Submissions

Submissions and ideas for publication are appreciated. They should be sent to the editor:

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CAIMS•SCMAI 2022 Announcement
President’s Letter

by Rebecca Tyson, CAIMS•SCMAI President

Dear Members,

I hope that you are all able to find time and space - both mental and physical - to enjoy the winter holiday. It’s been a busy fall for many, especially with the continuing pandemic. I hope that you each have a "no" committee to help you decide when to say "yes" to requests! There is much to tell you in this letter, especially since it’s been two years since the last Newsletter.

First, I want to tell you just how hard the executive works to make sure that your society is maintaining a presence or applied mathematics in Canada, providing resources throughout the year for students and faculty, and organising an annual meeting famous for its welcoming atmosphere and high quality science. It takes hours of work each month to keep the society running smoothly, and I am extremely grateful to the hardworking volunteers on the executive: Christina Christara - Secretary, Morgan Craig - Communications Officer, David Iron - Treasurer, Sue Ann Campbell - President-Elect, and Thomas Hillen - Past-President.

The executive is also working towards the addition of a new position: The chair of the (also new) Equity, Diversity, Inclusion, and Membership Committee. This committee was originally the Membership Committee, and, thanks to Thomas Hillen, its mandate has been unofficially expanded to include EDI. Votes to formalise the creation of the new committee, and the addition of its chair to the executive, will be forthcoming at the CAIMS 2022 Annual Meeting. In the meantime, the EDIM Committee is already hard at work, examining all of CAIMS’ operations through an EDI lens, and providing recommendations to the Executive and Board. I am most grateful to Amy Hurford for taking on the leadership of this important committee.

I am excited about the upcoming CAIMS 2022 Annual Meeting, offered in hybrid format, and hosted by UBC Okanagan in Kelowna, BC from June 13-16, 2022. The Okanagan is a beautiful valley in the heart of BC wine country, and is a reliably warm and sunny destination in June. The organising committee is looking forward to welcoming everyone who is able to travel to Kelowna in person. The committee is also putting considerable effort into ensuring that the online attendees feel genuinely included in the conference. After one and a half years of pandemic science, there is a robust discussion about what platforms and activities work well online and in conjunction with in-person activities!
In addition to the executive, I am grateful to those who have volunteered to serve on the board. The diversity of perspectives that they bring to our discussions are extremely valuable. They join the executive for meetings three times each year.

The society’s journal, “Mathematics of Science and Industry”, was launched by Thomas Hillen (president, 2019-2021) and Ray Spiteri (president, 2015-2017), both of whom have worked tirelessly to ensure the establishment of the journal. The journal is doing well, with several issues already published. The journal is published under the auspices of AIMS, and so is indexed and easily searchable. Beginning next summer, editorship of the journal will be transferred to the trifecta of presidents, elect, current, and past. We look forward to growing this important platform for applied mathematics in Canada.

As it has been two years since the last newsletter, there are many CAIMS Prizewinners to announce! CAIMS awards several highly competitive prizes, for distinguished service, for outstanding research with industry, as an early-career researcher, and as a body of research, and for remarkable PhD dissertations. Over the past two years, these prizes were awarded to the following researchers: The Arthur Beaumont Distinguished Service Award winners are James Colliander (2021), and Ray Spiteri (2020); The CAIMS-Fields Industrial Mathematics Prizewinners are Nilima Nigam (2021), and Vakhtang Putkaradze (2020); The CAIMS/PIMS Early Career Award Winners are Brendan Pass (2021), and Jun Liu (2020); The CAIMS Research Prizewinners are David Earn (2021) and Steven Ruuth (2020); The Cecil Graham Doctoral Dissertation Prizewinners are Nadia Shardt (2021) and Amir Maleki (2020).

Nominations are open for the 2022 prizes. Please take a few moments to nominate your deserving colleagues and students! Most require a letter and a CV, and some require 1-3 letters of support. For all except the doctoral dissertation prize, nominations will be carried forward for one year.
Finally, I wish to thank all of you, the society’s members, who are training the next generation of applied mathematicians, volunteering at workshops, running the society’s activity groups, giving talks across the country, and supporting the society with your memberships.

Thank you and happy holidays to all of you, and I look forward to seeing you at CAIMS 2022!

Regards,

Rebecca

Rebecca Tyson, CAIMS • SCMAI President
CMPS Department (Mathematics)
UBC Okanagan
Sylix (Okanagan) Territory
Past President’s Letter

by Thomas Hillen, CAIMS•SCMAI Past-President

Dear CAIMS members,

Thank you for letting me serve as CAIMS President for 2019-2021. It has been a great pleasure and I will always cherish the time spent with my colleagues to move the Society forward. In fact, the personal relations within the Society are its strength. Being part of a group of engaging people is the best motivator. Special thanks to all my co-officers of CAIMS.

When starting as President in the summer of 2019, I had big plans for meetings, conferences, publications etc. However, a certain pandemic threw a wrench into many of my plans. For example, the joint SIAM/CAIMS conference 2020 had to move online, and it was one of the first large conferences that moved fully online. Quite a challenge and I thank everybody involved to make it such a success.

Despite pandemic, we have been able to further establish CAIMS as a venue for publications. We observe currently quite some changes in the developing scientific landscape, also influenced by COVID. It is important that CAIMS plays a role in that endeavour and ensures Applied Mathematics publications find a serious and reliable home. Let me elaborate on this a bit more:

• We have started the CMS/CAIMS-Springer book series, and I am grateful for the involvement of a strong editorial team. The CMS/CAIMS book series has now published the first volume. Several more volumes are under revision, and I encourage everybody to consider sending a book manuscript to CAIMS (or CMS).

• We have started a CAIMS blog on our website. This blog has helped members in COVID isolation to express their challenges and communicate society-relevant ideas. The use of this blog has slowed down quite a bit, but that is fine. It still exists as a more informal way of communication, and new contributions are always welcome.

• We started the new journal MSI (Mathematics in Science and Industry) and I am amazed by the enthusiasm and energy of my co-editor in chief, Ray Spiteri. I am glad to announce three new volumes, coming out around Christmas 2021 or in January 2022. These new volumes are mostly related to special issues and I
thank the special issue editors for their hard work: Special issue on Biochemical Problems, Mathematical Solutions, edited by Mark Roussell and Moises Santillan Zeron; an issue on Mathematics of signal processing in complex networks and systems, edited by Rio Sun; and an issue on COVID-19 modelling, edited by Morgan Craig, Rebecca Tyson, Huaiping Zhu and myself.

The scientific landscape is changing. We all are being contacted by journals to submit papers or to lead special issues. Some of these requests are serious, but many are from predatory journals. This is a direct result of the increased demand of publication venues. For each paper in a top journal there are 100eds of medium quality papers, and these want to be published as well. Hence mass-publishers develop, to harvest this need. Many scientists are getting quite concerned about predatory publishers, who publish anything if just the author fee is paid. Colleagues call out to professional societies to step up and lead quality-oriented publishing. This is exactly what we do with MSI and the CMS/CAIMS book series. I think we have a tremendous opportunity to show an alternative to fast throughput journals and promote values of quality and scientific rigor. But this does not come overnight, and it requires dedication of the Society and patience. It also requires good papers for MSI. Please continue to support our journal and submit a paper in the near future. A good journal for CAIMS will have a tremendous value in the coming years.

A particular challenge in the pandemic is the career development of young scientists. For this purpose we have started the CAIMS GAP connector. It is intended to connect new and coming researchers typically postdocs and senior PhD students) with established research groups. The student and/or postdoc lists their name, affiliation and interests on our GAP connector website, and senior researchers can browse those to invite speakers for seminars or conferences.

Again, it was and still is, a great pleasure to work with so many people at CAIMS. Thanks to all of you!

I wish all CAIMS members a Happy Holiday season. Joyeuses fêtes de fin d’année.

Thomas.
Board of Directors

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Minutes of the CAIMS•SCMAI Annual General Meeting
Tuesday, June 22, 2021 via zoom
organized by University of Waterloo, Waterloo

1. CAIMS•SCMAI President Thomas Hillen called the meeting to order at 12:30 PM ET.

2. Quorum was established.

3. The meeting was constituted. There were 24 members present at the start of the meeting. (Later raised to 27.)

4. Approval of the Minutes of the AGM of July 7, 2020:
   The minutes were circulated electronically to members with the Notice of Meeting ahead of time.
   Carried.

5. Business Arising From the Minutes:
   None.

6. Annual reports and Motions related to accounting:

   (4a) President
   The President, T. Hillen, started his report with an inclusion statement, that “CAIMS condemns all forms of racism and inequity and we are committed to be welcoming and supportive to all, without regard to race, religion, gender, or sexual orientation.” Also, a reminder to respect the histories, languages and cultures of First Nations, Métis, Inuit, and all First Peoples of Canada, whose presence continues to enrich our community.
   
   • Annual meetings
     2019 in Whistler BC
     2020 with SIAM online
     2021 online, University of Waterloo (Anita Layton, Brian Ingalls, Justin Wan)
     2022 is considered to be held in Kelowna, BC, at UBC-Okanagan
     2023 Some people expressed a wish to hold it in Quebec soon.
• MSI (Mathematics in Science and Industry)

The Mathematics for Science and Industry journal is advancing. The 2019 issue of MSI is online and paid for! It has 9 papers. There was no issue in 2020.
2021 special issue on Dynamics (Rio Sun), 3 accepted, 1 in revision
2021 special issue on Biochemical networks (Mark Roussel, 2 accepted, 3 in review
2021 special issue on COVID-19 (Hillen), 2 accepted, 2 in review (2 more promised)
2021 normal submissions: 2 accepted, 2 in review
2021 total: 9 accepted, 8 in review (and fully paid for)
We are always accepting new submissions for MSI.

• CMS/CAIMS Book Series

CMS/CAIMS Book No 1 is now out: A. Buttenschoen, T. Hillen, Non-local Cell Adhesion Models. A big thank you to our editors: Nilima Nigam (SFU) and Frithjof Lutscher (Ottawa), and three Associate Editors: Ben Adcock (SFU), Matt Davison (Western), and Ray Spiteri (Saskatchewan).

• CAIMS-blog

T. Hillen said that CAIMS has a blog, there are already 10 topics. Members wishing to initiate a blog should send e-mail to the President for approval.

• CAIMS/SCMAI GAP connector is now online. More details in the Communication Officer’s report.

• Activities with other Societies in 2020/2021

CAIMS collaborated with various organizations or universities, or participated in activities of other organizations, including PIMS (coronavirus modeling conf), BIRS, CRM and AARMS (career and innovation hub), Fields (lecture series, industrial prize), York U (CAIMS/SCMAI 2021), CMS (Books in Mathematics, combined institutional memberships), SIAM (2020 joint annual meeting), ICIAM (Ray Spiteri, Industrial Prize Cmt), ICM (Matt Davison)

• Approval of Election Results and new Board members

We had two candidates for next President-Elect: Huaiping Zhu, Sue Ann Campbell, with Sue Ann Campbell elected.
MOTION to appoint Sue Ann Campbell (Waterloo) for a two-year term as CAIMS
President-Elect: moved by T. Hillen, seconded by C. Christara, all in favour, carried.

Other three positions filled by acclamation:

Secretary: Christina Christara

MOTION to appoint Christina Christara (Toronto) as new CAIMS Secretary: moved by T. Hillen, seconded by R. Spiteri, all in favour, carried.

Communication Officer: Morgan Craig

MOTION to appoint Morgan Craig (Montreal) as new CAIMS Communication Officer: moved by T. Hillen, seconded by Sue Ann Campbell, all in favour, carried.

Board members: Alex Alvarez

MOTION to appoint Alex Alvarez (U Prince Edward Island) as new CAIMS Board member: moved by T. Hillen, seconded by C. Christara, all in favour, carried.

- Thanks to the outgoing Board members

T. Hillen thanked Matt Davison, for serving as CAIMS President-Elect, President and Past President, and for his leadership and vision for CAIMS. It was through his hard work and also Ray Spiteri’s that CAIMS found a modern online presence. Matt gave CAIMS a new face and new directions of growth.

Kathleen Wilkie, for serving as CAIMS Communication officer, ensuring a modern CAIMS online representation and keeping everything current. Thanks for input to the many different CAIMS activities, and for never saying "no" to strange requests for the website.

Jacques Bélair, for serving as CAIMS Secretary. His input and insight were greatly appreciated, and his leadership in the Communication Workshops was essential.

MOTION to accept the President’s report: moved by C. Christara, seconded by D. Aruliah, all in favour, carried.

(4b) President-Elect

The President-Elect, R. Tyson, presented her report.

- CAIMS Awards

All prizes except the Cecil Graham Doctoral Dissertation Award were awarded. The official announcement will be done towards the end of the AGM.
• Public communications workshop
During the year, CAIMS held a successful public communications workshop for applied mathematicians. The Treasurer, D. Iron, contributed by managing registrations and payments. R. Tyson intends to start a related blog post with ideas of incorporating public communication skills in supervisory work.

• Membership Committee and EDI
T. Hillen and R. Tyson proposed to expand the Membership committee to include EDI issues. There was discussion on whether CAIMS should have a separate EDI Cmt. The disadvantage is that CAIMS is a fairly small organization and it is difficult to find chairs/members for many committees.

MOTION to expand the Membership committee to include EDI: moved by R. Tyson, seconded by M. Davison, all in favour, carried.

• Next CAIMS conference/meeting
R. Tyson will lead the organization of next meeting in Kelowna, BC, at UBC-Okanagan. She aims for a hybrid meeting, with some people present in person and some remotely. Ideas about organization are welcome.

MOTION to accept the President-Elect’s report: moved by T. Hillen, seconded by C. Christara, all in favour, carried.

(4c) Treasurer
The Treasurer, David Iron, presented his report, which included the CAIMS financial statements, for the financial year ending on January 31, 2021, signed by a chartered professional accountant, authorized to practise public accounting (public accountant, PA).
Revenues: 5,405 on 31-01-2021 ( 92,441 on 31-01-2020)
Expenses: 15,576 on 31-01-2021 (112,329 on 31-01-2020)

Much of the excess of expenses over revenue comes from the cost of using a PA. D. Iron mentioned that, according to government regulations,
(https://www.ic.gc.ca/eic/site/cd-dgc.nsf/eng/cs05010.html#toc2)
when an association has gross annual revenues more than 50K, the financial statements must be signed by a PA, something that costs a considerable amount (e.g.
8K). If the revenues are 50K or less, then, if the members waive the appointment of a PA by annual unanimous resolution, then only a compilation is necessary and the cost of PA is saved. (Compilation is the process by which unaudited financial information is compiled to produce financial statements.) For the past year, we paid for a PA, but for this year, if we are at 50K or less, and if we pass the relevant motion at the AGM unanimously, we can waive the appointment of a PA.

MOTION to waive the appointment of a PA and only have a compilation of the financial statements, if the revenues of the current year are 50K or less: moved by D. Iron, seconded by C. Christara, all in favour, carried.

MOTION to accept the Treasurer’s report: moved by T. Hillen, seconded by C. Christara, all in favour, carried.

(4d) Communications Officer

The Communications Officer, K. Wilkie, presented her report. Activities include keeping the website up-to-date, handling news items (with some extra work during this year due to the secretary’s, Jacques Bélair, absence), blog posts, etc. Award nominations package distribution, and award plaques mailing were all completed. E-newsletter sent out regularly. Job opportunities posted.

A new google drive was created to house all CAIMS/SCMAI documents by the executive.

CAIMS/SCMAI has a YouTube channel, currently hosting lecture from applied analysis days (U Ottawa). New content welcome.

The CAIMS/SCMAI GAP Connector was started. This is an online listing of Ph.D. students and Postdoctoral Fellows working in Canadian Universities. It helps networking and exposure to the community.

There was discussion on whether Canadians abroad, who wish to return to Canada, should be included in the GAP Connector. There was positive feedback on this issue from the members. If the demand turns out to be too much to handle, then we can discuss ways to limit the number of applications.

MOTION to accept the Communication Officer’s report: moved by K. Wilkie, seconded by T. Hillen, all in favour, carried.
7. **Past-President’s greeting:**
   Matt Davison made a quick greeting to the members.

8. **Announcement of 2021 CAIMS/SCMAI Award winners:**
   R. Tyson made the official announcement of this year’s awards.
   - 2021 CAIMS/SCMAI Research Prize: Professor David Earn (McMaster)
   - 2021 CAIMS/SCMAI-Fields Industrial Mathematics Prize: Professor Nilima Nigam (SFU)
   - 2021 CAIMS/SCMAI-PIMS Early Career Award: Professor Brendan Pass (U Alberta)
   - 2021 Arthur Beaumont Distinguished Service Award: Professor James Colliander (UBC)

9. **Termination of the Meeting**
   MOTION to close the meeting (1:45 PM): moved R. Tyson, seconded by C. Christie, all in favour, carried.
Committee Membership

1. Cecil Graham Doctoral Dissertation Award Committee:
   Matthew Betti (Mount Allison, chair), Yana Nec (Thompson Rivers), Chun-Hua Ou (Memorial), Pouria Ramazi (Alberta), Tanya Schmah (Ottawa).

2. Arthur Beaumont Distinguished Service Award Committee:
   Lucy Campbell (Carleton, chair), James Colliander (UBC), Gail Wolkowicz (McMaster).

3. CAIMS Research Prize Committee:
   Jimmy Garnier (Savoie Mont-Blanc), Rachel Kuske (Georgia Tech), Anita Layton (Waterloo), Steven Ruuth (SFU, chair), Xinfu Zou (Western).

4. CAIMS-PIMS Early Career Award in Applied Mathematics:
   Ben Adcock (SFU) Bahman Gharesifard (Queen’s, chair), Jean-Philippe Lessard (McGill), Stephanie Portet (Manitoba), Weirun Sun (SFU).

5. CAIMS-Fields Industrial Mathematics Prize:
   James Feng (UBC), Roderick Melnik (Wilfrid Laurier), Kumar Murti (Chair, Toronto, Fields), Catherine Sulem (Toronto), Brian Wetton (UBC, chair).

6. EDI and Membership Committee:
   Amy Hurford (Chair, Memorial), Alexander Bihlo (Memorial), Christina Christara (Toronto), Colin Macdonald (UBC), Rebecca Tyson (UBC-Okanagan).

7. CAIMS 2021 Scientific Committee:
   Rebecca Tyson (UBC-Okanagan, general chair), Eric Foxall, Warren Hare, Bruce Shepherd, John Stockie.
Report on CAIMS · SCMAI 2021

by Brian Ingalls, Anita Layton, and Justin Wan

The 2021 Annual Meeting, held remotely, was anything but typical. When we began planning the event in June 2020 we made preliminary arrangements an in-person event. Luckily, we abandoned those plans within a few weeks. In hindsight, it seems naive to have even considered the possibility.

The on-line event, held June 21-24, followed the usual Annual Meeting scheme, with session plenaries by Ben Adcock, Peter Caines, Arup Chakraborty, Stefanie Jegelka, Kees Oosterlee, and Hansi Singh, as well as prize speakers for 2021 and some for 2020. (Some prize lectures from the 2020 Annual Meeting held jointly with SIAM were postponed due to the pandemic.) It featured talks on six scientific themes, namely, Mathematical Biology, Dynamical System/Control Theory, Financial Mathematics, Scientific Computing, Fluid Dynamics/Climate, and Data Science/Machine Learning.

The online format certainly has drawbacks, but it did allow a broad participation of speakers, attendees, and poster presenters (including our poster award winners!), and provided freedom to invite far-flung speakers for the panel discussions on Industry and Mathematics, Equity, Diversity and Inclusion in Mathematics, and Indigenization of Mathematics.

Despite the obstacles presented by the pandemic, we hope the participants found the meeting useful, and that this first on-line Annual Meeting experience will be of value in planning future CAIMS events.

Brian Ingalls, Anita Layton, Justin Wan
2021 CAIMS Annual Meeting organizers
University of Waterloo
2021 Arthur-Beaumont Distinguished Service Award

The Arthur Beaumont Distinguished Service Award honours members of CAIMS•SCMAI for outstanding service to the society or to Applied Mathematics in Canada. The award is named after its first recipient, and was initiated as a means to honour Arthur for his years of unselfish service to the society.

This award is given to Prof. James Colliander in recognition of outstanding service to applied and industrial mathematics at many levels in Canada. He has been PIMS Director since 2016 and has shown extraordinary leadership and ability to act on emerging opportunities in data science and scientific computing. He developed Syzygy, a cloud hosted platform that is used by Universities in Canada and the USA. Based on this, Callysto was developed for school grades 5-12 that is now widely used in classrooms, and Jupyter that is used by faculty and students to share research work. Dr. Colliander also organised bc-data events, and a workshop Math to Power Industry to connect students and faculty with industrial partners. His efforts have resulted in a better computational infrastructure for applied and industrial mathematicians in Canada as well as increased access to computational resources for educators at all levels, from K-12 to postsecondary.

2021 CAIMS-Fields Industrial Mathematics Prize

The CAIMS-Fields Industrial Mathematics Prize is awarded to a researcher in recognition of exceptional research in any branch of industrial mathematics, interpreted broadly, and conducted primarily in Canada.

In 2021, the CAIMS-Fields Industrial Mathematics Prize is awarded to Prof. Nilima Nigam for her many broad-ranging contributions to the discipline of industrial mathematics. Her recent interdisciplinary research is ground-breaking and demonstrates how theoretical results can have a major impact on the development of new mathematical models. Dr. Nigam has also provided outstanding national leadership as a vocal, effective and selfless advocate for the industrial mathematics community.
2021 CAIMS-PIMS Early Career Award in Applied Mathematics

The CAIMS-PIMS Early Career Award is given to a researcher less than ten years past the date of Ph.D. at the time of nomination. The prize recognizes exceptional research in any branch of applied mathematics, interpreted broadly. The nominee’s research should have been conducted primarily in Canada or in affiliation with a Canadian university.

The 2021 CAIMS-PIMS Early Career Award in Applied Mathematics was awarded to Prof. Brendan Pass of the University of Alberta in recognition of his contributions to the study of optimal transport problems. In particular, Dr. Pass has worked on multi-marginal optimal transport problems, Wasserstein barycenters, and optimal transportation between unequal dimensions. These problems have many applications including in economics, physics, and quantum chemistry.

2021 CAIMS・SCMAI Research Prize

The CAIMS・SCMAI Research Award is the society’s preeminent research award, established to recognize innovative and exceptional research contributions in an emerging area of applied or industrial mathematics.

The 2021 Research Prize was awarded to Prof. David Earn of McMaster University. The award is given in recognition of his outstanding contributions to the mathematical epidemiology of infectious diseases. His work and digitization efforts have had and will continue to have incredible impact in epidemiology, applied mathematics, and beyond.
CAIMS·SCMAI 2022 Election: Call for Nominations

by Christina Christara

CAIMS·SCMAI will be holding an election in March or April 2022 for:

- Four Member-at-Large positions on the Board of Directors
- Treasurer

The member-at-large positions are normally for a three-year term. However, there is the choice for two of them to be for a two-year term. The current incumbents are also eligible to apply. The Treasurer appointment is for a three-year term, and current Treasurer, David Iron, is willing to continue in this role.

All members of CAIMS·SCMAI are invited to put forward names of candidates for these offices. Nominations should reach the CAIMS Secretary, Christina Christara (secretary@caims.ca) by January 31, 2022.
Many academic and non-academic organizations have suffered extreme disruption to their operations due to the COVID-19 pandemic. AARMS is absolutely no exception to this. Most of the signature in-person events we usually organize had to be cancelled in 2020 and 2021; including the 2020 AARMS Industrial Problem Solving Workshop, the 2020 and 2021 Annual Summer Schools, and the 2020 and 2021 Girl Guides All SySTEMs Go events. In addition, almost all of the outreach initiatives, conferences, and workshops for which AARMS had committed support did not happen. However, despite these unfortunate modifications to our normal activities, there have been many important recent positive developments for AARMS:

• The most consequential recent news for AARMS was our successful application for Bridging funding from NSERC’s new Discovery Institutes Support (DIS) program. With this award, AARMS will at long last have access to direct funding from the federal government. The grant will provide an additional approximate $280,000 to utilize in the 2021-22 fiscal year (an approximately 300% increase in federal funding). We hope NSERC’s new direct funding of AARMS will be renewed with a 5-year commitment in the full DIS competition in Fall of 2021.

• The AARMS Summer School had to be cancelled in 2020 and 2021 due to the COVID-19 pandemic. To compensate, AARMS created a new Advanced Course program that allows graduate and upper year undergraduate students to participate virtually in courses offered at AARMS Member universities. This
program greatly enhances the access of students in the region to specialized education in cutting edge mathematical sciences topics.

- The COVID-19 pandemic has resulted in high interest from the community in online-only scientific interactions. AARMS has responded by providing essential infrastructure to our members to host several new virtual seminar series in 2020-21 such as the Atlantic Graph Theory Seminar, the Atlantic General Relativity Seminar, the AARMS Scientific Machine Learning Seminar, the AARMS COVID-19 Seminar, the Dalhousie-AARMS Analysis- Applied Math-Physics Seminar, and the AARMS Summer Math Kitchen Party series.

- We recently doubled our support of the highly successful “Connect Math to our Lives and Communities” indigenous and African Nova Scotian community visit program to $20,000 per year.

- The AARMS Industrial Problem Solving Workshop (IPSW) was cancelled in 2020 due to COVID, but came back in a highly successful online format in 2021. The IPSW featured four problems from companies and governments, and involved over 50 participants over two weeks in midsummer. We fully expect the IPSW to result in multiple new funded research collaborations in Atlantic Canada.

- Largely due to the increased funding from the NSERC DIS program, AARMS will support a record number of new postdocs in the 2021-22 academic year. The research areas of these seven highly talented young researchers include mathematical physics, combinatorics, partial differential equations, algebraic geometry, number theory, and relativity and gravitation. As indicated in our DIS proposal, postdoctoral support has been increased from $17,500 to $25,000 per year.

- Canada’s four regional Mathematical Science institutes (AARMS, CRM, Fields and PIMS) have recently collaborated (with many co-applicants) on a substantial new $3M grant from NSERC to further expand emerging infectious disease research entitled “Mathematics for Public Health”.

- Using increased funding from NSERC we have funded a record number of new Collaborative Research Groups from our 2021 competition:
  
  – Developing general dynamic modelling systems and spatiotemporal models for omics data, Administered by Hong Gu, (Dalhousie)
– Graph Searching in Atlantic Canada, Administered by Danielle Cox, (MSVU)
– Groups, Rings, Lie and Hopf Algebras, Administered by Yorck Sommerhäuser (MUN)
– Mathematical foundations and applications of Scientific Machine Learning, Administered by Alexander Bihlo (MUN)
– Numerical Solution of Geophysical Inverse Problems, Administered by Peter Lelièvre, (MTA)

• We have launched a new graduate student scholarship program and are in the process of creating a doctoral thesis award.

Finally, Sanjeev Seahra started a second term as the Director of AARMS on July 1, 2021.
News from the Centre de recherches mathématiques

by Alexandre Girouard

This is a report on activities at the CRM from winter 2020 to fall 2021. This was a particularly intense period at the CRM, not only scientifically, but also in terms of adaptation to the covid-19 pandemic and administrative transformation: in July 2021, Octav Cornea (Université de Montréal) became the new director of the CRM. He succeeded Luc Vinet (Université de Montréal) who was director since 2013. At the same time Alexandre Girouard (Université Laval) was nominated as deputy director for scientific activities, succeeding Jean-Philippe Lessard (McGill).

The thematic semesters are among the most important activities to take place at the CRM. The thematic semester on *The mathematics of decision making* was supposed to take place from January to June 2020. It started as planned in January 2020, with a first Aisenstadt lecture by Éva Tardos (Cornell University). It was followed by the conference on *Voting systems* in February. The rest of the thematic semester was moved to the fall 2021, with *Optimization under uncertainty* in September and *Agents behaviour in combinatorial game theory* in November. The semester will be concluded by a second Aisenstadt Chair lecture by Éva Tardos in January 2022. The thematic semester on *Number theory - cohomology and arithmetic* took place during the fall 2020 semester, with a Workshop on *Serre weights conjectures and geometry of Shimura varieties* and a conference on *p-adic L-functions and Euler systems in September*, a conference on *Arithmetic quotients and locally symmetric spaces and their cohomology* in October and a conference on *Higher Coleman theory and applications* in December, and many more activities. Two Aisenstadt chairs lecture series were also given by Wieslawa Niziol (Sorbonne) and Nicolas Bergeron (ENS Paris). The next thematic semesters are *Probability and PDEs* from January to May 2022 and *Symmetries: algebras and physics* from May to December 2022.

The activities of the general program are too numerous to list with full details. They included the following events in 2020: CANBAN workshops, *Regional conference in Lie theory, Montreal AI and Neuroscience, Hodge theory, period mappings and local system*. The following took place in 2021: *Differential geometry and global analysis, Computational modelling of cancer biology and treatments, Group theoretical methods in physics, workshop on Special geometries on Riemannian manifolds*.
In the fall 2020, the Nirenberg lectures in geometric analysis welcomed mini-courses by Antoine Song (Berkeley) and Yevgeny Liokumovich (University of Toronto) and, in the fall 2021, by Yuansi Chen (Duke University) and Bo’az Klartag (Weizmann Institute of Sciences). The interdisciplinary and industrial program hosted the 10th and 11th Montreal industrial problem-solving workshop in August 2020 and August 2021. For the younger generation of mathematicians, several schools and conferences were also organized, including the SMS 2020 summer school on Discrete probability, physics and algorithms, which was organized in collaboration with FIELDS and PIMS; the inaugural École Langlands, the SMS 2021 summer school Microlocal analysis: theory and applications, the CRM-PIMS probability summer school, a school on Solving large systems efficiently in multiphysics numerical simulations, and another one on Nonlinear Dynamics for the Life Sciences with Applications to Neuroscience and Psychology.

Apart from these captivating programs, we welcomed a variety of public lectures in the context of the Grandes conférences publiques lecture series. In February 2021, François Bergeron (UQAM) presented Bach et les mathématiques de la fugue, and, in March 2021, the conference Mathematics for a better world was hosted at the CRM, with talks by Yvan Saint-Aubin (Université de Montréal), Christian Genest (McGill) and Christiane Rousseau (Université de Montréal). In May 2021, Mary Lou Zeeman (Bowdoin College) presented Harnessing math to demystify tipping points on the occasion of the 24 heures des sciences provincial initiative. Finally, in October 2021 Yoshua Bengio lectured on Intelligence artificielle: entre généraliser et comprendre. The program will resume in the winter 2022 semester with talks by Francis Su (Harvey Mudd College) and Frédéric Goudeau (Université Laval).

The Equity, diversity and inclusion (EDI) committee was launched in September 2020. It participated in the development of the CRM EDI statement and the organization of some activities: the workshop Women in mathematics during the time of covid in March 2021; an EDI-Colloquium by Melania Alvarez (PIMS) on Narrowing the gap: addressing mathematical inequity in indigenous education on the occasion of the National indigenous peoples day (June 21, 2021).

The prize winners were the following: the 2020 CRM-Fields-PIMS prize recipient was Catherine Sulem (University of Toronto); the 2020 André-Aisenstadt prize went ex aequo to Robert Haslhofer (University of Toronto) and Egor Shelukhin (Université de Montréal); the 2021 André-Aisenstadt prize went ex aequo to Giulio Tiozzo (University of Toronto) and Tristan Collins (MIT); the 2021 CRM-Fields-PIMS win-
ner was Andrew Granville (Université de Montréal); the 2021 CAP-CRM prize went to Robert Raussendorf (UBC), the inaugural CRM-ISM-AMQ prize was awarded to Francesco Amoroso and Sinnou David, and the 2022 CRM-Fields-PIMS prize went to Bálint Virág (University of Toronto).

Of course the covid-19 pandemic had a major impact starting in March 2020. Nevertheless, many of our workshops, conferences and seminars were quickly transformed to become virtual events. In the wake of this initial transformation, major efforts were undertaken to move to the hybrid mode, which is now the main paradigm for events at the CRM. The CRM is now performing both virtually and in hybrid mode seamlessly.

The CRM new website will be up and running in a few weeks. For more information on the overall programs at the CRM, please visit:

http://www.crm.umontreal.ca
News from the Fields Institute

by Jordana Feldman and Miriam Schoeman

The Fields Institute is now in our second year of delivering virtual programming. At first, the shift to online was a necessity; however, one of the most frequent bits of feedback we’ve received over the past two years is how grateful many of our community members are to be able to attend Fields programs that would otherwise be inaccessible due to travel, health or budget constraints.

As we consider our approach to reopening (hopefully) in the Spring of 2022, we have learned that investment in a high-quality hybrid model, meaning some participants in the room and many more online, is a path worth exploring beyond the pandemic. A hybrid model will allow the Institute to continue to benefit from the boost in participation afforded by offering programs online, while also allowing those who are here in person to engage in deeper collaborations.

Thanks to the hard work of our staff and the flexibility of our invited speakers, Fields recorded the highest participation levels in the Institute’s history, with over 10,000 registrants tuning in from 67 countries. A select list of the past year’s programs, events, public lectures and workshops can be found below.

Our Thematic and Focus Programs are among the Institute’s most substantial core programs, each running between three and six months in length (Thematic) and several weeks (Focus). Extended programs can run an entire calendar year. They feature a mix of courses, workshops and long-term visitors based on the approved theme and include Postdoctoral Fellows (PDFs) and senior researchers.

In 2020 and 2021, we ran the following Thematic and Focus programs:

• Thematic Program on Trends in Pure and Applied Model Theory
  July 1, 2021  December 31, 2021
  Organizing Committee: Deirdre Haskell, François Loeser, David Marker, Rahim Moosa, Thomas Scanlon, Caroline Terry

• Thematic Program on Geometric Constraint Systems, Framework Rigidity, and Distance Geometry
  January 1, 2021  June 30, 2021
  Organizing Committee: Tony Nixon, Pablo Parrilo, Meera Sitharam, Walter Whiteley, Henry Wolkowicz
• Thematic Program on Mathematical Hydrodynamics  
July 1, 2020 December 31, 2020  
Organizing committee: Almut Burchard, Alexandru Ionescu, Robert Jerrard, Fabio Pusateri, Catherine Sulem

• Fields-CQAM Thematic Program on Integrative Modelling of Emerging Infectious Disease Outbreaks  
May 10, 2021 June 30, 2021  
Organizing Committee: Kumar Murty, Jianhong Wu, Henri Berestycki

• Focus Program on Systemic Recovery: Lessons from Covid-19 modelling, analysis and policy implications  
April 5, 2021 May 11, 2021  
Organizing Committee: Matheus Grasselli, Angus Armstrong, William Hynes, Alan Kirman

• Focus Program on Analytic Function Spaces and their Applications  
July 1, 2021 December 31, 2021  
Organizing Committee: Ilia Binder, Damir Kinzebulatov, Javad Mashreghi

Our General Scientific Activities run the gamut from Seminars to Workshops to Public Events. We organized 24 Seminar Series, more than 60 Workshops, Public Lectures, and Outreach programs and several Town Halls.

Seminar Series

• Algebraic Combinatorics Seminar, Organizing committee: Nantel Bergeron
• Applied Mathematics Colloquium, Organizing committee: Robert McCann, Adrian Nachman, Fabio Pusateri, Catherine Sulem, Ting Kam Leonard Wong
• ArtSci Salon, Organizing committee: Roberta Buiani, Stephen Morris, Joel Ong
• Blockchain Research Seminar, Organizing committee: Henry Kim, Andreas Park, Andreas Veneris
• Colloquium on Analytic Function Spaces and their Applications, Organizing Committee: Javad Mashreghi
• Colloquium on Mathematics for Public Health, Organizing Committee: Sarah Nayani
• Fields Number Theory Seminar, Organizing committee: Kumar Murty, Payman Eskandari
• Fields Postdoc Colloquium, Organizing Committee: Deirdre Haskell
• GANITA Seminar, Organizing committee: Kumar Murty, Debanjana Kundu
• Geometric Analysis Colloquium, Organizing committee: Spyros Alexakis, Robert Haslhofer, Spiro Karigiannis, et al.
• Geometric Representation Theory Seminar, Organizing committee: Marco Gualtieri, Maxence Mayrand
• Geometry and Model Theory Seminar, Organizing committee: Patrick Speissegger
• Hydrodynamics Seminar, Organizing committee: Almut Burchard, Alexandru Ionescu, Robert Jerrard, Fabio Pusateri, Catherine Sulem
• Machine Learning Advances and Applications Seminar, Organizing committee: Erin Yoxall
• Mathematics and COVID-19 Lecture Series, Organizing committee: Huaiping Zhu
• MfPH Next Generation Seminar Series, Organizing Committee: Leila Amiri, Jummy David, Martin Grunnill, Ao Li, Zahra Mohammadi
• Model Theory Seminar, Organizing Committee: Christian d’Elbée, Esther Elbaz Saban
• Operator Algebra Seminar, Organizing Committee: George Elliott
• Optimization: Theory, Algorithms, Applications Lecture Series, Organizing Committee: Jochen Koenemann, Walaa Moursi, Chloe Potovszky Emma Watson, Henry Wolkowicz
• Quantitative Finance Seminar, Organizing committee: Matheus Grasselli, Thomas Hurd, Sebastian Jaimungal, Adam Metzler, Dan Rosen, Tom Salisbury
• Quantum Information Seminar, Organizing committee: Paul Brumer, Amr Helmy, Helen Iyer, Dvira Segal, Aephraim Steinberg
• Set Theory Seminar, Organizing committee: Ilijas Farah, Ivan Ongay Valverde et al.
• Thematic Program Research Seminar, Organizing committee: Daniel Bernstein, Alexander Heaton
• Western-Fields Seminar Series in Networks, Random Graphs, and Neuroscience, Organizing committee: Jan Minac, Lyle Muller
Workshops and Conferences

- Closing Session of the Fields CQAM Thematic Program on Integrative Modelling of Emerging Infectious Disease Outbreaks
- 30th Biennial Symposium on Communications 2021
- Queer and Trans Mathematicians in Combinatorics Conference
- Workshop on Real Algebraic Geometry and Algorithms for Geometric Constraint Systems
- Mini-symposium on Low-Rank Models and Applications
- The Ninth Canadian Statistics Student Conference
- 25th Ontario Combinatorics Workshop
- Connecting Women in Mathematics Across Canada 2021
- The 49th Canadian Operator Symposium
- Western Canada Linear Algebra Meeting 2021
- Atlantic General Relativity Meeting 2021
- Mini-symposium on Sensor Network Localization and Dynamical Distance Geometry
- Systemic Resilience: What is it, and how can it be enhanced?
- Workshop on Distance Geometry, Semidefinite Programming and Applications
- Opening Session of the Fields CQAM Thematic Program on Integrative Modelling of Emerging Infectious Disease Outbreaks
- Finance Conference in Honour of Phelim Boyle
- Finance Workshop and Industry Panel in Honour of Phelim Boyle
- Symposium on Systemic Recovery
- Statistics Graduate Student Research Day 2021
- Workshop on the Geometry of Circle Packings
- Mini-symposium on Materials and Periodicity
- Workshop on Progress and Open Problems in Rigidity Theory
- Mathematical Institutes Open House
- 2020 Canadian Mathematical Society (CMS) Winter Meeting
- Quantitative Finance Career Day - How I Became a Quant
- Workshop on Link Homology and Concordance
• Workshop on Vortex Filaments
• Workshop on Free Surface Hydrodynamics
• Mini-school on Free Surface Hydrodynamics
• Workshop on Mean Field Games on Networks
• Mini-course and Workshop on Blaschke Products and Inner Functions
• Mini-course and Workshop on Truncated Toeplitz Operators
• Mini-course and Workshop on Operators on Function Spaces
• Mini-course and Workshop on de Branges-Rovnyak Spaces
• Fields-CFI Bootcamp on Machine Learning for Quantitative Finance
• Mini-course and Workshop on Bounded Mean Oscillation
• Cyclic Cohomology at 40: achievements and future prospects
• Mini-course and Workshop on Riesz Bases, Frames, Signal Processing
• Mini-course and Workshop on Interpolation and Sampling
• Workshop on Algebraic Graph Theory and Quantum Information
• Algorithms and Data Structures Symposium (WADS) & Canadian Conference on Computational Geometry (CCCG)
• Quantitative Systems Pharmacology Approaches to Problems in the Pharmaceutical Industry
• Mini-course and Workshop on Model Spaces
• Workshop on Trends in Pure and Applied Model Theory
• Mini-course and Workshop on Bergman Spaces
• Computational Complexity Conference (CCC2021)
• Fields-CFI-CQAM Industrial Problem-Solving Workshop 2021
• Mini-course and Workshop on Dirichlet Spaces
• Séminaire de Mathématiques Supérieures on Periodic and Ergodic Spectral Problems
• Symposium on Geometry Processing (SGP)
• 2021 Canadian Undergraduate Mathematics Conference
• Mini-course and Workshop on Hardy Spaces
• IWOCA 2021 - 32nd International Workshop on Combinatorial Algorithms
• Fields CQAM Extended Problem Solving Workshop on Data Science and Analytics
• Theta Series: Representation Theory, Geometry, and Arithmetic

Outreach Activity is a fulmination of the Institute’s efforts to create mathematics programming intended for a broader, more inclusive audience. The 2020-2021 year saw Fields expand our programming to include events such as:

• Ask a Mathematician
• Fields Trips
• LGBTQ+Math Day
• Math Horizons Day
• MathEd Forums
• Mathematical Institutes Open House

Fields Academy
This is a rich group of activities that includes shared graduate courses, and upskilling programs that give graduates with strong quantitative skills a pathway from academia to industry. We are now in our third cohort of our Accelerated Cybersecurity program, with almost 30 alumni placed in top-tier jobs at major companies. Academy also houses the established Fields Undergraduate Summer Research Program, which brings undergraduates together to explore real mathematics problems, and a new K-12 mathematics program that involves teacher training and classroom outreach.

• Shared Graduate Courses
• Accelerated Cybersecurity Training Program (in partnership with Palette Skills)
• FUSRP 2021

Mathematics for Public Health (MfPH)
Another new initiative we launched this past year is the Mathematics for Public Health (MfPH) network. MfPH is a national network led by the Fields Institute in partnership with the other Canadian mathematics institutes. The projects connect 50+ researchers working on 11 projects relating to emerging infectious disease. It is supported by a $3M grant from the Natural Sciences and Engineering Research Council (Federal Government of Canada) and the Public Health Agency of Canada (Federal Government of Canada). The network grew out of our Mathematical Modelling of COVID-19 Task Force, which mobilized early in the pandemic to provide mathematical modelling recommendations to the provincial government on key public health initiatives and organized a series of lectures and seminars to provide information to
the public from leading epidemiologists, clinicians and math modellers working on the front lines.

We held a successful kickoff in June with a special lecture by Henri Berestycki. Other programming has included a day-long Workshop on Modelling Immunity, as well the Colloquium on Mathematics for Public Health, as ongoing seminars that take place every Tuesday from September 7 December 14. Finally, we are also running a Next Generation Seminar Series on Wednesdays for early career scholars, which runs through the end of June 2022.

Fields Medal Symposium
From October 25-29, 2021 the Institute hosted the second online Fields Medal Symposium honouring Peter Scholze, a 2018 Medalist. The scientific organizing committee created a compelling program of 14 talks with speakers from Europe and North America.

Additional Special Lectures

- What the Numbers Say: Your Pandemic Questions Answered by Scientists (4)
- Home Advantage: How Early Supports Help Girls and Women Thrive in Mathematics
- Special Lecture in Honor of Angus Macintyre’s 80th birthday
- Special Lectures in Honor of Anand Pillay’s 70th birthday
The Pacific Institute for the Mathematical Sciences (PIMS) not only continued its activities, but tried to make the difficult situation created by the pandemic an opportunity to support the collaboration of researchers in remote settings.

During the summer of 2021, a new Interim Director, Prof. Jayadev Athreya, and a new Interim Deputy Director, Prof. Özgür Yilmaz, were appointed.

During the 2020-2021 year, PIMS hosted five Collaborative Research Groups (CRGs), and continued the conferences, workshops, lectures and seminar series. In the summers of 2020 and 2021, PIMS hosted the Diversity in Math Summer School, and several other education and outreach activities. PIMS also offered the Math to power Industry workshop that connects young mathematicians to important industry sectors in Canada.

PIMS collaborated again with CAIMS to offer the CAIMS-PIMS Early Career Award. In 2020, the prize was awarded to Prof. Jun Liu of the University of Waterloo. In 2021, the prize was awarded to Prof. Brendan Pass of the University of Alberta.

Furthermore, PIMS took the initiative to start new online programs, graduate courses, seminar and colloquium series.

The outlook seems exciting too. Read more in the complete version of the PIMS report following.
News and Highlights from Pacific Institute for the Mathematical Sciences

PIMS supports a wide range of activities in research, non-academic collaborations, education, and outreach in the mathematical sciences. This includes workshops, conferences, distinguished lecture series, a postdoctoral program, industrial innovations, Collaborative Research Groups, and more. These activities take place at our ten-member sites: University of British Columbia, Simon Fraser University, University of Victoria, University of Calgary, University of Alberta, University of Lethbridge, University of Regina, University of Saskatchewan, University of Manitoba and University of Washington.

PIMS activities are funded by the member universities, by the Natural Sciences and Engineering Research Council of Canada (NSERC), and private donors. We strongly believe that equity, diversity and inclusion strengthen the mathematical community by increasing the impact and relevance of research; widening the pool of qualified potential participants; and enhancing the integrity of the programs. The programs and groups we support promote and develop a rich research community, accessible to every member of our network.

While the pandemic had a slowing effect in 2020 and 2021, many of our activities thrived, leveraging the distributed nature of PIMS. We took this as an opportunity to support the need for researchers to collaborate exclusively in a remote setting. As new initiatives emerged, we were pleased to offer our expertise and support to ensure research in the mathematical sciences could move forward in a collaborative manner.

PIMS News

In the summer of 2021 PIMS made two key leadership appointments at the institute—Prof. Jayadev Athreya as the Interim Director, and Prof. Özgür Yılmaz, as the interim Deputy Director.

Jayadev Athreya is a Professor of Mathematics and the Comparative History of Ideas at the University of Washington, and the founder of the Washington Experimental Mathematics Lab. Athreya completed his Ph.D. at the University of Chicago, took on postdoctoral fellowships at Yale and Princeton, and was previously at the University of Illinois before moving to the University of Washington. He has held visiting positions in the UK, France, and India. Much of his research is in geometry, dynamical systems, and the creative processes of mathematics.

Özgür Yılmaz is a Professor of Mathematics at the University of British Columbia. His research focuses on the mathematics of information and data. He received his PhD in Applied and Computational Mathematics from Princeton University in 2001. He held a postdoctoral position at University of Maryland, College Park before joining UBC in 2004.
2020-2021 PIMS Scientific Highlights

At the core of PIMS activities are the Collaborative Research Groups, which bring together researchers across many universities to focus on particular topics with funding for conferences, workshops and support of highly qualified personnel, including postdoctoral fellows. In 2020 - 2021 PIMS hosted five CRGs in the research areas below:

- High Dimensional Data Analysis
- Quantum Topology and Its Applications
- Novel Techniques in low Dimension
- Movement and Symmetry in Graphs
- Pacific Interdisciplinary Hub on Optimal Transport

PIMS supports a large number of postdoctoral fellows, through matching funding with the ten university sites that make up the PIMS distributed network. These include regular postdoctoral fellowships and the CNRS/PIMS fellowship (which brings in young researchers from France to work with research groups in the PIMS network). We had 15 scholars in our 2020 cohort and 19 in 2021.

Some of our 2020 - 2021 PIMS conferences and workshops include those connected to the CRGs, ongoing lecture and seminar series, as well as individual events such as:

- Pacific Dynamics Seminar
- Women in Mathematics Day: Movie & Panel Discussion- Picture a Scientist
- PIMS EDI Panel: Effective Allyship in STEM
- Workshop on New Trends in Localized Patterns in PDEs
- Workshop on Mean Field Games on Networks

Speakers to these events logged in from around the world and include everyone from graduate students to leading international researchers. A shared highlight was the 2020 CAIMS - PIMS Coronavirus Modelling Conference in July 2020-. Over the course of the 3 days, 25 speakers and 125 attendees came together to exchange ideas and learn from each other. Using digital infrastructure, researchers were able to understand and manage the epidemiology of the disease and the in-host dynamics of COVID-19 through mathematical modelling. The conference facilitated the exchange of data and expertise in addition to connecting researchers with the public and government. It was co-organized by Dr. Thomas Hillen (UAlberta), Dr. Daniel Coombs (UBC) and Dr. Morgan Craig, (UMontreal & CRM)

In 2020 and 2021 PIMS hosted the Diversity in Math Summer School, a multi-year, multi-level program geared towards promoting diversity and inclusivity in STEM. These summer programs were hosted online with a focus on undergraduate women in math and high school students

- 2020 DiM: 2-Week online program
  - Stream 1: An interactive online math day camp for grade 11 – 12 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.
Stream 2: 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.

A creative forum for mentorship and leadership at all levels, where the undergraduate participants learn to serve as mentors for their younger counterparts.

2021 DIM Program: 1-week Online program

Stream 1: An interactive math day camp for high school students in grade 10 - 12 where higher-level math topics, such as that are not part of regular school curricula are explored.

Stream 2: An interactive math day camp for grade 9 - 10 Indigenous students transitioning into the precalculus stream of math courses in high school. Students spent the mornings mastering essential mathematical understandings and critical-thinking skills necessary to succeed in high school. During the afternoon students explored applications of mathematics with integrated Indigenous knowledge.

PIMS Education Highlights
Many of our PIMS education activities including our Summer Schools, Public Lectures and Distinguished Speakers were moved online during the past 18 months. The annual Emerging Indigenous Scholars Summer Camp ran online for both 2020 and 2021 summers. These were held in partnership with Langara College and Simon Fraser University. In 2021, elementary school math teachers from districts all over BC met with PIMS Education Coordinator, Melania Alvarez, and UWaterloo Lecturer, Cameron Morland to practice various exercises, share ideas and watch videos that would get their students inspired to learn mathematics.

PIMS Industrial Activities Highlights
PIMS and our partners have offered the Math^Industry (read as Math to power Industry) workshop every August for the past two years. This workshop trains young mathematical scientists for jobs in important industry sectors in Canada. The program begins with a training bootcamp (software best practices,
business and communications, project management) and includes group collaborations with industry partners and academic mentors. [https://m2pi.ca/](https://m2pi.ca/)

In partnership with BIRS and Hackhub, PIMS hosted the a 3-day data science focused event that provided students an opportunity to interact with employers and industry leaders through virtual programs, showcase their skill in a data science focused hackathon, and attend workshops with a practical focus on today’s data science job market. More industry-focused courses and programs will be forthcoming in the new year.

2020 and 2021 CAIMS - PIMS Early Career Award

The Early Career Award, presented jointly with CAIMS, was awarded in 2020 to Prof Jun Liu at the University of Waterloo and in 2021 to Prof. Brendan Pass of the University of Alberta.

Prof. Jun Liu has made contributions to mathematical control theory for cyber-physical systems, using innovative approaches that combine theoretical depth and computational analysis, applied to problems that are of practical importance.

Prof. Brendan Pass has worked on multi-marginal optimal transport problems, Wasserstein barycenters, and optimal transportation between unequal dimensions. These problems have many applications including in economics, physics, and quantum chemistry. Prof. Pass is one of the organizers of the PIMS Collaborative Research Group Pacific Interdisciplinary Hub on Optimal Transport (PIHOT)

New Online Programs

The PIMS Network-wide graduate courses utilized our network to deliver high-level graduate courses online. This inclusive program enabled students from diverse backgrounds to access courses that might not otherwise be available to them. It also helped instructors increase the viability of their course which can be important in their professional development and in building their research community. Students were able to receive graduate credit through the Western Deans’ Agreement (WDA). PIMS offered 14 network-wide courses in 2020–21 and will offer 10 courses in 2021–22.

The Emergent Research PDF seminar series, provides a network-wide platform for PIMS postdoctoral scholars to disseminate their research and foster new interactions with researchers at other sites.
Seminars will take place bi-monthly in the 2021/22 academic year. The schedule of talks is available online at [https://www.pims.math.ca/scientific/PIMSPDF](https://www.pims.math.ca/scientific/PIMSPDF).

The **PIMS Network Wide Colloquium** featured talks by distinguished researchers including PIMS PDF Ben Green (now Wayneflete Professor of Pure Mathematics at Oxford; winner of the Clay Research Award, the Salem Prize, and the Sylvester Medal of the Royal Society), Lauren Williams (Dwight Parker Robinson Professor of Mathematics at Harvard University), John Baez (UC, Riverside). Our 2021/22 speakers include Ingrid Daubechies (Duke), Holly Krieger (Cambridge), Maryanthe Malliaris (Chicago), Rafe Mazzeo (Stanford), Assaf Naor (Princeton) and Benoît Pertham (Sorbonne).

2021 PIMS Network Wide Colloquium Speakers: Holly Krieger (Cambridge), Rafe Mazzeo (Stanford), Ingrid Daubechies (Duke), Assaf Naor (Princeton), and Benoît Pertham (Sorbonne). Not pictured, Maryanthe Malliaris (Chicago).

**2022 Outlook**

As Canada continues to open up, expect more exciting workshops, seminars, lecture series and industrial activity through-out PIMS. There are numerous events that we have supported for many years and many new programs that will commence in 2022, including:

- PIMS-CRM Summer School in Probability, May – June 2022
- PIMS- SMS Summer School in Floer Homology, July 2022

In December 2022 PIMS will host the Pacific **Rim Mathematical Congress (PRIMA)**. The Pacific Rim Mathematical Association (PRIMA) was founded in 2005, and currently consists of 48+ member institutions around the Pacific Rim. The PRIMA charter calls for PRIMA to facilitate the exchange of ideas and the dissemination of scientific knowledge via a quadrennial Pacific Rim Congress. PRIMA Congresses have been held in 2009 (Sydney), 2013 (Shanghai) and 2017 (Oaxaca). PIMS will host the next Congress in Vancouver from 4-9 December 2022. We anticipate more than 400+ participants at this exciting event. Mark your calendars!

**PIMS always welcomes proposals for new activities; small events can be proposed at any time, large events have an October deadline for the coming year, postdoctoral applications have deadlines in December. Calls for funding proposals are announced through the PIMS website [www.pims.math.ca](http://www.pims.math.ca), as are all our upcoming activities.**
Have you ever wished you could be more effective in media interviews? In getting the attention of your elected representatives? In presenting yourself and your work on social media? All of these topics, and more, were covered in the CAIMS Workshop on Effective Communication Skills for Applied Mathematicians (ECSAM), offered as a series of five modules last spring. Over 50 attendees set aside their Thursdays and Fridays in May and the first week of June to learn from experts, and engage in thought-provoking discussions. Shari Graydon, founder of the non-profit organisation Informed Opinions and 30-year veteran of the media industry, anchored the workshops with her welcoming, insightful, and empowering teaching. Other highlights were the diversity workshop led by Cheryl Kristiansen of SCWIST, the media panel of Professors Sarah Otto, Caroline Colijn, and Peter Molnar organised and facilitated by Professor Mark Lewis, and the communication theory sessions with Professors Robert Danisch and Bert Baumgaertner.

The ambitious agenda covered multiple topics including political agendas and the consequences of abdicating the field to non-experts, how to communicate specialised or technical issues with a lay audience, principles for all forms of written communication including blogs and op-eds, how to be effective in a media interview, and interpersonal communication skills for controversial topics. Participants emerged with a wealth of information and practical tools for getting started with public communication. I was particularly taken with two exercises that I’m now doing with my research group at least once each term: I set aside one group meeting for students to present 3-sentence summaries of their research, and I set aside a second group meeting for me and my students to give 3-minute presentations on our research. For both events I invite one of the experts from the university media relations department to come and provide feedback. I have also started encouraging my students to enter the 3-minute thesis competition, as the university provides valuable coaching to participants. The next step will be to work with my research group to write an op-ed. I will definitely be asking the media relations department for help with this exercise!

Public communication can seem daunting to scientists, and particularly mathe-
maticians. If one is willing to take the leap, however, public communication can have enormous impact. One op-ed can do more to change public opinion than an entire body of top quality research. The pandemic has made it clear how important it is to have good science communicators, and with the enormous challenges posed by climate change it is more important than ever that scientists join the public conversation. The task can seem daunting, but with the skills taught through ECSAM, a group of at least 50 scientists has the know-how to get started.

Key funding for the workshop was provided by NSERC through the Science Public Communication Skills grant. Additional funding was provided by Western University, the University of Ottawa, and Waterloo University. Logistical and administrative support were provided by BIRS, PIMS, Fields, AARMS, and CRM. All of the facilitators either donated their time, or provided it at a significant discount. CAIMS president-elect Professor Rebecca Tyson applied for the NSERC funding, and organised the workshop.
CAIMS・SCMAI Atelier en ligne sur les compétences en communication publique pour les mathématiciens appliqués

May, 2021

by Rebecca Tyson, CAIMS・SCMAI President

Avez-vous déjà souhaité être plus efficace dans vos entrevues avec les médias, mieux attirer l’attention des décideurs publics, ou encore rayonner sur les médias sociaux? Ces sujets, et d’autres encore, ont été abordés lors de l’atelier de la SCMAI Communications efficaces pour mathématiciens appliqués (CEMA), avec le soutien du CRSNG et du CRM. L’atelier a été offert sous la forme d’une série de quatre modules en mode distanciel au printemps dernier. Plus de 50 participants ont consacré leurs jeudis et vendredis de mai et de la première semaine de juin pour apprendre des experts et participer à des discussions stimulantes. Laura Shine, de l’organisme à but non lucratif Femmes Expertes / Informed Opinions et forte d’une expérience de plusieurs années dans les média, a mené le quart des ateliers avec un enseignement accueillant, perspicace et stimulant. D’autres moments forts ont été la session sur la diversité dirigée par Mariloue Daudier d’IVADO, l’animation de Laurent Pujo-Menjouet sur la communication écrite à l’aide des réseaux sociaux, et l’atelier animé par Thierry Bélair sur l’écosystème de l’information et les relations privilégiées entre les décideurs publiques, les journalistes et le grand public. Il y avait aussi de multiples perspectives offertes sur la communication au grand public, par un nombre de panels et d’ateliers intéractifs.

L’ambitieux agenda comportait un programme couvrant des sujets tels que la nature des agendas politiques et les conséquences de laisser le champs libre aux non-experts d’un domaine, comment communiquer des questions spécialisées ou techniques avec un public profane, les principes des diverses formes de communication écrite, notamment les blogs et les lettres d’opinion, comment être efficace dans une interview avec les médias et les qualités en communication interpersonnelle nécessaires pour réussir à traiter des sujets controversés. Les participants sont ressortis avec une mine d’informations et d’outils pratiques pour se lancer dans la communication publique. J’ai été particulièrement séduit par deux exercices que je fais maintenant avec mon groupe de recherche au moins une fois par trimestre: j’ai réservé une réu-
nion de groupe pour que les étudiants présentent leur recherche dans un résumé de 3 phrases, et j’ai réservé une deuxième réunion de groupe pour moi et mes étudiants pour faire des présentations de 3 minutes sur nos recherches. Pour les deux événements, j’invite l’un des experts du service des relations avec les médias de l’université à venir nous évaluer. J’ai également commencé à encourager mes étudiants à participer au concours Ma thèse en 180 secondes, car l’université fournit un encadrement précieux aux participants. La prochaine étape sera de travailler avec mon groupe de recherche pour rédiger une lettre d’opinion. Je demanderai certainement de l’aide au même service des relations avec les médias pour cet exercice!

La communication publique peut sembler intimidante pour les scientifiques en général, et les mathématiciens en particulier. Cependant, si l’on est prêt à faire le saut, la communication publique peut avoir un impact énorme. Une lettre d’opinion bien sentie et bien reçue peut faire plus pour influencer l’opinion publique que l’ensemble des réalisations en recherches, même de très grande qualité. La pandémie a clairement montré l’importance des bons communicateurs scientifiques, et avec les énormes défis posés par les changements climatiques, il est plus crucial que jamais que les scientifiques se présentent sur la place publique. La tâche peut sembler intimidante, mais avec les compétences enseignées au CEMA, un groupe d’au moins 50 scientifiques a maintenant le savoir-faire pour s’y essayer.

Le financement principal de l’atelier a été octroyé par le CRSNG dans le cadre du programme Subvention de développement des compétences en communication scientifique. Des fonds supplémentaires ont été fournis par les Universités Western, d’Ottawa et Waterloo. Le soutien logistique et administratif a été fourni par BIRS, PIMS, Fields, AARMS et CRM. Tous les animateurs ont soit fait don de leur temps, soit l’ont fourni à un prix très avantageux. La présidente désignée de la SCMAI, la professeure Rebecca Tyson, a obtenu le financement du CRSNG et organisé l’atelier.
CAIMS · SCMAI 2022
Annual Meeting
University of British Columbia, Okanagan
Kelowna, BC, Canada

June 13-16, 2022
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