



CMS

NOTES

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President's Report

22

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From the Vice-President's Desk

Elena Braverman, University of Calgary



Measure of Success

As university faculty, we are from time to time evaluated: for tenure, promotion, during the annual or biennial assessment process (in which I have been for several years involved as a division chair) and during grant applications. This evaluation, as a rule, has the following common features: while the initial review is done by mathematicians, later it goes through some committees which include administrators and colleagues from other disciplines, usually working in natural sciences or engineering. The evaluation is done in the same way as any other evaluation: for example, when we grade our students' tests, we usually compare the presented solutions with some ideal version. Sometimes, the students give an unexpected or elegant solution, for which they receive a bonus. To some extent, a similar approach is used in the assessment process, both at the university, within faculties and colleges of science, and in grant evaluation. From the point of view of faculties of science, an ideal applicant is the head of a laboratory which includes many graduate and undergraduate students, and some postdoctoral fellows. An ideal applicant publishes papers in high-impact journals such as Nature or Science and has a substantial support for the research program that allows them to employ many research associates. Any prestigious national or international prizes come as a bonus to the application. This short note presents some thoughts on the evaluation process.

Evaluation processes have certainly been in place for quite a while, but there have recently been changes in the direction of a larger carrot and a harder stick. These changes have led to much more controversy compared to previous evaluation methods. In the past, the nominal merit increments in the university assessment process varied mainly from 0.4 to 1.6, with an average of 1.0-1.2. An exceptional effort was required to get anything outside this interval, including a lower increment. Previously, the value of an NSERC discovery grant in mathematics mostly varied from \$8- 30,000, with some exceptions, and all reasonably active faculty members had it. At that time, there was a consensus that a fair, and probably not very exciting, game was going on. This is reminiscent of the situation at most Canadian universities where tenure-track positions turn to tenured ones with little exceptions, and some top US universities where tenure is very rare — in both situations, there is little interest in the outcome of the tenure application. However, if the success rate is between 25% and 75%, the evaluation process creates a lot of pressure. Not such a sharp but certainly a painful process occurred in faculty assessment when there appeared a tendency toward "extreme evaluations"; in particular, the zero increment was assigned to several faculty members. The point is that the collective agreement allows termination of the tenure in the case of an unsatisfactory performance, and several successive zero increments is considered to be a definite indication of it. I am not aware of the cases when low students' satisfaction was the only reason for such evaluations, but low research activity certainly was. The level of uncertainty with grant applications is even higher when the success rate is going down; approaching 50%. What is worse, if you are given reports



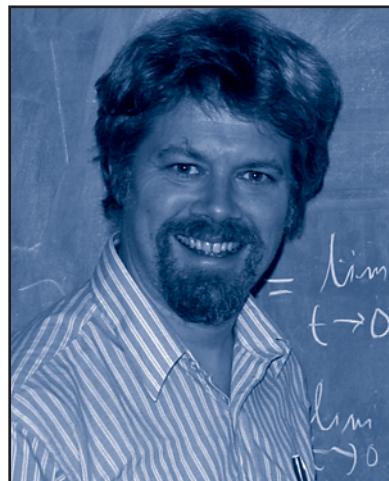
Rubber and Steel

By Robert Dawson,
*Saint Mary's University,
Halifax*

One can build things from steel that one simply cannot build from rubber. Not just towers and bridges, but engines and watches. Rubber has its uses – it shapes itself to things, it absorbs shocks – but when you know where one end of an extensive piece of rubber is, you have only a vague idea of what the rest might be doing. With steel, or any other rigid material, information is transferred accurately from one point to another. The value, and the price, of this is internal consistency; if it doesn't fit you can't put it in. Mathematics can be like either steel or rubber. A handful of rigorous axioms allow us to set up a mathematical structure more complicated than the most complex mechanical watch. Think – just for a few examples – of group theory, Euclidean geometry, category theory, or even Conway's game of Life. A set of axioms that you could write on the back of a postcard gives rise to an infinite, infinitely complex Mandelbrot set of theorems and new concepts. On the other hand, when we explore a new area, we often set rigor aside in our thoughts – even though it may be our eventual goal. We think in analogies, we take ideas that worked in one setting and we let them shape themselves (we cannot force them) to another. Everything is negotiable – for now. Later, once we know the shape of the body, we will add the bones. Sometimes it can be a challenge to reflect this in our teaching. School curricula in particular sometimes err on the side of flexibility: it's always playtime, the medium is the message, and every answer is valuable, provided it didn't come from the textbook or the teacher. The final addition of rigor can be postponed

“It’s not easy to get students to experiment – and sometimes we don’t even try.”

forever. But with some courses (and I’m thinking, for instance, of first-year calculus) the opposite problem appears. Even though first year calculus isn’t very “rigorous”, it’s often very “rigid”. It’s not easy to get students to experiment – and sometimes we don’t even try. Keeping the balance – the correct blend of rubber and steel, in the right places – is an ongoing challenge to all of us.



Aacier et caoutchouc

Par Robert Dawson,
*Saint Mary's University,
à Halifax*

Àvec de l'acier, on construit des objets impossibles à construire avec du caoutchouc. Non seulement des tours et des ponts, mais aussi des moteurs et des montres. Le caoutchouc a toutes sortes d'usages; on s'en sert entre autres pour façonnner des objets ou absorber les impacts. Par contre, si l'on connaît l'emplacement d'une extrémité d'un morceau de caoutchouc flexible, on n'a qu'une vague idée de ce qui arrive au reste du morceau. Avec l'acier, ou tout autre matériau rigide, l'information est transférée de façon précise d'un point à l'autre. La valeur – et le prix – de cette propriété est la consistance interne : si un objet n'est pas de la bonne taille pour une cavité, on ne pourra l'y faire entrer. Les mathématiques sont parfois à l'image de l'acier, parfois à l'image du caoutchouc. Une poignée d'axiomes rigoureux permettent

« Il n'est pas facile d'amener les étudiants à expérimenter, et il nous arrive de ne même pas essayer. »

la création d'une structure mathématique plus compliquée que la montre mécanique la plus complexe. Prenons par exemple la théorie des groupes, la géométrie euclidienne, la théorie des catégories ou même le jeu de la vie de Conway. Un ensemble d'axiomes que l'on peut écrire au verso d'une carte postale produit un ensemble de Mandelbrot infini et infinitement complexe de théorèmes et de nouveaux concepts. Par contre, quand un chercheur se lance dans un nouveau domaine, il met souvent la rigueur de côté dans sa réflexion, même si ce sera sans doute son objectif ultime. Il fait des analogies, il prend des idées qui ont fonctionné dans un contexte et les laisse se transformer (on ne peut pas les forcer) dans un autre contexte. Tout est négociable à cette étape-là. Plus tard, une fois qu'il connaîtra la forme du corps, il ajoutera l'ossature. Il n'est pas toujours facile de transposer ces notions dans notre enseignement. Les programmes scolaires en particulier pèchent parfois par excès de souplesse : l'heure est toujours au jeu, le médium est le message, et toute réponse est valable à condition qu'elle ne vienne pas du manuel ou de l'enseignant. La rigueur finale est parfois reportée aux Calendes grecques. Pour certains cours, toutefois (je pense ici, par exemple, aux cours de calcul différentiel et intégral de première année), on assiste parfois au problème inverse. Même si la première année de calcul n'est pas très « rigoureuse », elle est souvent très « rigide ». Il n'est pas facile d'amener les étudiants à expérimenter, et il nous arrive de ne même pas essayer. Garder l'équilibre – ou la combinaison parfaite de caoutchouc et d'acier aux endroits appropriés – est une préoccupation constante pour chacun de nous.

Du bureau de la vice-présidente
Elena Braverman, University of Calgary



Mesure de réussite

Comme membres du personnel enseignant à l'université, nous faisons à l'occasion l'objet d'une évaluation : pour une permanence, une promotion, dans le cadre du processus d'évaluation annuel ou biannuel (processus auquel j'ai participé pendant plusieurs années comme présidente d'une division) et dans le cadre des demandes de subventions. En règle générale, cette évaluation présente les caractéristiques communes suivantes : bien que l'examen initial soit confié à des mathématiciens, des comités quelconques s'en occupent par la suite. Ces comités sont formés d'administrateurs et de collègues d'autres disciplines, habituellement du domaine des sciences naturelles ou du génie. L'évaluation ressemble à toute autre évaluation : par exemple, lorsque nous corigeons les examens de nos étudiants, nous comparons habituellement les solutions offertes à une version idéale quelconque. Parfois, les étudiants présentent une solution inattendue ou élégante qui leur vaut des points en prime. Dans une certaine mesure, l'évaluation est fondée sur une démarche semblable, tant à l'université, au sein des facultés et des collèges de science que dans le cadre des évaluations pour obtenir des subventions. Selon la perspective des facultés de science, un postulant idéal est responsable d'un laboratoire comptant de nombreux étudiants de deuxième et de premier cycles et quelques chercheurs postdoctoraux. Un postulant idéal publie des articles dans des revues spécialisées bien en vue telles que Nature ou Science et jouit d'un soutien important pour son programme de recherche, appui qui lui permet de recruter de nombreux associés en recherche. Tout prix national ou international prestigieux est un atout pour le postulant. Le bref exposé qui suit offre quelques réflexions sur le processus d'évaluation.

Certes, les évaluations existent depuis belle lurette, mais on constate ces jours-ci des changements dans l'orientation d'une plus grosse carotte et d'un bâton encore plus dense. Ces changements ont soulevé davantage de controverse que les méthodes d'évaluation antérieures. Auparavant, les incréments de mérite nominaux dans le cadre du processus d'évaluation universitaire se situaient principalement entre 0,4 et 1,6, la moyenne étant de 1,0 à 1,2. Il fallait faire un effort exceptionnel pour sortir de cette plage, y compris pour un incrément moins élevé. Antérieurement, la valeur d'une subvention à la découverte du CRSNG en mathématiques se situait la plupart du temps entre 8 000 \$ et 30 000 \$, sauf quelques exceptions. Tout membre du personnel enseignant raisonnablement actif

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Letters to the Editors Lettres aux Rédacteurs

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 notes-letters@cms.math.ca or at the Executive Office.

Les rédacteurs des NOTES acceptent les lettres en français ou anglais portant sur un 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.

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JUNE 2012

2-4 CMS Summer Meeting, Regina Inn and Ramada Hotels, Scientific program: University of Regina
www.cms.math.ca/summer12

JULY 2012

2-6 24th Conference on Operator Theory, (West Univ. Timisoara, Roumania)
www.imar.ro/~ot/

8-15 International Conference on Wavelets and Applications (Euler Institute, St. Petersbrug, Russia)
www.pdmi.ras.ru/EIMI/2012/WLA/index.html

29-August 3 XVIII Brazilian Topology Meeting (XVIII Encontro Brasileiro de Topologia)
www.dm.ufscar.br/~ebt2012/

AUGUST 2012

8-10 USENIX Security Symposium (Cambridge, U.K.)
www.math.washington.edu/~pischool/

AUGUST (CONTINUED)

20-24 AIM Workshop: Invariants in convex geometry & Banach space theory (Palo Alto, CA)
www.aimath.org/ARCC/workshops/convexbanach.html

23-26 International Congress in Honour of Professor Hari M. Srivastava (Uludag University, Bursa, Turkey)
<http://srivastava2012.uludag.edu.tr>

29-Sept 2 Semigroups & Applications (Uppsala, Sweden)
www.math.uu.se/Semi2012

SEPTEMBER 2012

5-7 Computation Challenges in Probability (ICERM, Providence RI)
<http://icerm.brown.edu/sp-f12>

5-9 Lie Algebras & Applications, (Uppsala, Sweden)
Lie2012@math.uu.se, www.math.uu.se/Lie2012

12-14 Algebra, Geometry & Math Physics (Brno, Czech)
<http://agmp.eu/brno12/general.php>

20-22 Lie and Klein: the Erlangen program & its impact on math & physics
www-irma.ustrasbg.fr/article1173.html

OCTOBER 2012

8-12 Uncertainty Quantification (ICERM, Providence RI)
<http://icerm.brown.edu/sp-f12-w2>

NOVEMBER 2012

17 Info-Metrics & Nonparametric Inference (UC Riverside, CA)
www.america.edu/cas/economics/info-metrics/orkshop-2012-november.cfm

DECEMBER 2012

8-10 CMS Winter Meeting Fairmont Queen Elizabeth, Montreal, Quebec
 Scientific program: CRM
www.cms.math.ca/winter12

17-21 International Conference on Theory, Methods & Applications of Nonlinear Equations, (Kingsville, TX)
www.tamuk.edu/artsci/math/conference_2012/html

19-22 Conference on Commutative Rings, Integer-valued Polynomials, etc (Graz, Austria)
www/integer-valued.org/conf2012

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www.smc.math.ca/members/

Harmonic Analysis on Finite Groups

by Tullio Ceccherini-Silberstein, Fabio Scarabotti and Filippo Tolli

ISBN 978-052-188-336-8 ; Price \$ 85.00 Cambridge studies in advanced mathematics, vol. 108. xiii + 440 pages, Cambridge University Press, 2008.

Reviewed by Wolfgang Woess, Graz University of Technology, Austria.

Representation theory of groups can just be considered as a part of algebra, in particular group theory. However, it gains much fascination and excitement when it is used for analytic purposes. This is where one builds upon classical Fourier analysis, and in the general non-commutative setting, harmonic analysis on groups is basically the use of representation theory for analytic purposes.

A good deal of those analytic purposes concerns the application of harmonic analysis to probability theory – just think of how useful characteristic functions (\equiv Fourier transforms) are in the basic study of sums of independent, identically distributed random variables. Card shuffling can be interpreted as a random process that takes place on a finite symmetric group, made up as a product of independent, identically distributed random permutations: one sees that the use of harmonic analysis of finite, non-commutative groups may have important applications in probability, too.

The famous little monograph by Persi Diaconis [Group Representations in Probability and Statistics; Inst. Math. Statist., Hayward, CA, 1988] gave an account of such applications. The present monograph can be considered as a sequel to that book.

One of the main motivating themes from probability is as follows: suppose that we have an ergodic Markov chain with transition matrix $(p(x,y))_{x,y \in X}$ on a finite state space X , with stationary distribution π . Then one wants to know how fast the n -step distributions $p^{(n)}(x, \cdot)$ converge to π in the total variation norm (“how many shuffles of a deck of cards are required to achieve randomness ?”). In terms of matrix analysis, one has to study the asymptotics of the powers P^n . If X is large, this needs subtle work. The situation simplifies if the transition probabilities are invariant under the action of a large group of symmetries, such as the symmetric group in the case of card shuffles. This is where representation theory of that group becomes extremely useful.

An important issue within the above probabilistic theme is the so-called “cutoff phenomenon”, observed in several classes of highly symmetric Markov chains, where the variation distance between $p^{(n)}(x, \cdot)$ and π remains big for initial values of n and then at a certain n undergoes a rapid drop very close to 0. Again, this can often be studied by harmonic analysis methods.

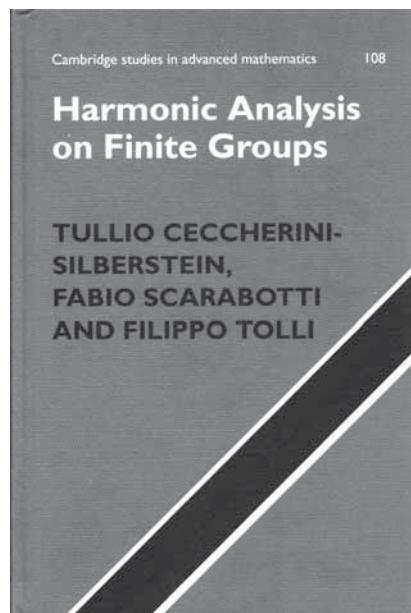
The central theme of the present book is the theory of finite Gelfand pairs. These are spaces with “big” symmetry groups that permit to transport commutative approaches to a non-commutative setting. More precisely, a Gelfand pair consists of a group G and a subgroup K with the property that the functions on G which are left- and right invariant under K form a commutative convolution algebra. Typical examples arise when G acts transitively on some set X and K is the stabilizer of a point in X (but of course, this does not always result in a Gelfand pair). This topic is treated with great care, and the book is apparently the first monograph that gives a complete account of finite Gelfand pairs and their harmonic analysis. It contains a wealth of combinatorial-probabilistic examples that are elaborated in detail.

The book has three parts. The first one starts with one of the main motivations, namely the theory of finite Markov chains, and then turns to Fourier analysis on finite Abelian groups, plus applications to classical Markov chain models coming from such groups.

The second, central part contains all the basic representation theory of finite groups and, in the center of the central part, the details of the theory of finite Gelfand pairs. This is followed by an exposition of several important classes of examples and applications (distance-regular graphs, Hamming scheme, Johnson scheme, Bernoulli-Laplace scheme, ultrametric spaces).

The third part contains some advanced aspects (posets, more representation theory, symmetric groups, random matchings, etc.)

The book is very carefully written, contains many elaborated examples as well as exercises, and it is very well suited for courses at different levels. Highly recommended !



Outer Billiards on Kites

Annals of Mathematics Studies No 171

by Richard E. Schwartz

Princeton University Press, Princeton and Oxford (2009),
ISBN 978-0-691-14248-7.

Reviewed by Franco Vivaldi, School of Mathematical Sciences,
Queen Mary, University of London

Outer Billiards on Kites

Richard Evan Schwartz

ANNALS OF MATHEMATICS STUDIES

This is a research monograph on outer billiards, which are discrete-time dynamical systems of geometric origin, defined on the exterior of an oriented closed convex curve Γ on the plane. The construction is simple. Choose a point p outside Γ , and draw a line γ tangent to Γ , passing through p . The orientation of Γ allows us to select this tangent uniquely. The line γ touches Γ at a point q ; the outer billiard map is the map f which sends p to its reflection with respect to q , that is, $f(p) = 2q - p$. One sees that this map sends the exterior of Γ onto itself, and it is not difficult to show that f is area-preserving. The connection with ordinary

billiards — a ball bouncing elastically inside a (not necessarily convex) domain on the plane — is very feeble, yet the term ‘billiard’ is firmly established.

This construction has an interesting history. It was proposed by B. H. Neumann in the 60s as a geometrical problem: how to cut a cake in two parts, with a prescribed area ratio. (Here the tangent line γ is the knife, and both p and $f(p)$ lie on the edge of the cake.) It was then popularised by J. Moser in 1978, in an article entitled “Is the solar system stable?”, which appeared in the first issue of the *Mathematical Intelligencer*. The action of f^2 calls to mind planetary motions, because, far away from Γ , this map produces slow orbitals; the problem (already posed by Neumann) is to decide whether or not every orbit is bounded. As in celestial mechanics, the mathematical difficulties originate from the presence of small divisors. Moser used KAM theorem (being the ‘M’ in KAM) to show that all orbits are indeed bounded provided that Γ is sufficiently smooth. Boundedness follows from the existence of convex invariant curves near infinity, which prevent the orbits inside them from escaping.

Moser pointed out that the stability question remains very meaningful even if Γ is not smooth, and in particular, if Γ is a polygon. (In this case the point of tangency is not necessarily unique, but the resulting ambiguity is easily resolved, or circumvented.) The boundedness problem for the outer billiard of a polygon lies beyond the scope of KAM theorem, because in this case the map f is discontinuous.

It may seem remarkable that it took almost thirty years before Moser’s question was answered in the negative, when R. E. Schwartz —the author of this book— established the existence of unbounded orbits for the outer billiard of a quadrilateral Γ , with the shape of a kite. (A kite is a quadrilateral whose diagonal is an axis of symmetry.)

With hindsight, such a long delay shouldn’t be surprising. The outer billiard of a polygon is a *piecewise isometry*, where each isometry is a reflection with respect to one vertex q_i of the polygon. The lines tangent to the sides of the polygon mark the boundaries of the domains of definition of each isometry. Under the dynamics, the points of an orbit jump from one domain to another, and are therefore affected by different isometries. The topology of the phase space is shaped by discontinuity rather than nonlinearity, resulting in strikingly complex behaviour from minimal ingredients.

Planar piecewise isometries are two-dimensional generalisations of interval-exchange transformations; the increased dimensionality allows the geometry to blossom, and, given a computer, it is not difficult to produce stunning pictures. But beyond the pictures, there is difficult mathematics, which invariably must confront —among other things— intricate arrangements of simple geometrical objects.

For these reasons, the development of this area of mathematics has been slow and uneven. After a long gestation, intermittent progress, and repeated discoveries of the same phenomena, the theory of

piecewise isometries should have come of age by now, yet general results are still very few, while conjectures abound.

Schwartz's monograph should be seen against this background. The book is devoted to the proof of the existence of unbounded orbits in a one-parameter family of kites, for all irrational parameter values. This is a substantial generalisation of the author's original proof for a specific parameter value, which exploited a connection with the Penrose tiling.

But this monograph does more than proving a theorem. It illustrates a certain approach and research philosophy, of which the author is a well-known exponent, which is fruitful when proving theorems discovered by extensive computer experimentation. Even though the proofs are conventional —no computer assistance is required—the reader will not fail to observe that the objects described in this book could hardly have been imagined without first seeing them on a computer screen.

At first glance, the problem under consideration seems exceedingly narrow. First, the polygon Γ is restricted to a specific class of symmetric quadrilaterals —the kites. Then the dynamics is further restricted to the invariant set $R \times (2Z + 1)$ of the so-called *special orbits*. (The author justifies this restriction without apologies: “The special orbits are hard enough for us already.”)

In fact, these restrictions are quickly forgotten, and, as the subject opens up, geometric objects of great complexity and beauty begin to appear in rapid succession, of which the so-called *arithmetic graph* is the centrepiece. In the space available in a book (as opposed to a research article), the author is able to organise and dilute the material sufficiently as to make it digestible, while a generous supply of illustrations provides a great—and necessary—aid to comprehension. (Research articles in this field tend to feature tiresome notation, baroque formulae, and punishing intricacy.)

The mathematical problem is then reduced to the study of the first return map of a specific domain in the plane, a segment lying close to the kite. This map features both periodic and non-periodic orbits, as well as points that never return. The task is to show that the non-periodic orbits of the first return map correspond to unbounded orbits for the outer billiard map.

The proof of unboundedness is structured around some key theorems, with suggestive names: the Erratic Orbits theorem, the Comet theorem, the Master Picture theorem, the Embedding theorem, the Hexagrid theorem, the Copy theorems. The subdivision of the material in the book is shaped by these theorems, each claiming a separate chapter.

To my taste, these pictorial names are a welcome departure from a dry list of numerical references (e.g., theorem 3.5). However, the author applies this labelling method also to secondary results, and in the end the complete nomenclature poses a challenging exercise for the memory (the Pinwheel lemma, the Torus lemma, the Barrier theorem, the Diophantine lemma, the Decomposition theorem, the Pivot theorem, etc.). It must be said however, that these names tends to be used locally, within the confines of individual chapters, so recovering the meaning of a term is not as difficult as it seems.

Those studying outer billiards will undoubtedly find this monograph useful. But I believe that this book can also inspire mathematicians or computer scientists dealing with discontinuous processes with zero-entropy. Many intriguing connections are exposed between outer billiards maps and renormalisation, higher dimensional polytope-exchange maps, Diophantine approximations, the modular group, and odometer theory. These connections place the book's narrow subject matter in a broader context, encouraging further studies and applications.

My only complaint concerns the introduction and bibliography, which are too succinct for a book, particularly with regard to general and historical references. However, the ‘work in progress’ nature of this research topic makes these omissions not so noticeable.

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A Note to Our Readers

John Grant McLoughlin (*University of New Brunswick*) and Jennifer Hyndman (*University of Northern British Columbia*)

This issue of the *Education Notes* marks the halfway point of our five-year term as co-editors. During this time Laura Alyea has been our primary liaison at the CMS and we wish to thank her for sharing a spirit of cooperation and service. It was a pleasure working with Laura. As co-editors we welcome the opportunity to collaborate with Jessica St-James in her new role.

Typically as summer approaches our task is to roughly map out potential items for the following academic year. As we once again start this process we would be pleased to learn of any initiatives, ideas, or mathematics you may wish to share with others interested in educational aspects of the CMS mandate. Kindly send a note to either John Grant McLoughlin (johngm@unb.ca) or Jennifer Hyndman (hyndman@unbc.ca) if you have an interest in writing something for the forthcoming year.

Occasionally we get surprises where we have little work to do as is the case with the feature article in this issue. That is, we are happy to have as the attached item an unsolicited article sent to the *CMS Notes* which we present here with almost no editorial changes. We hope that you find it to be of interest.

Mathematics outreach comes in many forms with many different foci. As we see in this article outreach through a math contest-game can have far reaching involvement. For some students (and their parents) contests offer wonderful sources of challenge and learning. Although not everyone likes the competition of a contest the associated enrichment activities can offer avenues of engagement for all.

If something excites *you* to write, feel free to do so. We want you to share your ideas with the readership through this column.

Popularizing Mathematics in Canada through Math Kangaroo Competition

Rossitza Marinova, *Department of Mathematical and Computing Sciences, Concordia University College of Alberta*

Valeria Pandelieva, *Statistics Canada*

Math Kangaroo is a broad-participation contest-game. Students in grades 1 through 12 are given the opportunity to participate in a non-selective competition with inspiring and challenging content. The impact of the contest on students is enhanced by various enrichment activities such as on-line and on-campus training sessions, workshops, clubs, and the production of related practice materials. Since joining the International Association “Kangaroo without Borders” in 2006, the Canadian Math Kangaroo has associated with many prestigious organizations and universities and continues to seek ways to further expand the reach and scope of its unique programs.

Competition Overview

The international contest-game *Math Kangaroo* is indisputably the largest mathematics competition in the world. In 2011, it involved hundreds of mathematicians and over six million students from 46 countries [KSF]. The main purpose of *Math Kangaroo* is to dispel the myth that mathematics is boring by creating a positive environment with fun events that emphasize the practical nature of mathematics.

The competition is currently available in Canada to students through the non-profit organization Canadian Math Kangaroo Contest [CMK]. Students can participate independently of their own school’s involvement. The contest and its accompanying activities are used as university outreach for promoting mathematics among school students. The Canadian Math Kangaroo has its unique place among the outreach programs in Canada, and as such, it has been recognized and supported by reputable national and regional, academic and professional institutions. The organization has attracted funding from societies and industry including: CMS; PIMS; BIRS; IEEE Northern Canada; Telus; and Imperial Oil. In addition, universities¹ hosting the competition strongly support the *Math Kangaroo* activities and promote them within their scientific outreach programs.

The number of contest centres and participants has increased during the last five years. Nevertheless, entries in Canada and United States are relatively low compared to the thousands of participants in other, smaller countries. (See [KSF] for comparative figures.) To a certain extent, this is because Canada and United States are the only two participating countries in which the contest is not directly promoted by Ministries of Education, due to the decentralization of educational affairs. Undoubtedly, there is great potential for the competition to grow in Canada.

Recently, CMS has provided a helping hand to *Math Kangaroo* for the development of a system for processing the contest registration entirely electronically. This will greatly facilitate the coordinators’ work for administering the competition. The hope is that more universities and schools will be willing to take over the organization of the competition in their regions. New centres are supported by small grants as well as provided with training materials, if needed.

¹ Concordia University, Concordia University College of Alberta, Dalhousie, Laurentian, Mount Royal, Nipissing, University of Ottawa, University of Toronto, University of Winnipeg

Competition Format and Awards

Until 2011, problem sets consisted of 24 multiple-choice questions, arranged in three levels of complexity (A, B, and C), to be answered in 60 minutes. The maximum attainable score was 120: three points for a correct answer in level A; four points for a correct answer in level B; and five points for a correct answer in level C. Note that one point was deducted for each incorrect answer though all participants started with 24 points.

This year, 2012, Canadian students are competing in *six* grade categories: Pre-Ecolier (grade 2); Ecolier (grades 3 and 4); Benjamin (grades 5 and 6); Cadet (grades 7 and 8); Junior (grades 9 and 10); and Student (grades 11 and 12). There are some changes in the 2012 contest; in particular, there is a separate new category for grade 2 students and an increased number of questions (30) and duration (75 minutes) for contests in grades 5 through 12.

There are two types of awards in the Canadian Math Kangaroo contest: national and regional. Approximately 25% of the participants in a city receive awards. The distribution of regional awards takes into account the specific differences in the demography, the number of participants, and the experience in the contest.

Problems and Topics Covered

As mentioned, all students can play the game doing their best and those who perform well are recognized. For this reason, problems are created to be attractive, entertaining and appealing to the students; nevertheless, they are rich in math content and provoke exploration of novel ideas and approach. There are lots of questions from the area of applied mathematics so that students can see how mathematics is used in real life.

Internationally, the problems are proposed by representatives of the member-countries of the International Association and selected during its Annual Meeting in the fall of the preceding year. Nationally, the countries are allowed to make some changes in their selections, (i.e., several problems may be modified, re-defined, exchanged or moved to another category). It is recognized that school math curricula vary from country to country and some degree of flexibility is needed to find the best fit for the participants' acquired knowledge and experience. For the same reason, there is no international comparison and ranking.

The first two groups (A and B) of questions are intended to be directly familiar to the students from their life and classroom experience. However, most of them require creative applications of the grade-appropriate curriculum knowledge, to see things outside the box, to go beyond studied procedures, and to pay attention to details. The problems in the third group (C) are more challenging. Some of these problems may relate to contest-specific knowledge appropriate for the respective grade level, or higher levels of logical thinking and imagination. As the problems are designed to test students' mathematical thinking rather than abilities to execute extensive calculations and apply specific knowledge learned outside the school classroom, contestants are not allowed to use calculators.

Accompanying Activities

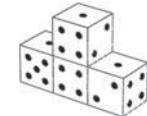
Math Kangaroo training activities were developed as a direct response to the requests of parents and participants for more practice opportunities; however, their scope and objectives expanded beyond the purpose of the contest alone. The training component is becoming a network of math enrichment activities for diverse audiences, which contributes to both de-demonizing and promoting math and science.

All contest activities build a sense of community and provide enjoyable experience to everyone involved through the following ways: creating a welcoming environment for the program; by providing small souvenirs for all participants; by inviting prominent mathematicians to share the celebrations of students' excellence; and by incorporating music and art performances in the award ceremonies. The activities are family-oriented. Parents and older siblings volunteer during the training activities, participate in the informal parents' contest, and enhance their own appreciation about mathematics.

Sample Problems

(2010, Grade 3-4, Group B) A ferry can take through the river either ten small cars or six trucks at a time. On Wednesday, it transported 42 vehicles in total, crossing the river five times. Each time, it was full with vehicles of one type. How many small cars did the ferry transport that Wednesday?

- (A) 10 (B) 12 (C) 20 (D) 22 (E) 30



(2011, Grade 3-4, Group C) The picture shows an arrangement of four identical dice. On each die, the total number of dots on each pair of opposite faces is 7. What does the arrangement look like from behind?

- (A)
- (B)
- (C)
- (D)
- (E)

(2011, Grade 7-8, Group C) Mark plays a computer game on a 4x4 square grid. Originally, all 16 cells appear white. When he clicks on a cell it reveals its hidden colour, either red or blue. Only two blue cells can be found and they always have a common side. Mark claims that no matter where the blue cells are positioned he can always find them by clicking on at most N cells. What is the number N?

- (A) 9 (B) 10 (C) 11 (D) 12 (E) 13

continued on page 11

Why Banach Algebras?

Volker Runde, Department of Mathematics and Statistical Sciences,
University of Alberta

The question in the title is deliberately vague, for it is shorthand for several questions.

Why are they called Banach algebras? They bear the name of the Polish mathematician Stefan Banach (1892–1945), who introduced the concept of Banach space, but never studied Banach algebras. The first to explicitly define them—under the name of *linear metric rings*—seems to have been the Japanese mathematician Mitio Nagumo in 1936, [6]. Banach algebras became a landmark through the work of Israel M. Gelfand (1913–2009), who called them *normed rings*, [3]. But in 1945, Warren Ambrose (1914–1995) referred to them as *Banach algebras*, [1], and the name has stuck ever since. In a classical monograph, [2], the authors claim that, had the terminology been less established, they would rather speak of *Gelfand algebras*. I fully agree with them.

Why am I researching Banach algebras? The answer is multilayered and dependent on my mathematical tastes. I find Banach algebra theory elegant. Indeed, commutative Banach algebras allow for a powerful representation theory, now rightfully known as *Gelfand theory*. Suppose that \mathfrak{A} is a commutative Banach algebra (with an identity element, for the sake of simplicity), and let

$$\Phi_{\mathfrak{A}} := \{ \phi : \mathfrak{A} \rightarrow \mathbb{C} \mid \phi \text{ is non-zero, linear, and multiplicative.}\}$$

It is easy to see that $\Phi_{\mathfrak{A}}$ lies in the unit ball of the dual space \mathfrak{A}^* , and restricting the weak* topology of \mathfrak{A}^* to $\Phi_{\mathfrak{A}}$ turns it into a compact Hausdorff space. For each $a \in \mathfrak{A}$, we thus obtain a continuous function \hat{a} on $\Phi_{\mathfrak{A}}$ by letting $\hat{a}(\phi) := \langle a, \phi \rangle$ for $\phi \in \Phi_{\mathfrak{A}}$; the function \hat{a} is called the *Gelfand transform* of a . The remarkable insight of Gelfand was that a is invertible in \mathfrak{A} if and only if \hat{a} is invertible as a continuous function on $\Phi_{\mathfrak{A}}$, i.e., has no zeros.

The Gelfand transform can be thought of as an abstract Fourier transform. Due to Fourier analysis, a still young theory of Banach algebra had its first surprising and strikingly beautiful application. In [9], Norbert Wiener (1894–1964) proved:

Theorem 1. Let T be the unit circle in \mathbb{C} and let $f : T \rightarrow \mathbb{C}$ be a continuous function without zeros whose Fourier series $\sum_n f(n)$ converges absolutely. Then the Fourier series of $1/f$ converges absolutely as well.

Wiener's proof in [9] was hard Fourier analysis. Using his representation theory, Gelfand gave an astonishingly short and simple proof. Let

$W := \{f : T \rightarrow \mathbb{C} \mid f \text{ is continuous with absolutely converging Fourier series}\}$

and set $\|f\| := \left(\sum_{n \in \mathbb{Z}} |\hat{f}(n)|^2 \right)^{1/2}$ for $f \in W$. It is easy to see that this turns W into a commutative Banach algebra, and it is equally simple to check that $\Phi_{\mathfrak{A}}$ can be identified with T in such a way that $\hat{f} = f$. Thus, if $f \in W$ has no zeros, it must already be invertible in W , i.e., $1/f \in W$.

There is more to the axioms of a Banach algebra than meets the eye at first glance. We have an algebraic structure (an algebra) and an analytic structure (a Banach space), and the two structures are linked by the inequality

$$\|ab\| \leq \|a\| \|b\| \quad (a, b \in \mathfrak{A}).$$

It turns out that the relationship between the analytic and the algebraic structure is much more subtle.

If an algebra equipped with a norm is a Banach algebra, are there other (non-equivalent) norms that achieve the same structure? In general, the answer is yes: take a linear space that is a Banach space under two nonequivalent norms and turn it into a Banach algebra by defining the product of any two elements to be zero. But there are cases when a given algebra admits—up to equivalence—only one norm that makes it a Banach algebra. For instance, let K be a compact Hausdorff space. Then $\mathfrak{A} = C(K)$, the algebra of all continuous functions on K , is a Banach algebra under the supremum norm $\|\cdot\|_\infty$. A simple closed graph argument shows that any norm turning \mathfrak{A} into a Banach algebra is already equivalent to $\|\cdot\|_\infty$. This is only an easy special case of the following famous theorem, [4], due to Barry E. Johnson (1937–2002):

Theorem 2 (Johnson's uniqueness of the norm). *Let \mathfrak{A} be a semisimple (i.e. with zero Jacobson radical) Banach algebra. Then any norm on \mathfrak{A} turning it into a Banach algebra is equivalent to the given norm.*

An algebraic hypothesis, semisimplicity, thus forces the uniqueness of the analytic structure.

Why should the rest of mathematics care about Banach algebras? They show up naturally in many areas of analysis: If E is a Banach space, then the bounded linear operators on E form a Banach algebra, as do the compact, the nuclear, and other operators; if G is a locally compact group, then the space $L^1(G)$ of integrable functions (with respect to left Haar measure) is a Banach algebra under convolution. If we have an analytic object that has a Banach algebra naturally associated with it, then this algebra can provide us with further insight into the nature of the underlying object.

The notion of an amenable, locally compact group goes back to John von Neumann (1903–1957), [7]; it is fundamental in abstract harmonic analysis.

There is also the notion of an amenable Banach algebra; it is due to Johnson, [5]. Among various equivalent characterizations of amenable Banach algebras (see [8]), the one that probably requires the least background is as follows. Given a Banach algebra \mathfrak{A} , a bimodule E over \mathfrak{A} , which is also a Banach space such that the module actions of \mathfrak{A} on E are continuous, is called a *Banach \mathfrak{A} -bimodule*. We call \mathfrak{A} *amenable* if, for every Banach \mathfrak{A} -bimodule E and every bounded derivation $D: \mathfrak{A} \rightarrow E$, there is a bounded net $(x_\alpha)_\alpha$ in E such that

$$Da = \lim_\alpha a \cdot x_\alpha - x_\alpha \cdot a \quad (a \in \mathfrak{A}).$$

The choice of the adjective “amenable”—both for certain locally compact groups and for a class of Banach algebras—suggests that there is a link between the two, and indeed, there is one, [5, Theorem 2.5]:

Theorem 3. *The following statements are equivalent for a locally compact group G :*

- (1) G is amenable;
- (2) $L^1(G)$ is an amenable Banach algebra.

This means that the amenability of a locally compact group can be captured through an entirely Banach algebraic property of its L^1 -algebra.

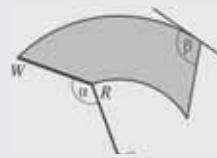
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Popularizing Mathematics in Canada through Math Kangaroo Competition, continued from page 9

(2011, Grade 11-12, Group B)

The rear windshield wiper of a car is constructed in such a way that the wiper blade RW and the connecting rod



OR are of equal lengths and are joined at a constant angle α . The wiper pivots on the center O and clears the area as shown. Determine the angle β between the right-hand edge of the cleared area and the tangent of the curved upper edge.

- (A) $(3\pi - \alpha)/2$
- (B) $\pi - \alpha/2$
- (C) $3\pi/2 - \alpha$
- (D) $\pi/2 + \alpha$
- (E) $\alpha/2 + \pi$

The positive feedback Canadian Math Kangaroo receives from parents, students, teachers, and communities proves that its activities are in high demand. Some of the needs merge with the broader call for increasing the overall mathematical, scientific, and technological literacy and skills of young Canadians. However, the most prominent need for the program is to correct the existence of a gap in the math and science outreach programs and activities for elementary students. Studies confirm [LJS] that it is extremely important to start challenging these students at a younger age, “well before students reach the sixth or seventh grade.” Delivering high quality year-long training programs across Canada, and providing students with opportunities to express themselves in competitive events and informal communications, significantly contributes to improving their analytical skills and helps them build confidence, which, in turn, motivates them to advance and to look for new challenges and goals.

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The Shape of Associativity

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Associativity is ubiquitous in mathematics. Unlike commutativity, its more popular cousin, associativity has for the most part taken a backseat in importance. But over the past few decades, this concept has blossomed and matured. We start with a brief look at three fields of mathematics that find it very powerful.

An *elliptic* curve is a smooth, projective algebraic curve of genus one, a core object in fields such as cryptography or number theory, where it was used to prove Fermat's Last Theorem. The key property of an elliptic curve stems from the group law, a product structure defined in the curve's point set.

Theorem 1. Under this product structure, the points on an elliptic curve form an abelian group, making the elliptic curve into an abelian variety.

The proof is quite trivial except for showing associativity for the group law, which is laborious when tackled directly [5]. An insight to this phenomena comes from Riemann-Roch.

Associativity also plays a key role in enumerative geometry: a classic question is to find the number N_d of plane rational curves of degree d that pass through $3d - 1$ points. The cases up to $d = 4$ were known in the 19th century, but the full result was provided by Maxim Kontsevich in the mid-1990s, one reason why he was awarded the Fields Medal:

$$\textbf{Theorem 2. } N_d = \sum_{a+b=d} a^2 b N_a N_b \left[b \binom{3d-4}{3a-2} - a \binom{3d-4}{3a-2} \right]$$

Remarkably, this formula expresses the *associativity* of a new product structure called the *quantum product* [3]. Developed in string theory, this product for quantum cohomology plays a crucial role in symplectic geometry, stable maps, and Gromov-Witten invariants.

Our final example comes from algebraic topology. Let X be a space and ΩX its loop space, i.e. the space of continuous maps from the unit circle to X . The *recognition question* is an archetype problem in the theory of homotopy invariant structures, asking when a space Y has the same homotopy type as the loop space of some X . The main result follows:

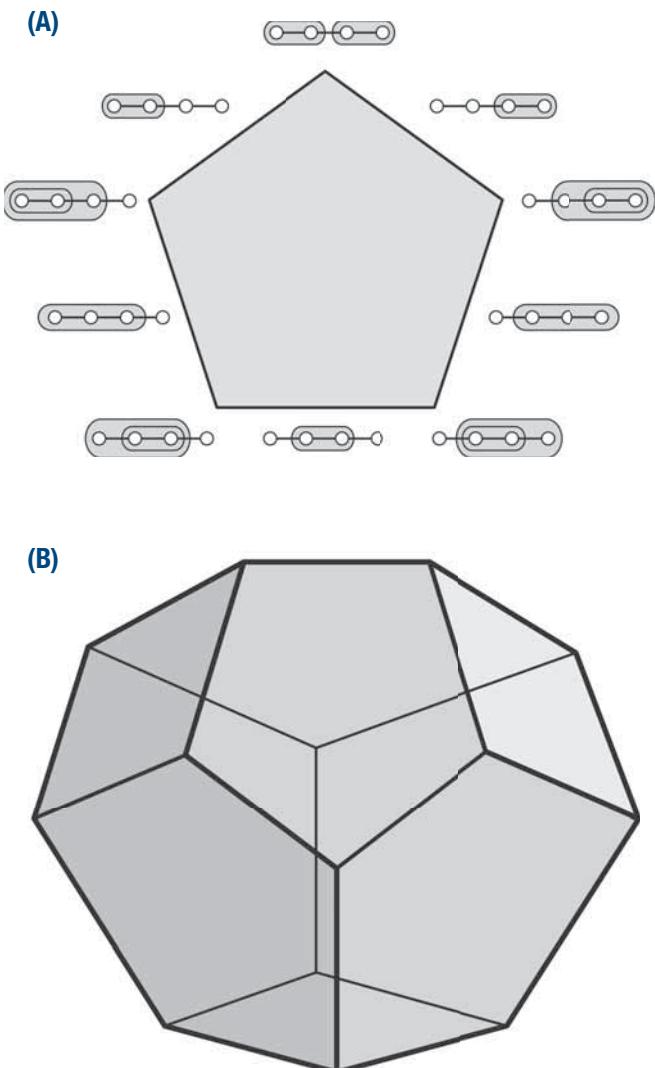
Theorem 3. A connected space Y has the homotopy type of ΩX , for some X , if and only if Y admits the structure of an A_∞ space.

We say Y is an A_∞ space if it has a family of maps $K_n \times Y^n \rightarrow Y$ that fit together nicely [6]. The heart of this construction is the space K_n , an object which embodies associativity.

Our story focuses on K_n , the famous *associahedron* polytope, born in 1951 due to Dov Tamari as a realization of the poset of bracketings on n letters. Independently, in his 1961 thesis, Jim Stasheff constructed a convex curvilinear version useful in homotopy theory relative to associativity properties of H -spaces, as described above. Figure 1(A) shows the 2D associahedron K_4 with a labeling of its faces, and (B) shows the 3D version, K_5 .

Definition. Let $A(n)$ be the poset of all bracketings of n letters, ordered such that $a \prec a^0$ if a is obtained from a^0 by adding new brackets. The associahedron K_n is a convex polytope of dimension $n - 2$ whose face poset is isomorphic to $A(n)$.

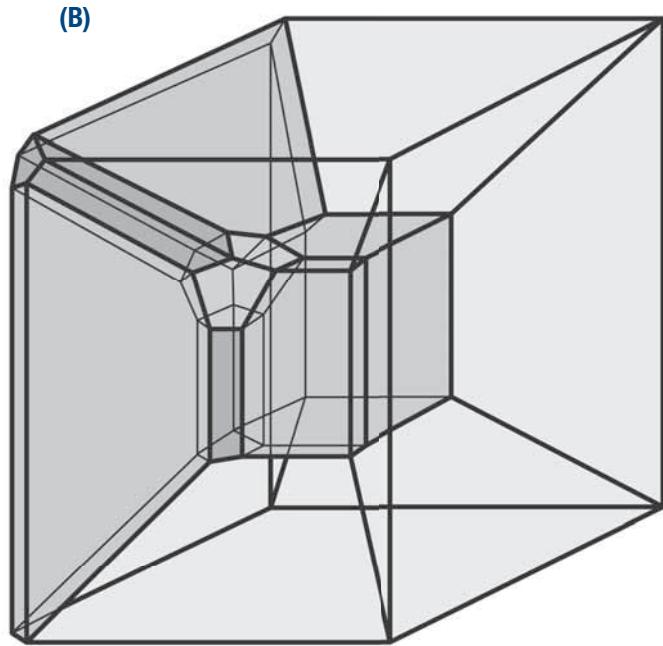
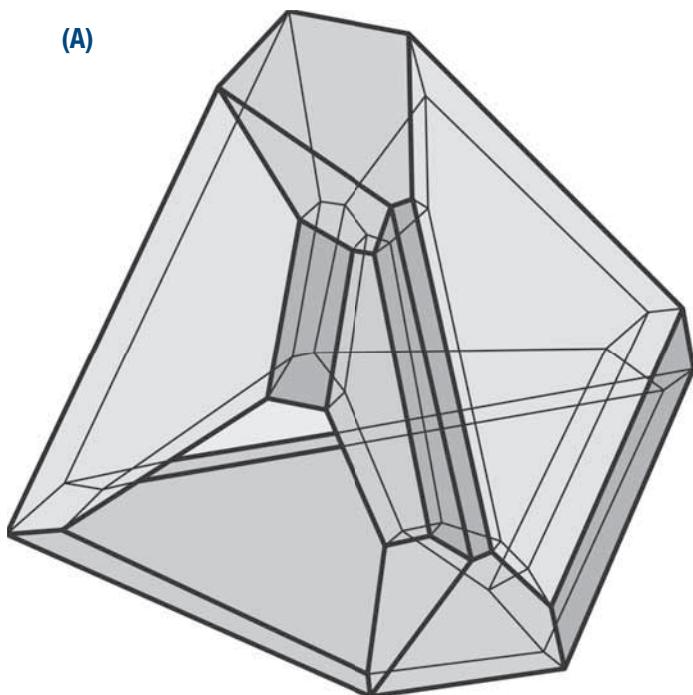
Figure 1. Associahedra K_4 and K_5 .



From this we see that K_n does indeed capture the shape of associativity: the vertices correspond to all different ways n letters can be multiplied, each with a different associative grouping. The famous *Catalan numbers* enumerate the vertices, with over one hundred different combinatorial and geometric interpretations available. The beauty of this polytope is the multiplicity of areas in which it makes an appearance [4], a sampling of which includes root systems, real algebraic geometry, computational geometry, phylogenetics, string theory, J -holomorphic curves, and hypergeometric functions. This should not surprise us since the underlying principle of associativity is a foundational concept.

Beyond the combinatorial framework discussed above, K_n also has a rich *geometric* perspective. There are numerous realizations of the associahedron, obtained by taking the convex hull of the vertices of K_n with integer coordinates. The most prominent is the elegant construction by Jean-Louis Loday based on the language of trees. There are also constructions of K_n obtained from truncations of cubes and simplices [1]. Figure 2 shows examples of the 4D polytope K_6 , generated from iterated truncations of the 4-simplex and the 4-cube, respectively. These truncations make the associahedron inherit the algebraic structures inherent in the simplex and cube. Such an approach relates blowups of varieties (from algebraic geometry) to the world of operads and category theory.

Figure 2. K_6 from truncations of (A) the 4-simplex and (B) the 4-cube.



One measure of an object's importance is the number of its generalizations. In our case, there are a plethora of associahedral siblings, including generalized associahedra coming from cluster algebras, Coxeter-associahedra from root systems, multiplihedra from category theory, polytopes from pseudotriangulations, and permutoassociahedra. In line with associativity, one generalization is close to our heart: the *graph associahedron*, a polytope that captures the shape of associativity on a *graph*, whereas the classic associahedron considered letters arranged on a path [2].

Let G be a connected simple graph. A *tube* is a set of nodes of G whose induced graph is a connected proper subgraph of G . Two tubes u_1 and u_2 may interact on the graph as follows:

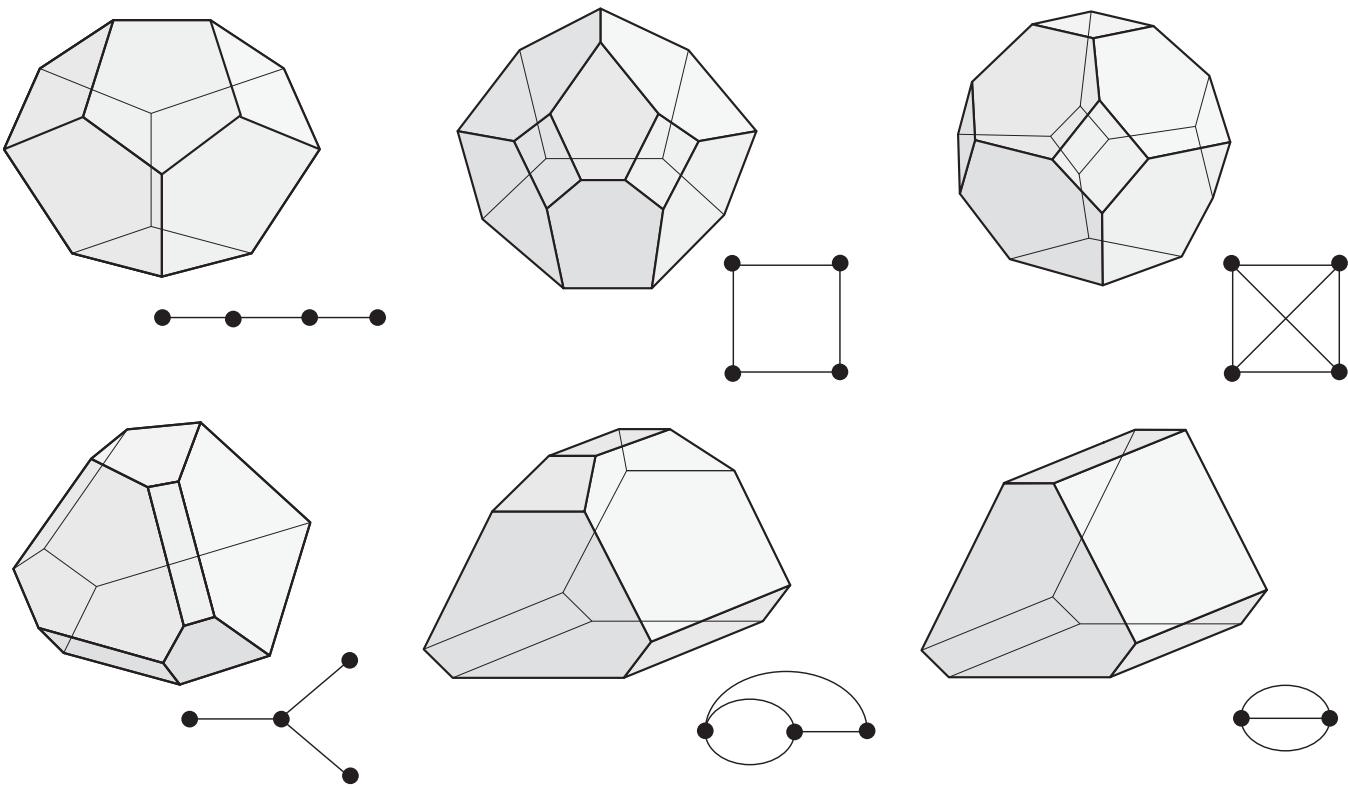
- (1) Tubes are *nested* if $u_1 \subset u_2$.
- (2) Tubes intersect if $u_1 \setminus u_2 \neq \emptyset$ and $u_1 \not\subseteq u_2$ and $u_2 \not\subseteq u_1$.
- (3) Tubes are adjacent if $u_1 \setminus u_2 = \emptyset$ and $u_1 \sqcap u_2$ is a tube in G .

Tubes are *compatible* if they do not intersect and are not adjacent. A *tubing* U of G is a set of tubes of G such that every pair of tubes in U is compatible.

Theorem 4. *For a graph G with n nodes, the graph associahedron K_G is a simple convex polytope of dimension $n - 1$ whose face poset is isomorphic to the set of tubings of G , ordered such that $U \prec U'$ if U is obtained from U' by adding tubes.*

These graph associahedra are starting to appear in fields such as Floer homology, moduli space of punctured surfaces, tropical geometry, gene sequencing, Coxeter complexes, and Bergman complexes. Figure 3 gives examples of graphs and their corresponding graph associahedra. When G is a path with n nodes, K_G becomes the associahedron K_{n+1} . When G is a cycle, the resulting polytope K_G is the *cyclohedron*, a very close and natural kin of the classical associahedron, first making its appearance in the knot invariant work of Raoul Bott and Clifford Taubes. Most interesting is when G is a complete graph, when K_G becomes the *permutohedron*.

Figure 3. Examples of graph associahedra.



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Dear Colleague:

The Long Range Plan Steering Committee has completed its consultation draft of the Long Range Plan for Mathematics and Statistics, and is releasing it today to the mathematical and statistical sciences communities for their feedback. You will find it on the front page of the website <http://longrangeplan.ca>.

We don't intend this version to be circulated beyond our communities; it is still rough in places and the layout is very approximate.

There will be presentations on the LRP at the CMS meeting in Regina (June 2, 12.30pm), the SSC meeting in Guelph (June 3, 4pm) and the CAIMS meeting in Toronto (June 24, 1pm (Board) and June 27, 12 pm (AGM)).

Comments on any aspect of the plan are welcome, in the form most convenient to you. You may post comments on our web site, send email to any member of the steering committee or send comments by mail or email to Nancy Reid (reid@utstat.toronto.edu). The consultation period will run to July 31, 2012; after this date we will proceed to prepare and translate into French the final version.

In writing the plan we aimed to include material addressed at three different audiences: mathematical and statistical science researchers, NSERC, and non-specialists, and it may help to keep this in mind as you read it. In the final version we will also include some pictures and graphics, and will be very happy if you send us your favourites.

Looking forward to your feedback,

On behalf of the LRP Steering Committee,

Nancy Reid

Cher collègue, chère collègue,

Le Comité directeur du Plan à long terme (PLT) a terminé l'ébauche du plan à long terme pour les sciences mathématiques et statistiques. Cette ébauche a été rendue publique aujourd'hui sur la page d'accueil du PLT (<http://longrangeplan.ca/fr/>) afin de recueillir les commentaires de la communauté mathématique et statistique.

Nous vous demandons de ne pas diffuser cette version au-delà de nos communautés de recherche car le document n'est encore qu'à l'état d'ébauche.

Des présentations sur le PLT sont prévues à l'occasion des congrès annuels de la SMC à Régina [2 juin, 12h30], de la SSC à Guelph [3 juin, 16h] et de la SCMAI à Toronto [24 juin, 13h, CA et 27 juin, 12h, AGA].

Vos commentaires sur le plan sont les bienvenus. Vous pouvez les poster sur le site Web du PTL (<http://longrangeplan.ca/fr/>), les faire parvenir à un des membres du Comité ou les expédier par courriel à Nancy Reid (reid@utstat.toronto.edu). La période de consultation s'étendra jusqu'au 31 juillet 2012, après quoi le document sera finalisé et traduit en français.

À la lecture du document, veuillez garder à l'esprit que le plan s'adresse à trois auditoires : les chercheurs en sciences mathématiques et statistiques, le CRSNG et les non-spécialistes. La version finale comportera quelques photos et graphiques ; nous serions ravis que vous nous fassiez parvenir vos suggestions à cet égard.

Dans l'attente de recevoir vos commentaires,

Nancy Reid

Measure of Success, continued from cover

on two colleagues with significantly different merit evaluations, you can easily guess who got which increment, but would you be willing to try the same exercise with the two complete grant applications, including peer review references, where one of the applicants got a medium-size grant, and the other application was denied?

Here I would like to outline two points.

First, is a reasonably positive evaluation, both for the university merit increment and in the grant application, a necessity or a privilege? Concerning merit increments, there are formal, nearly mathematical, definitions of the satisfactory and meritorious (good) levels. Everything above these is considered to be a privilege, a prize for high achievements. Concerning grants in Canada, the answer is no longer straightforward, as some time ago receiving an NSERC discovery grant was treated as a necessity for professors actively involved in research. The situation has recently changed, and, without a feeling of fairness, is reminiscent of a lottery with a certain chance to win. There are some countries and universities (for example, major universities in Israel) where traveling funds come along with the faculty position. The value of the traveling allowance is between \$3 - 6,000 USD per year, and the amount increases with promotion. Other grants are highly competitive and are definitely viewed as a privilege, while students are mostly supported from other sources. In some places, there are no personal traveling funds, but, with an invitation to an international conference, it is relatively easy to get full institutional support. Across the border to the south, NSF grants are also very competitive, and most universities do not support any research travel, but there are tax incentives for such travel if paid from personal funds. However, graduate students support without a grant is a difficult issue at many US universities.

Second, mathematics to some extent is different from other natural sciences and engineering, and is influenced differently by these recent changes in the evaluation process. On a personal note, some of my colleagues and I, who work in applied mathematics areas, mostly benefited from the new assessment process both at the university and with NSERC. There were definitely deficiencies in the previous NSERC discovery grant evaluation system when an unfavourable review letter during the first application could keep funding at a lower level throughout an entire career. In the faculty assessment process, the closer you are to the field of pure mathematics from the direction of applied sciences and engineering, the lower is the possibility that you match this image of the "ideal professor" created by the administration. Administrators (and myself, as an administrator, as well) are happier when formal criteria can be applied to compare faculty members in different fields which makes the assessment process easier, with little thought applied. For example, to evaluate research, score the papers with the journal rankings, evaluate the citation index, if relevant, and estimate research grants. Yes, I hear the concerns of my colleagues about the misuse of the system, and, as both an associate editor of several journals and a reviewer, I can add to these stories. For example, about six or seven years ago

I reviewed a paper where the author "improved" his previous paper which analyzed a predator-prey system with several parameters, and the generalization was that one of the parameters of the system was multiplied by a constant between zero and one. There are also many reported cases when the impact factor was misused, for example, with the publications of El Naschie in the journal of Chaos, Solutions and Fractals, see http://rationalwiki.org/wiki/Mohamed_El_Naschie.

However, I would like to tell you another story about two or three mathematicians who, after about 15 years of their research careers, had published 25-38 research papers, with reasonably good (in the range of 50-250) total citations. From the point of view of an average administrator these are solid, but not very impressive achievements. From the point of mathematicians, these are the top mathematicians in the world, since in 2006-2010 they received the Fields medal which is a top world honour in mathematical sciences. This illustrates that sometimes judging mathematical research (using a formal approach) is as hard as trying to evaluate a painting by the sheer amount of paint used per canvas area.

"The evaluation process should be designed to improve performance, and in particular, to attract talented, young faculty members."

Another point of evaluation is training undergraduate and graduate students and postdoctoral fellows. To the great disadvantage of mathematics, there are fewer graduate students in mathematics, and good for us! Excluding some areas of applied branches, for example, financial mathematics, where careers in industry or financial institutions are quite common, most of our graduate students find jobs in postgraduate education. Thus it is not reasonable to have too many graduate students in mathematics. I also believe that the per cent of our graduates working abroad, either returning to their home countries or moving to the US, is higher than in natural sciences and engineering. There are certainly exceptions, as one of my former MSc students is now a high school teacher in a school with an IB (International Baccalaureate) program, there are some mathematics PhD graduates who work in energy companies. However, for some reason it seems harder for PhD graduates in mathematics to find jobs in Canadian industry than in the US and some other countries, for instance, in Russia they are welcome after short training as bank and company analysts, as well as in research and development. I hope that in regard to the training of students we are still compared to our mathematician colleagues at the university level, and I have no information that NSERC really enforces this criterion unless

there are no graduate students in a six-year period at all. Anecdotal evidence shows little difference in the evaluation of this item, when the estimation of “strong” was assigned for the reported number of undergraduate and graduate students and postdoctoral fellows ranging from three to 15, with similar further careers profiles for former students. There is also a rather strong grade correlation between the candidate and HQP evaluations; however, the general picture is for the relevant committees to explore. The situation reminds me of the outcome of our Universal student rating of instruction, where one of the questions inquired whether the course outline was detailed enough when the range of students' responses was from four to six (out of seven) in different groups of the coordinated course, where all the lecture sections had the same course outline, and the material taught was the same. Being a reviewer of NSERC applications, I am also curious what percent of reported supervision related to either undergraduate USRA and graduate students officially registered in the programs, as opposed to postdoctoral fellows, and how many applicants on average reported co-supervision of one PDF.

The evaluation process should be designed to improve performance, and in particular, to attract talented, young faculty members. At the

university level, the requirements at the Assistant Professor level are officially lower than for higher ranks. There have also been introduced in 2010 NSERC competition (compared to 2009), an advanced placement for new faculty members, which increased their chances of success. However, would this be considered an encouragement if they know that a struggle for reasonable funding is inevitable in five years, when all start-up funds are spent and they already have several graduate students? For an emotional description of this situation, see the open letter of Frithjof Lutscher to NSERC <http://mysite.science.uottawa.ca/flutsche/LetterToMsBlain.html>

At the university, provincial, and national levels, there is a tendency to support large projects which appeal to the public. For these programs and faculty involved, NSERC does not make much difference, and sometimes the project leaders do not even bother to apply. Even in industry, they never put all eggs in one basket, and develop a variety of inexpensive initial projects. When trying to get the best, don't we lose the second best? In other words, in the academic world, aren't we needlessly trying to compete with Boeing rather than developing our own Bombardier?

Mesure de réussite, suite de la page 3

en recevait une. À l'époque on sentait qu'il s'agissait d'un jeu aux règles équitables et probablement peu excitant. Cela rappelle ce qui se passe dans la plupart des universités canadiennes où les postes menant à la permanence deviennent des postes permanents sans grandes exceptions et dans quelques grandes universités américaines où les postes permanents sont très rares — dans les deux cas, on s'intéresse peu au résultat de la demande de permanence. Cependant, si le taux de réussite se situe entre 25 % et 75 %, le processus d'évaluation crée beaucoup de pression. On a eu droit à un processus qui n'est peut-être pas aussi marquant, mais aussi douloureux en matière d'évaluation de personnel enseignant. On semble avoir constaté une tendance vers les « évaluations extrêmes »; en particulier, l'incrément de « zéro » a été assigné à plusieurs membres du personnel enseignant. Ce qu'il faut retenir, c'est que selon la convention collective, on peut mettre fin à une permanence d'un enseignant en cas de rendement insatisfaisant. Plusieurs incréments « zéro » successifs sont considérés comme une indication nette de rendement inadéquat. Je ne connais pas de situations où un faible degré de satisfaction de la part des étudiants était la seule raison pour de telles évaluations, mais une faible activité de recherche l'était certainement. Le niveau d'incertitude par rapport aux demandes de subventions est encore plus élevé lorsque le taux de réussite baisse (on approche la marque des 50 %). Pis encore, si l'on vous remet des rapports sur deux collègues ayant obtenu des évaluations de mérite fort différentes, vous pouvez facilement savoir quels incréments les deux ont reçus; mais seriez-vous disposé à tenter le même exercice avec les deux demandes de subventions complètes, y compris les références découlant des examens par les

pairs, où un des demandeurs a obtenu une subvention moyenne et l'autre s'est vu rejeter sa demande?

Laissez-moi à ce point-ci souligner deux éléments d'importance.

D'abord, est-ce qu'une évaluation relativement bonne, tant pour l'incrément de mérite de l'université que pour la demande de subvention, est nécessaire ou un privilège? En ce qui concerne les incréments de mérite, on compte des définitions officielles et pratiquement mathématiques des niveaux satisfaisants et méritoires (bons). Tout ce qui est au-dessus de ces niveaux est considéré comme un privilège, un prix pour souligner de grandes réalisations. En ce qui concerne les subventions au Canada, la réponse n'est plus évidente. Il y a quelque temps, recevoir une subvention à la découverte du CRSNG était considéré comme une nécessité pour les professeurs s'intéressant activement à la recherche. La situation a changé récemment et – sans impression d'équité – elle n'est pas sans rappeler une loterie où on a une certaine chance de remporter le gros lot. Dans certains pays et universités (par exemple, les grandes universités en Israël), on fournit des fonds pour les déplacements aux titulaires de postes d'enseignement. Ces indemnités de voyage varient entre 3 000 \$ et 6 000 \$ américains par année. Le montant augmente en fonction des promotions. D'autres subventions font l'objet d'un processus fortement compétitif et sont décidément considérées comme un privilège; alors qu'on finance les travaux des étudiants en grande partie à partir d'autres sources. À certains endroits, on n'offre aucune somme pour les déplacements personnels, mais l'enseignant qui se fait inviter à une

conférence internationale peut assez facilement obtenir un appui financier complet de l'établissement. Aux États-Unis, les subventions de la NSF font également l'objet d'un processus fortement compétitif, et la plupart des universités ne versent aucune somme pour les déplacements effectués pour la recherche, mais on offre des incitatifs fiscaux pour ces déplacements si la personne s'acquitte de ces frais de ses fonds personnels. Le soutien d'étudiants des cycles supérieurs sans subvention est toutefois une question difficile dans de nombreuses universités américaines.

En deuxième lieu, les mathématiques, dans une certaine mesure, sont une science différente d'autres sciences naturelles et du génie. Elles sont touchées différemment par ces changements apportés récemment au processus d'évaluation. Sur une note personnelle, quelques-uns de mes collègues et moi, qui travaillons dans les domaines des mathématiques appliquées, ont profité en général du nouveau processus d'évaluation à l'université et chez le CRSNG. L'ancien régime d'évaluation des subventions à la découverte du CRSNG comptait décidément de graves lacunes. Par exemple, une lettre d'examen défavorable au cours de la première demande pouvait condamner toute une carrière à des niveaux de financement moins élevés. Dans le cadre du processus d'évaluation du personnel enseignant, plus on se situe à proximité du domaine des mathématiques pures par rapport aux sciences appliquées et au génie, moins on courre la chance de correspondre à cette image du « professeur idéal » que s'est fixée l'administration. Les administrateurs (et moi comme administratrice aussi) sont plus heureux lorsqu'on applique des critères officiels pour comparer les membres du personnel enseignant dans divers domaines, ce qui facilite le processus d'évaluation, sans avoir à trop réfléchir. Par exemple, pour évaluer la recherche, accorder une note aux travaux de recherche selon l'ordre de classification des revues spécialisées, évaluer l'indice de citations, le cas échéant et établir une estimation des subventions à la recherche. Oui, j'entends très bien les préoccupations de mes collègues quant à l'emploi abusif du système et, à titre de corédactrice de plusieurs revues spécialisées et examinatrice, je peux relater mes propres récits. Par exemple, il y a six ou sept ans, j'ai examiné un travail où l'auteur avait « amélioré » son document antérieur, qui était une analyse d'un système de prédateur-proie, en y ajoutant plusieurs paramètres. Selon la généralisation, un des paramètres du système était multiplié par une constante se situant entre zéro et un. On compte aussi bien des cas signalés d'emploi abusif du facteur d'impact, par exemple, avec les publications de El Naschie dans la revue spécialisée de Chaos, Solutions and Fractals. À ce sujet, voir http://rationalwiki.org/wiki/Mohamed_El_Naschie (en anglais seulement).

J'aimerais toutefois vous relater un autre récit. Il porte sur deux ou trois mathématiciens qui, après environ 15 ans de carrière en recherche, avaient publié 25 à 38 rapports de recherche qui comptaient un nombre raisonnablement bon de citations (entre 50 et 250 au total). Du point de vue de l'administrateur moyen, ce sont de solides réalisations, mais des réalisations qui sont loin

d'être impressionnantes. Du point de vue d'un mathématicien, ce sont là les plus illustres mathématiciens du monde puisqu'en 2006-2010, ces mathématiciens ont reçu la médaille Fields, un des plus grands honneurs du monde entier en sciences mathématiques. On voit bien par cet exemple qu'il est parfois aussi difficile d'évaluer la recherche mathématique (à l'aide d'une démarche officielle) que de tenter d'évaluer un tableau selon la quantité de peinture employée pour chacune des sections du canevas.

« Le processus d'évaluation devrait viser à améliorer le rendement et, en particulier, à attirer de jeunes membres talentueux au corps enseignant. »

La formation d'étudiants de premier et de deuxième cycles et de chercheurs postdoctoraux est un autre point d'évaluation. Au grand détriment des mathématiques, on compte moins d'étudiants de deuxième cycle en mathématiques, et tant mieux pour nous! À part pour quelques domaines découlant des disciplines appliquées comme les mathématiques financières, où les carrières dans le secteur privé ou dans les établissements financiers sont courantes, la plupart de nos étudiants de deuxième cycle trouvent des emplois en enseignement de cours d'études supérieures. Par conséquent, il n'est pas raisonnable de compter un trop grand nombre d'étudiants de deuxième cycle en mathématiques. Je crois aussi que le pourcentage de nos diplômés qui travaillent à l'étranger, qu'ils retournent dans leur pays d'origine ou qu'ils s'établissent aux États-Unis, est plus élevé qu'en sciences naturelles et en génie. Il y a certainement des exceptions : un de mes anciens étudiants à la maîtrise en sciences enseigne maintenant dans une école secondaire comptant un programme de baccalauréat international. Certains diplômés au doctorat en mathématiques se sont trouvés des emplois dans des entreprises du secteur de l'énergie. Sans trop savoir pourquoi, il semblerait que la tâche soit plus difficile toutefois pour les diplômés au doctorat en mathématiques de trouver un emploi dans le secteur privé canadien qu'aux États-Unis et dans d'autres pays. Par exemple, en Russie, on les accueille après une courte formation comme analystes bancaires et d'entreprises, de même qu'en recherche et développement. J'espère qu'en ce qui concerne la formation d'étudiants, nous sommes toujours comparés à nos collègues mathématiciens au niveau universitaire. Je ne sais trop non plus si le CRSNG applique réellement ce critère à moins qu'il n'y ait aucun étudiant des cycles supérieurs au cours d'une période de six ans. Selon des preuves anecdotiques, il y a peu de différence en ce qui concerne l'évaluation de cet élément lorsque l'estimation de « fort » était assignée pour le nombre signalé d'étudiants de deuxième et de troisième cycles et de chercheurs postdoctoraux compris entre trois et 15, avec des profils de carrière semblables

pour d'anciens étudiants. On note également une forte corrélation des classements entre les évaluations de candidats et de PHQ, mais il incombe aux comités intéressés d'examiner la situation dans son ensemble. Le tout me rappelle le résultat obtenu à la suite de notre évaluation universelle, par l'étudiant, de l'enseignant. Dans le cadre de cette évaluation, on demandait aux personnes d'indiquer si le plan de cours était suffisamment détaillé, et les réponses variaient de quatre à six sur sept dans différents groupes du cours coordonné, là où l'ensemble des sections de conférences disposaient du même plan de cours et où la matière enseignée était la même. Comme examinatrice des demandes au CRSNG, je suis aussi curieuse de savoir quel pourcentage de la supervision signalée avait trait aux étudiants de premier cycle titulaires d'une BRPC et aux étudiants de deuxième cycle officiellement inscrits aux programmes et quel pourcentage avait trait aux chercheurs postdoctoraux, de même que le nombre de demandeurs en moyenne qui ont indiqué une co-supervision d'un chercheur postdoctoral.

Le processus d'évaluation devrait viser à améliorer le rendement et, en particulier, à attirer de jeunes membres talentueux au corps enseignant. Au niveau universitaire, les exigences au niveau des professeurs adjoints sont officiellement moins strictes que pour les rangs plus élevés. On a également présenté dans le cadre du concours de 2010 du CRSNG (comparativement à 2009) un placement avancé pour les nouveaux membres du corps enseignant. Ce nouveau mécanisme permet d'améliorer leurs chances de réussite. Faut-il y voir là un incitatif toutefois s'ils savent qu'une lutte pour obtenir du financement raisonnable est inévitable dans cinq ans, une fois que tous les fonds de démarrage sont dépensés et qu'ils comptent déjà plusieurs étudiants de deuxième cycle? Pour obtenir une description émotive de cette situation, veuillez lire la lettre ouverte de Frithjof Lutscher au CRSNG : <http://mysite.science.uottawa.ca/flutsche/LetterToMsBlain.html> (en anglais).

Aux niveaux universitaire, provincial et national, on a tendance à appuyer les grands projets qui intéressent le public. Pour ces programmes et les membres du corps enseignant concernés, le CRSNG ne fait pas beaucoup de différence. Parfois les responsables de projet ne prennent même pas la peine de présenter une demande. Même dans le secteur privé, on ne met jamais tous ses œufs dans le même panier, mais on tente plutôt de mettre sur pied divers projets initiaux peu coûteux. Lorsqu'on tente d'obtenir les meilleurs candidats, ne perd-on pas forcément le candidat qui suit de près? Autrement dit, dans le milieu universitaire, ne tente-t-on pas inutilement de faire concurrence avec Boeing au lieu de développer notre propre Bombardier?

COMPETITION NOTES

Eighty students, invited mainly on the basis of high performance in the Sun Life Financial Canadian Open Mathematics Challenge, or the Repêchage, wrote the 2012 Canadian Mathematical Olympiad. The smooth and successful running of the competition was, as usual, mostly due to the efforts of the CMS Staff, in particular Laura Alyea.

The first prize winner is Calvin Deng of the North Carolina School of Science and Mathematics, with a perfect score of 35.

Question 1 was an inequality that yields to most sustained attacks: "Let x, y and z be positive real numbers. Show that $x^2 + xy^2 + xyz^2 \geq 4xyz - 4$." Of the 80 students writing, 33 got a perfect 7. The number-theoretic Question 2 was also well done, with 18 students getting full marks. The combinatorial Question 4 had 14 full marks. The remaining two questions, one in classical Euclidean geometry, and the other in combinatorics, each had 6 perfect scores. Here is Question 5: "A bookshelf contains n volumes, labelled 1 to n , in some order. The librarian wishes to put them in the correct order as follows. The librarian selects a volume that is too far to the right, say the volume with label k , takes it out, and inserts it in the k -th position. (a) Show that if this process is repeated, then, however the librarian makes the selections, all the volumes will eventually be in the correct order; (b) What is the largest number of steps that this process can take?"

Andrew Adler

Chair, CMO Committee
Department of Mathematics, UBC

2012 CMS Winter Meeting

December 8 – 10, 2012

Fairmont Queen Elizabeth Hotel, Montreal, Quebec

Host: Centre de recherches mathématiques

Public Lecture | Conférence publique

Ivar Ekeland (UBC)

Doyne Farmer (Santa Fe Institute)

Prize Lectures | Conférence de prix

Jeffery-Williams Prize | Prix Jeffery-Williams

Roland Speicher (Universität des Saarlandes)

Doctoral Prize | Prix de doctorat

Adrien Pouliot Award | Prix Adrien-Pouliot

Plenary Speakers | Conférences plénierées

Graciela Chichilnisky (Columbia)

Catherine Sulem (Toronto)

Martin Nowak (Harvard)

Réunion d'hiver SMC 2012

8 – 10 décembre 2012

Hôtel Fairmont Queen Elizabeth, Montréal (Québec)

Hôte : Centre de recherches mathématiques

Scientific Director | Directeur scientifique

Luc Vinet (CRM, Université de Montréal),

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Scientific Committee | Comité scientifique

Jacques Bélair (Montréal)

François Bergeron (UQAM)

John Hamad (Concordia)

Niky Kamran (McGill)

François Lalonde (Montréal)

Sabin Lessard (Montréal)

Christiane Rousseau (Montréal)

Jean-Marc Rousseau (CIRANO)

Sessions

We welcome and invite proposals for sessions for this Meeting; in particular, we encourage submissions from Quebec universities. Proposals should include a brief description of the focus and purpose of the session, the expected number of speakers, as well as the organizer's name, complete address, telephone number, e-mail address, etc. All sessions will be advertised in the CMS Notes, on the web site and in the AMS Notices. Speakers will be requested to submit abstracts, which will be published on the web site and in the meeting program. Those wishing to organize a session should send a proposal to the Meeting Director by June 30, 2012.

Nous vous invitons à proposer des sessions pour cette Réunion, nous incitons particulièrement les universités du Québec à faire des propositions. Votre proposition doit inclure une brève description de l'orientation et des objectifs de la session, le nombre de conférenciers prévus, ainsi que le nom, l'adresse complète, le numéro de téléphone et l'adresse courriel. Toutes les sessions seront annoncées dans les Notes SMC, sur le site web et dans le 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 au directeur de la Réunion avant 30 juin 2012.

The following sessions have been confirmed | Les sessions suivantes ont été confirmées :

Special Sessions (MPE2013) | Sessions spéciales (MPT2013)

Applied Mathematics | Mathématiques appliquées

Jean-Christophe Nave, Gantumur Tsogtgerel (McGill)

Epidemiology – Genomics

Épidémiologie - Génomique

Erica Moodie, David Stephens (McGill)

Epidemiology - Infectious Diseases

Épidémiologie - Maladies infectueuses

Julien Arino (Manitoba), Robert Smith? (Ottawa)

Geophysics | Géophysique

Jacques Bélair (Montréal)

Modeling and Management of Aquatic Ecosystems

Modélisation et gestion des écosystèmes aquatiques

Frithjof Lutscher (Ottawa), Rebecca C. Tyson (UBC)

Operations Research | Recherche opérationnelle

Bernard Gendron (Montréal)

Probability - Branching Processes

Probabilité - processus de branchement

Lea Popovic (Concordia)

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Regular Sessions | Sessions générales**Algebraic Combinatorics | Combinatoire algébrique**

Christophe Hohlweg (UQAM), Franco Saliola (UQAM)

Algebraic Number Theory**Théorie algébrique des nombres**

Henry Darmon (McGill), Eyal Goren (McGill), Adrian Iovita (Concordia)

Analytic Number Theory**Théorie analytique des nombres**

Chantal David (Concordia), Andrew Granville (Montréal), Matilde Lalín (Montréal)

Celestial Mechanics | Mécanique céleste

Florin Diacu (Victoria)

Complex Analysis | Analyse complexe

Javad Mashreghi (Laval), Thomas T. Ransford (Laval)

Computational Fluid Dynamics**Dynamique computationnelle des fluides**

Wagdi G. Habashi (McGill)

Differential Equations | Équations différentielles

Hermann Brunner (Memorial)

Econometrics | Économétrie

Jean-Marie Dufour (McGill), Christian Genest (McGill)

Enumerative Geometry and String Theory**Géométrie énumérative et théorie des cordes**

Johannes Walcher (McGill)

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Geometrical Group Theory**Théorie géométrique des groupes**

Mikael Pichot (McGill), Daniel T. Wise (McGill)

Mathematical Physics - Random Matrices and Integrable Systems | Physique mathématiques - matrices aléatoires et systèmes intégrables

Marco Bertola (Concordia), Dmitry Korotkin (Concordia)

Medical Imaging | Imagerie médicale

Frédéric Lesage (École Polytechnique Montréal), Jean-Marc Lina (ÉTS)

Quantum Imaging | Imagerie quantique

André D. Bandrauk (Sherbrooke)

Probability Theory and Mathematical Physics**Méthodes probabilistiques et physique mathématique**

Louigi Addario-Berry (McGill), Louis-Pierre Arguin (Montréal)

Spectral Theory | Théorie spectrale

Dmitry Jakobson (McGill), Iosif Polterovich (Montréal)

Contributed Papers | Communications libres

Org: Edward Doolittle (First Nations University), Fotini Labropulu (Regina)

AARMS-CMS Graduate Student Poster Session**Présentations par affiches pour étudiants - AARMS-SMC**

Org: TBD | à déterminer

2013 CMS Summer Meeting

Dalhousie University

June 4 – 7, 2013

(Tuesday to Friday)

Réunion d'été SMC 2013

Université Dalhousie

juin 4 – 7, 2013

(du mardi au vendredi)

Something old, something new.



Jacques Hurtubise,
CMS President

by Rachel Kuske, and the Jeffery-Williams lecture by Kai Behrend. Yvan Saint-Aubin gave a beautiful and thoughtful lecture, quite in line with his award, which was for Excellence in Teaching. Gerda deVries entertained both us and a wider audience with a lovely (both visually and intellectually) talk on the mathematics of quilting.

The Toronto meeting was one of the most heavily attended meetings ever. We had a wider-ranging Coxeter-James lecture on spectral geometry by **Iosif Polterovich**, as well as a deep and surprising Doctoral Prize lecture from **Youness Lamzouri**. At the awards banquet, I had the pleasure of giving the Graham Wright Award for Distinguished Service to David Rodgers, our long serving (and occasionally suffering) treasurer, whose wisdom has guided the Society for many years. The G. de B. Robinson Award went to Hugh Thomas and Alexander Yong and the Adrien Pouliot award to Małgorzata Dubiel, who unfortunately had to cancel her lecture. The meeting had two well attended series of graduate lectures, given by Dina Simanova and Luis Seco, as well as an intensive series on operator algebras. These lectures were a great success, and I hope that they will be the first of many.

Our research journals are doing well; the backlog, on the electronic side, is now under control, and the printed version is slowly catching up, as articles feed through the presses. On the educational side, CRUX now has a new editor, Shaun Godin, in place, and he is heading a re-vamp of the format of the journal. Our math camps are flourishing (more details in the Executive Director's report), and the competitions are heading towards a new mode of functioning, with the COMC now moving to a wider base of institutional support, with the Universities of Toronto and Laval spearheading the efforts last year (and we thank them for their generosity of their efforts), and with coming on line for the coming year. This arrangement, we think, benefits both the Society and the institutions, highlighting the remarkable high school level talent pool that is out there to fuel our future.

All in all, it was a good year for the Society, with some very good meetings, and a few new directions. We had two very good meetings this past year, the first in June in Edmonton, and the second in December in Toronto. Edmonton's was hosted by the University of Alberta, and York and Ryerson kindly co-hosted the Toronto one. In June, the meeting saw some very good plenary lectures, and two prize lectures given by colleagues from UBC- the Krieger-Nelson lecture

On the science policy front, the interaction with NSERC continued to be a preoccupation of the Society, and it was a somewhat stormy year. The outcome of the 2011 competition was far from optimal, and a lot of the reason for this, or at least the portion not due to simple underfunding, seemed to be attributable to some rather irrational rigidities in the adjudication process. The President of NSERC, Suzanne Fortier, attended the Edmonton meeting, and explained things from her point of view. I am glad to report that this year's results seem to be more reasonable; informal reports tell us that a much more flexible and cooperative interaction took place in this year's grant competition. Our thanks are due to all those involved.

For the future, the Mathematics and Statistics Long Range Plan committee continued its work, and will, I am told, be submitting its draft proposal soon. A lot of its work, and in particular its consultations, took place in the context of the Society's meetings, and I am told that the Society's Study of Mathematics in Canada was a very useful resource in its deliberations. We await the results with impatience.

Overall, the Society is doing well. Our finances show a smidgeon of black ink for the third year in a row, following a now well-established pattern of initial pessimism, followed by a feeling of relief as things turn out well in the end. All of this would not be possible without the unceasing vigilance of our Executive Director, Johan Rudnick, who runs a tight but not ungenerous ship. Our staff remains devoted to our mission, and does much to make it all happen. Of course, any professional society depends to a great degree on volunteers, and I would like to thank the many generous people who contribute to the CMS. In particular, I would like to thank our able and ever vigilant treasurer David Rodgers, as well as the other current members of the new executive, Elena Braverman (West), Olivier Collin (Quebec), Karl Dilcher (Atlantic), and Steve Kudla (Ontario), who have now been in place for almost a year. Particular thanks are due to Keith Taylor, who has agreed to take on the job of President as my term comes to an end this June. The Society is in good hands.

L'ancien et le nouveau.

Tout compte fait, 2011 a été une bonne année pour la SMC. En effet, on a eu quelques excellentes réunions et emprunté quelques voies nouvelles. Nous avons eu deux excellentes réunions au cours de l'année, la première au mois de juin, à Edmonton, la deuxième au mois de décembre, à Toronto. Celle d'Edmonton a été animée par la University of Alberta, et York et Ryerson ont gracieusement co-animé celle de Toronto. La réunion du mois de juin a compté de très bonnes séances plénaires, et deux allocutions lors de la remise de prix par des collègues de la UBC – l'allocution d'acceptation du prix Krieger-Nelson de Rachel Kuske et celle pour le prix Jeffery-Williams de Kai Behrend. Yvan Saint-Aubin a donné une belle allocution réfléchie, qui cadrait parfaitement avec son prix, soit le Prix d'excellence en enseignement. Gerda deVries nous a divertis-

tout comme l'auditoire en général, en donnant un bel exposé (tant sur le plan visuel qu'intellectuel) sur la mathématique du matelassage.

La réunion de Toronto a été l'une des plus courues de tous les temps. Nous avons eu droit à une allocution d'acceptation du prix Coxeter-James de portée plus large sur la géométrie spectrale d'**Iosif Polterovich**, de même qu'à une allocution profonde et surprenante d'acceptation du prix doctoral de **Youness Lamzouri**. Au banquet de remise des prix, j'ai eu le plaisir de remettre le prix Graham-Wright pour service méritoire à David Rodgers, notre trésorier de longue date (et parfois souffrant), dont la sagesse a guidé la SMC pendant de nombreuses années. Le prix G. de B. Robinson a été décerné à Hugh Thomas et à Alexander Yong, et le prix Adrien Pouliot a été remis à Małgorzata Dubiel, qui a dû malheureusement annuler son allocution. La réunion comptait aussi deux séries de conférences de deuxième cycle fort courues (par Dina Simapova et Luis Seco), de même qu'une série intensive sur l'algèbre des opérateurs. Ces exposés ont été fort bien accueillis, et j'espère qu'ils ne sont que le début d'une longue série.

Nos revues de recherche spécialisées se portent bien; le retard de traitement sur le plan électronique est maintenant réglé, et la version imprimée se rattrape peu à peu, à mesure que les articles passent sous la presse. Sur le plan éducatif, CRUX compte maintenant un nouveau rédacteur en chef, Shaun Godin. Shaun s'occupe de la refonte du journal. Nos camps mathématiques sont en plein essor (on peut obtenir des détails supplémentaires à ce sujet dans le rapport du directeur exécutif) et les concours se font recentrer peu à peu sur un nouveau mode de fonctionnement : le DOCM obtient graduellement le soutien élargi des établissements, avec les universités de Toronto et de Laval qui s'étaient chargées des efforts l'an dernier (et nous les remercions de ces efforts généreux) et qui se sont engagés pour l'année à venir. Cette entente, selon nous, est profitable tant pour la SMC que pour les établissements. Elle met en évidence le talent remarquable qu'on retrouve au niveau secondaire et qui assurera notre avenir.

Sur le plan des politiques en matière de sciences, l'interaction avec le CRSNG est toujours un sujet de préoccupation pour la SMC. C'était une année pour le moins orageuse. Le résultat du concours de 2011

était loin d'être enviable, situation dont la grande partie, ou du moins la partie qui n'était pas fonction d'un simple sous-financement, semblait attribuable à des règles de sélection relativement rigides et irrationnelles. La présidente du CRSNG, Suzanne Fortier, a participé à la réunion d'Edmonton et a donné son point de vue du dossier. J'ai le plaisir d'affirmer que les résultats cette année semblent plus raisonnables; selon des rapports non officiels, il y aurait eu des échanges bien plus souples et davantage axés sur la coopération pendant le concours de subventions cette année. Nous remercions tous ceux qui ont contribué à cette amélioration.

Pour l'avenir, le comité du Plan à long terme pour les sciences mathématiques et statistiques a poursuivi son travail et présentera, à ce qu'on m'a dit, son ébauche de proposition bientôt. Une grande partie de son travail, et en particulier ses consultations, a eu lieu pendant les réunions de la SMC. On me dit que l'Étude des mathématiques au Canada de la SMC a été une ressource très utile pour le comité dans son processus décisionnel. Nous attendons avec impatience les résultats.

Dans l'ensemble, la SMC se porte bien. Côté finances, nous voyons quelques petits surplus pour une troisième année de suite, après un pessimisme initial maintenant bien établi, suivi d'un soulagement en voyant que tout tournait pour le mieux, au bout du compte. Tout ceci ne serait pas possible sans la vigilance intarissable de notre directeur exécutif, Johan Rudnick, qui veille au grain, sans pour autant manquer de générosité. Notre personnel est toujours dévoué à notre mission et fait beaucoup pour assurer la réussite. Bien entendu, toute société professionnelle est largement tributaire de bénévoles, et je souhaite remercier les nombreuses personnes généreuses qui contribuent à la réussite de la SMC. Je souhaite remercier en particulier notre trésorier des plus compétents et vigilants, David Rodgers, de même que les autres membres actuels du nouvel exécutif, soit Elena Braverman (Ouest), Olivier Collin (Québec), Karl Dilcher (Atlantique) et Steve Kudla (Ontario), qui y siègent maintenant depuis près d'un an déjà. Je souhaite remercier tout particulièrement Keith Taylor, qui a accepté le poste de président, car mon mandat sera écoulé à la fin du mois de juin. La SMC est entre bonnes mains.

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Helping to make better math happen



Johan Rudnick,
Executive Director

What CMS does and accomplishes is a direct result of the hundreds of volunteers and staff that actually make the plans, awards, journals, camps, and programs and services to support Canadian mathematics and help make better happen in Canada. There is very little that CMS volunteers get involved with that is not operationally supported by the CMS. In 2011, the CMS office continued to support CMS committees and volunteers and it also managed to maintain, and in some cases improve, existing advancement, discovery, learning, and application programs, as well as take on some new responsibilities.

In 2010 the CMS initiated a strategic change to how it makes math happen – the CMS decided to start focusing on promoting the advancement, discovery, learning, and application of mathematics. The change in orientation is starting to affect CMS operations and management as Committee are being asked to consider what they are doing to move CMS forward and the CMS office starts to refocus and realign resources.

Under the rubric of emerging change, 2011 was very busy year for CMS operations. The year marked a second year in a row that the CMS managed to etch out a tiny but real operating surplus, notwithstanding a planned budget deficit. The year was also marked by new university and organizational partnerships as well as program initiatives. At the same time, CMS became engaged with the NSERC Long Range Plan for Mathematical and Statistical Sciences, Mathematics of Planet Earth 2013, and the Mathematical Congress of the Americas 2013.

For CMS, helping to promote the advancement of mathematics encompasses the development of the CMS membership community as well as support to the CMS Board of Directors, the Executive

“The support and advice of the CMS office was invaluable in helping us to start thinking about how to develop Math Reports in the future.”

George Elliot, Editor in Chief, Math Reports

“The CMS’s extensive experience in handling conferences and their online facilities were a tremendous asset in the planning of CanaDAM 2011.”

Prof. Ortud Oellermann, University of Winnipeg, Chair, CanaDAM 2011 Executive Committee

Committee, and various other CMS committees and sub-committees, including providing secretariat support and staging and planning business and AGM meetings. It also involves being engaged in community development, such as long range planning and endowment grants, and advocacy in areas such as Discovery Grants. In addition, it also includes production of the CMS newsletter, CMS Notes, as the editors introduced new content materials under the guidance of the CMS Publications Committee, as well as delivering a diverse award program. Advancement and indeed any other activity would not be possible without maintaining an enviable record of on-line performance and robust office support. While CMS operations ‘hummed along’ in 2011, a number of changes were introduced:

- » New information protection, language, and conflict of interest policies;
- » New look for CMS Notes; and
- » New public posting of CMS financial statements.

For CMS, helping to promote the discovery of mathematics encompasses semi-annual research meetings, publishing research journals, honouring outstanding research and researchers, and supporting student-oriented seminars and workshops. Operationally this means that the actual research meetings are staged and executed while at the same time planning for meetings over the next few years, including joint international meetings. This also means the actual production of the two CMS research journals, CJM and CMB while at the same time starting to examine how best to sustain the journals in the future, especially with respect to marketing. In 2011, the CMS also started to look at how the journal publication infrastructure developed by the CMS publication Committee and the CMS Winnipeg office could be used to support other Canadian mathematics research journals. Some of the changes introduced in 2011 include:

- » New opportunity for more universities to be involved as research meeting directors.
- » New student workshops added to research meetings.
- » New pages added to CMB to publish more research articles.

For CMS, helping to promote the learning of mathematics encompasses staging the education component of the semi-annual national meetings, production of CRUX with Mayhem, honouring teaching excellence, partnering with universities to hold math camps, staging national mathematics competitions, and assembling and coaching Math Team Canada to compete in the International Mathematical Olympiad (IMO). The CMS also supports universities and other organizations in staging math competitions. In 2011, the CMS also started to look at how the competitions infrastructure developed by the CMS Competitions Committee and the CMS office could be used to support other Canadian math competitions. Some of the changes in 2011 include:

- » New national university partnership and format created for the COMC.
- » New math camps added, including a special camp for girls.
- » New training home, BIRS, for Math Team Canada.

An unfortunate and major challenge for the CMS in 2011 was the need to address new competing competitions introduced by the University of Waterloo. In addition, the CMS continued to struggle with an initiative to revamp CRUX and address a publication backlog. In 2011 the CMS also decided to address a unique opportunity – hosting, in one form or another, the continuation of the Statistics Canada Education Outreach program material that is scheduled to be eliminated in 2012.

For CMS understanding how best to help promote the application of mathematics (outside advancement, discovery and learning contexts) has been a real challenge – especially in light of the research orientation of most CMS members. Furthermore, some applied mathematics organizations are quite surprised that the CMS has a genuine interest in helping them. While the role of the CMS in promoting the application of mathematics is still very much a ‘work in progress,’ in the interim, the CMS has been reaching out to see what it should and can do. One way the CMS helped in 2011 was the continued ‘back office’ operational support, under contract, provided to the Statistical Society of Canada. Another way the CMS helped in 2011 was assisting CanaDAM stage their conference.

In 2011 the CMS also moved forward and made changes for 2012, including revamping CMS membership categories that will see new lower fees, moving subscription rates to a two-tier domestic-international pricing structure to off-set the negative impact of a high Canadian dollar, once again adding more pages to CMB, and expanding CMS partnerships with universities.

Operationally, 2011 represented a continuation of the cycle of quiet renewal and development that was launched in 2010 and that cycle is indeed starting to affect how CMS helps make math happen in Canada. Membership is starting to be more diverse. Research meetings are starting to be more engaging. Learning and education activities are starting to expand. And more math organizations are

starting to discover that the CMS really can help them. What is slowly emerging, and as was suggested in 2010, is a CMS that will be more relevant and effective, a CMS that will be more sustainable, and a CMS better positioned to help advance the interests of everyone in Canada and more especially the broader mathematics community in making better math happen in Canada.

“CMS financial and registration support will make a big difference to our ability to stage and develop the Kangaroo math competitions.”

Valeria Pandelieva, Kangaroo Math, Organizing Committee

Pour des mathématiques meilleures au Canada

Les travaux et les réalisations de la SMC sont le fruit direct des efforts de milliers de bénévoles et de membres du personnel qui dressent les plans et préparent les prix, les revues spécialisées, les camps et les programmes et les services afin d’appuyer les mathématiques canadiennes et pour de meilleures mathématiques au Canada. Très peu d’activités auxquelles participent les bénévoles de la SMC ne sont pas appuyées par la SMC sur le plan fonctionnel. En 2011, le bureau de la SMC a poursuivi son soutien des comités et des bénévoles de la SMC et a réussi, en plus, à maintenir et, dans certains cas, à améliorer les programmes d’avancement, de découverte, d’apprentissage et d’application existants. Elle a aussi assumé de nouvelles responsabilités.

En 2010, la SMC a apporté un changement stratégique à la façon dont elle favorise de meilleures mathématiques au Canada. En effet, la Société a décidé d'accorder la priorité à la promotion de l'avancement, de la découverte, de l'apprentissage et de l'application des mathématiques. Les effets de ce changement d'orientation commencent à se faire sentir au niveau des opérations et de la gestion de la SMC, car on demande maintenant aux membres des comités de réfléchir à ce qu'ils font pour faire avancer la SMC. Le bureau de la SMC a commencé à recentrer et à réaligner ses ressources en conséquence.

Sous la rubrique des changements nouveaux, 2011 était une année fort chargée pour la SMC. C'était la deuxième année d'affilée où la SMC réussissait à réaliser un petit, mais véritable surplus de fonctionnement, sans compter un déficit budgétaire planifié. Elle a aussi formé de nouveaux partenariats avec des universités et des organisations et créé de nouvelles initiatives de programme. Pendant l'année, la SMC s'est engagée à l'égard du Plan à long

« L'appui et les conseils du bureau de la SMC ont été fort précieux et nous ont aidé dans nos réflexions sur la préparation de rapports mathématiques à l'avenir. »

George Elliot, Rédacteur en chef, Rapports mathématiques

terme pour les sciences mathématiques et statistiques de la CRSNG, les Mathématiques de la planète Terre 2013 et le Congrès des mathématiques dans les Amériques 2013.

Pour la SMC, contribuer à la promotion des mathématiques passe par l'augmentation du nombre d'adhésions et un appui au Conseil d'administration, au Comité exécutif et à divers autres comités et sous-comités, y compris un service de secrétariat, de même que par la planification et l'organisation des réunions d'affaires et des AGA. Il s'agit aussi de participer activement au développement de la communauté, notamment à la planification à long terme et aux bourses du fonds de dotation, de même que de consentir des efforts de promotion dans des domaines tels que les subventions à la découverte. En outre, il s'agit de voir à la rédaction du bulletin de nouvelles de la SMC et des Notes de la SMC, puisque les rédacteurs ont ajouté du contenu sous les conseils du Comité des publications de la SMC et de voir au programme de prix divers. Il n'y aurait aucun avancement ni activité si l'on n'assurait pas un rendement enviable en ligne et un excellent soutien administratif au bureau. Bien que les activités de la SMC aient été « comme sur des roulettes » en 2011, on a adopté un certain nombre de changements :

- » nouvelle politique sur la protection des renseignements personnels, nouvelle politique linguistique et nouvelle politique concernant les conflits d'intérêt;
- » nouvelle présentation des Notes de la SMC;
- » nouvelle diffusion publique des états financiers de la SMC.

Selon la SMC, aider à promouvoir la découverte des mathématiques se fait grâce aux réunions de recherche semi-annuelles, en publiant des revues de recherche spécialisées, en soulignant la recherche et les chercheurs exceptionnels et en appuyant des séminaires et des ateliers axés sur les étudiants. Sur le plan fonctionnel, il faut organiser les réunions de recherche et les administrer quand elles ont lieu, tout en planifiant les réunions qui auront lieu au cours des prochaines années, y compris les réunions internationales conjointes. Il faut aussi assurer la préparation des deux revues

« L'aide financière et le soutien en matière d'inscriptions de la SMC nous aideront énormément à organiser et à créer des concours mathématiques Kangaroo. »

Valeria Pandelieva, Comité organisateur de Kangaroo Math

de recherche spécialisées de la SMC, soit le JCM et le BCM, tout en commençant à examiner les meilleurs moyens d'assurer la survie des revues spécialisées, à l'égard surtout du marketing. En 2011, la SMC a également commencé à examiner ses options pour employer l'infrastructure de publication de revues mise au point par le Comité des publications de la SMC et du bureau de la SMC à Winnipeg afin d'appuyer d'autres revues de recherche spécialisées en mathématiques au Canada. Voici quelques-uns des changements apportés en 2011 :

- » nouvelle occasion pour un plus grand nombre d'universités de participer comme directeurs au cours des réunions de recherche;
- » nouveaux ateliers pour étudiants ajoutés aux réunions de recherche;
- » nouvelles pages ajoutées au JCM, afin de publier un plus grand nombre d'articles de recherche.

Selon la SMC, aider à promouvoir l'apprentissage des mathématiques se fait en organisant le volet éducatif des réunions nationales semi-annuelles, en préparant CRUX avec Mayhem, en soulignant l'excellence en enseignement, en formant des partenariats avec les universités afin d'organiser des camps mathématiques, en organisant des concours de mathématiques nationaux et en formant et en encadrant l'Équipe mathématique Canada pour qu'elle puisse participer à l'Olympiade internationale de mathématiques (OIM). La SMC appuie également les universités et d'autres organisations qui organisent des concours de mathématiques. En 2011, la SMC a également commencé à examiner certaines options pour employer l'infrastructure des concours mise au point par le Comité des concours de la SMC et le bureau de la SMC afin d'appuyer d'autres concours de mathématiques au Canada. Voici quelques-uns des changements apportés en 2011 :

- » nouvelle formule de partenariat national avec les universités pour le DOCM;
- » nouveaux camps mathématiques ajoutés, y compris un camp spécial pour filles
- » nouvel endroit de formation, le BIRS, pour l'Équipe mathématique Canada.

Défi de taille et malencontreux, la SMC a dû en 2011 tenir compte de nouveaux concours concurrentiels créés par la University of Waterloo. De plus, la SMC était toujours aux prises avec une initiative qui visait à revitaliser CRUX et à régler les retards de publication. En 2011, la SMC a également décidé de profiter d'une occasion unique – assurer, d'une forme ou d'une autre, la continuité du matériel du Programme de soutien à l'éducation de Statistique Canada qui devait être éliminé en 2012.

Pour la SMC, comprendre comment s'y prendre pour promouvoir le mieux possible l'application des mathématiques (outre les contextes d'avancement, de découverte et d'apprentissage) s'est avéré un véritable défi – surtout à la lumière de l'orientation de la recherche de

« La grande expérience de la SMC en matière de gestion de conférences et ses fonctions en ligne ont été un outil précieux pour planifier CanaDAM 2011. »

Prof. Ortrud Oellermann, University of Winnipeg, Présidente,
Comité exécutif de CanaDAM 2011

la plupart des membres de la SMC. De plus, certaines organisations de mathématiques appliquées sont fort surprises d'apprendre que la SMC est véritablement résolue à les aider. Bien que le rôle de la SMC par rapport à la promotion des moyens qui permettent d'assurer l'application des mathématiques soit toujours, en quelque sorte, un « projet en chantier » pour l'instant, la Société a participé à des consultations afin d'établir ce qu'elle devrait et ce qu'elle pouvait faire. Une des façons dont la SMC a aidé en 2011 a été d'assurer le soutien fonctionnel d'arrière-plan, à contrat, pour la Société statistique du Canada. La SMC a contribué d'une autre façon en 2011, en aidant CanaDAM à organiser sa conférence.

Au cours de l'année, la SMC a également apporté des changements pour 2012. Elle a notamment modifié ses catégories de membres, ce qui a permis de créer de nouveaux frais moins élevés, a adopté une structure tarifaire nationale-internationale à deux niveaux pour

les taux d'adhésion afin de compenser les effets négatifs d'un dollar canadien vigoureux, a ajouté des pages au JCM et a formé davantage de partenariats avec les universités.

Du point de vue fonctionnel, l'année 2011 était la continuité du cycle de renouvellement et de développement discrets lancé en 2010, et ce cycle commence en effet à influencer le soutien que la SMC donne aux mathématiques au Canada. On commence à voir une plus grande diversité des membres. Les réunions de recherche commencent à susciter un plus grand intérêt. Les activités d'apprentissage et d'éducation commencent à prendre de l'ampleur. Et davantage d'organisations en mathématiques commencent à découvrir que la SMC peut véritablement les aider. Ce qui ressort peu à peu et ce qui avait été suggéré en 2010, est une SMC qui sera plus pertinente et efficace, une SMC qui sera plus durable et une SMC qui sera mieux placée pour contribuer à l'avancement des intérêts de tous les Canadiens et Canadiennes et plus particulièrement ceux de la communauté des mathématiques en général, pour des mathématiques meilleures au Canada.



FIELDS INSTITUTE DIRECTOR SEARCH

The Fields Institute for Research in Mathematical Sciences invites applications or nominations for the position of Director for a three- to five-year term beginning July 1, 2013 (once renewable).

The Fields Institute is an independent research institute located on the downtown campus of the University of Toronto. The Institute's mission is to advance research and communication in the mathematical sciences. With 3000 registered annual participants from around the world, its programs bring together researchers and students, commercial and industrial users, and an interested public. See www.fields.utoronto.ca.

Candidates should be researchers in the mathematical sciences with high international stature, strong interpersonal and administrative skills, and an interest in developing the activities of the Fields Institute.

A letter of application addressing the qualities above, together with a CV and names of three references should be sent to directorsearch@fields.utoronto.ca. Expressions of interest or nominations may also be sent to this address.

Applications or nominations will be considered until the position is filled, although the Search Committee will begin discussions in June 2012. Women and members of underrepresented groups are encouraged to apply.

The members of the Director Search Committee are Susan Friedlander, Konstantin Khanin, Gregory Margulis, Juris Steprans, Mary Thompson and Stephen Watt (Chair).

The School of Mathematics and Statistics at Carleton University invites applications for the position of Manager/Senior Consultant of its newly created Consulting Service, starting July 1, 2012. The Service is scheduled to commence operation on September 1, 2012. This position is renewable annually.

Applicants must possess a Masters degree or higher in Mathematics or Statistics and ideally at least five years of consulting experience (or equivalent combination of education and experience) together with demonstrably strong interpersonal and communication skills. Additional qualifications include the ability to supervise technical and administrative support staff. Budgeting skills, knowledge of contract and project management, and the ability to communicate in both French and English are desirable qualities. In addition, past experience in such a role, particularly in a university setting, is a definite plus.

Applications, including an up-to-date curriculum vitae and three letters of reference, should be sent in hard copy to

Dr. Patrick J. Farrell, Director
School of Mathematics and Statistics
Carleton University
1125 Colonel By Drive
Ottawa, Ontario, CANADA
K1S 5B6

Consideration of applications will begin on May 15, 2012 and continue until the position is filled. This position is subject to final budgetary approval.

L'École de mathématiques et de la statistique à Carleton University met au concours un poste de manager/senior consultant pour son service de consultation nouvellement créé, avec entrée en fonction le 1er juillet 2012. Le service est prévu d'être complètement opérationnel au 1er septembre 2012. Ce poste est renouvelable annuellement.

Les candidats doivent avoir au minimum un diplôme de master en mathématiques ou en statistique, et de préférence une expérience de consultation d'au moins cinq ans (ou une combinaison équivalente d'études et d'expérience) avec de fortes compétences relationnelles et communicatives. Parmi les atouts supplémentaires est l'aptitude à superviser les personnels de soutien administratifs et techniques. Les compétences en matière de budgétisation, connaissance de contrat, management de projet, et la capacité de communiquer en français et en anglais sont des qualités souhaitables. En fin, une expérience dans un tel poste, particulièrement dans un cadre universitaire, est définitivement un plus.

Les dossiers de candidature (en papier), incluant un curriculum vitae à jour et trois lettres de recommandation, devront être envoyés à

Dr. Patrick J. Farrell, Director
School of Mathematics and Statistics
Carleton University
1125 Colonel By Drive
Ottawa, Ontario, CANADA
K1S 5B6

Les candidatures commenceront à être examinées à partir du 15 mai 2012, et continueront d'être considérées jusqu'à ce que le poste soit comblé. Ce poste est sujet à une approbation budgétaire finale.

2011 Treasurer's Report

Submitted by David Rodgers



David Rodgers, Treasurer

Operating results for 2011 were achieved in the face of a completely re-engineered COMC competition and fewer than expected number of participants at the Summer meeting. On the other hand, there were more than the expected number of participants at the Winter meeting. There was some attrition in individual memberships but more corporate sponsorships. Net publishing revenue was roughly flat but the number of subscriptions down. CRUX is a continuing issue going forward. Overall, the CMS financial condition is stable but fragile.

In 2011, the CMS changed auditors. The revised audit format is organized to align with promoting *advancement, discovery, learning and application* of mathematics. The outcome is a single, bilingual audit report that moves the CMS further in the direction of mission-based reporting. Work for the 2011 Audit is now complete and the auditors are satisfied that the CMS continues to properly account for its revenues and expenses.

The weak US dollar continues to exert pressure on operating results going forward, with no realistic prospects for relief over the foreseeable future.

The CMS is not alone in facing financial and professional challenges. Virtually every professional association and scholarly society is in a similar position. Their members are demanding focused, electronically connected opportunities that expand their professional network, engage research collaborators, and facilitate their learning.

The Executive Director, Finance Committee, and Executive Committee remains acutely aware of these trends and that the CMS must redouble efforts to diversify and expand its revenue base in ways that offer programs and services of interest to the Canadian mathematical community.

Rapport du trésorier 2011

Présenté par David Rodgers

MS operating results for 2011 show a **net revenue surplus of \$12,182**, (\$8,328 plus \$3,854 in foreign exchange), the second year in a row where the CMS has posted a revenue surplus, net of foreign exchange. The TD Asset Management Fund balance was \$1,678,537 on December 31, continuing a recovery cycle going back to 2008.

La SMC a enregistré en 2011 un **surplus de revenus net de 12 182 \$** (8 328 \$ plus 3 854 \$ en devises étrangères), ce qui représente une deuxième année de surplus (net de devises étrangères) de suite pour la SMC. Le solde du fonds géré par Gestion de placements TD était de 1 678 537 \$ en date du 31 décembre, chiffre qui s'inscrit bien dans une optique de continuité d'un cycle de rétablissement qui remonte à 2008.

Les résultats en 2011 ont été obtenus malgré un concours du DOCM complètement repensé et un nombre moins important que prévu de participants à la réunion d'été. D'autre part, on comptait un nombre plus élevé que prévu de participants à la réunion d'hiver. On a constaté une diminution du nombre d'adhésions individuelles, mais une augmentation du nombre de commandites d'entreprises. Les revenus nets découlant des publications étaient à peu près les mêmes qu'au cours de l'exercice précédent, mais le nombre d'abonnements a baissé. CRUX est une question qui reste à régler. Dans l'ensemble, la situation financière de la SMC est stable, mais fragile.

En 2011, la SMC a changé de vérificateur. La nouvelle formule de vérification s'aligne sur la promotion de *l'avancement, de la découverte, de l'apprentissage et de l'application* des mathématiques. Il en découle donc un seul et unique rapport de vérification bilingue qui permet à la SMC de se diriger progressivement vers le principe du rapport axé sur la mission. Le travail nécessaire à la vérification de 2011 est maintenant terminé, et les vérificateurs sont d'avis que la SMC rend toujours de manière convenable des comptes sur ses revenus et ses dépenses.

Le faible dollar américain exerce toujours des pressions sur les résultats fonctionnels; on n'entrevoit aucune diminution réaliste de cette pression dans un avenir rapproché.

La SMC n'est pas la seule à éprouver des difficultés financières et professionnelles. Pratiquement toutes les associations professionnelles et sociétés savantes se trouvent en position semblable. Leurs membres exigent des occasions ciblées et électroniques qui élargissent leur réseau professionnel, font participer des collaborateurs en recherche et facilitent l'apprentissage.

Le directeur exécutif, le Comité des finances et le Comité exécutif sont toujours très conscients de ces tendances et savent fort bien que la SMC doit redoubler d'efforts pour se diversifier et accroître ses revenus, de manière à offrir des programmes et des services d'intérêt pour la communauté mathématique du Canada.

Call for Nominations

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: researchers having their PhD degrees conferred in 2002 or later will be eligible for nomination in 2012 for the 2013 prize. 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. The prize lecture will be given at the 2013 CMS Winter Meeting.

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. The prize lecture will be given at the 2013 CMS Summer Meeting.

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. The prize lecture will be given at the 2013 CMS Summer Meeting.

The deadline for nominations is June 30, 2012.

Nominators should ask at least three referees to submit letters directly to the CMS by September 30, 2012. Some arms-length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available. Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline to the corresponding email address:

Coxeter-James: cjprize@cms.math.ca

Jeffery-Williams: jwprize@cms.math.ca

Krieger-Nelson: knprize@cms.math.ca

Appel de mises en candidature

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 mathématiciens qui se sont distingués par l'excellence de leur contribution à la recherche mathématique. Cette personne doit être membre de la communauté mathématique canadienne. Les candidats sont admissibles jusqu'à dix ans après l'obtention de leur doctorat : ceux qui ont obtenu leur doctorat en 2002 ou après seront admissibles en 2012 pour le prix 2013. Toute mise en candidature est modifiable et demeurera active l'année suivante, à moins que la mise en candidature originale ait été faite la 10e année suivant l'obtention du doctorat. La personne choisie prononcera sa conférence à la Réunion d'hiver SMC 2013.

Le prix Jeffery-Williams rend hommage aux mathématiciens 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. La personne choisie prononcera sa conférence à la Réunion d'été SMC 2013.

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. La lauréate prononcera sa conférence à la Réunion d'été SMC 2013.

La date limite de mises en candidature est le 30 juin 2012.

Les proposants doivent faire parvenir trois lettres de référence à la SMC au plus tard le 30 septembre 2012. Nous vous incitons fortement à fournir des références indépendantes. 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, dans la mesure du possible. 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:

Coxeter-James: prixcj@smc.math.ca

Jeffery-Williams: prixjw@smc.math.ca

Krieger-Nelson: prixkn@smc.math.ca

Math Competition Grants

The CMS is now accepting applications for the 2012 Math Competition Grants.

The Math Competition Grants are open to contests of different kinds at the school level. This includes:

- » **Traditional:** students solve problems in a timed written exam
- » **Projects:** Teams competing to solve a strategic problem over a longer period of time
- » **Posters:** Preparation of a mathematical solution or discussion for display purposes

Preference will be given to:

- » Competitions which embrace a number of regional schools (city, county or province-wide)
- » New ventures or those which are aiming to expand their reach
- » Competitions which have matching sources of funding or which are aiming to become self-sufficient

The deadline for applications is November 15, 2011. An application form and more information about the math competition grants can be found at: <http://cms.math.ca/Competitions/grants>

Subventions pour les concours de mathématiques

La SMC accepte maintenant des demandes de subventions pour les concours de mathématiques de 2012.

Les subventions pour les concours de mathématiques s'appliquent à divers concours organisés au niveau scolaire. Cela comprend :

- » **Traditionnel** : les étudiants règlent des problèmes pendant un examen écrit à temps limité
- » **Projets** : des équipes font la lutte afin de régler un problème stratégique au cours d'une plus longue période
- » **Affiches** : la préparation d'une solution mathématique ou d'une discussion à afficher

La préférence sera accordée à :

- » Les concours qui s'entendent à un certain nombre d'écoles régionales (à toute une ville, un comté ou une province)
- » De nouveaux projets ou ceux qui visent à étendre leur portée
- » Les concours qui jouissent de sources de financement de contrepartie ou qui visent à devenir autonomes sur le plan financier

La date d'échéance pour les candidatures est le 15 novembre 2011. Un formulaire de demande et plus amples renseignements sur le subventions pour les concours de mathématiques sont isponibles à : <http://smc.math.ca/Concours/grants>



NSERC-CMS Math in Moscow Scholarships

The Natural Sciences and Engineering Research Council (NSERC) and the Canadian Mathematical Society (CMS) support scholarships at \$9,000 each. Canadian students registered in a mathematics or computer science program are eligible.

The scholarships are to attend a semester at the small elite Moscow Independent University.

MATH IN MOSCOW PROGRAM

www.mccme.ru/mathinmoscow

APPLICATION DETAILS

www.cms.math.ca/Scholarships/Moscow

Deadline September 30, 2012 to attend the Winter 2013 semester.

Bourse CRSNG-SMC Math à Moscou

Le Conseil de Recherches en Sciences Naturelles et en Génie du Canada (CRSNG) et la Société mathématique du Canada (SMC) offrent des bourses de 9,000 \$ chacune. Les étudiantes ou étudiants du Canada inscrit(e)s à un programme de mathématiques ou d'informatique sont éligibles.

Les bourses servent à financer un trimestre d'études à la petite université d'élite Moscow Independent University.

PROGRAMME MATH À MOSCOU

www.mccme.ru/mathinmoscow

DÉTAILS DE SOUMISSION

www.smc.math.ca/Bourses/Moscou

Date limite le 30 septembre 2012 pour le trimestre d'hiver 2013.

