Pacific Institute for the Mathematical Sciences

PIMS MONTHLY CONNECTION | **November 2021**

Hello from PIMS

We thank all members of the PIMS research community for submitting proposals for activities in 2022. Decision outcomes, as determined by the PIMS Scientific Review Panel will be communicated later this month.

A reminder that nominations for the CRM-Fields-PIMS prize **closes on Monday, November 1**. This is the premier prize for research awarded jointly by the three Canadian mathematics institutes. The prize recognizes exceptional achievement in the mathematical sciences.

PIMS strives to support a rich research community, accessible to every member of the community. The purpose of the PIMS Equity, Diversity, and Inclusion Committee (EDI) is to develop implementable, explicit strategies to monitor and improve the EDI of the Institute and its activities. We have collected data from our 2020/2021 events and **developed an** EDI Report **to share with our community**. We welcome feedback, as EDI is an important part of our mandate.

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

Sincerely,
The PIMS Team

INDUSTRY HIGHLIGHT: Math[Industry]

In August, PIMS hosted its second annual virtual Math[Industry] workshop (M2PI or Math to Power Industry) for graduate students and postdoctoral fellows in the mathematical and statistical sciences. The intent of this four-week workshop was to develop the industry skills needed for success in their careers.

Participants attended various courses from *Skills of Communication* and *Equity, Diversity, and Inclusion* to technical learnings such as *Team Website Building* and *Git and GitHub*. They were then recruited into teams to work through real-world, hands-on projects supplied by industry partners while being supported by industry and academic mentors. The projects included topics such as insect control, heating technologies, cancer, food sustainability, and road surface scanning. Teams had two weeks to work on their projects, after which the results would be presented to the industry partners. The feedback received by the organizers and industry partners was overwhelmingly positive, and in some cases, the teams completed work which would typically take a year, in just two weeks. The M2PI program is chaired by Prof. Kristine Bauer at the University of Calgary.

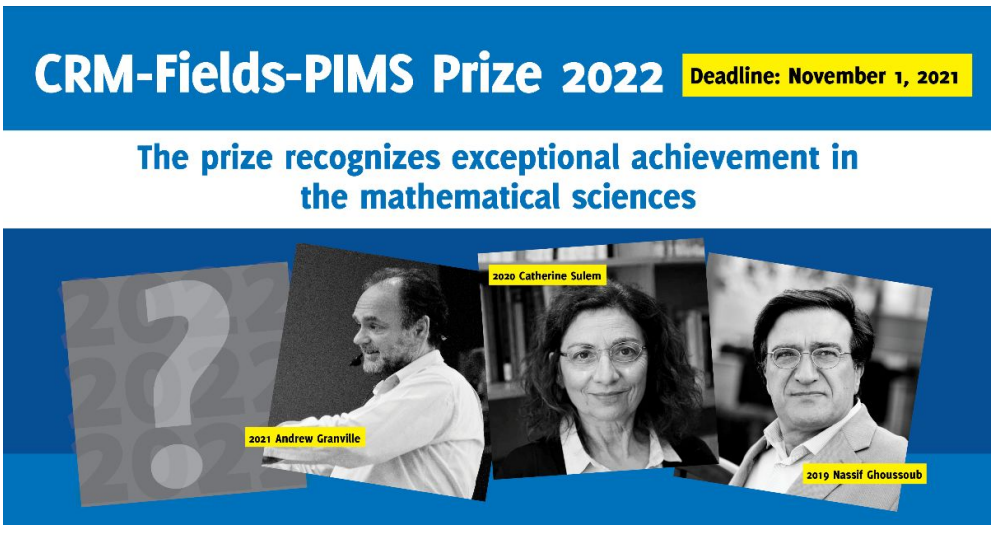
Devin Goodsman, Natural Resources Canada — Industry Mentor
Students that worked on the projects were already familiar with the problems. In addition, our goal is to take the project end reports and to extend them so that they form the basis for peer-reviewed manuscripts. Students that worked on the problems demonstrated their ability to push these problems into the realm of peer-reviewed research and so they were ideal candidates to hire on a contract basis to do so.

Mishty Ray, UCalgary — Participant
We had a great mentor—he gave great input and provided a lot of space and encouragement for team members to pursue their own ideas. Our team had great synergy and I had a lot of fun working with them.

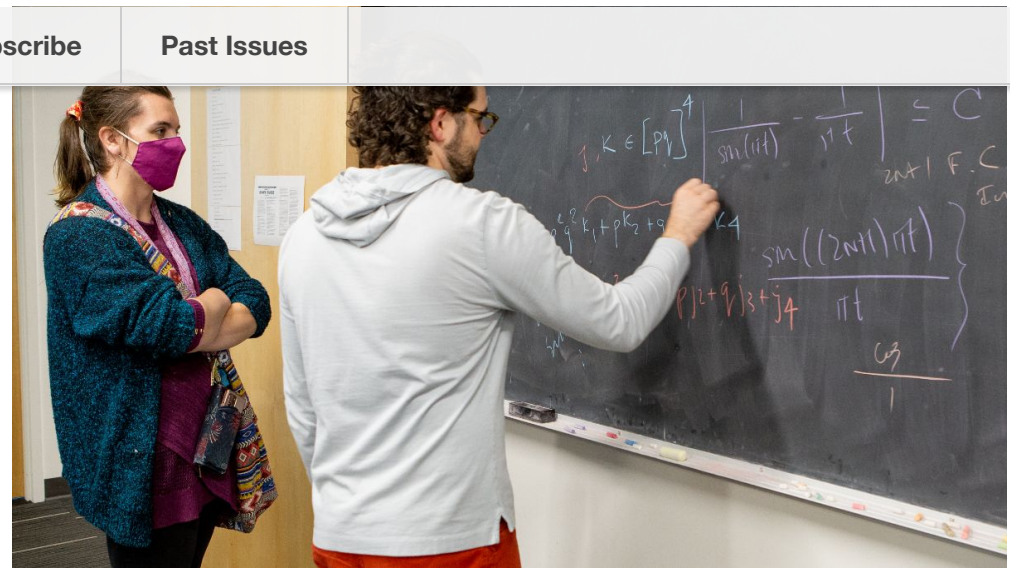
Noah Bolohan, UOttawa — Participant
Using many of the skills developed earlier in the workshop, alongside an exciting new software, my team and I were able to tackle a very interesting project and produce interesting and exciting results. Once the workshop had ended, I was offered a contract with Natural Resources Canada to pursue my team's work to completion.

Math INDUSTRY

NEWS & ANNOUNCEMENTS



November 1st Deadline, CRM-Fields-PIMS Prize



[PIMS Postdoctoral Competition - Application Deadline December 1, 2021]

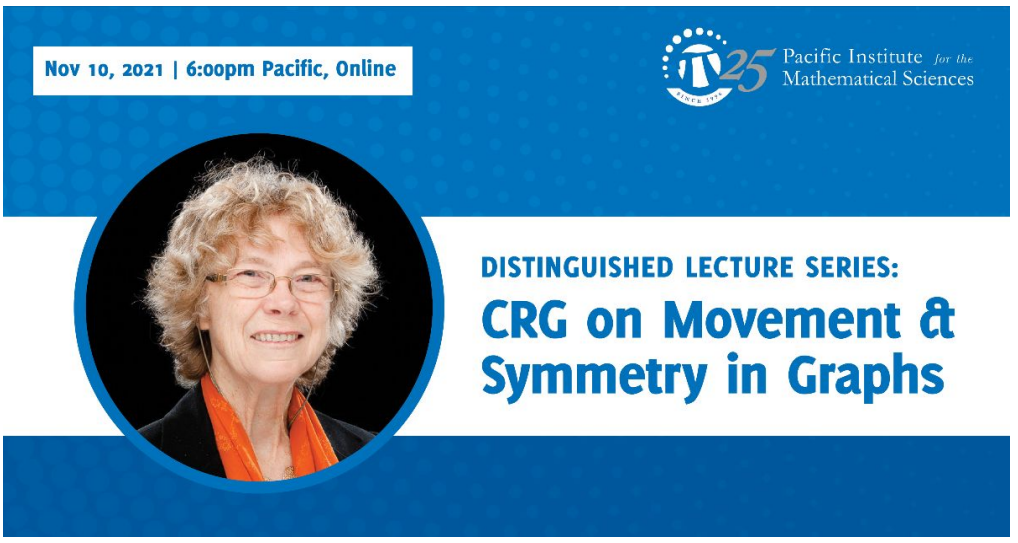
PIMS invites nominations of outstanding researchers in the mathematical sciences for postdoctoral fellowships beginning in the academic year 2022-2023. Candidates must be nominated by a scientist or department affiliated with PIMS. These fellowships are intended to supplement the support provided by the sponsor, and are tenable at any of the PIMS Canadian member universities: the University of Alberta, the University of British Columbia, the University of Calgary, the University of Lethbridge, the University of Manitoba, the University of Regina, the University of Saskatchewan, Simon Fraser University and the University of Victoria.

FEATURE EVENTS

[The PIMS Postdoctoral Fellow Seminar: Sacha Ikinocoff (UCalgary)]

Nov 10. Online.

Divided Power Algebras: In this talk we will review the motivations for the definition of divided power algebra. We will start by recalling some constructions of algebraic invariants from topological spaces, and we will show that divided power algebras arise naturally in this setting. We will give the generalized definition of a divided power algebra, given by B. Fresse in 2000, using the theory of operads. Finally, we will give a complete characterization for generalized divided power algebras in terms of monomial operations and relations.



[CRG on Movement and Symmetry in Graphs Distinguished Lecture Series: Cheryl E Praeger]

Nov 10. Online.

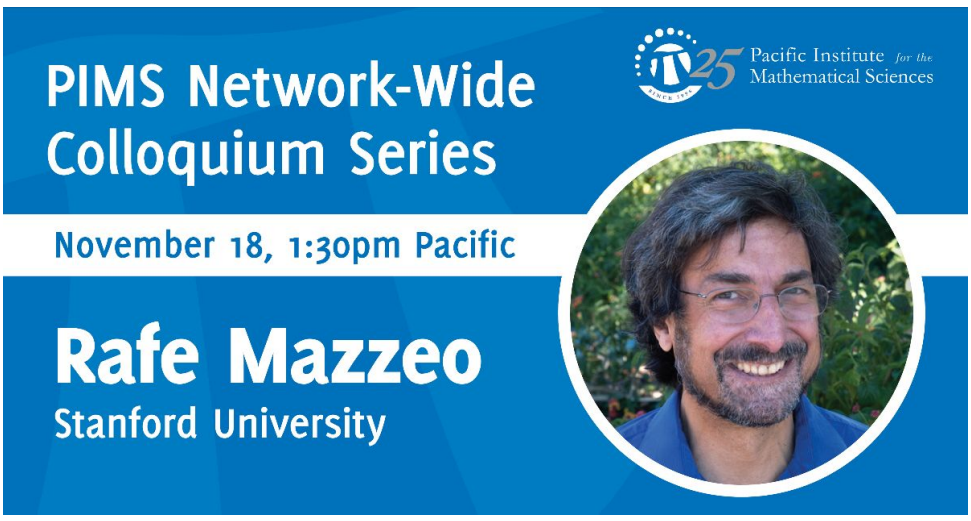
Basic edge-transitive oriented graphs of valency four: The talk is about finite connected 4-valent graphs admitting an edge-transitive and vertex-transitive subgroup G of automorphisms which preserves an orientation of the edges. Cheryl will first talk about the general approach to describing families of graphs with strong symmetry properties using certain quotients. *This talk is intended to be accessible to beginning graduate students/students with a bachelor's degree in Mathematics.*

[PIMS - BIRS - Hackhub Math to Power Career & Innovation]

Nov 12–14. Online.

Data Science in Action: The event will provide students an opportunity to interact with employers

and industry leaders through virtual programs, prove their skill in a data science focused hackathon, and attend workshops with a practical focus on today's data science job market . This event is free to attend but registration is required. See event schedule.



PIMS Network Wide Colloquium: Rafe Mazzeo (Stanford)

Nov 18. Online.

Z_2 Harmonic Spinors in Gauge Theory: Gauge-theoretic moduli spaces are often noncompact, and various techniques have been introduced to study their asymptotic features. Seminal work by Taubes shows that in many situations where the failure of compactness for sequences of solutions is due to the noncompactness of the gauge group, diverging sequences of solutions lead to what he called Z_2 harmonic spinors.

The PIMS Postdoctoral Fellow Seminar: Reinier Kramer (UAlberta)

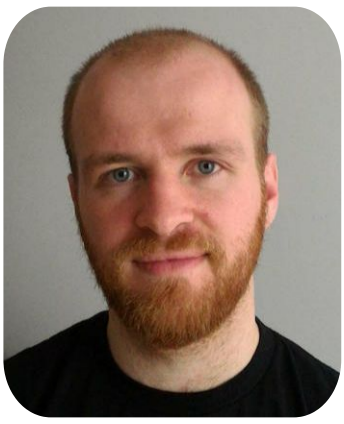
Nov 24. Online.

Hurwitz Numbers via Topological Recursion: In this talk, Reinier will first give some of the definitions of Hurwitz numbers and then explain what topological recursion is and how it helps us shed new light on these numbers.

Click below for upcoming events

Scientific

MEDIA



Meet PIMS PDF Sacha Ikonicoff

"*I work in Algebraic Topology, a field of pure mathematics that studies shapes up to continuous deformation, through the construction of algebraic invariants. I was drawn to this subject during my Masters. I had taken a course during the first year of my Masters on a topic related to that subject and started reading about it in textbooks. In fact, there was no complete course on algebraic topology in my university in Paris, so I had to choose courses that were close to the topic and supplement my learning with lots of reading.*" — Sacha Ikonicoff, University of Calgary

Meet PIMS PDF Reinier Kramer

"*I consider myself a bit of an algebraic geometer and a bit of a mathematical physicist, but I like employing tools from different parts of mathematics and theoretical physics as well.*" —Reinier Kramer, University of Alberta

PIMS COMMUNITY RECENT PUBLICATIONS

1. Z.S. Aygin and P.C. Toh, When is the derivative of an eta quotient another eta quotient?, J. Math. Anal. Appl. 480 (2019) 123366.
2. Shirou Wang. Intermittent synchronization in nite-state random networks under Markov perturbations (with A. Berger, H. Qian and Y. Yi), Comm. Math. Phys. 384 (2021), no. 3, 1945{1970.

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

Donate to PIMS

Follow PIMS and be a part of our community

Mailing address:
Pacific Institute for the Mathematical Sciences
The University of British Columbia
4176-2207 Main Mall
Vancouver, BC V6T 1Z4
Canada

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 Səl̓ílwətaʔ/Selilwitulh (Tsleil-Waututh) Nations.
www.native-land.ca