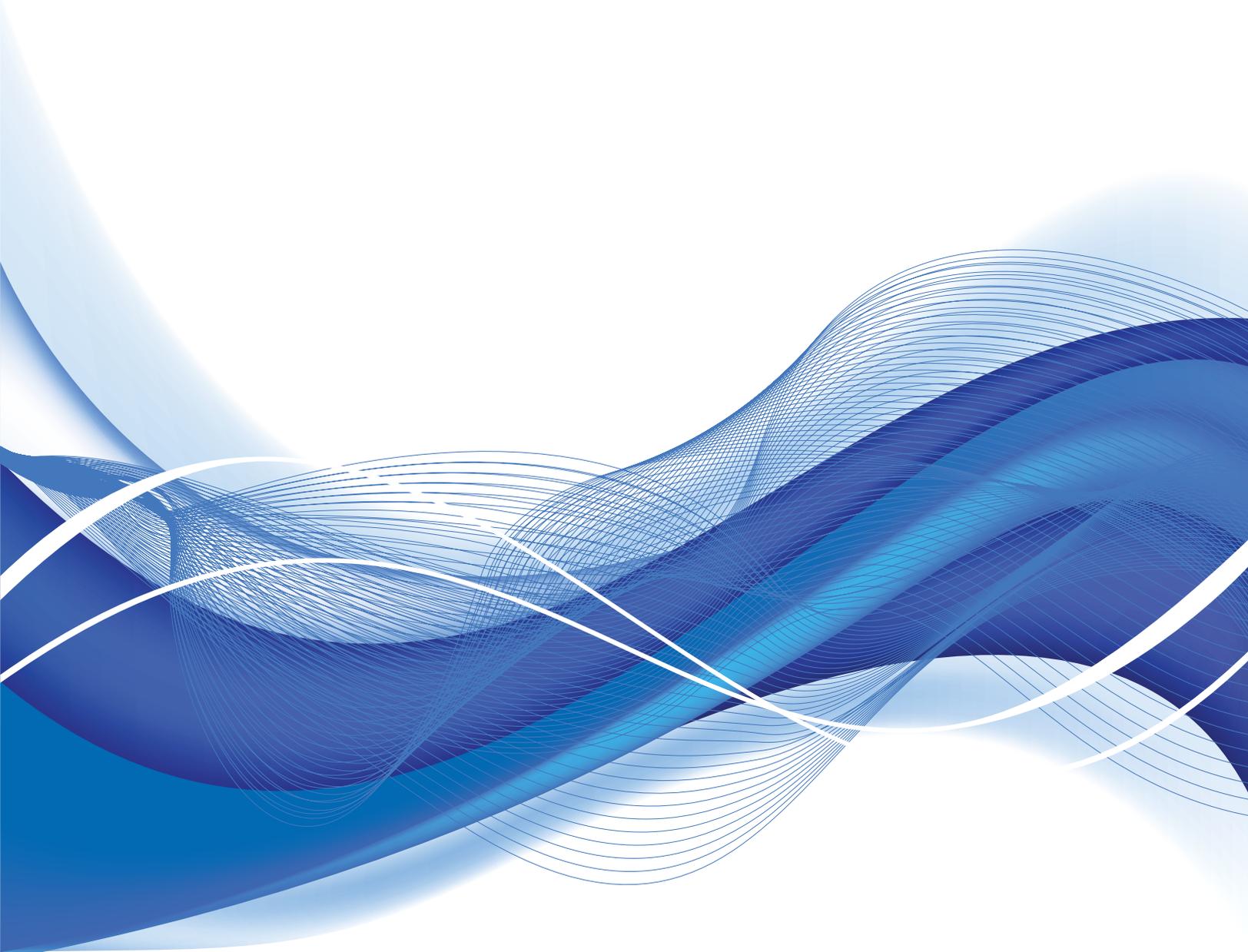


Pacific Institute *for the*
Mathematical Sciences



Annual Report 2016

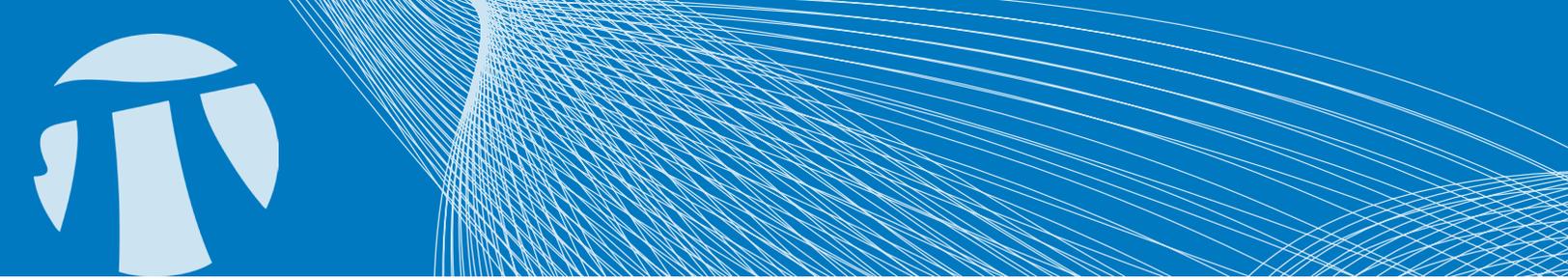
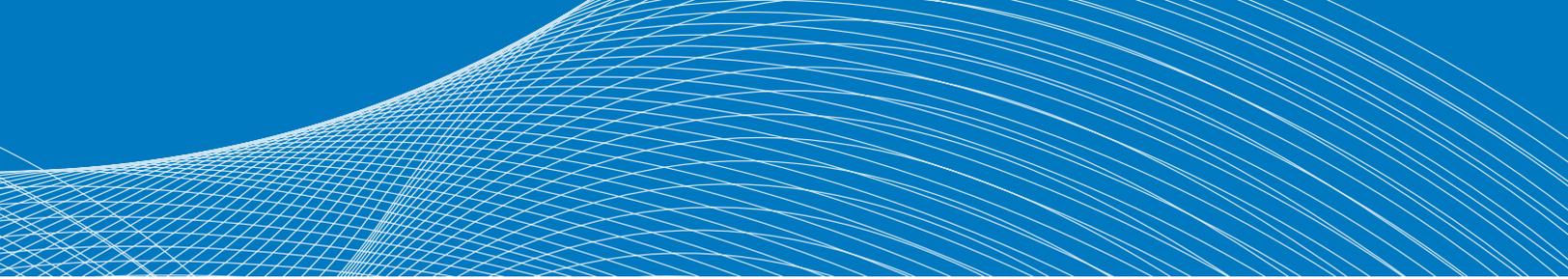


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ANNUAL PROGRESS REPORT

CTRMS-342044-2014

Pacific Institute for the Mathematical Sciences

January 1–December 31, 2016



I. OVERVIEW OF 2016

1. HIGHLIGHTS

- 1. Two Weeks in Vancouver-A Summer School for Women in Math:** The aim of the summer school was to target top female undergraduate students from across the country and the northwest United States, specializing in mathematics or in the closely related fields of computer science, physics and statistics. The program exposed them to the many facets of careers in mathematics and related fields. Lecture topics included stochastic modelling, knot theory, financial mathematics and combinatorics. There were 19 participants, 16 from Canada. All attendees, many of whom were previously undecided, have confirmed their intention to obtain a masters or PhD in mathematics or a related field.
- 2. PIMS Summer School in Mathematical Finance:** The summer school was held June 25-July 6, 2016 at UA. There were two themes: informational and imperfect financial markets, and market microstructure and algorithmic trading. There were 60 participants including 19 from Canada and 22 from USA. Participants wrote in the evaluation that the scientific program as a whole was a highlight. The lectures during the two weeks reflected the full breadth of mathematical finance: from theoretical to applied topics, all of which were delivered at a high scientific level and included the latest developments in the field
- 3. Western Canada Linear Algebra Meeting (WCLAM):** This meeting continued its tradition of high quality talks presented in an atmosphere that is especially welcoming to emerging researchers. In particular, seven of the fifteen contributed talks were given by graduate students and postdoctoral fellows. This years invited speakers were Rajesh Pereira (Doubly stochastic matrices and majorization), Rachel Quinlan (Adventures in nilpotent matrix spaces) and Kevin Vander Meulen (Spectral analysis of matrix patterns). There were 45 participants including 37 from across Canada.
- 4. Institutes Innovation Platform:** The goal of the Institutes Innovation Platform is to increase the involvement of mathematical and statistical scientists in specific collaborations with industry research partners. Major activities this year include the Graduate Math Modelling In Industry Workshop (Vancouver) and the Industrial Problem Solving Workshop (Toronto) which were jointly organized by PIMS, CRM and Fields; industrial panel discussions with researchers at the summer and winter meetings of the Canadian Math Society and the Canadian Applied and Industrial Math Society; Lunchbox Lecture Series in Calgary and Vancouver which bring topical research presentations to an industrial audience; industrial travel awards to facilitate academics who wish to publicize their research at more industry-focused conferences and workshops; new courses in mathematical methods and computational tools for industry (Math 651 at the University of Calgary, Math 210 at UBC, Scientific Software Seminars at UBC); launch of the syzygy.ca computational server for academic researchers who need to train their HQP with industry-standard computational tools such as Python and R; launch of an expertise survey to gather details on the interests and expertise of institute members in undertaking collaborative research with industry; development of the Solutions Canada website to match our academic researchers with business partners. Most of these activities are coordinated through formal Memoranda of Agreements with groups including AARMS, CANSSI, CRM, Fields, Mitacs, Compute Canada and Cybera. PIMS also explored the funding environment for these collaborations, with the Innovation Coordinator supervising an NSERC Engage grant in 2016, and developing a set of templates for Engage applications that are now available to any PIMS researcher seeking such funding. Engage grant applications are up considerably in the mathematics community, to 44 in 2015/16 compared to 15 in the previous year. Of 37 Engage grants awarded in that period, 11 were at PIMS member universities. Some 65 Mitacs Accelerate grants have been awarded to PIMS researchers in the past few years, as well as 4 Mitacs Elevate grants, according to data on the Mitacs website. Two new Strategic grants were awarded in the mathematical sciences in 2015/16, and three new Collaborative Research and Development grants awarded, with all three at PIMS universities. These are all key measures of impact of the innovation initiative at PIMS.

5. **Successful PDFs:** Over the past two years, one of our PDFs, J. Courtiel (SFU, now at U Paris) submitted articles dealing with bijective combinatorics, bioinformatics, theoretical physics, and probability theory. He also co-organized two conferences in the framework of the PIMS CRG on Applied Combinatorics. Another PDF, S. Scully at UA, published two articles in the renowned journals *Adv. Math.* and *J. Reine Angew. Math.* on quadratic forms. N. Beaton, a PDF from US, proved a well-known conjecture that the free energy of pulled self-avoiding walks in two or more dimensions is non-analytic at the point $f=0$. This is a statistical mechanical model of a forced long linear polymer tethered at one end to a surface. PIMS PDFs often go on to achieve high honours. For instance, B. Green of U Oxford, a 2003-2005 fellow, was recently awarded the Sylvester Medal of the Royal Society of London “for his famous result on primes in arithmetic progression and his subsequent proofs of a number of spectacular theorems over the last 5-10 years”.

2. WHAT'S NEW

- **James Colliander became PIMS Director on July 1, 2016.**
- **Brian Marcus became PIMS Interim Deputy Director on July 1, 2016.**
- **Jupyter Hub:** Jupyter notebooks are a computational tool which allow researchers to perform advanced computations and data analysis in their own web browsers. In the past year, PIMS has led an initiative, which now includes Compute Canada and Cybera, toward the goal of providing Jupyter as a service to all Canadian researchers. This initiative under the domain `syzygy.ca` is currently serving over 1200 researchers at universities such as UBC, UA, UC, UL, US and University of Waterloo. The service has been enthusiastically received across research disciplines and has significantly broadened the profile of PIMS. Together with Compute Canada and Cybera, we are in the process of extending service to many more Canadian Universities, and we are also exploring how it might be leveraged in partnership with industry, as part of our Innovation platform.
- **Collaborations with Mitacs:** PIMS and Mitacs have partnered to see graduate and postdoctoral researchers solve challenges using mathematical sciences in collaboration with industry and not-for-profit organizations. The partnership provides companies in Alberta, British Columbia, Manitoba and Saskatchewan with access to top mathematical scientists in order to support the development of technologies and services in all sectors. Graduate students and postdoctoral fellows will have opportunities to transfer their skills from theory to real-world application, while the companies gain competitive advantages by accessing high-quality research expertise.
- **CRG on Cohomological and Geometric Methods in Algebra:** This CRG held the ABC Workshop in October at UA. It was a weekend workshop in algebra and algebraic geometry. There were 39 participants from 10 universities including 5 women and 19 junior mathematicians (students and postdocs).
- **CRG on Geometric Analysis:** This new CRG aims to enhance connections and stimulate collaborations among the mathematicians at the Australian National University, the Beijing International Center for Mathematical Research, the University of British Columbia and the University of Washington and beyond. They ran Perspectives in Geometric Analysis which consisted of a summer school and workshop in Beijing, China and another workshop in Xi'an, China. These were held June 26-July 7, 2016. In Beijing, there were 95 participants including 20 females and 46 graduate students. The speakers reported on some of the latest developments in geometric analysis and partial differential equations. The summer school topics included recent progress on Ricci flow, Variation of Yang-Mills Lagrangian, Index theory, Comparison and Rigidity in Riemannian manifolds with boundary, and Semi-linear PDE.

3. PROGRAMS, ACTIVITIES AND NUMBER OF USERS

PIMS has built an international reputation for excellence and has transformed the conditions of mathematical research in Canada. PIMS funds Collaborative Research Groups, Postdoctoral Fellowships, the Postdoctoral Training Centre in Stochastics as well as individual events and focus periods on a competitive basis.

- **Collaborative Research Groups:** Collaborative Research Groups (CRGs) consist of researchers with a common interest and a desire to collaborate in developing aspects of their research programs for 3-4 years. Groups organize focus periods, including workshops, summer schools, and seminars. They make joint postdoctoral fellowship (PDF) appointments, and develop joint graduate training programs. CRGs are designed to promote and support long-term, multi-event, multi-site coordinated activities.
- **Conferences and Workshops:** PIMS organizes and funds a variety of meetings around North America and the Pacific Rim each year. These range from small one-day workshops to multi-week conferences involving hundreds of participants. PIMS also hosts or cosponsors various meetings by professional societies.
- **Summer Schools:** Every year PIMS runs a number of topical summer schools. They are intended to educate graduate students and early career researchers on current developments.
- **Focus Periods:** These intensive activities may occur as part of a CRG or on their own depending on current mathematical trends and collaborative prospects. Each covers a specific but substantial area of research of current importance to Canada, with participants ranging from students to world experts in the mathematical sciences.
- **Lecture and Seminar Series:** PIMS supports various seminar series at member universities and industrial centres throughout the year. Some of these are for specialists, while others are geared towards the general public, with the goal of unculcating in the citizenry the importance of mathematical research and its applications.
- **Industrial Activities:** PIMS also fosters collaborations with industry. Graduate Math Modeling in Industry Workshops enable graduate students to learn various aspects of high-level techniques for solving industrial mathematics problems. Industrial workshops, short courses, summer schools and seminar series are organized by PIMS researchers with topics of interest to both industry and academia that serve to disseminate newly developed mathematical tools that can be of use in industry.

ACTIVITY	2014		2015		2016		2017	
	Activities	Users	Activities	Users	Activities	Users	Activities	Users
Conference/Workshops	34	1861	41	2138	40	3476	38	3500
Summer Schools	9	409	5	307	11	652	4	300
Collaborative Research Groups	5		6		6		6	
Lecture/Seminar Series	28	1470	24	883	29	1458	21	1300
Industrial Activities	3	731	7	393	6	233	6	250
Other	23	2262	16	2193	26	1691	25	1500

Figure 1: Numbers of each type of activity supported by PIMS by year.

Note: The category “Conferences/Workshops” includes CRG events and Focus Period Activities. Not all 2017 events are known at this time.

II. ACCESS TO THE RESOURCE

1. COMMUNICATIONS PLAN

This plan identifies communication objectives, key messages, identifies stakeholders and sets out the strategies and tools that will be used.

Objectives and communication priorities:

- Build a consistent communications framework to raise the profile of PIMS in the global scientific community.
- Demonstrate to existing and potential new sponsors, as well as the global scientific community that PIMS has given thought and priority to communicating with them.
- Place education as a top priority in terms of gathering funding, program organization and awareness-raising.
- Build the PIMS community through regular, consistent and targeted formal and informal communications.

Key messages:

- PIMS is a leading mathematical institute in North America, with worldwide influence on research and industry. It has established innovative programs that have had a transformative impact on the mathematical sciences and the training of HQP.
- The PIMS community is inclusive; from K-12 to research faculty. PIMS' distributed structure throughout the Pacific Northwest enables all who are engaged to do so locally, while still benefitting from all of PIMS' resources.
- PIMS is nurturing the pipeline of younger generations in Western Canada, including those with Aboriginal backgrounds. PIMS promotes numeracy as an integral part of development and learning.

Strategies:

- Create consistency, clarity and regularity of communications.
- Respond to the needs of stakeholders as to how they would like to receive information.
- Add a more human touch, include photos, personal stories and testimonials.
- Become more proactive and opportunistic in promoting PIMS to stakeholders.
- Increase internal and external community building opportunities.

Tools:

- Websites and electronic
 - **PIMS website:** The PIMS website (www.pims.math.ca) offers easy global access to information on all PIMS activities, recent news and resources. One feature is the PIMS News/Press section that is highlighted on the home page; stakeholders can easily access the most current and noteworthy happenings at PIMS via this section, be they award notices, media coverage, funding announcements or site appointment updates.
 - **Mathtube.org:** A dedicated site that will eventually archive all of PIMS written, video and audio media. mathtube.org was created to meet the increasing demand to see footage of past PIMS lectures. It provides global exposure to PIMS events and gives event attendees the chance to review. For others, it offers a chance to see what they've missed. This resource also gives added value to conference organizers and participants, as well as a forum to see world-class speakers from all areas of the mathematical sciences. These materials are an important resource and include contributions from some of the world's most distinguished contemporary mathematicians. Whether one is a student, a researcher, an industry professional or a mathematics teacher, mathtube.org includes useful content that will help advance one in their field.



- **PIMS Connection, monthly e-newsletter:** This brief email includes links to upcoming events, updates and news items. Its circulation is over 3,700. In 2014, PIMS switched from a purely text-based format, to one that used an online resource (Mailchimp), which allows us to utilize a more brand-savvy digital template, and track the number of opens and link clicks.
- **Social Media:** PIMS now uses Twitter, Facebook, LinkedIn and Medium to connect with and provide all of our updates and news to the PIMS community. These posts cover a range of content from event photo highlights, notices of publication availability, weekly event updates and more. (The same content is provided on both Twitter and Facebook.)
- **Hardcopy Publications**
 - **Year in Review** is a booklet designed to summarize the range of PIMS activities. The 2009–2015 Years in Review can be downloaded from www.pims.math.ca/resources/publications/pims-year-review.
 - **PIMS Newsletter** is produced twice yearly. It contains reports on the recent activities at PIMS, announcements of upcoming scientific, industrial and educational events, accolades and breakthroughs within the PIMS community, and upcoming opportunities and how to apply. The latest issue can be found at pims.math.ca/resources/publications/pims-newsletter. It has a circulation of 800 hardcopy issues. We also use Mailchimp to send it in electronic format to a list of over 1000 recipients.
 - **Pi in the Sky** is primarily aimed at high-school students and teachers, with the main goal of providing a cultural landscape for mathematics. It has a natural extension to junior high school students and undergraduates, with articles that put curriculum topics in a different context. *Pi in the Sky* accepts material on any subject related to mathematics and its applications, including: articles, problems, cartoons, statements, jokes, etc. *Pi in the Sky* is produced once a year and mailed to various institutes and private subscriptions throughout Canada and the world (estimated circulation is 1,700) and can be downloaded from the PIMS website: www.pims.math.ca/resources/publications/pi-sky.
- **Other**
 - **Advertising** PIMS-funded events and opportunities are advertised both electronically and in print. We advertise through websites and publications at institutions such as AMS, CMS, IMS and SIAM and by offering custom-designed event posters that are distributed to the major mathematical departments and institutes in Canada and the US, as well as an annual poster highlighting all of PIMS main events for the year, which is distributed to over 200 of the top scientific institutions worldwide.
 - **Reports** Conference proceedings, abstracts, lecture notes, websites and final event reports are all made available for download from the PIMS website in .pdf format. (See www.pims.math.ca). Conference materials are attached to the corresponding event, which are listed chronologically and are searchable by keyword for ease of access. PIMS also produces an annual report that is sent to sponsors, administrators at PIMS-affiliated universities, representatives from the business, industry and resource sectors as well as the major professional societies. Past annual reports (1997-2015) can be viewed at www.pims.math.ca/resources/publications/annual-reports.

2. AUDIO/VIDEO FACILITIES

Seminars and Lectures: Seminar organizers at PIMS are offered the ability to include remote participants by picking from a wide variety of technologies. In addition to operating traditional h.323-based videoconferencing systems we integrate software solutions such as Skype and BlueJeans and Vidyo, to provide as low a barrier to participation as possible.

- As the UBC-Vancouver WestGrid/Compute-Canada collaboration node, PIMS-UBC participates in the WestGrid and Coast-to-Coast seminar series. The latter includes participants from throughout Canada and 2015 saw two series being run. The first was on “The Power of Linked Administrative Health Data for Population Health Research” and the second was on “Foundations and Applications of Big Data.” PIMS-UBC hosted many of the speakers for these events. Historically, these seminars have been valuable to PIMS by bringing PIMS researchers into contact with a wide variety of external groups and offering an opportunity to showcase PIMS at the same time.
- In the winter term of 2015, PIMS sites are participating in a shared seminar series as part of the PIMS CRG in Explicit Methods for Abelian Varieties. This seminar series is conducted over Bluejeans with participants and speakers coming from PIMS sites such as SFU and UW. These seminars are recorded and posted to our mathtube.org site. Earlier in 2015, we also concluded a successful video seminar series between UBC and UA in Geometry and Physics.

Academic Courses:

- R. Jardine of U Western Ontario is conducting a course during the winter term. It includes students from Western and UBC.
- D. Rolfsen of UBC provided a course in Topology to students at UBC in the fall of 2015. The format of the course was a mix of in-person and electronic sessions. This flexible structure was essential to accommodate the schedules of the participants, and the course would not have been possible otherwise.

Other Uses:

- The PIMS education coordinators held a virtual meeting to give program updates and to share techniques and best practices. This meeting was deemed so successful that it is expected to become a regularly scheduled event within PIMS.
- As in previous years our facilities were used to allow researchers to take care of academic duties such as participating in thesis defenses or academic job interviews.

III. CONTRIBUTIONS TO RESEARCH

The PIMS News in 2016 More information about PIMS can be obtained under “PIMS News/Press” at pims.math.ca and in “Year in Review” at pims.math.ca/resources/publications/pims-year-review.

IV. DISTRIBUTION OF USERS

In 2016, the total number of attendees was 7,510.

67% were from Canadian institutions, of which:

46% were from British Columbia,

37% were from Alberta,

3% were from Saskatchewan,

5% were from Manitoba,

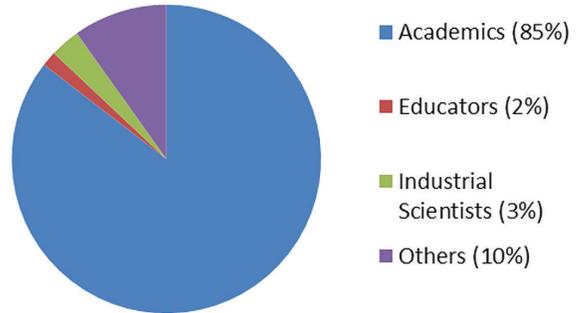
8% were from Ontario and Quebec, and

1% were from the Atlantic Provinces.

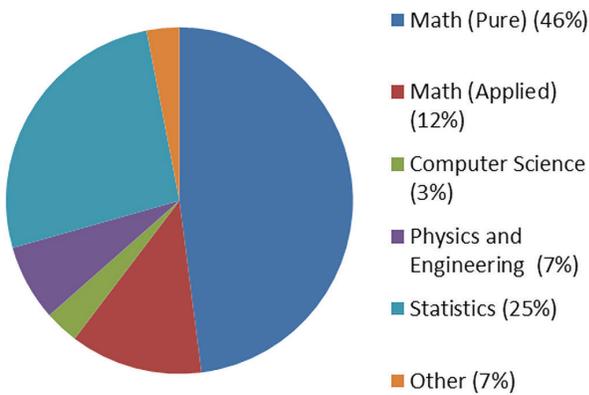
19% were from other North American institutions,

14% were from elsewhere.

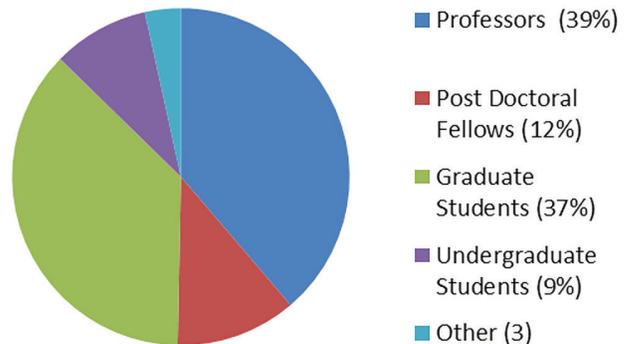
Attendee Demographics



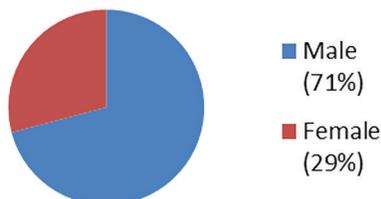
Subject Area



Academic Attendee Demographics



Attendee Gender Demographics



V. TRAINING AND DEVELOPMENT OF HIGHLY QUALIFIED PERSONNEL

1. POSTDOCTORAL FELLOWS & CNRS/PIMS SCIENTISTS

PIMS sponsors numerous postdoctoral fellows (PDFs) – 51 in 2016 – attracting outstanding young scientists who contribute to PIMS research programs, many of whom later become faculty members at leading Canadian universities. They are distributed throughout PIMS sites on a competitive basis. Postdoctoral candidates from institutions in France are eligible for CNRS/PIMS fellowships. PIMS PDFs are closely mentored by sponsoring faculty at PIMS host institutions. In the case of CRG or PTCS PDFs, they are inducted into appropriate research groups. PIMS Central also monitors PDF progress, and follows up on PDFs after their tenures have ended. PIMS PDFs are looked after intellectually and professionally: PIMS Central holds yearly one-day workshops on professional development topics such as Postdoc/Grad Student Job Forum and workshop discussions including “ Postdoctoral life in different kinds of institutions”.

2. PIMS POSTDOCTORAL TRAINING CENTRE IN STOCHASTICS

As part of the PTCS networking activities across Canada, a Summer School in Mathematical Finance was held at UA, Probability Seminars at UBC were broadcast to UA and UC and the Annual PTCS Retreat was held at BIRS. The purpose of the retreat was to enable the PDFs in the program and supervising faculty to get acquainted as well as to give the young researchers an opportunity to present their work to the Western Canadian probability community.

3. ALBERTA GRADUATE FELLOWSHIPS

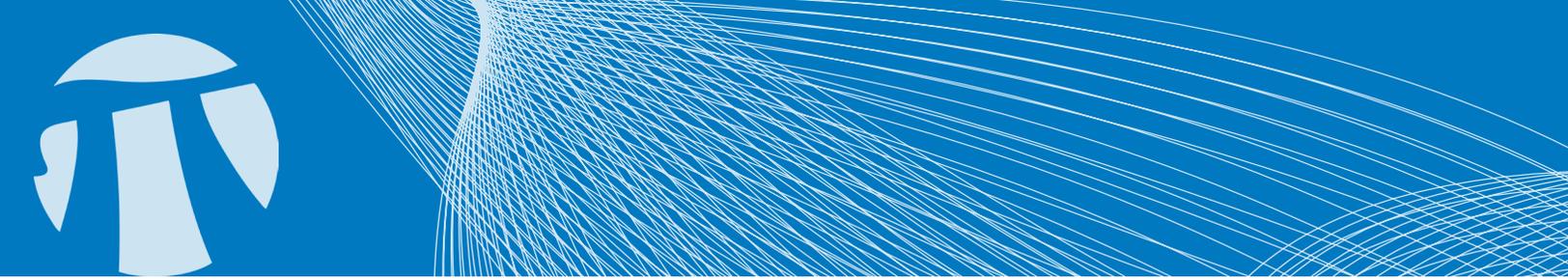
In 2016, PIMS sponsored 9 Graduate Fellowships in Alberta. This provided graduate students the opportunity to work and learn in fields including Mathematical Biology and Geomathematics.

VI. PARTNERSHIPS AND OUTREACH

1. NATIONAL

PIMS has a national mandate to support the mathematical sciences in Canada. To this end, in partnership with the Fields Institute (FI) and the Centre de Recherches Mathématiques (CRM), it has created major national programs such as the Atlantic Association of Research in the Mathematical Sciences (AARMS). Together with the Mathematical Sciences Research Institute (MSRI), PIMS created the Banff International Research Station (BIRS), which is now the premier mathematical research station in North America.

PIMS coordinates with AARMS, BIRS, CRM and Fields to support a number of Canadian activities such as meetings of the societies (CAIMS, CMS and SSC), the Séminaire de Mathématiques Supérieures in Montreal, and the regularly scheduled Canadian Discrete and Algorithmic Mathematics and CNTA meetings.



In 2016, we began a yearly national rotation for the IPSW, which were created by PIMS and then emulated by CRM and Fields. PIMS funding for activities in Atlantic Canada through AARMS is an important link to another region of the country. As part of the Long Range Plan for Mathematical and Statistical Sciences in Canada, PIMS and the other institutes commit significant resources to support the Canadian Statistical Sciences Institute (CANSSI). Joint activities have been underway for several years.

PIMS and Mitacs, a national not-for-profit research and training organization, have partnered to see graduate and postdoctoral researchers solve challenges using mathematical sciences in collaboration with industry and not-for-profit organizations. The partnership will provide companies in Alberta, British Columbia, Manitoba and Saskatchewan with access to top mathematical scientists in order to support the development of technologies and services in all sectors.

Graduate students and postdoctoral fellows will have opportunities to transfer their skills from theory to real-world application, while companies gain competitive advantages by accessing high-quality research expertise.

2. INTERNATIONAL

Part of the PIMS mandate is to establish international partnerships in order to provide mechanisms for Canadian researchers to participate in activities outside Canada and attract visitors from abroad. The establishment of the Centre National de la Recherche Scientifique (CNRS) Unite Mixte international, at PIMS (the first in mathematics in North America) has led to year-long visits by more than 35 researchers from France since 2007, fully funded by CNRS. Similarly, the leadership role played by PIMS in establishing the Pacific Rim Mathematical Association (PRIMA) has provided ample opportunities for Canadian exchanges with countries in this huge region. Our connections with Latin America have led to joint events (Canada-Mexico meetings), as well as facilitating the existing North American partnership at BIRS, to the benefit of the entire community.

3. EDUCATION AND OUTREACH

PIMS has a mandate to promote mathematics vigorously in Canada and takes upon itself the mission to help provide the elements for success that are necessary for current and future generations of teachers, scientists and engineers. In addition, the educational programs at PIMS advocate strongly for the participation of people of all backgrounds in mathematics. PIMS is actively involved in promoting mathematical outreach events in schools throughout Western Canada, either directly or through mechanisms such as science fairs. These involve students, teachers and parents and seek to convey the excitement of discovery and learning that underlies mathematics and its applications.

PIMS has developed partnerships with Aboriginal schools in western Canada that have been supported by provincial governments as well as by private donors. The activities under this program include summer camps for students, teacher training sessions, and a coordinated mentoring program where undergraduate students from universities work with local teachers and students to provide support in mathematics.

Many teachers, especially in elementary schools, do not have the necessary knowledge or experience to feel comfortable teaching mathematics. To address this, PIMS developed a 4-week Summer School for In-service Teachers. The goal is to create a team of teachers at each school that could foster a cultural and academic shift with respect to the learning and enjoyment of mathematics.

Colleges and universities within the BC, Alberta, Saskatchewan and Manitoba post-secondary systems that do not qualify for regular membership in PIMS may become PIMS Education Associates. The PIMS educational network allows for the exchange of successful practices in outreach, teaching, and professional development amongst its members. Currently PIMS has 16 educational associates in Alberta and British Columbia.

VII. CONSULTATION MECHANISMS AND COLLABORATIVE ACTIVITIES WITH AARMS AND CANSSI

As part of a national mandate, PIMS supports mathematical activities in the Maritime Provinces in conjunction with the Atlantic Association for Research in the Mathematical Sciences (AARMS). Together they co-sponsored the following activities in 2016 (PIMS' financial contribution to each activity is listed in parentheses):

- *Collaborative Research Group in Iterated Function Systems, Fractals, Invariant Measures and Applications* led by Shafiqul Islam at UPEI. Events included:
 - *Iterated Function Systems, Fractals, Invariant Measures and Applications conference*, Dalhousie University, June 10-12. There were 11 speakers at this event.
 - *AARMS CRG Seminar Series* including a talk by Franklin Mendivil (Acadia) on Sets of Sums and Sums of Sets. (\$15,000)
 - *AARMS Summer School*, Dalhousie University, July 11-August 5. During a four week period every summer, AARMS invites highly regarded faculty from around the world to deliver graduate courses in the mathematical sciences and their applications. In 2016, the theme of the summer school was “Applications of Category Theory, Combinatorics and Number Theory”. An international collection of students took at least two graduate level courses each from the following list: “Higher Category Theory and Categorical Logic”, “Categories, Quantum Computation and Topology”, “Stable polynomials: with applications to graphs, matrices, and probability”, and “An Introduction to Special Functions and WZ Theory”. (\$15,000)
 - *Graduate Math Modeling in Industry at UBC* August 8-13. Travel support was provided for several AARMS students to attend this industrial problem-solving workshop (\$2,750)

PIMS also supports statistical activities throughout Canada through CANSSI. In 2016 these included:

- *Joint Analysis of Neuroimaging Data: High Dimensional Problems, Spatiotemporal Models and Computation*, CRT team meeting, UV, July 13. (\$6,132)
- *International Meeting on Statistical Climatology*, Canmore, AB, June 6-10. This meeting facilitated communication between science and statistics communities and promote good statistical practice in climate and atmospheric science. (\$10,000)
- *Student travel support* (\$14,565)
- *Statistical Analysis of Large Administrative Health Databases: Emerging Challenges and Strategies*, SFU, April 4-6. The work-shop brought together statisticians and health researchers to discuss statistical issues arising in the use of large administrative databases for health research. (\$18,500)
- *Scientific Coordinator* (\$53,246), Postdoc (\$15,540) and Research Assistants (\$53,717) salaries.

PIMS provides in-kind contributions to CANSSI in the form of facilities for their events held at PIMS sites and **administrative and logistical support provided by PIMS Manager of Finance & Administration and Site Admin**



VIII. MANAGEMENT AND BUDGETS

Resource Revenues (collected during the period January 1 to December 31 2016)

a)	User Fees (Registration Fees collected)	86,869
b)	Contributions from Partner Universities	
	UBC	272,132
	Simon Fraser University	80,000
	University of Alberta	77,700
	University of Calgary	67,710
	University of Victoria	66,600
	University of Saskatchewan	50,000
	University of Regina	35,000
	University of Washington	14,342
	University of Lethbridge	35,000
	University of Manitoba	50,000
	Portland State University	5,138
c)	Contributions from MITACS/NSF	
	NSF for Topology Events	3,138
	University of Utah (NSF) for Representation Theory	2,351
	Mitacs Industrial Innovation	50,000
d)	AIAE (Alberta Government)	400,000
e)	Private Donations	34,919
f)	Other Contributions	
	FIELDS for Combinatorial Constructions	4,000
	FIELDS for Women in Math	7,500
	Pepperdine University for Undergraduate Supersymmetry	1,179
	University of Bielfeld for Representation Theory	7,350
	Goldcorp for Women in Math	500
	CRM for Women in Math	2,400
	UBC Various Depts	8,123
	Other Miscellaneous	31,839
g)	NSERC Industrial Innovation Grant (payment delayed)	0
h)	NSERC CTRMS Grant	1,160,500
i)	Carried Forward from December 31 2015	1,871,911
	TOTAL REVENUES (January 1 to December 31 2016)	4,426,201
	Revenue less Expenses	1,692,478

PIMS CTRMS NSERC Activity Report January 1 to December 31 2016

	Use of the resource (i.e. PIMS) Paid from ALL revenue sources January 1 to December 31 2016	Planned use of CTRMS funds Jan 1 to December 31 2017
<u>Resource Expenditures</u>		
1) Salaries & Benefits		
a) Administrative Staff	315,131	0
b) Directors & Site Directors Teaching Releases/Stipends	139,894	0
c) Scientific Support Personnel	318,882	108,976
d) Postdoctoral Fellows (inc. CRG PDFs)	603,440	464,249
e) Technical/Professional Assistants (inc. Education)	36,879	0
f) Graduate Students	62,986	0
2) Equipment or Facility		
a) Purchase or Rental	24,100	0
b) Operation and Maintenance Costs	30,617	0
3) Materials & Supplies		
a) Refreshments	7,965	0
b) Office Supplies	20,079	0
4) Meetings/Collaborations/Staff Travel		
a) PIMS Meetings (SRP, PDF, Board, Admin, Exec)	48,997	0
b) Staff/PDF Travel	18,130	0
c) Director Research Support and Scientific Consultation	41,179	0
5) Dissemination Costs		
a) Publication Costs	7,699	0
b) Advertising & Networking	6,170	0
6) Scientific Activities (inc. CRGs and IGTC)		
a) Conferences/Symposia	328,217	145,915
b) Summer Schools	162,506	76,000
c) Workshops/Seminars/Colloquia (inc. MMIW)	212,863	85,610
d) Distinguished Visitors/Chairs/Speakers	51,091	19,750
7) Education Initiatives	92,448	0
8) AARMS Activities		40,000
a) AARMS Summer School	15,000	
b) CRG IFS, Fractals, Invariant Measures and Applications	15,000	
c) Math Modeling in Industry	2,750	
9) CANSSI		220000
a) Scientific Meetings	49,197	
b) Scientific Coordinator	53,246	
c) Postdoctoral Fellow	15,540	
d) Research Assistant	53,717	
TOTAL EXPENDITURES	2,733,723	1,160,500

GLOSSARY OF ACRONYMS

PIMS	Pacific Institute for the Mathematical Sciences
AARMS	Atlantic Association of Research in the Mathematical Sciences
AMS	American Mathematical Society
BIRS	Banff International Research Station
CAIMS	Canadian Applied and Industrial Mathematics Society
CANSI	Canadian Statistical Sciences Institute
CMS	Canadian Mathematical Society
CNRS	Centre National de la Recherche Scientifique
CNTA	Canadian Number Theory Association
CRG	Collaborative Research Group
CRM	Centre de Recherches Mathématiques
IMA	Institute for Mathematics and its Applications
IPSW	Industrial Problem Solving Workshop
Mitacs	Mathematics of Information Technology and Complex Systems
MMIW	Mathematical Modeling in Industry Workshops
MSI	Mathematical Sciences Institute
MSRI	Mathematical Sciences Research Institute
NSERC	National Sciences and Engineering Research Council
PDF	Postdoctoral Fellow
PNRMS	Prairie Network for Research in the Mathematical Sciences
PRIMA	Pacific Rim Mathematical Association
PSU	Portland State University
PTCS	PIMS Postdoctoral Training Centre in Stochastics
SFU	Simon Fraser University
SFU-V	Simon Fraser University-Vancouver
SIAM	Society for Industrial and Applied Mathematics
SRP	Scientific Review Panel
SSC	Statistical Society of Canada
UA	University of Alberta
UBC	University of British Columbia
UBC-O	University of British Columbia–Okanagan
UC	University of Calgary
UL	University of Lethbridge
UR	University of Regina
US	University of Saskatchewan
UV	University of Victoria
UW	University of Washington
WWU	Western Washington University