Welcome to the March/April Issue of CMS Notes

Issue Contents

(Un)Balancing Mathematical Research and Remote Schooling in Times of COVID

Cover Article   March 2022 (Vol. 54, No. 2)

Prof. Matilde N. Lalín (Université de Montréal)
Vice-President, Quebec

When I was invited to write this piece in early December, my first thought was to discuss the positive academic aspects of this pandemic from the point of view of mathematical research. Indeed, we have learned to collaborate remotely in a very efficient way. This represents a big advantage for collaborating with interesting people in the four (or infinite?) corners of the world. It is also a great benefit for those who have difficulty travelling, either for personal reasons or for lack of resources. Indeed, our newly gained expertise in remote collaboration has also opened the door for events to be more inclusive of virtual participation in the future, and we can dream of having less of an impact on planet Earth with lower levels of academic travel.

"Syntactic manipulation!"

Fast forward a few weeks to when I find myself, once again, in crisis control mode. In early January, the frantic pace of Omicron accompanied by remote schooling for my children, replaces the almost-romantic vision of early December. In spite of this, I still try to achieve the research goals of a sabbatical year at home. This being done with virtually no travel (or should I say most of the travel is virtual?). I am so lucky that I do not have to worry about the uncertainty of teaching in variable (or variant?) nonstandard formats this year, and of course, I am beyond lucky that I have tenure, a good job, a roof, a supportive family, and access to many resources. I keep repeating this to myself, in between the many interruptions.

"How do you spell, 'whatever'?"

What does remote schooling mean? By now, most parents of school-aged children are certainly familiar with this term, in Canada and in many other parts of the globe. Allow me to try to explain it to those who have been spared of this exquisite experience. First of all, this is a trick question with no single answer! Back in March 2020, most teachers, like the rest of us mortals, had no background in remote schooling. When schools closed in the early days, my children spent several weeks without much formal instruction. Then, some teachers started emailing parents with activities for students. Of course, homework for the kids often means homework for the parents. This is particularly true if the kids are young, or if the assignment is difficult, or anytime! Eventually, our teachers organized meetings with their classes through various online platforms. Make no mistake; this did not make things easier! First, young kids still needed considerable help and supervision while participating in these meetings. Second, some of these online platforms were quite difficult to manage for those that have never used them. In some unfortunate (but nonetheless hilarious) online classes, confused kids and parents created multiple simultaneous isomorphic meetings, and we had to connect with various devices to find the correct meeting (by definition, the one where the teacher was connected). Finally, those meetings were short and ended with a list of activities for students to work on. Naturally, the ever-growing list of assignments led to endless parental frustration.

"The ethics teacher is holding his baby while he lectures! Come see!"

Things have improved drastically since the ancient days of 2020. By now, teachers and kids have become veritable experts with online platforms. Classes last longer, and in some cases even for the whole time that the kids would normally be at school! Children are more engaged and need less parental assistance. Still, this is a far cry from having school in person. We need to monitor the kids so that they do not chat during class. Plus, we have to be available for some occasional help (i.e. when they can't find the right book, pencil, geometry set, coins, vinegar, they don't know how to spell a word, they need to go to the washroom, they need a snack, they have a crisis in art class, etc.).

"Mommmmm, come! Latin class!"

How does one accomplish the reflection necessary for writing an opinion piece, let alone the deep thinking that entails research when one suffers interruptions every fifteen minutes or so? Please tell me, I'm all ears! In terms of seemingly "research-ish" activities, I find myself doing less

challenging tasks: easier projects with students, editorial duty, taking care of referee reports, event organization, trying to answer to collaborator's questions, rather than generating questions for them myself.

"OK, now I have to represent 2 times 5 with coins."

With that in mind (or out of mind?), I am now focusing on the positives, and making a list (and checking it twice) of what works. The most important step is to lower your expectations in terms of both parenting and mathematical work. Live day-to-day, show love to your family. Try to accomplish quick, easy tasks first and leave the hardest projects for the middle of the night when everybody else is sleeping (What? You want to sleep? No such luck!). Find fun collaborators who truly understand the situation and are patient (bonus points for communal commiseration). Be honest with what you can and cannot do. Learn to say no. In fact, say no generously and often (except to people who are having a worse time, which, you know, may be everybody else). Be appreciative of the teachers' work and be patient, and try to add some humor to the kids activities ("tonight we're eating your science project, yay!"). Try to keep a routine/structure at home. Plan so that each kid has easy access to their material, so that they do not have to call for help too often. Be appreciative of the good things you do have in your life. Talk to your friends. Eat chocolate.

"Ayyy, I need to go to the washroom!"

In conclusion... While work-life balance was always on the challenging side, the pandemic took it to a whole new level. Of course, what we discussed here is just the surface of some particularly challenging aspects that COVID has brought to us mathematicians. I am sure there are many different difficult scenarios that you, dear readers, have to deal with. But, if you belong to the club of parenting small children and being a mathematician in these times, here is my message to you: If you feel like a bad parent while working and a bad mathematician during remote schooling, try to be more gentle with yourself and your loved ones and keep in mind that you are in good company!

"Si, yo ask for help, moi aussi."

Notes:

1. The phrases between paragraphs are actual quotes from the author's children during remote schooling periods. The original sentences were pronounced in a mixture of Spanish, French, and English. Only the last one was left in the original language.
2. While most of this article was written during the remote-schooling days in Montreal, it was finished in early February, when the author's children went back to school and the author had time to take long baths.
3. No children were harmed in the making of this article.

We Will Not Be There.

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

As I write this, Russian forces are still shelling Ukrainian cities. The ability of other countries to assist Ukraine is limited, the ability of non-governmental organizations still more so. However, the CMS has declared that we will not be participating as an organization in the 2022 ICM, scheduled to be held in St. Petersburg, and does not support individual participation. Compared with the sacrifices of the Ukrainian people, or even the material support being given by our own and other governments, this may seem like a small gesture. And yet many of us are probably thinking "yes, but isn't science – isn't mathematics – meant to be above politics?" It's a natural question: but it's not the right question.

Firstly, while there are two sides to every issue, the two sides of this dispute are not comparable. It's true that superpowers in general take a view of national security that rather resembles one of the higher separation axioms: to be truly secure, the theory goes, a strong country should be surrounded by weaker countries that are aligned with it. This is understandable, but it's wrong, at least when the role is forced onto the weaker country. ("What about the Bay of Pigs, and the American trade embargo with Cuba?" you may ask. Precisely – that was wrong, and this is far, far worse.) Russia's desire for an expendable protective layer does not and must not trump Ukraine's self-determination. And Ukrainians saw in the 1930s that – even when Ukraine and Russia were nominally two equal parts of the USSR – Russia was considered to be the essential part of the union, Ukraine a granary to be ransacked at need. Neither history nor popular opinion is on Russia's side.

Secondly, the ICM is not mathematics. There has been, quite rightly, no suggestion that we should hold our Russian colleagues individually responsible for this outrage. Decent Russians are shocked and mortified by Putin's outrageous actions, and I hope that most of our Russian colleagues are among them. Mathematics is no guarantee of good character, of course, and events will bring the occasional Bieberbach or Kaczynski to the surface: but such people are the exception. I trust that most of our readers who are collaborating with colleagues in Russia will be able to continue to do so with clear consciences, and that many individual friendships will survive this painful period.

But, if we're honest, we have to realize that events such as the ICM and the Olympics are about national pride as well as about mathematics or sport. In good times, these goals, though unrelated, are not incompatible: but these are not good times. We cannot — as an organization or as individuals — pretend that things are normal.

I believe that the Society's decision was the correct one.

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

Book Reviews bring interesting mathematical sciences and education publications drawn from across the entire spectrum of mathematics to the attention of the CMS readership. Comments, suggestions, and submissions are welcome.

Karl Dilcher, *Dalhousie University (notes-reviews@cms.math.ca)*
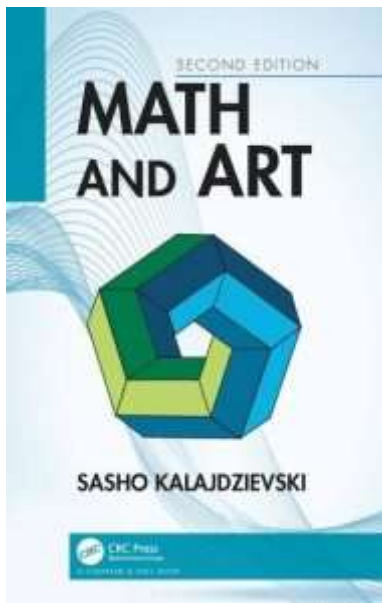
by Sasho Kalajdzievski
CRC Press, 2022
ISBN: 978-0367076115
Reviewed by Robert Dawson

This book presents various topics in mathematics visually, with copious illustrations. The topics are, not unreasonably, almost all drawn from geometry or neighboring areas. The table of contents includes "Euclidean Geometry", "Plane Transformations", "Similarities, Fractals, and Cellular Automata," "Hyperbolic Geometry," "Perspective," "Some Three-Dimensional Objects," and "Topology." The reader should have some exposure to linear algebra (or be prepared to learn it rather fast!) and complex numbers (ditto.) The level of algebra assumed is low enough that while the classical "impossible constructions" of the squared circle, duplicated cube, and trisected angle are mentioned (in section 1.2) the author merely assures the reader that they have been proved to be impossible and moves on.

The level of the book, then, is about right for a liberal-arts math course. The author, in the introduction, suggests its use as "an unorthodox geometry textbook," and indeed has based it on the content of a course of this type, entitled "Math in Art", taught at the University of Manitoba.

What are its strengths? The section on plane transformations is well written, given the constraint of working without any formal group theory. The third chapter, on "similarities, fractals, and cellular automata" feels a little stuck-together. The segue from fractals to cellular automata is managed by way of the Sierpinski triangle, which arises in both contexts: but truly the two have little in common. Unfortunately, neither chapter contains a great deal about art.

The fifth chapter, on perspective, is where the book comes closest to living up to its title. The subject matter applied directly to art, and the illustrations are interesting, including pre-perspective medieval works, sketches by Dürer and da Vinci, perspective illusions by Escher and de May, a piece of Op art by Riley, and one of Termes' six-vanishing-point spheres.

I found the section on hyperbolic geometry interesting but weaker. It's a difficult topic, and the author is to be commended for attempting to include it at all. It begins with inversive geometry, and various illustrations of mirror balls (including Escher's classic *Hand with Reflecting Sphere.*) Section 4.4 involves Euclidean constructions of hyperbolic objects in the Poincaré model: while this is a valid drafting exercise, it's a weird hybrid mathematically. The chapter ends, predictably, with hyperbolic disc tilings by Escher, Leys, and others.

Artistically, the section on three-dimensional objects is perhaps the most successful. While it has less mathematical content than most other chapters, it contains many examples of mathematical sculptures, both real and virtual. Here the connection between the math and the art feels most natural. Works like this are easier to construct than the reader might think: it is a pity that the book does not contain a little about software such as POV-Ray (www.povray.org) that would empower the reader to explore. Even 3D printing is becoming more accessible these days.

As a textbook, I feel this book would succeed only if the course were very much built around it: as the author hints, it would not fit a traditional undergraduate geometry course. It might be a useful resource for high school art teachers, provided they are not afraid of algebra, though I think for this purpose Fathauer's *Tesselations: Mathematics, Art, and Recreation* (CRC, 2021; reviewed here Sept. 2021) might be a better choice. The professional mathematician, or upper-level math undergraduate, will not find a great deal new, but will enjoy some of the illustrations. The interested layperson should find it challenging and interesting.

David E. Zitarelli (posthumous) (Temple University)

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)*

Editors' Note: When he died in December 2018, long-time CSHPM member David Zitarelli left behind manuscript material for a people-centered perspective on how mathematics teaching and research has unfolded in the United States and Canada from the arrival of Europeans to the near-present day. David's genuine enthusiasm for individuals and his fascination with how individuals come together to form organizations and communities both made him a beloved colleague and shaped the way he understood the past. Below, we offer his profiles of a few Canadian mathematicians, via excerpts from the material in volume 1, which covers the period 1492–1900 and is now available from the MAA Press imprint of the AMS. Volume 2 of what was intended as a three-volume work will appear in fall 2022; it will cover the period 1901–1940. We thank Stephen F. Kennedy and Della Dumbaugh, who have been editing David's manuscripts for publication, for their assistance with this column.

AMS / MAA | SPECTRUM

VOL 94

A History of Mathematics in the United States and Canada

Volume 1: 1492–1900

David E. Zitarelli

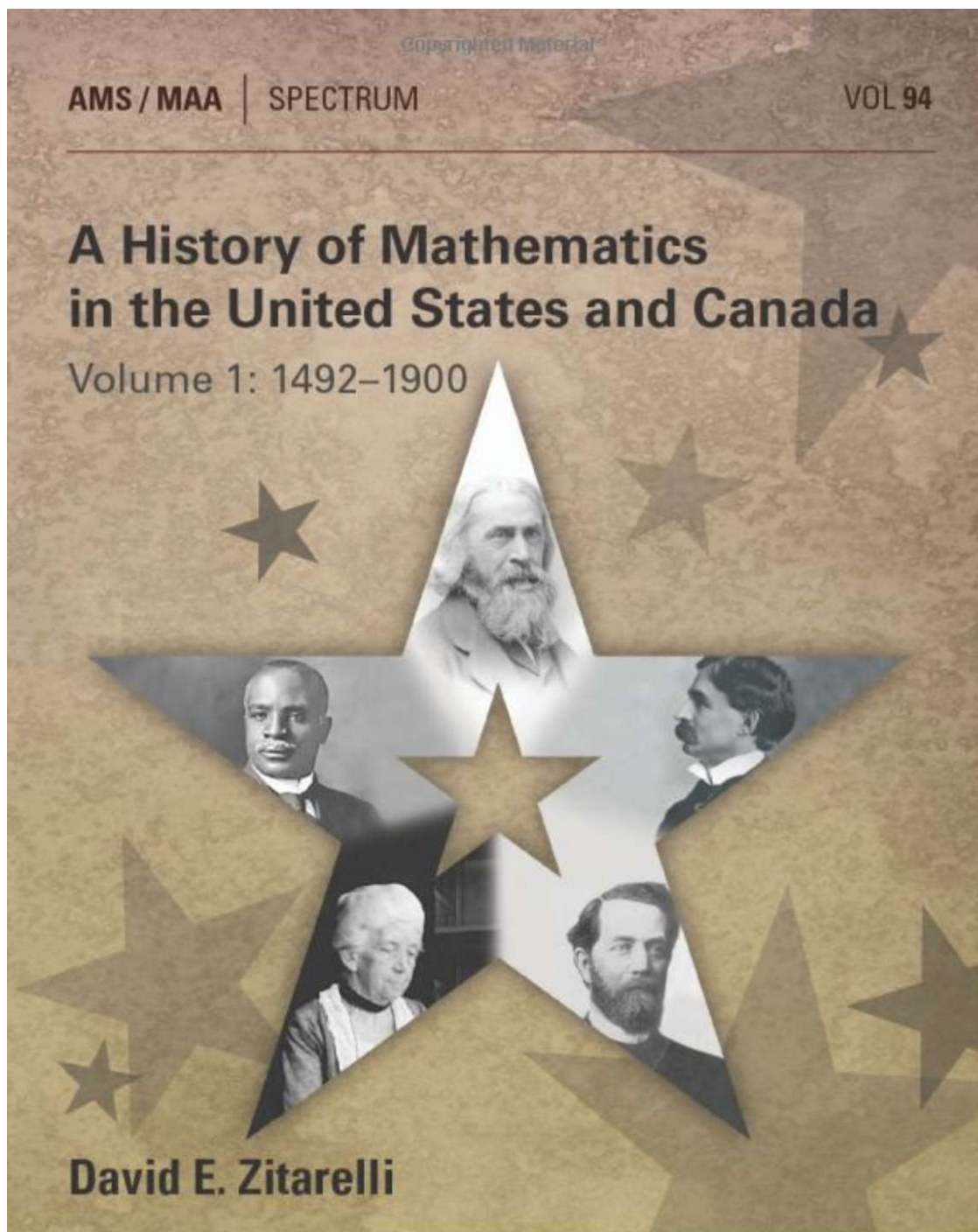MAA PRESS

An Imprint of the AMERICAN MATHEMATICAL SOCIETY

Figure 1. The cover of Zitarelli's *A History of Mathematics in the United States and Canada*, vol. 1. AMS/MAA Press.

The first mathematics professor at the Collège de Québec [in existence from 1635 to 1760] was the Frenchman Martin Boutet de Saint-Martin (ca. 1612–1683), who sailed to Canada in 1645 with his wife and two daughters. Except for a return trip to France in 1677 to accept an honor decreed by King Louis XIV, he spent the rest of his life in Quebec City. Virtually nothing is known about his years in France, including his education. . . . In 1661 Boutet began offering mathematics courses . . . that were oriented toward two important aspects of life along the Saint Lawrence River, surveying and navigation. The Collège's main mission was training for the priesthood, however, so mathematics instruction was not emphasized. One of Boutet's earliest students was Louis Jolliet (ca. 1645–1700), the Canadian explorer known for mapping the Mississippi River. . . . About 1666 [Boutet] was asked to extend his courses beyond the Collège to include the training of pilots for navigating the Saint Lawrence River. As the historians Thomas Archibald and Louis Charbonneau observed, "Besides the chronic shortage of navigators, there was also the need for accurate maps. Once again the natural choice to provide such training was Boutet" [1, p. 3; 2, p. 6]

Figure 2. Collège de Québec buildings, as painted by Richard Short in 1761. Archives de la Ville de Québec, N016369.

The Rev. Robert Murray (ca. 1795–1853) was a graduate of the University of Glasgow, and was ordained a minister of the Church of Scotland. During 1824–1834, he was master of the Edinburgh Commercial and Mathematical Academy, publishing a very successful textbook on commercial arithmetic that was later reprinted in Upper Canada. He immigrated to Canada in 1836 to become a minister of the Church of Scotland in Oakville, ON. Six years later he was appointed Canada's first assistant superintendent of education, but for political reasons he was removed from this post in 1844. [Richard] Potter's convenient resignation [from the University of Toronto] that year enabled the Upper Canada governor to appoint Murray as professor of mathematics and natural philosophy. Unfortunately, little is known of Murray's life from this point except that he died in 1853 after a prolonged illness. Nonetheless, Murray made a very good choice for his assistant in 1850 when he chose John Bradford Cherriman (1823–1908). . . . Cherriman published many papers during his 25 years in Toronto, mostly in mathematical analysis and applications to the social sciences. . . . Although mathematics was his main interest, the professorship required him to teach the physical sciences (heat, optics, electricity, magnetism, mechanics, hydrostatics, pneumatics, acoustics, and astronomy) even though there were no laboratories for demonstrations at the time. Cherriman left the university in 1875 to assume a federal position as an actuary with the Canadian government in Ottawa [2, p. 152].

NEW SYSTEM

OF

COMMERCIAL ARITHMETIC,

OR

GUIDE TO BUSINESS AND SCIENCE;

FOR THE USE OF SCHOOLS.

IN WHICH THE PRINCIPLES OF THE RULES, AND THE REASONS OF
THE OPERATIONS ARE FULLY EXPLAINED;

ALSO,

Containing a Copious Selection of Questions, affording the means of Minute
Examination on the Principles and Application of the Rules.

BY ROBERT MURRAY,

MASTER OF THE COMMERCIAL AND MATHEMATICAL ACADEMY,
10, NICOLSON STREET, EDINBURGH.

EDINBURGH:

JOHN BOYD, 37, GEORGE STREET.

M. OGLE, AND W. COLLINS, GLASGOW; J. DEWAR, PERTH; E. DONALDSON,
DUNDEE; A. WATSON, AND J. KILO, ABERDEEN; K. DOUGLAS, INVER-
NESS; JOHN SINCLAIR, DUMFRIES; JOHN DICK, AYR; J. M. LECKIE,
DUBLIN; SIMPKIN & MARSHALL, AND WHITTAKER & CO. LONDON.

M.DCCC.XXX.

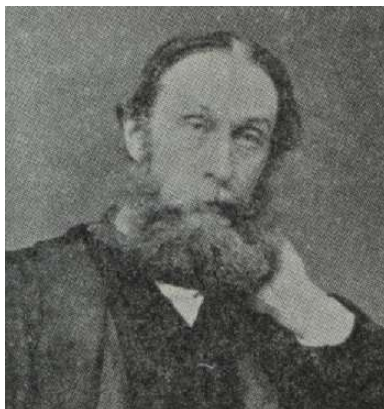**Figure 3.** Title page from Murray's 1830 *New System of Commercial Arithmetic*. GoogleBooks.

Figure 4. Cherriman also served as head of the Meteorological Service of Canada from 1853 to 1855.

William Henry Metzler (1863–1943) received his PhD [from Clark University] in June 1893. After teaching at MIT and Genesee Wesleyan (NY) 1892–1895, he accepted a professorship at Syracuse University. Initially, he produced an impressive array of papers on determinants and quaternions; two others appeared in the *Proceedings of the London Mathematical Society*. [He] then switched gears to education, becoming a prominent researcher in the field and establishing *The Mathematics Teacher* as a quarterly publication of the Association of Mathematics Teachers of the Middle States and Maryland in 1908. . . . Thomas Franklin Holgate (1859–1945), a Canadian and a University of Toronto graduate like Metzler, was a mathematics instructor at Albert College in Ontario before accepting his Clark fellowship. He moved to Northwestern University in 1893, two years before officially receiving his Clark doctorate. He was a particularly active contributor to mathematics on the national scene, one of five professors who made Chicago one of the focal points of the emerging AMS along with New York City. . . . [He] was devoted to Northwestern throughout his career, serving as interim president on two occasions and as dean of the faculty. In the latter position, he spent the year 1921–1922 at the University of Nanking in China lecturing on mathematics but, more importantly on the international scene, assisting in the general organization of that university. Holgate's text *Projective Pure Geometry* (1930) was highly regarded [2, p. 308].

Figure 5. Metzler ca 1890. MacTutor.

Figure 6. Holgate also served as president of Northwestern from 1904 to 1906 and 1916 to 1919. Northwestern University Archives.

The Canadian-born William Gillespie (1870–1947) enrolled in the Chicago graduate program in 1893 upon graduation from the University of Toronto. He left after four years without a degree to accept an instructorship at Princeton, but he completed his dissertation under Oskar Bolza while carrying out his teaching duties. He was promoted to preceptor (assistant professor) in 1905 and to full professor six years later. Gillespie spent the rest of his career as a minor player on the Princeton stage until his retirement in 1939 [3]. Like Gillespie, John Hector McDonald (1874–1953) was a Canadian and a University of Toronto graduate (1895). He entered Chicago the following year. His 1900 dissertation reads, "I feel under a deep obligation to all the teachers named, but particularly to Professors [E. H.] Moore and Bolza for the continued and varied assistance which they gave me throughout my whole term of graduate study." McDonald joined [Derrick Norman] Lehmer at Berkeley in 1902 and remained there for the rest of his life [2, pp. 354–355].

Mathematics Genealogy Project

John Hector McDonald

MathSciNet

Ph.D.   The University of Chicago 1900

Dissertation: *Concerning the System of the Binary Cubic and Quadratic with Application to the Reduction of Hyperelliptic Integrals to Elliptic Integrals by a Transformation of Order Four*

Advisor: Oskar Bolza

Students:
Click here to see the students ordered by family name.

Name	School	Year	Descendants
Sznyter, Mary	University of California, Berkeley	1918	
McFarland, Elsie	University of California, Berkeley	1920	
Saund, Dalip	University of California, Berkeley	1924	
Terami, Takashi	University of California, Berkeley	1925	
Trjitzinsky, Waldemar	University of California, Berkeley	1926	61
Reimer, Edward	University of California, Berkeley	1927	
Shaghoian, Armenag	University of California, Berkeley	1927	
Brady, Dorothy	University of California, Berkeley	1933	10
Ma, Shun	University of California, Berkeley	1934	
Rauch, Louis	University of California, Berkeley	1935	
Robinson, Raphael	University of California, Berkeley	1935	1
Cowan, Russell	University of California, Berkeley	1936	6
Wakerling, ex Wood, Orla	University of California, Berkeley	1940	
Arnold, Elizabeth	University of California, Berkeley	1941	

Figure 7. McDonald mentored five women PhDs at Berkeley. Mathematics Genealogy Project.

References

[1]Archibald, Thomas, and Louis Charbonneau. (1995) Mathematics in Canada before 1945: A preliminary survey, in *Mathematics in Canada*, edited by Peter Fillmore, vol. 1, 1–90. Ottawa: Canadian Mathematical Society. Reprinted (2005) in *Mathematics and the Historian's Craft: The Kenneth O. May Lectures*, edited by Glen Van Brummelen and Michael Kinyon, 141–182. *CMS Books in Mathematics.* New York: Springer.

[2]Zitarelli, David E. (2019) *A History of Mathematics in the United States and Canada*. Vol. 1. Providence, RI: American Mathematical Society.

[3]Zitarelli, David E. (n.d.) Supplementary materials for *A History of Mathematics in the United States and Canada*. https://davidzitarelli.wordpress.com/a-history-of-mathematics-in-the-united-states-and-canada/ (accessed 20 January 2022).

Email Zitarelli's editors: skennedy@amsbooks.org

Indigenizing University Mathematics

Naomi Simone Borwein (University of Windsor)

Florence Glanfield (University of Alberta)

Veselin Jungic (Simon Fraser University)

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.

The Canadian mathematical community has been going through a slow and painful process of learning and accepting the fact that the discipline of mathematics has contributed to the colonization of Indigenous communities and peoples.

In the words of Edward Doolittle, an Associate Professor at First Nation University of Canada:

> *"Mathematics is how they really got us," said one residential school survivor to me. The issue has not been studied at all, to my knowledge, but it seems likely to me that in residential school the power of mathematics was misused, as were the other residential school subjects, as a tool for colonization and repression. The study of that issue is within the domain of mathematics education, but all mathematicians and math educators should be aware of the potential of mathematics to do harm as well as good. (Doolittle, 2020)*

Ubiratan D'Ambrosio, a Brazilian mathematics educator, extensively wrote about the role of mathematics in suppressing Indigenous knowledges across the globe.

For example, D'Ambrosio relates colonialism and mathematics (and science and technology) in the following way:

> *As part of the colonial strategy of not recognizing structured knowledge of the conquered, particularly in science, technology and mathematics, mathematical ideas of the peoples of different regions of the world*

have been disregarded. Part of this strategy is the belief, still predominant, that Western mathematics is the privileged manifestation of the rationality of the human species, hence universal and culture-free. The emergence of ethnomathematics, as a research field, is the result of the recognition that every cultural group develops, as a result of its rationality, its own ways and styles of explaining, understanding and coping with their environment. (D'Ambrosio, 2006)

Consequently, the mathematical community faces increasing expectations from students, institutions, and wider Indigenous and non-Indigenous communities to address an array of questions from the role of mathematics in the process of colonization to strengthening connections between Indigenous knowledge (as the holistic total of an Indigenous peoples' understanding of the world) and academic mathematics, to creating a learning environment in which Indigenous learners could fulfill their mathematical potentials; and finally, to exploring perspectives on what it all means.

To meet these expectations and as a part of its responsibility to contribute in a meaningful way to the process of reconciliation, in the recent year the CMS welcomed at its semi-annual meetings several sessions that aimed to address various topics related to the relationship between mathematics and Indigenous communities and their cultures and traditions:

- At the CMS Summer 2021 meeting, Darja Barr (University of Manitoba), Benoit Dionne (University of Ottawa) and Emily McKinnon (University of Manitoba) co-organized a session "Transitioning to University: Indigenous Perspectives on Post-Secondary Mathematics." The session was built around the following question: "How can university and high school instructors, administrators, and other stakeholders help to support Indigenous students to success in first-year university mathematics courses?"
- At the CMS Summer 2019 meeting, Douglas Farenick (University of Regina) and Keith Taylor (Dalhousie University) co-organized a session "Indigenization and Reconciliation in Mathematics." The session focused "on hearing from experts and individuals experienced with indigenization/reconciliation in the university contexts of teaching and research."
- At the CMS Winter 2018 meeting, Darja Barr (University of Manitoba), Shawn Desaulniers (University of Alberta), Edward Doolittle (First Nations University), and Veselin Jungic (Simon Fraser University) co-organized a session "Indigenization and Reconciliation through University Mathematics: Why, When and How?" (Barr at al., 2019) The session participants were invited to address the following two questions: *Why, when, and how the mathematical community can contribute to the process of the reconciliation inside and outside of our college and university math classrooms? How can the Canadian mathematical community come together to reduce the drastic educational achievement gap between Indigenous and non-Indigenous peoples?*

Clearly, the three above listed sessions overlapped in many ways. For example, each of them had a strong teaching/educational component.

In our view, this overlap comes from the fact that the Canadian mathematical community is facing complex historical, political, cultural, scientific, and educational issues that are rooted in the role that mathematics has played in the process of colonization. And, as a community, we are still in the early stages of grasping and understanding that role and its many consequences.

The common denominator for the above listed sessions was an effort to make space within the Canadian mathematics community to further explore what it meant to Indigenize university mathematics, both in education and research.

With this in mind, it should not be a surprise that the Canadian Mathematics Society (CMS) Winter Meeting session entitled "Indigenizing University Mathematics" revisited many of the themes that were discussed during the earlier CMS meetings.

In the early fall 2021, we invited a group of friends and colleagues to join us for the Winter 2021 CMS meeting and share their thoughts, knowledge and experiences with the following questions:

- What does it mean to Indigenize university mathematics?
- What is the role of mathematics in the process of colonization?
- What are the roles of Indigenous mathematicians and mathematics educators in the process?
- What are the roles of non-Indigenous mathematicians and mathematics educators in the process?
- What must be done to unleash the mathematical potential among Indigenous learners?

- How can one strengthen connections between Indigenous knowledge and academic mathematics?
- What does the wider mathematical community—including students of mathematics—need to learn to meaningfully contribute to the process of reconciliation between Indigenous and non-Indigenous peoples in Canada and across the globe?
- Anything else related to this topic that you wish to address.

The major difference between the recent session and the previous CMS sessions was, in the fact, that all invited presenters and panelists were self-identified Indigenous scholars.

The session speakers represented the cross-section of the Indigenous mathematical community.

The presenters and panelists came from Australia (Michael Donovan, Macquarie University); Canada (Melania Alvarez, University of British Columbia; Broderick Causley, McGill University; Kori Czuy, University of Calgary; Shawn Desaulniers, University of Alberta; Edward Doolittle, First Nations University of Canada; and Florence Glanfield, University of Alberta); and the United States (Henry Fowler, Navajo Institute for Technology; Robert Megginson, University of Michigan; Belin Tsinnajinnie, Santa Fe Community College; and Kamuela Yong, University of Hawaii).

The strong international component of our session reflected the fact that all the presenters have been involved in at least one of two relatively new global initiatives. One such initiative is the community "Indigenous mathematicians" (https://indigenousmathematicians.org/) coordinated by Kamuela Yong with the overarching goal to "build community both with those [Indigenous mathematicians] living in the present and those in the past." The other initiative is "Indigenizing University Mathematics" (https://carma.newcastle.edu.au/meetings/ium/index.html) led by Judy-anne Osborn, University of Newcastle. As part of this initiative, a large international group of Indigenous and non-Indigenous scholars collaborates and shares "knowledge and worldviews from within both Indigenous cultures and the cultures of mathematics and its allied disciplines." Such initiatives mirror a growing base of global efforts to engage with Indigenizing mathematics established from South Africa to Chile.

We cannot resist addressing this apparent contradiction, that Indigenous scholars who are, by definition, firmly rooted in their local cultures, connect globally to establish the universal truths implicit/explicit with the following characterization of a convex n-gon:

If $n \geq 4$, then n points in the plane in general position form a convex polygon if, and only if, every four of them form a convex quadrilateral.

Similarly, a shape of the idea of Indigenizing university mathematics emerged through presentations that addressed a number of very specific issues. They create a vision of the importance of place-based mathematical practices across cultures, from inscribing a regular hexagon (Fowler) to the use of Polynesian nautical and astronomical concept knowledge to build place-based pre-calculus (Yong)—reimagining Optimization. Within the session, through the breadth of approaches, we start to visualize a conceptual knowledge framework and space for Indigenous mathematics. Over the course of the day the audience learned about Navajo ethnomathematics (Fowler); about the challenges and success in the process of creating a university mathematics training program for aspiring Indigenous teachers (Desaulniers); about providing real mathematical support for in-service teachers working with Indigenous students and Indigenous students preparing for post-secondary education (Alvarez); about redesigning and enhancing a standard university mathematics course by incorporating the elements of local Indigenous knowledge (Yong); about looking at the side of the academic mathematics that is experienced, relational, relevant, and even spiritual (Czuy); about implementing Indigenous pedagogy and heutagogy as a way to build a student-centered approach to teaching mathematics (Causley); about examining from an Indigenous person's perspective the meaning of Indigenization of university math (Donovan); about how current diversity and inclusion efforts in mathematics and mathematics education directly empower Indigenous communities (Tsinnajinnie).

In addition, two prominent Indigenous mathematicians and pronounced leaders of the mathematical communities in Canada and the USA, Doolittle and Megginson, described their own experiences working within Indigenous communities and within academies. This included their reflections about acting, over many years, as the bridges between the two communities: laying groundwork and offering insight into the cultural importance of spirituality and mathematics, allies, and language in the pursuit of past-present-future Indigenous mathematics.

We feel the need to underline something that the reader has probably noticed already, the wide range of topics—from ethnomathematics to various practices in teaching mathematics to some of the fundamentals of academic mathematics—covered during the session.

In our view, this clearly demonstrated diversity of interests of Indigenous mathematicians and mathematics educators is directly proportional to the level of complexity of the process of Indigenizing university mathematics, but also to the fact the Indigenous academic community is a vibrant and very active segment of the modern academia.

The message that emerged at the end of the session was that the process of Indigenizing University Mathematics was not prescriptive nor one set of general rules to be followed.

The 2021 CMS session "Indigenizing University Mathematics" confirmed that Canadian mathematicians and mathematics educators are willing to listen to and learn from our Indigenous colleagues from across the world. This assures us that, as a community, we can work together to help repair the damage caused by years of benign neglect and intentional harm for the benefit of the Indigenous learners and users of mathematics, but also for the benefit of our beloved subject.

References:

[1] Barr, D., Desaulniers, S., Doolittle, E., & Jungić, V. (2019) Indigenization and Reconciliation through University Mathematics: Why, When and How? CMS Notes, 51(2), pages 9-11.

[2] D'Ambrosio, U. (2006) The Program of Ethnomathematics and the challenges of globalization. Circumscribere: International Journal for the History of Science 1, 74-82.

[3] D'Ambrosio, U. (2017) Ethnomathematics and the pursuit of peace and social justice. Educação Temática Digital 19(3), 653-666.

[4] Doolittle, E. (2020) Mathematics and Reconciliation. CMS Notes, 52(2), Online: https://notes.math.ca/en/article/mathematics-and-reconciliation/.

MathemAttic: An Invitation to Participate

Kseniya Garaschuk (UFV)
Editor in Chief, Crux Mathematicorum

Shawn Godin (Ottawa-Carleton D.S.B., retired)
Editor, MathemAttic; Editor-in-Chief, ATOM

John McLoughlin (UNB)
Editor, MathemAttic

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)*

Crux Mathematicorum is an internationally well-known problem-solving journal. Each issue contains original problems for readers to solve, as well as solutions from readers to past problems. It also features other notes of interest to problem solvers including articles, regular columns, and collections of problems from Mathematical Olympiads. What many people might not know is that *Crux* started as a newsletter aimed at high school teachers in Ottawa. The level of problems in earlier volumes made the content broadly accessible as compared to those of recent years including current volumes. Over time the journal evolved to what it is today.

Mathematical Mayhem was a problem-solving journal for students, by students. It was started by Ravi Vakil and Patrick Surry, who had participated in the International Mathematical Olympiad, with an intention of being a journal specifically aimed at that group of people who may be prospective Olympiad participants. The journal ran for 8 years before losing its funding. It was "saved" by *Crux Mathematicorum* and continued as a section of *Crux* for several years.

However by this time, the level of problems appearing in *Mathematical Mayhem* had become increasingly difficult. Earlier scaffolding of problems or a variety of levels had seemingly been replaced by more of an Olympiad flavour. A conscious effort was made to broaden the scope of problem offerings in an effort to reach more secondary level students and teachers. Features such as *Polya's Paragon* and *Problem of the Month* were introduced so as to appeal to a wider audience. At one point in time, there was an attempt to separate *Mayhem* from *Crux* and have it continue online as a free publication. Unfortunately, this did not work out and *Mayhem* was discontinued. Eventually, *Crux* stopped being a subscription-based print journal and took its current form as a free online publication with the link below. The current issue is readily accessible as is a complete digital archive of the entire collection of the journal.

https://cms.math.ca/publications/crux/

The online access offers this journal to a much wider audience than the subscribers who were regular readers. It marked a new beginning of another sort as some of us undertook an initiative to again reach a wider audience. This marked the birth of *MathemAttic*. The remainder of this article is

intended to make the CMS community more aware of this part of the journal. People are encouraged to share this piece with teachers, students and others who may be interested in such a freely available publication. We welcome more problem proposers, solvers, and readers, along with contributors of articles and more. The invitational spirit carries through the subsequent paragraphs. Please get in touch with us with feedback and indications of interest.

MathemAttic, like the latter versions of *Mathematical Mayhem*, is meant to appeal to a range of pre-university students and their teachers. Unlike *Mathematical Mayhem*, it doesn't have a history so it can more easily be created from the ground up. As co-editors, we have been there from the outset.

Currently, *MathemAttic* has a problem section where problems, for the most part, are picked from a wide variety of sources with the occasional problem proposed by a reader. Two regular features have been there from the first year. *Problem Solving Vignettes* explore interesting problems, and their solutions as well as looking at techniques and ideas that would benefit high school problem solvers. *Teaching Problems* focuses attention on problems that have been used in teaching with an eye to how they can develop students' appreciation and learning around mathematical problem solving. This past year, a new feature called *Explorations in Indigenous Mathematics* was introduced with consideration of mathematics pertinent to Indigenous culture.

The journal continues to evolve with the newest feature appearing first in the January 2022 issue. *From the Bookshelf* will highlight books that contributors recommend for inclusion in one's own personal library. The recommendations will offer insight into the selections. In some cases the selections will be more like mini-collections such as the work of a particular author. Longtime *Crux* readers will know that book reviews were staples in the journal for years. This feature will allow for reviews of titles that may interest pre-university students and teachers. This will open the avenue for publishers to send materials along for review. We are also developing a feature that will highlight resources on the internet such as articles, videos, podcasts, or apps of relevance to our target audience.

MathemAttic will evolve further in the coming years with the input and contributions of people interested in the spirit of mathematical problem solving, outreach, and the enhancement of public appreciation of mathematics. The next step in the growth process is the development of a community of people who will act as an advisory board. We are looking to have people from across Canada engage with us in a variety of roles. The need is there for some people to edit the problem submissions, others to assist with editorial roles concerning articles, and generally a collection of people to act as a sounding board for the directions of *MathemAttic*. If you see a way that you would like to contribute, please send us a note (mathemattic@cms.math.ca) as we would welcome hearing from you. The support of the CMS community is appreciated as are efforts to circulate this notice.

Before closing, we share a couple of problems from the March issue. Solutions are welcomed from secondary level students. These can be submitted prior to the end of May through the following link: https://publications.cms.math.ca/cruxbox/

MA162. From an 8×8 chessboard, the central 2×2 block rises up to form a barrier. Queens cannot be placed on the barrier, and may not attack one another across this barrier. Determine the maximal number of Queens which can be placed on the chessboard so that no two attack each other.

MA163. In the diagram, the log A has radius R. A hole of radius r is drilled through the centre of log A at right angles to the axis. Another log B of radius r passes through the hole. Find the length S in terms of R and r.
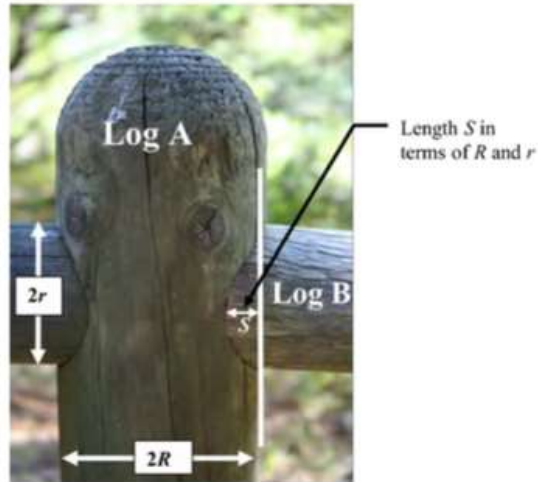
A Letter to Future CMS Meeting Organizers

Nilima Nigam (SFU)

Dear future organizer,

Your first instinct at being asked to help with a CMS meeting was, most likely, "NOOOOOOOoooooo!"

This was certainly my first response when asked about co-organizing the 2021 CMS Winter Meeting in Vancouver. After all, I'd sworn to *Never Organize Anything Big Ever Again*. But, you're organizing the meeting, and I figured I should write to you.

I was still recovering from the co-organization of a meeting several years ago. I had to: deal with our university, sign room contracts, negotiate rates, hunt for vendors of poster boards, build our own website, manage the abstract submission, figure out how many cookies per person per coffee break, book hotel rooms and blocks, write grants... While the mathematical event itself went smoothly and was a success, the experience behind the scenes was exhausting. (Did I mention we dealt with universities?) The inevitable complaints (and there are always some) stung more than the overwhelming positive feedback.

Like you, I was about to respond, "No way!" to the CMS invitation, but I took a deep breath. This was in December of 2020. We'd all just lived through the first of many months of a devastating global pandemic. Schools had been shut, and many regular activities suspended. There was fear and fatigue to spare. (I remember, around then the news was fretting about toilet paper supplies in the stores.)

In the midst of this, I remember reading the year-end CMS Notes, in which the CMS Executive Director summarised many of the activities which the society had continued to run. It was inspiring – and humbling! – to read that fellow mathematicians and students continued to dedicate their time to mathematical activities, and keeping some form of connection alive. The CMS launched its inclusion initiative that summer. Thanks to generous support from sponsors, the CMS was able to run Math Camps for Indigenous communities in Whitehorse, and the first-ever all-girls training camps for the 2021 EGMO and IMO. Canada's 2020 EGMO team did really well, even though the event was held in April 2020 – online! In the midst of troubling times, to contemplate the energy and heart displayed by the organizers and participants is truly to celebrate the best among us.

Given these difficult circumstances for our community, and the continued efforts of many to continue to create some semblance of normalcy, I felt motivated to do my part, and agreed to help out with the CMS Winter Meeting. You cannot imagine my relief to learn my colleague, Nils Bruin, would be co-organizing the meeting, and that the CMS staff would take care of all that scary stuff (the contracts, the scheduling, the negotiating, the websites, the coffees, the "I need to leave early on Saturday"...).

Within short order, we had a wonderful Scientific Organizing Committee: Anthony Bonato, Chantal David, Sara Faridi, Terry Gagnon, Alexandre Girouard, Patrick Ingram, Lilia Krivodonova and Liam Watson. We discussed possible plenary speakers and sessions, and I remain profoundly grateful to this group of people for their wisdom and deep disciplinary knowledge. We agreed early on that the meeting should reflect mathematical activity in all its facets, and the expertise of this group helped make this possible.

At this juncture, we were all hopeful that the meeting would be held in person in Vancouver in December 2021. To our collective dismay, Covid-19 showed no signs of abating. We had to discuss plans with a great deal of uncertainty around the format of the meeting, and consequently, the scope. This was a challenging time for me personally. The Delta variant was devastating for my home country, and thinking about the CMS meeting was simultaneously hard and a welcome relief.

It was clear the pandemic presented unique challenges to any form of participation. By the time it was confirmed that the meeting would be online, we had but a few months to ensure there would be a stimulating and exciting program. The Scientific Committee steered us through a difficult patch here, with creative ideas and suggestions.

The CMS community responded generously through proposals for sessions. And kudos to the CMS staff! They were absolutely the stars of the moment. Sarah Watson and Jessica Wallace kept track of bajillions of emails, following up with organizers and speakers. And Termeh Kousha would

'Zoom Bomb' our meetings even during her maternity leave, to remind us of the importance of having a lot of vibrant activities.

I'll note the CMS staff ended up organising the physical iteration of the Winter meeting, had to cancel it, and then pivot to organising the meeting to be entirely online. The amount of time and energy this must have taken is hard for us to imagine. The online meeting was a lot more time-intensive for them to run.

The meeting itself featured mathematical activity in a range of subdisciplines. It was especially great to see the strong presence of math education, and history and philosophy of mathematics. I hope this will continue.

In closing: yes, organising a CMS meeting will be work. Yes, it will at times be thankless, and there will be errors, and complaints. We are human, and can only strive to do our sincere best. On the bright side, dear future organizer, hopefully the pandemic will soon be 'over', or at least we'll have learned to live with it. You'll have the support of a wonderful team of CMS staff. You'll have colleagues from around the country who will selflessly help you. And most of all, you'll know the CMS – and this means each of us – will be grateful that you didn't just say, "Noooooooooo!"

Call for Nominations: 2022 Adrien Pouliot Award

Adrien Pouliot Award

> Nominations are currently welcomed for the 2022 Adrien Pouliot Award.
> Deadline: April 30

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 the deadline indicated above.

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 letter 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

A nomination will remain active for three (3) years, with the possibility to update. In this case, only updating materials need be provided as the original nomination has been retained.

Nomination Information

[Cathleen Synge Morawetz Prize](#)

> Nominations are currently welcomed for the 2023 Cathleen Synge Morawetz Prize.
>
> Deadline: September 30

The Cathleen Synge Morawetz Prize is for an author(s) of an outstanding research publication. A series of closely related publications can be considered if they are clearly connected and focused on the same topic. At least one author of any nominated paper should be part of the Canadian Mathematical community.

The Cathleen Synge Morawetz Prize will be awarded according to the following 6-year rotation of subject areas:

1. Geometry and Topology *(2021, and every six years thereafter)*,
2. Combinatorics, Discrete mathematics, Logic and foundations, and Mathematical Aspects of Computer Science *(2022 , and every six years thereafter)*,
3. Applied mathematics, including but not limited to Numerical Analysis and Scientific Computing, Control Theory and Optimization, and Applications of Mathematics in Science and Technology *(2023, and every six years thereafter)*,
4. Probability and Mathematical Physics *(2024, and every six years thereafter)*,
5. Algebra, Number theory, Algebraic geometry *(2025, and every six years thereafter)*,
6. Analysis and Dynamical systems *(2026, and every six years thereafter)*.

All of the above fields will be understood most broadly, to ensure that any outstanding publication can be considered under at least one of the categories. A paper (or a series of papers) which has significantly impacted more than one of the listed fields can be nominated more than once in the six-year rotation. The nomination must focus on a single topic, rather than a broad body of work by the nominee.

This call for nominations is for an author(s) of a publication or a series of closely related publications in the field of Applied mathematics, including but not limited to Numerical Analysis and Scientific Computing, Control Theory and Optimization, and Applications of Mathematics in Science and Technology.

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 for research in the mathematical sciences regardless of race, gender, ethnicity or sexual orientation.

The nomination letter should highlight the research paper(s) being nominated, providing evidence of its impact and significance. The nomination letter should list the chosen referees, and should include a recent curriculum vitae of the nominee(s), if available. Up to three reference letters in support of the nomination should be sent directly to the CMS.

All documents should be submitted electronically, preferably in PDF format and **no later than the deadline date above**, to **csmprize@cms.math.ca**.

Call for Nominations: 2023 Krieger-Nelson Prize

Nomination Information

Krieger-Nelson Prize

The Krieger-Nelson Prize recognizes outstanding research by a woman or a female-identifying mathematician.

> Nominations are currently welcomed for the 2023 Krieger-Nelson Prize.
> Deadline: September 30

The prize lecture will be delivered at the Summer Meeting. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for two years.

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 for research in the mathematical sciences regardless of race, gender, ethnicity or sexual orientation. A candidate can be nominated for more than one research prize in the applicable categories; several candidates from the same institution can be nominated for the same research prize.

CMS research prizes are gender-neutral, except for the Krieger-Nelson Prize, which is awarded to women and female-identifying mathematicians only. Nominations of eligible women and female-identifying mathematicians for general research prizes in addition to the Krieger-Nelson Prize are strongly encouraged.

The Research Committee of the CMS reserves the right to consider a nomination for one of the three research prizes for any other, applicable prize.

The deadline for nominations is indicated above. Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline, to knprize@cms.math.ca.

Nominators should ask at least three referees to submit letters directly to the CMS (knprize@cms.math.ca) by the deadline. Some arm's length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available.

Nomination Information

Jeffery-Williams Prize

The Jeffery-Williams Prize recognizes mathematicians who have made outstanding and sustained contributions to mathematical research.

> Nominations are currently welcomed for the 2023 Jeffery-Williams Prize.
> Deadline: September 30

The prize lecture will be delivered at the Summer Meeting. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for three years.

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 for research in the mathematical sciences regardless of race, gender, ethnicity or sexual orientation. A candidate can be nominated for more than one research prize in the applicable categories; several candidates from the same institution can be nominated for the same research prize.

CMS research prizes are gender-neutral, except for the Krieger-Nelson prize, which is awarded to women and female-identifying mathematicians only. Nominations of eligible women and female-identifying mathematicians for general research prizes in addition to the Krieger-Nelson Prize are strongly encouraged.

The Research Committee of the CMS reserves the right to consider a nomination for one of the three research prizes for any other, applicable prize.

The deadline for nominations is shown above. Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline, to jwprize@cms.math.ca.

Nominators should ask at least three referees to submit letters directly to the CMS (jwprize@cms.math.ca) by the deadline above. Some arms-length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available.

Call for Nominations: 2022 Graham Wright Award for Distinguished Service

Graham Wright Award for Distinguished Service

> Nominations are currently welcomed for the 2022 Graham Wright Award.
> Deadline: March 31

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 and be submitted by the deadline indicated above.

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

Nomination Information

Coxeter-James Prize

The Coxeter-James Prize recognizes young mathematicians who have made outstanding contributions to mathematical research. It is awarded on an annual basis. The selected candidate will deliver the prize lecture at the Winter Meeting.

Nominations are solicited the prior year, typically from early March to the end of September.

Nominations are currently welcomed for the 2023 Coxeter-James Prize. Deadline: September 30

The recipient shall be a member of the Canadian mathematical community. Nominations may be made up to ten years from the candidate's Ph.D: researchers having their Ph.D degrees conferred within the past ten years (e.g.: degree in 2009 or later would be eligible for nomination in 2019 for the 2020 Prize). Where eligible leaves of absence may warrant, nominations may be made more than ten years from the candidate's Ph.D. Such exceptions should be clearly addressed by the nominators. A nomination can be updated and will remain active for a second year unless the original nomination is made in the tenth year from the candidate's Ph.D.

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 for research in the mathematical sciences regardless of race, gender, ethnicity or sexual orientation. A candidate can be nominated for more than one research prize in the applicable categories; several candidates from the same institution can be nominated for the same research prize.

All CMS research prizes (the Coxeter-James Prize, the Jeffery-Williams Prize and the Doctoral Prize) are gender-neutral, except for the Krieger-Nelson Prize, which is awarded to women and female-identifying mathematicians only. Nominations of eligible women and female-identifying mathematicians for general research prizes in addition to the Krieger-Nelson Prize are strongly encouraged.

The Research Committee of the CMS reserves the right to consider a nomination for one of the three research prizes for any other, applicable prize.

Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline, to cjprize@cms.math.ca.

Nominators should ask at least three referees to submit letters directly to the CMS (same email address) by the deadline. Some arms length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available.

Call for Nominations: 2022 Fellows of the CMS

Fellows of the CMS

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.

Nominations are currently welcomed for the 2022 Fellows of the CMS. Deadline: March 31

For a nomination to be complete, all nomination requirements listed below 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.

Nomination Requirements

Each nomination must provide the following documents:

- contact information for the Nominee,
- a Curriculum Vita of the Nominee of not more than five pages,
- a statement of not more than 500 words that explains how the Nominee meets the selection criteria,
- a citation of not more than 75 words that explains the Nominee's accomplishments,
- the contact information and signatures of the principal Nominator as well as two additional CMS members not on the Selection Committee who support the nomination, with at least one of these supporting individuals being a current Fellow. Each supporting individual is asked to explain in a sentence or two why they are supporting the nomination.

Eligibility

Nominee:

To be eligible for nomination as a Fellow, the individual being nominated must be a CMS member for the year during which he or she is nominated (2021) and have been a member for the prior year (2020).

Nominator:

To be eligible as a Nominator, a current year (2021) CMS membership is required. A member can serve in the role of Nominator for no more than two (2) nominees in a calendar year. Members of the Fellows Selection Committee may not participate in a nomination. Self-nominations are not permitted.

Supporting Member:

Each nomination must additionally be supported by two current CMS members who are not on the Fellow Selection Committee, and at least one of these supporting members being a current Fellow.

Submission

The nomination requirements listed above should be included in a nomination in order to be a complete nomination. A CMS member may nominate a maximum of two Fellows in a calendar year.

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

Nominations should be submitted electronically, preferably in PDF format, to fellows@cms.math.ca **before the deadline above.**

Canadian Mathematical Society
Société mathématique du Canada

SUMMER MEETING
RÉUNION D'ÉTÉ *2022*

ST. JOHN'S, NEWFOUNDLAND

SAINT JEAN, DE TERRE-NEUVE

JUNE 3-6, 2022 | 3 - 6 JUIN 2022

MEMORIAL UNIVERISTY

PUBLIC PLENARY | CONFÉRENCE PUBLIQUE
ELISABETH WERNER (CASE WESTERN RESERVE UNIVERSITY)

PLENARY LECTURES | CONFÉRENCES PLÉNIÈRES
NATALIA KOMAROVA (UNIVERSITY OF CALIFORNIA, IRVINE)
JACOB TSIMERMAN (UNIVERSITY OF TORONTO)
MIROSLAV LOVRIC (MCMASTER UNIVERSITY)

PRIZE LECTURES | CONFÉRENCES DE PRIX
JEFFERY-WILLIAMS PRIZE | PRIX JEFFERY-WILLIAMS
ANDRÉ JOYAL (UNIVERSITÉ DU QUÉBEC À MONTRÉAL)
KRIEGER-NELSON PRIZE | PRIX KRIEGER-NELSON
MATILDE LALIN (UNIVERSITÉ DE MONTRÉAL)

CATHLEEN SYNGE MORAWETZ PRIZE | PRIX CATHLEEN SYNGE MORAWETZ
ANDREI BURLATOW (SIMON FRASER UNIVERSITY)

SCIENTIFIC DIRECTORS | DIRECTEURS SCIENTIFIQUES
MARCO MERKLI, MEMORIAL UNIVERSITY
CHUNHUA OU, MEMORIAL UNIVERSITY

summer22.cms.math.ca | ete22.smc.math.ca

Call for Speakers at 2022 Summer Meeting Sessions

The Canadian Mathematical Society (CMS) invites you to submit an abstract to participate in one of the planned sessions at the 2022 CMS Summer Meeting. The Canadian Mathematical Society has created an **open abstract submission process** to support session organizers in their important work and in their efforts towards inclusivity and diversity. We encourage applications from members who identify as part of traditionally under-represented groups, including, but not limited to: Women, Indigenous Peoples, Persons with Disabilities, Members of Visible Minorities and/or Racialized Groups, and members of the LGBTQ+ Community. The CMS also welcomes applications from Graduate Students.

Applicants must submit their presentation abstract using this link. For more information, applicants should visit the meeting website, which displays a list containing an abstract for each session. This will allow all session information to be viewed before submission of an application.

Once the deadline has passed and the open call has concluded, session organizers will be able to select and invite successful candidates from the pool of abstracts received, as well as from their list of potential speakers that they had included in their proposal. The CMS encourages organizers to invite speakers from under-represented groups and graduate students who would not normally have the opportunity to present at CMS meetings.

Upon approval of their presentation, speakers must register for the meeting in order to be able to submit their abstract to the CMS website. Please note that this year, thanks to the RBC Foundation's generous sponsorship of our Closing the Gap initiative, we are able to offer discounted meeting registration rates to CMS members and non-members **aged 15-29** who identify as part of one or more of the groups mentioned above.

The scientific sessions will take place from **June 3-6, 2022**.

Speakers must submit abstracts to session organizers for approval no later than **Friday, April 15, 2022**.

Successful applicants must submit their abstract to the CMS by **Tuesday, May 10, 2022**.

Funding for CMS Member Students:

With the support of the Memorial University, Centre de recherches mathématiques (CRM), the Fields Institute, and Pacific Institute for the Mathematical Sciences (PIMS), grants are available to fund a portion of the travel and accommodation expenses for bona fide graduate students at a Canadian or other university and CMS student members. Canadian students will be given preference.

Applicants should ask their supervisor or departmental graduate advisor to complete the online application form here no later than **April 30, 2022**.

The CMS will notify applicants of the funding decision after applications have closed. If successful, the student will receive a cheque for reimbursement of expenses **after** the meeting and **upon completion and submission of the standard Travel Expense Claim Form, along with appropriate original receipts**.

Scientific Directors:

Chunhua Ou (Memorial):ou@mun.ca
Marco Merkli (Memorial): merkli@mun.ca
CMS Office: meetings@cms.math.ca

Summer 2022 Call for Sessions

The Canadian Mathematical Society (CMS) welcomes and invites session proposals and mini-course proposals for the 2022 CMS Summer Meeting in St. John's from June 3-6, 2022.

PLEASE NOTE: Due to the uncertainty of the COVID pandemic, the 2022 Summer Meeting may be switched to an online platform. We will post this decision by the end of March, and if a decision is made earlier, we will inform all session organizers directly.

CALL FOR SESSIONS

In accordance with the CMS mandate to *propose conferences which are accessible and welcoming to all groups*, diversity amongst organizers and speakers is strongly encouraged. Diversity includes topics of interest, career stages, geographic location, and demographics.

Proposals should include:

(1) Names, affiliations, and contact information for all session co-organizers. Early career researchers are encouraged to propose sessions.

(2) A title and brief description of the topic and purpose of the session. This can include an overview of the subject.

(3) The total number of expected talks, with a list of possible speakers and/or papers in the theme. It is expected that all sessions will make efforts to include speakers from designated underrepresented groups. These groups include, but are not limited to, women, Indigenous Peoples, persons with disabilities, members of visible minority/racialized groups, and members of LGBTQ2+ communities. Intention to include new PhD's and to make the session accessible to graduate students is also encouraged.

We kindly ask that you refrain from inviting speakers until after your session has been approved and until after the open call for talk abstracts has concluded.

New! Open Call for Abstracts: The CMS is creating an **open abstract submission process** to support session organizers in their important work and in their efforts towards inclusivity and diversity. After the open call has concluded, session organizers will be able to select and invite speakers from amongst the abstracts received and/or from their list of potential speakers as indicated in their proposal.

The scientific sessions will take place during **June 3-6, 2022**. Those wishing to organize a session should send a proposal to the Scientific Directors and copy the CMS office: meetings@cms.math.ca.

Proposals should be submitted by **Monday, March 14, 2022**.

Abstracts should be submitted no later than **Friday, April 15, 2022** to the session organizers for approval.

CALL FOR MINI-COURSES

The CMS is organizing three-hour mini-courses to add more value to meetings and make them attractive for students and researchers to attend.

The mini-courses will be held on Friday, June 3, before the public lecture, and include topics suitable for graduate students, postdocs and other interested parties.

Proposals should include names, affiliations, and contact information for all the mini-course co-organizers and title and brief description of the focus of the mini-course.

In the meantime, if you have any questions or concerns, please do not hesitate to contact us.

Scientific Directors: Chunhua Ou (Memorial)- ou@mun.ca ; Marco Merkli (Memorial)- merkli@mun.ca

CMS Office: meetings@cms.math.ca

David Wehlau (RMC and Queen's)

I have many fond memories of Bruce Shawyer. He was a treasured mentor and friend. I knew Bruce before being an undergraduate student at Western in 1979. Both my parents were Astronomy professors at Western and they had all been in the same Physical Science department before it was subdivided into specialities. This led to a friendship between our families. I well remember attending semi-pro baseball games watching the London Majors as a pre-teen and teenager. Bruce would often attend games and occasionally would look after me in my parent absence. He was a push-over for getting an ice cream or hotdog.

Later, when I became a student at Western he supervised me and two other undergraduates, David Cowan and Pam Hagan, for an NSERC Undergraduate Summer Research Project after my second year. The department had purchased one of the newly released Radio Shack TRS-80 personal computers. We were tasked with writing software that would allow the departmental secretaries to enter books into a small departmental library catalogue. In retrospect, this was a doomed task but Bruce was very encouraging and kept our spirits up. I developed a comprehensive knowledge of the TRS-80 machine language and many skills for optimizing code to fit within the 68 byte cassette tape buffer available to us. Unfortunately, this skill has proved to be of limited use in later years.

However, in addition to working on this programming project Bruce exposed us three undergrads to a number of fascinating mathematical topics. In particular, he would allow us to borrow books from his personal library. I remember him lending *Naïve Set Theory* as well as *Mathematics Made Difficult*. The latter was a favourite of his and I treasure my own photocopied version. I happily pass on Bruce's recommendation to locate and read this brilliant book.

Bruce was the long-time Associate Head of Mathematics at Western and I often visited him or sought his advice in his office in Middlesex College. He was always willing and happy to help me. Over the years, I regularly saw Bruce either at CMS meetings or when I visited Memorial University. He was always warm, friendly, generous and had a quick wit. I will miss him.

Editorial Team

CMS Notes

Editors-in-Chief
Robert Dawson and Srinivasa Swaminathan
notes-editors@cms.math.ca

Editor
Jessica Horobetz
communications@cms.math.ca

Contributing Editors:

Calendar and Member Relations:
Levente Olvaso
mpagent@cms.math.ca

CSHPM:
Amy Ackerberg-Hastings and Hardy Grant
aackerbe@verizon.net and hardygrant@yahoo.com

Book Reviews:
Karl Dilcher
notes-reviews@cms.math.ca

Education:
Kseniya Garaschuk and John McLoughlin
kseniya.garaschuk@ufv.ca and johngm@unb.ca

Meetings:
Jessica Wallace
notes-meetings@cms.math.ca

Executive Committee

President:
Javad Mashreghi (Laval)
president@cms.math.ca

President-Elect:
David Pike (Memorial)
pres-elect@cms.math.ca

Vice-President – Atlantic:
Tim Alderson (UNBSJ)
vp-atl@cms.math.ca

Vice-President – Quebec:
Matilde Lalin (Montréal)
vp-que@cms.math.ca

Vice-President – Ontario:
Monica Nevins (Ottawa)
vp-ont@cms.math.ca

Vice-President – West:
Vacant

Vice-President – Pacific:
Liam Watson (UBC Vancouver)
vp-pac@cms.math.ca

Treasurer:
David Oakden
treasurer@cms.math.ca

Research:
Vacant

Corporate Secretary:
Termeh Kousha
corpsec@cms.math.ca

The editors welcome the submission of 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.