b>525</b>	<b>829</b>	<b>1095</b>	<b>1360</b>	<b>1544</b>	<b>664</b>	<b>6084</b>	

Table 7b: Participation history of professors in Engage Grants – mathematics and statistics

Grantee new to RP	2009	2010	2011	2012	2013	2014	2015	Total	
Not New	1	5	2	5	11	5	2	31	43%
New		6	7	4	10	9	2	38	53%
Not specified							3	3	4%
<b>Total</b>	<b>1</b>	<b>11</b>	<b>9</b>	<b>9</b>	<b>21</b>	<b>14</b>	<b>7</b>	<b>72</b>	

Of the 24 unique universities referenced above, Table 8 shows 19 institutions that have participated in Engage Grants in mathematics and statistics. Similar provincial representation is noted.

Table 8: Unique universities participating in Engage Grants awarded in mathematics and statistics

University	2009	2010	2011	2012	2013	2014	2015	Total
Ryerson		2		2	3	3	1	11
Carleton			1	2	2			5
Guelph	1	1	1	1		1		5
Western Ontario			3		1			4
Toronto	1				2	1		4
Windsor				1	2	1		4
Simon Fraser		2	1			1		4
Thompson Rivers		1	1		2			4
Waterloo		1			1	1		3
York					1	2		3
Acadia		1	1		1			3
Calgary				1	1			2
British Columbia			1			1		2
École Polytechnique de Montréal						2		2
HEC Montréal						1		1
Wilfrid Laurier					1			1
Saskatchewan					1			1
Northern British Columbia		1						1
Montréal					1			1
<b>Total</b>	<b>1</b>	<b>10</b>	<b>9</b>	<b>7</b>	<b>19</b>	<b>14</b>	<b>1</b>	<b>61</b>

Also similar to participation rates noted above, 60 unique companies representing a broad spectrum of industrial sectors have participated in Engage Grant applications.

Table 9: Unique companies participating in Engage Grants attributed to mathematics and statistics

Company	2009	2010	2011	2012	2013	2014	2015	Total
Cyborg Trading Systems			2					2
1564959 Alberta Ltd		1						1
A2b Fiber Inc.		1						1
Advanced Micro Devices		1						1
Aero-X Aerospace Exploration Systems					1			1
AQL Management Consulting Inc.	1							1
Arcana Studio Inc.						1		1
BlackBerry					1			1
Bluink Ltd.				1				1
Canadian Ctr for Swine Improvement Inc.						1		1
Canfor Pulp Limited Partnership		1						1
Can-Technologies Inc.			1					1
CenterLine (Windsor) Ltd					1			1
Charter Press Ltd.							1	1
Chrysler Canada Inc.						1		1
CIBC Global Asset Management Inc					1			1
Cistel Technology Inc.				1				1
ComLinked Corp.						1		1
CTS Forex				1				1
Dream Qii						1		1
DSA Ltd			1					1
ESSA Technologies Ltd			1					1
Fundy Tidal Inc.		1						1
GE Digital Energy		1						1
GeneYouIn						1		1
GenomeDx Biosciences Inc					1			1
Geo-X Exploration Services Inc.					1			1
Global Intellectual Strategies			1					1
HealthWizer Inc.						1		1
InfoMagnetics Technologies Corporation					1			1
Infonaut Inc.		1						1
InteraXon Inc.		1						1

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Irdeto Canada Corporation					1			1
ISIS Health Informatics Resource Group Inc.					1			1
Keen Projection Media Ltd.						1		1
LuminUltra Technologies Ltd					1			1
Magna International Inc.				1				1
Mako Invent				1				1
Matricis Informatique inc.						1		1
Mesh Consultants					1			1
Mistik Management Ltd						1		1
ODOTECH Inc.						1		1
Pelesys Learning Systems Inc.			1					1
PluraPix Inc.						1		1
Prosyna Communication Inc.		1						1
Sales Choice Inc.					1			1
SILKAN Solutions Inc.						1		1
Slyce Inc.						1		1
Solink Corporation					1			1
Sprung-brett RDI					1			1
TCI Stamps			1					1
Teck					1			1
The Globe and Mail					1			1
The Pressure Pipe Inspection Co. Ltd		1						1
The Smile Epidemic Inc.						1		1
Tim Horton Inc.				1				1
Vimich Traffic Logistics						1		1
William T Ziemba Investment Management Inc						1		1
Winston Inc.					1			1
Yaletown Trading Group			1					1
<b>Total</b>	1	10	9	7	19	14	1	61

The participation history of these unique companies in Engage follows similar trends to what is noted among other disciplines, as seen in Table 10.

Table 10a: Participation history of companies in Engage Grants – all disciplines

Company new to RP	2009	2010	2011	2012	2013	2014	2015	Total	
New to NSERC	43	293	334	488	629	686	168	2641	43%
New to Partnerships	4	24	68	84	51	39	8	278	5%
Not New (Not specified)	20	208	427	523	680	819	243	2920	48%
							245	245	4%
<b>Total</b>	<b>67</b>	<b>525</b>	<b>829</b>	<b>1095</b>	<b>1360</b>	<b>1544</b>	<b>664</b>	<b>6084</b>	

Table 10b: Participation history of companies in Engage Grants – mathematics and statistics

Company new to RP	2009	2010	2011	2012	2013	2014	2015	Total	
New to NSERC		6	5	5	9	9	1	35	49%
New to Partnerships		2	2		1			5	7%
Not New (Not specified)	1	3	2	4	11	5	3	29	40%
							3	3	4%
<b>Total</b>	<b>1</b>	<b>11</b>	<b>9</b>	<b>9</b>	<b>21</b>	<b>14</b>	<b>7</b>	<b>72</b>	

## INDUSTRIAL SCHOLARSHIPS

The Industrial Undergraduate Student Research Awards (IUSRA) provide an opportunity for undergraduate students in science and engineering programs to undertake a research project in an industrial setting. Those applications indicating a research subject related to mathematics and statistics are shown in Table 11.

Table 11: IUSRA Applications indicating a research subject in mathematics and statistics

Application Status	2011	2012	2013	2014	2015	Total
Awarded	7	6	14	14	9	50
Not Awarded		1	3	4		8
Rejected/Withdrawn				1		1
<b>Total</b>	<b>7</b>	<b>7</b>	<b>17</b>	<b>19</b>	<b>9</b>	<b>59</b>

The above IUSRA applications have been held in 14 unique companies.

Table 12: Unique companies hosting IUSRA research projects related to mathematics and statistics

Company	2011	2012	2013	2014	2015	Total
AKAC inc.	3	4	5	6	2	20
Tangam Gaming Inc	1		6	5	4	16
Air Canada	1	1				2
Caribou Contests Inc.					1	1
Cyborg Trading Systems	1					1
Eight Leaves Media Inc			1			1
Emerging Star Investment Group Inc.				1	1	2
Entomogen Inc.			1			1
Infoknowledge Inc.				1		1
Integrated Asset Management Corp.		1				1
IQAnalytics Inc.			1			1
Planora Inc,	1					1
ReelyActive					1	1
Uken Studios				1		1
<b>Total</b>	<b>7</b>	<b>6</b>	<b>14</b>	<b>14</b>	<b>9</b>	<b>50</b>