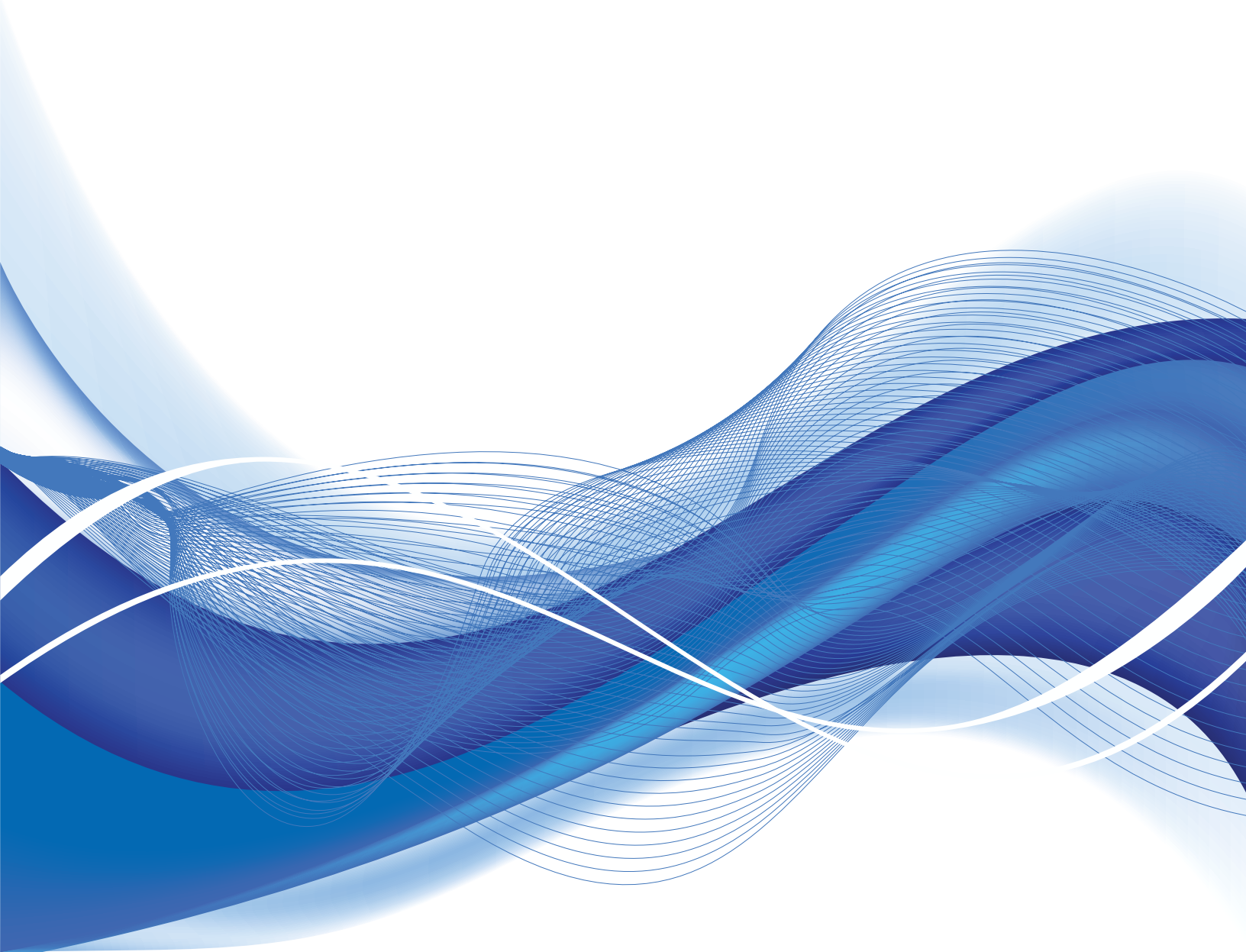


Pacific Institute *for the*
Mathematical Sciences



Annual Report 2018

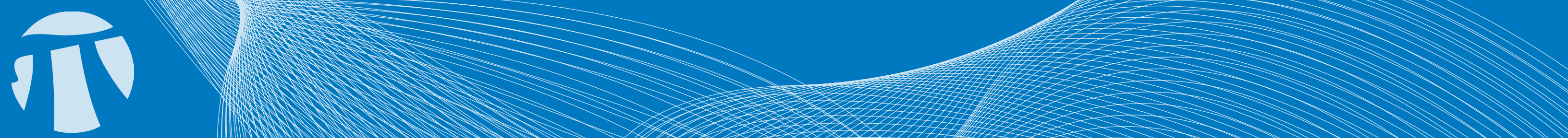


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ANNUAL PROGRESS REPORT

CTRMS-342044-2014

Pacific Institute for the Mathematical Sciences

January 1–December 31, 2018



I. OVERVIEW OF 2018

1. HIGHLIGHTS

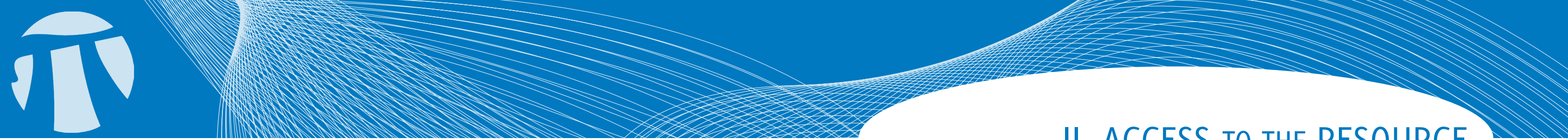
- 1. The 2018 Calgary PIMS Datathon, UCalgary:** The 2018 Calgary Datathon created an opportunity for students from PIMS institutes to analyze and evaluate the open data provided by the city's Open Data Portal, and propose solutions to enhance the infrastructure and build a healthy, green and safe city. The aim was to use and enhance the data by improving data connectivity, suggesting the collection of new and relevant data points, and optimizing data usability. Final projects included strategies for mapping pedestrian routes, analysis of water demand, and discovering barriers to recreational activities for local residents.
- 2. Diversity in Mathematics Summer School:** As part of Diversity in Mathematics, a multi-year, multi-level program geared towards promoting diversity and inclusivity in STEM, between August 7-17, 2018, PIMS hosted the Undergraduate Summer School for female-identified undergraduate students studying mathematics. The purpose of the program was to introduce the undergraduate participants to a wide variety of professions and careers, in academia and in industry. The highlights of the annual two-week program include: (a) An interactive math day camp for high school students from groups that are consistently under-represented in the STEM fields. The aim is to increase their representation and retention at post-secondary institutions in STEM fields. (b) A national summer school that inspires talented undergraduate women to specialize in a mathematics-related field at the graduate and post-graduate level and consider career options focused on science and mathematics. (c) A creative forum for mentorship and leadership at all levels, where the undergraduate participants learn to serve as mentors for their younger counterparts.
- 3. Graph Searching in Canada (GRASCan):** This ongoing Graph Searching in Canada (GRASCan) workshop was organized at the University of Regina and saw plenary speakers including Shannon Fitzpatrick (UPEI) and Bill Kinnersley (URhode Island). The workshop brings together graph searchers working in any and all aspects of vertex pursuit games on graphs and their variants, such as Cops and Robbers, edge searching, firefighting, burning, and graph cleanings.
- 4. BCDATA Workshop:** The bcddata workshop, targeted at students from PIMS institutions with an interest in data science and strong mathematical backgrounds, took place Jun 4-8, 2018. The workshop had two main goals: to bring together top researchers, industry professionals and students to tackle interesting research and industry problems; and to develop data science literacy in students with strong mathematical skills who may have little or no previous experience in the realm of "data science". The workshop hosted graduate students in mathematics and interested industry members for a week-long foray into foundational and crucial elements of the rapidly expanding field of data science. It showcased for industry partners and students alike the opportunity in data science tools—such as working with large data sets, statistical inference, and machine learning—that aid in research and broaden career options after graduation. Computational work was done with Jupyter notebooks using bcddata.syzygy.ca.
- 5. The Joint Canada-Asia Pacific Conference on General Relativity and Relativistic Astrophysics:** The Joint Canada-Asia Pacific Conference on General Relativity and Relativistic Astrophysics was held at the University of Alberta in 2018. It has been an important conference for over 30 years and brought together relativists, cosmologists and mathematical physicists, from Canada, the Asia-Pacific countries, and from around the world.
- 6. The PIMS Syzygy Platform Expands:** Together with Compute Canada and Cybera, PIMS launched a computational platform based on Jupyter notebooks in 2017. As of the end of 2018, this platform was available at over 18 Canadian higher education institutions and has served more than 13,750 users. The service delivers Jupyter notebooks to faculty, staff and students at Canadian universities using single-sign-on (SSO) via their university user account. By eliminating the requirement to install customized software on personal computers, syzygy.ca makes it easier for research teams

to collaborate using the right tools for their investigations. The platform delivers an interactive coding environment for literate programming in Python 2, Python 3, R (and sometimes Julia, Octav, Sage and other languages). PIMS is leveraging syzygy.ca and other tools to develop expertise in scientific computing, data science, machine intelligence, optimization, etc. Academy-industry partnerships are forming to investigate data science challenges arising in business through a workshop built atop of syzygy.ca. It was reported at JupyterCon 2018 that PIMS is currently hosting the largest JupyterHub in the world and it continues to grow. It was also reported that the USA National Science Foundation was "inspired" by the federated approach taken by PIMS and is exploring plans to implement similar JupyterHub service in the USA.

- 7. Federal CanCode Grant:** The Callysto project, launched by PIMS and Cybera, is closely related to Syzygy and leverages many of the same tools aiming to help today's youth become tomorrow's digital leaders. It is an all-in-one educational program, combining a computational platform with curriculum-based learning and skill development materials, all accessible from any device with an internet connection. An important component of the Callysto project is the partnership between higher education and the K-12 community, which produces a rich library of open-access materials for teaching computational learning. By using a train-the-trainers approach, PIMS and Cybera have introduced Callysto to 931 teachers and nearly 25,000 students across Canada.

2. WHAT'S NEW

- **Ben Adcock became Site Director at Simon Fraser University.**
- **Anthony Quas became Interim Deputy Director of PIMS.**
- **PIMS Launched the Student Mobility Program - France to Canada:** PIMS created a new program, in partnership with Mitacs and leveraging Mitacs Globalink, to support visits by students from France to carry out research at PIMS member universities and for Canadian students from PIMS member universities to study in France. This award provides \$6,000 (CAD) for senior undergraduates and graduate students and postdoctoral fellows to conduct 12-24 week research projects in the host country. This program is offered under the umbrella of PIMS-Europe, CNRS Unité Mixte Internationale #3069.
- **PIMS Launched the PIMS-Europe Fellowships:** PIMS-Europe (CNRS UMI #3069) announced a new program, the PIMS-Europe Fellowships, with the goal of developing and supporting research collaborations between mathematical scientists at PIMS member universities and researchers across France. These fellowships champion a mutual exchange of knowledge and talent while encouraging cross-ocean research on the frontline of the Mathematical Sciences. Fellowship awardees receive CAD \$5,000 to facilitate long-term visits to France of at least 2 months, but preferably longer.
- **Collaborative Research Group on High Dimensional Data Analysis started:** There are fundamental open questions that limit the industrial uptake of ideas from the mathematics of high-dimensional data and their application in practice, which this CRG will address. The focal areas are: bridging the gap between theory and practice in applications of sparse recovery; methods for large-scale optimization; and deep learning and sampling.
- **CNRS Visitor - Paul Vigneaux, Mathematics Department of ENS de Lyon, France:** This research project is centered on the mathematical modelling and simulation of the flow of viscoplastic materials (materials that have the ability to be rigid or behave like a fluid). The visit facilitates collaborative research with Neil Balmforth, Ian Frigaard and Anthony Wachs from UBC.



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.
- PIMS encourages and promotes diversity in mathematics

Strategies:

- Create and manage the 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.

3. PROGRAMS, ACTIVITIES AND NUMBER OF USERS

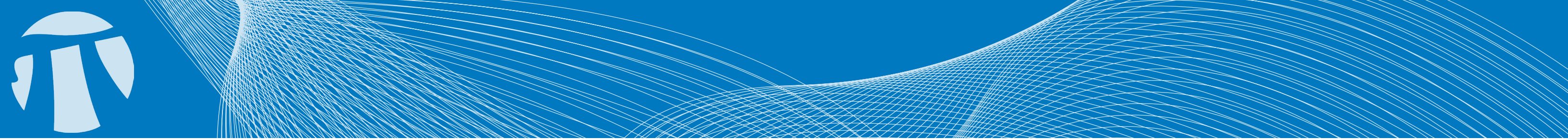
PIMS has built an international reputation for excellence and has transformed the conditions of mathematical research in Canada. PIMS funds Collaborative Research Groups, Postdoctoral Fellowships, the Postdoctoral Training Centre in Stochastics as well as individual events and focus periods on a competitive 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 inculcating in the citizenry the importance of mathematical research and its applications.
- **Industrial Activities:** PIMS also fosters collaborations with industry. Industry Problem Solving Workshops enable graduate students to learn various aspects of high-level techniques for solving industrial mathematics problems. 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	2016		2017		2018		2019	
	Activities	Users	Activities	Users	Activities	Users	Activities	Users
Conferences/Workshops	40	3,476	34	4,251	42	4,294	28	2,800
Summer Schools	11	652	3	202	4	198	3	180
Collaborative Research Groups	6		6		6		3	
Lecture/Seminar Series	29	1,458	21	893	37	1,285	22	900
Industrial Activities	6	233	6	280	6	217	4	150
Syzygy	5	480	12	3,500	11	13,750	11	14,000
Callysto					82	24,206	82	24,206
Other	26	1,691	7	1,130	7	960	9	1,000

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 2019 events are known at this time.



- **PIMS Connection, monthly e-newsletter:** This brief email includes links to upcoming events, updates and news items. Its circulation is over 3,600. 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 to maximize the effectiveness of our email communications.
- **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, featuring 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. It also serves as an update of the institute's organizational structure and an overview of ongoing initiatives. The previous editions of the Years in Review can be downloaded from www.pims.math.ca/resources/publications/pims-year-review.
 - **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 (1997-2017) can be viewed at www.pims.math.ca/resources/publications/annual-reports.
 - **Open Source:** PIMS shares all source code for the syzygy.ca and Callysto projects as open software projects on Github. The educational resources developed as part of the Callysto project are also shared openly on Github.

2. AUDIO/VIDEO FACILITIES

Seminars and Lectures: PIMS offers seminar organizers and affiliated researchers a selection of technologies to help them include participants at remote sites. The selection includes traditional h.323 based videoconferencing as well as software-based alternatives such as bluejeans, vidyo and zoom.

- The UBC Topology seminar, the UBC-SFU number theory seminar and the Abelian Varieties Multi-Site seminar were regular users of the systems, while some of our other seminar series occasionally use the facilities to accommodate travelling members.
- An increasing number of PIMS sponsored seminars and lectures are being captured as video and added to the media catalog on the mathtube.org platform, which PIMS created. In 2018, this included a number of PIMS public lectures, such as the one by Ami Radunskaya (Pomona College) on using Mathematics to fight cancer.

Academic Courses: PIMS continues to use its facilities and expertise to assist PIMS affiliated researchers with their teaching needs. In 2018, three major courses were taught with the assistance of PIMS.

- Rick Jardine (Western) taught a course on Local Homotopy Theory with participants at Western and UBC.
- Stephen Gustafson (UBC) taught a course on Measure Theory to students at UBC and UBC-Okanagan.
- Brian Marcus (PIMS-UBC Site director) taught a course on “Functional Analysis” as a follow-up to Stephen Gustafson's course on Measure Theory.

Computational Platforms:

- 2018 has seen dramatic growth in the PIMS computational platforms. In addition to the exceptional growth of the existing Syzygy platform, another service called Callysto was launched by PIMS in partnership with Cybera as part of the CanCode initiative, to serve the needs of Canadian K-12, and to help further the educational goals of the PIMS Mandate.

Other Uses:

- Our facilities were also used for PIMS Administrative Functions, such as prize committee meetings, for academic duties for PIMS affiliated researchers such as attending thesis defences, and for drop-in collaboration meetings for PIMS researchers, especially with our CNRS faculty and postdocs with strong connections to France.
- Our remote participation facilities were used for a graduate learning seminar in ergodic theory, which made extensive use of the remote camera control facilities in our videoconferencing room.

III. CONTRIBUTIONS TO RESEARCH

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 2018, the total number of attendees was 6,954.

76% were from Canadian institutions, of which:

26% were from Alberta,

43% were from British Columbia,

4% were from Manitoba,

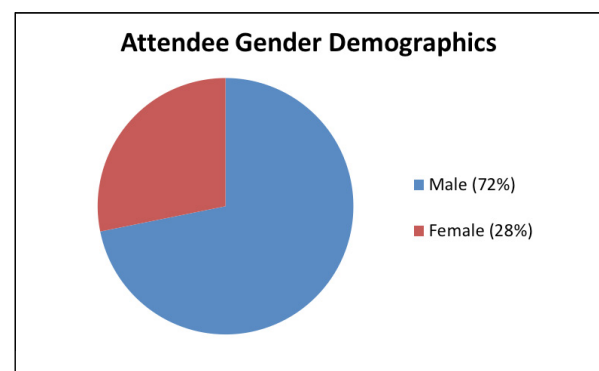
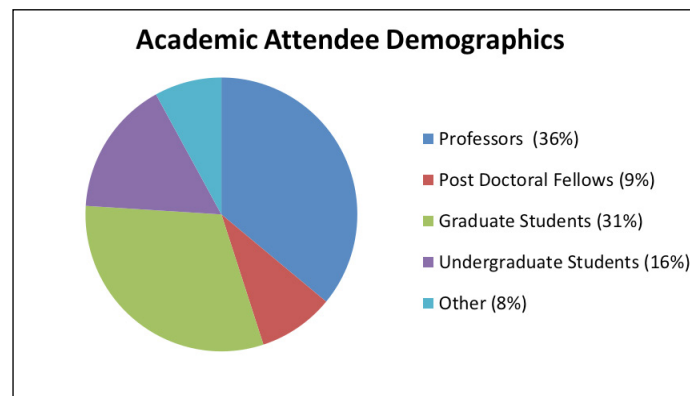
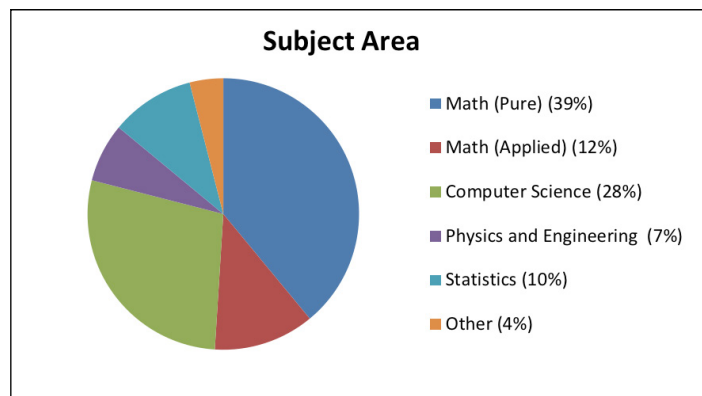
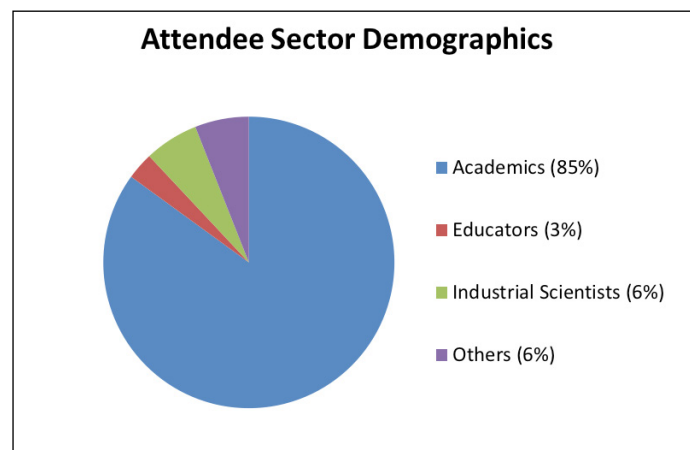
5% were from Atlantic Provinces,

19% were from Ontario and Quebec, and

4% were from Saskatchewan.

9% were from other North American institutions,

9% were from elsewhere.



* The distribution of users reported here does not include the syzygy.ca and Callysto projects.

V. TRAINING AND DEVELOPMENT OF HIGHLY QUALIFIED PERSONNEL

1. POSTDOCTORAL FELLOWS & CNRS/PIMS SCIENTISTS

PIMS sponsors numerous postdoctoral fellows (PDFs) – 41 in 2018 – 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 (PTCS)

This was the fourth Annual PTCS Retreat and was held at the Banff International Research Station (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. Eight of the nine postdoctoral fellows affiliated with PTCS spoke at the event.

3. ALBERTA GRADUATE FELLOWSHIPS

In 2018, PIMS sponsored four 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



VII. CONSULTATION MECHANISMS AND COLLABORATIVE ACTIVITIES WITH AARMS AND CANSSI

of the societies (CAIMS, CMS and SSC), the Seminaire de Mathematiques Superieres 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 internationale, at PIMS (the first in mathematics in North America) has led to year-long visits by more than 36 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.

The federated `syzygy.ca` JupyterHub deployed by PIMS, in partnership with Compute Canada and Cybera, is used to deliver scientific computing and data science instruction at 18 universities.

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 2018 (PIMS' financial contribution to each activity is listed in parentheses):

- The Graph Searching in Canada (GRASCan) 2018 Workshop (\$3,256). The purpose of this ongoing, invitation-only workshop is to bring together graph searchers working in any and all aspects of vertex pursuit games on graphs and their variants, such as Cops and Robbers, edge searching, firefighting, burning and graph cleaning.
- Postdoctoral Fellow (\$9,750)
- Administrator (\$1,994)
- AARMS Summer School 2018 (\$15,000). Courses included: Functional Data Analyses for Big Data, Machine Learning and Data Mining, Statistical Learning for High Dimensional Data, and Foundations in Data Science and Applications.

PIMS also supports statistical activities throughout Canada through CANSSI. In 2018 these included:

- Mi-Seq Sequencing (\$11,100)
- CSSC Meeting (\$2,500)
- IMS New Researchers Conference (\$10,000)
- Summer School on Mathematical & Statistical Model Uncertainty (\$3,859)
- Sports Analytics (\$4,000)
- Meeting of Alberta Statisticians (\$833)
- Regression Modeling (\$1,939)
- Seminar/travel support (\$14,791)
- Scientific Coordinator (\$62,290), Postdoctoral Fellows (\$104,644), Research Assistants (\$31,333)

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 Chief Operations Office, Finance Manager & Site Administrators

VIII. MANAGEMENT AND BUDGETS

Resource Revenues (collected during the period January 1 to December 31 2018)

a)	User Fees (Registration Fees collected)	19,510
b)	Contributions from Partner Universities	
	UBC	288,497
	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	14,130
	University of Lethbridge	35,000
	University of Manitoba	50,000
	Portland State University	5,144
c)	Private Donations	28,135
d)	Other Contributions	
	Fields/CRM/AARMS support for Diversity in Math	17,500
	UVic support for Diversity in Math	4,800
	SFU Various Depts	2,620
	UM Various Depts	25,401
	UBC Various Depts	35,693
	Other Miscellaneous	40,305
e)	Callysto Grant	399,000
f)	NSERC CTRMS Grant	1,177,975
g)	Carried Forward from December 31 2017	1,421,559
	TOTAL REVENUES (January 1 to December 31 2018)	3,942,279
	Revenue less Expenses	1,411,589

PIMS CTRMS NSERC Activity Report January 1 to December 31 2018

	Use of the resource (i.e. PIMS) Paid from ALL revenue sources January 1 to December 31 2018	Planned use of CTRMS funds Jan 1 to December 31 2019
Resource Expenditures		
1)	Salaries & Benefits	
	a) Administrative Staff	386,885
	b) Directors & Site Directors Teaching Releases/Stipends	93,745
	c) Scientific Support Personnel	164,664
	d) Postdoctoral Fellows (inc. CRG PDFs)	514,632
	e) Technical/Professional Assistants (inc. Education)	20,039
	f) Graduate Students	19,345
2)	Equipment or Facility	
	a) Purchase or Rental	8,477
	b) Operation and Maintenance Costs	25,327
3)	Materials & Supplies	
	a) Office supplies and expenses	17,504
4)	Meetings/Collaborations/Staff Travel	
	a) PIMS Meetings (SRP, PDF, Board, Admin, Exec)	43,439
	b) Staff/PDF/Prize Winner travel	19,210
	c) Director Research Support and Scientific Consultation	40,583
5)	Dissemination Costs	
	a) Publication Costs	4,394
	b) Advertising & Networking	4,058
6)	Scientific Activities (inc. CRGs and IGTC)	
	a) Conferences/Symposia	128,596
	b) Summer Schools	51,011
	c) Workshops/Seminars/Colloquia (inc. MMIW)	376,142
	d) Distinguished Visitors/Chairs/Speakers	50,168
7)	Education Initiatives	
	a) General activities	60,591
	b) Callysto	224,591
8)	AARMS Activities	
	a) Scientific Meetings	18,256
	b) PDF	9,750
	c) Administrator	1,994
9)	CANSSI	
	a) Scientific Meetings	49,022
	b) Scientific Coordinator	62,290
	c) Postdoctoral Fellow	104,644
	d) Research Assistant	31,333
	TOTAL EXPENDITURES	2,530,690
		1,177,975

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
UM	University of Manitoba
UR	University of Regina
US	University of Saskatchewan
UV	University of Victoria
UW	University of Washington