Welcome to the February Issue of the *CMS Notes*

February 2021 : Vol. 53, No. 1

Issue Contents

Monica Nevins (University of Ottawa)
VP Ontario

2020 saw the creation of two new standing committees of the CMS. The *Reconciliation in Mathematics* committee was born of the need to coordinate the contributions of the mathematical community to the reconciliation process and to help us eliminate the educational and employment gaps in mathematics between Indigenous and non-Indigenous Canadians. The *Equity, Diversity and Inclusiveness* (EDI) committee was born of a need to monitor and promote the position and interests of equity-seeking groups in the mathematical community and to ensure their participation at all levels. Both committees were natural next steps, following processes that began long before the pandemic, and conceived in the anticipation that our combined will and fresh charge would push us over the tipping point to diminish these gaps and inequities.

But 2020 instead saw them increase. From the reduced access to education and further marginalization of students in remote communities or without reliable internet access, to the disproportionate negative impact (economic and personal) of the shutdowns on members of underrepresented groups, the pandemic exacerbated our society's problems. The response, from the best of us, was a fiery need to turn our personal shutdown into action.

I am privileged to witness some of this first-hand. I served as President's Delegate on the EDI committee, alongside **Steven Rayan** (Saskatchewan, chair of the EDI committee), **Habiba Kadiri** (Lethbridge), **Elana Kalashnikov** (Harvard), **Israel Ncube** (Alabama A&M), **Reila Zheng** (Toronto), and **Karen Meagher** (Regina, chair of the Women in Mathematics committee). The EDI committee's regular meetings since its inception have informed and inspired me, and the work it has begun can lead to a shared strategy on EDI for our community across Canada. Most tangibly, and what inspires me to write today, is its hosting at the CMS Winter meeting of a series of themed breakout rooms and a panel discussion.

The four themes were *Challenges faced by caregivers*, *Challenges faced by mathematicians from underrepresented groups*, *Supporting LGBTQ+ mathematicians*, and *Supporting Early Career Researchers*. The breakout rooms were facilitated by the members of the EDI committee together with **Broderick Causley** (McGill, and member of the CRM EDI committee). The conversations were active and the topics wide-ranging, from the difficulties of being inclusive while teaching online, to worries about career impacts playing out over the coming years, to spreading the word about events like OURFA²M²: the Online Undergraduate Resource Fair for the Advancement in Academia of Marginalized Mathematicians.

The catalyst for this event at the CMS Winter meeting was a letter, published by the European Women in Mathematics (EWM) and which was, on recommendation of the EDI committee, endorsed by the CMS. The letter highlights the unequal impact of the COVID-19 crisis on untenured faculty, women and caregivers, and advocates for proactive, eyes-open, policies to support the vulnerable among us. These range from the immediate (extending contracts, offering teaching releases for caregivers), to the longer term (correcting academic age for parental and other leaves, for all evaluation committees), to the simply respectful (offering flexibility during the crisis to those who need it). Importantly, we, the decision-makers of our community, are asked not to be blind judges, but to take explicit extra steps to particularly retain and support our colleagues from underrepresented groups.

From the reduced access to education and further marginalization of students in remote communities or without reliable internet access, to the disproportionate negative impact (economic and personal) of the shutdowns on members of underrepresented groups, the pandemic exacerbated our society's problems. The response, from the best of us, was a fiery need to turn our personal shutdown into action.

Tweet

The question to take up: to what extent have we, in the Canadian mathematical community, adopted the measures recommended in the EWM letter?

The answers we heard at the meeting were as diverse as the participants. One is left with the (probably correct) impression that every department and agency is still scrambling to deal with the present crisis, and not ready to define policies going forward. Some of the most vulnerable members of our community, including postdoctoral fellows and international graduate students, are falling through the cracks – the chasms! – left by this patchwork support.

Moreover, there is real fear that when the crisis has passed, caregivers will find themselves left behind: their research competitiveness diminished by exhausting months spent meeting the massively increased demands of not only their jobs but also their life at home. There were also secondary effects: their graduate students' progress delayed by isolation, both mathematical and social. Can they trust each evaluation committee – for grants, prizes, hiring, tenure or promotion – to individually understand and acknowledge the full weight of the year's sacrifices?

These concerns echoed another: when policies are eventually codified, they often refer to four designated groups: women, persons with disabilities, Indigenous peoples and members of visible minorities. Such boxes miss other equity-seeking members of our community, notably those identifying as LGBTQ+. And even when these categories are used, for example to encourage applicants to a position to self-identify, it is often up to each individual hiring committee to find a way to turn the policy from thought into action. In many cases, we are bumbling along with good intentions, but isolated from one another, and unsure who's taking the lead.

Interestingly, some of the clearest directions for action were expressed in a breakout room that veered off-topic, into the challenges of teaching online. Perhaps it is that our classrooms are realms under our control, and we can individually see how to make that realm better. Participants described their concrete steps to making their classes more inclusive, from creating an online environment with links to resources to students from a variety of underrepresented communities, to discussing communication and etiquette in class, to keeping things as low-tech and low-cost as possible. The best went even further: responding to the individual crises of their students with compassion and flexibility, acknowledging and respecting that one-size-fits-all is not an equitable response.

I think perhaps that is the main message I take from the EWM letter, and from these excellent discussions: a reflection on what equity, diversity and inclusiveness really means, to me, individually, as a professor or a committee member or someone in charge of some small part of this massive academic machine. Equity is correcting imbalances. Diversity is seeing and respecting the other. Inclusiveness is reaching out. And (borrowing from a panelist's definition from the hugely successful Fields LGBTQ+Math Day in November): to be an ally is to be an advocate, to take others' problems as your own. We each have our role to play.

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Email to a Student

Editorial February 2021 (Vol. 53, No. 1)

Robert Dawson (Saint-Mary's University)
Editor-in-chief

Dear X:

How did I grow to understand mathematics? What a great question! There's the story about a tourist in New York, lost and about to be late to a concert, who stops his car, rolls down the window, and asks a traffic cop, "Hey, officer, how do you get to Carnegie Hall?"

The cop shrugs. "Practice, practice, practice."

As we said at the beginning of the course – we give you a number of questions to work on. If you need more, the textbook has plenty. If you want more than that, or a different style of answer, Dr. Y and I recommend Schaum's Outline of Calculus, a classic and still cheap after seventy years. Do that work as soon as possible after the lecture, so it sticks with you.

That, over four or five courses, will get almost anybody to basic competence – if you actually do it and take it seriously. That's how I did it. What's more, that's how Donald Coxeter did it. That's how Albert Einstein did it. (Stories about his failing high school math are incorrect; they seem to stem from a change in grading scheme around his time from 1-high, 5-low to 5-high, 1-low.) About the only variation from the pattern is that a few high fliers do it on their own rather than waiting for a class – but everybody does the work.

The next stage is getting fluent with working with new ideas and proving new things. In reading one math paper, one might need to understand more new ideas than are in your entire calculus course – and during a research project, one might need to read several papers in a day. It's a skill one can learn – with practice. In writing a paper, admittedly a slower process, you might need to _invent_ that many ideas. To learn those skills, you start with single "Prove this" questions, mixed in with the "technique" questions – and keep that up for a dozen or more courses before your BSc, then more in grad school, ending up with a thesis. Practice.

Wanting to do it for its own sake, asking questions that nobody's asked before, being prepared to stare at a blank sheet of paper for the twentieth day in a row in the hope of a theorem on the twenty-first – those are things nobody knows how to teach. That gets us to the other old joke, about the amateur musician who begs a virtuoso to listen to him play and tell him if he has any potential. The expert agrees, and at the end of the performance shakes his head. "You don't have the fire." The amateur swallows hard, leaves the room, and goes on to be a successful stockbroker.

Years later he meets the musician at a party. "I guess I should thank you for steering me away from music." Rueful grin. "I've had a pretty successful career in investment, though."

"I told you you didn't have the fire, right?"

"That's it."

"That's what I tell everybody who plays for me."

"What? You mean I could have been a musician? That's terrible!"

"No, my friend. If you'd had the fire, you wouldn't have listened to me."

But maybe you do have it, who knows? There's only one way to find out.

RD

John McLoughlin (University of New Brunswick)

Education Notes bring mathematical and educational ideas forth to the CMS readership in a manner that promotes discussion of relevant topics including research, activities, issues, and noteworthy news items. Comments, suggestions, and submissions are welcome.

John McLoughlin, *University of New Brunswick (johngm@unb.ca)*
Kseniya Garaschuk, *University of Fraser Valley (kseniya.garaschuk@ufv.ca)*

One of the objectives of *Education Notes* is to raise awareness of initiatives, resources, or ideas of potential interest to the CMS community. Suggestions are welcomed concerning possible directions with this theme. For starters, we will begin with a journal that crosses many mathematical areas. An introduction of the journal is followed by a selection of titles, abstracts and comments intended to provoke your curiosity to learn more about the journal.

The term *humanistic mathematics* and the nature of this journal are likely unfamiliar to many readers. *Journal of Humanistic Mathematics* is fully accessible online at the link shown here. here.

An effort is made here to introduce more people to this journal. For starters, the following excerpts in italics appear verbatim on the journal's website.

What is humanistic mathematics?

The term humanistic mathematics could include a broad range of topics; for our purposes it means "the human face of mathematics." Thus our emphasis is on the aesthetic, cultural, historical, literary, pedagogical, philosophical, psychological, and sociological aspects as we look at mathematics as a human endeavor. More broadly, we aim to provide a forum for both academic and informal discussions about matters mathematical.

What is the origin of the journal?

The Journal of Humanistic Mathematics was inspired by the work of Alvin White, a former professor of mathematics at Harvey Mudd College. Dr. White was the founding editor of the Humanistic Mathematics Network Journal (HMNJ), a work of love that he almost single-handedly edited and produced for 15 years. Dr. White believed wholeheartedly in the importance of recognizing mathematics as a humanistic discipline and played a significant role in bringing this idea to the forefront of many minds. Though this is an independent enterprise, the Journal of Humanistic Mathematics builds on the spirit and tradition of the HMNJ.

What sort of articles are published?

We publish articles that focus mainly on the doing of mathematics, the teaching of mathematics, and the living of mathematics. We also welcome contributions about the state of the mathematical profession (both in research and in education), underrepresentation issues within the world of mathematics, mathematics across national and cultural boundaries, mathematical fiction and poetry, personal reflections that provide insight to the inner workings of the mathematical mind, and other types of writing which may stimulate discussion among our readers. Overall we are a free platform where many different conversations about mathematics are welcome and encouraged.

Who is the intended audience?

We hope to serve the whole mathematical community and we wish to encourage the development and sustenance of an equitable and welcoming environment for all individuals, independent of their status within and relationship to the community. Occasionally some of our content might make some readers uncomfortable. We welcome reader responses to content that provokes disagreement.

Content

A cross-section of articles from recent issues is highlighted here to offer a sense of the range of content. Two issues appear in each volume. Respectively these articles go chronologically backwards from the recent second issue of Volume 10 through to the first issue of Volume 9. Brief descriptions are included from the abstracts or introductory comments of the authors who are identified in parentheses.

Inspiring Mathematical Creativity through Juggling (C. Monahan, M. Munakata, & A. Vaidya)

…. scheduling of a professional juggling company's performance at our on-campus theater inspired us to create a module connecting mathematics and juggling for both a general education mathematics course and a mechanics course. We drew from research on the mathematics of juggling [2, 3] to develop a module that encouraged students to explore the patterns, notations, and mathematical elements of juggling in a variety of ways. Their final projects, representing further explorations, were displayed in our theater's lobby and featured interactive displays and demonstrations. In this paper we describe our experiences developing and implementing this juggling module, students' experiences with the modules, and their development of final projects.

Designing Fractal Line Pied-de-poules: A Case Study in Algorithmic Design Mediating between Culture and Fractal Mathematics (L.M.G. Feijs)

Millions of people own and wear pied-de-poule (houndstooth) garments. The pattern has an intriguing basic figure and a typical set of symmetries. The origin of the pattern lies in a specific type of weaving. In this article I apply computational techniques to modernize this ancient decorative pattern. In particular I describe a way to enrich pied-de-poule with a fractal structure…

A Few Firsts in the Epsilon Years of My Career (H. Goodson)

In this essay, I describe the unexpected ways I achieved some milestones in the early years of my career.

Incorporating Philosophy, Theology and the History of Mathematics in an Introduction to Proof Course (S. Deckelman)

In this article I describe a project activity for an undergraduate introduction to proof course aimed at mathematics and computer science majors that combines logic and philosophy with a significant dimension of writing. Pedagogically, the project involves a broader range of critical thinking skills than is usual in such courses. Undergraduate students analyze Anselm of Canterbury's and Kurt Gödel's proofs of the existence of God using modal logic.

Most Popular Papers

The idea of popularity and humanistic mathematics may seem to be at odds. Nevertheless the journal, most recently as late December 2020, listed its most popular papers based on "the average number of full-text downloads per day since the paper was posted." That list provided here offers insight into the journal. Connections to poetry, music, and mathematical history are evident. The latest collection of popular papers can be accessed readily from the homepage.

Raphael's School of Athens: A Theorem in a Painting?
Robert Haas

Differential Equations of Love and Love of Differential Equations
Isaac Elishakoff

What Would the Nautilus Say? Unleashing Creativity in Mathematics!
Megan E. Selbach-Allen, Cathy A. Williams, and Jo Boaler

Book Review: Logicomix by Apostolos Doxiadis, Christos H. Papadimitriou, Alecos Papadatos, and Annie di Donna
Paolo Mancosu

What Do We Mean by Mathematical Proof?
Todd CadwalladerOlsker

An Introduction to Fourier Analysis with Applications to Music
Nathan Lenssen and Deanna Needell

Math in Seventeen Syllables: A Folder of Mathematical Haiku

Special Issue — Creativity in Mathematics: Foreword
Emily Cilli-Turner, Houssein El Turkey, Gulden Karakok, Milos Savic, and Gail Tang

The Multiple Identities of a Mathematics Professor Mom
Margaret J. Mohr-Schroeder

Working Backwards Further

Continuing backwards would take us to the inaugural issue in January 2011. The opening article aptly named *Welcome to the Journal of Humanistic Mathematics* was prepared by the co-editors Mark Huber and Gizem Karaali. The welcome offers a sense of what is to be found in that issue.

> *This inaugural issue contains a good representative sample. Refereed papers on mathematical aesthetics and mathematical proof appear, as well as a personal essay written by a mathematician who participated in Operation Iraqi Freedom. In addition, there are essays that discuss teaching mathematics as a liberal arts course, difficulties faced by young students of mathematics, the concept of entropy as applied to the social sciences, and the poetic nature of mathematics. There is also a review of the graphic novel Logicomix, based on the experiences of Bertrand Russell. Finally, we have three amazing poems. Please enjoy our first issue!*

The journal is now in its eleventh year. Most issues consist of an assortment of topics and ideas. Periodically special issues zero in on particular themes. The three special issues to date are listed below. A call for submissions on a fourth special issue is forthcoming. The theme will be math and ethics.

1. Volume 6 Issue 1 (January 2016): Special Issue on The Nature and Experience of Mathematical Beauty
2. Volume 8 Issue 2 (July 2018): Special Issue on Mathematics and Motherhood
3. Volume 10 Issue 2 (July 2020): Special Issue on Creativity in Mathematics

Closing Comments

My experience with this journal has been rather limited in recent years. I was brought back to the journal by considering resources that are underutilized in my own work. Now I am perusing various articles from different issues. In contrast, most of the issues of the journal's predecessor while online now can be found in hardcopy in my office at UNB. Stephen Brown at University of Buffalo introduced me to the *Humanistic Mathematics Network Journal* while I was doing my doctoral program there in the early 1990's. That journal (1987 – 2004) served as a rich resource for a range of ideas that pushed my own boundaries for both perceiving and thinking about mathematics. The complete collection from that journal can be accessed here.

Poster presentations were incorporated into my mathematical methods course at Memorial University of Newfoundland in the Faculty of Education. One of the projects by Marlene Neff focused on Ramanujan. Her work was impressive and with encouragement she proceeded to submit a paper that was published in 1999 by this journal. Following my single page introductory piece about the idea, her article appeared in *Issue 20* as *A Window into the Life of Ramanujan*.

The combination of these two journals contains a treasure trove of rich ideas. You are encouraged to take a look at select issues and see what you find. Search options are in place to look for keywords or authors. Feedback is welcomed. The co-editors assured me that more Canadian readers and contributors are welcomed while noting contributions from several including Nat Banting, Robert Dawson, Matthew Oldridge and Nathalie Sinclair. Meanwhile if you have ideas of other resources that ought to be more familiar to the CMS community, please consider suggesting them or contributing a piece for a future issue.

Acknowledgments: The logo image is credited to Infinito /Pablo Flores/ CC BY-NC-SA 2.0 and used here with the permission of the Journal of Humanistic Mathematics. *The co-editors of the* Journal of Humanistic Mathematics, *namely, Mark Huber, and Gizem Karaali, provided helpful feedback and assistance with the article.*

Mary Boole's Anti-Math-Anxiety Pedagogy and the Use of Narrative, Ephemera, and Mathematical Discovery

CMS NOTES

CSHPM Notes February 2021 (Vol. 53, No. 1)

Brittany Carlson (University of California, Riverside)

CSHPM Notes bring scholarly work on the history and philosophy of mathematics to the broader mathematics community. Authors are members of the Canadian Society for History and Philosophy of Mathematics (CSHPM). Comments and suggestions are welcome; they may be directed to either of the column's co-editors:

Amy Ackerberg-Hastings, *Independent Scholar (aackerbe@verizon.net)*
Hardy Grant, *York University [retired] (hardygrant@yahoo.com)*

Before Forster's Education Act of 1870 mandated compulsory education, primary schooling in Great Britain was irregular, with many children receiving little or no systematic instruction [6, p. 184]. When education became required, the curriculum was typically centered on the Three R's: reading, writing, and arithmetic. Teaching had undergone professionalization with the opening of James Phillips Kay-Shuttleworth and Edward Carleton Tufnell's Battersea College teaching institute in the 1830s, but Robert Lowe, Vice President of the Committee of the Council on Education from 1859 to 1867, believed that greater emphasis should be placed on exam results. This undermined the implementation of active-learning pedagogies such as Pestalozzian approaches. Student performance on the General Inspector's exams determined the amount of grant money awarded to a school and consequently impacted a teacher's salary. The vast majority of teachers thus saw student memorization without understanding as the best means to securing the grant money [6, p. 188]. While their inference impacted all subjects, this development was especially problematic for mathematics because students had to learn mathematical facts in a sterile, repetitive regime, which unsurprisingly was difficult and unenjoyable [4, p. 76].

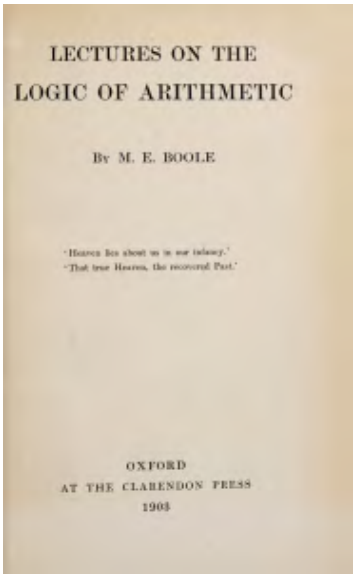
Victorian education, and its rote learning, came to be criticized by mathematical pedagogues. Specifically, they observed that anxieties about learning mathematics were prevalent, and they conceived that the dominant pedagogical approach failed to address this concern. For instance, Augustus De Morgan believed that presenting students with too much new material at once would overwhelm and "embarrass" them. In turn, he feared their embarrassment would deter them from further mathematical study [3, p. 5]. Decades later, Bertrand Russell complained: "Even the most intelligent child finds, as a rule, great difficulty" in learning algebra; for such a child it was "almost impossible, at first, not to think that every letter stands for some particular number" and become frustrated [8, p. 63].

One of the first Victorian mathematics educators to attempt to counter the damage inflicted by rote learning by implementing anti-anxiety techniques in her pedagogy was Mary Everest Boole (1832–1916). As a child, Boole was educated at home and took arithmetic lessons from a Monsieur De'place. She later deemed Monsieur De'place her 'hero' because, instead of forcing her into rote memorization of arithmetical principles, he "asked [her] a succession of questions and made [her] write down each answer as [she gave it]" [quoted in 5, p. 36]. He engaged in an effective mathematical conversation with her and guided her through the process of mathematical discovery to develop her intuition. But her lessons with respect to approaches to learning mathematics did not end there. At the age of sixteen, while she was learning differential calculus, she realized how non-intuitive theoretical textbooks were and instead taught herself the subject from an older book on fluxions [5, p. 36], which placed a greater emphasis on the discovery process in a more natural setting. When she began to teach in 1864, Boole adapted her own favorable learning experiences in her pedagogy. She "discourage[d] all formulae" until the students had constructed them for themselves. Only then were they allowed to write in their form[ula] books, from which they could build their mathematical knowledge [1, p. 807].

Figure 1. Mary Everest Boole. Cambridge University Library via the Darwin Correspondence Project;

Boole required this process because she noticed "nerve storms" [2, p. 910] that happened in a child's brain if it were overloaded with too much new material at once. She also recognized a generally widespread malaise with arithmetic, which "seems to some people dry and un-beautiful, but that is because they have not soaked it in the solvent which is called sympathy" [1, p. 815]. Sympathy, for Boole, was achieved by recreating the mathematical discovery process through allowing students to experiment, record their experiments, and gain an intuitive understanding of the concept in question. Showing very young students the aesthetically pleasing discovery process of mathematics was critical to avoiding the common mental blocks—associated with "embarrassment," among other feelings of frustration—to their mathematical progress.

To prevent these ill feelings toward mathematics, Boole began a child's mathematical education by stimulating their discovery processes from infancy. Instead of teaching babies to say "one, two, three like a parrot," she taught them to count objects such as bricks, pebbles, or buttons, and expanded that materiality to higher numbers such as eleven and twelve by breaking them down into "ten-one, ten-two, etc." [1, p. 823]. The underlying concept for this approach, which involves narration of each step, is simple. A bijective assignment of a number term such as "one, two, . . . ten" narrated the cardinal sequence of the numbers, and breaking higher numbers into their constituent parts helped children discover the underpinnings of the base-ten number system. Boole acknowledged that number words should reveal these underlying concepts. Although the learner was allowed to memorize the numbers one through nine, rote memorization was not the most critical pedagogical tool involved in the development of the child's intuition of the concept of numbers. Rather, the act of picking up a brick, pebble, or button and creating an aggregated pile physically represented the counting process. It surpassed rote memorization because it emphasized the material quantity behind the abstracted counting process. This process allowed the learner to create a representation of a number and gain intuition of it, which helped prevent ill feelings toward the subject later because pupils better understood the concept of a number by discovering it for themselves.


LECTURES ON THE
LOGIC OF ARITHMETIC

By M. E. BOOLE

OXFORD
AT THE CLARENDON PRESS
1903

Figure 2. Title page of Boole's *Lectures on the Logic of Arithmetic* (1903). Internet Archive.

When children were old enough to participate in monetary transactions, Mary Boole emphasized the importance of learning sums with money naturally. She acknowledged that it was possible to go out shopping, exchange currency, and then be given change "in a muddled order" [1, p. 826]. She believed that students needed to be prepared for this messy situation instead of experiencing only the orderly situations that were presented in the vast majority of their textbooks. A typical sum from her 1903 *Lectures in the Logic of Arithmetic* is as follows: If you have nine pence in your purse and spend three pence on flower-roots, what do you have left? On the surface, there seems to be a simple answer of sixpence. However, Boole extended the narrative to include the value and cost beyond the transaction. The true cost and value, she argued, depended on the lives of the flowers. If the flowers lived, sixpence and flowers are left. However, if they died, all that was left was the sixpence, and money was wasted [1, p. 828]. Thinking about all these potential outcomes, she contended, helped students not only to gain a stronger understanding of arithmetic but also to appreciate the aesthetics of arithmetic as they anticipated and narrated multiple possible outcomes of the transaction. In this case, the student was the determining agent in which way the sum ended. The student narrated the outcome of the flowers, calculated the amount of change they got back, and by caring or not caring for the flowers, they participated in discovering the true arithmetical results from their transaction.

Boole believed that understanding arithmetic in this way allowed a more natural progression into algebra, geometry, and the mathematical discovery process in general. Her ideas have continued to resonate with education theorists. The American anthropologist, Leslie White, posited in 1947 that "mathematical truths exist in the cultural tradition into which the individual is born, and so enter his mind from the outside" [9, p. 2350]. White's views of mathematics as a cultural tradition coincide with Boole's discovery process that relied on the child's access to material objects such as the pebble, brick, button, coin, and the narratives they created with them in natural language. Taking that language and putting it into mathematical terms fit for their form book directly engaged them with this deeply culturally entrenched discovery process, which still has important implications in the philosophy of mathematics today. For example, Imre Lakatos' *Proofs and Refutations* [7] also focused on utilizing the narrativized dialogue in the classroom discovery process, which emphasizes the role of the person and their background in shaping mathematics.

Brittany Anne Carlson is a PhD candidate in English at the University of California, Riverside. She earned her BS in mathematics at Westminster College, SLC, and her dissertation is titled "(Re)mediating Math Anxieties with the Narrative, the Ephemeral, and the Visual, 1830–1930."

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2021 CMS Election Notice

In 2021, the CMS will be electing eleven (11) officers and directors. Candidates have to agree to the nomination and provide the committee with biographical information.

You are invited to nominate members to be candidates and their nominations will be accepted by the Nominating Committee **prior to March 1, 2021** provided that each person nominated: (i) is supported in writing by at least five (5) other members of the CMS; and (ii) has given written acceptance to stand for office and to supply biographical information.

Nominations with supporting materials should be e-mailed to nominations-2021@cms.math.ca or sent to:

Nominating Committee Chair
Canadian Mathematical Society
209 – 1725 St. Laurent Blvd.
Ottawa, ON K1G 3V4 Canada

Nominations are being solicited for the following slate of candidates for the Executive Committee *(length of elected term in parentheses)*:

- President-Elect *(1 year)*/President *(2 years)*/Past-President *(1 year)*;
- Vice-President – Atlantic (N.B., P.E.I., N.S., N.L.) *(4 years)*; and
- Vice-President – Pacific (B.C., Yukon) *(4 years)*.

Nominations are also being solicited for Board of Directors members *(length of elected term in parentheses)*:

- Atlantic – 1 member *(4 years)*;
- Quebec – 1 member *(4 years)*;
- Ontario – 2 members *(4 years)*;
- West – 1 member *(4 years)*;
- Pacific – 2 members *(4 years)*; and
- Student – 1 member *(2 years)*.

The CMS will hold the election electronically in April 2021 and the results formally approved in June at the Annual General Meeting (AGM) in Ottawa, Ontario. Updated information will be periodically e-mailed to members and posted on the CMS website at on the Election page.

Alexandre Girouard
Chair, CMS Nominating Committee

2021 CMS Fellows

The CMS Fellows program recognises CMS members who have made excellent contributions to mathematical research, teaching, or exposition; as well as having distinguished themselves in service to Canada's mathematical community. In exceptional cases, outstanding contributions to one of the below areas may be recognised by fellowship.

- Making significant contributions to the profession and to the Canadian mathematical community.
- Increasing the relevance and visibility of the CMS.

For a nomination to be complete, all nomination requirements and eligibility should be included. A CMS member may nominate a maximum of two Fellows in a calendar year. Any person who is nominated and is not selected a Fellow will remain an active nominee for a further two years.

The CMS aims to promote and celebrate diversity in the broadest sense. Nominations for outstanding colleagues are encouraged regardless of race, gender, ethnicity or sexual orientation.

All documentation, including letters of support, should be submitted electronically, preferably in PDF format, to fellows@cms.math.ca **no later than March 31, 2021**.

For the full program description, please visit here.

Second Inaugural Class of Fellows

2019 Winter Meeting Banquet, Toronto, ON

First Inaugural Class of Fellows

2018 Winter Meeting Banquet, Vancouver, BC

In 1995, the Society established this award to recognize individuals who have made sustained and significant contributions to the Canadian mathematical community and, in particular, to the Canadian Mathematical Society. The award was renamed in 2008, in recognition of Graham Wright's 30 years of service to the Society as the Executive Director and Secretary.

CMS aims to promote and celebrate diversity in the broadest sense. We strongly encourage department chairs and nominating committees to put forward nominations for outstanding colleagues regardless of race, gender, ethnicity or sexual orientation.

Nominations should include a reasonably detailed rationale including three support letters and be submitted **by March 31, 2021**.

All documentation should be submitted electronically, preferably in PDF format, by the appropriate deadline, to gwaward@cms.math.ca.

Renewals

Individuals who made a nomination last year can renew this nomination by simply indicating their wish to do so by the deadline date. In this case, only updating materials need be provided as the original has been retained.

2020 Graham Wright Award for Distinguished Service Recipient

Claude Levesque
Laval University (retired)

Prof. Levesque is the most recent recipient of the award. Please read the Media Release. For a list of past recipients and to read their citations, please visit the official Graham Wright Award page.

Nominations of individuals or teams of individuals who have made significant and sustained contributions to mathematics education in Canada are solicited. Such contributions are to be interpreted in the broadest possible sense and might include: community outreach programs, the development of a new program in either an academic or industrial setting, publicizing mathematics so as to make mathematics accessible to the general public, developing mathematics displays, establishing and supporting mathematics conferences and competitions for students, etc.

CMS aims to promote and celebrate diversity in the broadest sense. We strongly encourage department chairs and nominating committees to put forward nominations for outstanding colleagues regardless of race, gender, ethnicity or sexual orientation.

Nominations must be received by the CMS Office **no later than April 30, 2021**.

Please submit your nomination electronically, preferably in PDF format, to apaward@cms.math.ca.

Nomination requirements

- Include contact information for both nominee and nominator.
- Describe the nominated individual's or team's sustained contributions to mathematics education. This description should provide some indication of the time period over which these activities have been undertaken and some evidence of the success of these contributions. This information must not exceed four pages.
- Two letters of support from individuals other than the nominator should be included with the nomination.
- Curricula vitae should not be submitted since the information from them relevant to contributions to mathematics education should be included in the nomination form and the other documents mentioned above.
- If nomination was made in the previous year, please indicate this.
- Members of the CMS Education Committee will not be considered for the award during their tenure on the committee.

Renewals

Individuals who made a nomination last year can renew this nomination by simply indicating their wish to do so by the deadline date. In this case, only updating materials need be provided as the original has been retained.

2020 Adrien Pouliot Award Recipient

Veselin Jungic
Simon Fraser University

Prof. Jungic is the most recent recipient of the award. Please read the Media Release or his citation. For a list of past recipients and to read their citations, please visit the official Adrien Pouliot Award page.

2022 Editors-in-Chief of CJM

The CMS invites expressions of interest for the Editor-In-Chief (EIC) of the *Canadian Journal of Mathematics* (CJM); **two Editors-in-Chief are being solicited**, with a five-year term to commence January 1, 2022 and some partial funding support from the CMS is available for both these EIC positions.

Since 1949, the *Canadian Journal of Mathematics* has been committed to publishing original mathematical research of high standard following rigorous academic peer review. New research papers are published continuously online and are collated into print issues six times each year. CJM and CMB (*Canadian Mathematical Bulletin*) are supported by respective Editors-in-Chief and share a common Editorial Board.

Expressions of interest should include a cover letter, your curriculum vitae, and an expression of views regarding the publication. Since being EIC of CJM is a large responsibility that may require a lessening of responsibilities in an individual's normal work, individuals should review their candidacy with their university department and include a letter of support.

Please submit your expression of interest electronically to: CJM-EIC-2020@cms.math.ca **before April 15, 2021**.

For more information, please contact us at the email address above.

The Canadian Mathematical Society (CMS) is looking for competition focused volunteers and leaders to help with the European Girls Mathematical Olympiad (EGMO) and International Mathematical Olympiad (IMO) programs. The CMS needs volunteers who are passionate about competition problem solving and enjoy working with young students (ages 12-17). CMS is looking for both trainers and leaders to help with these competitions.

For the EGMO/IMO programs, we need volunteers to:

1. Create and submit contest problems.
2. Contribute to the EGMO and IMO training camps.
3. Lead the Canadian delegations for international contests (e.g. EGMO/IMO), which typically consists of chaperoning the teams, reading our student's work, and determining its merit with the coordinators of the organizing countries.
4. Be a part of online training programs, which can be run through correspondence or through platforms such as Zoom or Discord.
5. Proctoring competitions such as the COMC, APMO, CMO, team selection tests, etc.

CMS is looking for individuals who could do one or some of these items. If you are interested, please let us know which part you can help with so we can add you to our volunteers for 2021. We are looking for volunteers in all areas. More details on leading the EGMO/IMO team can be found below.

Being an EGMO leader consists of:

- Helping out at winter camp, which is held in the Toronto area in early January
- Helping with the administration of the team selection test(s), online training, and an in-person camp in February in the Toronto area (subject to change).
- Chaperoning the students to the EGMO, marking their solutions, and coordinating these marks with the host country's grading team. A certain level of ability/experience is required for the coordination, as it often involves determining the merit of partial solutions that stray from the provided mark scheme.

The approximate in-person time commitment for EGMO is:

- 1 week in early January for winter camp
- 4 days in February for the training camp
- 10 days in April for the EGMO, which takes place in a European country

Being an IMO leader consists of:

- Helping out at winter camp, which is held in the Toronto area in early January

- Helping with the marking of the qualification tests
- Running a training camp just prior to the IMO departure to prepare the IMO team for the IMO. This is normally held in Banff or Waterloo.
- Chaperoning the IMO team to the IMO, marking their solutions, and coordinating these marks with the host country's grading team. A certain level of ability/experience is required for the coordination, as it often involves determining the merit of partial solutions that stray from the provided mark scheme

The approximate in-person time commitment for IMO is:

- 1 week in early January for winter camp
- 3-4 weeks in the summer (late June- July) for the training camp and IMO (~2 weeks for the training camp, and ~1 week for the IMO)

Please send your information to meetings@cms.math.ca

The Canadian Mathematical Society (CMS) welcomes and invites new session proposals for scientific sessions for the 2021 CMS Summer meeting in Ottawa from June 4-7, 2021. Priority will be given to sessions in complementary areas; new organizers are invited to contact existing organizers of closely related sessions to optimize complementarity. Existing sessions can be found here:

Proposals should include

1. names, affiliations, and contact information for two (or more) session co-organizers,
2. a title and brief description of the focus and purpose of the session,
3. a preliminary list of potential speakers with their affiliations, along with a total number of expected speakers.

Potential organizers are encouraged to consider diversity in their selection of session invitees.

Sessions will take place June 4-7. They will be advertised in the *CMS Notes*, on the CMS website and in the *AMS Notices*. Speakers will be requested to submit abstracts, which will be published on the website and in the meeting program.

Those wishing to organize a session should send a proposal to the Scientific Directors:

Ailana Fraser (University of British Columbia) afraser@math.ubc.ca
Monica Nevins (University of Ottawa) mnevins@uottawa.ca
Mateja Šajna (University of Ottawa) msajna@uottawa.ca

Proposals should be submitted by **March 1, 2021**.

A Simple Model for Distributing Meal Payments to Conference Attendees

Jonathan Jedwab (Simon Fraser University)

Notes de réunion est un espace pour les organisateurs et organisatrices d'évènements de partager des pratiques et expériences exemplaires avec leurs collègues. Les commentaires et les suggestions sont les bienvenues. Veuillez les diriger à l'éditrice de la section:

Sarah Watson, *Chef de réunions de la SMC (reunions@smc.math.ca)*

The 2020 Cascadia Combinatorial Feast was held online on 21 November 2020, without advance registration. Meal payments of CAD 25 / USD 19 were made to each of 47 participants on the day via electronic transfer, without requiring receipts, funded from the NSERC Discovery Grants of six faculty members at Simon Fraser University and the University of Victoria. This note describes the rationale for the meal payments, how they were implemented, and how effective this model was. I hope other Canadian funding agencies will consider adopting a similar model for online conferences during the Covid-19 pandemic.

Why distribute meal payments to conference attendees?

A key aspect of conferences is to provide social and networking opportunities, especially for early career researchers. This aspect is greatly diminished during the current period of online-only conferences, which might plausibly continue for another 12–24 months. A relatively small meal payment allows participants to order their favourite

takeout food, to be eaten during the online social events of the conference, thereby enhancing networking opportunities.

How can the traditional paperwork be avoided?

The traditional support model involves collection and submission of individual receipts for food expenses. It can be very time-intensive and onerous for conference organisers to manage the associated paperwork, which might not be completed until months after the conference ends.

However, for this conference the Tri-Agency (NSERC, SSHRC, CIHR) agreed that meal payments could be charged to the NSERC Discovery Grants of faculty members conducting research in the area of the conference, without requiring individual receipts. I am happy to supply on request the precise conditions specified by the Tri-Agency, but principally these were:

- payments are not to be used for alcohol
- the payments must contribute to the direct costs of the research for which the funds were awarded, with benefits directly attributable to the grant
- all policies and processes of the Discovery Grant holder's institution must be followed.

How were funds distributed?

At the end of the first talk, the organisers invited participants to send a simple email from a university/college email address, stating full name, institution, and whether a student/postdoc (as in Figure 1). Those with a Canadian bank account sent email to me, and I made 34 payments of CAD 25 each using Interac. Those with a US bank account sent email to a US-based organiser, who made 13 payments of USD 19 each using Zelle.

During the second talk, we two organisers made the transfers from our personal bank accounts and emailed an individual password to the participants. The fees for making these transfers are small or zero, depending on the type of the sender's bank account. Collecting the payment is straightforward, free, and instant. About half those requesting payments had already collected the funds before the lunch break.

The organisers were keen that the early career researchers, many of whom did not appear to be familiar with the ease of Interac/Zelle transfers, could be confident of having received the promised funds before placing a takeout order. Even without advance registration, I was able to process payment from my bank account in about one minute each (enter name and email address, request payment, enter security question and answer, send answer to participant by return email). I then cross-checked the list of transfer requests shown by my bank against the email requests, discovering and rectifying an error for 2 of the 34 requests where I had mistakenly moved on to the next request with completing the final step of actually sending the payment.

What safeguards were used against abuse of the model?

The organisers considered two possible abuses of the model:

1. Fraudulent requests from people outside the target academic community. The safeguards against this were that the scheme was not announced publicly in advance, and all payment requests had to originate from a university/college email address.
2. Participants contacting friends without a real interest in the conference after hearing that meal payments were available; or participants requesting and receiving money but then not attending the social event. To deter these, the organisers made clear that acceptance of payment was to be considered a commitment to attend the social event, and stressed that this experimental model would not be repeated if there was irresponsible behaviour.

There was no evidence of even a single instance of abuse of either type.

How was the model received?

The meal payments were enthusiastically received, especially by early career researchers for whom meal payment of $25 is apparently an unusual and significant event. Attendance during the day fluctuated, with over 80 distinct Zoom logins. Of these, 47 requested and received meal payments. A small number were ineligible because they had neither a Canadian nor a US bank account, and presumably some knew they would not attend the social event and so did not send a request.

The social event was attended by over 55 participants. The organisers asked each of the early career researchers to introduce themselves briefly during this event. Many participants stayed to chat online several hours after the official end of the conference. This was a very definite success.

What advice do you have for future conference organisers wanting to follow this model?

Most banks impose limitations on electronic transfers in a single day. My bank limits the total amount of Interac transfers to $3000 in 24 hours; the US organiser's bank limits the number of Zelle transfers to 10 in one day. Therefore multiple distributors might be needed.

Early career researchers should receive priority if there is insufficient funding to cover all participants. The early career researchers should also receive priority for processing payments because they might be reluctant to buy food before receiving payment.

Advance registration would simplify the electronic transfers by allowing names and email addresses and passwords to be set up in advance. This would also reduce the chances of a minor error (forgetting to complete the payment to an individual) or a major error (transferring the wrong amount).

Conclusion

This is a simple, fast, and effective model for distributing relatively small meal payments to conference participants. Straightforward safeguards and clear communication appear to have been sufficient to avoid abuse of the payment model. I hope that other Canadian funding agencies will consider adopting a similar model for online conferences during the Covid-19 pandemic, in order to enhance networking opportunities. This is especially important for early career researchers, who are most disadvantaged from the current restrictions on academic meetings.

Figure 1. Example of a slide announcing the payment model.

INTRODUCING

Diamond Open Access Journal

COMMUNICATIONS
of the American Mathematical Society

Communications of the American Mathematical Society (CAMS) is a new journal designed to provide a home for the very best research and review articles across all areas of mathematics. The journal will be a natural home for both pure and applied mathematics, presenting a window into a holistic view of mathematics and its applications to a wide range of disciplines. The AMS expects the journal to be a diverse and inclusive home for mathematicians around the world in support of emerging research.

CAMS uses a Diamond Open Access model, meaning that there are no article processing charges for authors and that all published articles will be freely available to read without charge to individuals or institutions.

CAMS will be led by a stellar group of mathematicians across all aspects of mathematics, under the leadership of Ralph Cohen (Stanford University) and Qiang Du (Columbia University) as Co-managing Editors.

EDITORIAL BOARD:

For more information,
including submission guidelines, visit:
https://www.ams.org/CAMS

IBET Momentum Fellowship.

The Indigenous and Black Engineering and Technology Momentum Fellowship is the flagship fellowship for the IBET PhD Project.

This prestigious Fellowship will provide financial support of $30,000 per year for 4 years for University of Waterloo recipients. This funding support ($25,000 from faculty and $5,000 from faculty supervisor) will allow the recipient(s) to pursue advanced degrees and undertake both traditional and/or non-traditional areas of research without incurring financial hardship.

The IBET Momentum Fellowship is intended to support Indigenous peoples (First Nations, Inuit and Metis) and Black researchers in achieving their rightful place and respected inclusion in academia at the University of Waterloo.

This Fellowship is intended to help build and support an equitable environment that is reflective of Canada's population and reconcile the under-representation of Indigenous and Black scholars at the University of Waterloo. An integral component of the IBET Momentum Fellowship will be access to mentorship and community-wide support.

Application Process

Applications for the IBET Momentum Fellowship were open as of January 18, 2021. Details for applicants for this fellowship, along with all Faculty of Engineering Graduate Studies Funding and Awards.

To be eligible for this award applicants must:

- Be a Canadian Citizen or Permanent Resident of Canada who self-identify as being Indigenous* or Black.
- Meet the minimum admission requirements (normally a cumulative average of 80%) for their chosen Faculty of Engineering PhD program
- Be admitted into the PhD program in Spring 2021 or later;
  - Students transferring from an eligible, incomplete Master's program to a PhD may also be considered for the Fellowship

Direct entry (from Bachelors) PhD applicants may also be considered for the Fellowship.

**For the purposes of this Fellowship, an Indigenous person is a person who self-identifies as First Nations (Status/Non-Status), Métis, or Inuit as defined in the Canadian Constitution Act 1982*

Mentorship Process

A key part of the success of the IBET PhD Project is mentorship with support from both our industrial partners and academic colleagues. By having supportive academics and professionals who have gone through the rigourous doctoral process we expect our young scholars will be even more successful.

A network of support will be a key part of building an environment of acceptance and connection.

Our IBET PhD Project Mentors will provide high-quality mentorship and connect students with:

- Outstanding research groups and professors
- Industry research mentors
- Combined industry and academic supervision

This will provide a network of peer support on their journey to becoming professors.

Faculty members will serve as role models in attracting and mentoring Indigenous and Black students while improving the preparation of all students for a fully diverse workplace and society. They can also help to identify key networking opportunities such as attending annual conferences.

Additional training that mentors can provide is CV/resume, professional social media use to build an online profile, online and in-person networking, future job search, and application tips.

For more information about how you can become a mentor

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We are deeply saddened by the loss of our dear colleague Donald Fraser. On behalf of the Canadian Mathematical Society, we express our sincere condolences to Nancy Reid, Ailana Fraser and Andrea Fraser. We are thinking of them in these difficult times and remembering Don as a valuable member of the community, a special colleague, and a friend. Don will be greatly missed, but his kindness, dedication to the scientific society, warmth and gentle spirit will be remembered forever.

Dr. Javad Mashreghi, President of the Canadian Mathematical Society

CMS Notes

The editors welcome articles, letters and announcements. Indicate the section chosen for your article, and send it to *CMS Notes* at the appropriate email address indicated above.

No responsibility for the views expressed by authors is assumed by the *CMS Notes*, the editors or the CMS.

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