



Pacific Institute *for the*
Mathematical Sciences

PIMS MONTHLY CONNECTION | MARCH 2023



Hello from PIMS

March is here and we are excited to host plenty of activities taking place across the PIMS sites. Our final Network-wide Colloquium takes place on March 13. Our speaker is [Alessio Figalli](#), winner of the 2018 Fields Medal. Be sure to sign up on zoom; the talk begins at 1:30 pm Pacific Time.

Our PIMS PDF Seminar series continues this month. We will have online presentations from [Félix Boudreau](#) (ULethbridge), [Fatma Çiçek](#) (UNBC), and [Jyoti Bhadana](#) (UAlberta). You can also know more about each of our PDFs on our [Medium](#) publication. The seminars are also an excellent opportunity to connect with current PIMS postdoctoral scholars as they continue their research at our member universities.

We have some upcoming deadlines this month, so be sure to review the list below. Among them are applications for the [PIMS-BIRS Team Up!](#) program and [registration](#) for the Winter 2023 PIMS network-wide graduate courses.

We are accepting nominations for the [2023 Education Prize](#). The prize will be awarded to members of the PIMS community who have made significant contributions to education in the mathematical sciences. It is intended to recognize individuals or groups from the PIMS universities, or other educational institutions in Alberta, British Columbia, Manitoba, Saskatchewan, and Washington who have played a major role in encouraging activities that have enhanced public awareness and appreciation of the mathematical sciences, as well as fostering communication among various groups and organizations concerned with mathematical training at all levels.

UPCOMING DEADLINES

- **March 15** - Nomination Deadline for the [PIMS Education Prize](#)
- **April 4** - Early Registration deadline for [CanaDAM](#)
- **April 10** - Application for admission to the [Summer School on Forecasting and Mathematical Modeling for Renewable Energy](#)
- **April 15** - Applications due for [Team Up! Pathways to Inclusive Research](#)
- **April 15** - Registration closes for Winter 2023 [PIMS Network-wide graduate courses](#)
- **April 25** - Abstract submission deadline for the [Western Canada Linear Algebra Meeting](#)
- **May 5** - Registration submissions for the [USaskatchewan - PIMS Data Science Bootcamp](#)

See below for more details on this month's news, featured events, and publications.

NEWS & ANNOUNCEMENTS



PIMS International Partnerships.

The PIMS Institutional Exchange Program (PIMS+X) aims to reduce the carbon footprint of travel for research purposes by maximizing the scientific impact of each visit. Inspired by the [Simons Oberwolfach Visiting Professor Program](#), PIMS+X builds agreements between partner American, Indian and French Mathematical Institutes, allowing scholars to extend existing visits to include nearby universities or institutes, and facilitating additional scientific collaboration. Researchers travelling between PIMS and one of the following partner institutes for a scientific event (conference, workshop, etc.) may be eligible for funding to extend their visit to include nearby universities or institutes.

- [Institute for Computational and Experimental Mathematics](#) (ICERM)
- [International Centre for Theoretical Sciences](#) (ICTS)
- [Centre International de Rencontres Mathématiques](#) (CIRM)
- [Institut Henri Poincaré](#) (IHP)
- [Institute for Mathematical and Statistical Innovation](#) (IMSI)

Additionally, PIMS Researchers participating in the semester programs at either of the following institutes may be eligible to visit PIMS through this program.

- [Simons Laufer Mathematical Sciences Institute](#) (formerly MSRI)
- [Institute for Pure and Applied Mathematics](#) (IPAM)

[Read More About the Program](#)



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Banff International Research Station
for Mathematical Innovation and Discovery

PIMS/BIRS Team Up!
Pathways to Inclusive Research



The **PIMS/BIRS Team Up!** program provides opportunities for in-person collaboration to teams of mathematical scientists, targeting researchers whose research program may have been disproportionately affected by various obstacles like family obligations, professional isolation, access to funding, and the COVID-19 pandemic. This includes, but need not be limited to, **women, gender-expansive, and minoritized groups, Indigenous scholars, individuals with visible/invisible challenges, and early-career researchers with limited resources.**

Successful applicants will receive lodging and meals at one of the BIRS sites in Banff or Kelowna (subject to availability) and reasonable travel expense reimbursement. A key goal of this program is to provide its participants with a distraction-free opportunity to engage fully in research activities. To help with caregiving responsibilities, support may be offered in the form of either lodging and reimbursement of travel expenses for children accompanying the member and accommodation and travel expenses for a caregiver.

We are currently accepting applications for residences in the period September 1, 2023 - August 31, 2024. **Complete applications (including demographic information for all collaboration members) must be received by April 15, 2023.**

[See Application Details](#)



PIMS Network Wide Courses: Enrolment Open.

Registration for Winter 2023 Network-wide graduate courses is still open. Students at Canadian PIMS member universities can register for these courses and receive graduate credit via the [Western Deans Agreement](#).

- [Gaussian and Empirical Process Theory for High Dimensional Statistics](#) - Alexander Giessing (University of Washington), Jiahua Chen (University of British Columbia)
- [Nanoscale Modelling and Simulations](#) - Alireza Nojeh (University of British Columbia)
- [Lie Groups: Structure and Representation Theory](#) - Lior Silberman (University of British Columbia)
- [Analytic Number Theory II](#) - Greg Martin (University of British Columbia)
- [Methods for Multivariate Data](#) - Kevin J. Keen (University of Northern British Columbia)
- [Stochastic Differential Equations](#) - Yaozhong Hu (University of Alberta)
- [Geometry and Mechanics](#) - Rouslan Krechetnikov (University of Alberta)

See the [PIMS Courses website](#) for more information and registration details. The **deadline to apply will be on April 15.**

[See Courses Details](#)

FEATURE EVENTS



PIMS-UNBC Distinguished Colloquium: Cameron Stewart.

March 2, 2023: Online

Arithmetic and transcendence

Techniques developed for transcendental number theory have had many surprising applications in the study of purely arithmetic questions. The aim of our talk will be to discuss this phenomenon.

[Register Here](#)

Coast Combinatorics Conference 2023.



March 4 - 5, 2023: SFU - Harbour Centre

The [Coast Combinatorics Conference Series](#) began in 1999. In most years, there has been a meeting on the Canadian west coast in February or March, featuring a collegial, collaborative and workshop-style atmosphere, and a diverse collection of talks on topics in discrete mathematics and theoretical computer science.

The 2023 meeting is organized by Jonathan Jedwab (SFU), Nancy Neudauer (Pacific University) and Amarpreet Rattan (SFU). Attendance includes more than 50-75 faculty, postdocs, and

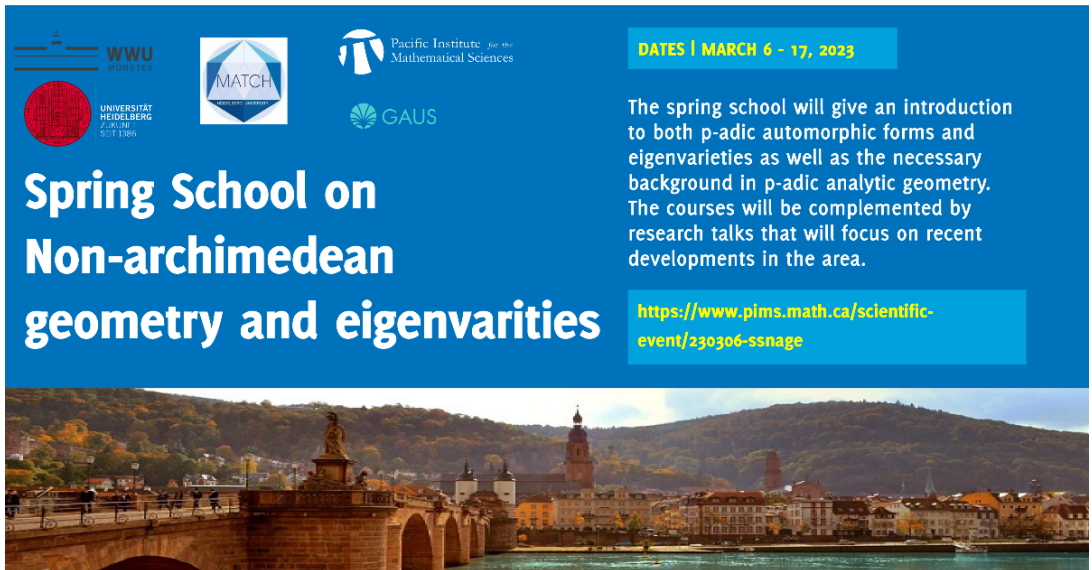
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students from the Pacific Northwest. Taking place in March at the SFU Harbour Center in Downtown Vancouver, it will feature 20-minute contributed talks (including time for questions) and

a 5-minute break between talks. Talks on any topic in discrete mathematics or theoretical computer science are welcome.

[See Conference Details](#)



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UNIVERSITÄT
HEIDELBERG
1786

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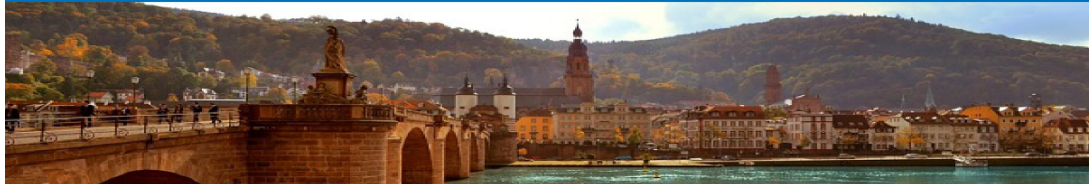
Pacific Institute for
Mathematical Sciences

GAUS

DATES | MARCH 6 - 17, 2023

The spring school will give an introduction to both p -adic automorphic forms and eigenvarieties as well as the necessary background in p -adic analytic geometry. The courses will be complemented by research talks that will focus on recent developments in the area.

<https://www.pims.math.ca/scientific-event/230306-ssnaga>



Spring School on Non-archimedean Geometry and Eigenvarieties.

March 6 - 17, 2023: University of Heidelberg, Germany

Families of p -adic automorphic forms are well studied objects of arithmetic geometry since the pioneering work of Hida and Coleman. Their study resulted in the definition of geometric objects, called eigenvarieties, that parametrize systems of Hecke eigenvalues of p -adic automorphic forms. Conversely, the rich geometry of these varieties gives insights about p -adic (and thereby also about classical) automorphic forms. Recent techniques from perfectoid geometry, locally analytic representation theory and the point of view of the p -adic Langlands program give new insights and impulses.

The spring school will give an introduction to both p -adic automorphic forms and eigenvarieties, as well as the necessary background in p -adic analytic geometry. The courses will be complemented by research talks that will focus on recent developments in the area.

[See Spring School Details](#)

Canadian Western Algebraic Geometry Symposium.

March 18 - 19, 2023: Simon Fraser University - Burnaby

All talks will take place on the Burnaby Mountain campus of Simon Fraser University. Speakers include Sankhaneel Bisui (Manitoba), Katrina Honigs (SFU), Michael Groechenig (Toronto), Elana Kalashnikov (Waterloo), and many more. We expect 5 talks on Saturday and 3 talks on Sunday. Although there is no registration fee for the symposium, we request all participants to register. Support for CWAGS is generously provided by PIMS. More details will follow closer to the event date.



PIMS Emergent Research-PDF Seminar Series.

March 1, 8 and 15 2023: Online

PIMS continues to host the Emergent Research PDF Seminar Series. This semester we will host fourteen PIMS scholars from across our member universities. PIMS PDFs are amongst the top young researchers in Canada, and this is an excellent opportunity to learn about them and their work. Visit the PIMS website to learn more about the outstanding young researchers, or visit our [Medium](#) blog to learn more about their backgrounds.

Emergent Research:

The PIMS Postdoctoral Fellow Seminar

Mar 01, 2023 | 9:30am Pacific



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L-Functions of Elliptic

Curves Modulo Integers

Félix Baril Boudreau

University of Lethbridge



Emergent Research:

The PIMS Postdoctoral Fellow Seminar

Mar 08, 2023 | 9:30am Pacific



Pacific Institute *for the*
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Title TBC

Fatma Çiçek

University of Northern British Columbia



Emergent Research:

The PIMS Postdoctoral Fellow Seminar

Mar 15, 2023 | 9:30am Pacific



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The Bootstrap

Learning Algorithm

Jyoti Bhadana

University of Alberta



[More Information on the Seminar Series](#)

PIMS Network Wide Colloquium: Alessio Figalli.



Network-Wide Colloquium Series

| 1.30pm Pacific | Online



March 23
ALESSIO FIGALLI
ETH Zürich

**Free boundary regularity for
the obstacle problem**

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www.math.ubc.org

March 23, 2023: Online

Free boundary regularity for the obstacle problem

The classical obstacle problem consists of finding the equilibrium position of an elastic membrane whose boundary is held fixed and which is constrained to lie above a given obstacle. By classical results of Caffarelli, the free boundary is smooth outside a set of singular points. However, explicit examples show that the singular set could be, in general, as large as the regular set. This talk aims to introduce this beautiful problem and describe some classical and recent results on the regularity of the free boundary.

Speaker Biography

Alessio Figalli is a leading figure in the areas of Optimal Transport, partial differential equations and the calculus of variations. He received his Ph.D. from the Scuola Normale Superiore di Pisa and the Ecole Normale Supérieure de Lyon and has held positions in Paris and Austin, Texas. He is currently a Professor at ETH Zurich. His work has been recognized with many awards including the Prize of the European Mathematical Society in 2012 and the Fields Medal in 2018.

[Register for the Colloquium](#)

2023 Marsden Memorial Lecture



photo credit: Margo Weinstein

MARSDEN MEMORIAL
LECTURE
SERIES



Speaker: Marvik Leok, University of California, San Diego

March 24, 2023: In-person at UNBC & Online

The Connections Between Discrete Geometric Mechanics, Information Geometry, Accelerated Optimization, and Machine Learning.

Geometric mechanics describes Lagrangian and Hamiltonian mechanics geometrically, and information geometry formulates statistical estimation, inference, and machine learning in terms of geometry. A divergence function is an asymmetric distance between two probability densities that induces differential geometric structures and yields efficient machine-learning algorithms that minimize the duality gap. The connection between information geometry and geometric mechanics will yield a unified treatment of machine learning and structure-preserving discretizations. In particular, the divergence function of information geometry can be viewed as a

applied, and the symplectic map generated by a divergence function can be associated with the exact time-h flow map of a Hamiltonian system on the space of probability distributions. We will also discuss how time-adaptive Hamiltonian variational integrators can be used to discretize the Bregman Hamiltonian, whose flow generalizes the differential equation that describes the dynamics of the Nesterov accelerated gradient descent method.

About the Marsden Memorial Lectures:

The Marsden Memorial Lecture Series is dedicated to the memory of Jerrold E Marsden (1942-2010), a world-renowned Canadian applied mathematician. Marsden was the Carl F Braun Professor of Control and Dynamical Systems at Caltech, and prior to that, he was at the University of California (Berkeley) for many years. He did extensive research in the areas of geometric mechanics, dynamical systems, and control theory. He was one of the original founders in the early 1970s of reduction theory for mechanical systems with symmetry, which remains an active and much-studied area of research today. Please visit the Marsden webpage here for more information here: <http://www.pims.math.ca/scientific/distinguished-lecture-series/marsden-memorial-lecture-series>

[Register for the Lecture](#)

View our calendars for more meetings and events

[Scientific Events](#)

EDUCATION HIGHLIGHTS



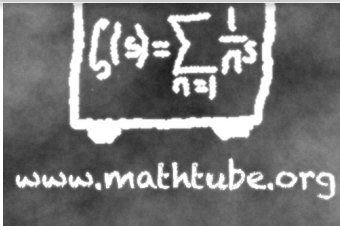
Math Circles for Elementary Schools Students at UBC.

Math Circles returns for the Winter 2023 semester! Students of grades 4 to 7 are invited to challenge and develop their thinking and creativity skills at the Math Circle Workshops. This is an enrichment program for students organized by the faculty members of the Department of Mathematics at the University of British Columbia and the Pacific Institute for the Mathematical Sciences. The goal of these workshops is to convey to students the importance of mathematics in the real world as well as how much fun mathematics can be. We want to get the students excited about mathematics and to give them a setting that encourages them to become passionate about this subject.

The Math Circles Workshops will run on March 6 and 27, and April 3 and 17. To book any of these days or for more information, please send an email to melania@math.ubc.ca. Drop-Ins are welcome if seating is available.

[See More Details](#)

MEDIA



Since 1996, PIMS has collected and maintained an archive of videos and lecture notes covering many areas of the mathematical sciences. If you missed any of the PIMS PDF Colloquium Lectures, visit www.mathtube.org to see these and other archives.

Read our PIMS PDF features on [Medium](#).

PIMS is happy to share our stories and short interviews with members of the PIMS Community. We are currently featuring our 2022 PDF Cohort as they speak at the PDF Seminar Series.

Our Features this month (from top left) are [Félix Baril Boudreau](#) (University of Lethbridge), [Cintia Pacchiano](#) (University of Calgary), [Mahsa Shirazi](#) (University of Manitoba), and [Nabarun Deb](#) (University of British Columbia).



ABOUT PIMS

The Pacific Institute for the Mathematical Sciences (PIMS) was created in 1996 to promote discovery, understanding, and awareness in the mathematical sciences. PIMS has expanded from the mathematics community of Alberta and British Columbia to include Washington State, Saskatchewan, and Manitoba. Our mandate is to promote research in and applications of the mathematical sciences, to facilitate the training of highly qualified personnel, to create an equitable, diverse and inclusive community, to enrich public awareness of and education in the mathematical sciences, and to create mathematical partnerships with similar organizations in other countries in the Pacific Rim. PIMS funds Collaborative Research Groups, Post-Doctoral Fellowships, and individual events on a competitive basis.

We Want to Hear from You

Share your feedback on this month's newsletter and tell us what stories and news you would like to hear more of.

[Feedback](#)

Your Support Makes a Difference

PIMS education and outreach programs touch countless educators, students, and Indigenous communities. Some of our activities include summer schools, mathematics contests and meetings for educators [Learn more](#)

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We acknowledge with gratitude that PIMS central office is located on the unceded, traditional, and occupied territory of the Coast Salish peoples. This includes the territories of the xwməθkwəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and Səlilwətaʔ/Selilwitulh (Tsleil-Waututh) Nations.
www.native-land.ca