



CMS 2019 Summer Meeting Recap / Bilan de la Réunion d'été de la SMC 2019..... 22

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CMS NOTES de la SMC

September /
septembre
2019

President-Elect's Notes / Notes du Président élu

Javad Mashreghi

President-Elect, CMS / Président élu, SMC

The CMS Torch



Next summer, we shall be celebrating the 75th anniversary of the creation of the Canadian Mathematical Society in Ottawa. It will be a joyful occasion as we are all proud of the accomplishments from the time of the founding fathers of the CMS to the present day. The Society has gone through many ups and downs, witnessed 75 harsh winters and equally 75 beautiful and warm summers, and stands firm on the solid foundation created by the voluntary work of thousands of Canadian mathematicians. The wide spectrum of mathematical disciplines exercised by members of the Society is just a small indication of the diversity, depth and leadership of our community. Thus, we are all indebted to our predecessors who have contributed to the creation of such a significant scientific structure within Canada, from coast to coast.

This said, it is now our duty to keep the torch burning, for ourselves and more importantly for the generations to come. It is truly a duty to fulfill. A duty that compels us to look more carefully at today's Society, better understand its current problems, and envisage plans for a brighter future. This is therefore a call to all Canadian mathematicians, in particular, those who have been involved in various aspects of the CMS, as chair of a committee, member of board of directors, vice-presidents and presidents, to share their views and suggest their visions for the future of the Society. To begin with, I must raise two principal points: Income & Accommodation! However, this should be considered as the beginning of a

Le flambeau de la SMC

Le été prochain, nous célébrerons le 75^e anniversaire de la création de la Société mathématique du Canada à Ottawa. Il sera sans doute un moment joyeux : nous sommes toutes et tous très fiers et fiers de tout ce que la Société a accompli depuis sa naissance. Elle a connu des hauts et des bas, a été témoin de 75 hivers rudes, mais aussi de 75 beaux étés chauds, se tenant debout sur de solides bases grâce au travail bénévole des milliers des mathématicien.ne.s canadien.ne.s. Le large éventail de disciplines mathématiques pratiquées par les membres de la société n'est qu'une modeste preuve de la diversité, de la profondeur et de la bonne direction de notre communauté. Nous sommes donc toutes et tous redevables à nos prédecesseurs d'avoir bâti cette formidable structure scientifique au Canada, d'un océan à l'autre.

Or, il est maintenant à nous de prendre la relève et de garder le flambeau allumé pour les générations à venir : une tâche qui s'avère monumentale. C'est d'ailleurs ce même devoir qui nous amène à examiner de plus près la Société aujourd'hui et à mieux comprendre ses défis actuels afin d'envisager des plans d'action pour un meilleur avenir. J'invite donc toutes et tous les mathématicien.ne.s au Canada, surtout celles et ceux qui ont servi la société à des titres variés, —en tant que le président d'un comité, le membre du conseil administratif, le président et le vice-président— de nous faire part de leur vision d'avenir de la société. Je commence en soulignant deux sujets principaux : le revenu et l'hébergement! Mais cela, comme je viens de le mentionner, n'est

Flygskam and the Canadian Researcher

Robert Dawson, St. Mary's
CMS Notes Editor-in-Chief



Last month Malabika Pramanik (VP Pacific) wrote an excellent article about the impact of climate change on conferences. She quotes the work of two UBC geographers, Seth Wynes and Simon Donner, whose research has studied the amount of greenhouse gas emissions that result from business-related travel. Their findings, as you may recall, were sobering: academic travel creates a lot of greenhouse gases, and the more senior the academic, the higher the amount. (The use of business- and first-class travel is identified as a particular problem, though not usually a temptation for those of us funded by NSERC or paying our own way.)

There have also been several recent articles in the media about a new Swedish word, "flygskam," meaning "flight shame." This is a social trend that sees more Swedes avoiding unnecessary travel, or choosing lower-impact modes of transportation. Some questions have been raised about the actual impact of this – Swedes have by no means abandoned air travel – but news stories quote Swedish travel agents as saying that more local vacations and vacations by train have indeed been booked this year.

However, it has been pointed out that Europe, with its higher population density, has options that will never be realistic in most of Canada. There are affordable high-speed trains that take not much longer than airplanes for trips of a few hundred kilometers: in fact, as you can walk into the train station and onto the train with minimal delay, and the station is usually in town, total travel time may be faster. And universities - large universities with strong mathematics departments - are closer together. From Dalhousie to Memorial, Boston, or Montreal is over a thousand kilometers by road; the same radius around the Sorbonne includes every university in France, England, Switzerland, Belgium, the Netherlands, Austria and Germany, and much of Scotland, Italy, and Spain.

An abandonment of air travel would be a major inconvenience for European researchers, but trains and private cars - small and shared - would do much to fill the gap. In most of Canada, research travel is air travel. Nonetheless, we cannot go on as if there was no problem: climate change will not go away because we find the remedy inconvenient.

In decades to come, it may be that location becomes a more important factor in the location of research universities than it is now. Universities from which you can get to conferences without undue carbon emission may start to seem more attractive to young researchers than isolated institutions for whose faculty most conferencing must be "tele-." Population density guides the

location of financial institutions, opera houses, sports teams, and ballet companies: we are not immune.

This prospect saddens me; over the last fifty years many strong mathematics departments have grown up at relatively isolated universities, in an era when technology could trump geography. But if this is our possible future, it would be better to meet it with eyes open, and try to avert the worst.

Flygskam et les chercheur.e.s canadien.ne.s

Le mois dernier, Malabika Pramanik (VP pacifique) a écrit un excellent article au sujet de l'impact des changements climatiques sur les congrès et les réunions. Elle cite notamment le travail de Seth Wynes et Simon Donner, deux géographes à l'Université de la Colombie-Britannique, dont la recherche porte sur l'émission des gaz à effet de serre associée aux déplacements professionnels. Les résultats de leur recherche, comme le mentionne Malabika Pramanik, fait la lumière sur une sombre réalité : une large quantité de gaz à effet de serre est attribuable aux déplacements professionnels, et cela est encore plus signifiant pour les universitaires éminent.e.s. (Les vols en classes affaires et en première classe y sont identifiés comme un problème majeur, quoique ces vols ne tentent pas toujours les universitaires qui sont subventionné.e.s par le CRSNG ou celles et ceux qui paient les frais de leurs voyages de leurs poches.)

Plusieurs articles médiatiques parlent aussi d'un nouveau mot suédois « *flygskam* », qui signifie « la honte de prendre l'avion ». Selon cette nouvelle tendance sociale, de plus en plus de Suédois.e.s abandonnent les voyages superflus, ou choisissent plutôt les modes de transport avec un moindre impact environnemental. Cet engouement soulève toutefois des questions quant à son impact réel : certes, les Suédois.e.s sont loin de bannir les trajets aériens, mais les agent.e.s de voyage suédois.e.s remarquent déjà une hausse des réservations de vacances locales et de voyages en train cette année.

Or, nous savons que l'Europe, avec une plus grande densité de population, a des options qui s'avèrent impossibles pour le Canada. Il y existe des trains à grande vitesse et abordables pour le grand public, transportant leurs passagers et leurs passagères à une vitesse qui, pour les voyages de quelques centaines de kilomètres, est comparable à celle d'avion. En effet, compte tenu du fait qu'on puisse simplement entrer dans la gare et de là immédiatement dans le train avec un délai minimal, et que les gares ferroviaires sont le plus souvent situées à l'intérieur des villes, la durée totale du voyage pourrait être inférieure à celle du trajet aérien. Et les universités, surtout celles dotées des départements de mathématiques renommés, sont situées plus près l'une de l'autre. La distance entre l'Université de Dalhousie et Mémorial (ou Boston, ou Montréal) est plus que mille kilomètres; le rayon de même longueur autour de Sorbonne couvre toutes les universités en France, en Angleterre, en Suisse, en Belgique, aux Pays-Bas, en Autriche, en Allemagne et la plupart des Universités en Écosse, en Italie et en Espagne.

Bannir le transport en avion serait une contrainte considérable pour les chercheur.e.s européen.ne.s, mais les trains, les voitures personnelles— de plus en plus petites et en covoiturage — pourraient certainement aider à combler l'écart. Or, pour les chercheur.e.s canadien.ne.s, le voyage aérien est forcément le mode principal du transport. Cela dit, nous ne pouvons pas simplement fermer les yeux en espérant que le problème disparaîtra : le changement climatique ne disparaîtra pas parce que nous trouvons le remède incomode.

Dans les prochaines décennies, la localisation des universités croîtra en importance. Plutôt que de choisir les universités isolées dont le corps professionnel doit se servir de plus en plus des téléconférences, les jeunes chercheur.e.s opteront pour les universités d'où on peut se rendre à des congrès sans une émission excessive de carbone. La densité de population dicte déjà la localisation des institutions financières, des opéras, des équipes sportives, et des compagnies de ballet; nous n'y échapperons pas non plus.

Je suis néanmoins attristé par cette perspective; au cours des cinq dernières décennies, des départements mathématiques renommés se sont développés dans les universités relativement isolées, dans une ère où la technologie l'emporte sur la géographie. Mais l'avenir nous attend et il vaut mieux le rencontrer les yeux ouverts et faire de notre mieux pour éviter le pire.



Letters to the Editors

The Editors of the NOTES welcome letters in English or French on any subject of mathematical interest but reserve the right to condense them. Those accepted for publication will appear in the language of submission. Readers may reach us at the Executive Office or at notes-letters@cms.math.ca

Lettres aux Rédacteurs

Les rédacteurs des NOTES 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 lettres acceptées paraîtront dans la langue soumise. Les lecteurs peuvent nous joindre au bureau administratif de la SMC ou à l'adresse suivante : notes-lettres@smc.math.ca.

NOTES DE LA SMC

Les Notes de la SMC sont publiés par la Société mathématique du Canada (SMC) six fois par année (février, mars/avril, juin, septembre, octobre/novembre et décembre).

Rédacteurs en chef

Robert Dawson et Srinivasa Swaminathan (notes-redacteurs@smc.math.ca)

Adjointe à la rédaction

Zishad Lak (zlak@smc.math.ca)

Comité de rédaction

Calendrier : Denise Charron (mpagent@smc.math.ca)

SCHPM : Amy Ackerberg-Hastings (aackerbe@verizon.net) et Hardy Grant (harrygrant@yahoo.com)

Comptes-rendus de livres : Karl Dilcher (notes-critiques@smc.math.ca)

Pédagogique : John McLoughlin (johngm@unb.ca) Kseniya Garaschuk (kseniya.garaschuk@ufv.ca)

Réunions : Sarah Watson (notes-reunions@smc.math.ca)

Relation des membres : Denise Charron (mpagent@smc.math.ca)

Recherche : Patrick Ingram (notes-recherche@smc.math.ca)

Les rédacteurs des Notes de la SMC accueillent vos articles, lettres et notes. Indiquer la section choisie pour votre article et le faire parvenir à l'adresse courriel appropriée ci-dessus.

Les Notes de la SMC, les rédacteurs et la SMC ne peuvent pas être tenus responsables des opinions exprimées par les auteurs.

CMS NOTES

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Editors-in-Chief

Robert Dawson et Srinivasa Swaminathan (notes-editors@cms.math.ca)

Editorial Assistant

Zishad Lak (zlak@cms.math.ca)

Contributing Editors

Calendar: Denise Charron (mpagent@cms.math.ca)

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

Book Reviews: Karl Dilcher (notes-reviews@smc.math.ca)

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

Meetings: Sarah Watson (notes-meetings@smc.math.ca)

Member Relations: Denise Charron (mpagent@smc.math.ca)

Research: Patrick Ingram (notes-research@smc.math.ca)

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

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

COMITÉ EXÉCUTIF

Président : Mark Lewis (Alberta)
president@smc.math.ca

Président élu : Javad Mashreghi (Laval)
pres-elu@smc.math.ca

Vice-présidente Atlantique :
Sara Faridi (Dalhousie)
vp-atl@smc.math.ca

Vice-Présidente Québec :
Matilde Lalín (Montréal)
vp-que@smc.math.ca

Vice-Présidente Ontario :
Monica Nevins (Ottawa)
vp-ont@smc.math.ca

Vice-présidente Ouest :
Gerda de Vries (Alberta)
vp-ouest@smc.math.ca

Vice-présidente Pacifique :
Malabika Pramanik (UBC Vancouver)
vp-pac@smc.math.ca

Trésorier : David Oakden
treasurer@smc.math.ca

Secrétaire général : Termech Kousha
secgen@smc.math.ca

La Société mathématique du Canada appuie l'avancement, la découverte, l'apprentissage et l'application des mathématiques. L'exécutif de la SMC encourage les questions, commentaires et suggestions des membres de la SMC et de la communauté.

President: Mark Lewis (Alberta)
president@cms.math.ca

President-Elect: Javad Mashreghi (Laval)
pres-elect@smc.math.ca

Vice-President – Atlantic:
Sara Faridi (Dalhousie)
vp-atl@smc.math.ca

Vice-President-Quebec:
Matilde Lalín (Montréal)
vp-que@smc.math.ca

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

Vice-President-West:
Gerda de Vries (Alberta)
vp-west@smc.math.ca

Vice-President – Pacific:
Malabika Pramanik (UBC Vancouver)
vp-pac@smc.math.ca

Treasurer: David Oakden
treasurer@smc.math.ca

Corporate Secretary: Termech Kousha
corpssec@smc.math.ca

The CMS promotes the advancement, discovery, learning and application of mathematics. The CMS Executive welcomes queries, comments and suggestions from CMS members and the community.

Canadian Mathematical Society - Société mathématique du Canada
209-1725 St. Laurent Blvd., Ottawa, ON, Canada K1G 3V4 tel 613-733-2662

notes@cms.math.ca | smc.math.ca | cms.math.ca
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Continued from cover

process and we expect many other contributors to come forward and help the Society.

Membership dues, publication of the Canadian Journal of Mathematics (CJM) and the Canadian Mathematical Bulletin (CMB), a few grants, and donations constitute CMS' main sources of income. The membership fee, though not that high, is relatively stable and constitutes a considerable part of CMS revenue. Yet, it is paramount that we make use of every opportunity to remind and urge all members to renew their memberships in due time and encourage our colleagues who are not CMS members to become members. The CMS also receives various grants and donations each year. Nonetheless, the CMS needs to take more solid steps to attract potential donors and also to raise awareness about the importance of endowments and other donations within the mathematical community.

The publication of CJM and CMB is another major source of income and this is precisely why we are concerned. After numerous discussions within the Society and negotiating with some major publication houses, the CMS signed a new contract with Cambridge University Press in 2018 to publish CJM and CMB. For the next five years or so, the situation is secure and we are expecting to continue the same trend and renew the contract. However, there are some hidden facts that threaten the whole process. You are most likely aware that several small publication houses have either disappeared or merged with bigger companies in the last two decades. The face of publication, in particular paper publication, is changing in the new online-era with new articles and commentaries being published on a daily basis. A number of open access mathematical journals have also seen the light of day in the last few years, some of which are being managed by prominent mathematicians. These are particularly attractive to our colleagues around the globe as

major research results are published immediately after acceptance. In short, due to such phenomena, if this part of CMS revenue declines even by a small percentage, then we will be in big financial trouble. We need to take this possibility very seriously. As of now, there doesn't seem to be a clear strategy to tackle this weighty problem inside the CMS. The only suggestion, which was proposed a few years ago and is now resurfacing, is to create a new journal (e.g., *Transactions of the Canadian Mathematical Society*). This idea has two principal merits. First, due to active domains of research in Canada, there are several long and valuable papers that are being published on a regular basis and thus such a journal would merit enough input. Second, it would increase the CMS income by a good percentage. Besides this suggestion, which should be thoroughly discussed within the Society and be accurately accessed by the publication committee, no other solid remedy has been proffered.

At the age of 75, one hopes to have paid off all debts and mortgages in order to enjoy and share the comfort and security of one's home with family and friends. Well, with great regret, this is not the case for the CMS. Our cousin societies have their own residences in the heart of many Western cities and we are still looking for a place to rent. This does not reflect the prestige, which should accompany such a Canadian entity. We need to buy a building and establish the Canadian House of Mathematics. It is never too late and this is the priority to adopt. With over 1100 members, there is no doubt that CMS can attract generous donors in order to initiate this project. Let us work together to make this conception become a reality. We hope to celebrate the 100th anniversary of CMS in the Canadian House of Mathematics.

2020 CMS MEMBERSHIP RENEWALS



The 2020 membership renewals have been sent! Please renew your membership online at portal.cms.math.ca by logging into your member account. Should you have any questions, please email us at memberships@cms.math.ca

RENOUVELLEMENTS 2020 À LA SMC

Le renouvellement pour l'an 2020 a été envoyé!
S'il vous plaît renouveler votre adhésion en ligne à portail.smc.math.ca et en vous connectant à votre compte de membre. Si vous avez des questions, s'il vous plaît écrivez-nous à adhesions@smc.math.ca

Suite de la couverture

qu'un début et nous anticipons la contribution de nombreux autres membres qui viendront en aide à la société.

Les cotisations des membres, la publication du *Journal canadien de mathématiques* (JCM) et du *Bulletin canadien de mathématiques* (BCM), quelques subventions et des dons constituent les principales sources de revenu pour la Société. Le revenu relatif aux droits d'adhésion, quoique peu élevé, est relativement stable et contribue au financement de la SMC. Or, il est primordial pour nous de saisir toute occasion de rappeler à nos collègues de renouveler leur adhésion à temps utile et d'encourager celles et ceux qui ne sont pas encore membres de la SMC à le devenir. Malgré des subventions et des dons que la SMC reçoit chaque année, il nous faut des mesures fermes pour attirer des donateurs potentiels et les sensibiliser à l'importance des dotations et d'autres dons pour la communauté mathématique.

La publication du *JCM* et du *BCM* est une autre source importante de revenu pour la Société et mérite d'autant plus notre attention. Après de nombreuses discussions entre les membres de la Société et des négociations avec de grandes maisons de publications, la SMC a pris la décision en 2018 de signer un nouveau contrat avec les presses universitaires de Cambridge concernant la publication du *JCM* et du *BCM* pour une durée de cinq ans et nous prévoyons renouveler ce contrat après cette période. Nos inquiétudes sont toutefois liées à des obstacles plus insidieux. Comme vous l'avez remarqué, plusieurs petites maisons de publication sont en voie de disparition ou ont fusionné avec de larges compagnies au cours des deux dernières décennies. L'industrie de publication, surtout de publication imprimée, est en pleine mutation dans cette nouvelle ère en ligne et un grand nombre de longs et courts articles paraissent tous les jours. Un certain nombre de revues mathématiques à libre accès ont aussi vu le jour dernièrement, dont quelques-unes sont gérées par les mathématicien.ne.s éminent.e.s. Ce type de revue intéresse surtout nos collègues partout au monde parce qu'ils et elles auront la chance de voir publier les résultats de leur recherche dans un délai minimal. Bref, si cette nouvelle tendance cause une baisse de revenu pour la SMC, aussi infime soit-elle, nous serons vraiment dans le pétrin. Il faut donc prendre cette possibilité au sérieux. Pour le moment, il ne semble pas y avoir une stratégie claire pour s'attaquer à ce problème à la SMC. La seule proposition, qui était mise de l'avant il y a quelques ans et qui commence à refaire surface, est de créer une nouvelle revue (ex. *Transactions de la Société Mathématique du Canada*). Cette idée a notamment deux avantages. D'abord, le domaine de la recherche au Canada est très actif, et de longs et courts articles paraissent régulièrement dans les revues variées; une nouvelle revue aurait donc suffisamment de contenu. Deuxièmement, une nouvelle revue augmentera considérablement le revenu de la SMC. À part cette suggestion, qui doit être sérieusement considérée à la SMC et examinée de près par le comité de publication, aucun autre remède n'a été proposé.

À 75 ans on attend à ce que les dettes soient payées et que les parents puissent profiter du confort de leur maison et de leur sécurité financière en compagnie de leurs enfants, de leur famille et de leurs ami.e.s. Malheureusement, ceci n'est pas le cas pour la SMC. Alors que nos sociétés cousines sont propriétaires de leurs foyers au sein des grandes villes occidentales, nous cherchons toujours un loyer, ce qui n'est pas digne de prestige de notre Société. Il faut donc acheter un immeuble et y installer *La maison canadienne des mathématiques*. Il n'est jamais trop tard de prioriser ce rêve. Avec plus de 1100 membres, la SMC pourrait sans doute attirer des donateurs et des donatrices généreux.x.es afin d'initier ledit projet. Travaillons ensemble pour réaliser ce rêve et célébrons le 100^e anniversaire de la SMC à *La maison canadienne des mathématiques*.



Maple Conference 2019

October 15-17, 2019
Waterloo, Ontario, Canada

Math Matters - Maple in Mathematics Education and Research

This conference is dedicated to exploring different aspects of the math software Maple, including Maple's impact on education, new symbolic computation algorithms and techniques, and the wide range of Maple applications.

Keynote presentation and reception to take place at the Perimeter Institute!

To learn more or to register, go to:
www.mapleconference.com



The Calendar brings current and upcoming domestic and select international mathematical sciences and education events to the attention of the CMS readership. Comments, suggestions, and submissions are welcome.

Denise Charron, Canadian Mathematical Society,
(mpagent@cms.math.ca)

Le calendrier annonce au lectorat de la SMC les activités en cours et à venir, sur la scène pancanadienne et internationale, dans les domaines des mathématiques et de l'enseignement des mathématiques. Vos commentaires, suggestions et propositions sont les bienvenues.

Denise Charron, Société mathématique du canada,
(mpagent@smc.math.ca)



SEPTEMBER 2019 SEPTEMBRE

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|-----------------|--|
| A26-S20 | Low-Dimensional Topology, CRM, Montreal, QC. |
| A30-S6 | Ciprian Manolescu's Aisenstadt Chair Lectures Series, CRM, Montreal, QC. |
| 1-6 | Workshop on Probabilistic and Extremal Combinatorics, BIRS, Banff, AB. |
| 3-7 | Workshop on New Trends in Polynomial Differential Systems, CRM, Montreal, QC. |
| 8-13 | Topology and Measure in Dynamics and Operator Algebras, BIRS, Banff, AB. |
| 9-13 | CIRGET Hot Topics Lecture Series by Lisa Piccirillo, CRM, Montreal, QC. |
| 9-13 | Workshop on Variational Discretization for Geophysical Fluid Dynamics, Fields Institute, Stewart Library, Toronto, ON. |
| 11 | Probability Seminar: Paul Jung, University of British Columbia, Vancouver, BC. |
| 14-15 | 63 rd Cascade Topology Seminar, University of Manitoba, MB. |
| 15-20 | Random Matrix Products and Anderson Localization, BIRS, Banff, AB. |
| 16-20 | The Geometry and Algebra of Landau-Ginzburg Models, Fields Institute, Toronto, ON. |
| 22-27 | New Challenges in Energy Markets - Data Analytics, Modelling and Numerics, BIRS, Banff, AB. |
| 27 | Lecture by Nassif Ghoussoub, 2019 CRM-Fields-PIMS Prize Recipient, CRM, Montreal, QC. |
| 29-Oct 4 | Classification Problems in von Neumann Algebras, BIRS, Banff, AB. |

OCTOBER 2019 OCTOBRE

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|-------------|--|
| 1-31 | Mixed Integer Nonlinear Programming: Theory and Computation, CRM, Montreal, QC. |
| 6-11 | Herglotz-Nevanlinna Theory Applied to Passive, Causal and Active Systems, BIRS, Banff, AB. |
| 9 | Math Biology Seminar: David Holloway, University of British Columbia, Vancouver, BC. |

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|-----------------|--|
| 13-18 | Physics-Dynamics Coupling in Earth System Models, BIRS, Banff, AB. |
| 13-18 | Spaces of Embeddings: Connections and Applications, BIRS, Banff, AB. |
| 14-18 | Workshop on Automorphic p-adic L-functions and regulators, University of Lille, Laboratoire Paul Painlevé, Lille, France |
| 15-17 | Maple in Mathematics Education and Research, Perimeter Institute and University of Waterloo, Waterloo, ON. |
| 17-18 | Mathematics of Vision Workshop, Fields Institute, Toronto, ON. |
| 18-19 | 63 ^e Congrès de l'AMQ, Cégep du Vieux Montréal, Montréal, QC. |
| 20-25 | Women in Commutative Algebra, BIRS, Banff, AB. |
| 27-Nov 1 | Bridging the Gap between Kahler and non-Kahler Complex Geometry, BIRS, Banff, AB. |

NOVEMBER 2019 NOVEMBRE

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|--------------|--|
| 1-31 | Mathematical Physiology – Better Health Through Mathematics, CRM, Montreal, QC. |
| 3-8 | Unifying 4-Dimensional Knot Theory, BIRS, Banff, AB. |
| 10-15 | Interactions between Brauer Groups, Derived Categories and Birational Geometry of Projective Varieties, BIRS, Banff, AB. |
| 17-22 | Dimers, Ising Model, and their Interactions, BIRS, Banff, AB. |
| 24-29 | Theoretical Foundations of Relativistic Hydrodynamics, BIRS, Banff, AB. |

DECEMBER 2019 DÉCEMBRE

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| 1-6 | Challenges in Mathematical and Computational Modeling of Complex Systems, BIRS, Banff, AB. |
| 6-9 | 2019 CMS Winter Meeting / Réunion d'hiver de la SMC 2019, Chelsea Hotel, Toronto, ON. |
| 8-13 | Discrete Subgroups of Lie Groups, BIRS, Banff, AB. |

Book Reviews brings 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)

Editor's Note : *The three books featured in this issue have in common that each of them consists of a fairly large number of reasonably independent sections or chapters. Such books are not normally reviewed in full, but these three books, all very different from each other, deserve short reviews at least.*

The reviews were written by myself, and I quoted quite freely from prefaces or promotional texts. More short reviews will be published at regular intervals. – Karl Dilcher.

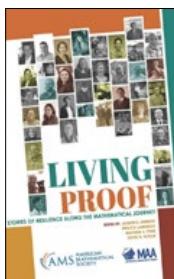
Living Proof: Stories of Resilience Along the Mathematical Journey

Edited by Allison K. Henrich et al.

Jointly published by MAA and AMS, 2019

ISBN: 978-1-470452810

E-book version free



This is a truly inspiring book, which is also available in print. It consists of 41 deeply personal stories by mathematicians of many different backgrounds who eventually “made it”. These essays, typically just under 3 pages in length, are organized into four parts, namely “Mathematics Just Suddenly Feels Hard!”, “Who Are These People? Do I Even Belong?”, “Can I Really Do This? How Do I Muster Through?”, and “What Do I Do Now? What Happens Next?”.

The book begins with Barbie’s famous (or rather, infamous) statement that “Math is hard.” The Foreword then continues, “Well, Barbie was right, but math is not uniquely hard. Playing the violin is hard, hitting a baseball is hard, and learning a second language is hard. What seems to make mathematics different from playing the violin or learning Chinese is that the struggle to play violin doesn’t make people feel defeated and dumb. Somehow, when we encounter difficulties in mathematics, our natural tendency is to retreat, to think it’s too hard, we’re not smart enough, or we’re not ‘math people.’ We allow ourselves to be defeated by the difficulty. [...]

“The stories of struggle in this volume were collected in order to inspire mathematics students. And, they will serve that purpose. But they should also inspire mathematicians and educators. We can create a mathematical world where demoralizing, punishing struggle is not necessary. It will always be necessary for people to struggle within their own minds to master mathematics, but

Les comptes-rendus de livres présentent au lectorat de la SMC des ouvrages intéressants sur les mathématiques et l’enseignement des mathématiques dans un large éventail de domaines et sous-domaines. Vos commentaires, suggestions et propositions sont les bienvenues.

Karl Dilcher, Dalhousie University (notes-critiques@smc.math.ca)

we need to teach our students to see [...] the power and glory of mathematical struggle.”

In the Preface the editors then write: “Our primary goal in collecting this volume of essays is to push the conversation forward. Yes, math is difficult. We should talk about what makes it difficult. But we should also acknowledge the various biases and prejudices that people bring to their study of math that compound its difficulty. By making an effort to understand what we have in common and what makes our experiences different, our hope is that our community will become more inclusive while making the struggle more bearable – perhaps even more fun.”

For me as a white European male, some of the essays were real eye-openers, even this late in my career. That makes this book particularly important. But in other essays I could clearly identify myself and some of my own experiences in the past. For students, perhaps the most important message is that “you’re not alone”.

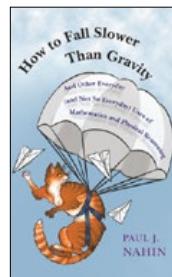
The AMS and MAA should be thanked for making this important book available for free download.

How to Fall Slower Than Gravity: And Other Everyday (and Not So Everyday) Uses of Mathematics and Physical Reasoning

by Paul J. Nahin

Princeton University Press, 2018

ISBN: 978-0-691-17691-8



Paul J. Nahin has made a name for himself as a successful writer of popular science books, mainly at the intersection of mathematics and physics. The book under review is another volume in this tradition.

To quote from the publisher’s description: “In this collection of twenty-six intriguing problems, Nahin explores how mathematical physicists think. Always entertaining, the problems range from ancient catapult conundrums to the puzzling physics of a very peculiar kind of glass called NASTYGLASS—and from dodging trucks to why raindrops fall slower than the rate of gravity.”

“The questions” raised may seem impossible to answer at first and may require an unexpected twist in reasoning, but sometimes their

solutions are surprisingly simple. Nahin's goal, however, is always to guide readers—who will need only to have studied advanced high school math and physics—in expanding their mathematical thinking to make sense of the curiosities of the physical world.

"The problems are in the first part of the book and the solutions are in the second, so that readers may challenge themselves to solve the questions on their own before looking at the explanations. The problems show how mathematics—including algebra, trigonometry, geometry, and calculus—can be united with physical laws to solve both real and theoretical problems. Historical anecdotes woven throughout the book bring alive the circumstances and people involved in some amazing discoveries and achievements."

The mathematical topics range across the spectrum of classical mathematics. In addition to the expected differential equations and Fourier series, one also finds interesting topics involving, for instance, combinatorics and even number theory. Throughout the book the author provides MATLAB code, to encourage the reader to experiment numerically and thus gain a deeper understanding of the problems at hand.

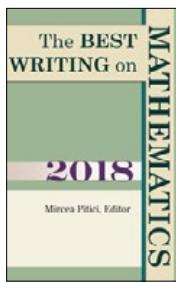
This is a fascinating and well-written book that actively engages the reader and reminds us of the physical roots of much of mathematics.

The Best Writing on Mathematics, 2018

Edited by Mircea Pitici

Princeton University Press, 2019

ISBN: 978-0-691-18276-6



This is the ninth volume in a remarkable series of annual anthologies; a brief review of one of them is therefore long overdue. The purpose of these volumes is best described by quoting from the Editor's introduction:

"The pieces you will read here were initially published during 2017 in various venues, including academic and other professional journals, book chapters, online publications, or newspapers. [...] The origins of *The Best Writing on Mathematics* series goes back about 15 years. [...] I discovered that a considerable literature on mathematics authored by mathematicians and by nonmathematicians exists and thrives. Despite its richness in ideas, it is mostly ignored in academic institutions, as if it did not exist and it had no instructional value. [...]

"Since 2010, the volumes in this series have contained more than two hundred pieces by authors with diverse backgrounds. These articles range in style from tightly argued theoretical positions on issues related to mathematics to bold speculations on the limits of the applicability of mathematics. Overall, the series is meant to convey to its readers the extraordinary ramifications of the influence of mathematics on contemporary mind, life, and society—and to stimulate connections we usually overlook when we talk about mathematics."

The wide variety of topics in this anthology is apparent from the titles of the 18 articles: "Mathematics for Human Flourishing"; "How To Play Mathematics"; "Beauty Is Not All There Is to Aesthetics in Mathematics"; "The Science of Brute Force"; "Computational Thinking in Science"; "Quantum Questions Inspire New Math"; "Tangled Tangles"; "The Bizarre World of Nontransitive Dice: Games for Two or More Players"; "The Bingo Paradox"; "The Sleeping Beauty Controversy"; "Wigner's 'Unreasonable Effectiveness' in Context"; "Learning and Teaching Interdisciplinary Modeling"; "Six Essential Questions for Problem Solving"; "What Does Active Learning Mean for Mathematicians?"; "Written in Stone: The World's First Trigonometry Revealed in an Ancient Babylonian Tablet"; "Quadrivium: The Structure of Mathematics as Described in Isidor of Seville's 'Etymologies'"; "The World War II Origins of Mathematics Awareness"; and "The Writing Mathematicians".

Most articles come with notes and extensive lists of references, and there are 16 pages of colour plates related to several of the articles. The book also has an interesting and informative section on "More Writings on Mathematics" with an extensive list of books mentioned, and at the end there are 19 pages of references to "Notable Writings", "Notable Interviews", "Notable Lives in Mathematics: Profiles, Memorial Notes, and Obituaries", and "Notable Journal Issues".

I look forward to seeing (and reading!) the next, 10th volume of *The Best Writing on Mathematics*, which is due to be published in October, 2019.

Education Notes brings mathematical and educational ideas forth to the CMS readership in a manner that promotes discussion of relevant topics including research, activities, 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)

Les Notes pédagogiques présentent des sujets mathématiques et des articles sur l'éducation aux lecteurs de la SMC dans un format qui favorise les discussions sur différents thèmes, dont la recherche, les activités et les nouvelles d'intérêt. Vos commentaires, suggestions et propositions sont les bienvenues.

John McLoughlin, University of New Brunswick

(johngm@unb.ca)

Kseniya Garaschuk, University of Fraser Valley

(kseniya.garaschuk@ufv.ca)

Inviting Participation in Supporting Initiatives

John McLoughlin, University of New Brunswick

Education Notes offers a channel for people to contribute stories, share ideas, or address issues concerning mathematics education. I notice while approaching the completion of a tenth year as a co-editor that the range of articles has been enriched by the blend of surprising contributions that arrive unsolicited and others received in response to requests. In addition there have been a smattering of pieces authored by the co-editors, namely, Jennifer Hyndman, Kseniya Garaschuk, and myself. Please consider writing a piece if you know of an interesting event that would appeal to the readership. An example of such an event will be featured in the next issue with a story from an Irish mathematician about the Hamilton Walk.

This issue offers insight into a smorgasbord of ideas and initiatives. These are offered in a spirit of invitation. The mathematical community will benefit from broader based participation through surveys and contributions to two new publications. Readers are encouraged also to enhance awareness of both the first-year

newsletter and *MathemAttic* by introducing them to potentially interested educators and students. Transitional issues, particularly as they relate to first year math and statistics, are taking on increased prominence at this time. Fittingly the topic has been featured in recent issues, as well as being a central theme here beginning with the newly launched newsletter. Finally, this issue concludes with a description of an industrial problem solving workshop organized through AARMS.

First-Year Math and Stats in Canada (FYMSIC) Newsletter

The introductory remarks identify its purpose: "to be a forum through which the members of our community can have useful exchanges of information, practices, views, and opinions about the issues listed in the above quote. It is our hope that those exchanges would help us to find means and strategies to better advocate for a major change in the ways our institutions view and value teaching of math and stats at the first-year level."

The newsletter can be found at <https://mailchi.mp/0f902522da65/fymsic-newsletter-issue-1>



Readers of the newsletter will find brief articles and expositions of teaching ideas along with mention of milestones such as Peter Taylor's 50 years of service at Queen's University. Congratulations Peter!

One intention of the newsletter is to provide an avenue for building upon the momentum of national discussions around the first-year. In addition to national discussions, related regional efforts are taking place. For instance, in May a two-day event was held at Mount Saint Vincent University, namely, the *Calculus Instruction in Atlantic Canada Symposium*. This built upon a meeting a year earlier. Short reports from participants at such events would also be welcomed here in the *Education Notes*.

Surveys welcoming your input

The FYMSIC newsletter includes a request for participation in a survey, "What I Wish My Students Knew", as excerpted here. Veselin Jungic (SFU) invites your feedback.

"What would you, as a university course instructor, say to your former, current, and/or future students? Would that be advice? A list of principles that determine your teaching philosophy? Your approach to teaching? A moment that changed your teaching perspective? Your opinion about students in general? A description of your "ideal" student? A "Thank You"? A "Sorry"? A memory from your own days as a student? An anecdote? Or a piece of personal information that you wish that your students knew but never had an opportunity to tell? Or anything else ..."

The goal of this survey is to collect reflections about teaching and being a teacher that may be shared (anonymously, if you choose) with other members of the teaching community.

The survey is accessible at the link: <http://websurvey.sfu.ca/survey/269496490>

European Mathematical Society Survey on Transitional Issues

Another invitation to participate in a survey comes from Bernard Hodgson as a member of the Education Committee of the European Mathematical Society. A brief note below is followed by a French version of the invitation. Any questions about the survey can be directed to Bernard.Hodgson@mat.ulaval.ca.

The Education Committee of the European Mathematical Society (EMS) has recently launched a survey concerning the theme of *The secondary-tertiary transition in mathematics: What are our current challenges and what can we do about them?* An article by that name appears as the 2019 entry in the list of reports found at <https://euro-math-soc.eu/reports>. The link to the survey appears on the first page of that article. The survey can be completed up to September 15th.

Le Comité d'éducation de la Société mathématique européenne (EMS) a récemment lancé une étude sur le thème: *The secondary-tertiary transition in mathematics: What are our current challenges and what can we do about them?*

L'étude est ouverte JUSQU'AU 15 SEPTEMBRE — il faut une quinzaine de minutes pour répondre au questionnaire. Toutes les personnes intéressées sont invitées à remplir le questionnaire en cliquant sur les liens fournis sur le document en remorque. Il est aussi possible de trouver de l'information sur cette étude en visitant le site de l'EMS, à l'url

<https://euro-math-soc.eu/reports>

(aller au bas de la page)

Un rapport sur les résultats de cette étude sera publié dans le EMS Newsletter. Les données recueillies au cours de l'étude pourront être mises à la disposition des chercheurs, sous certaines conditions.

MathemAttic and CRUX Mathematicorum

The current volume of CRUX Mathematicorum (*Crux*) is now freely accessible online. This marks a significant change in *Crux* and along with it an opportunity for people worldwide to see the issues on a timely basis. The journal appears at <https://cms.math.ca/crux/>.

A new feature of *Crux* is a section entitled *MathemAttic* geared to secondary level students and teachers. Each issue features five problems that will ideally bring in publishable solutions from secondary school students. Also, there are typically two other features in *MathemAttic*. The first, *Problem Solving Vignettes*, contains content, ideas and examples thematically drawn together to develop problem solving. Topics such as modulo arithmetic, counting, and congruent triangles have figured into early issues. Shawn Godin is editing that section and writing most of the vignettes. The editors are grateful to Don Rideout, a retired professor from Memorial University of Newfoundland, for his contributions, and welcome hearing from other interested contributors.

The second feature, *Teaching Problems*, focuses attention on problems that are pedagogically effective. The value of a problem may be rooted in the elegance of a solution, a surprising "unsolvability" characteristic, hidden structural similarities to familiar problems, or counterintuitive results or as with the initial example in Issue 4, a problem that lends itself to multiple approaches.

As the editor of *Teaching Problems*, I would suggest that good teaching problems are not usually identified until our experience



awakens us to an insight exposing richness that was not immediately evident. Intellectual curiosity is sparked with a desire to revisit a problem, share insights with others, delve into related patterns, or possibly transfer the conceptual aspect to another mathematical area. The common element is that something about a problem is perceived to be extraordinary. Further, my teaching problems are not likely to be yours and hence the value of this feature will be enriched with contributions from people like you and your colleagues. *MathemAttic*, like *Crux*, is published 10 times annually. There is a standing invitation for people interested in problem solving to come forth and offer contributions through articles, problems, and support. Please let potentially interested secondary level students and teachers know about *MathemAttic*. Send any inquiries to MathemAttic@cms.math.ca.

AARMS Industrial Problem Solving Workshop

The Atlantic Association for Research in the Mathematical Sciences (AARMS) hosted its second annual Industrial Problem Solving Workshop (IPSW) at University of New Brunswick for a week in mid-July.

What is an IPSW? This question is addressed on the AARMS website with reference to the context for the local meeting. “The main goals of an IPSW are to build connections between researchers in industry, non-profit organizations, and academia. Six organizations based in Atlantic Canada and elsewhere will present problems related to their interests, and participants will break into teams to explore solutions to these problems. The problems come from a variety of subject areas, but all are designed to be approachable by students and postdocs with backgrounds in pure mathematics, modelling, scientific computing, computer science, or data analysis. Each problem group will be led by one or more university faculty members with expertise relevant to the technical challenge at hand but participants with a wide range of interests and expertise are welcome. Over the course of the five-day workshop, problem groups will work collaboratively to explore possible solution strategies to the technical challenges and propose longer-term research directions, as well as make connections to a larger group of companies and academic researchers.”

The tentacles of the workshop actually extend beyond the immediate participants to a wider sector encompassing funding agencies, government, academia, and industry. This takes the form of a connector event. An event called *Formulating Success Academic-Industrial Connector* was held midweek with an open invitation to the public community for attendance, in addition to the 60+ participants. In fact, I was one of those others who attended the session that opened with five minutes each for a presentation by AARMS, an overview of the event, and an industrial example from last year. These were followed by 25 separate presentations in a lightning talk format with only 3 minutes given to each presenter. Typically presenters briefly described technical challenges specific to their context or in the case of agencies examples of programs and expertise were discussed. A single background slide appeared

with the name of the presenter, the organization, and a relevant summary supporting each of the presentations.

Before closing this section, two examples of problems are shared directly from the AARMS site. More details on the event including descriptions of other problems can be found at <https://aarms.math.ca/ipsw2019/>.

The first example is from industry, namely, The Black Arcs problem. The Black Arcs uses transportation modelling to simulate the way mobility in a city changes in response to various land-use decisions. Part of generating this model is determining a plausible set of activities for the simulated citizens to use when planning out their virtual days. Typically, this set of activities is generated using population statistics and aggregate trip data representing the number and type of trips taken by a population. Some communities, particularly smaller municipalities, often do not have trip data available. We are looking for a way to generate synthetic trip data with the minimal amount of sampling of real-world traffic counts at key intersections: Put another way, if we are given a graph consisting of edges and nodes, likely destinations in relation to this graph, and population statistics, can we sample traffic counts at key intersections in the graph to recover a likely set of paths representing trips taken in that community? Knowledge of graph theory, statistical analysis, and stochastic modelling are all expected to be useful for tackling this problem.

The second example comes from the New Brunswick Health Council.

The New Brunswick Health Council (NBHC) is interested in leveraging large population level datasets for evidence-based allocation of health resources. More specifically, NBHC has access to survey results from 14,000 New Brunswick residents involving more than 200 variables including information about general health, socioeconomic status, chronic conditions, geospatial data, etc. The goal of this problem is to produce from this data a “sickness” index that will indicate which communities are in need of greater health resources (such as doctors). Students familiar with machine learning, statistical analysis, and/or statistical computing will be well suited to make progress on this problem.

Acknowledgment: Thank you to Sanjeev Seahra for providing the photos from the AARMS Industrial Problem Solving Workshop. The photos are credited to Jeff Picka.

Research Notes brings mathematical research ideas forth to the CMS readership in a generally accessible manner that promotes discussion of relevant topics including research (both pure and applied), activities, and noteworthy news items. Comments, suggestions, and submissions are welcome.

Patrick Ingram, York University (notes-research@cms.math.ca)

Hereditarily indecomposable continua

Logan C. Hoehn, Nipissing University

This note concerns *continuum theory*, the branch of fundamental topology devoted to the study of compact, connected, metric spaces (*continua*). Continuum theory is a highly visual area whose basic notions are accessible to anyone with the background established in a standard undergraduate topology course. It has a rich theory and vibrant cast of characters, and is an active research area with several attractive, easily stated, old open questions. In this note, I will discuss some of the most exotic continua, called *hereditarily indecomposable continua*, and speak to their structure and their role in some classical open problems in the field.

I will start by stating two open questions, which have motivated a great deal of research in continuum theory.

Question 1. *A continuum is called hereditarily equivalent if it is homeomorphic to every one of its non-degenerate subcontinua (where a non-degenerate continuum is one which contains more than one point). How many (non-degenerate) hereditarily equivalent continua are there, and what are they?*

The reader will easily see that the *arc* (i.e. the interval $[0, 1]$) is such a continuum, but may have difficulty coming up with any other examples. This question was first raised by Mazurkiewicz in 1921 [14], where he asked if the arc is the only hereditarily equivalent continuum. We will see the current state of this question later.

Question 2. *A topological space X is homogeneous if for any points $x, y \in X$, there is a homeomorphism h of X onto X such that $h(x) = y$. What are all the 1-dimensional homogeneous continua?*

Some well-known examples of homogeneous 1-dimensional continua are the *circle*, the *Menger cube*, and *solenoids*. The notion of homogeneity was introduced by Sierpiński in [17]. The first question in the spirit of Question 2 was raised by Knaster and Kuratowski in 1920 [10], where they asked whether the circle is the only homogeneous continuum which can be embedded in the plane \mathbb{R}^2 .

A continuum X is *decomposable* if it is the union of two of its proper subcontinua; otherwise it is *indecomposable*. X is *hereditarily indecomposable* if not only is X indecomposable, but every one of its subcontinua is also indecomposable. The most well-known example of a hereditarily indecomposable continuum is the *pseudo-arc*. This space, discovered independently by Knaster [9],

Les Notes de recherche présentent des sujets mathématiques au lectorat de la SMC dans un format généralement accessible qui favorise les discussions sur divers sujets pertinents, dont la recherche (pure et appliquée), les activités et des nouvelles dignes de mention. Vos commentaires, suggestions et propositions sont les bienvenues.

Patrick Ingram, York University (notes-recherche@smc.math.ca)

Moise [15], and Bing [1], is a 1-dimensional fractal-like continuum. It can be obtained by taking a nested sequence S_1, S_2, \dots of thinner and thinner “snakes” (topological disks) in \mathbb{R}^2 , such that the snake S_{n+1} follows a highly crooked pattern through S_n . The intersection $\bigcap_{n=1}^{\infty} S_n$ will be homeomorphic to the pseudo-arc provided that (roughly speaking) the snakes S_n exhibit such crookedness that they zig-zag all over the place, on all scales large and small, and more and more as n increases.

The pseudo-arc has several striking properties, besides being hereditarily indecomposable. Moise [15] proved that it is another example of a hereditarily equivalent continuum, and for this reason he coined the name “pseudo-arc”. Bing [1] proved that it is homogeneous, thus answering in the negative the question of Knaster and Kuratowski; still another homogeneous plane continuum, called the *circle of pseudo-arcs*, was later constructed by Bing and Jones in [3]. Though the pseudo-arc might seem like a “pathological” example, it turns out that it is the *generic* continuum, in the sense that in any manifold M of dimension at least 2, the set of subcontinua homeomorphic to the pseudo-arc is a dense G_{δ} subset of the set of all subcontinua of M (equipped with the Vietoris topology) [2]. The pseudo-arc is a universal object in the sense that it is *arc-like*, and every arc-like continuum is a continuous image of it [12, 5].

It is essentially impossible to draw a single, informative raster image of a hereditarily indecomposable continuum in the same way as one does for simpler continua like the arc or circle – such an image would be at best a messy smattering of pixels, and could never be distinguished from a picture of a simple (e.g. decomposable) continuum (see [13] for a detailed discussion). Instead, to visualize hereditarily indecomposable continua one must rely on a more dynamical conception, where the “crooked” shape of the space is revealed more and more as one looks more and more closely at it.

This intuition is in the background for the following recent result. This theorem states roughly that hereditarily indecomposable continua are so crooked that they can match any essential zig-zagging pattern in any graph. One might picture the set U in the theorem as a blanket draped over a graph G , which may be crumpled and fold back over itself, but ultimately covers G so that there is no pathway for the air above the blanket to get to G without meeting U .

Theorem 1. ([7], see also [8]) *A continuum X is hereditarily indecomposable if and only if for any map $g : X \rightarrow G$ to a graph G and for any open set $U \subseteq G \times (0, 1)$ which separates $G \times \{0\}$ from $G \times \{1\}$ in $G \times [0, 1]$, there exists a map $h : X \rightarrow (0, 1)$ such that $(g(x), h(x)) \in U$ for all $x \in X$.*

This theorem is the key result which we used in [8] to prove that there are no other non-degenerate homogeneous continua in the plane \mathbb{R}^2 besides the circle, the pseudo-arc, and the circle of pseudo-arcs, thus putting to rest the question of Knaster and Kuratowski once and for all. Besides Theorem 1, we relied on a number of substantial partial results contributed by several researchers between the 1920's and 1980's.

The general classification of 1-dimensional homogeneous continua is an ambitious project which may not see completion in the near future. However, one natural starting place is to find all the so-called *tree-like* homogeneous continua. It was proved by Rogers [16] and Krupski and Prajs [11] that a homogeneous continuum is tree-like if and only if it is hereditarily indecomposable. This leads to the following interesting open question: Is the pseudo-arc the only hereditarily indecomposable, homogeneous continuum?

Using Theorem 1, we prove in [7] that the arc and the pseudo-arc are the only hereditarily equivalent continua in the plane \mathbb{R}^2 . Henderson [6] proved that the arc is the only decomposable hereditarily equivalent continuum. It remains an open question whether there exist any non-planar indecomposable hereditarily equivalent continua. Clearly any such continuum would be hereditarily indecomposable, and Cook [4] has proved that it would be tree-like (in particular 1-dimensional, hence embeddable in \mathbb{R}^3).

References

1. R. H. Bing, *A homogeneous indecomposable plane continuum*, Duke Math. J. 15 (1948), 729–742. MR 0027144 (10,261a)
2. ___, *Concerning hereditarily indecomposable continua*, Pacific J. Math. 1 (1951), 43–51. MR 0043451 (13,265b)
3. R. H. Bing and F. Burton Jones, *Another homogeneous plane continuum*, Trans. Amer. Math. Soc. 90 (1959), 171–192. MR 0100823 (20 #7251)
4. H. Cook, *Tree-likeness of hereditarily equivalent continua*, Fund. Math. 68 (1970), 203–205. MR 0266164 (42 #1072)
5. Lawrence Fearnley, *Characterizations of the continuous images of the pseudo-arc*, Trans. Amer. Math. Soc. 111 (1964), 380–399. MR 0163293
6. George W. Henderson, *Proof that every compact decomposable continuum which is topologically equivalent to each of its nondegenerate subcontinua is an arc*, Ann. of Math. (2) 72 (1960), 421–428. MR 0119183 (22 #9949)
7. Logan C. Hoehn and Lex G. Oversteegen, *A complete classification of hereditarily equivalent plane continua*, ArXiv 1812.08846.
8. ___, *A complete classification of homogeneous plane continua*, Acta Math. 216 (2016), no. 2, 177–216. MR 3573330
9. B. Knaster, *Un continu dont tout sous-continu est indécomposable*, Fund. Math. 3 (1922), 247–286.
10. B. Knaster and C. Kuratowski, *Problème 2*, Fund. Math. 1 (1920), 223.
11. Paweł Krupski and Janusz R. Prajs, *Outlet points and homogeneous continua*, Trans. Amer. Math. Soc. 318 (1990), no. 1, 123–141. MR 937246 (90f:54054)
12. A. Lelek, *On weakly chainable continua*, Fund. Math. 51 (1962/1963), 271–282. MR 0143182
13. Wayne Lewis and Piotr Minc, *Drawing the pseudo-arc*, Houston J. Math. 36 (2010), no. 3, 905–934. MR 2727011
14. S. Mazurkiewicz, *Problème 14*, Fund. Math. 2 (1921), 286.
15. Edwin E. Moise, *An indecomposable plane continuum which is homeomorphic to each of its nondegenerate subcontinua*, Trans. Amer. Math. Soc. 63 (1948), 581–594. MR 0025733 (10,56i)
16. James T. Rogers, Jr., *Homogeneous hereditarily indecomposable continua are tree-like*, Houston J. Math. 8 (1982), no. 3, 421–428. MR 684167 (84b:54072)
17. Wacław Sierpiński, *Sur une propriété topologique des ensembles dénombrables denses en soi*, Fund. Math. 1 (1920), 11–16.

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Amy Ackerberg-Hastings, Independent Scholar
(aackerbe@verizon.net)

or

Hardy Grant, York University [retired] (hardygrant@yahoo.com)

Canadian Women Who Earned PhDs in Mathematics before 1940

Judy Green, Marymount University

Jeanne LaDuke, DePaul University

In this article the authors will note the eleven Canadian women who received PhDs in mathematics before 1940. Eight women born or raised in Canada received the degree in the United States and are among the 228 women featured in the book, *Pioneering Women in American Mathematics: The Pre-1940 PhD's* [1], and in long biographies that are freely available in the supplementary material on the website associated with it [2]. The three women who received PhDs in mathematics before 1940 in Canada will also be noted before we concentrate on Louise D. Cummings, who had a rich scholarly, professional, and teaching life.

The eight Canadian women with US degrees are listed below in chronological order of their doctoral-degree dates. They are followed by the three women with Canadian degrees whose biographies are not included in [1] and [2].

The eight women with US degrees are:

- Fitch, Annie (MacKinnon) (1868–1940). University of Kansas (BS 1889, MS 1891), Cornell University (PhD 1894). The MacKinnon family had moved to Kansas by 1870.
- Hill, Agnes (Baxter) (1870–1917). Dalhousie University (BA 1891, MA 1892), Cornell University (PhD 1895).
- Cummings, Louise D. (1870–1947). University of Toronto (BA 1895, MA 1902), Bryn Mawr College (PhD 1914).
- Colpitts, Julia T. (1875–1936). University of Mount Allison College (BA 1899), Cornell University (MA 1900, PhD 1924).
- Hughes, Olive Margaret (1899–1936). University of Saskatchewan (BA 1925, MA 1926), Bryn Mawr College (PhD 1934).
- Humphreys, Mabel Gweneth (1911–2006). University of British Columbia (BA 1932), Smith College (MA 1933), University of Chicago (PhD 1935).
- Grant, Anna M. C. (1903–1984). Dalhousie University (BA 1925), Bryn Mawr College (PhD 1937).
- Widder, Vera (Ames) (1909–2004). University of Saskatchewan (BA 1931, MA 1932), Bryn Mawr College (PhD 1938).

Les articles de la SCHPM présentent des travaux de recherche en histoire et en philosophie des mathématiques à la communauté mathématique élargie. Les auteur.e.s sont membres de la Société canadienne d'histoire et de philosophie des mathématiques (SCHPM). Vos commentaires et suggestions sont les bienvenues et peuvent être adressées à:

Amy Ackerberg-Hastings, Chercheuse indépendante
(aackerbe@verizon.net)

ou

Hardy Grant, York University [retraité] (hardygrant@yahoo.com)

The following are the three Canadian women who received PhDs in Canada before 1940. All were awarded by the University of Toronto. We list online sources for information about the first two and somewhat more information about the third, for whom no comprehensive online source is available.

- Krieger, Cypra Cecilia (1894–1974). University of Toronto (BA 1924, MA 1925, PhD 1930). Krieger earned the first PhD in mathematics awarded to a woman in Canada. In 1953 she married Zygmund Dunajj but continued to use the name Cecilia Krieger professionally. See [3].
- Turner, Alice Willard (1908–1997). McGill University (BA 1927, MA 1928), University of Toronto (PhD 1932). Turner and Clara Thomas were the first two women faculty members at York University. See [4], which was written by Thomas.
- Sargent, Mary Jean (Fisher) (1907–1981). University of British Columbia (BA 1929, MA 1931), University of Toronto (PhD 1933). After her PhD she married Hartley Sargent, a mining engineer. They later moved to Victoria, BC, where they had two sons, and she did some teaching at the University of British Columbia.

The following information is adapted from the entry for Louise D. Cummings in [2].

Louise Duffield Cummings was born in Hamilton, Ontario, on November 21, 1870. Cummings received her PhD from Bryn Mawr College, a women's college in Pennsylvania, in 1914 at the age of 43. She had received her BA in 1895 from the University of Toronto, had done graduate work in mathematics at four schools, and had been on the faculty at Vassar College since 1902, when she received her master's degree from Toronto. Cummings continued her teaching at Vassar while maintaining an active professional and scholarly life until her retirement in 1935 because of poor health. At the time of her death it was noted that her teaching and research had contributed greatly to Vassar's reputation in mathematics.

Cummings attended public schools and the Hamilton Collegiate Institute. In 1889 she enrolled at the University of Toronto, and she graduated in 1895 with first-class honours in mathematics. She had taken off the years 1890–1891 and 1893–1894 but held a scholarship in mathematics in her second year and half of the physics scholarship in her third year.



Figure 1 Louise D. Cummings, from “Canadian Women in the Public Eye,” *Saturday Night* (August 24, 1924).

Cummings spent all but one semester during the next five years studying mathematics. In 1895–1896 she attended the University of Toronto; in 1896–1897 she held a fellowship at the University of Pennsylvania; in 1897–1898 she was at the University of Chicago; and in 1898–1899 and the second semester of 1899–1900 she was a fellow by courtesy at Bryn Mawr. In 1900–1901, the year before she resumed her study of mathematics, Cummings studied at the Ontario Normal College in Hamilton. She then returned to Toronto to continue her studies and to teach mathematics at St. Margaret’s College, a day and boarding school for girls. Her master’s degree was awarded by the University of Toronto in 1902, and in the fall she joined the faculty at Vassar College, a women’s college in Poughkeepsie, New York, as an instructor.

She remained at Vassar her entire career, where she was considered an excellent teacher and thought of as a friend as well as a teacher. Sources indicate she was active socially and had a delightful sense of humour. Louise Cummings continued her studies at Bryn Mawr at various times while on the faculty at Vassar, including in 1912–1913 when she was in residence at Bryn Mawr for the academic year. She received her doctorate in 1914, and in her dissertation, “On a method of comparison for triple systems,” she acknowledges her indebtedness to Charlotte A. Scott of Bryn Mawr “for helpful criticism and unfailing interest in the preparation of this paper” and to Henry Seely White of Vassar “who suggested . . . the subject of [the] dissertation.” She published a dozen papers over 20 years, two of which were coauthored with White and Frank Nelson Cole.

Cummings attended many meetings of the AMS and MAA and often gave presentations at the AMS meetings. In 1924 she was appointed to the MAA committee to formulate the details for awarding the newly established Chauvenet Prize. She also attended the International Congress of Mathematicians (ICM) in Toronto in 1924 and in Zurich in 1932, where she read papers. She was given an honorary DSc degree by the University of Toronto at the university’s centennial celebration in 1927.

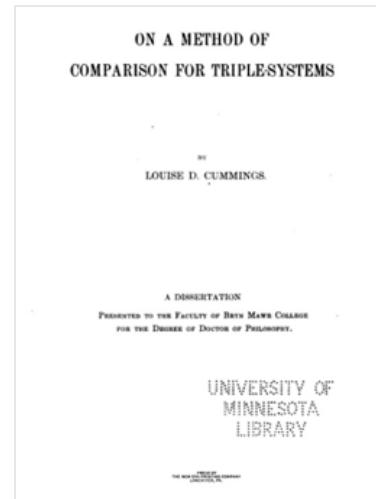


Figure 2 Cummings’s dissertation, from GoogleBooks.

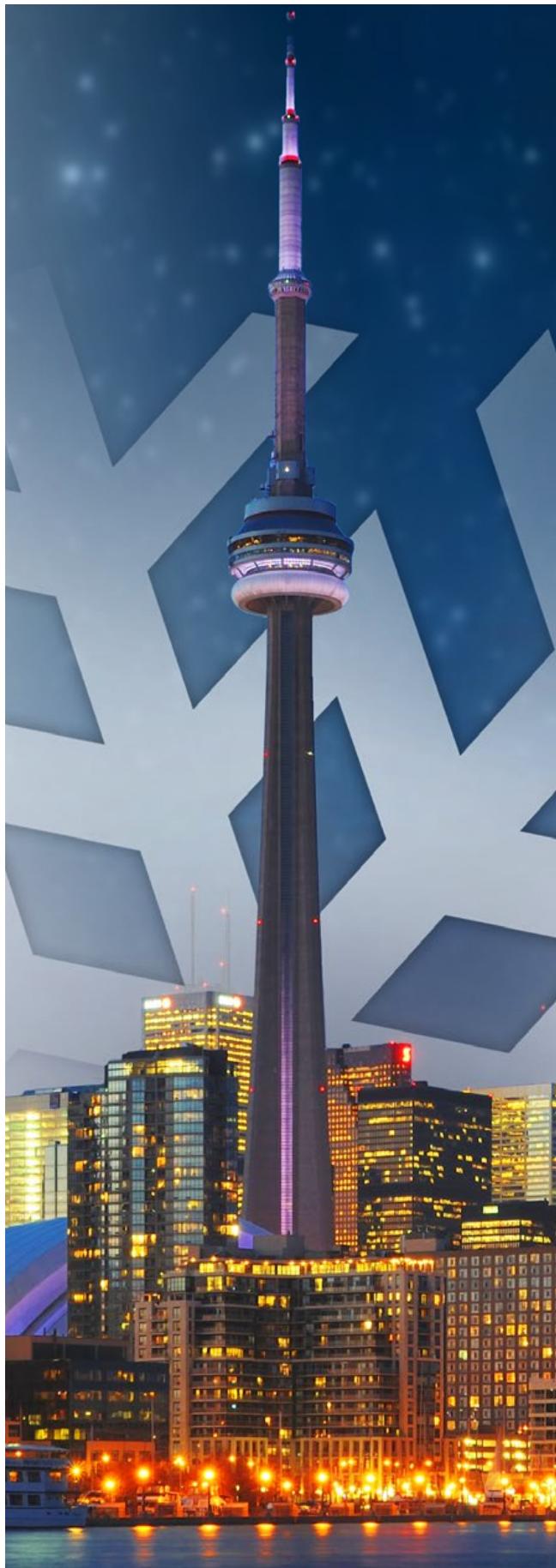
Cummings retired in 1935 as professor emeritus. However, as a college teacher she did not have retirement benefits. In 1905 Andrew Carnegie founded what would become the Carnegie Foundation for the Advancement of Teachers that offered pensions to college teachers; Cummings received an allowance from the fund beginning February 24, 1936.

After suffering from severe arthritis for several years, Louise Cummings died in 1947, at the age of 76, at her niece’s home in Wayne, Michigan. She was buried in a Hamilton, Ontario, cemetery.

References

- [1] Green, Judy, and Jeanne LaDuke. (2009) *Pioneering women in American mathematics: The pre-1940 PhD's*. Providence, RI: American Mathematical Society.
- [2] Green, Judy, and Jeanne LaDuke. (2016) Supplementary material for *Pioneering women in American mathematics*. <http://www.ams.org/publications/authors/books/postpub/hmath-34-PioneeringWomen.pdf>.
- [3] O’Connor, J. J., and E. F. Robertson. (2002) *MacTutor History of Mathematics* (University of St Andrews, Scotland). <http://www-history.mcs.st-and.ac.uk/Biographies/Krieger.html>.
- [4] Thomas, Clara. (1997, September) Alice Willard Turner: 1908–1997, *Profiles*. <http://www.yorku.ca/yul/profiles/past/sept97/current/dept/news/news1.htm>.

Judy Green (judy.green@marymount.edu) and Jeanne LaDuke (jladuke@depaul.edu) both received their PhDs in mathematics (Jeanne in 1969 from the University of Oregon and Judy in 1972 from the University of Maryland) but switched their research interests to the history of mathematics in the late 1970s under the influence of the late Uta C. Merzbach, then curator of mathematics at the Smithsonian Institution’s Museum of History and Technology, now the National Museum of American History. Both focused their work on women in mathematics with an emphasis on American women in mathematics that resulted in References [1] and [2]. They are now both retired.



DECEMBER 6-9 DÉCEMBRE, 2019

2019 CMS Winter Meeting Réunion d'hiver de la SMC 2019

Toronto, ON

Plenary speakers | Conférences plénierées

Maria Chudnovsky (Princeton)
Sarah Mayes Tang (Toronto)
Antonio Montalban (California)
Kirsten Morris (Waterloo)
Malabika Pramanik (British Columbia)
Lauren K. Williams (Harvard)

Public Lecture | Conférence publique:

David Earn (McMaster)

Prizes | Prix

Doctoral Prize Lecture | Conférence de prix de doctorat

Dr. Mikhail Karpukhin (California)

Coxeter James Prize | Conférence de prix de Coxeter-James

Dr. Jacob Tsimerman (Toronto)

Adrien Pouliot Prize | Conférence de prix Adrien-Pouliot

Tiina Hohn (MacEwan University)

Graham Wright Award for Distinguished Service |

Prix Graham-Wright pour service méritoire

Karl Dilcher (Dalhousie)

G. de B. Robinson Award | Prix G. de B. Robinson

Lars Louder (University College London), Henry Wilton (Cambridge)



WINTER19.CMS.MATH.CA
HIVER19.SMC.MATH.CA



■ CMS 75th Anniversary Meeting

The Canadian Mathematical Society (CMS) welcomes and invites proposals for scientific sessions for the 2020 CMS Summer meeting in Ottawa from June 5-8, 2020.

Proposals should include (1) names, affiliations, and contact information for two (or more) session co-organizers, (2) a title and brief description of the focus and purpose of the session, (3) a preliminary list of potential speakers with their affiliations, along with a total number of expected speakers. Potential organizers are encouraged to consider diversity in their selection of session invitees.

Sessions will take place June 5-8. They will be advertised in the CMS Notes, on the CMS website and in the AMS Notices. Speakers will be requested to submit abstracts, which will be published on the website and in the meeting program.

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

Ailana Fraser (University of British Columbia) afraser@math.ubc.ca

Monica Nevins (University of Ottawa) mnevins@uottawa.ca

Mateja Šajna (University of Ottawa) msajna@uottawa.ca

Proposals should be submitted by **September 30, 2019**.

■ Réunion du 75^e anniversaire de la SMC

La Société mathématique du Canada (SMC) sollicite des propositions de sessions scientifiques pour sa Réunion d'été 2020, qui se tiendra à Ottawa du 5 au 8 juin 2020.

Les propositions doivent inclure (1) les noms, affiliations et coordonnées d'au moins deux coorganisateurs, (2) un titre et une brève description du sujet et du but de la session, (3) une liste préliminaire des conférenciers potentiels avec leurs affiliations, ainsi que le nombre de conférenciers attendus. Les organisateurs potentiels sont invités à prendre en compte la diversité dans leur sélection d'invités.

Les sessions auront lieu du 5 au 8 juin. Toutes les sessions seront annoncées dans les Notes de la SMC, sur le site web de la SMC et dans les AMS Notices. Les conférenciers devront présenter un résumé, qui sera publié sur le site web et dans le programme de la Réunion.

Toute personne qui souhaiterait organiser une session est priée de faire parvenir une proposition aux directeurs scientifiques :

Ailana Fraser (Université de la Colombie-Britannique) afraser@math.ubc.ca

Monica Nevins (Université d'Ottawa) mnevins@uottawa.ca

Mateja Šajna (Université d'Ottawa) msajna@uottawa.ca

La date limite pour présenter une proposition est le **30 septembre 2019**.



Call for Proposals: 2019 Endowment Grants Competition

The Canadian Mathematical Society is pleased to announce the *2019 Endowment Grants Competition*. The CMS Endowment Grants fund projects that contribute to the broader good of the mathematical community. Projects funded by the Endowment Grants must be consistent with the interests of the CMS: to promote the advancement, discovery, learning and application of mathematics.

An applicant may be involved in only one proposal per competition as a principal applicant. Proposals must come from CMS members, or, if joint, at least one principal applicant must be a CMS member.

The deadline for applications is **September 30, 2019**. Successful applicants will be informed in January 2020 and the grants issued in February 2020.

Further details about the endowment grants and the application process are available on the CMS website: www.cms.math.ca/Grants/EGC

The Endowment Grants Committee (EGC) administers the distribution of the grants and adjudicates proposals for projects. The EGC welcomes questions or suggestions you may have on the program. Please contact the Committee by e-mail at chair-egc@cms.math.ca.

Appel de projets : Concours de bourses du fonds de dotation 2019

La Société mathématique du Canada (SMC) est heureuse d'annoncer la tenue du *Concours de bourses du fonds de dotation 2019*. Les bourses du fonds de dotation de la SMC finance des activités contribuant à l'essor global de la communauté mathématique. Les projets financés à partir des bourses du fonds de dotation doivent correspondre aux intérêts de la SMC : soit promouvoir et favoriser la découverte et l'apprentissage des mathématiques, et les applications qui en découlent.

Un demandeur ne peut présenter qu'un projet par concours en tant que demandeur principal. Les projets doivent venir de membres de la SMC. S'il s'agit d'un projet conjoint, au moins un des demandeurs principaux doit être membre de la SMC.

La date limite pour présenter sa demande est le **30 septembre 2019**. Les projets retenus seront annoncés en janvier 2020, et les bourses distribuées en février 2020.

Pour vous procurer un formulaire ou pour de plus amples renseignements sur l'appel de projets, passez sur le site de la SMC au : www.smc.math.ca/Grants/EGC/f

Le Comité d'attribution des bourses du fonds de dotation (CABFD) gère la répartition des bourses et évalue les projets. Pour toute question ou tout commentaire sur les bourses du fonds de dotation, veuillez communiquer par courriel avec le comité à pres-egc@smc.math.ca.



CMS Research Prizes

The CMS Research Committee is inviting nominations for three prize lectureships. These prize lectureships are intended to recognize members of the Canadian mathematical community.

The **Coxeter-James Prize** Lectureship recognizes young mathematicians who have made outstanding contributions to mathematical research. 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. 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. For more information, visit: <https://cms.math.ca/Prizes/cj-nom>

The **Jeffery-Williams Prize** Lectureship recognizes mathematicians who have made outstanding contributions to mathematical research. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for three years. For more information: <https://cms.math.ca/Prizes/jw-nom>

The **Krieger-Nelson Prize** Lectureship recognizes outstanding research by a female mathematician. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for two years. For more information: <https://cms.math.ca/Prizes/kn-nom>

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 open to all genders, except for the Krieger-Nelson prize, which is awarded to women only. Nominations of eligible women for the general research prizes in addition to the Krieger-Nelson Prize are strongly encouraged.

The deadline for nominations, including at least three letters of reference, is **September 30, 2019**. Nomination letters should list the chosen referees and include a recent curriculum vitae for the nominee. Some arms-length referees are strongly encouraged. Nominations and the reference letters from the chosen referees should be submitted electronically, preferably in PDF format, to the corresponding email address and **no later than September 30, 2019**:

Coxeter-James: cjprize@cms.math.ca

Jeffery-Williams: jwprize@cms.math.ca

Krieger-Nelson: knprize@cms.math.ca

Prix de recherche de la SMC

Le Comité de recherche de la SMC lance un appel de mises en candidatures pour trois de ses prix de conférence. Ces prix ont tous pour objectif de souligner l'excellence de membres de la communauté mathématique canadienne.

Le **Prix Coxeter-James** rend hommage aux jeunes mathématicien.ne.s qui se sont distingué.e.s par l'excellence de leur contribution à la recherche mathématique. Cette personne doit être membre de la communauté mathématique canadienne. Les candidat.e.s sont admissibles jusqu'à dix ans après l'obtention de leur doctorat. Toute mise en candidature est modifiable et demeurera active l'année suivante, à moins que la mise en candidature originale ait été faite la 10 année suivant l'obtention du doctorat. Pour les renseignements, voir : <https://cms.math.ca/Prix/cj-nom>

Le **Prix Jeffery-Williams** rend hommage aux mathématicien.e.s ayant fait une contribution exceptionnelle à la recherche mathématique. Cette personne doit être membre de la communauté mathématique canadienne. Toute mise en candidature est modifiable et demeurera active pendant trois ans. Pour les renseignements, voir : <https://cms.math.ca/Prix/jw-nom>

Le **Prix Krieger-Nelson** rend hommage aux mathématiciennes qui se sont distinguées par l'excellence de leur contribution à la recherche mathématique. La lauréate doit être membre de la communauté mathématique canadienne. Toute mise en candidature est modifiable et demeurera active pendant deux ans. Pour les renseignements, voir : <https://cms.math.ca/Prix/kn-nom>

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 pour la recherche dans les sciences mathématiques sans distinction de race, de genre, d'appartenance ethnique ou d'orientation sexuelle. Une personne peut être mise en candidature pour plus d'un prix de recherche dans les catégories applicables ; plusieurs candidat.e.s d'un même institut peuvent être nommé.e.s pour le même prix de recherche.

Les prix de recherche de la SMC sont ouverts aux candidat.e.s de tous les genres, à l'exception du prix Krieger-Nelson, qui est décerné uniquement aux femmes. Les candidatures de femmes éligibles pour les prix de recherche généraux en plus du prix Krieger-Nelson sont fortement encouragées.

La date limite pour déposer une candidature, qui comprendra au moins trois lettres de référence, est **le 30 septembre 2019**. Le dossier de candidature doit comprendre le nom des personnes données à titre de référence ainsi qu'un curriculum vitae récent du candidat ou de la candidate. Veuillez faire parvenir les mises en candidature et lettres de référence par voie électronique, de préférence en format PDF, avant la date limite, à l'adresse électronique correspondante et **au plus tard le 30 septembre 2019** :

Coxeter-James : prixcj@smc.math.ca

Jeffery-Williams : prixjw@smc.math.ca

Krieger-Nelson : prixkn@smc.math.ca

2020 Excellence in Teaching Award

The CMS Excellence in Teaching Award Selection Committee invites nominations for the **2020 Excellence in Teaching Award**.

The Excellence in Teaching Award focuses on the recipient's proven excellence as a teacher at the undergraduate level, including at universities, colleges and cégeps, as exemplified by unusual effectiveness in the classroom and/or commitment and dedication to teaching and to students. The dossier should provide evidence of the effectiveness and impact of the nominee's teaching. The prize recognizes sustained and distinguished contributions in teaching at the post-secondary undergraduate level at a Canadian institution. Only full-time teachers or professors who have been at their institution for at least five years will be considered. The nomination will remain active for three years, with a possibility to update.

Nomination letters, *including at least three letters of reference*, should list the chosen referees and include a recent curriculum vitae for the nominee, if available.

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 and reference letters should be submitted electronically, preferably in PDF format, to: etaward@cms.math.ca no later than the deadline of **November 15, 2019**.

Prix d'excellence en enseignement 2020

Le Comité de sélection du Prix d'excellence en enseignement de la SMC sollicite des mises en candidature pour le **Prix d'excellence en enseignement 2020**.

Le Prix d'excellence en enseignement de la SMC récompense l'excellence reconnue d'un.e enseignant.e ou d'un.e professeur.e de niveau postsecondaire (universités, collèges et cégeps), telle qu'illustrée par son efficacité exceptionnelle en classe et/ou son engagement et son dévouement envers l'enseignement et les étudiant.e.s. Le dossier de candidature doit montrer l'efficacité et les effets de l'enseignement du candidat ou de la candidate. Ce prix récompense des contributions exceptionnelles et soutenues en enseignement collégial et de premier cycle universitaire dans un établissement canadien. Seules les candidatures d'enseignant.e.s et de professeur.e.s à temps plein qui travaillent dans le même établissement depuis au moins cinq ans seront retenues. Une candidature peut être mise à jour et demeure active pendant 3 ans.

Le dossier de candidature, *comportant au moins trois lettres de référence*, doit comprendre le nom des personnes données à titre de référence ainsi qu'un curriculum vitae récent du candidat ou de la candidate, dans la mesure du possible.

La SMC a pour but de promouvoir et de célébrer la diversité au sens le plus large. Nous encourageons fortement les directeurs et 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.

Veuillez faire parvenir les mises en candidature et lettres de référence par voie électronique, de préférence en format PDF, à : prixee@smc.math.ca avant la date limite du **15 novembre 2019**.



Call for Proposals: 2020 CMS Math Competition Grants

The CMS is now accepting applications for the 2020 CMS Math Competition Grants program. The CMS supports activities that promote the learning of mathematics among Canadian youth. In addition to the Society's math competitions, the CMS offers math competition grants for activities at the elementary and secondary school levels.

The deadline for submissions is **November 15, 2019**. Successful applicants will be informed in January 2020 and the grants issued in February 2020.

Further details about the math competitions grants and the application process are available on the CMS website: <https://cms.math.ca/Competitions/grants>

The Committee on Grants for Provincial Competitions (CGPC) adjudicates proposals for support. Should you have further questions or comments, please contact the Committee by e-mail at chair-grants-pc@cms.math.ca

Applications should be submitted electronically, preferably in PDF format, **no later than November 15, 2019** to mathgrants@cms.math.ca.



Appel de projets : Subventions pour les concours mathématiques de la SMC 2020

La SMC accepte maintenant des demandes de subventions pour le programme des concours de mathématiques de la SMC 2020. La SMC appuie des activités qui favorisent l'apprentissage des mathématiques chez les jeunes canadiens. En plus d'organiser ses propres concours de mathématiques, la SMC offre des subventions pour les concours de mathématiques pour les activités scolaires au niveau primaire et secondaire.

La date limite pour présenter sa demande est **le 15 novembre 2019**. Les projets retenus seront annoncés en janvier 2020, et les bourses distribuées en février 2020.

Pour vous procurer un formulaire ou pour de plus amples renseignements sur l'appel de projets, passez sur le site de la SMC au : <https://cms.math.ca/Concours/grants>

Le Comité du financement des concours provinciaux (CFCP) évalue la répartition des bourses. Pour toute question ou tout commentaire sur le financement des concours provinciaux, veuillez communiquer par courriel avec le comité à pres-grants-pc@smc.math.ca

Les demandes devraient être présentées par voie électronique, préféablement en format PDF, **au plus tard le 15 novembre 2019**, à l'adresse suivante : subventionsmaths@smc.math.ca

CMS 2019 Summer Meeting Recap

Sarah Watson, CMP, CMM - Manager, Meetings & Events, CMS

Over 250 mathematicians were welcomed to the University of Regina for the 2019 CMS Summer Meeting, from June 7-10th. Participants attended 18 Scientific Sessions; five Plenary Lectures; two Prize Lectures and one Public Lecture over the course of the meeting. The Plenary Lecture Speakers were: Denis Auroux (Harvard); Caroline Colijn (Simon Fraser); Gregory Lawler (Chicago); Grigorios Paouris (Texas A&M); and Pham Huu Tiep (Rutgers).

This summer, the CMS introduced three-hour mini-courses to add value to the meetings and make them attractive for students and researchers to attend. A graduate student focused mini course



Bilan de la Réunion d'été de la SMC 2019

Sarah Watson, CMP, CMM - Chef, réunions et événements, SMC

Quelque 250 mathématicien.ne.s ont été accueilli.e.s à l'Université de Regina à l'occasion de la Réunion d'été de la SMC, du 7 au 10 juin 2019. Au programme : dix-huit sessions scientifiques; cinq conférences plénières; deux sessions de remise de prix et une conférence publique. Les conférences plénières ont été prononcées par Denis Auroux (Harvard); Caroline Colijn (Simon Fraser); Gregory Lawler (Chicago); Grigorios Paouris (Texas A&M); et Pham Huu Tiep (Rutgers).

Cet été, la SMC organise des mini-cours afin d'ajouter de la valeur à nos réunions et d'encourager les étudiant.e.s et les chercheur.e.s à y assister. Un mini-cours pour les étudiant.e.s aux études supérieures intitulé 'Building Your Career in Mathematics'

entitled 'Building Your Career in Mathematics' was held Friday morning and seven mini-courses were held on Friday afternoon, June 7, before the public lecture, and included topics suitable for graduate students, postdocs and other interested parties.

The conference opened with the Public Lecture, entitled 'When Mathematicians Play the Drums', given by Nilima Nigam (Simon Fraser). Following the lecture, there was a well-attended Welcome Reception where participants got the chance to visit with one another and catch up on current developments!

On Saturday June 8th the CMS Awards Banquet recognized the 2019 CMS Award winners: They are: Professor Jeremy Quastel (Toronto) recipient of the Jeffery-Williams Prize; and Professor Julia Gordon (UBC) recipient of the Krieger-Nelson Prize.

The Student Poster Awards were also presented at the banquet: AARMS Prize: Ankai Liu (Queen's); CMS President's Prize:



Scientific Directors (left to right) / Directeurs et directrice scientifique (de gauche à droite) : Prof. Allen Herman (Regina), Prof. Alexander Litvak (Alberta) and Prof. Karen Meagher (Regina).



Student poster winner Roghayeh Maleki (left) from the University of Regina is with CMS VP – West and Dean of Faculty of Science (Regina) Prof. Douglas Farenick and CMS Executive Director, Dr. Termeh Kousha.

La gagnante du prix de la meilleure affiche étudiante, Roghayeh Maleki (gauche) de l'Université de Regina est avec Prof. Douglas Farenick, le VP-Ouest de la SMC et le doyen de la faculté des sciences (Regina), et Termeh Kousha, la directrice générale de la SMC.

('Bâtir votre carrière en mathématiques') a eu lieu le matin du vendredi 7 juin et sept autres mini-cours ont eu lieu en après-midi, avant de la conférence publique. Ces cours abordent des sujets qui intéressent les étudiant.e.s diplômé.e.s, les postdoctorant.e.s et d'autres chercheur.e.s dans le domaine.

La conférence publique, intitulée 'When Mathematicians Play the Drums' ('Quand les mathématiciens jouent de la batterie') a été prononcée par Nilima Nigam (Simon Fraser). Après la conférence publique, il y avait aussi une réception qui a permis à de nombreux et nombreuse participant.e.s de faire davantage la connaissance de

Roghayeh Maleki (Regina); and CMS Student Committee Prize: Sudan Xing (Memorial).

The CMS would like to acknowledge the financial support from the University of Regina particularly Scientific Directors, Allen Herman (Regina), Alexander Litvak (Alberta) and Karen Meagher (Regina) and other faculty at the University of Regina, especially Andrei Volodin, and Shaun Fallat for their part in making the 2019 CMS Summer Meeting such a success.



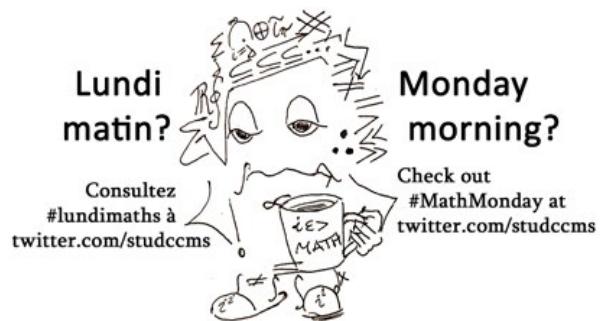
Judging underway for the CMS student poster presentations.
Jugement en cours pour la meilleure affiche d'étudiant.e de la SMC

leurs collègues dans le domaine et d'apprendre sur les plus récents développements mathématiques !

Le banquet du samedi 8 juin était consacré à la remise des prix de la SMC. Le professeur Jeremy Quastel (Toronto) a reçu le Prix Jeffery-Williams; et la professeure Julia Gordon (UBC) s'est vue décerner le Prix Krieger-Nelson.

Toujours au banquet, des prix ont également été décernés aux étudiant.e.s ayant conçu les meilleures affiches : Ankai Liu (Queen's) a gagné le Prix de l'AARMS; le Prix du président de la SMC a été remis à Roghayeh Maleki (Regina); et le Prix du Comité étudiant de la SMC a été décerné à Sudan Xing (Memorial).

La SMC tient à remercier l'Université de Regina pour son soutien financier et plus particulièrement le travail des codirecteurs et de la codirectrices scientifiques : Allen Herman (Regina), Alexander Litvak (Alberta) et Karen Meagher (Regina), ainsi que celui du personnel de l'Université, notamment Andrei Volodin et Shawn Fallat pour leur contribution au succès de cette réunion.



A Message from your Student Committee

A heartfelt thanks to all our new friends in Regina, to everyone who has made the meeting a success! Over 30 students came out to a raucous student social dinner at the old University Club, complete with Math Taboo and Math Bingo! We were treated to 10 beautiful posters and 5 engaging student talks. We hope to see you at the Winter meeting in Toronto Dec. 6-9.

If you cannot wait this long, check out our #MathMonday puzzles on twitter.com/studccms, read our Notes from the Margin on Issuu. As always, we welcome and encourage applications for funding from all who organize a math conference that will benefit students.

CMS Student Committee

Un message de votre Comité étudiant

Un gros merci à tous nos nouveaux amis de Régina, et à tous les gens qui ont fait de la rencontre un franc succès! Plus de 30 étudiant.e.s se sont joints pour un événement social, et pour jouer à des versions mathématiques des jeux Taboo et Bingo! Un total de 10 excellentes affiches ont été présentées, et 5 présentations étudiantes engageantes ont été données. Nous espérons vous voir à la réunion d'hiver à Toronto du 6 au 9 décembre.

En attendant, consultez nos casse-têtes #lundimaths (#MathMonday) sur twitter.com/studccms ou lisez notre revue « Notes From the Margin » sur Issuu. Comme toujours, nous encourageons les applications pour du financement destiné à la communauté étudiante de la part des comités organisateurs des conférences mathématiques.

Comité étudiant de la SMC



Election results

As a result of the 2019 CMS Election that took place in April and pending approval at the CMS Annual General Meeting to be held on June 9, 2019, the following fifteen (15) officers and directors have been elected to the CMS Board of Directors and Executive:

Executive Committee

President-Elect/President/Past-President: **Javad Mashreghi** (Laval);
Vice-President – Atlantic: **Sara Faridi** (Dalhousie);
Vice-President – Quebec: **Matilde Lalín** (Montreal);
Vice-President – Ontario: **Monica Nevins** (Ottawa);
Vice-President – West: **Gerda de Vries** (Alberta); and
Vice-President – Pacific: **Malabika Pramanik** (UBC).

Board of Directors

Director – Atlantic: **Stephen Finbow** (St. Francis-Xavier);
Director – Quebec: **Christophe Hohlweg** (UQAM);
Director – Quebec: **Alina Stancu** (Concordia);
Director – Ontario: **Hans Boden** (McMaster);
Director – Ontario: **Megan Dewar** (Carleton/Tutte Institute);
Director – West: **Adam Clay** (Manitoba);
Director – West: **Sarah Plosker** (Brandon);
Director – Pacific: **Ailana Fraser** (UBC); and
Director – Student: **Pamela Brittain** (Toronto).

Résultats des élections

A la suite de l'élection 2019 de la SMC, qui a eu lieu en avril et ensuite approuvé à l'Assemblée générale annuelle de la SMC qui a eu lieu le 9 juin 2019, les suivants quinze (15) dirigeants et administrateurs ont été élus au Conseil d'administration et Exécutif de la SMC :

Comité exécutif

Président élu/Président/ Président sortant : **Javad Mashreghi** (Laval);
Vice-Présidente – Atlantique : **Sara Faridi** (Dalhousie);
Vice-Présidente – Québec : **Matilde Lalín** (Montréal);
Vice-Présidente – Ontario : **Monica Nevins** (Ottawa);
Vice-Présidente – Ouest : **Gerda de Vries** (Alberta); et
Vice-Présidente – Pacifique : **Malabika Pramanik** (UBC).

Conseil d'administration

Directeur – Atlantique : **Stephen Finbow** (St. Francis-Xavier);
Directeur – Québec : **Christophe Hohlweg** (UQAM);
Directrice – Québec : **Alina Stancu** (Concordia);
Directeur – Ontario : **Hans Boden** (McMaster);
Directrice – Ontario : **Megan Dewar** (Carleton/Tutte Institute);
Directeur – Ouest : **Adam Clay** (Manitoba);
Directrice – Ouest : **Sarah Plosker** (Brandon);
Directrice – Pacifique : **Ailana Fraser** (UBC); et
Directrice – Étudiante : **Pamela Brittain** (Toronto).



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