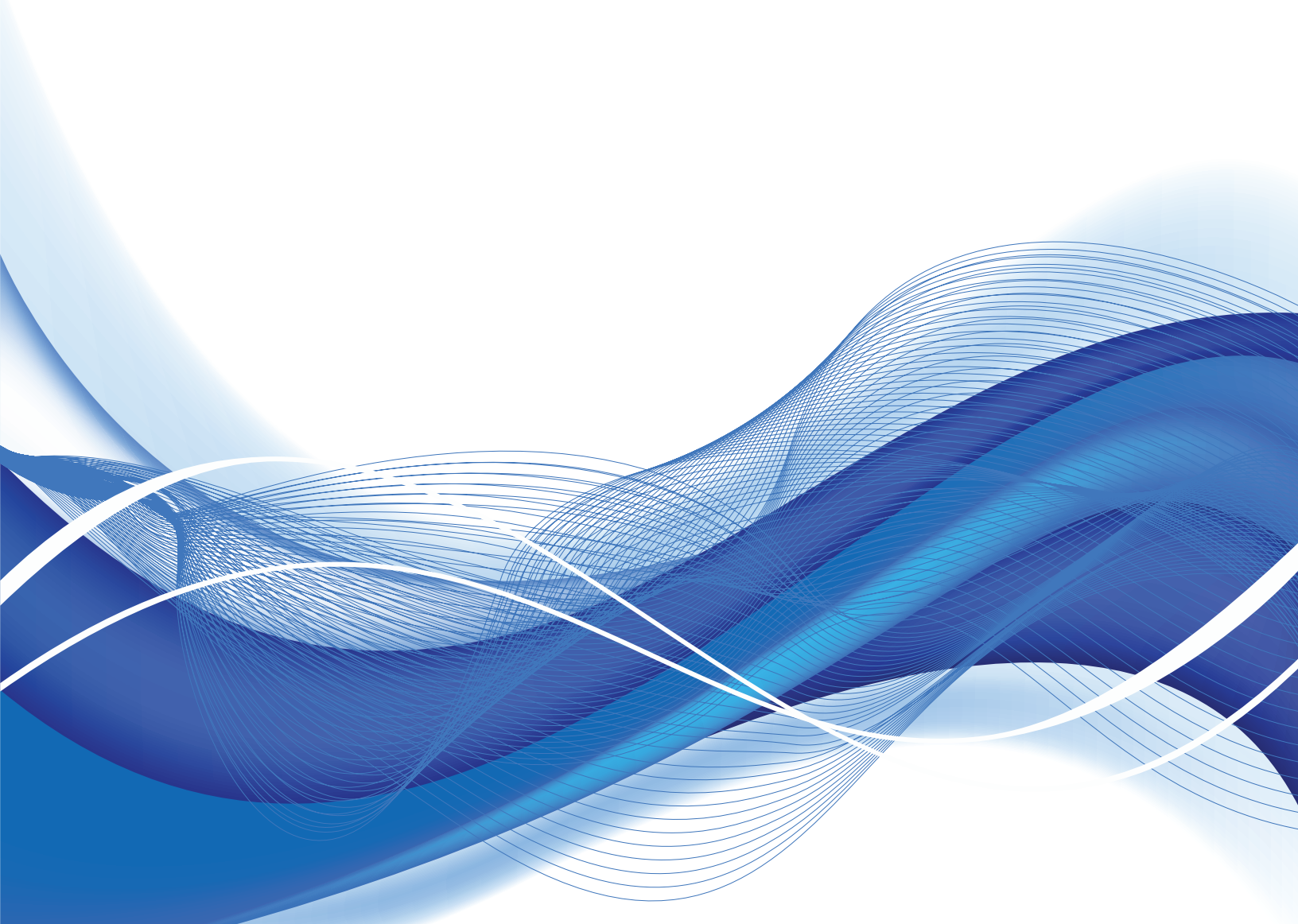


Pacific Institute *for the*
Mathematical Sciences

A large, abstract graphic consisting of multiple overlapping, wavy lines in various shades of blue and white. These lines create a sense of movement and depth, resembling a mathematical wave or a fluid flow. The graphic occupies the lower half of the page, starting from the left edge and extending towards the right.

Annual Report 2025

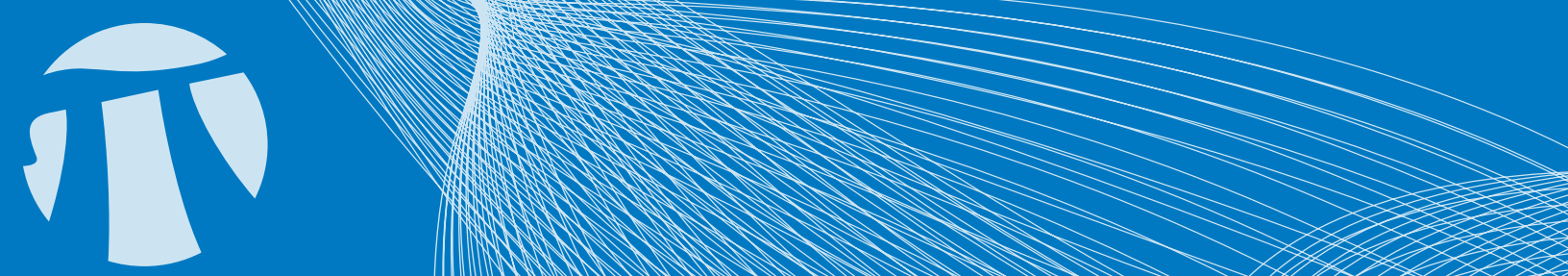


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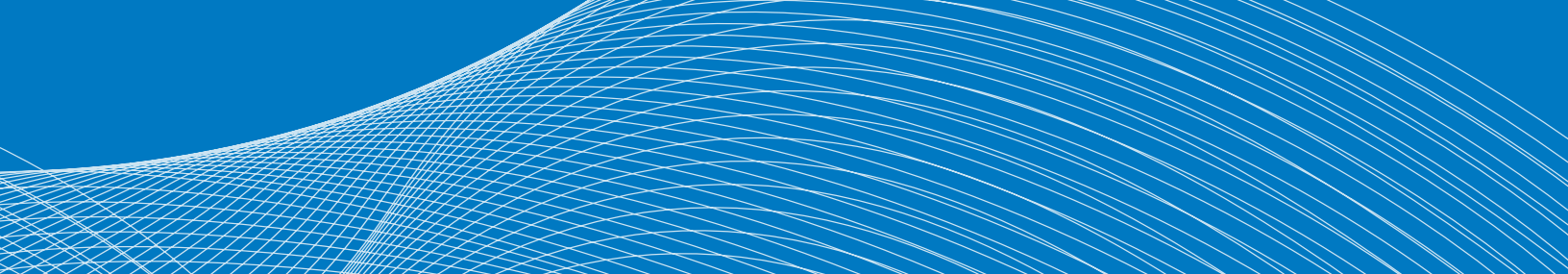
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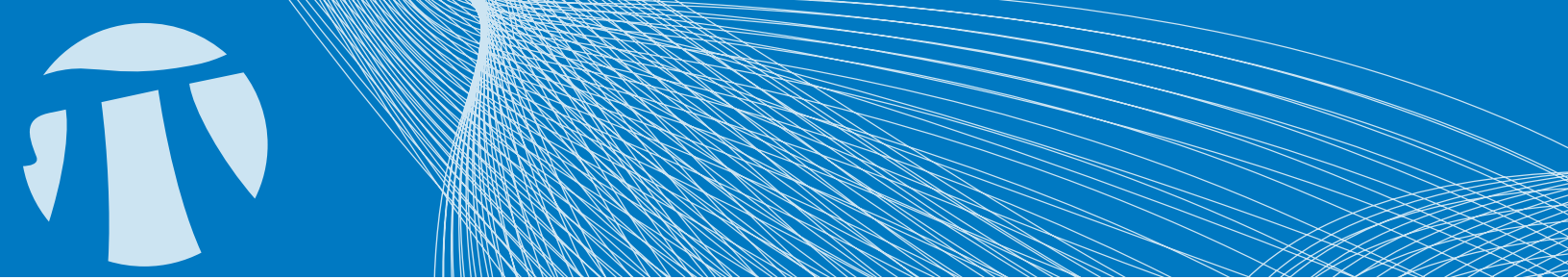


ANNUAL PROGRESS REPORT

DIS-2022-568577

Pacific Institute for the Mathematical Sciences

January 1–December 31, 2025



HIGHLIGHTS

PIMS Education Prize

In April 2025, Darja Barr, senior mathematics instructor at the University of Manitoba was awarded the 2025 PIMS Education Prize for her outstanding contributions to math education. The PIMS Education Prize recognizes individuals or groups from PIMS member universities who have played a major role in encouraging activities which have enhanced public awareness and appreciation of the mathematical sciences. Darja was presented with her award at the 2025 Changing the Culture conference which took place on May 16, 2025.

PIMS Media Exposure

At the beginning of summer 2025, PIMS Education Coordinator, Melania Alvarez, was featured in a news segment on BC's Global News. Dr. Alvarez spoke on ways to keep children engaged with mathematics over the summer months.

Math Summer School for Elementary Teachers

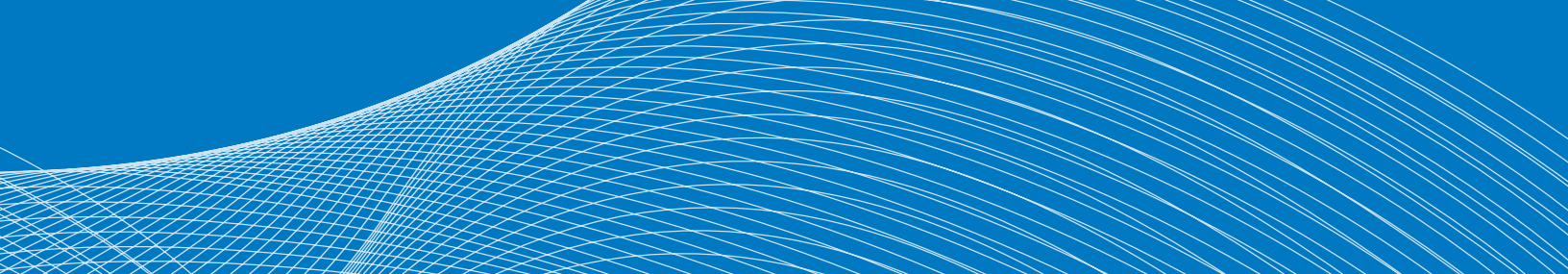
PIMS delivered the Math Summer School for Elementary Teachers, providing participants with opportunities to strengthen their mathematical knowledge, explore real-world applications, and develop effective teaching strategies. Teachers collaborated to design classroom-ready lesson materials and shared best practices. This approach fostered ongoing collaboration and helped build a sustainable, school-wide culture of enthusiasm and confidence in mathematics teaching.

2025 IEEE Educational Activities Board Award

PIMS' commitment to education and community impact was underscored when Dr. Melania Alvarez, BC Education Coordinator at PIMS, received the 2025 IEEE (Institute of Electrical and Electronics Engineers) Educational Activities Board Meritorious Achievement Award in Pre-University Education. The award recognizes her leadership in inclusive and culturally responsive mathematics and STEM education, empowering students and teachers—particularly within Indigenous communities—through mentorship and hands-on learning.

In April 2025, PIMS announced that Dr. Kristine Bauer would step down as Co-Director, Industry, as the conclusion of her term which ended on June 30, 2025. Dr. Bauer's leadership was pivotal in establishing and strengthening partnerships with industry and non-academic research organizations, contributing to key strategic decisions that have shaped the direction and success of PIMS, developing and leading the Math to Power Industry (M2PI) workshop, and leading the PIMS Postdoctoral program.

In 2025, Dr. Gabriel Paternain also stepped down as Interim Co-Director International. Dr. Paternain is a faculty member at the University of Washington and took over the role in 2024 after the departure of Dr. Jayadev Athreya as PIMS Co-Director, International.



WHAT'S NEW

New Co-Director, Programs

Prof. Deanna Needell (University of California, Los Angeles) was appointed Co-Director, Programs, bringing international expertise to the strategic direction of PIMS' research portfolio. She oversees programs that cultivate vibrant research communities and guides investment in high-impact thematic areas, including quantum science, climate, and oceans. She also leads the PIMS Postdoctoral Fellowship competition, a cornerstone of talent development at PIMS.

New Co-Director, Careers

Prof. Raymond Spiteri (University of Saskatchewan) joined PIMS as Co-Director, Careers, leading initiatives that prepare highly trained mathematicians for impactful careers. His work strengthens partnerships with industry, government, and academia, while expanding professional development opportunities for postdoctoral fellows and advancing industrial research programs across the PIMS network.

Mathematical Foundations of Quantum Advantage Workshop

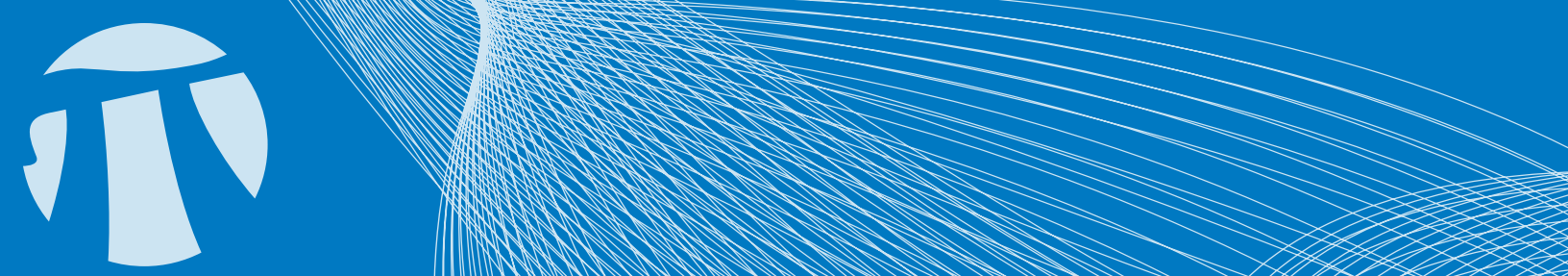
PIMS hosted the Mathematical Foundations of Quantum Advantage workshop, bringing together researchers to explore fundamental questions at the intersection of pure mathematics and quantum computing. The workshop uniquely connected diverse communities, including both theoretical and application-driven perspectives, fostering dialogue across areas that rarely interact.

PIMS-CRM Probability Summer School

The 2025 PIMS-CRM Summer School in Probability brought together graduate students and early-career researchers for an intensive four-week program on contemporary developments in probability theory. The program featured courses by Tom Hutchcroft and Mathav Murugan, alongside mini-courses from Nathanael Berestycki, Nina Holden, and Tianyi Zheng, covering topics such as percolation, random walks, and Liouville quantum gravity.

PIMS/BIRS Team Up! Pathways to Inclusive Research

In 2025, PIMS and the Banff International Research Station (BIRS) delivered the PIMS/BIRS Team Up! Pathways to Inclusive Research program, supporting in-person collaboration among teams of mathematical scientists. The program prioritizes researchers whose work has been impacted by barriers such as limited access to funding. It supports women, gender-diverse and minority groups, Indigenous scholars, and early-career researchers. In 2025, PIMS funded four collaborative research teams.



IMPACT OF RESEARCH ACTIVITIES

Creation, curation, sharing or reuse of data sets

- PIMS has been collecting demographic data for our postdoctoral competition since 2018. These data are specific to academic employment in the mathematical sciences, and broad enough to include more than one academic employer. Thus, we believe that the data can be used to give a snapshot of the population of early career researchers in the mathematical sciences.

Development of tools, including software, for use by researchers or by others in the public or private domain

- PIMS has developed significant expertise in cloud computing and, in partnership with the Digital Research Alliance of Canada and Cybera, launched Jupyter Hub services for researchers and students across Canada and at the University of Washington.
- The Syzygy project enables staff, students, and faculty at Canadian higher education institutions to access Jupyter using their existing institutional credentials. Project Jupyter is a powerful open-source web application that supports collaboration through live code, equations, visualizations, and narrative text. Currently deployed at 35 Canadian universities and the University of Washington, Syzygy has served more than 90,000 users and continues to support thousands daily. Each user receives a curated computational environment that can be customized to meet specific research, teaching, and training needs. By developing and broadening access to these computational resources, PIMS has strengthened infrastructure for the mathematical sciences in Canada. While primarily designed to support research activities, Syzygy has also been widely adopted by instructors in undergraduate and graduate courses nationwide.
- Members of the PIMS Research Network Kantorovich Initiative have developed the software scConfluence, a Python toolbox. This is a novel method for the integration of unpaired multiomics data combining uncoupled autoencoders and Inverse Optimal Transport to learn low-dimensional cell embeddings. These embeddings can then be used for visualization and clustering useful for discovering subpopulations of cells, and for imputation of features across modalities.

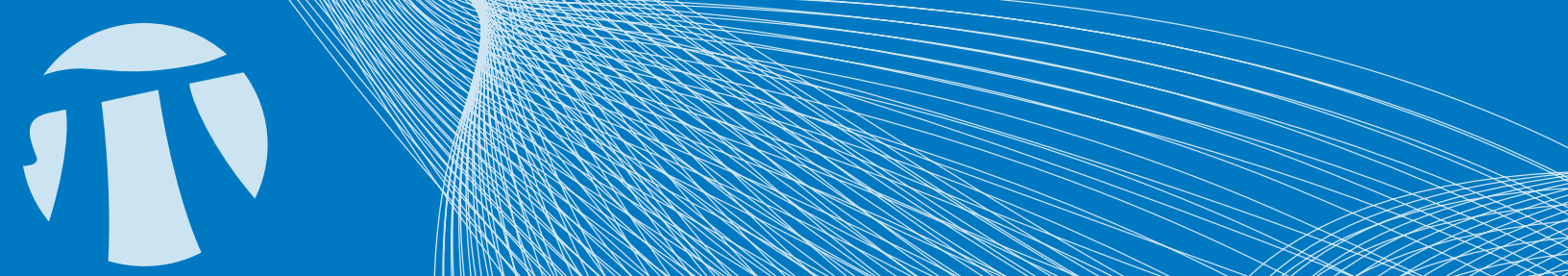
Communication of research results and knowledge translation to specialist or non-specialist audiences, including the public

- During 2025, PIMS supported 38 research conferences and workshops, four summer schools for graduate students and postdoctoral fellows (PDFs), three online seminar series, and 32 department seminar series and colloquia across its ten member universities, in addition to dozens of education and outreach activities. Below are some notable examples.
- The five-day international conference Discrete, Convex, and Combinatorial Geometry Fest was held at the University of Calgary in July. It brought together 46 participants, including internationally recognized experts and emerging scholars, primarily from Europe and North America. The program covered a broad range of topics, including packing and coverings, Helly-type theorems, the Borsuk problem, various forms of the illumination problem, and other current research directions in the field. The conference also featured a special public lecture by Robert Connelly (Cornell University). His interactive presentation focused on the isoperimetric theorem for polygons with fixed-length sides and drew conference participants as well as an additional 56 registered guests.

- The second CRM-PIMS-AARMS Invited Address was delivered by Wilfrid Gangbo at the 2025 Joint Mathematics Meeting. The title of his talk was “Viscosity Solutions in Non-Commutative Variables.”
- PIMS continues to showcase the breadth and diversity of the mathematical sciences community through its online Network-Wide Colloquium. In 2025, Maria Chudnovsky presented a lecture titled “Tree decompositions: representing a graph by a tree,” exploring how graph structure can be understood and measured. Curtis McMullen also presented “The question mark function, welding and complex dynamics,” highlighting connections between number theory, conformal geometry, and dynamical systems. Most talks in this series are recorded and made available online. In addition, PIMS ran six other Distinguished Lecture Series across its sites.
- The PIMS Emergent Research Seminar Series highlights the work of PIMS Postdoctoral Fellows and is delivered as a network-wide virtual event via Zoom. During the reporting period, 12 PIMS PDFs presented their research as part of this series.
- PIMS sponsors a large number of seminar series across its sites, which play a key role in ensuring a regular flow of high-level visitors to member universities. In 2025, PIMS supported 32 seminar series across ten different universities.
- The CRM-Fields-PIMS Prize is the premier award for mathematical research in Canada, with the recipient selected jointly by the three Canadian mathematical sciences institutes. The winner is invited to deliver a lecture at each institute, or may choose to present in a hybrid format at one institute. In 2025, the prize was awarded to Leah Edelstein-Keshet (UBC).
- MathTube, a PIMS initiative (mathtube.org), is a platform for sharing and accessing mathematical videos and related content. Visitors may browse or search MathTube directly, and links to individual recordings are also available through event pages on the PIMS website. PIMS posts all applicable recorded content to MathTube, helping make mathematical media as accessible and easy to navigate as possible.
- PIMS communications activities continue to support network visibility and engagement. PIMS uses Bluesky, Instagram, and LinkedIn to publicize research and events across the network and to celebrate the accomplishments of researchers, trainees, and community members. PIMS also distributes a monthly newsletter to share upcoming events, announcements, and highlights from across the mathematical sciences community.

Additional 2025 events, seminars, conferences and workshops

- Joint Mathematics Meeting: CRM-PIMS-AARMS Special Session on Indigenous Voices in Mathematics. This special session took place in-person (Seattle) and highlighted the research of Indigenous mathematicians.
- Joint Mathematics Meeting: CRM-PIMS-AARMS Special Session on Optimal Transport – Theory and Applications. This special session was organized by PIMS Kantorovich Initiative PRN.
- Joint Mathematics Meeting: CRM-PIMS-AARMS Invited Address – Wilfrid Gangbo.
- Prairie Mathematics Colloquium: Shonda Dueck, Adam Clay.
- PIMS-Lethbridge Distinguished Lecture: Micah Milinovich.
- Testing Gravity 2025 (Jan 29 – Feb 1): Hosted by SFU, this conference brought together leading experts on the various ways of testing laws of gravity. This conference aimed to provide theorists working on extensions of General Relativity with a realistic perspective on what aspects of their theories can be tested.
- UVic Maud Menten Institute/Mathematical & Statistical Biology Seminar (Feb 3).
- Science for All: Building Equity Together with Lisa M.P. Munoz (Feb 10): Science writer and president of SciComm Services, Lisa M.P. Munoz, presented a talk titled “Women in Science Now: How to Use Science to Overcome the Remaining Obstacles to Equity” at UBC. This was a free event aimed at the public.
- M2PI Case Studies Virtual Seminar (Feb 21): This event aimed to bring together grad students, postdoctoral fellows and faculty members with members of the business, industry, not-for-profit, and government sectors.
- PIMS/UBC Mathematical Sciences Early Career Award Lecture (Mar 21): Christos Thrampoulidis, the 2024 PIMS/UBC



Early Career Award winner presented a talk titled “Implicit Geometries of Deep Representations”.

- Dr. Constance van Eeden Seminar (Apr 4): A yearly seminar presented by the UBC Statistics department. In the 2025 draft, the accompanying example still refers to a 2024 presentation by Arnaud Doucet.
- PIMS Lunchbox Lecture.
- Western Algebraic Geometry Symposium (Apr 26 – 27): WAGS is a twice-yearly meeting of algebraic geometers in the western part of North America.
- 2025 PIMS Postdoctoral Summit (Apr 28): The 2025 PIMS Postdoctoral Summit brought together PIMS Postdoctoral Research Fellows for an in-person summit at the University of Calgary.
- Alberta Math Dialogue (AMD) 2025 (May 1 – 2): The Alberta Math Dialogue is the largest annual meeting for professional mathematicians and math educators in Alberta.
- Springtime in Mathematical Quantum Physics (May 5–9): The workshop gathered leading experts and emerging researchers to explore analytical and topological aspects of many-body quantum mechanics.
- Math to Power Industry 2025 (May 5-27): A hybrid workshop pairs industry problems with mathematical talent.
- Pacific Northwest Geometry Seminar (May 10 – 11): A regional meeting for geometers; in 2025 the conference was held at UBC.
- Science Rendezvous 2025 (May 10): A free festival that takes science, technology, engineering, art and math research and innovation out of the lab and onto the street.
- Changing the Culture 2025 (May 16): The annual conference brings together mathematicians, mathematics educators and school teachers from all levels to work together towards narrowing the gap between mathematicians and teachers of mathematics.
- Canadian Discrete and Algorithmic Mathematics Conference (May 20–23): Hosted by the University of Ottawa and Carleton University.
- Mathematical Foundations of Quantum Advantage (May 20-24): This workshop, held at SFU, aimed to connect mathematicians, physicists and computer scientists interested in common topics.
- Hugh C. Morris Distinguished Lecture ft. Jordan Ellenberg (May 27): High-profile lectures aimed at either the broader public or the scientific community.
- 2025 PIMS-CRM Summer School in Probability (June 2 – 27): This summer school, which took place at UBC, featured two long courses and three mini courses.
- LG&TBQ2: Geometry, Topology, and Dynamics (June 2-6): The conference celebrated LGBTQ mathematicians in geometry, topology, and dynamics.
- 3MC-PIMS-ICMS Summer School on Quantitative Molecular and Cellular Biology (Jun 16-17): A summer school that was part of the Maud Menten Institute activities.
- Structure-Preserving Scientific Computing and Machine Learning: Summer School and Hackathon (Jun 16-25): Held at the University of Washington, this summer school exposed graduate students to Structure-Preserving Scientific Computing and Machine Learning through four mini-courses taught by world-leading experts in computational mathematics.

Ongoing Seminars

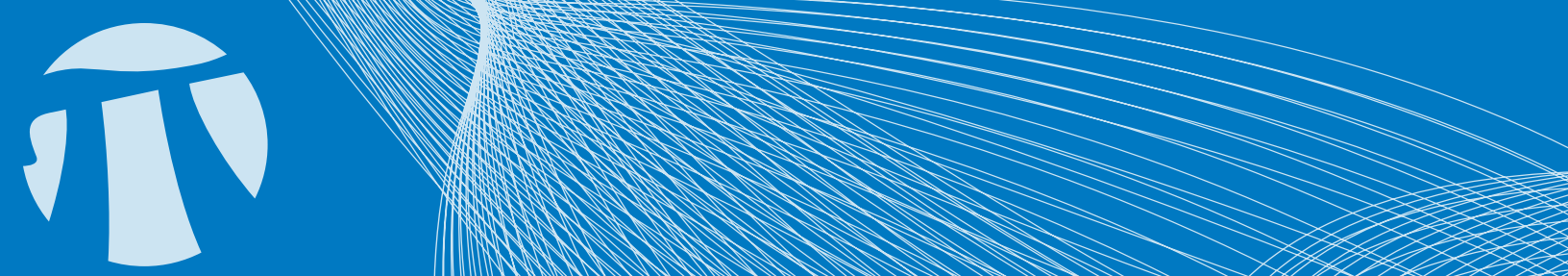
- SFU Number Theory and Algebraic Geometry Seminar
- UBC Discrete Math Seminar
- UBC Math Department Colloquium
- USaskatchewan Mathematics & Statistics Colloquium
- UBC Math Bio Seminar
- L-functions in Analytic Number Theory
- UVic Probability & Dynamics Seminar

- UW Combinatorics & Geometry Seminar
- o5C5o Online Seminar
- Lethbridge Number Theory & Combinatorics Seminar
- UVic Statistics Seminar
- UAlberta Math Bio Seminar
- URegina Topology & Geometry Seminar
- Kantorovich Initiative Seminar
- PIMS-CORDS SFU Operations Research Seminar
- UCalgary Algebra & Number Theory Seminar
- UVic Discrete Math Seminar
- UBC Probability Seminar
- UBC Harmonic Analysis & Fractal Geometry Seminar
- SF MOCAD Seminar
- UBC DG-MP-PDE Seminar

Advances to equity, diversity, inclusion and accessibility in the research ecosystem

The Pacific Institute for the Mathematical Sciences (PIMS) recognizes that EDI strengthens the mathematical community by increasing research impact and relevance, broadening participation, and enhancing program integrity. PIMS supports inclusivity across all career stages.

- EDI Committee (EDIC): Includes faculty, students, and postdoctoral fellows across the PIMS network; develops strategies to monitor and improve EDI; focus areas include women, Indigenous Peoples, persons with disabilities, visible minorities, and diverse sexual orientations and gender identities.
- Increasing Diversity in Mathematical and Related Sciences (Summer School): Encourages female and female-identifying students to pursue graduate studies. 2025 theme: Quantitative Molecular and Cellular Biology.
- Recruitment Fund: Provides supplemental salary support for postdoctoral fellows from diverse backgrounds.
- Indigenous Engagement Committee (IEC): Supports Indigenous-led initiatives; includes Indigenous mathematical scientists across academia and industry; promotes respectful and inclusive environments for Indigenous communities.
- PIMS/BIRS Team Up! Pathways to Inclusive Research: Supports collaborative research teams; focuses on researchers affected by systemic barriers; provides support for caregiving responsibilities, including travel and lodging; funded four teams in 2025.
- Gender Equity in the Mathematical Study (GEMS) of Optimization Workshop: Builds community among gender minorities in optimization; combines research and gender justice initiatives; includes actionable strategies for inclusive practices.
- LG&TBQ2 Conference: Celebrates LGBTQ mathematicians and includes discussions on lived experiences in mathematics.
- Public Lecture – “Science for All: Building Equity Together” by Lisa M.P. Muñoz: Focus on overcoming barriers to equity in STEM.
- International Women in Mathematics Day: Celebrated at Simon Fraser University and featured short presentations highlighting diverse careers.
- Policy and Review Enhancements: Scientific Review Panel (SRP) and Postdoctoral Fellow Panel guidelines now emphasize EDI; applications include applicant EDI statements and supervisor philosophy statements.



Co-creation or transfer of products, technology, processes, services or advice useful to specific organizations

- Developed by the Pacific Institute for the Mathematical Sciences (PIMS), Math to Power Industry (M2PI) is a professional development program that strengthens the Canadian economy by connecting highly trained mathematical talent with real-world industry needs. The program equips graduate students and postdoctoral fellows with the skills required to succeed beyond academia while helping industry partners address complex technical challenges. M2PI trainees begin with an intensive boot camp covering software development best practices, coding, business fundamentals, professional communication, and project management. Following training, participants collaborate in teams under industry mentorship to solve real-world challenges. In 2025, 30 trainees participated, organized into five interdisciplinary teams:
 - Clause Technology: Automated identification of architectural and civil engineering information in the BC Building Code.
 - IOTO International: Developed tools for predictive and decision-support insights from legislative data.
 - Hummingbird Bioscience: Advanced understanding of the Rocq proof assistant.
 - Awesense: Designed applications to optimize electrical load distribution across power grids.
 - Type One Energy: Computed numerical solutions to Beltrami's equation in toroidal geometries.
 Through hands-on collaboration, M2PI demonstrates the value of mathematical expertise in innovation and workforce development.
- Syzygy.ca: A project of PIMS, Digital Research Alliance, and Cybera; provides Jupyter notebook access to researchers and educators across Canada; supports Julia, Python, and R; integrated with institutional single sign-on systems.

Community service that leverages expertise, such as membership on scientific or advisory committees, or journal editorships

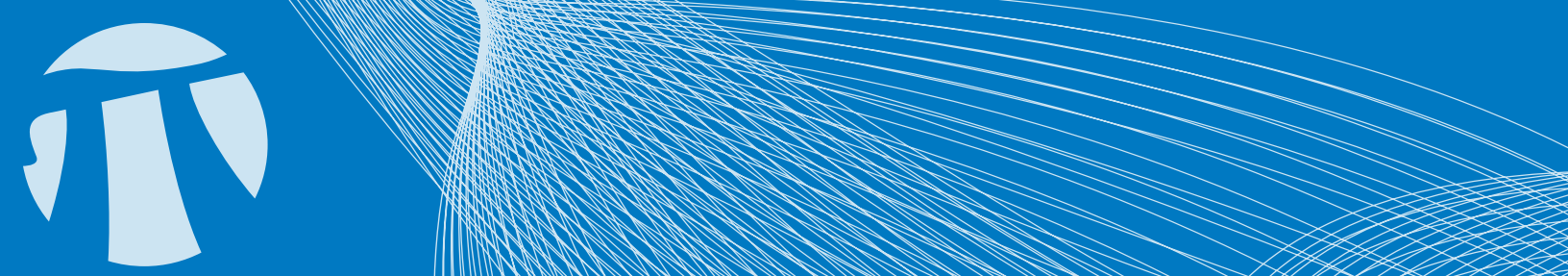
- PIMS Director Ozgur Yilmaz is on the Board of Directors of BIRS. He is also an Institute Appointed Member of the Board of Directors of the Canadian Mathematical Society. He serves in the Executive Committee of UBC DataScience Institute. He is on the Editorial Boards of "Applied and Computational Harmonic Analysis", "Sampling Theory, Signal Processing, and Data Analysis", and "Mathematics, Computation and Geometry of Data".
- PIMS Co-Director, Programs, Deanna Needell provides extensive service to the mathematical sciences, data science, and machine learning communities through editorial leadership, conference organization, advisory roles, and national reviewing activities that directly leverage her research expertise. She currently serves as Associate Editor of the "AMS Bulletin" (2024-present) and of the "SIAM Journal on Imaging Sciences" (2018-present). Her conference and workshop leadership included serving as Technical Program Chair for Sampling Theory and Applications (SampTA) from 2020-2025 and major organizational roles in the AAAI CoLoRAI Workshop on Connecting Low-Rank Representations in AI (2025), NeurIPS and Asilomar workshops and sessions and SIAM-sponsored conferences. She has served on National Science Foundation review panels repeatedly and regularly since 2015 and has been a reviewer for the European Research Council and multiple academic publishers, including Cambridge University Press.
- PIMS Co-Director, Industry, Kristine Bauer is on the Board of Brain CREATE. Engin Ozberk (PIMS Board Chair) is also on this Board. The Brain CREATE training program focuses on the development of neurotechnologies. The trainees will play critical roles in revamping and modernizing traditional industries with brain-centric innovations. Kristine Bauer is a founder of the Women in Topology network and serves on its Steering Committee.
- PIMS Education Coordinator, Melania Alvarez is a key organizer for Science Rendezvous at UBC. This is a national festival that takes science out of the lab and onto the street. Festival-goers get a chance to meet world-class researchers and innovators, participate in hands-on experiments, and see amazing scientific demonstrations.

Creation, direction, facilitation and/or strengthening of partnerships or collaborations in the Canadian or international research community, or with other communities, including through research networks, large collaborative projects or community-engaged research/citizen science

- Collaborative Research Groups (CRGs)
At the core of PIMS activities are the Collaborative Research Groups (CRGs), which bring together researchers across many universities to focus on particular topics with funding for conferences, workshops and support of highly qualified personnel. In 2025, PIMS hosted four CRGs: L-functions in Analytic Number Theory, Forecasting and Mathematical Modeling for Renewable Energy, Structure-Preserving Discretizations and their Applications, and Diagram Categories in Homotopy Theory.
- PIMS Research Networks (PRNs)
In 2025, PIMS hosted two PRNs – the Kantorovich Initiative and the Maud Menten Institute (MMI). The Kantorovich Initiative focuses its research and dissemination of modern mathematics of optimal transport to a wide audience of researchers, students, industry, policy makers and the general public. The primary purpose of the Maud Menten Institute (MMI) is to provide a collaborative research platform for mathematical biologists at PIMS sites to promote interactions with life science experts and decision makers in government, industry and NGOs. From July 11 to 13, 2025, PIMS sponsored the 2025 MMI HQP Summit, a two-day conference that brought together mathematical biologists from across the PIMS network. Held at the University of Alberta, the summit featured communication workshops, seminars, and a poster session.
- In 2025, PIMS launched the Mathematics for the Future Initiative, with a focus on mathematical research that will shape the future of humanity and the environment. As part of this initiative, the Mathematical Foundations of Quantum Advantage workshop was held at Simon Fraser University in May. The workshop brought together quantum scientists interested in fundamental questions surrounding quantum advantage. In several respects, this meeting was the first of its kind: in its explicit focus on the intersection of pure mathematics and quantum advantage; in the unique blend of communities and subareas represented; and in its role in establishing the PIMS network as a global centre for the study of these questions. Although quantum advantage is a highly active area within quantum computing, it has not yet been widely adopted as a subject of dedicated study within pure mathematics. Another distinctive feature of the workshop was the diversity of computer science perspectives represented. Researchers from both foundational and application-driven communities—groups that rarely collaborate despite their shared interests—were present. The workshop successfully transformed what had previously been a largely virtual community of researchers, familiar primarily with one another’s results, into a genuine collaborative community, with future research projects, visits, and meetings already planned.
- PIMS partners with similar institutions around the world, for details on these partnerships, see the “Partnerships” section.

Publications

- Selected Key Publications (from PIMS PDFs and CRGs/PRNs)
- F. Cicek, A. Hamieh, and N. Ng, “Mean values of long Dirichlet polynomials associated with the divisor function”, *Algebra and Number Theory* 19 (2025), no. 7, 1427–1462.
- G. Martin and C.H. Yip, “Oscillation results for the summatory functions of fake μ ’s”, *Canadian Journal of Mathematics* 57 (2025), no. 3, 33–46.
- M. Kia et al., “Koopman-based linearization of preparatory EEG dynamics in Parkinson’s disease during galvanic vestibular stimulation”, *Frontiers in Human Neuroscience* 19 (2025), p. 1566566.



- C. Djuikem and J. Arino, “Transmission of multiple pathogens across species”, *Bulletin of Mathematical Biology* 87 (2025).
- T. Jia and D. Sezer, “Improving Short-Term Wind Speed Forecasts Using Regime-Switching Spatio-Temporal Covariance Models”, *Journal of Renewable and Sustainable Energy* (2025).
- K. Druzhkov and A. Cheviakov, “Invariant reduction for partial differential equations: I. Conservation laws and systems with two independent variables”, *Nonlinearity* 38 (2025).
- F.C. Clemen, A. Dumitrescu and D. Liu, “On multiplicities of interpoint distance”, *Acta Mathematica Academiae Scientiarum Hungaricae* 177 (1), 2025.
- S. Dijols, “Parabolically Induced Representations of p-adic G Distinguished by S_0 ”, *Experimental Mathematics*, May 2025.
- B. Kuzma and S. Singla, “Birkhoff-James classification of finite-dimensional C-algebras”, *Proceedings of the American Mathematical Society* 153(4), 2025.
- T. So, D. Stanley, S. Theriault and B. Williams, “Realizing orders in rational sphere product algebras with three generators”, Preprint arXiv:2511.16910.
- M. Frankland and A.N. Ngompe, “Enriched model categories and the Dold-Kan correspondence”, Preprint arXiv:2510.26744.
- R. Yao, Y.H. Kim, and G. Schiebinger, “Convergence Rate of the Solution of Multi-marginal Schrödinger Bridge Problem with Marginal Constraints from SDEs”, Preprint arXiv:2507.09151.
- W. Li, S. Ahmed, Y.P. Park and K. Dao Duc, “Transport-based transfer learning on Electronic Health Records: application to detection of treatment disparities”, *Journal of the American Medical Informatics Association*, ocaf134.
- G.-J. Huizing, J. Samaran, G. Peyré and L. Cantini, “Learning cell fate landscapes from spatial transcriptomics using Fused Gromov-Wasserstein”, *Nature Methods*, 2025.

Non-technical publications

- PIMS Annual Reports (available on the website).
- PIMS Connection and Year in Review (available on the website).

Support for traditional knowledge or Indigenous ways of knowing, including cultural practices

- The CRM-PIMS-AARMS Special Session on Indigenous Voices in Mathematics, held over two days at the 2025 Joint Mathematics Meeting, showcased the research and lived experiences of Indigenous mathematicians. The session celebrated the breadth and depth of Indigenous contributions across mathematical disciplines, spanning theoretical research, practical applications, and innovations in mathematics education.
- Layne Burns of First Nations University presented “Bridging Tradition and Mathematics: A Study of the Peach Stone Bowl Game.” The talk examined a traditional Iroquois game using Markov chains and demonstrated how modern mathematical tools can meaningfully engage with traditional knowledge.
- Donna Lee Fernandez from the Alliance of Indigenous Math Circles delivered “Indigenous Mathematical Knowledge Strengthens Students’ Identity,” focused on culturally responsive teaching and how Indigenous and mathematical identities can be complementary.
- Lilinoe Harbottle presented “Innovating Medical Robots: Harnessing Data Science and AI,” emphasizing the importance of diverse perspectives, including Indigenous and Native Hawaiian scholars, in shaping innovation.
- First Nations University (FNU) is an active PIMS Affiliated Member dedicated to enhancing quality of life and to preserving, protecting, and interpreting the rich history, culture, and artistic heritage of First Nations.

PARTNERSHIPS AND COLLABORATIONS

Atlantic Association for Research in the Mathematical Sciences (AARMS)

- PIMS, AARMS, and CANSSI jointly supported the Canadian Statistics Students Conference.
- PIMS and AARMS co-sponsor national meetings of the Canadian Mathematical Society (CMS) and the Canadian Applied and Industrial Mathematics Society (CAIMS), in collaboration with CRM and Fields.
- PIMS, AARMS, and CRM partnered with the American Mathematical Society (AMS) at the Joint Mathematics Meetings (JMM), including a special session on Indigenous Voices in Mathematics.
- The Increasing Diversity in Mathematical and Related Sciences summer school is delivered in collaboration with BIRS, AARMS, CRM, and Fields.
- AARMS, CRM, Fields, and PIMS jointly sponsored CanaDAM (Canadian Discrete and Algorithmic Mathematics Conference).
- AARMS and PIMS co-sponsored the Operator Analysis on Function Spaces Conference.

Banff International Research Station (BIRS)

- PIMS and BIRS jointly established the PIMS/BIRS Team Up! Program, supporting collaborative research initiatives.
- The Increasing Diversity in Mathematical and Related Sciences annual summer school is delivered in collaboration with BIRS, AARMS, CRM, and Fields.

Canadian Statistical Sciences Institute (CANSSI)

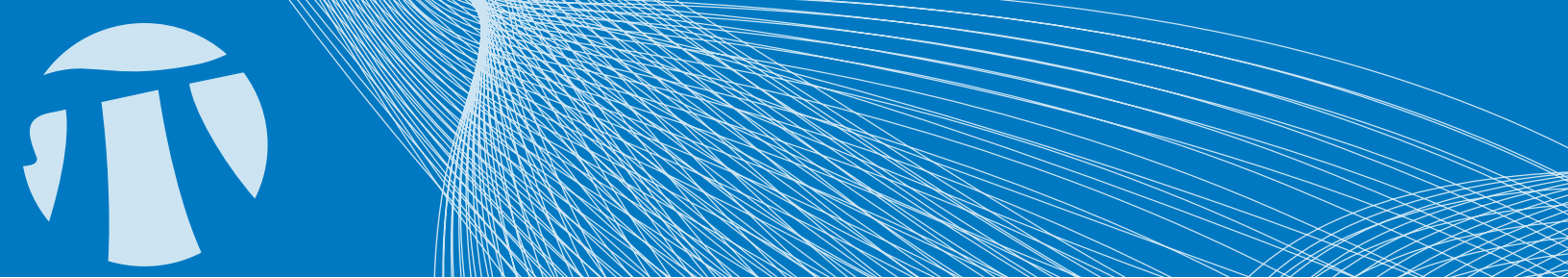
- PIMS and CANSSI collaborated on Biostatistics Research Day at the University of Calgary.
- PIMS, CANSSI, and AARMS jointly supported the Canadian Statistics Students Conference.

Fields Institute for Research in Mathematical Sciences (Fields)

- PIMS, CRM, and Fields jointly award the CRM–Fields–PIMS Prize.
- PIMS, CRM, and Fields collaborate on the Séminaire de Mathématiques Supérieures (SMS).
- PIMS, CRM, and Fields co-sponsor national meetings of the Canadian Mathematical Society (CMS) and Canadian Applied and Industrial Mathematics Society (CAIMS).
- Fields is a partner in the Increasing Diversity in Mathematical and Related Sciences summer school with BIRS, AARMS, and CRM.
- AARMS, CRM, Fields, and PIMS jointly sponsored CanaDAM.

Centre de recherches mathématiques (CRM)

- PIMS and CRM, together with Fields, collaborated on the Séminaire de Mathématiques Supérieures (SMS). 2025 theme: Recent Trends in Commutative Algebra.
- PIMS, CRM, and Fields jointly award the CRM–Fields–PIMS Prize.
- PIMS and CRM co-sponsor national meetings of CMS and CAIMS.
- PIMS and CRM co-sponsor the PIMS–CRM Summer School in Probability.
- PIMS, AARMS, and CRM partnered with the American Mathematical Society at the Joint Mathematics Meetings.
- The Increasing Diversity in Mathematical and Related Sciences summer school is delivered in collaboration with BIRS, AARMS, CRM, and Fields.
- AARMS, CRM, Fields, and PIMS jointly sponsored CanaDAM.



Canadian Institute for Theoretical Astrophysics (CITA)

- PIMS collaborated with CITA on the Testing Gravity Conference, which featured the latest developments from gravitational wave observatories, astrophysical observations, and laboratory-based experiments. The conference aimed to provide theorists working on extensions of general relativity with a realistic understanding of which aspects of their theories can be tested through current and emerging experimental approaches.

New Canadian Industry Partners

- Clause Technology is a software automation firm focused on research and development of solutions for clients across a range of industries. One of its key areas of work is developing tools to streamline tasks in architecture and civil engineering. Through its M2PI project, Clause Technology developed a large language model (LLM)-powered chatbot designed to assist builders in navigating the BC Building Code.
- Type One Energy Group is a mission-driven organization focused on delivering sustainable and affordable fusion energy. Its M2PI project focused on the study of magnetic fields in Taylor-relaxed states, contributing to improved understanding and modeling of plasma behavior in fusion energy systems.

New International Partnerships

- Hummingbird Bioscience (headquartered in Singapore) is advancing a new approach to engineering biotherapeutics that aims to shape the future of precision medicine. Building on its expertise in biologics discovery and development, along with proprietary linker-payload technologies, the company is developing a pipeline of next-generation antibody-based therapeutics. Its M2PI project included analysis related to Rocq, a powerful and evolving proof assistant.

Highlights of a unique partnership that has taken place over the past year and the impact

- 2025 was a strong year for PIMS as an International Research Laboratory of the Centre National de la Recherche Scientifique (CNRS). This collaboration strengthens knowledge exchange between western Canada and France and deepens long-term institutional research ties.
 - A flagship initiative of this partnership is the CNRS Visitors Program, through which distinguished French researchers—funded by CNRS—spend an academic year at a PIMS member university and actively participate in research activities.
 - In 2025, PIMS hosted two CNRS visitors: one at the University of British Columbia and one at Simon Fraser University.
 - The PIMS–CNRS Fellowships support international collaboration by enabling faculty at PIMS institutions to undertake extended research visits in France. In 2025, two fellowships were awarded, with both researchers visiting the University of Montpellier for long-term collaborative work.
 - Another key component is the PIMS–CNRS Postdoctoral Fellowship Program, which brings French-trained researchers to PIMS institutions and forms part of the broader PIMS postdoctoral fellowship program. In 2025, one fellowship commenced at the University of Victoria.

Together, these initiatives demonstrate the strength and continued growth of the PIMS–CNRS partnership, advancing research excellence through sustained international collaboration.

INTERACTIONS AND OUTREACH

New initiatives that support equitable and inclusive participation in outreach activities

- Girls in Data Science Camp (Jul 7-9): A camp for girls and gender minorities in grades 8-12.
- 2025 Math Attack Summer Camp for Girls (Jun 29 – Jul 6): An 8-day overnight camp held at the University of Calgary and BIRS, bringing together girls in grades 7-10 to engage in mathematical activities.
- Science for All: Building Equity Together with Lisa M.P. Muñoz: A free public event focused on overcoming remaining obstacles to equity in science.

Highlights of a unique outreach activity that has taken place over the past year

- In 2025, we hosted the Diversity in Research Experiences Across Mathematics (DREAMS) Institute, a three-week summer enrichment program designed for senior high school students. The program provides an opportunity to explore the study of mathematics at the university level and supports one of its core goals: helping students envision future pathways in mathematics and STEM more broadly. Students are introduced to foundational areas of mathematics while engaging with mentors and peers in a supportive learning environment.

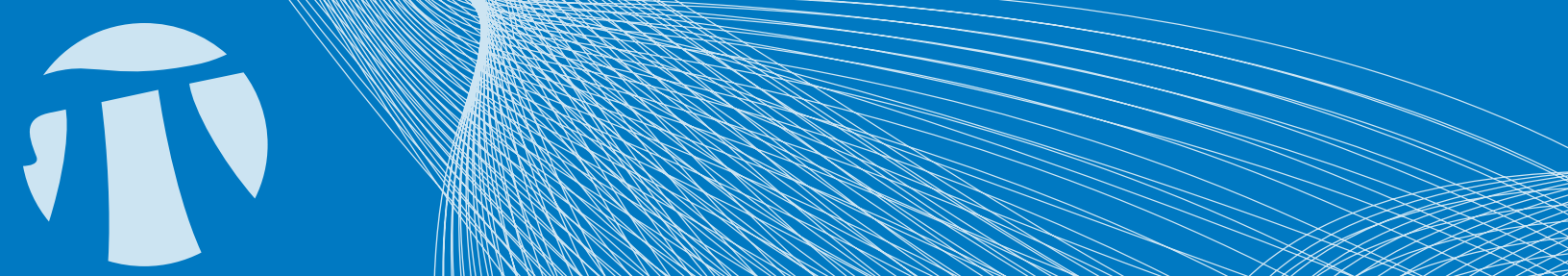
CONTRIBUTION TO THE TRAINING AND DEVELOPMENT OF HQP

Establishment of safe, equitable and inclusive research environments, practices and norms

- We have an established PIMS Code of Conduct, which provides rules that we expect all organizers and participants of PIMS events to follow. These guidelines are designed to ensure that our events are as safe, welcoming and inclusive as possible. Further, the Scientific Review Panel and Postdoctoral Fellow Panel guidelines have been updated with a strong emphasis on EDI. In particular, the PDF application now includes an EDI statement, and guidelines for evaluating candidates were made with EDI in mind to ensure that equity-deserving candidates receive fair consideration. The Math to Power Industry program includes an EDI training course to promote inclusive teams. This training is delivered immediately before participants engage in team-based projects.

Formal or informal mentoring of HQP, colleagues, collaborators, relevant partners, other professionals or community members

- PIMS First Year Interest Groups (FYIG) bring together early career researchers to study active research topics in the mathematical sciences. Each FYIG is led by a PIMS PDF and centers on an accessible subject for beginning graduate students. 2025 subjects included generative diffusion models and approximation theory.
- PIMS supports local Experimental Mathematics Labs (XML). Research problems are proposed and a team consisting of mentor, graduate student and 2-4 undergraduate students work on the problem. In 2025 PIMS supported the Washington XML, Manitoba XML and QuanTA at the University of Saskatchewan.
- PIMS hosts a virtual orientation, introducing the postdocs to their cohort, providing resources for professional development and EDI training and creating channels for interaction within the cohort.
- Changing the Culture brings together mathematicians and mathematics educators to work towards narrowing the gap between mathematicians and teachers of mathematics.



Outreach to and engagement with students, youth or members of the general public:

- Math Mania presents interactive demonstrations, puzzles, games and art. These activities are a fun way of learning both math and computer science concepts.
- Math Circle Workshops are conducted for students in grades 4-7 to convey to students the importance of mathematics in everyday life.
- PIMS conducts Elmacon, a mathematics competition for students in grades 5-7.
- PIMS participates in Science Rendezvous, a national program bringing exciting STEM experiences and programming to the public.
- In 2025, PIMS ran the UCalgary Junior High Data Science Camp. The students experienced hands-on activities with real data using Python and R; fun, game-based learning experiences related to the Data Science field; data visualization, simulations, and problem-solving challenges; guest speakers from industry and student leaders from the Data Science & Machine Learning Club; and opportunities to explore how math, coding and data come together in the real world.

Supervision of HQP in the research process

- PIMS currently has 40 PDFs across its network. These fellowships are highly competitive and are awarded by our PDF Panel. The expected quality of supervision is one of the main evaluation criteria in awarding these fellowships, with the goal of assuring that the HQP receives appropriate supervision.
- In 2025, PIMS hosted a Postdoc Summit in-person meeting to foster networking amongst the 2025 postdoctoral cohort, and to deliver workshops in career development specifically aimed at postdoctoral fellows.
- During the M2PI workshop, teams of 4-6 graduate students work with industry and academic mentors on a challenge provided by the mentor. The program requires industry partners to provide at least 2 hours per day of mentorship to students while they are working on the team project.
- PIMS CRGs and PRNs create long term (3 year) thematic programs that give HQP a dynamic research environment where they get supervision through interaction with various CRG researchers.

HQP participation in institute organized activities by career stage									
Activity	Total number of participants	Undergraduate		Graduate**		Doctoral		Postdoctoral	
		Number	% of total	Number	% of total	Number	% of total	Number	% of total
Conferences/Workshops	3499	402	11.5	1144	32.7	N/A	N/A	546	15.6
Summer Schools (outside CRGs/PRNs)	282	16	5.8	217	76.9	N/A	N/A	34	12.1
CRG/PRN Events	490	8	1.7	212	43.3	N/A	N/A	41	8.3
Lecture-Seminar Series	3449	200	5.8	1245	36.1	N/A	N/A	562	16.3
Industrial Activities	140	10	7.5	68	48.5	N/A	N/A	36	25.8
Other	843	66	7.8	71	8.4	N/A	N/A	5	0.7

Graduate includes both Master and Doctoral students

Training in traditional knowledge or Indigenous ways of knowing including cultural practices

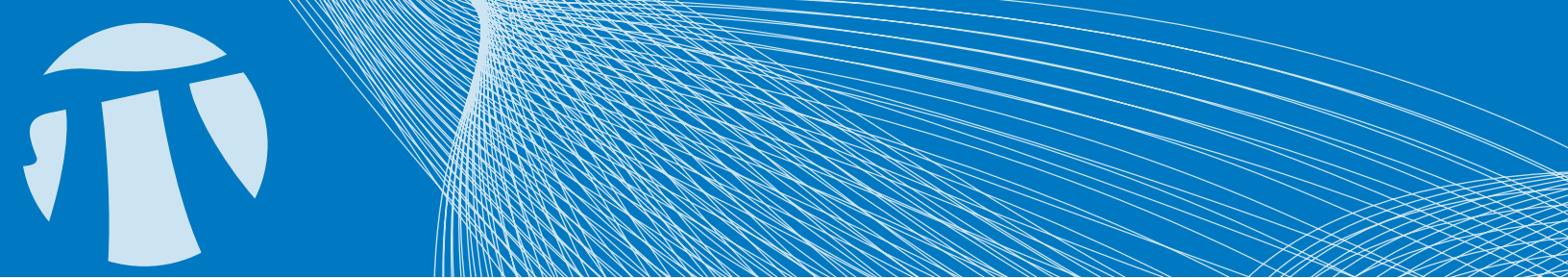
- The CRM-PIMS-AARMS Special Session on Indigenous Voices in Mathematics, held over two days at the 2025 Joint Mathematics Meeting, showcased the research and lived experiences of Indigenous mathematicians. The session celebrated the breadth and depth of Indigenous contributions across mathematical disciplines, spanning theoretical research, practical applications, and innovations in mathematics education. Together, the talks highlighted how Indigenous scholars bring rich and diverse perspectives that continue to strengthen and expand the mathematical sciences. Layne Burns of First Nations University presented “Bridging Tradition and Mathematics: A Study of the Peach Stone Bowl Game.” Games of chance from Indigenous cultures have historically been underexplored through a mathematical lens. This talk examined the Peach Stone Bowl Game, a traditional Iroquois game, using Markov chains to analyze its structure and dynamics. By unraveling the game’s complexities, the work offered new insights into its mechanics and demonstrated how modern mathematical tools can meaningfully engage with traditional knowledge. Donna Lee Fernandez from the Alliance of Indigenous Math Circles delivered the talk “Indigenous Mathematical Knowledge Strengthens Students’ Identity.” The presentation focused on culturally responsive teaching (CRT) as a framework for incorporating students’ cultures, experiences, and perspectives into mathematics classrooms. Fernandez highlighted the impact of the Alliance’s math circles and camps for Indigenous students, emphasizing how these programs foster students’ confidence as mathematical thinkers and problem solvers. Participants come to see their Indigenous identities and mathematical identities as complementary rather than conflicting. Lilinoe Harbottle presented “Innovating Medical Robots: Harnessing Data Science and AI,” which explored the role of applied mathematics, data science, and artificial intelligence in advancing medical robotics. The talk examined how these technologies improve robotic performance and reliability through predictive maintenance, real-time telemetry, and data integrity. The presentation also emphasized the importance of diverse perspectives, including those of Indigenous and Native Hawaiian scholars, in shaping innovation in this rapidly evolving field.
- First Nations University (FNU) is an active PIMS Affiliated Member dedicated to enhancing quality of life and to preserving, protecting, and interpreting the rich history, culture, and artistic heritage of First Nations.
- The PIMS Indigenous Engagement Committee (IEC), composed of distinguished mathematical scientists and industrial leaders from Indigenous backgrounds, has carried out exemplary work identifying Indigenous-led initiatives in the mathematical sciences that PIMS can collaborate with and support, including Indigenous mathematicians.

Development and delivery of training workshops outside of research or course requirements

- Developed by PIMS, Math to Power Industry (M2PI) is an annual professional development program designed to strengthen the Canadian economy by connecting highly trained mathematical scientists with career opportunities beyond academia. Following an intensive training workshop, teams of graduate students collaborate with mentors from industry and academia to tackle real-world challenges posed by government and industry partners.
- In 2025, PIMS supported four summer schools for graduate students, covering research areas such as quantitative molecular and cellular biology, recent trends in commutative algebra, probability, and structure-preserving discretizations.
- PIMS fosters networking and career development for graduate students and postdoctoral fellows. The online PIMS Emergent Research Seminar showcases the work of PIMS postdoctoral fellows, helping them expand their professional networks. PIMS organizes career development sessions to support transition into diverse career paths.

Initiatives or changes to policy that support equitable and inclusive training and development of HQP

- PIMS has programs aimed at underrepresented groups including, but not limited to, women, Indigenous Peoples (First Nations, Inuit and Metis), persons with disabilities, members of visible minorities/ racialized groups and members of LGBTQ+ communities.
- PIMS created an EDI recruitment fund to provide salary supplements to help make attractive and competitive offers to PDF applicants from diverse backgrounds. This program acknowledges that many of these candidates face additional barriers in academia and seeks to address those inequities to ensure that their excellence can



be recognized.

- PIMS has an Indigenous Engagement Committee to ensure that PIMS listens to Indigenous voices in identifying ways of supporting Indigenous led activities in the mathematical sciences.
- PIMS/BIRS Team Up Pathways to Inclusive Research targets researchers whose program may have been disproportionately affected by various obstacles like family obligations, professional isolation, access to funding and the Covid pandemic. It provides opportunities for in-person collaboration to teams of mathematical scientists.
- PIMS offers Network-wide courses and a Network-wide Colloquium Series to enhance accessibility for individuals from smaller universities with limited resources.
- The First Year Interest Groups (FYIG) aim to bring together early career researchers to study an accessible subject for beginning graduate students. Each group is led by a PIMS PDF.

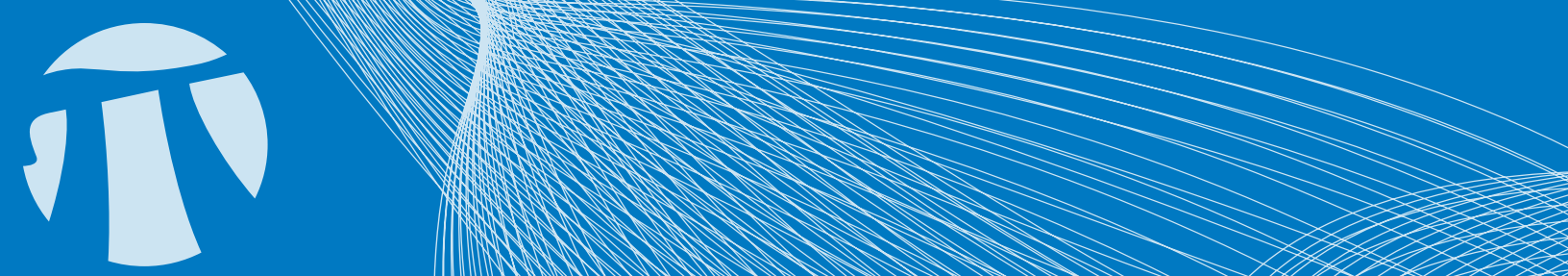
MANAGEMENT & BUDGET

Costs paid from all revenue sources

BUDGET ITEM	2024 ACTUAL	2025 BUDGETED	2025 ACTUAL	2026 BUDGETED
SALARIES & BENEFITS				
Technical/professional	847679.00	959982.00	915256.00	903219.00
HQP stipends/awards	913681.00	794689.00	881491.00	692347.00
Director/Co-Directors/Site Directors	148765.00	160650.00	125056.00	173400.00
INSTITUTE				
Operating costs	52027.00	50000.00	64154.00	64239.00
Maintenance	25722.00	22000.00	18302.00	20000.00
Minor Equipment Upgrades	11411.00	13000.00	14426.00	12000.00
TRAVEL (INCLUDING ACCOMMODATION, MEALS, ETC)				
Conference	240522.00	259000.00	325050.00	272000.00
Engagement	501363.00	512000.00	613660.00	529000.00
Board/Exec. Mtgs	56795.00	47000.00	52159.00	52000.00
DISSEMINATION COSTS				
Outreach to user communities	5455.00	2500.00	4401.00	2500.00
Scientific Publications	3481.00	2000.00	2512.00	2000.00

Costs paid from NSERC Discovery Institute Support Grant funding

BUDGET ITEM	2024 ACTUAL	2025 BUDGETED	2025 ACTUAL	2026 BUDGETED
OTHER COSTS				
Education initiatives	74976.00	64500.00	79938.00	42000.00
BUDGET ITEM				
2024 ACTUAL				
2025 BUDGETED				
2025 ACTUAL				
2026 BUDGETED				
SALARIES & BENEFITS				
Technical/professional	212431.00	154349.00	164788.00	157679.00
HQP stipends/awards	854124.00	794689.00	676717.00	612347.00
TRAVEL (INCLUDING ACCOMMODATION, MEALS, ETC)				
Conferences	130000.00	120000.00	210000.00	257000.00
Engagement	70400.00	80000.00	105000.00	128000.00



Institute revenues

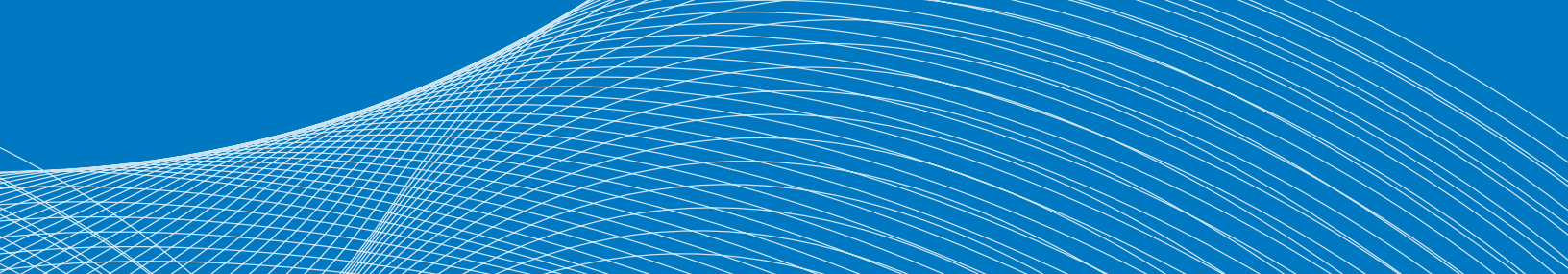
REVENUE SOURCE	2024 ACTUAL	2025 BUDGETED	2025 ACTUAL
User fees	49047.00	80000.00	54692.00
Partner Universities	839671.00	1020639.00	1014529.00
Donations/contributions	61051.00	168589.00	317817.00
Callysto	95000.00	0.00	0.00
NSERC DIS	1153748.00	1153748.00	1153748.00
Prairies Can	52526.00	51500.00	85460.00

Overall financial statement of account

Previous balance at 31/12/2024	934244.00
Actual institute revenues for 2025	2759876.00
Total actual institute costs for 2025	3096405.00
Total carry forward at 31/12/2025	597715.00

PIMS operates on a fiscal year ending March 31. At the close of the current fiscal year, we anticipate a carry-forward balance of approximately \$225,000. It is our policy to maintain a carry-forward balance rather than reduce it to zero. A reserve in the range of \$200,000 to \$500,000 is necessary to ensure continuity of programs and staffing commitments through the fiscal year-end transition period.

RESEARCH AREA	PROPORTION OF INSTITUTE FUNDS
Pure math	31
Applied math	24
Statistics	9
Computer science	8
Math biology	24
General math (mixed)	4



Initiatives or changes to policy that support an equitable and inclusive research, management or work environment

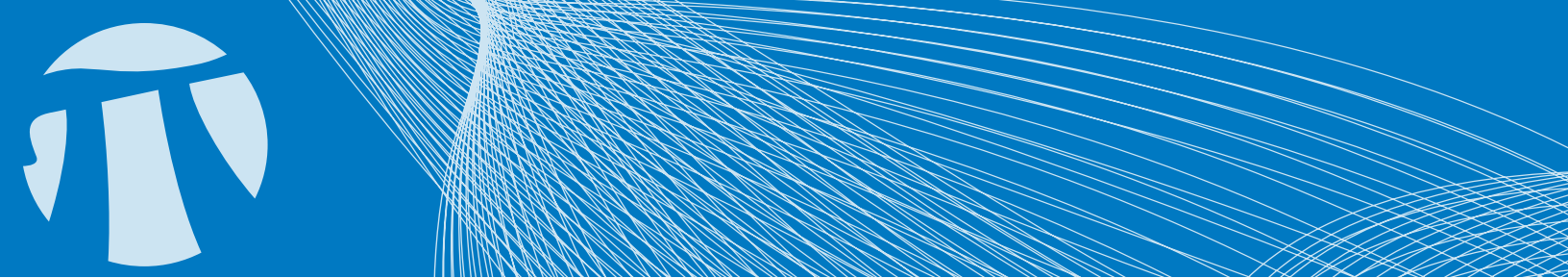
- 2025 PIMS is committed to fostering a supportive and safe environment dedicated to excellence, equity, and mutual respect. We envision a climate in which all participants are provided with the best possible conditions for learning and research. Through our Code of Conduct, we expect every member of the PIMS community to act with integrity and respect, and to refrain from causing, condoning, or participating in discrimination, harassment, or prejudice toward any individual or group.
- All PIMS Central staff are required to complete courses on Preventing and Addressing Workplace Bullying and Harassment as well as Workplace Violence Prevention. At UBC, attracting and sustaining a diverse workforce is considered key to excellence in research, innovation, and learning.
- PIMS has an EDI recruitment fund to provide a salary supplement to recruit candidates from diverse backgrounds. PIMS considers inequalities faced by women, Indigenous Peoples, persons with disabilities, members of visible minorities, and diverse sexual orientation and gender identities in its EDI initiatives.
- PIMS annually updates the terms of reference for the Postdoctoral Fellow Panel and the Scientific Review Panel, incorporating EDI best practices.

PROBLEMS ENCOUNTERED

- 2025 Equipment and facilities -- At times it has been difficult to secure suitable lecture room space for hybrid seminars and events. We have attempted to equip more lecture rooms with the necessary equipment for hybrid events. There is a problem with soundproofing in our designated lecture room. We are currently fund-raising toward improving this situation.
- Staffing issues, including students -- The Communications Manager position at PIMS Central was unstaffed for over a month. We now have new permanent staff in place.
- Barriers or challenges for different groups to fully access or participate in the activities -- Some potential conference participants/speakers have had to cancel their trips due to very long waits for visitor visas. Some PDFs have had to start their appointments late due to immigration delays such as obtaining a visa/work permit.

GENERAL INFORMATION

- The institute's website is maintained weekly
- NSERC acknowledgement can be found at <https://www.pims.math.ca>
- NSERC funding is almost always acknowledged in written materials developed by the institute.
- The content of the institute's website is only available in English



LOOKING FORWARD

PIMS is excited to advance a dynamic slate of initiatives that strengthen research excellence, support training at all career stages, foster inclusive community-building, and deepen international collaboration across the mathematical sciences in 2026.

- **Women in Mathematics of Data Science** -- Programming aimed at strengthening participation, visibility, and leadership of women and underrepresented groups by forming research collaborations in data science and related mathematical fields.
- **3MC Summer School** -- An advanced training program supporting early-career researchers through intensive instruction and community-building in mathematical and computational sciences.
- **Mathematics of Human-Environmental Systems & Climate Change Impacts Summer School** -- A summer school exploring mathematical approaches to coupled human-environment systems and the impacts of climate change, led through the Maud Menten Institute.
- **Education – Teachers' Mathematics Camp** -- A professional development program designed to support K-12 teachers through mathematical content enrichment, pedagogy, and peer learning.
- **Women in Mathematics of Data Science – Junior Researcher Math Camp** -- A focused math camp supporting underrepresented researchers through advanced training, mentorship, and community-building in data science-related mathematics.
- **Queer in Computational & Applied Mathematics** -- A community-building event supporting equity, visibility, and inclusion through mentoring and research opportunities.
- **SAGE Days Western Canada 2026** -- To be held in Calgary, supporting open-source mathematical software development and community engagement.
- **Canada-France-Chile Ocean Research** -- A joint international workshop bringing together mathematical scientists, oceanographers, and marine ecologists to strengthen international research collaborations.

Participation by region in institute organized activities															
Activity	Total number of participants	Western Canada (AB, BC)		Central Canada (SK, MB)		Ontario		Quebec		Eastern Canada (NB, NS, NL, PEI)		Northern Canada (NWT, NvT ,YT)		International	
		Number	% of total	Number	% of total	Number	% of total	Number	% of total	Number	% of total	Number	% of total	Number	% of total
Conferences Workshops	3499	1,855	53.0	140	4.0	336	9.6	91	2.6	59	1.7	0	0.0	1018	29.1
Summer Schools (outside CRGs/PRNs)	282	84	29.8	26	9.2	14	5.0	62	22.0	0	0.0	0	0.0	96	34.0
CRG/PRN Events	490	302	61.6	106	21.7	25	5.0	0	0.0	8	1.7	0	0.0	49	10.0
Lecture-Seminar Series	3449	1,918	55.6	428	12.4	38	1.1	14	0.4	3	0.1	0	0.0	1048	30.4
Industrial Activities	140	58	41.0	22	16.0	4	3.0	3	2.0	0	0.0	0	0.0	53	38.0
Others	843	706	83.7	0	0.0	3	0.3	0	0.0	0	0.0	0	0.0	134	16.0

Participation by sector in institute organized activities													
Activity	Total number of individual participants	Industry		Govt		NGO		Academia		Educator (K-12)		Other	
		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Conferences/Workshops	3499	119	3.4	14	0.4	0	0.0	3118	89.1	105	3.0	143	4.1
Summer Schools (outside of CRGs/PRNs)	282	0	0.0	0	0.0	0	0.0	273	96.8	3	1.1	6	2.1
CRG/PRN Events	490	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lecture-Seminar Series	3449	176	5.1	3	0.1	0	0.0	3115	90.3	107	3.1	48	1.4
Industrial Activities	140	18	13.0	7	5.0	1	1.0	93	66.0	0	0.0	21	15.0
Other**	843	0	0.0	0	0.0	0	0.0	173	20.5	124	14.7	546	64.8

** These participant numbers do not include Syzygy **