IN THIS ISSUE

Barbara Csima (University of Waterloo)
President-Elect, CMS

International Women's Day is on March 8th, and you will see that issues related to women are a theme in this month's CMS Notes. No matter your gender identity, March 8th is a day to recognise the achievements and struggles of women around the world.

International Women's Day is observed in different ways around the world, and will mean different things to different people. My earliest memories of Women's Day were that my dad would always bring a single cut flower for me, my mom, and my two sisters. It made me feel special to be counted as a woman. When I was a girl, I had learned of the struggles that women had faced. That they hadn't always been allowed to study, or work, or vote. I was happy to be growing up in Canada in the 1980s, when women were equals and had all the opportunities of men. I understood that for the most part, women would not be able to compete in sports against men due to their different body types. But as far as what I thought I was interested in, a future in math or computer science or business or such, I thought it was all good. It took me a while to notice that the women's movement wasn't done, that maybe, there were still differences in how women were viewed, and the opportunities available to them. I do think that my cheerful optimism pushed me through some situations, thinking it was a weird blip that there were way more boys than girls in the math league in high school, and then in the math program in undergrad, and just plowing through.

It was in my senior years of undergraduate studies and in graduate school that it started to be apparent to me that sometimes, people were looking at me differently because I was a woman. I won't share anecdotes because most of them involved good people who later became quite supportive. But there were definitely some uncomfortable moments, and moments where I felt that I wasn't being viewed fairly. On the flip side, I stood out because I was a woman, and this was often an advantage. Everyone knew who I was, and remembered me. And I definitely benefited from attempts to increase female representation in mathematics, with more invitations and opportunities than my male counterparts. So still, I was confused: It's pretty nice for women in math, so where are the women?

I had somehow forgotten about the main big difference between females and males: It is the females who give birth to children. Though science is making advances, still, all people alive today have spent at least several months in a female's womb. One might think that this shouldn't matter so much, but it does. Some women know that they will not be able to carry children, for whatever reason. This can be hard. Some women hope to have children, but aren't sure how to time it, since these things are not on a clear schedule, and it may not work out if you leave it too long. This also a hard choice. If you decide and are able to have children, now you're a mom (maybe we reflect on that in May). Maybe you want to have children and cannot. Maybe you choose not to have children. Whatever your choice, society will have expectations of you, and one can feel a lot of pressure. Moreover, reproduction is not something we often discuss, so this pressure is often carried by women with very few people with whom to share their hopes, fears, and general thoughts. For a career in research mathematics, there are a lot of pressures to produce at a high level during these reproductive years. I found it to be a very difficult thing, and so I am no longer surprised that other women may have made a different choice. And indeed, the perception that girls ought to grow up into moms will possibly affect where parents try to direct their daughters, which can be influential. But then, with fewer women as mentors, perhaps other young women are less likely to imagine themselves in the profession, and shy away.

Even as I write this note, I'm still confused as to why there aren't more women in math, and why the proportion decreases as the level rises. What is also puzzling is why some STEM areas attract more women than others? It is something to reflect on as we try to ensure that all people have access to mathematics.

Now in the 2020s, I'm certainly more jaded about being a woman than I was in the 1980s. But I am still so grateful to be a woman in Canada, who can vote, go to work, choose whether to try to carry a child, and whose daughter is allowed to go to school. Other women around the world are not so lucky. So this International Women's Day, I am thankful to the people who fought in the past for gender equality, and hope that as a society we can create better opportunities for women both in Canada and around the world. Just think of the beautiful mathematics they might produce.

Barbara Csima (University of Waterloo)

President-Elect, CMS

La Journée internationale des femmes a lieu le 8 mars, et vous verrez que les questions relatives aux femmes sont un thème dans les Notes de la SMC de ce mois-ci. Quelle que soit votre identité de genre, le 8 mars est une journée de reconnaissance des réalisations et des luttes des femmes dans le monde entier.

La Journée internationale des femmes est célébrée de différentes manières à travers le monde et revêt des significations différentes selon les personnes. Dans mes premiers souvenirs de la Journée des femmes, mon père apportait toujours une fleur coupée pour moi, ma mère et mes deux sœurs. Je me sentais spéciale d'être considérée comme une femme. Quand j'étais petite, j'avais appris les luttes auxquelles les femmes étaient confrontées. Elles n'avaient pas toujours eu le droit d'étudier, de travailler ou de voter. J'étais heureuse de grandir au Canada dans les années 1980, lorsque les femmes étaient égales et avaient toutes les chances des hommes. Je comprenais que, dans la plupart des cas, les femmes ne pouvaient pas rivaliser avec les hommes dans les sports en raison de leur morphologie différente. Mais pour ce qui est de ce qui m'intéressait, un avenir dans les mathématiques, l'informatique, les affaires ou autres, je pensais que tout allait bien. Il m'a fallu un certain temps pour me rendre compte que le mouvement des femmes n'était pas terminé, qu'il y avait peut-être encore des différences dans la manière dont les femmes étaient perçues et dans les possibilités qui leur étaient offertes. Je pense que mon optimisme jovial m'a permis de surmonter certaines situations, en pensant que le fait qu'il y ait beaucoup plus de garçons que de filles dans la ligue de mathématiques au secondaire, puis dans le programme de mathématiques à l'université, était une bizarrerie et que je pouvais tout simplement aller de l'avant.

C'est au cours de mes dernières années d'études de premier cycle à l'université que j'ai commencé à me rendre compte que, parfois, les gens me regardaient différemment parce que j'étais une femme. Je ne raconterai pas d'anecdotes, car la plupart d'entre elles concernaient de bonnes personnes qui, par la suite, m'ont beaucoup soutenue. Mais il y a eu des moments inconfortables et des moments où j'ai eu l'impression qu'on ne me regardait pas de la même manière. D'un autre côté, je me distinguais parce que j'étais une femme, et c'était souvent un avantage. Tout le monde savait qui j'étais et se souvenait de moi. Et j'ai certainement bénéficié des tentatives visant à accroître la représentation des femmes dans les mathématiques, avec plus d'invitations et d'opportunités que mes homologues masculins. Malgré tout, je suis restée perplexe : c'est plutôt bien pour les femmes en mathématiques, mais où sont les femmes ?

J'avais oublié la principale différence entre les femmes et les hommes : Ce sont les femmes qui donnent naissance aux enfants. Bien que la science fasse des progrès, tous les êtres humains vivant aujourd'hui ont passé au moins plusieurs mois dans l'utérus d'une femme. On pourrait penser que cela n'a pas tant d'importance, mais c'est pourtant le cas. Certaines femmes savent qu'elles ne pourront pas porter d'enfants, pour une quelconque raison. Cela peut être difficile. Certaines femmes espèrent avoir des enfants, mais ne sont pas sûres de savoir comment s'y prendre, car ces choses ne se font pas selon un calendrier précis, et il se peut que cela ne fonctionne pas si vous attendez trop longtemps. C'est aussi un choix difficile. Si vous décidez et pouvez avoir des enfants, vous êtes maintenant une mère (nous réfléchirons peut-être à ce sujet en mai). Peut-être que vous voulez avoir des enfants et que vous ne le pouvez pas. Peut-être choisissez-vous de ne pas avoir d'enfants. Quel que soit votre choix, la société aura des attentes à votre égard, et vous pouvez ressentir beaucoup de pression. De plus, la reproduction n'est pas un sujet dont nous discutons souvent, de sorte que cette pression est souvent supportée par des femmes qui ont très peu de personnes avec qui partager leurs espoirs, leurs craintes et leurs réflexions générales. Pour une carrière dans la recherche en mathématiques, il y a beaucoup de pressions pour produire à un niveau élevé pendant ces années de reproduction. J'ai trouvé cela très difficile, et je ne suis donc plus surprise que d'autres femmes aient pu faire un choix différent. En effet, la perception selon laquelle les filles doivent devenir des mères influencera peut-être la manière dont les parents tentent d'orienter leurs filles, ce qui peut exercer une influence. Mais alors, avec moins de femmes comme mentors, peut-être que d'autres jeunes femmes sont moins susceptibles de s'imaginer dans la profession, et qu'elles s'en éloignent.

Au moment même où j'écris cette note, je ne comprends toujours pas pourquoi il n'y a pas plus de femmes en mathématiques et pourquoi la proportion diminue à mesure que le niveau s'élève. Je ne comprends pas non plus pourquoi certains domaines des STIM attirent plus de femmes que d'autres. C'est une question à laquelle il faut réfléchir alors que nous essayons de faire en sorte que tout le monde ait accès aux mathématiques.

Aujourd'hui, dans les années 2020, je suis certainement plus blasée d'être une femme que je ne l'étais dans les années 1980. Mais je suis toujours aussi reconnaissante d'être une femme au Canada, qui peut voter, travailler, choisir d'essayer de porter un enfant et dont la fille est autorisée à aller à l'école. D'autres femmes dans le monde n'ont pas cette chance. En cette Journée internationale des femmes, je suis donc reconnaissante aux personnes qui se sont battues par le passé pour l'égalité des sexes et j'espère qu'en tant que société, nous pourrons créer de meilleures opportunités pour les femmes, tant au Canada que dans le reste du monde. Pensez seulement aux belles mathématiques qu'elles pourraient produire.

Robert Dawson (Saint Mary's University)

Editor, CMS Notes

Don't worry, I'm not suggesting that calculus has gone downhill, or that it's about to do so. As long as things change smoothly (and the laws of physics, among others, suggest that that's not about to end) we'll need derivatives to measure the rate of change, and integrals to total its effects. Rather, I'm referring to the first semester of calculus, which most science students take in the autumn in which they arrive on campus.

It's probably much the same course that you took. Well, maybe you taught yourself from *Schaum's Outline* or *Prof. E. McSquared's Calculus Primer,* or were admitted into a select class using Apostol… but first calculus courses at most universities are pretty much the same, and the textbooks reflect it. James Stewart's excellent "Violin Book", now in its nth edition, is the type specimen: but most of the others are isomorphic.

The biggest change since when I started teaching here at Saint Mary's is that "Math 200" was still a one-year course then, as it was at many universities. (The number started with 2 because we'd had a post-grade-11 admission stream; 100-level courses had been Grade 12 level.) Stewart's text was written back in those days: as everybody was there for the whole year, the important thing was for the order of material to be as logical as possible. Review of Functions, Limits, Derivatives, Theorems and Applications of Derivatives, Integrals. At the end of Chapter 5, if all had gone well, the class took their first steps in integration just in time for the Christmas exam, and in January the course began again where it had left off.

The problem with that, of course, was that if anybody fell behind in the first semester, it would be a long wait until they could retake the course in summer. So, not long after my arrival, we broke it into two one-semester courses, and offered each one in each semester. But we were still doing (for most students) limits in September, derivatives in October, integration by parts in January… the same old tune from Stewart's well-crafted violin. And why not? Everybody was still there for the whole concert, even though some of them were now restarting in January.

But along the way some science departments decided that their students might get more use out of, say, one semester of calculus and one of programming, or maybe linear algebra. (Engineering, computing science, and other math-heavy fields are of course still requiring "all of the above" and more.) So their calendar requirements changed… and that's maybe not a bad thing. But it does lead to a problem. Most scientists need differential and integral calculus in approximately equal measure… and the first movement of Stewart's *Violin Concerto in F Prime*, on its own, doesn't provide that. That's not his fault: it wasn't meant to.

So is it possible to rearrange first year calculus in order to make Math 1210 (as we now call it) work better as a standalone course? Maybe some material on limits can be moved into the second semester? Perhaps there are some integration techniques (trig substitution?) that many life sciences students don't need? It's not clear yet if we can adapt the content, or how. But… maybe we should fiddle with it.

Robert Dawson (Saint Mary's University)

Editor, CMS Notes

Ne vous inquiétez pas, je ne veux pas dire que le calcul s'est dégradé ou qu'il est sur le point de le faire. Tant que les choses changeront en douceur (et les lois de la physique, entre autres, suggèrent que ce n'est pas près de s'arrêter), nous aurons besoin de dérivées pour mesurer le taux de changement et d'intégrales pour totaliser ses effets. Je fais plutôt référence au premier semestre de calcul, que la plupart des étudiants en sciences suivent à l'automne de leur arrivée sur le campus.

Il s'agit probablement du même cours que vous avez suivi. Peut-être avez-vous appris tout seul à partir du Schaum's Outline ou du Calculus Primer du professeur E. McSquared, ou avez-vous été admis dans une classe sélective grâce à Apostol... mais les premiers cours de calcul dans la plupart des universités sont à peu près les mêmes, et les manuels le reflètent. L'excellent « Violin Book » de James Stewart, qui en est à sa énième édition, est le spécimen type : mais la plupart des autres sont isomorphes.

Le plus grand changement depuis que j'ai commencé à enseigner ici à Saint Mary's est que le cours « Math 200 » était encore un cours d'un an, comme c'était le cas dans de nombreuses universités. (Le chiffre commençait par 2 parce que nous avions une filière d'admission après la 11e année ; les cours de niveau 100 étaient du niveau de la 12e année). Le texte de Stewart a été écrit à l'époque : comme tout le monde était là pour toute l'année, l'important était que l'ordre des matières soit aussi logique que possible. Révision des fonctions, limites, dérivées, théorèmes et applications des dérivées, intégrales. À la fin du chapitre 5, si tout s'est bien passé, la classe fait ses premiers pas dans l'intégration juste à temps pour l'examen de Noël et, en janvier, le cours reprend là où il s'était arrêté.

Le problème, bien sûr, c'est que si quelqu'un prenait du retard au premier semestre, il fallait attendre longtemps avant de pouvoir reprendre le cours pendant l'été. Peu de temps après mon arrivée, nous avons donc scindé le cours en deux sessions d'un semestre, et nous avons proposé chacune d'entre elles à chaque semestre. Mais nous continuions à faire (pour la plupart des étudiants) les limites en septembre, les dérivés en octobre, l'intégration par parties en janvier... la même vieille chanson du violon bien fait de Stewart. Et pourquoi pas ? Tout le monde était encore là pour tout le concert, même si certains d'entre eux recommençaient en janvier.

Mais en cours de route, certains départements scientifiques ont décidé que leurs étudiants tireraient un meilleur parti d'un semestre de calcul et d'un semestre de programmation, ou peut-être d'algèbre linéaire. (L'ingénierie, l'informatique et d'autres domaines à forte intensité mathématique continuent bien sûr à exiger « tout ce qui précède » et plus encore). Leurs exigences calendaires ont donc changé... et ce n'est peut-être pas une mauvaise chose. Mais cela pose un problème. La plupart des scientifiques ont besoin de calcul différentiel et intégral dans des proportions à peu près égales... et le premier mouvement du *Concerto pour violon en « F Prime »* de Stewart, à lui seul, ne le leur permet pas. Ce n'est pas sa faute : il n'était pas censé le faire.

Est-il possible de réorganiser le cours de calcul de première année afin que Math 1210 (comme nous l'appelons maintenant) fonctionne mieux en tant que cours indépendant ? Peut-être que certaines matières sur les limites peuvent être déplacées au second semestre ? Peut-être y a-t-il des techniques d'intégration (substitution de trigonométrie ?) dont beaucoup d'étudiants en sciences de la vie n'ont pas besoin ? Il n'est pas encore clair si nous pouvons adapter le contenu, ni comment. Mais... peut-être devrions-nous y réfléchir.

John Grant 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.

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The booklets in the series, A Taste of Mathematics (ATOM), are published by the Canadian Mathematical Society (CMS). They are designed to provide enrichment materials for pre-university students, and their teachers, who have an interest in mathematics. Some booklets in the series will cover materials useful for mathematical competitions at national and international levels, while other booklets may cover topics of broad interest to students and teachers such as puzzle collections, applications of mathematics, as well as treatises through a historical, social, or cultural lens.

The above description appears at https://cms.math.ca/publications/atom-booklets/ where more can be found about the ATOM collection. Few hard copies of the booklets remain available for purchase though the booklets are readable in pdf formats that can be accessed by opening the respective volumes. The most recent publication, Volume XVII, *Mathematical Logic Puzzles on a Grid* appears in a freely accessible electronic format. This will be the case for any future volumes. The seventeen volumes span in publication dates from 1997 through 2022. Titles are listed here.

ATOM Volume XVII: Mathematical Logic Puzzles on a Grid
ATOM Volume XVI: Recurrence Relations
ATOM Volume XV: Géométrie plane, avec des nombres
ATOM Volume XIV: Sequences and Series
ATOM Volume XIII: Quadratics and Complex Numbers
ATOM Volume XII: Transformational Geometry
ATOM Volume XI: Problems for Junior Mathematics Leagues
ATOM Volume X: Modular Arithmetic
ATOM Volume IX: The CAUT Problems
ATOM Volume VIII: Problems for Mathematics Leagues III
ATOM Volume VII: Problems of the Week
ATOM Volume VI: Problems for Mathematics Leagues II
ATOM Volume V: Combinatorial Explorations
ATOM Volume IV: Inequalities
ATOM Volume III: Problems for Mathematical Leagues
ATOM Volume II: Algebra – Intermediate Methods
ATOM Volume I: Mathematical Olympiads' Correspondence Program (1995-1996)

Generally speaking the volumes fall into three broad categories: problem collections; specific mathematical topics; and recreational mathematics.

Several volumes are collections of problems whether from math leagues or correspondence programs, as suggested by the titles. Volumes III, VI and VII feature problems and solutions from the Newfoundland and Labrador Senior Math League. A description of the other math league collection appears here. Its content would be the most elementary of all volumes as it is geared to students in intermediate grades.

ATOM Volume XI: Problems for Junior Mathematics Leagues
Bruce L.R. Shawyer & Bruce B. Watson (both of Memorial University)

The problems in this volume were originally designed for mathematics competitions aimed at students in the junior high school levels (grade 7 to 9) and including those students who may have the talent, ambition and mathematical expertise to represent Canada internationally. The problems herein function as a source of "out of classroom" mathematical enrichment that teachers and parents/guardians of appropriate students may assign to their charges. To aid in this, answers and complete solutions are provided to all the problems (except the relays where there are answers only) and problems and solutions are presented in separate chapters. The authors have also deliberately avoided the temptation to discuss the various mathematical concepts or to intrude in any way with what is done in the school system. This volume is similar to previous publications on Problems for Mathematics Leagues in this series.

Further, *The CAUT Problems* volume draws upon contributions of Ed Barbeau to the CAUT publication, and *Problems of the Week* features 80 problems offered by Jim Totten as problem challenges to undergraduate students in Kamloops.

Many volumes focus attention on mathematical topics with an eye to developing knowledge in an area. These volumes incorporate a problem solving bent with problems drawing upon the topic at hand whether modular arithmetic, inequalities, sequences and series or any other. The lone French publication in the series falls into this group. The description follows.

ATOM Volume XV: Géométrie plane, avec des nombres
Michel Bataille (Rouen, France)

On constate actuellement un fort déclin de la géométrie dans les programmes de mathématiques de nombreux pays. Dans ces conditions, l'étudiant.e confronté à un problème de géométrie (d'une olympiade, par exemple) peut se sentir à court d'idées bien en peine, par manque de pratique et de connaissances, de découvrir une solution « par la géométrie pure ». La géométrie analytique pourra souvent lui apporter une aide appréciable, en l'emmenant rapidement sur le terrain plus familier de l'algèbre élémentaire. Ce tome de la série ATOM propose de nombreux problèmes, certains classiques, tous traités dans le cadre de la géométrie analytique. Dans les quatres premiers chapitres, après des rappels illustrés d'exemples entièrement traités, plusieurs problèmes sont proposés, tous résolus dans le cinquième chapitre. J'espère ainsi fournir à l'étudiant.e une méthode directe et simple de résolution et par là, renforcer son assurance et aviver son goût pour la géométrie.

Finally, a pair of volumes offers more of a recreational mathematical flavour. The most recent publication in the series is described and linked here.

ATOM Volume XVII : Mathematical Logic Puzzles on a Grid
Susan Milner (University of the Fraser Valley)

This book is intended to introduce secondary students to the joys of logical reasoning by way of puzzles. The four types of puzzles described herein have been successfully shared with people from ages 12 to 90. The hope is that students, teachers, and any curious puzzle enthusiasts will find the collection accessible, enjoyable, and a gateway to increasingly challenging puzzles. No prior mathematical knowledge is assumed aside from basic numeracy.

The other volume with a recreational mathematical slant blends investigations and challenges. *Combinatorial Explorations* (written by Richard Hoshino and John Grant McLoughlin) is built around three problems rather than four puzzles. An excerpt from the description appears here.

> *Combinatorial Explorations contains an introduction to Combinatorics through the analysis of three core problems: Handshakes, Routes, and Checkerboards. Each chapter features one of these problems as a springboard for mathematical problem solving. Problem sets, extensions, novel twists, and the inclusion of open-ended investigations offer means through which readers can delve deeper into the mathematics.*

Concluding comments

The ATOM collection is a rich resource for students, teachers and armchair mathematical enthusiasts who enjoy dabbling with mathematical challenges. Engagement with the material will sharpen mathematical knowledge and problem-solving abilities. Enjoy the opportunity to browse the descriptions and immerse yourself with one or two of the titles that interest you. Readers are encouraged to make others aware of this resource. It is hoped that the exposition of ideas and descriptions in this feature will pique the curiosity of many to consider a resource drawn made available through the CMS itself.

An abbreviated adaptation of a problem posed by Ed Barbeau in *The CAUT Problems* is shared to close this piece. Perhaps you can solve it mentally or with some playful consideration.

> The three hymn numbers for a church service each contain three digits. Together the hymn numbers use each of the digits 1 through 9 exactly once and the hymn numbers are in the ratio of 1:3:5. Determine the hymn numbers for the service.

Roger Godard (Royal Military College of Canada)

The history of mathematics is plural; thus, mathematicians have expressed differing views about what mathematics is and whether it has changed over time. For instance, contrast Henri Poincaré's 1908 statement:

> If we wish to foresee the future of mathematics, our proper course is to study the history and present condition of the science [7, p. 19].

with the 1938 reflection of Jean Cavaillés, a French philosopher of mathematics:

> The mathematician does not need to know the past, because his vocation is to refuse it . . . in the measure where he rejects the authority of the tradition, does not recognize an intellectual climate, in this measure alone, he is a mathematician [quoted in 3, p. 5, translated by the author].

or with Gaston Bachelard's observation:

> A truly new mathematical idea is also an immediate reorganization of all the ancient ideas [quoted in 3, p. 5, translated by the author].

Although these quotations sum up to only a few sentences, they reveal the complexity and variety of opinions on the history of mathematics held by scholars. In the remainder of this column, we offer several additional examples for readers to ponder. We close by suggesting several resources for delving more deeply into the nature of mathematics in the past, present, and future, as well as for contemplating relationships between history of mathematics, mathematical research, and the teaching and learning of mathematics.

The Bourbaki group was created in France in 1934 by Henri Cartan, Claude Chevalley, Jean Delsarte, Jean Dieudonné, André Weil, Jean Coulomb, René de Possel, Charles Ehresmann, and Szolem Mandelbrojt. Over the next decades, they published collectively *Éléments de mathématique*, a series of modern textbooks in mathematics. They collected their notes about the history of mathematics in their 1960 *Éléments d'histoire des mathématiques*, issuing the following warning:

> Finally, the reader will not find in these notes practically any biographical or anecdotal information on the mathematicians we are talking of; we have mainly looked for and emphasized each theory as clearly as possible [1, p. iii, translated by the author].

Figure 2. Cartan, de Possel, Dieudonné, Weil (standing), Mirlès, Chevalley, and Mandelbrojt (seated) at the first official meeting of the Bourbaki group in 1935. MacTutor.

Dieudonné went on to edit a two-volume "abbreviated" history of mathematics (*Abrégé d'histoire des mathématiques*) in 1977. Although his project was also of most interest to pure mathematicians who were not historians, he adopted an approach that was less rigid than that stated by Bourbaki. Specifically, he no longer equated mathematics with only abstract concepts and rather saw it as unfolding within a human context:

> No more than the other sciences (and despite its reputation of abstraction), mathematics is not a disembodied science, and it would be absurd to separate completely a history of ideas from that of the men who introduced them. An annex at the end of the volume gives some biographical indications about most of the mathematicians quoted during the path of the text [4, translated by the author].

Indeed, in 2024 most mathematicians would deem it essential to associate Leonhard Euler or Jean D'Alembert with the period of the Enlightenment, for example, or to link Augustin-Louis Cauchy's royalist ideas to his career and research.

Let us see how the American Morris Kline presented his notion of the history of mathematics in his very popular three-volume history, first published in 1972:

> This book treats the major mathematical creations and developments from ancient times through the first few decades of the twentieth century. It aims to present the central ideas, with particular emphasis on those currents of activity that have loomed largest in the main periods of the life of mathematics and have been influential in

promoting and shaping subsequent mathematical activity. The very concept of mathematics, the changes in that concept in different periods, and the mathematicians' own understanding of what they were achieving have also been vital concerns [5, preface].

For Dirk J. Struik, mathematics was a vast adventure of ideas, with its history reflecting some of the noblest thoughts of countless generations. Yet, in his 1967 *A concise history of mathematics*, he confessed his difficulty with fulfilling the role of historian:

> The selection of the material was, of course, not based exclusively on objective factors, but was influenced by the author's likes and dislikes, his knowledge and his ignorance. As to his ignorance, it was not always possible to consult all sources first-hand; too often, second- or even third-hand sources had to be used [8, p. 1].

> Our story ends around 1945, for we feel that the mathematics of the last decades of the twentieth century has so many aspects that it is impossible—to this author at any rate—to do justice even to the main trends [8, p. 1].

In 1986 the French authors Amy Dahan-Dalmédico and Jeanne Peiffer did not hesitate to title their book **One** *history of mathematics: roads and mazes*. They commented:

> "History," this term takes on two senses at least. Historiography on one side: a narrative according to a chronological order of what happened in such or such domain of human activity. . . . Genesis on the other side: development, persistence, and transformation of the thing itself that the activity concerns [2, p. 7, translated by the author, who also added emphasis to the title].

Figure 3. Dahan-Dalmédico and Peiffer (fifth and sixth from left) among other historians of mathematics at the Oberwolfach Research Center in 1988. Photo by Enid Grattan-Guinness, Oberwolfach Photo Collection.

Finally, we consider the thoughts voiced in 2000 by George Phillips, who is a professor at the University of St Andrews in Scotland. It appears that he selected topics in the areas of mathematics that particularly interest him, but he challenged the still-common student misperception that mathematics has not changed over time:

> This book is intended for those who love mathematics, including undergraduate students of mathematics, more experienced students, and the vast number of *amateurs*, in the literal sense of those who do something for the love of it. . . . It is fascinating, for example, to follow how both Napier and Briggs constructed their logarithms before

many of the most relevant mathematical ideas had been discovered [6, p. v, emphasis in source]

> I have often been asked, "How can one do research in mathematics? Surely it is all known already!" If this is your opinion of mathematics, this book may influence you towards a different view that mathematics was not brought down from Mount Sinai on stone tables by some mathematical Moses, all ready-made and complete. It is the result of the work of a very large number of persons over thousands of years, and with no end in sight [6, p. vii].

If any or all of these quotations have intrigued you, there are many ways to enter further into the communities of history (and philosophy) of mathematics! The Canadian Society for History and Philosophy of Mathematics (CSHPM) was founded 50 years ago, in 1974, in order to promote research and teaching in the history and philosophy of mathematics. We are a sister society to the Canadian Society for the History and Philosophy of Science (CSHPS), the British Society for the History of Mathematics (BSHM), the Canadian Philosophical Association (CPA), and of course the Canadian Mathematical Society (CMS). A meeting is organized annually, and we publish annals of contributed papers as well as a semiannual newsletter. More than a decade's worth of keynote lectures appeared in 2005. Many members have published articles, monographs, and textbooks, including founder Kenneth O. May (bibliography), Duncan Melville (Mesopotamian mathematics), Len Berggren (medieval Islamic mathematics), Glen Van Brummelen (trigonometry), Robert Bradley (Leonhard Euler), Craig Fraser (Hamilton-Jacobi theory), and Israel Kleiner (abstract algebra), to only scratch the surface of the breadth of interests and productivity of our members.

Figure 4. Participants in a joint meeting of CSHPM and BSHM in Dublin, July 2011. CSHPM/SCHPM *Bulletin*.

In France, the Séminaire d'Histoire des Mathématiques de l'Institut Henri Poincaré was founded in 1948. Its objectives are to maintain and develop the links between mathematicians and historians, and to be a place of exchange for historians of mathematics. Regular lectures and symposia are now under the direction of François Lê and Maarten Bullynck. GDR 3398, History of Mathematics, was established in 2011 by the Institut national des sciences mathématiques et de leurs interactions (INSMI) of the Centre national de la recherche scientifique (CNRS) to support research in history of mathematics in a variety of ways, such as the annual European conference and workshop for graduate students, Novembertagung. GDR 3398 also helps support France's journal, *Revue d'Histoire des Mathématiques*, and digital library, Numdam.

Outside of North America, the Instituts de recherche sur l'enseignement des mathématiques (IREM) have been active at producing textbooks and supporting the use of history in teaching mathematics at the lycée level since 1969. Work on interweaving the history of mathematics with the teaching and learning of mathematics is also pursued by the International Study Group on the Relations between History and Pedagogy of Mathematics, or HPM for short, which meets every 4 years as a satellite to the quadrennial International Congress on Mathematical Education (ICME) gatherings. Those eager to join the international community of scholars and educators who explore the effectiveness of using the histories of mathematics to support student learning will be pleased to know that HPM's next conference is this summer, July 1–5, in Sydney, Australia. To discuss research into the histories of mathematics with mathematicians, historians, and philosophers, please join CSHPM June 15–17 at McGill University for the 2024 Congress of the Canadian Federation for the Humanities and Social Sciences.

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Roger Godard is a retired professor from the Royal Military College of Canada in Kingston, Ontario. He joined the Canadian Society for History and Philosophy of Mathematics in 1991. His fields of interest are mathematical modeling and history of mathematics.

Interview with Jacqueline Doan, a founder of Western's student chapter of the Association for Women in Mathematics

Chris Kapulkin (Western University)

Jacqueline Doan is a person whose energy knows no bounds. During her M.Sc. (2021-23) at Western University, she published four papers and delivered presentations at international conferences. On top of her academic achievements, she also founded and served as the first president of Western's student chapter of the Association for Women in Mathematics (AWM). There are currently over 100 student chapters at universities across North America that help address the existing imbalances and promote success of female mathematicians. Chapters' activities range widely and include networking events, lecture series, outreach activities, and mentoring opportunities among others. While the chapters operate independently of one another, each year the AWM recognizes the most active ones with awards in different categories, like community outreach or scientific excellence.

Jackie was spectacular at running the chapter. Constantly coming up with new creative events, she and the chapter were recognized with an AWM award for outreach among all chapters in 2023. I met with Jackie to speak about her experience founding and running the chapter in hopes that her story inspires some to start new chapters across Canada and others to get involved in their activities. We discussed her reasons for founding the chapter, including her experience as often the only woman in the room, and how the chapter brought positive change for her and other women. We also talked about the chapter's various activities and lessons learned from three years' worth of events, outreach, and community-building.

Chris Kapulkin: Let me start with a somewhat provocative question. Math departments around the world are doing their best to attract female applicants at all levels: from undergraduates to faculty members. Given all these efforts, do we really need student chapters of the AWM?

Jacqueline Doan: When thinking about improving female representation in mathematics and other fields, we need to consider two aspects: recruitment and retainment. I agree that universities are putting a lot of effort into recruitment, but retainment is still lagging. This is why as we are moving to upper levels, from undergraduate to graduate, or from postdoc to assistant professor, we see fewer women. To address this issue, we need to think about the environment women experience when they arrive at our institutions, and frankly, my experience could have been better.

CK: Can you help me understand why?

JD: Mathematics is still a male dominated field. As an undergraduate, when talking to other math students, I felt that my opinion wasn't taken seriously. It happened numerous times that when working on a homework problem together, I would make a suggestion that would be dismissed by my male-only peers. When a few minutes later, another person, this time a man, repeated this exact suggestion, it would be acknowledged as a great insight. You might say "what's the big deal?" but when situations like that happen all the time, it's hard not to let them get to you. You start doubting yourself and question whether you belong in this community.

Being the only woman in the room, I got unsolicited comments about my appearance as an almost daily occurrence. It would be easier to stand up for myself if there was another woman in the room with me. But being alone, I felt I had to go along to get along.

CK: This is all deeply disturbing to hear. Can you speak to ways in which the student chapter helped you and other women?

JD: I started the chapter as a "support group" for women. All of us there could relate in some way to the experiences mentioned before of not being taken seriously, belittled, and objectified. I felt I had people that understood me and how I felt. Until then, I didn't realize how much I needed it.

In the early days of the chapter, we focused on small networking events and workshops that helped us build a tight community. Through this process, I also realized that I had built a lot of internalized misogyny. Being exposed to the culture I was surrounded by, I bought into the expectation of what a mathematician should look like and behave. I subconsciously thought I was "cooler" than other girls because I was hanging out with boys. I recognize now that it was just a coping mechanism. I had to buy into this culture or be completely isolated. The chapter allowed me to break out of this mindset.

I am excited to see how many first and second year students now belong to the chapter. I hope that as a result, other women will have a better experience during their degrees.

CK: Given the success that you have had, students at other universities may wish to start their own AWM student chapter. What advice would you give prospective founders and/or chapter presidents?

JD: I believe in engaging your community in every way possible. I thought of what we can offer those on campus and those in our local community, in London, Ontario. We focused heavily on outreach, going to local high schools, telling students about mathematics as a profession and opportunities for women in mathematics. Many students that are about to graduate high school are unaware of the fact that mathematics is something one can do in life and what career options there are for those with a mathematics degree.

You should also try to leverage your personal network. Our high school visits started with going to my own high school. Because of a contest I participated in before, I had some contacts at a math software company. I casually asked them for funding for an event we were organizing as a chapter and they agreed!

One thing that was difficult for me in the beginning was to start depending on other people. I'm a perfectionist and would like to do everything myself. But to build a community, you need to get others involved. By letting go, you are allowing others to get engaged and feel included in the community you are building. And perhaps even more importantly, once we were a team, we could organize events at a scale that I could not imagine being just one person.

I also appreciate the direction the next presidents took the chapter in. Although I'm no longer at Western, I still hear about the events and am constantly impressed with their creativity and scale.

CK: Speaking of events, which of the events that you have organized stick best in your mind?

JD: As I said, early on, we focused on smaller networking events and I think fondly of their intimate atmosphere. One that stood out was "Professional Headshots" – I have a side interest in photography, so I brought my camera and offered to take everyone's headshot. Very simple but people appreciated it. And it helped us reach new people on campus: students posted their pictures online and were asked where they got professional pictures from. We had several people asking to join the club that gets you professional headshots for free. Of the more recent ones, I really like the idea of "math duels" where members just gathered to solve some math puzzles together and win prizes. It's very simple but it really helps build a community.

I also enjoyed going off campus and visiting local high schools. Going to my own high school was an opportunity to reflect on how far I have come since then. And going to my successor's high school in Stratford allowed me to understand her much better than I did. Not to mention, our car broke down on the way, and dealing with it was perhaps a better bonding experience than I could ever intentionally arrange.

CK: While this feels like a long list, it is just a small part of everything the chapter has done. For those who want to see more, there is a link to the chapter's website at the end of this article. But let's talk about the other side of this picture – what could faculty administrators do to support a student chapter?

JD: When it comes to supporting the student chapter, I feel that less is more. That's something I appreciated at Western: our faculty sponsors arranged funding for our events and left us alone, giving us an opportunity to learn and grow. Not all of our ideas were good, and some events did not work out the way we wanted, but we were able to learn these lessons and improve going forward. And, of course, the fact that we had continued financial support was very helpful in reaching students who might have heard about a club with free food.

Thinking more broadly, I would say that all of us should think about how to make our language less exclusive. Forming inner circles and groups with special privileges tends to promote more confident individuals who can force their way into them. Unfortunately, the atmosphere of exclusivity may persist and makes it harder to establish communication channels between students and faculty. As a result, those mistreated by others are less likely to bring it to anyone's attention, choosing to suffer quietly instead. For that reason, the AWM events are always open to all.
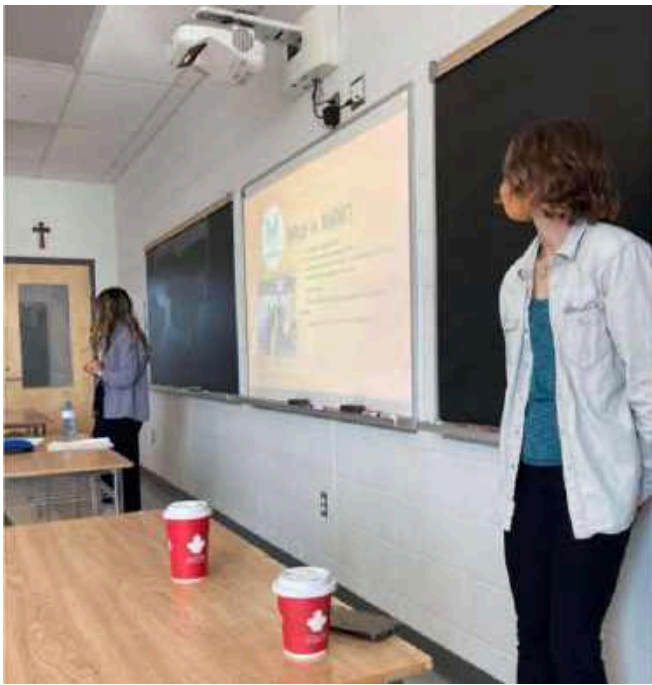
CK: And last but not least, what would be your advice for undergraduate students coming from underrepresented groups?

JD: For those doubting whether mathematics is for them, I would say "you actually like math; keep doing it." Sometimes, all that's needed is a supportive community. Coming from an underrepresented group, you might find it harder to find such a community, so think out of the box and don't be afraid to meet new people.

Be open minded about your interests. Being surrounded by (over)confident people, you might get an impression that you need to know at 18 or 19 exactly what you want to do. You don't! Your interests may evolve and there is no reason to limit yourself. Take a wide range of courses and seek diverse opportunities, like an internship. Your degree will be what you'll make it to be.

I also think there is some role for the AWM chapter to play here. Students from underrepresented groups are less likely to hear about different opportunities, like an NSERC scholarship, through more traditional channels. I wish I was told to talk to my professors and develop my interests much earlier than I was. And for students from underrepresented groups who might not know the ins and outs of academia, this is far from obvious! Both of my parents are immigrants working minimum wage jobs. What others took for granted, I learned quite late in life. I believe the AWM has both the reach and the sensitivity that allows it to minimize many of these inequities.

Western student chapter's website: https://sites.google.com/view/awmwestern Learn how to start your own chapter: https://awm-math.org/programs/student-chapters-info/

Renate Scheidler (University of Calgary)

In mathematics, women continue to be underrepresented in research positions and at the higher levels of education. Despite advances in narrowing this gap, the number of female mathematicians who hold positions at top universities or private sector research labs, are editors-in-chief of influential scholarly journals, or serve on decision making bodies of major funding agencies remains small. In many areas of mathematics, including number theory, women who deliver plenary talks at premier conferences continue to be in the minority.

In an effort to address this imbalance, the *Women in Numbers* (WIN) network [5] was established for the purpose of highlighting the accomplishments of female researchers in number theory. Its goals are to heighten the visibility of contributions by female scholars in the field, increase the participation of women in number theory research, grow the number of active female researchers in the discipline, and offer a research community for women number theorists at all career stages.

Group Photo
Inaugural Women in Numbers Workshop, November 2-7, 2008. Banff International Research Station.

WIN grew out of a fateful conversation at the Workshop on Computational Challenges Arising in Algorithmic Number Theory and Cryptography, hosted by the Fields Institute in Toronto in the fall of 2006. At the daily communal afternoon tea, WIN founders Kristin Lauter, Rachel Pries and I found ourselves discussing the lack of female invited speakers at number theory conferences with Barbara Keyfitz, who served as the Institute's Director at the time. We proposed the idea of organizing a research conference for women in number theory which, rather than following the traditional format of individual presentations, focused instead on research collaborations conducted in small groups. With Barbara's encouragement, we submitted a proposal to hold such a conference as a 5-day workshop at the *Banff International Research Station* (BIRS) in Banff, Alberta. Our BIRS proposal was successful and the series of WIN conferences was born, with the first of its kind held at BIRS in November 2008. In the aftermath of this event, the organizers and many of the participants worked to establish the Women in Numbers network, creating a website [5] and an email distribution list, and eventually forming a steering committee to plan future meetings.

WIN Founders (left to right): Renate Scheidler, Rachel Pries, Kristin Lauter.
Inaugural Women in Numbers Workshop, November 2-7, 2008. Banff International Research Station.

WIN's main mechanism for supporting new number theorists entering the "leaky pipeline" of female underrepresentation is a series of regular workshops where female scholars at all career stages gather to collaborate on cutting-edge research in the field and produce publishable results. These workshops provide an ongoing forum for involving each new generation of early career faculty, postdocs and graduate students in exploring state-of-the-art open problems in number theory. A total of 10 WIN workshops have taken place since 2008. Six of these were hosted by BIRS, approximately every three years, including WIN5 in 2020 which was conducted entirely online due to the COVID-19 pandemic. Four more meetings under the umbrella *WIN Europe* (WINE) were held in varying locations all across Europe, along with numerous other workshops, conferences and symposia spearheaded and organized by members of the WIN community.

The WIN workshops are highly regarded among the broader number theory community due to the excellent quality of research produced by the collaborations. The work is conducted in small groups, usually comprised of 4-6 female researchers at varying career stages. The groups are led by one or two senior women scholars with an outstanding research reputation and a proven track record of effective mentorship who propose the projects and direct the work. Following an open call for applications, the junior participants (doctoral students, postdocs and pre-tenure faculty members) are carefully selected via peer review. After several months of independent background study guided by the project leaders, groups gather at the workshop and sequester for five days of intense collaborative research that continues remotely afterwards and is subsequently published in a peer-reviewed conference proceedings. In many cases, these collaborations last well beyond the duration of the conference and lead to further publications.

Group collaboration at WIN6, March 27-31, 2023. Banff International Research Station.
From left to right: Elisa Lorenzo Garcia, Beth Malmskog, Heidi Goodson, Renate Scheidler, Juanita Duque Rosero.

The unique nature of the WIN conferences was evident from the very start. At the first WIN workshop in 2008, seasoned BIRS staff with many years of experience coordinating some 50 workshops annually remarked that they had never witnessed such a level of enthusiasm and vibrant energy at any BIRS workshop. Many junior WIN participants have stated that the workshops ignited their careers; they have gone on to permanent positions at major research universities and have themselves become successful mentors of young female number theorists, including in the capacity as WIN group leaders, workshop organizers or steering committee members. Several student and postdoc participants of early WIN workshops have grown to become award winning scholars and research leaders in the field. WIN group leaders have reported that finding new research problems and directing a WIN research team represented a formative career experience for them. The WIN network has grown substantially over the years, broadening its activities to include organizing special sessions, student symposia and poster sessions at the annual Joint Mathematics Meetings as well as foster collaborative research targeted at undergraduate students. The WIN initiative and its effort to promote collaboration through research mentorship were highlighted in New York Times bestselling author Janice Kaplan's 2020 book The *Genius of Women* [3].

Since WIN's inception more than 15 years ago, numerous sister research networks for women in a variety of mathematical areas have been established, and the collaborative workshop framework, now generally referred to as the *WIN conference model*, has been widely and fruitfully adopted by many research communities far beyond these networks, both all-female and mixed-gender. In 2015, recognizing the success of the WIN model, the US National Science Foundation awarded a 5-year ADVANCE grant in the amount of US$ 750,000 to the *Association for Women in Mathematics* (AWM). The goal of this grant, entitled "Career Advancement for Women through Research-Focused Networks", was to help build and sustain research networks for women in all fields of mathematics and provide financial support for the Research Collaboration Conferences for Women (RCCW) program. A second NSF grant was awarded to AWM in 2020.

Group Photo
Women in Numbers 6 Workshop, March 27-31, 2023. Banff International Research Station
(the latest WIN workshop).

Today, AWM's website [1] list 26 research networks for women. Their history and successes are chronicled in [2], along with information and guidance on how to start and grow such a network. In addition to BIRS, many major research institutes in the United States and across Europe now host RCCWs on a regular basis. Spearheaded by Founding Editor Kristin Lauter, the peer-reviewed AWM Springer Series [4] was launched in 2014 as a venue for proceedings of conferences worldwide organized by AWM, including the proceedings volumes of research articles produced by the collaboration groups at the RCCWs. To date, this series has published 31 volumes, six of them devoted to WIN conferences. At the time of writing, two more WIN proceedings volumes in this series (WIN5 and WINE4) are in production.

The WIN website [5] aims to be a resource both to women number theorists — as a clearinghouse of information and opportunities relevant to women in numbers — and to the number theory community as a whole, by showcasing the many contributions of women number theorists to the discipline. All are welcome to visit the site, subscribe to the WIN mailing list, or stay in touch via Twitter/X (@WINnumbertheory). Number theorists who identify as a woman in a way that is meaningful to them are also encouraged to add themselves to the WIN directory.

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[5] Women in Numbers Website, womeninnumbertheory.org.

Canadian Mathematical Society
Société mathématique du Canada

RÉUNION D'ÉTÉ DE LA SMC 2024
Saskatoon

31 MAI - 3 JUIN

APPEL DE SESSIONS

La Société mathématique du Canada (SMC) sollicite des propositions de sessions pour la Réunion d'été 2024 de la SMC qui se tiendra à Saskatoon (Saskatchewan) du 31 mai au 3 juin 2024. La date limite de soumission est le 31 mars 2024.

La Société mathématique du Canada invite la communauté mathématique à la Réunion d'été 2024 de la SMC pour quatre jours de conférences de prix, de conférences plénières, de sessions scientifiques et de panels, en plus d'un banquet de remise de prix au Wanuskewin Heritage Park, et des mini-cours le 31 mai.

LES ORATEURS PEUVENT POSTULER POUR PARLER LORS DES SESSIONS JUSQU'AU 29 MARS

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Visitez le site Web pour de plus amples informations

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Canadian Mathematical Society / Société mathématique du Canada

2024 CMS Summer Meeting | Saskatoon, Saskatchewan

CALL FOR
Education Sessions

The Canadian Mathematical Society (CMS) welcomes and invites education session proposals for the 2024 CMS Summer Meeting in Saskatoon from May 31 – June 3.

The education session proposals will be selected by the CMS Meeting Education Session Committee, which will also schedule the accepted sessions, in communication with their co-organizers.

Each proposal should follow the guidelines indicated in the call for Scientific Sessions. In addition, organizers are asked to specify the structure of their session (e.g., 20-minute talk followed by 5 minute Q&A and 5 minute transition; or a panel, or interactive session/workshop, etc.).

Proposals should include:

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

(2) A title and brief description of the topic and purpose of the session. This should include a brief paragraph of the subject.

(3) Two to three sentence summary that will be posted on the CMS Meeting website if your proposal is selected.

(4) Indicate the number of time blocks needed. A block can be between 1 and 3 hours in length.

(5) A list of speakers who have confirmed or who expressed interest and are approached before submitting the proposal. An inclusive and diverse set of speakers is highly encouraged.

(6) The structure of your session. Traditionally, each presenter gets 20 minutes to talk, 5 minutes of Q&A, and a 5-minute buffer for transition. We are open to different formats as well, such as a panel, interactive session/workshop, 10-minute lightning talks, etc

The CMS kindly asks session organizers to consider all eligible abstract submissions for their session, as up to 30 speakers per session can be accommodated.

The scientific sessions will take place from June 1-3, 2024.

Deadline: Proposals should be submitted by **Wednesday, January 31, 2024**. There will be a second deadline of **March 29, 2024**, but earlier submissions will be considered first. Their contact information is as follows:Contact information is as follows:

Andie Burazin a.burazin@utoronto.ca

With Elana Kalashnikov: e2kalash@uwaterloo.ca
Steven Rayan: rayan@math.usask.ca
Jacek Szmigielski: szmigiel@math.usask.ca, and meetings@cms.math.ca in

Canadian Mathematical Society
Société mathématique du Canada

Réunion d'été 2024 de la SMC | Saskatoon, Saskatchewan

APPEL DE
Sessions d'éducation

La Société mathématique du Canada (SMC) sollicite des propositions de sessions en matière d'éducation pour la Réunion d'été 2024 de la SMC qui aura lieu à Saskatoon du 31 mai au 3 juin 2024.

Les propositions de sessions en matière d'éducation seront sélectionnées par le Comité des sessions en matière d'éducation de la réunion de la SMC, qui établira également le calendrier des sessions acceptées, en communication avec leurs co-organisateurs.

Chaque proposition doit suivre les directives indiquées dans l'appel pour les sessions d'éducation. En outre, les organisateur.rice.s sont invité.e.s à préciser la structure de leur session (par exemple, un discours de 20 minutes suivi de cinq minutes de questions-réponses et une autre cinq minutes de transition; ou un panel, ou une session/atelier interactif, etc.)

Les propositions doivent comprendre:
1. Les noms, affiliations et coordonnées de tous les co-organisateurs de séances de formation. Les éducateurs en début de carrière sont invités à proposer des sessions.
2. Un titre et une brève description du sujet et de l'objectif de la session de formation. Cela devrait inclure un bref paragraphe du sujet.
3. Un résumé de deux ou trois phrases qui sera publié sur le site web de la Réunion de la SMC si votre proposition est retenue.
4. Indiquez le nombre de tranches horaires nécessaires. Un bloc peut durer entre 1 et 3 heures.
5. Une liste d'orateurs/oratrices qui ont confirmé ou qui ont exprimé leur intérêt et qui sont sollicité(e)s avant de soumettre la proposition. Un ensemble d'orateurs/oratrices inclusif et diversifié est fortement encouragé.
6. La structure de votre session (par exemple, un exposé de 20 minutes suivi de 5 minutes de questions-réponses et de 5 minutes de transition, ou un panel, ou une session/un atelier interactif, etc.).

La SMC vous prie de considérer les soumissions de tout candidat.e.s admissibles. Jusqu'à 30 orateur.rice.s par session seront accommodés. Les sessions d'éducation se dérouleront du 1 au 3 juin 2024.
Conformément aux propositions de sessions scientifiques. La date limite sera le **31 janvier, 2024**. Une deuxième date limite sera fixée au **29 mars 2024**, mais les demandes antérieures seront examinées en premier lieu

Andie Burazin a.burazin@utoronto.ca

Avec Elana Kalashnikov: e2kalash@uwaterloo.ca, Steven Rayan: rayan@math.usask.ca
Jacek Szmigielski: szmigiel@math.usask.ca, et meetings@cms.math.ca

Canadian Mathematical Society
Société mathématique du Canada

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Wanuskewin Heritage Park
2024 CMS Summer Meeting | Saskatoon, Saskatchewan

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DEER AND EAGLE ROOM | TRANSPORTATION PROVIDED
TICEKTS $110 (Includes Transportation)

Call for *University* Hosts

The Canadian Mathematical Society (CMS) welcomes and invites host proposals from Canadian Universities for the 2026 CMS Summer Meeting with a priority going to Eastern Canada. All proposals will remain valid for upcoming meetings. CMS will provide all logistical support and contract negotiation with local venues. CMS is looking for Canadian Universities who are willing and able to showcase their department and University to students and faculty from across Canada. It is asked that proposals include the following information:

✓ 1. LOCATION

How would people get from the airport to the venue? What are the reasons your city may be of interest to Canadian Mathematicians? Is your university located downtown or would shuttles need to be provided?

✓ 2. SITE

Describe the University where the meeting would be held. Which building would the meeting be in and how many rooms are available for meeting sessions and plenaries? What technological support is available in session rooms? Will these rooms be available during the proposed dates?

✓ 3. LODGING

Is your university able to offer any residence lodging during the conference dates? CMS will take care of contracting and negotiating with hotels. What hotel is closest to the university for lodging?

✓ 4. HOST UNIVERSITY

Please briefly describe your institution and department. What funding support will the Host University have for the CMS Meeting? Is the University available for regular calls and updates on the meetings progress? Is the Host University able to commit and provide at least one scientific director for the meeting? What level of participation do you think there might be from academics at your institution?

The CMS Meetings typically run from Friday to Monday on the first weekend in June and December, but we are open to other possibilities. Summer meetings typically have 350-500 registrants.

Please submit proposals to:

meetings@cms.math.ca

Appel pour des *universités* hôtes

La Société mathématique du Canada (SMC) invite les universités canadiennes à soumettre des propositions pour accueillir la Réunion d'été 2026 de la SMC, en accordant la priorité à l'Est du Canada. Toutes les propositions seront valides pour les réunions à venir. La SMC fournira tout le soutien logistique et négociera les contrats avec les sites locaux. La SMC est à la recherche d'universités canadiennes désireuses et capables de mettre en valeur leur département et leur université auprès des étudiants et des professeurs de tout le Canada. Les propositions doivent contenir les informations suivantes :
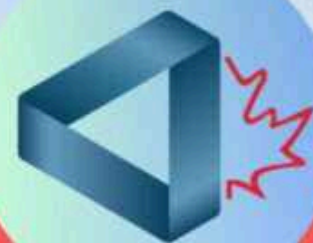
1. EMPLACEMENT
Comment les gens se rendraient-ils de l'aéroport au lieu de la réunion ? Quelles sont les raisons pour lesquelles votre ville pourrait intéresser les mathématiciens canadiens ? Votre université est-elle située au centre-ville ou faudrait-il prévoir des navettes ?

2. SITE
Décrivez l'université où se tiendra la réunion. Dans quel bâtiment se déroulera la réunion et combien de salles sont disponibles pour les sessions et les séances plénières ? Quel est le support technologique disponible dans les salles de réunion ? Ces salles seront-elles disponibles aux dates proposées ?

3. HÉBERGEMENT
Votre université est-elle en mesure d'offrir un hébergement en résidence pendant les dates de la conférence ? La SMC s'occupera des contrats et des négociations avec les hôtels. Quel est l'hôtel le plus proche de l'université pour l'hébergement ?

4. UNIVERSITÉ HÔTE
Veuillez décrire brièvement votre institution et votre département. Quel soutien financier l'université hôte aura-t-elle pour la réunion de la SMC ? L'université est-elle disponible pour des appels réguliers et des mises à jour sur les progrès de la réunion ? L'université hôte est-elle en mesure de s'engager et de fournir au moins un directeur scientifique pour la réunion ? Quel niveau de participation pensez-vous qu'il pourrait y avoir de la part des universitaires de votre institution ?

Les réunions de la SMC se déroulent généralement du vendredi au lundi, le premier week-end de juin et de décembre, mais nous sommes ouverts à d'autres possibilités. Les réunions d'été comptent généralement entre 350 et 500 participants.

Veuillez soumettre les propositions à:

meetings@cms.math.ca

Call for Nominations for the 2024 Fellows of the CMS | Appel de mises en candidature pour les Fellows de la SMC 2024

The Fellowship recognizes 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 these areas may be recognized by fellowship.

The 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, and sexual orientation.

Nominations should include a reasonably detailed rationale and be submitted by **March 31, 2024.**

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

For more information on this award, please visit: https://cms.math.ca/awards/fellows-of-the-cms/

Le Programme des fellows récompense les membres de la SMC qui ont fait une contribution exceptionnelle aux mathématiques en recherche, en enseignement ou en représentations, tout en se distinguant au service de la communauté mathématique canadienne. Dans des cas exceptionnels, une contribution extraordinaire à l'un des domaines ci-dessous peut être reconnue par un titre de fellow.

La SMC a pour but de promouvoir et de célébrer la diversité au sens le plus large. Nous encourageons fortement les directeurs ou les directrices de département et les comités de mise en candidature à proposer des collègues exceptionnel.le.s sans distinction de race, de genre, d'appartenance ethnique ou d'orientation sexuelle.

Pour les mises en candidature prière de présenter des dossiers avec une argumentation convaincante et de les faire parvenir, le **31 mars 2024** au plus tard.

Veuillez faire parvenir tous les documents par voie électronique, de préférence en format PDF, avant la date awards-prizes@cms.math.ca
Pour de plus amples renseignements sur ce prix, veuillez cliquer: https://smc.math.ca/prix/fellows-de-la-smc/

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 may be considered for up to three consecutive years. Unsuccessful nominations may be updated and resubmitted for consideration each year. 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**.

Deadline: March 31, 2024

En 1995, la Société mathématique du Canada a créé un prix pour récompenser les personnes qui contribuent de façon importante et soutenue à la communauté mathématique canadienne et, notamment, à la SMC. Ce prix était renommé à compter de 2008 en hommage de Graham Wright pour ses 30 ans de service comme directeur administratif et secrétaire de la SMC.

La SMC a pour but de promouvoir et de célébrer la diversité au sens le plus large. Nous encourageons fortement les directeurs et les directrices de département et les comités de mise en candidature à proposer des collègues exceptionnel.le.s sans distinction de race, de genre, d'appartenance ethnique ou d'orientation sexuelle.

La candidature restera active pendant un an seulement. Les candidatures non retenues peuvent être mises à jour et soumises à nouveau pour examen chaque année. Pour les mises en candidature prière de présenter des dossiers avec une argumentation convaincante et de les faire parvenir avant la date limite.

Veuillez faire parvenir tous les documents par voie électronique, de préférence en format PDF, **avant la date limite indiqué ci-dessus à** **prixgw@smc.math.ca**.

Date limite : 31 mars

Call for Nominations for 2024 Adrien Pouliot Award | Appel de mises en candidature Prix Adrien Pouliot 2024

The CMS invites nominations for the 2024 Adrien Pouliot Award. The award recognizes individuals or teams of individuals who have made significant and sustained contributions to mathematics education in Canada. 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.

The 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.

The deadline for nominations is **April 30, 2024**.

Complete nomination requirements and details are available here.

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

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La SMC sollicite des mises en candidature pour le Prix AdrienPouliot 2024. Le prix récompense une personne ou un groupe de personnes qui ont fait une contribution importante et soutenue à l'enseignement des mathématiques au Canada. Le terme « contribution » s'emploie ici au sens large; les candidat.e.s pourront être associé.e.s à une activité de sensibilisation, un nouveau programme adapté au milieu scolaire ou à l'industrie, des activités promotionnelles de vulgarisation des mathématiques, des initiatives spéciales, des conférences ou des concours à l'intention des étudiant.e.s, etc.

La SMC a pour but de promouvoir et de célébrer la diversité au sens le plus large. Nous encourageons fortement les directeurs et les directrices de département et les comités de mise en candidature à proposer des collègues exceptionnel.le.s sans distinction de race, de genre, d'appartenance ethnique ou d'orientation sexuelle.

La date limite pour des mises en candidature est le **30 avril 2024**.

Les détails complets de la mise en candidature sont disponibles **ici**.

Veuillez faire parvenir votre mise en candidature par voie électronique, de préférence en format PDF, à prixap@smc.math.ca

VOUS ÊTES ÉTUDIANT.E ET VOUS VOUS INTERROGEZ SUR LES OPPORTUNITÉS D'EMPLOI POST-ÉTUDES?

STUDYING MATH?

Wondering about preparing for work?

Le comité étudiant de la SMC vous invite à participer à deux événements en ligne gratuits. Des conférenciers travaillant dans une industrie liée aux mathématiques donneront une conférence portant sur leur parcours et les opportunités présentes en industrie pour les étudiants en mathématiques. Celles-ci seront suivies d'une séance de questions-réponses où vous pourrez poser toutes vos questions.

The CMS student committee invites you to two free online talks. The speakers will present on their experience and the opportunities avaliable for math students in industry, followed by a time for questions.

ÉVÉNEMENT FRANÇAIS
Mehdi Bozzo-Rey

5 avril
11h PST
midi MST
13h CST
14h EST
15h AST
15h30 NST

Physicien de formation, Mehdi est un exécutif chevronné, passionné par la mise en production et la commercialisation de recherches à fort impact et de technologies émergentes

Inscrivez-vous maintenant (avec le code QR) pour obtenir le lien de l'événement !

ENGLISH EVENT
Heather Vooys

March 22
11am PST
noon MST
1:00pm CST
2:00pm EST
3:00pm AST
3:30pm NST

Heather is a Machine Learning Lead at AERIUM Analytics with a PhD in Mathematics from the University of Calgary.

Register now (with the QR code) to be sent the event link!

Au plaisir de vous retrouver aux conférences !

All math students are welcome

Student Research Session at the CMS Summer Meeting

Dear students in mathematics,

The Canadian Mathematical Society Student Committee invites students to present their research at the Student Research Session during the 2024 CMS Summer Meeting in Saskatoon. The meeting will take place from May 31 to June 3.

Applicants must submit their presentation title and abstract to studc-summer24-talks@cms.math.ca in either English or French no later than April 30. Because space is limited, interested students are encouraged to submit an abstract as soon as possible.

This session aims to get students to present their research at the CMS Meeting. The presentations should introduce the student's research to a general mathematical audience. After approval of their presentation, speakers must register for the meeting.

Best,

StudC

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Chers étudiants en mathématiques,

Le Comité étudiant de la Société mathématique du Canada invite les étudiants à présenter leur recherche lors de la session de recherche étudiante de la réunion d'été 2024 de la SMC à Saskatoon. La réunion aura lieu du 31 mai au 3 juin.

Les candidats doivent soumettre leur titre et résumé de présentation en français ou en anglais à l'adresse studc-summer24-talks@cms.math.ca au plus tard le 30 avril. Le nombre de places étant limité, les étudiants intéressés sont encouragés à soumettre leur résumé dès que possible.

Cette session a pour but d'inciter les étudiants à présenter leurs recherches lors de la réunion de la SMC. Les présentations doivent présenter les recherches de l'étudiant à un public mathématique général. Les étudiants dont la présentation sera retenue devront s'inscrire à la réunion.

Bonne journée,
StudC
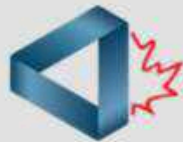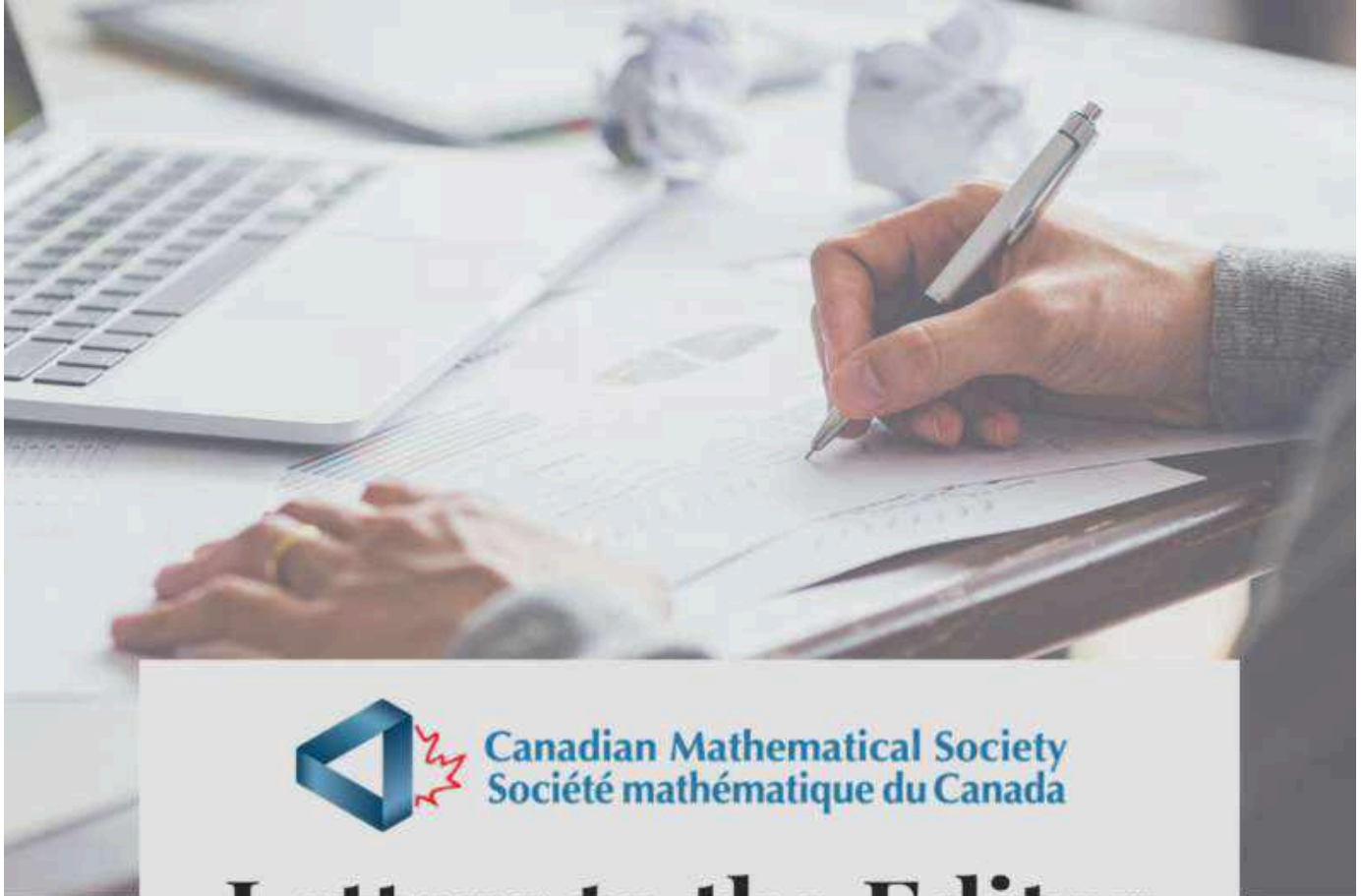
Canadian Mathematical Society
Société mathématique du Canada

Letters to the Editor
Courrier des lecteurs

LETTERS WELCOME
LETTRES AUX RÉDACTEURS

The Editors of the CMS Notes welcome letters in both official languages (English or French) on any subject of mathematical interest but we reserve the right to condense them. Those accepted for publication will appear in the language of submission. | Les rédacteurs et les rédactrices des Notes de la SMC acceptent les lettres en français ou en anglais portant sur n'importe quel sujet d'intérêt mathématique, mais ils se réservent le droit de les comprimer. Les textes acceptés pour publication paraîtront dans la langue dans laquelle ils ont été soumis.

Readers may reach us at the CMS Executive Office at | Le lectorat peut nous joindre au bureau administratif de la SMC par courriel au office@cms.math.ca.