



# CMS NOTES de la SMC

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## FROM THE PRESIDENT'S DESK

Jacques Hurtubise, *McGill University*



### We must have a plan.

About fifteen years ago, I had the pleasure of being one of those who helped Richard Kane get together a study of Mathematics in Canada. This study, combined with an external review, was part of an exercise prompted by NSERC's reallocation in the mid-nineties which had us ranked lowest of all the disciplines. Our efforts effected quite a turn around, not only in perceptions, which were indeed unfair, but in our own awareness of what we could do, and the study was an important element in getting together our strong institutional framework.

It was felt recently that it was time to do a bit of an update of this, mostly to survey the state of where we are, and as a vehicle for various elements of our lobbying efforts. It is not finished yet, but early results show a remarkable development. It is astounding how our community has evolved, and gained in strength. We have changed a lot; a whole new generation of actors are now on the scene.

It now turns out that this will again be pertinent in our dealings with NSERC, in a much more direct way than was originally planned. This turn of events was prompted by a decision to taper off the program which funds our institutional framework (BIRS, CRM, Fields, PIMS). The main purpose of this program is to fund major scientific infrastructure; mostly this means large and expensive equipment, which NSERC now feels should be the remit of the Canadian Foundation for Innovation (CFI). This left NSERC with the question of what to do with their four outliers.

Their answer was to invoke a precedent which has been used to good effect both in astronomy and in particle physics, that of developing a 'long range plan'. Our community is thus being asked to develop a long range plan for mathematics and statistics in Canada. The plan should examine our discipline, identify scientific trends, and propose the right structure of resources to develop the mathematics and the statistics. It should not, however, deal with individual allocations. The events fifteen years ago started with us taking a rather severe hit; this one starts on a very different, positive note, as we are being asked to show what we have done and what we want to do, perhaps boast a little, and shape our own futures. It has worked well for the astronomers and the physicists, so why not for us?

There are of course many issues. First some scientific ones: where is our discipline going? Getting some sense of this is important for explaining what we then want to do, not in the sense of only deciding to fund, say, number theory or geometry (mathematics in its own organic way has been doing very well on its own), but in giving the right structures. For example, a question of proportion: the mainstream (80% or so) individual funding of research is complemented by collective vehicles (the Institutes, BIRS), which have had a transformative effect (think of the increase in the number of post-doctoral fellows) and which have a remarkable record of leveraging additional resources from provinces, universities, and private sources, as well as foreign granting agencies. There is also the question of disciplinary outreach, and how this is to be managed, tied in to the end of

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## Quotes and mottoes

A friend of mine asked me how I sign off my e-mail and told me that she received one that signed off '*Audere est facere*' which is the motto of Tottenham Hotspur football club and means 'to dare is to do.' I replied that although I do not have the habit of signing off with mottoes, if I wished to do so I would write '*Wir müssen wissen. Wir werden wissen.*' (We must know. We shall know.), a well known saying of David Hilbert.

Witty sayings, profound and amusing passages about mathematics and mathematicians abound. There is a famous collection of these in [1]. The famous expression "God ever geometrizes" is attributed to Plato; an exact reference to it is hard to find. However, Jacobi changed it to 'God arithmetizes' and Kronecker expanded it to '*Die ganzen Zahlen hat Gott gemacht, alles andere ist Menschenwerk.*' (God gave the whole numbers, all else is work of man.)

A good quote at the head of an article sets the stage for a good introduction to the topic and creates interest for further reading. It is all the more so if the quote is well chosen and humorous to a certain extent: For example, a German article of Moszowski (1908) begins with: "After Pythagoras discovered his fundamental theorem he sacrificed a hecatomb of oxen. Since that time all dunces [Ochsen] tremble whenever a new truth is discovered." (In German vernacular a dunce or blockhead is called an ox.)

A quote from a non-mathematician but a famous author adds to the enjoyment of an article: for instance, "Ah! why, ye Gods, should two and two make four?" from *The Dunciad* of Alexander Pope. "The notion of infinity is our greatest friend; it is also the greatest enemy of our peace of mind" by James Pierpoint is a nice quote to head an article on Infinity.

Quotes by famous mathematicians are sure to enliven essays on mathematical topics. Here are a couple that I like: "In mathematics, you don't understand things. You just get used to them." (John von Neumann). "Everything should be made as simple as possible, but not simpler." (Albert Einstein). These quotes are short and sweet. Some authors prefer to use lengthy ones from Lewis Carroll, Galileo Galilei or from not so well known authors.

"Next to being witty yourself, the best thing is to quote another's wit." Christian Bovee.

[1] Robert Edward Moritz, *On Mathematics*. Dover 1942.

## Citations et devises

Une de mes amies m'a demandé ce que je mettais à titre de salutation à la fin de mes messages électroniques et m'a dit qu'elle en avait reçu un message qui se terminait par « *Audere est facere* », soit la devise du club de soccer Tottenham Hotspur signifiant « oser équivaut à faire ». Je lui ai répondu que je n'avais pas l'habitude de signer par une devise, mais que si j'avais à le faire j'écrirais « *Wir müssen wissen. Wir werden wissen.* » (Nous devons savoir. Nous saurons.), citation bien connue de David Hilbert.

Les expressions pleines d'esprit et les passages profonds et amusants au sujet des mathématiques et des mathématiciens sont très nombreux. On retrouve une collection bien connue d'expressions de la sorte dans [1]. L'expression populaire « Dieu géométrise toujours » est portée au crédit de Platon; une référence exacte à cette citation est difficile à trouver. Jacobi a toutefois changé l'expression, qui est devenue « Dieu arithmétise ». Quant à lui, Kronecker a tout élargi en disant « *Die ganzen Zahlen hat Gott gemacht, alles andere ist Menschenwerk.* » (Le nombre entier est l'œuvre de Dieu; tout le reste est l'œuvre de l'homme.)

Une bonne citation en tête d'article donne le ton, tient lieu de bonne introduction au sujet et incite le lecteur à poursuivre sa lecture. C'est surtout le cas si la citation est choisie à point et offre une pointe d'humour : par exemple, un article en allemand de Moszowski (1908) était introduit comme suit : « Lorsque Pythagore découvrit son théorème fondamental, il fit sacrifier une hécatombe de bœufs. Depuis, tous les ochsen (bœufs) tremblent chaque fois qu'une vérité est révélée. » (Dans le jargon allemand, un sot est appelé un bœuf.)

Une citation d'un auteur bien connu qui n'était toutefois pas mathématicien ajoute un peu d'humour à un article : « Oh! Pourquoi, dieux, deux et deux font-ils quatre? » du *The Dunciad* de Alexander Pope. « La notion d'infinité est notre meilleur ami; c'est aussi le pire ennemi de notre paix d'esprit » de James Pierpoint est une belle citation à mettre en tête d'article sur l'infinité.

Des citations de mathématiciens bien connus ne manqueront pas d'égayer des essais sur des sujets liés à la mathématique. Voici quelques citations que j'aime bien : « En mathématique, on ne comprend pas les choses. On s'y habite tout simplement. » (John von Neumann). « Tout devrait être rendu le plus simple possible, mais pas plus simple. » (Albert Einstein). Ces citations sont courtes et plaisantes. Certains auteurs préfèrent employer de longues citations, de Lewis Carroll, de Galilée ou d'auteurs moins bien connus.

« À défaut de pouvoir faire de l'esprit, le mieux est de citer les prouesses d'esprit d'un autre. » Christian Bovee.

[1] Robert Edward Moritz, *On Mathematics*. Dover 1942.

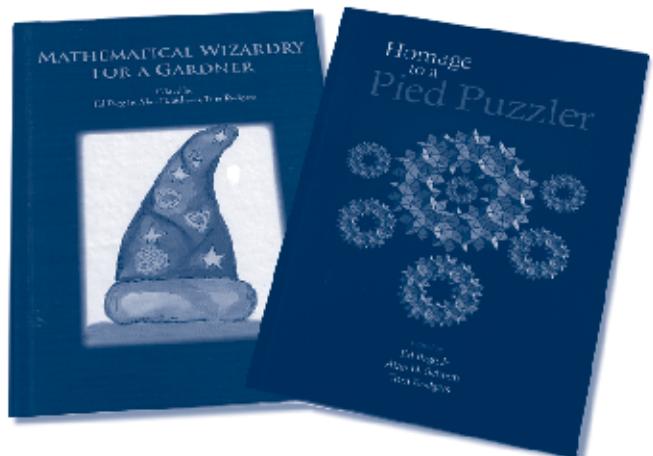
### **Mathematical Wizardry for a Gardner**

Edited by Ed Pegg Jr., Alan H. Schoen and Tom Rodgers  
A.K.Peters Ltd., Wellesley, MA 2009  
ISBN 978-1-56881-447-6 xx+262 pp. \$49.00 US

and

### **Homage to a Pied Puzzler**

Edited by Ed Pegg Jr., Alan H. Schoen and Tom Rodgers  
A.K.Peters Ltd., Wellesley, MA 2009  
ISBN 978-1-56881-315-8 xxviii+285 pp. \$49.00 US



Reviewed by Keith Johnson, Dalhousie University

Martin Gardner, probably the best and most influential writer about mathematics for a general audience in the 20th century, died May 22 at the age of 95. His best known writing was the mathematical games column in *Scientific American* which he wrote from 1956 to 1981. Many prominent professional mathematicians have cited this column as the critical factor in influencing them to pursue mathematics as a career. In addition to these columns, collections of which are being re-typeset and published by the Mathematical Association of America and which are also available complete on CD, Gardner wrote widely on puzzles, stage magic, philosophy and scientific skepticism. He was an avid debunker of pseudo scientific fads and theories and engaged in several long running controversies with promoters of these as a result of his uncompromising stance in this area.

While his books and columns have been very influential in mathematics Gardner was always careful to say that he was not a mathematician but rather a journalist or writer whose most frequent subject was mathematics. This distinction had two consequences. One was that while Gardner was not trained as a mathematician (his mathematical education at the University of Chicago stopped with calculus) he was trained as a philosopher and did not hesitate to criticize mathematicians writing about the philosophy of mathematics, defending the Platonist view if he felt it was being attacked. The other was that he remained somewhat aloof from the biennial conferences organized, since 1994, for the exchange of ideas on topics he had written about, attending only the first two of these. These Gatherings for Gardner (G4G) take place in even numbered years in Atlanta and have become a major forum for results in recreational mathematics and allied areas.

This brings us to the two books under review. While the Gatherings for Gardner started (as the name suggests) as informal meetings of Gardner enthusiasts, there were written versions of the talks preserved in many cases and as the meetings evolved demand for copies of these grew to the point where publication was appropriate. This has been done by A.K. Peters Ltd., who have in recent years taken a leading role in publishing material on recreational mathematics. The two books under review here mostly

contain material presented at the seventh conference (G4G7) held in 2006. There are 55 articles in total and they range widely in length, depth and topic. Almost all will hold some interest for the mathematically inclined reader and there are several in each volume that present serious, new mathematical results. Two examples of these (one from each volume) are an article by Derek Kisman, Richard Guy and Alex Fink titled *Patulous Pegboard Polygons* and an article by Peter Hilton, Jean Pedersen and Byron Walden titled *A Property of Complete Symbols*.

The pegboard article considers the problem of finding the convex polygon with the maximum number of sides whose vertices are dots in a square  $n$  by  $n$  grid for a given  $n$ . By considering the possible slopes of sides of the polygon this is translated into a number theory problem which the authors solve. They also solve the analogous minimum problem (the smallest grid containing a polygon with a given number of sides) and give asymptotic results including the 4th degree algebraic curve that the polygons approach in shape as  $n$  increases. The symbol article starts with the problem of using paper folding to produce a regular  $n$ -gon. Remarkably, this can be done up to any given degree of accuracy for any  $n$  with an algorithm the authors describe. The algorithm produces not only the convex polygons but the star shaped ones as well and the procedures involved can be indexed with certain 2 by  $m$  matrices for various  $m$ , the symbols of the title, which have some interesting number theoretic properties.

The books also contain a wealth of material about puzzles of various sorts ranging from descriptions of new puzzles (systems of gears and the crazy elephant dance) to historical accounts of classical puzzles (of Sam Lloyd and others) to accounts of designing puzzles for daily newspapers (the NAVIGATI puzzle, appearing in the Daily Mail).

A.K. Peters Ltd. has also published a collection of articles collected from an earlier Gathering for Gardner meeting under the title *The Mathemagician and Pied Piper*. While this is still available from A.K. Peters in bound form it has also been made available as a free download from the Gatherings for Gardner website (<http://g4g4.com/>) to encourage interest in recreational mathematics.

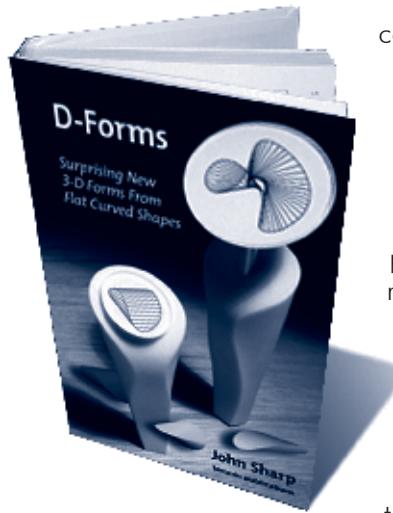
### D-forms: Surprising New 3-d Forms from Flat Curved Shapes

by John Sharp, 2009, Tarquin Publications,  
44 pp, £9.95, ISBN 978-1-899618-873

Reviewed by Peter Giblin, University of Liverpool

Take two convex planar pieces of paper with smooth boundaries of the same perimeter, and mark a point on each boundary. Now lift the paper out of the plane and identify the boundaries, starting at the two marked points, to form a surface in 3-space. The result is a D-form, a construction pioneered by the designer Tony Wills, of Wills–Watson Associates [5, 7]. An example is given by taking two pieces bounded by congruent ellipses, but choosing differently situated starting points on the two pieces, and sometimes the definition is relaxed to allow the pieces to have corners, or not to be convex. The general construction, even for the original definition, bristles with mathematical problems: will the curved sheets made from the two surface pieces have creases; is the surface obtained unique and rigid; is it the boundary of a convex solid, even the convex hull of a space curve; how can one compute the surface given the two planar pieces? – and so on. The book under review is happily free from such considerations. There is a pleasant discussion of developable surfaces – that is, surfaces formed from a flat sheet by bending, as classified by Euler and Monge in the eighteenth century into tangent developables of space curves (envelopes of one-parameter families of planes), together with cones and cylinders. This is followed by descriptions and photographs of D-forms, including ones made in stainless steel by Tony Wills. There are detailed instructions on how to assemble the D-forms (made from paper), using tabs to stick the boundaries together. They have names, such as the Wobbler and the Squaricle. The second half of the book is devoted to shapes to cut out and make your own D-forms. The book is a delightful example of a simple and highly imaginative idea which can be carried out in practice and can teach some nice mathematics at the same time.

One of the first publications in the technical literature to draw attention to D-forms is the 2001 book of Pottmann and Wallner [4, p. 418], in which the authors describe some of the differential-geometric problems associated with the construction. Since then there has been a good deal of progress on these problems. A recent reference is [2]. In this article the authors consider making surfaces with planar pieces having smooth ( $C$ ) boundaries, allowing just a single piece with equal-length parts of the boundary identified (a ‘pita-form’), or several pieces meeting along seams (a ‘seam-form’), with D-forms the special case of two pieces. They show, with appropriately precise definitions of all the terms, that every seam-form is the



convex hull of its seams and vertices (endpoints of seams), and that there are no creases on the developable parts of a D-form – the parts made from the flat planar pieces. Pita-forms have at most one crease. There is also a report of progress [3] on the computational problem, and its connexion with the Alexandrov–Pogorelov theorem which guarantees a unique convex embedding in 3-space.

There is also an interesting local problem of taking a planar region with a smooth boundary  $G$  and fitting this boundary locally along a given space curve  $\gamma$ . This turns out to be always possible provided  $\gamma$  is ‘more curved’ than  $G$ , and furthermore there are exactly two ways to do it. See the elementary but elegant article [6] and also [4, p. 417]. Of course D-forms show that these results are definitely local; indeed the main mathematical, and visual, challenges of D-forms lie in their very interesting global structure. Among the websites devoted to D-forms I recommend [1].

### References

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4. H. Pottmann and J. Wallner, *Computational Line Geometry* (Springer, Berlin, 2001).
5. R. Sarhangi (ed.), *Proceedings of the 1998 Bridges Conference on Mathematical Connections in Art, Music, and Science* (Southwestern College, Winfield, Kansas) 503–510.
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7. [www.wills-watson.co.uk](http://www.wills-watson.co.uk)

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## Hilbert Transforms, Volumes 1 and 2

By Frederick W. King

Encyclopedia of Mathematics and its Applications, 124 and 125

Vol 1: xxxviii + 858pp, US \$ 144; Vol 2: xxxviii + 660 pp,

US \$135 Cambridge University Press 2009

Many of the common integral transforms can be written in the form  $g(x) = \int k(x,y)g(y)dy$ , where the integral is taken over  $(-\infty, +\infty)$ ;  $k(x,y)$  is called the kernel function. The Hilbert transform on the real line is defined by  $H(f(x)) = P \int k(x,y)f(y)dy$  with  $k(x,y) = 1/[\pi(x-y)]$ , for all real  $x$ , where  $P \int$  denotes an extension of the normal definition of the integral called the Cauchy Principal Value.

Such transforms arise widely in a variety of applications including problems in aerodynamics, condensed matter physics, optics, fluids, and engineering.

The two volumes contain a thorough discussion of all the common Hilbert transforms, mathematical techniques for evaluating them, and a detailed discussion of their applications. Especially valued features are the tabulation of analytically evaluated Hilbert transforms, and an atlas that readily illustrates how the Hilbert transform alters a function, thus providing useful and convenient resources for researchers. The two volumes together contain 23 chapters. The first volume contains the first 14 chapters; it covers the background mathematical ideas and considers Hilbert transforms of basic functions, dealing with analytic and numerical aspects. In the second volume the basic theory is extended to generalized functions and treats applications to systems theory, signal processing and optics. A collection of exercises is appended to each chapter. The bibliography is an extensive collection of references to both classical mathematical papers and to a diverse array of applications.

## Aggregation Functions

By Michel Grabisch, Jean-Luc Marichal, Radko Mesiar  
and Endre Pap

xvii + 460 pp, US \$ 120. Cambridge University Press 2009

Aggregation is the process of combining several numerical values into a single representative value, and an aggregation function performs this operation. These functions arise wherever aggregation information is important: applied and pure mathematics (probability, statistics, decision theory, functional equations), operations research, computer science and many applied fields such as economics and finance, pattern recognition and image processing, data fusion. The classes of aggregation functions covered in this book include triangular norms and co-norms, copulas, means and averages, and those based on non-additive

integrals. The properties of each method, as well as their interpretation and analysis, are studied in depth, together with construction methods and practical identification methods. Special attention is given to the nature of scales on which values to be aggregated are defined (ordinal, interval, ratio, bipolar). The book contains a comprehensive, rigorous and self-contained exposition of aggregation functions. It will be useful to both graduate students and researchers.

## Stability and Stabilization: An Introduction

By William J. Terrell

xv +457 pp; US \$70. Princeton 2009

This book is a text on stability theory and applications of systems of ordinary differential equations. It covers a portion of the core mathematical control theory, including the concepts of linear systems theory and Lyapunov stability theory for nonlinear systems with applications to feedback stabilization of control systems.

Stability theory provides core techniques for the analysis of dynamical systems. J. Clerk Maxwell's feedback control study of a steam engine governor was probably the first modern analysis of a control system and its stability which can be said to have begun with Lyapunov's work in 1892. The problem of feedback stabilization of equilibria is a core problem of mathematical control theory.

After a couple of chapters on introductory mathematical background, chapters 3 to 7 deal with state space framework of linear systems theory. Chapters 8 to 16 are on nonlinear systems. Exercises are provided at the end of each chapter. There are six appendices dealing with basic analysis, ordinary differential equations, manifolds, Frobenius theorem, comparison functions and their use in differential



## 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](mailto: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](mailto:notes-lettres@smc.math.ca).

## BRIEF BOOK REVIEWS *continued*

equations; the final appendix contains hints and answers to selected exercises. The book will be useful for advanced undergraduates and beginning graduate students.

### Robust Optimization

By Aharon Ben-Tal, Laurent El Ghaoui  
and Arkadi Nemirovski  
xxii + 542 pp, US \$65 Princeton 2009

Robust optimization is a specific and relatively novel methodology for handling optimization problems with uncertain data. The data of real world optimization problems are uncertain more often than not – not known at the time the problem is being solved. One cannot ignore the possibility that even a small uncertainty in the data can vitiate the nominal optimal solution to the problem from a practical point of view. Thus a need for a methodology capable of detecting cases arises; robust optimization fills this need.

The book starts with a relatively simple treatment of uncertain linear programming, proceeding with a deep analysis of interconnections between the construction of appropriate uncertainty sets and the classical chance constraints (probabilistic) approach. It then develops the robust optimization theory for uncertain conic, quadratic and semi-definite optimization problems and dynamic (multistage) problems. The theory is supported by numerous examples and computational illustrations.

The authors have been the principal developers of the subject; the book includes their main achievements of a decade of research. The book can be used as a graduate text.

### NOTES DE LA SMC

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#### RÉDACTEURS EN CHEF

Robert Dawson, Srinivasa Swaminathan  
notes-redacteurs@smc.math.ca

#### RÉDACTEUR-GÉRANT

Johan Rudnick  
jrudnick@smc.math.ca

#### RÉDACTION

Éducation : John Grant McLoughlin et Jennifer Hyndman  
notes-education@smc.math.ca  
Critiques littéraires : Keith Johnson  
notes-critiques@smc.math.ca  
Réunions : Gertrud Jeewanjee  
notes-reunions@smc.math.ca  
Assistante à la rédaction : Laura Alyea

Note aux auteurs : indiquer la section choisie pour votre article et le faire parvenir au Notes de la SMC à l'adresse postale ou de courriel ci-dessous.

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#### EDITORS-IN-CHIEF

Robert Dawson, Srinivasa Swaminathan  
notes-editors@cms.math.ca

#### MANAGING EDITOR

Johan Rudnick  
jrudnick@cms.math.ca

#### CONTRIBUTING EDITORS

Education: John Grant McLoughlin and Jennifer Hyndman  
notes-education@smc.math.ca  
Book Reviews: Keith Johnson  
notes-reviews@smc.math.ca  
Meetings: Gertrud Jeewanjee  
notes-meetings@smc.math.ca  
Editorial Assistant: Laura Alyea

The Editors welcome articles, letters and announcements, which can be sent to the CMS Notes at the address below.

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**Canadian Mathematical Society - Société mathématique du Canada**  
105-1785 Alta Vista Drive Ottawa, ON, Canada K1G 3Y6 T: (613) 733-2662 F: (613) 733-8994  
notes-articles@cms.math.ca | www.smc.math.ca www.cms.math.ca  
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# Letter to the Editor



Dear V. Kumar Murty,

After reading your article, "Mathematics in a Changing World" in the March/April 2010 edition of CMS Notes, I would like to correct the statement that "...NSERC is trying to decrease the success rate on Discovery grants."

NSERC does not have a policy related to success rates. We have, however, recently implemented the recommendations of the Discovery Grants program's two major review committees. One recommendation was to separate the process of scientific merit assessment and grant budget level assignment. In doing so, two principles were fundamental. One, that the level of a grant should be commensurate with scientific merit. Second, that within a given discipline group, proposals with similar scientific merit should have similar grant level regardless of the applicant's granting tenure within NSERC. It is as a consequence of applying these principles that the success rate decreased, rather than as a matter of policy.

NSERC's goals include supporting the most productive researchers in Canada at levels that are internationally competitive and ensuring that the value of grants is not eroded over time. Any unsuccessful applicant can return the following year with a new proposal that can be funded, provided that it is sufficiently strengthened to meet the bar of excellence as assessed by their peers.

I would like to bring to your attention that, at NSERC's request, the Canadian mathematics and statistics communities will be conducting a collaborative long-range planning (LRP) exercise over the next 15 to 18 months. The exercise will include broad consultation, identifying areas of strength and establishing a unified vision of priorities and directions for mathematics and statistics research in Canada. The resulting plan will inform the Mathematics and Statistics Evaluation Group of the priorities for current and emerging areas, thereby allowing for the best use of resources to advance the work of the communities as a whole.

Key partners in this process include the Canadian Mathematical Society, the Canadian Applied and Industrial Mathematics Society and the Statistical Society of Canada, as well as the three Mathematical Institutes (the Pacific Institute for the Mathematical Sciences, the Centre de recherches mathématiques and the Fields Institute) and the Banff International Research Station.

Currently, the Mathematics and Statistics-NSERC Liaison Committee is working with the communities to establish a steering committee that will develop Terms of Reference that reflect how the communities at large will be consulted and discuss how their input will be incorporated into the final LRP report.

For more information, please contact Anne-Marie Thompson, NSERC's Director of Physical and Mathematical Sciences, at [anne-marie.thompson@nserc.crsng.gc.ca](mailto:anne-marie.thompson@nserc.crsng.gc.ca) or 613 943 7651.

**Isabelle Blain**  
Vice-President  
Research Grants and Scholarships Directorate  
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## Reflections on Experiences Teaching Mathematics in the Trinidad and Tobago/UNB B.Ed. Programme

Written by John Grant McLoughlin, University of New Brunswick

Currently I am teaching my ninth mathematics course in the University of New Brunswick's (UNB) Bachelor of Education (B.Ed.) Programme offered in Trinidad and Tobago (T&T) through a partnership with Roytec and University of the West Indies. My initial experience in this program was in 2003 with a class of about 25 students. The second offering was in 2005 with an enrollment of over 50 students. Students in classes up to this point were part of a "continuous intake" that allowed students to start the degree with any course. All students converged at Roytec in Port of Spain for the one week intensive that became known as the "face to face" component of the "maths block", a course that would continue in an online format using WebCT. It was the subsequent offering in 2006 that was the first of many to be offered in the new cohort model. The tremendous growth in enrolment came about through an announcement that the tuition fees for all T&T students would be paid by the government to ensure that elementary teachers in Trinidad and Tobago would earn degrees in education. The program continues today with this model in which regional cohorts (North, Central, South, Tobago) proceed through the B.Ed. via courses initiated at a regional site and completed via online format - Blackboard in recent years. In this article I will write about my experiences in these courses. Typically they have about 60 students, with the exception of the recently graduated initial South cohort of 82 students and the Tobago sections that tend to be smaller.

### Who are the students?

The students are fulltime teachers in primary grades in Trinidad and Tobago. A prototypical student would be a woman (likely 85%+ of the students) in her mid-late 30's with about 15 years in the teaching profession who completed a two year Teacher's Diploma in a Teacher's College early in her career. (UNB awards students with approximately one-third of the B. Ed. degree credits for this certificate.) The students represent a cross-section of the population in T&T. Many teach in denominational institutions including Anglican, Hindu, Seventh Day Adventist, Roman Catholic, Moslem and Presbyterian schools, whereas, others teach in government schools or private schools. Almost all of the schools are publicly funded. One notable exception is the Maple Leaf School that uses the Ontario curriculum. Virtually all of these teachers grew up in the country and have graduated from the school system in which they now teach.

### What is the context for elementary (primary) education in Trinidad and Tobago?

The education system is an exam driven one with the culmination of primary education being the Secondary Entrance Assessment (SEA) Exam administered in Standard Five for children around age 12. The results on this exam determine where a student attends for secondary school.

Recently the Ministry of Education has implemented national tests in mathematics in both Standards One and Three. Teachers are under great pressure to provide support for high levels of achievement in a country that has large variation in resources and socioeconomic circumstances from school to school and region to region. Many students fail grades and hence, there may be a two or three year age range in a class. Most classes have individual class teachers. Many schools employ a "looping" model for Standards Four and Five. That is, a teacher who is assigned the Standard Four class is expected to continue with the class to prepare them for the SEA about 1.5 years later in March of Standard Five. Several of the teachers have been doing this two-year cycle for many years. It should be pointed out that students in the SEA level typically spend, with their teacher, an additional one to two hours in after school instruction daily during Standards Four and Five.

### Observations

Some themes have become apparent to me through working with approximately 500 teachers in Trinidad and Tobago. The relatively uniform experiences of the collective have brought patterns to the forefront. Here I attempt to articulate a personal interpretation of what has been observed and how that has figured into the course planning.

Two positive attributes that these teachers bring to the student experience are reflected in their dispositions and mathematical skills. The healthy disposition comes through in an eagerness to learn and a climate of respect for myself, as an instructor, and their peers as colleagues. My efforts to respect the students in return have had a positive impact, as described by Wendy Gajadhar:

As educators, we sometimes do not take the time to offer gentle critiques but John has treated us with utmost respect and this was a reminder to many of us to extend the same to our kids at school. Personally, I have become a better listener and I have allowed my students to offer different solutions to problems, although it can be time-consuming.

Courtesy and gratitude have been consistent throughout the times together. Mathematically these teachers are skilled - unknowingly to themselves in many cases - as they demonstrate fluency with basic operations, mental mathematics, relevant vocabulary, and the procedures required to execute mathematical calculations. My observations about the high level of fluency surprise them as many associate strongly with their negative experiences in this regard.

The fluency comes with a flipside, however. Few of the teachers understand the mathematical principles underlying

the procedures. By comparison, my students at UNB would be weaker procedurally in that a significant number of the prospective elementary teachers are uncomfortable with doing mathematics in several areas such as fractions. The students at UNB are likely to have been exposed to elements of conceptual understanding, and will reflect a wide range on any scale of conceptual understanding. Hence, some students are strong procedurally and conceptually. The reality is that several are weak on both fronts. Teaching in Trinidad and Tobago has brought with it a novelty of meeting large groups of teachers who almost universally are procedurally strong and conceptually weak. The conceptual weakness is different, however, in that they have not been invited to understand the mathematical principles. Some students in each class speak to conceptually enriching experiences as part of their teacher's college courses. Few, if any, mention understanding as part of their school experience.

It is not that these teachers do not understand any of the mathematics. Instead it appears that this understanding has emerged since entering the teaching profession. The teaching experiences of these teachers have offered them conceptual understanding in some topics that they work with regularly; though it is fair to say that the examination driven system has neither provided time nor value for this place as of yet.

### Pedagogically meeting the reality

The respectful climate and the sound mathematical bases allow for us to genuinely delve into the conceptual aspects of elementary mathematics without worries that some people are stuck, for example, on adding two fractions. Methodologies shared in the course are generally geared to bridging elements of the conceptual gaps. Some ways that this challenge is met are briefly outlined here:

- *Mathematical manipulatives:* Concrete materials such as base ten blocks, geoboards, tangrams, cuisenaire rods, and pattern blocks are integrated into the teaching of topics ranging from area and perimeter to fractions or the basic operations with whole numbers.
- *Games and puzzles:* A variety of mathematical games are played to address particular areas. Also, puzzles such as KenKen and Kakuro have been shared to strengthen logical reasoning and mental mathematics.
- *Problem Solving:* Problems and challenges are placed before the students several times each day. The skills involved in solving the problems are not a concern. Rather it is the nonroutine nature of the problems posed as well as the development of mathematical communication that are central to this experience. The significance of problem

solving is expanded upon in the subsequent section concerning the online component.

### Transitioning from "Face to Face" to the Online Component

#### The Face to Face Component

The comments to this point in the article have focused mainly on the "face to face" component of the course. Typically we spend five days together doing mathematics. My primary objectives in the face to face component consist of two streams: the mathematical environment for teaching and learning, and the personal connections - individually and collectively.

The time together offers an opportunity to demonstrate and engage in a learning climate that values communication, works with errors, and shifts the attention away from a textbook and lecture only model. The uniformity of the collective experience raises itself again as the experiences in the class are not what they have come to expect in mathematics. More than a few students have commented that in Teacher's Training College this was explained to them but the lecture continued without offering insight into the actual unfolding of the theory. The experience in Teacher's Training College was focused on theory and content rather than equipping teachers with problem solving skills, methods and strategies to be used in teaching content. The emphasis was reflected in the evaluations with three-hour end of term tests every three months for two years and time given to mock exams. These exams tested procedures and methods rather than conceptual understanding. Teachers used more formulas, rote learning, and drills as opposed to actual logical reasoning, thus, heightening students' anxiety in Maths. Catering for students with multiple intelligences was not emphasized as it is at present.

Personally it is important for me to learn the names of the students and also to have individual conversations with most of the students. The latter point is particularly important for those who are carrying great anxiety about mathematics (about ten in each class). Many students have associated mathematics with corporal punishment as errors were punished in this manner during their schooling. One student mentioned that "The only manipulative her math teacher had in class was a whip."

My course opens with a series of activities geared to get a sense of who these students are and what mathematics they bring with them. The term *informal assessment* is used to describe this overarching idea. (The informal assessment idea is elaborated upon in detail in Grant McLoughlin, 2009). One component is a requirement for students to prepare a brief autobiography outlining one or two

snapshots from their mathematical story that shed light on how they see mathematics. This submission typically identifies teachers who need to be spoken to about their anxiety levels or circumstances relevant to the term ahead. Such conversations are critical to making the time together more effective. Essentially the entire week is dedicated to facilitating human interaction in an environment conducive to doing mathematics openly while engaging in an experience that upsets the way the students may have neatly boxed the discipline - whether that was easy or not. With respect to this unsettling idea, I share an example from my recent teaching of a cohort in 2009. Kristal Yarde, a student, surprisingly wrote of the value of confusion in her reflection on the opening week of this course. She writes with respect to a problem solving experience:

The problem appeared to be simple yet difficult all at once. I felt like an ant after a naughty child destroyed my home. I was dazed, confused and wanting to find safety! Strangely, I welcomed this feeling of uncertainty. Would I solve it or wouldn't I? It was at that instance, when I realized that I held distorted perceptions of what was a problem and which methods I could use in solving a problem. I began to appreciate the fact that a problem could have many forms. It could be an activity or a task which needs solving where there is more than one specific method for solving it. As in the aforementioned problem, my welcomed state of confusion led me to use an alternative method of solving.

### Online component

The online component builds upon our collective experience in that the time together has ideally set the tone for the course. Pedagogically the emphasis is placed on problem solving for the first month to six weeks. Typically two or three problems, or an organized set of problems such as a Gauss Contest, for example, are posted midweek with the discussion of these problems not opening until the following weekend, as in more than a week later. This provides ample time for students to access and try the problems before contributing to the respective discussions. The groups form themselves based upon the day that one posts to the discussions. Hence, each group is likely to have about 20 people, the composition of which can change weekly.

Why problem solve so much? The teachers learn so much mathematics this way in that they can do the math. The richness comes from realizing that a problem about remainders may have a connection to lowest common multiples; or by seeing a pictorial solution to a problem one solved algebraically; or by encountering a misconception. The variety of approaches in solutions and the mathematical underpinnings of problems are emphasized. Some problems are not discussed online but rather assigned for direct mail messages to me only. There is a mathematical anxiety group set up as the lone locked group in the course, thus, providing

a safe place for students to ask questions or express anxieties only to be viewed by the small group of others with serious mathematical concerns.

The reality is that these teachers have never before engaged in mathematical problem solving where the problem is different than all others they have seen in style, and the solution is not expected to be forthcoming quickly as a result of executing a particular procedure. The comments of Vijay Singh validate this perception.

The underlying principle of local teachers on problem solving prior to the face to face was that there is a special procedure or formula to solve problems; this definitely changed. We can now solve real problems (without scaffolding for each one as we are accustomed to two step problems). Imagine that you are given a worksheet entitled 'Two step problems' - Stifling isn't it.

The experience of doing mathematics this way has been a pivotal point of growth. The fact that about 500 teachers have experienced this is affecting the culture of mathematical teaching and learning at the ground level.

The online component extends beyond problem solving into various topics of discussion ranging from common concerns such as assessment to topics designed for particular audiences such as teaching for infants (kindergarten) or elective discussions such as one on probability. The course is designed to shift from the collective toward the individual, thus, giving students increased liberty as the course progresses to move their attention to personal areas of interest without affecting others. The problem-solving portion is the one online experience that requires full participation in terms of both contributing and reading postings.

### Implications

The students in these courses are teachers with personal contexts that have local particularities affected by the parent community, the school's history, and such factors. Frequent visits and numerous communications tell me that the UNB experiences of these students have affected mathematical culture in their school communities. It would be another task to document those changes. Wendy Gajadhar, a teacher with over 25 years experience responded to a question as to what should be mentioned in this piece. Wendy stressed the interest and motivation generated by the teachers as a result of participation in the mathematics course. She emphasized the five day experience at the outset of the course.

The many approaches, together with the hands-on activities made a difference in the learning experience. It was a novel way of assisting the teachers in connecting maths to real-life situations. The idea of using different manipulatives to stimulate students' interest and increase participation will not go unnoticed. The ingenuous ways

in which these manipulatives were used to teach different strands in maths effectively was evident in the application in the classroom. The use of games made maths exciting and captured our interest. Most teachers if not all are creating the maths mood at the beginning of each session in maths.

The final point refers to a practice in the course of opening the day and following each break with a problem to centre the group as a whole. Teachers now are taking this idea into their practice. Many teachers have commented on its benefits including learning, classroom discipline, and the enhanced awareness of the teachers themselves with respect to processes and forms of solutions. Wendy proceeds to note that "(c)hildren are now changing their mathematical thinking and view of maths because they are working collaboratively in groups eagerly trying to arrive at solutions to maths problems. They share the different ways of solving problems and value their colleague's suggestions in problem solving."

The value of the course and its effect on practice resonate in Wendy Gajadhar's words:

Preparation for SEA is rigorous for students; however, my new vision in the delivery of maths is more student-oriented. A wider variety of manipulatives encouraged weaker students to understand mathematical concepts. Maths is the most heavily weighted section of the SEA exams so receiving the gift of being more proficient in teaching the different strands in the maths curriculum has made a significant change in the students' response to maths. Many of them who come to the classroom with a feeling of intense fear have been stimulated and motivated because of the approach to maths. Providing a repertoire of teaching methods, manipulatives and strategies that encompass the multiple intelligences of students to solve problems made a remarkable difference

in achieving a mathematical climate that will endure. Teachers who have completed this block have been grateful for this rewarding experience.

### Closing comments

The reflections here pertain to my own experience. I have learned so much from the work with teachers in Trinidad and Tobago. The opportunity to dialogue and communicate with some of these people over several years has enriched my perceptions and my teaching. This column is shared in a spirit of gratitude to the many teachers in Trinidad and Tobago with whom I have crossed paths since 2003. The comments are true to my perceptions. Others would tell a different story. I trust that the words here honour the respectful and caring spirit that has been bestowed upon me. I look forward to traveling in December 2010 to meet a tenth group of teachers as UNB students. The learning continues for me.

### Acknowledgments

The author is grateful to Wendy Gajadhar and Vijay Singh for feedback and contributions to the article and to Krystal Yarde for permission to use her quote. The numerous conversations and insights shared by Wendy, Vijay, and others including in particular, Dayanan Ramsaran, have informed my understanding and perceptions of mathematics (education) in Trinidad and Tobago.

### Reference

Grant McLoughlin, J. (2009). Biography: Meeting simply in complexity. In S. Bell, L. Best, D. Creelman, K. Craft, D. Roach, and D. Ross (Eds.), *Atlantic Universities Teaching Showcase Proceedings (Vol. XII)*, Oct. 24, 2008, Saint John, NB, pp.147-158. Retrieved online July 12, 2010 at the link [www.atlanticuniversities.ca/AbsPage.aspx?siteid=1&lang=1&id=1223](http://www.atlanticuniversities.ca/AbsPage.aspx?siteid=1&lang=1&id=1223)

## 2011 CMS MEMBERSHIP RENEWALS RENOUVELLEMENTS 2011 À LA SMC

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## CALL FOR SESSIONS – APPEL DE SESSIONS RÉUNION D’ÉTÉ SMC 2011 CMS SUMMER MEETING

We welcome and invite proposals for sessions for this meeting in Edmonton, Alberta (June 3-5, 2011). 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 Directors by the deadline below.

**Deadline: September 30, 2010**

Nous vous invitons à proposer des sessions pour la réunion qui se tiendra à Edmonton (Alberta) du 3 au 5 juin 2011. 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, l'adresse courriel et les autres coordonnées de l'organisateur. Toutes les sessions seront annoncées dans les *Notes* de la SMC, sur le site web et dans les *Notices* de l'AMS. Les conférenciers devront présenter un résumé qui sera publié sur le site web et dans le programme de la Réunion. Toute personne qui souhaiterait organiser une session est priée de faire parvenir une proposition aux directeurs de la Réunion avant la date limite indiquée ci-dessous.

**Date limite : 30 septembre 2010**

### Scientific Directors / Directeurs scientifiques :

#### **Volker Runde**

vrunde@ualberta.ca, (780) 492-3526  
Department of Mathematical and Statistical Sciences  
University of Alberta, Edmonton, Alberta T6G 2G1

#### **Hassan Safouhi**

hassan.safouhi@ualberta.ca, (780) 485-8631  
Campus Saint-Jean  
University of Alberta  
8406, rue Marie-Anne-Gaboury (91e rue)  
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### The following sessions have been confirmed for this conference:

#### Les sessions suivantes ont été confirmées :

##### **Applicable Harmonic Analysis and Approximation Theory**

##### **Analyse harmonique appliquée et théorie d'approximation**

Org: Bin Han (Alberta)

##### **Asymptotic Geometric Analysis and Convex Geometry**

##### **Analyse géométrique asymptotique et géométrie convexe**

Org: Alexander Litvak, Nicole Tomczak-Jaegermann, Vlad Yaskin (Alberta)

##### **Banach Spaces and Operators Between Them**

##### **Espaces de Banach et des opérateurs entre eux**

Org: Edward Odell (Texas), Thomas Schlumprecht (Texas A&M), Vladimir Troitsky (Alberta)

##### **Computational Partial Differential Equations**

##### **Équations différentielles computationnelles**

Org: Youssef Behlhamedia, Peter Minev (Edmonton)

##### **Dynamical Systems**

##### **Systèmes dynamiques**

Org: Arno Berger, Hao Wang (Alberta)

##### **Plenary Lectures / Conférences plénier**

Leah Edelstein-Keshet (University of British Columbia)

Olga Holtz (UC Berkeley; TU Berlin)

François Lalonde (Université de Montréal)

Bjorn Poonen (MIT)

Roman Vershynin (University of Michigan)

##### **Geometry and Physics**

##### **Géométrie et physique**

Org: Charles Doran, Vincent Bouchard (Alberta)

##### **Lie Theory**

##### **Théorie de Lie**

Org: Terry Gannon, Nicolas Guay (Alberta)

##### **Mathematical Finance**

##### **Finance mathématique**

Org: Tahir Choulli, Alexander Melnikov (Alberta)

##### **New Mathematical Tools for the Modeling of Cellular Processes**

##### **Nouveaux outils mathématiques pour modélisation des processus cellulaires**

Org: Thomas Hillen (Alberta)

##### **Operator Algebras**

##### **Algèbres d'opérateurs**

Org: George Elliott (Toronto), Cristian Ivanescu (Edmonton)

# RÉUNION D'HIVER SMC 2010 CMS WINTER MEETING

December 4 - 6, 2010  
Vancouver, British Columbia  
[www.cms.math.ca](http://www.cms.math.ca)

Du 4 au 6 décembre 2010  
Vancouver (Colombie-Britannique)  
[www.smc.math.ca](http://www.smc.math.ca)

The Canadian Mathematical Society (CMS) and the University of British Columbia invite the mathematical community to the **2010 CMS Winter Meeting**. The program will run from Saturday to Monday and include ten plenary and prize lectures, and a wide variety of scientific sessions.

All scientific and social events will be taking place at the Coast Hotel & Suites in Vancouver.

Several events are planned for students: A student social, a panel discussion and a poster session. Details will be available on the website shortly.

## Early Bird Registration – Deadline: September 30

To qualify for the discounted Early Bird registration fee, the registration form and payment have to be received by the deadline.

## Accommodation – Deadline: October 30

We have secured discounted rates at the Coast Hotel & Suites; the rates may no longer be available after the deadline.

## Travel

Air Canada is the Official Canadian Airline for this event, offering special discounts to delegates attending the CMS Winter Meeting for travel to and from Vancouver between November 25 and December 13. The Promotion Code C4PN43M1 has to be entered during the booking.

**Student Subsidies** - We encourage the participation of students at the Meeting. With the support of CRM, the Fields Institute, MITACS, PIMS and the University of Lethbridge (Jiping [Jim] Liu Memorial Travel Fund), grants are available to partially fund the travel and accommodation costs for bona fide graduate students at a Canadian or other university. Preference is given to Canadian students. To apply for this funding, applicants should submit a letter written by their supervisor or departmental graduate advisor, providing the following: name of student, area of study and level, how the student will benefit from the meeting, whether or not the student be speaking, and what support is available from other sources.

We look forward to welcoming you in Vancouver!

La Société mathématique du Canada (SMC) et l'Université du Colombie-Britannique invitent la communauté mathématique à la Réunion d'hiver 2010 de la SMC. Au programme du samedi à lundi : dix conférences (plénières, publique et de lauréats) ainsi qu'une grande diversité de sessions.

La Réunion se tiendra à l'hôtel Coast Plaza Hotel & Suites.

Plusieurs activités sont prévues pour les étudiants : activité sociale, discussion en groupe, et séance de présentation par affiche. Les détails suivront sur le site web sous peu.

## Préinscription – Date limite : 30 septembre

Pour avoir droit au tarif réduit de préinscription, le formulaire d'inscription accompagné du paiement doivent nous parvenir au plus tard à la date limite.

## Hébergement – Date limite : 30 octobre

Nous avons négocié des chambres à tarif réduit au hôtel Coast Hotel & Suites; il se peut que le tarif réduit ne soit plus offert après la date limite.

## Déplacement

Air Canada est le transporteur aérien officiel canadien de cette rencontre. Il offre une réduction aux personnes qui assisteront à la Réunion d'hiver de la SMC et voyageront à destination ou en provenance de Vancouver entre le 25 novembre et le 13 décembre. Il faut entrer le Code de promotion C4PN43M1 au moment de la réservation.

**Aide financière** - Nous encourageons la participation des étudiants à la Réunion. Grâce au soutien financier du CRM, de l'Institut Fields, du Réseau MITACS, du PIMS et de l'Université de Lethbridge (fonds Jiping [Jim] Liu), les étudiants diplômés du Canada ou de l'étranger peuvent se faire rembourser une partie de leurs frais de déplacement et de séjour. La préférence est toutefois accordée aux étudiants canadiens. Toute demande de financement doit être accompagnée d'une lettre du superviseur de l'étudiant ou de la personne responsable des études supérieures de son département, dans laquelle il ou elle indiquera le nom de l'étudiant, son domaine et son niveau d'études, en quoi la Réunion sera profitable à l'étudiant, si l'étudiant présentera une communication et si l'étudiant a accès à d'autres sources de financement.

*Au plaisir de vous accueillir à Vancouver!*

# RÉUNION D'HIVER SMC 2010 CMS WINTER MEETING

## Prizes and Awards / Prix

Prix Krieger-Nelson Prize - Lia Bronsard (McMaster)  
 Doctoral Prize / Prix de doctorat - to be determined / à venir  
 Prix Adrien-Pouliot Award - to be determined / à venir  
 Prix G. de B. Robinson Award - to be determined / à venir  
 David Borwein Distinguished Career Award / Prix David-Borwein de mathématicien émérite pour l'ensemble d'une carrière - Nassif Ghoussoub (UBC)

## Public Lecture / Conférence publique

Ron Graham (UC-San Diego)

## Plenary Speakers / Conférences plénierées

David Aldous (UC-Berkeley)  
 David Donoho (Stanford)  
 Sujatha Ramdorai (Tata Institute; UBC)  
 Peter Sarnak (Princeton)  
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Thursday   Jeudi December 2 décembre	Saturday   Samedi December 4 décembre	Sunday   Dimanche December 5 décembre	Monday   Lundi December 6 décembre
18:00-22:00 <b>Executive Committee Meeting</b>	8:00 – 16:00 - <b>Registration</b> 9:30 – 16:00 - <b>Exhibits</b> 9:30 – 16:00 - <b>Student Poster Session</b>	8:00 – 16:00 - <b>Registration</b> 9:30 – 16:00 - <b>Exhibits</b>	8:00 – 14:00 - <b>Registration</b>
	8:15 – 8:30 <b>Opening/Ouverture</b>	8:00 – 10:00 <b>Scientific Sessions</b>	8:00 – 9:30 <b>Scientific Sessions</b>
	8:30 – 9:15 <b>Plenary Lecture</b>	9:30 – 10:15 <b>Plenary Lecture</b>	9:30 – 10:15 <b>Plenary Lecture</b>
	9:30 – 10:00 Break	10:00 – 10:30 Break	10:15 – 10:30 Break
<b>Friday   Vendredi</b> December 3 décembre	10:00 – 11:30 <b>Scientific Sessions</b>	10:30 – 11:15 <b>Plenary Lecture</b>	10:30 – 11:15 <b>Plenary Lecture</b>
11:00 AM – 13:00 <b>Development Group Luncheon</b>	11:30 – 12:15 <b>A. Pouliot Award Lecture</b>	11:30 – 12:15 <b>Krieger-Nelson Prize Lecture</b>	11:30 – 12:15 <b>Doctoral Prize Lecture</b>
13:00 – 18:30 <b>Board of Directors Meeting</b>	12:30 – 14:00 - Break <b>Student Panel (TBD)</b>	12:30 – 14:00 Break <b>CMS Town Hall Meeting</b>	12:30 – 14:00 Break
	14:00-15:00 <b>Scientific Sessions</b>	14:00-15:00 <b>Scientific Sessions</b>	14:00-16:30 <b>Scientific Sessions</b>
	15:00 – 15:45 <b>Plenary Lecture</b>	15:00 – 15:45 <b>Plenary Lecture</b>	
	15:45 – 16:00 Break		
	16:00– 17:30 <b>Scientific Sessions</b>	16:00 – 17:00 <b>Scientific Sessions</b>	
	17:30 – 18:30 <b>NSERC Longterm Strategy Panel (TBD)</b>	17:00 – 18:00 <b>NSERC Research Funding Focus Group</b>	
18:00-19:30 <b>Welcome Reception</b>	20:00 – 21:00 <b>Ron Graham</b> Public Lecture	18:30 - 19:00 Reception (cash bar)	19:00 – 22:00 <b>Banquet</b>
	<b>Student Social</b>	19:00 – 22:00 <b>Banquet</b>	

(updated July 26, 2010)

## Sessions

### Analysis and Geometry of Nonlinear Partial Differential Equations

### Analyse et géométrie des équations aux dérivées partielles non linéaires

Org: Nassif Ghoussoub (UBC), Young-Heon Kim (UBC), Robert McCann (Toronto)

Stanley Alama (McMaster), Sun-Sig Byun (Seoul National Univ., Korea), Sunhi Choi (Arizona), Rustum Choksi (McGill), Marina Chugunova (Toronto), Jaywan Chung (KAIST, Korea), Alessio Figalli (Texas), Pengfei Guan (McGill), Weiyoung He(Oregon), Robert Jerrard (Toronto), Kyungkeun Kang (Sungkyunkwan Univ., Korea), Inwon Kim (UCLA), Yong Jung Kim (KAIST, Korea), Ki-Ahm Lee (Seoul National Univ., Korea), Dong Li (Iowa), Brendan Pass (Toronto), Vitali Vougalter (Toronto), Jie Xiao (Memorial)

### Commutative Algebra and Combinatorics

### Algèbre commutative et combinatoire

Org: Sara Faridi (Dalhousie), Adam Van Tuyl (Lakehead)

Jennifer Biermann (Cornell), Shelly Bouchat (Slippery Rock), Ragnar-Olaf Buchweitz (Toronto), Enrico Carlini (Torino), Jaydeep Chipalkatti (Manitoba), David Cook II (Kentucky), Anton Dochtermann (Dartmouth), Alexander Engstrom (Berkeley), Tony Geramita (Queen's; Genova), Tai Ha (Tulane), Andrew Hoefel (Dalhousie), Claudia Miller (Syracuse), Susan Morey (Texas State), Uwe Nagel (Kentucky), Greg Smith (Queen's), Ali Soleyman Jahan (Univ. of Kurdistan), Russ Woodroffe (Washington), Rafael Villarreal (CINVESTAV-IPN, Mexico), Gwyn Whieldon (Cornell), Siamak Yassemi (Univ. of Tehran, Iran)

### Compressed Sensing: Theory, Algorithms and Application

### Acquisition comprimée : Théorie, algorithmes et application

Org: Michael Friedlander (UBC), Felix Herrmann (UBC), Ozgur Yilmaz (UBC)

### Computational Number Theory

### Théorie des nombres computationnelle

Org: Mark Bauer (Calgary), Mike Bennett (UBC)

Paul Buckingham (Alberta), Sander Dahmen (UBC), Eyal Goren (McGill), Matt Greenberg (Calgary), Patrick Ingram (Waterloo), Matilde Lalín (Montréal), Renate Scheidler (Calgary), Kate Stange (UBC; SFU), Edlyn Teske (Waterloo), Gary Walsh (Ottawa; CSE)

### Convex and Nonsmooth Analysis

### Analyse convexe et non lisse

Org: Philip Loewen (UBC), Yves Lucet (UBC-Okanagan)

Heinz Bauschke (UBC-Okanagan), Mclean Edwards (UBC), Nassif Ghoussoub (UBC), Yasin Gocgun (UBC), Rafal Goebel (Loyola - Chicago), Eldad Haber (UBC), Warren Hare (UBC-Okanagan), Yves Lucet (UBC-Okanagan), Tamon Stephen (SFU), Xiao Lin (Microsoft Research), Shawn Wang (UBC-Okanagan), Yuriy Zinchenko (Calgary), Jim Zhu (Western Michigan)

### Discrete Mathematics

### Mathématiques discrètes

Org: Jozsef Solymosi, Stephanie van Willigenburg (UBC)

### Harmonic Analysis and Additive Combinatorics

### Analyse harmonique et combinatoires additives

Org: Izabella Laba (UBC), Akos Magyar (UBC), Malabika Pramanik (UBC)

Michael Bateman (UCLA), Karsten Chinen (UBC), Brian Cook (UBC), Ciprian Demeter (Indiana), Burak Erdogan (UIUC), John Griesmer (UBC), Mariah Hamel (Georgia), Derrick Hart (Rutgers), Alex Iosevich (Rochester), Michael Lacey (Georgia Tech), Neil Lyall (Georgia), Richard Oberlin (UCLA), Matthew Smith (UBC), Elizabeth Stovall (UCLA), Tyler Whitehouse (Vanderbilt), Kelan Zhai (UBC)

### History and Philosophy of Mathematics

### Histoire et philosophie des mathématiques

Org: Tom Archibald (SFU), Alan Richardson (UBC), Glen van Brummelen (Quest Univ.)

### Mathematics Education

### Éducation mathématique

Org: Jennifer Hyndman (UNBC), Mark MacLean (UBC)

### Methods in Nonlinear Dynamics

### Méthodes en dynamique nonlinéaire

Org: George Patrick (Saskatchewan), Cristina Stoica (Wilfrid Laurier)

### p-adic groups, Automorphic forms, and Geometry

### Groupes p-adiques, formes automorphes et géométrie

Org: Clifton Cunningham (Calgary), Julia Gordon (UBC)

Moshe Adrian (Utah), Amir Akbary (Lethbridge), Bill Casselman (UBC), Dragos Ghioca (UBC), Eyal Goren (McGill), Matt Greenberg (Calgary), Adrian Iovita (Concordia), Tasho Polk (IAS; Princeton), Paul Mezo (Carleton), Dragan Milicic (Utah), Hadi Salmasian (Ottawa), Lior Silberman (UBC), Loren Spice (Texas Christian Univ.), Jeremy Sylvestre (Alberta -Augustana), Zhiwei Yun (MIT)

# RÉUNION D'HIVER SMC 2010 CMS WINTER MEETING

## Probability in Biology and Computer Science Probabilité en biologie et informatique

Org: David Brydges (UBC), Ed Perkins (UBC)

Shankar Bhamidi (North Carolina), Steve Evans (Berkeley), Christoph Hauert (UBC), Alexander Holroyd (UBC/Microsoft Research), Sylvie Meleard (Paris VI, France), Yuval Peres (Microsoft Research), Leah Popovic (Concordia), Bruce Reed (McGill)

## Spectral Theory Théorie spectrale

Org: Richard Froese (UBC), Dmitry Jakobson (McGill), Mahta Khosravi (UBC)

## Symbolic Dynamics and Ergodic Theory Dynamique symbolique et théorie ergodique

Org: Chris Bose (Victoria), Doug Lind (Washington), Ian Putnam (Victoria), Anthony Quas (Victoria)

Marcy Barge (Montana State), Chris Bose (Victoria), Mark Holland (Exeter, UK), Jarek Kwapisz (Montana State), Doug Lind (Washington), Brian Marcus (UBC), Tom Meyerovitch (UBC), Robert Moody (Victoria), Dave Morris (Lethbridge), Viorel Nitica (West Chester), Ronnie Pavlov (Denver), Marcus Pivato (Trent), Ian Putnam (Victoria), Anthony Quas (Victoria), Cecilia Tokman (Victoria), Reem Yassawi (Trent)

## Symmetry Methods for Differential Equations Méthodes de symétrie pour les équations différentielles

Org: Stephen Anco (Brock), George Bluman (UBC), Alexei Cheviakov (Saskatchewan)

Sajid Ali (Brock), Stephen Anco (Brock), George Bluman (UBC), Temuer Chaolu (Shanghai Maritime University, China), Alexei Cheviakov (Saskatchewan), Raouf Dridi (UBC), Biao Li (Ningbo Univ., China), Juha Pohjanpelto (Oregon State), Changzheng Qu (Northwest Univ., Xi'an, China), Roman Smirnov (Dalhousie), Thomas Wolf (Brock)

## Theory and Application of Sequences and Arrays Théorie et application des suites et tableaux

Org: Jonathan Jedwab (SFU), Brett Stevens (Carleton)

## Contributed Papers Communications libres

Org: Martin Barlow (UBC)

## CALL FOR SITES DEMANDES DE PROPOSITIONS D'EMPLACEMENTS

### Interested in hosting a CMS Meeting?

The CMS Research Committee invites proposals from heads of departments interested in hosting a CMS Meeting. The winter meeting sites are confirmed to December 2010, the summer meeting sites are confirmed to June 2012.

### Vous aimeriez accueillir une Réunion de la SMC?

Le Comité de la recherche de la SMC lance un appel de propositions aux chefs de départements intéressés à accueillir une Réunion de la SMC. Les hôtes des Réunions d'hiver sont confirmés jusqu'en décembre 2010, et ceux des Réunions d'été, jusqu'en juin 2012.

Dr. David Brydges, Chair  
CMS Research Committee / Comité de recherches de la SMC  
Department of Mathematics, University of British Columbia  
121-1984 Mathematics Rd  
Vancouver, British Columbia V6T 1Z2

## **CALL FOR NOMINATIONS EDITORS-IN-CHIEF - CJM**

## **APPEL DE MISES EN CANDIDATURE RÉDACTEURS-EN-CHEF - JCM**

The term of office of the present **Editors-in-Chief of the Canadian Journal of Mathematics** will end December 31, 2011. The Publications Committee of the CMS invites nominations for the next Editors-in-Chief to serve for a five year term beginning January 1, 2012.

**The deadline for submissions is November 15, 2010.**

Since editorial responsibilities often necessitate a lessening of responsibilities in an individual's normal work, individuals should review their candidacy with their university department.

Expressions of interest should include:

- a formal covering letter;
- a curriculum vitae;
- an expression of views regarding the publication; and
- an inclusion of support from their university department.

Please submit your expression of interest electronically, preferably in PDF format, to:

**CJM-EIC-2012@cms.math.ca**

Any input from the mathematical community concerning this important selection process is welcome. Applications (with supporting material) and/or comments should be sent to the email address above.

Le mandat des **rédacteurs-en-chef actuels du Journal canadien de mathématique** prendra fin le 31 décembre 2011. Le Comité des publications de la SMC sollicite des mises en candidatures pour les prochains rédacteurs-en-chef pour un mandat de cinq ans.

**La date limite pour les soumissions est le 15 novembre 2010.**

Puisque les responsabilités de rédaction nécessitent souvent une réduction dans la charge normale de travail, les individu(e)s devraient vérifier leur candidature avec leur département.

Les mises en candidature doivent inclure :

- une lettre formelle;
- un curriculum vitae;
- l'expression de votre opinion sur la publication; et
- une inclusion d'un soutien de leur département universitaire.

Veuillez soumettre votre mise en candidature par voie électronique, de préférence en format PDF, à :

**JCM-REC-2012@smc.math.ca**

Les commentaires de la communauté mathématique au sujet de cette importante sélection sont bienvenus. Les mises en candidatures (avec matériel à l'appui) et/ou commentaires devraient être acheminés à l'adresse électronique ci-dessus.

### **Current CJM/CMB Editorial Board / Conseil de rédaction pour le JCM et le BCM à présent**

#### **Editors-in-Chief / Rédacteurs-en-chef**

Nantel Bergeron (York), CMB/BCM to/à 12/2010  
Henry Kim (Toronto), CJM/JCM to/à 12/2011  
Robert McCann (Toronto), CJM/JCM to/à 12/2011  
Jianhong Wu (York), CMB/BCM to/à 12/2010

#### **Associate Editors / Rédacteurs associés**

Karoly Bezdek (Calgary) to/à 12/2011  
James Colliander (Toronto) to/à 12/2011  
Alan Dow (North Carolina) to/à 12/2010  
George Elliott (Toronto) to/à 12/2010  
Kathryn Hare (Waterloo) to/à 12/2011  
Stephen Kudla (Toronto) to/à 12/2013  
Vladimir Pestov (Ottawa) to/à 12/2013  
Gordon Slade (UBC) to/à 12/2013  
Roland Speicher (Queen's) to/à 12/2013  
Vinayak Vatsal (UBC) to/à 12/2013  
Jie Xiao (Memorial) to/à 12/2013

## Il nous faut un plan.

Il y a une quinzaine d'années j'ai eu le plaisir d'être un de ceux qui ont aidé Richard Kane à compiler une étude des mathématiques au Canada. Cette étude, combinée à une revue externe, faisait partie d'une réponse à la réallocation de ressources faite par le CRSNG au milieu de la décennie, qui nous classait fin dernière de toutes les disciplines. Nos efforts ont mené à un revirement substantiel, non seulement dans la correction d'une perception injuste, mais aussi dans notre propre conscience de ce que nous pouvions faire, et l'étude a été un élément important dans l'assemblage du cadre institutionnel que nous avons aujourd'hui.

On a récemment décidé de revoir cette étude et de la mettre à jour, principalement dans le but de voir où nous en étions, mais aussi pour nous aider dans nos différents efforts de représentation. Cette révision n'est pas encore terminée, mais nous voyons déjà un développement remarquable. Il est étonnant de voir à quel point notre communauté a évolué et gagné en force. Elle a beaucoup changé, notamment par l'addition de toute une nouvelle génération d'acteurs sur la scène.

Il semble maintenant que cette étude sera encore pertinente dans nos interactions avec le CRSNG, et ceci d'une façon encore plus directe que celle prévue initialement. Cette tournure des choses a été provoquée par leur décision d'éliminer le programme qui subventionne notre cadre institutionnel (BIRS, CRM, Fields, PIMS). Le but principal de ce programme est de financer des infrastructures majeures, pour la plupart des équipements importants et dispendieux ; le CRSNG croit que ces dépenses d'équipement relèvent de façon plus correcte de la Fondation Canadienne pour l'Innovation (FCI). Ils sont restés par contre pris avec la question d'où caser leurs quatre institutions mathématiques orphelines.

Leur réponse a été d'invoquer un précédent déjà utilisé à bon escient, et en astronomie et en physique des particules, celui du développement d'un 'plan à long terme'. Notre communauté devra donc développer un plan à long terme pour les mathématiques et les statistiques au Canada. Ce plan doit examiner notre discipline, identifier les tendances, et proposer les bonnes structures pour développer les mathématiques et les statistiques. Par contre, le plan n'affecte pas les allocations individuelles. En contraste avec les événements d'y a quinze ans, qui ont débuté avec un coup plutôt sévère, cette nouvelle tournure commence sur une note beaucoup plus positive. On nous demande de montrer ce que nous avons fait et ce que nous voulons faire, même de s'en vanter un peu, et de donner forme à notre avenir. C'est une recette qui a bien servi les astronomes et les physiciens, alors pourquoi pas nous ?

Nous ne manquons pas de questions à débattre. D'abord il y a les questions scientifiques : où va notre discipline ? Un

certain sens de ceci est essentiel pour expliquer et justifier ce que nous voulons faire, non dans le sens de ne financer, par exemple, que la géométrie et la théorie des nombres (les mathématiques, dans leur façon organique d'évoluer, se débrouillent fort bien), mais dans celui de proposer les bonnes structures. Par exemple, une question de proportions : environ 80% du financement global sert aux subventions individuelles ; le reste sert à des instruments collectifs (les Instituts, BIRS) qui ont eu effet transformateur (pensez à l'augmentation du nombre de bourses post-doctorales) et qui ont un dossier remarquable dans leur recherche de ressources complémentaires des provinces, des universités, du privé, ainsi que des organismes subventionnaires étrangers. Il y a aussi la question de l'interdisciplinarité, et de sa promotion, liée à la fin imminente de la subvention à MITACS. Celle-ci ne relève pas du CRSNG, mais fait quand même partie du portrait global.

A l'intérieur de la sphère des subventions individuelles, il y a des questions de distribution de ressources. Le contexte actuel voit l'existence de courants plutôt puissants au sein du CRSNG, qui poussent toutes les disciplines dans une direction à propos de laquelle elles ont presque toutes des réserves : subventions moins nombreuses et plus grandes concentration des ressources. J'ignore si le plan nous permettra de nager à contre-courant ; mais c'est certainement une question à débattre.

Le plan est aussi à développer avec nos collègues statisticiens. Les deux disciplines vivent dans une entente qui est généralement bonne, bien que non dénuée de complications. Souvent, nous nous ignorons, comme des chèvres et des moutons dans un champ. Mais des chèvres et des moutons ont des ressemblances, et des intérêts communs, si on les compare à d'autres espèces (je passe sous silence l'identification des discipline-loup). Faire front commun nous rendra, à la longue, plus forts. Je crois qu'il y a une convergence à chercher dans nos structures. Je pense aussi qu'on voit une convergence scientifique, du moins dans certains aspects de notre entreprise, mais je laisse la question à un autre éditorial.

Au moment où ces lignes sont écrites, au début de juillet, un comité directeur est en voie d'être mis sur pied, dont la tâche sera de demander des soumissions de la communauté, et, de façon générale, diriger le processus jusqu'à la production d'un rapport final. En particulier, les sociétés scientifiques sont appelées à jouer un rôle important à toutes les étapes du processus, tout particulièrement en organisant des forums pour la consultation, mais aussi en faisant leurs propres soumissions en consultation avec leurs communautés. Avec ses organismes sœurs, SCMAI et la SSC, la SMC, le principal organisme représentatif pour les mathématiciens du Canada, compte bien jouer son rôle à fond.

MITACS' fourteen year grant. The latter is not NSERC's remit, but it is certainly part of the picture.

Within the pot of individual grants, there are questions about distribution of resources. The review is being done in a context of some rather powerful currents at NSERC, pushing all disciplines in Canada along a direction that almost all of them don't really like: fewer and larger grants, concentration of resources. I really don't know if our plan will enable us to swim against these currents; but this certainly is, and will be, an issue.

The plan is also being developed jointly with our colleagues in statistics. The two disciplines have a by and large friendly relationship, though not devoid of complications. Often, we have ignored each other like the proverbial sheep and goats in the field. Yet sheep and goats are remarkably similar, and have quite common interests compared to other species

(which of the disciplines are the wolves?). Making common cause will, in the end, make us both stronger. I believe that there is a strong convergence in the way we should structure our disciplines. I also think that we are also seeing a scientific convergence, at least among some segments of our enterprise, but I will save that for another editorial.

As I write these lines in early July, a Steering Committee is being put together, whose task is to gather input from the community, and more generally oversee the process to a final report. In particular, the scientific societies will have an essential role to play in all stages of the process, in particular in organising the venues for consultation, and also in providing their own input in consultation with their communities. Together with its sister organisations, CAIMS and the SSC, the CMS, as the principal representative organisation for mathematicians in Canada, looks forward to playing this role.

### CALL FOR PROPOSALS 2010 Endowment Grants Competition

### APPEL DE PROJETS Concours de bourses du fonds de dotation 2010

The Canadian Mathematical Society is pleased to announce the 2010 Endowment Grants Competition to fund projects that contribute to the broader good of the mathematical community. The Endowment Grants Committee (EGC) administers the distribution of the grants and adjudicates proposals for projects. Proposals must address the goal and statement of purpose of the Canadian Mathematical Society: to support the promotion and advancement of the discovery, learning, and application of mathematics.

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

The EGC will consider funding one-year proposals to a maximum of \$2,500. The EGC tends to favour proposals where CMS funds can be leveraged or where applicants have no other natural funding to which they can apply.

Proposals must be received no later than September 30, 2010. Successful applicants will be informed in December 2010 and grants will be awarded in January 2011.

Application forms and further details about the application process are available on the CMS website: [www.cms.math.ca/Grants/EGC](http://www.cms.math.ca/Grants/EGC)

Please contact the CMS Executive Director with any questions or comments regarding the Endowment Grants at [director@cms.math.ca](mailto:director@cms.math.ca).

La Société mathématique du Canada (SMC) est heureuse d'annoncer la tenue du Concours de bourses du fonds de dotation 2010, qui finance des activités contribuant à l'essor global de la communauté mathématique. Le Comité d'attribution des bourses du fonds de dotation (CABFD) gère la répartition des bourses et évalue les projets. Les projets doivent répondre aux objectifs et au mandat de la SMC, soit promouvoir et favoriser la découverte et l'apprentissage des mathématiques, et les applications qui en découlent.

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

Le CABFD évaluera les projets qui s'étalent sur un an et accordera un maximum de 2 500 \$. Le CABFD accorde généralement la priorité aux projets pour lesquels le financement de la SMC sera égalé ou pour lesquels la SMC est la seule source de financement naturelle à laquelle le demandeur a accès.

Les projets doivent parvenir à la Société au plus tard le 30 septembre 2010. Les projets retenus seront annoncés en décembre 2010, et les bourses distribuées en janvier 2011.

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

Pour toute question ou tout commentaire sur les bourses du fonds de dotation, veuillez communiquer par courriel avec le directeur administratif de la SMC à [directeur@smc.math.ca](mailto:directeur@smc.math.ca).

# Jason Brown: Mathematical Music to our Ears

by Laura Alyea  
Communications and Special Projects Officer

The twang of a guitar, the beat of a drum, the crooning of a singer—these elements are usually more at home at a rock concert than a mathematics meeting, but Professor Jason Brown of Dalhousie University twisted and shook things up at the 2010 CMS Summer Meeting in Fredericton, NB with his public lecture entitled “A Hard Day’s Math: The Connections Between Mathematics and Music.”

Jason’s lecture aimed to show how mathematics can interact with music in a number of ways: by understanding the physics and physiology of sound and music, by understanding the role of patterns, by utilizing transformations and ambiguity in music, and by examining the inherent constraints and assumptions of music composition. Jason and his accompanying band illustrated these points through live performances of rock, blues and pop songs.

Jason is no stranger to the world of music and mathematics. In 2004 he was inspired by the 40th anniversary of the Beatles’ “A Hard Day’s Night” to mathematically solve the mystery of the song’s opening chord. His article “Mathematics, Physics and A Hard Day’s Night” was first published in the October 2004 issue of CMS Notes. The article was subsequently published in Guitar Player Magazine in January 2005, sparking a surge of media attention in his findings.

“I knew that there would be some attention as my research involved the Beatles, but I had no inkling of the breadth and scope of both the media and public interest,” says Jason.

In his lecture, Jason discussed the research behind the “A Hard Day’s Night” discovery as well as a wide range of musical topics, including analyzing the blues progression and the complex ways our ears and brains process sound. He also performed his original song “A Million Whys,” a Beatles-esque tune that Jason used his mathematical knowledge to write. This included the use of patterns and least common multiples to add energy to the introduction, as well as



circumventing listener assumptions in order to introduce ambiguity.

“When I was writing the bridge to the song, I knew there was an assumption that it would be relatively short – the Beatles called a bridge a ‘Middle Eight’ as it was usually 8 bars long,” says Jason. “Explicitly recognizing the assumption suggests to me as a mathematician to decide to intentionally contravene the assumption, and so I made the bridge longer than the combined verse-chorus.”

Jason is passionate about highlighting the role that mathematics plays in everyday life. He writes a regular column on this topic in the Chronicle Herald, and his book “Our Days are Numbered: How Mathematics Orders our Lives” was published in 2009. Jason’s lecture is an excellent way to showcase this passion. Many of the mathematical concepts he describes, such as patterns, are basic and familiar, and more complex concepts are clearly explained. For the general public, it is an eye-opening experience to see how math affects and can explain something as fundamental in our lives as music.



(L-R) Scott Ferguson, Floyd King, Jason Brown and Hal Bruce

Mathematicians can also find much to appreciate in Jason’s findings. His lecture notes the common link of ambiguity between mathematicians and songwriters: mathematicians use ambiguity to look for alternate models of a theory, while songwriters use ambiguity

## JASON BROWN: MATHEMATICAL MUSIC TO OUR EARS *continued*

to create listener interest. "The creative processes of mathematical research and songwriting are really quite similar," Jason remarks. "Some of the best mathematical research is that which utilizes results from a variety of fields, and it is not surprising to me that the Beatles were particularly broad musically and adept at adapting a wide variety of different genres of music."

Jason is aware that few musicians would admit to using math in their music, and not all of the response to his research has been positive. Some people believe the universal appeal of music and the genius of songwriters defy mathematical calculation. Yet watching Jason perform makes it clear that knowing the math behind the chords does not take away from his joy in listening

to and performing music. He's having a ball, and the audience is dancing in their seats along with him.

"I feel that music, like mathematics, doesn't suffer by analyzing it," says Jason. "The deeper my understanding of music, the more I appreciate the brilliance that can go into songwriting and playing."

For more information on Jason Brown and his upcoming public appearances, please visit <http://jasonibrown.com>.

### CALL FOR NOMINATIONS EDITORS-IN-CHIEF - CMS Notes

The Publications Committee of the CMS invites expressions of interest for two **Editor-in-Chief positions for CMS Notes**. The appointment will be for a five year term beginning January 1, 2012.

**The deadline for submissions is November 15, 2010.**

Since editorial responsibilities often necessitate a lessening of responsibilities in an individual's normal work, individuals should review their candidacy with their university department.

Expressions of interest should include:

- a formal covering letter;
- a curriculum vitae;
- an expression of views regarding the publication; and
- an inclusion of support from your university department.

Please submit your expression of interest electronically, preferably in PDF format, to:

**NOTES-EIC-2012@cms.math.ca**

For the current CMS Notes Editorial Board members, please visit [www.cms.math.ca/Docs/commlist/](http://www.cms.math.ca/Docs/commlist/)

### APPEL DE MISES EN CANDIDATURE RÉDACTEURS-EN-CHEF - Notes de la SMC

Le comité des publications de la SMC sollicite des mises en candidature pour deux postes de **rédacteur-en-chef pour Notes de la SMC**. Le mandat sera pour cinq ans et débutera le 1er janvier 2012.

**La date limite pour les soumissions est le 15 novembre 2010.**

Puisque les responsabilités de rédaction nécessitent souvent une réduction dans la charge normale de travail, les individus devraient vérifier leur candidature avec leur département.

Les mises en candidature doivent inclure:

- une lettre formelle;
- un curriculum vitae;
- l'expression de votre opinion sur la publication; et
- une inclusion d'un soutien de votre département universitaire.

Veuillez soumettre votre mise en candidature par voie électronique, de préférence en format PDF, à :

**NOTES-REC-2012@smc.math.ca**

Pour voir les membres du Conseil de rédaction Notes de la SMC à présent, veuillez visiter [www.smc.math.ca/Docs/comliste](http://www.smc.math.ca/Docs/comliste)

## 2010 PRESENTATION OF PRIZES / PRÉSENTATION DES PRIX 2010

### Prix Coxeter-James 2010 Coxeter-James Prize Balint Virag (University of Toronto)

Professor Virág is well known for his research on random walks, random matrices, random polynomials, and probabilistic methods in group theory, in each of which he has made fundamental contributions. He has elucidated the structure of an important new class of point processes called determinantal processes. Recently, he initiated an ambitious, and already very successful program to understand the asymptotics of eigenvalue ensembles through limiting random Schrödinger operators.

He is an exciting and highly sought after speaker, for example, at the Current Developments in Mathematics conference at Harvard this past year (2009). He has received a Sloan Fellowship (2004) and the Rollo Davidson Prize (2008) for young probabilists.

Professor Bálint Virág was born in Budapest, Hungary in 1973 and received his BA in mathematics at Harvard in 1996. He received his PhD at Berkeley working on random walks on graphs of exponential growth; his advisor was Yuval Peres. After his degree, he held a C.L.E. Moore instructorship at MIT. He has held the Canada Research Chair in Probability at the University of Toronto since 2003 where he has developed a lively working group and seminar.



Jacques Hurtubise and Balint Virag

Professeur Bálint Virág est bien connu pour sa recherche sur les trajets aléatoires, les matrices aléatoires, les polynômes aléatoires et les méthodes probabilistes en théorie de groupe, sujets auxquels il a fait des contributions fondamentales.

Il a élucidé la structure d'une importante nouvelle catégorie de processus de point appelés « processus déterminantaux ». Récemment, il a lancé un programme ambitieux, mais qui porte déjà ses fruits et qui vise

à comprendre l'asymptotique des valeurs propres en limitant les opérateurs Schrödinger aléatoires.

Bálint est un conférencier très dynamique et fort prisé. Il a donné un exposé, par exemple, à la conférence Current Developments in Mathematics à Harvard en 2009. Il est également lauréat d'une bourse Sloan (2004) et du prix Rollo Davidson (2008) pour jeunes probabilistes.

Le professeur Bálint Virág est né à Budapest, en Hongrie, en 1973 et a reçu un baccalauréat en mathématiques de Harvard en 1996. Il a obtenu son doctorat à Berkeley pour son travail sur les trajets aléatoires sur des graphiques de croissance exponentielle; son directeur de thèse était Yuval Peres. Après avoir obtenu son diplôme, il a enseigné au MIT grâce à une bourse prestigieuse (C.L.E. Moore instructorship). Depuis 2003, il occupe une chaire de recherche du Canada en probabilité à l'Université de Toronto, où il a créé un groupe de travail et un séminaire dynamiques.

### Prix Jeffery-Williams 2010 Jeffery-Williams Prize Mikhail Lyubich (Stony Brook, Toronto)

Mikhail Lyubich is a leader in the field of dynamical systems.

He is one of the founders of modern real and complex onedimensional dynamics, having in many ways shaped the development of the field.

Lyubich was born in 1959 in Kharkov, Ukraine. His undergraduate studies in dynamics were at Kharkov State University (1975-80) and graduate studies in Tashkent, Uzbekistan, where he worked on holomorphic dynamics.

His 1984 Ph.D. thesis proved fundamental results on ergodic theory and structural stability of rational maps; in particular, the existence of the measure of maximal



Mikhail Lyubich and Jacques Hurtubise

Mikhail Lyubich est un leader dans le domaine des systèmes dynamiques. Il est l'un des fondateurs de la dynamique réelle et complexe moderne de dimension 1, ayant de plusieurs manières façonné le développement de cette branche des mathématiques.

Lyubich est né en 1959 à Kharkiv en Ukraine. Il a fait ses études de premier cycle à l'Université d'État de Kharkov (1975-1980)

et ses études supérieures à Tashkent, en Ouzbékistan, où il a travaillé sur la dynamique holomorphe. Dans sa thèse de doctorat de 1984, il prouve des résultats fondamentaux de la théorie ergodique et de la stabilité structurelle des applications rationnelles, en particulier,

## Prix Jeffery-Williams 2010 Jeffery-Williams Prize continued / suite

entropy of a rational map, now known as Lyubich measure. In 1989, he joined John Milnor at the Institute for Mathematical Sciences (Stony Brook).

Lyubich received a Canada Research Chair at the University of Toronto in 2002 (joint appointment with Stony Brook).

In 2007 he became Director, Institute for Mathematical Sciences (Stony Brook). He addressed the 1994 International Congress of Mathematicians (Zurich), the 2000 Joint AMS Meeting, and the 2003 CMS-SMF Mathematics Congress. He was awarded a Sloan Fellowship (1991) and a Guggenheim Fellowship (2002).

Among Lyubich's fundamental results in one-dimensional dynamics is his proof in the 1990s of hyperbolicity of renormalization for unimodal maps (conjectured by Feigenbaum and by Coullet and Tresser in the 1970s). Renormalization has been one of the main themes in low-dimensional dynamics for the past 40 years. Sullivan and later McMullen proved parts of the renormalization picture for unimodal maps, and Lyubich completed the proof of universality for bounded combinatorics.

He later constructed a "full hyperbolic horseshoe" for the renormalization operator acting on real quadratic-like maps.

Lyubich also resolved perhaps the most famous problem in dynamics on the real line by showing that hyperbolicity is dense in the real quadratic family.

One of the most fundamental problems in dynamics, for a parameterized family of maps, is to understand the asymptotic behaviour of almost every orbit for almost every value of the parameter. Even for the family of quadratic interval maps, this question had eluded experts for years. Lyubich's construction of the full renormalization horseshoe, together with his joint work with M. Martens and T. Nowicki, allowed him to obtain the definitive answer: almost every quadratic map is either regular or stochastic.

Lyubich's work was a major step towards the celebrated MLC (Mandelbrot set is locally connected) conjecture. A series of new breakthroughs has come in his recent results with J. Kahn, using the Kahn-Lyubich quasi-additivity law in conformal geometry.

l'existence de la mesure d'entropie maximale d'une application rationnelle, maintenant connue sous le nom de la mesure de Lyubich. En 1989, il a rejoint John Milnor l'Institute for Mathematical Sciences (IMS) à Stony Brook.

Lyubich a reçu en 2002 une Chaire de recherche du Canada à l'Université de Toronto, où il est titulaire d'une nomination conjointe avec Stony Brook, et il est devenu directeur de l'IMS en 2007. Il a donné une conférence au Congrès international des mathématiciens à Zurich en 1994, au congrès conjoint de l'American Mathematical Society en 2000 et au premier congrès de mathématiques conjoint de la SMC et de la Société mathématique de France en 2003. Il a été récompensé par la bourse Sloan en 1991 et la bourse Guggenheim en 2002.

Parmi les principaux résultats de Lyubich en dynamique de dimension 1 se trouve sa preuve des années 90 sur l'hyperbolicité de la renormalisation des applications unimodales (conjecturée par Feigenbaum et par Coullet et Tresser dans les années 70). Pour les 40 dernières années, la renormalisation a été l'un des principaux thèmes de la dynamique de dimension faible. Sullivan et plus tard McMullen ont prouvé des parties de l'image de renormalisation pour les applications unimodales et Lyubich a complété la preuve d'universalité pour les combinatoires limitées. Il a plus tard construit une application fer à cheval hyperbolique complète pour l'opérateur de renormalisation agissant sur les applications réelles de type quadratique.

Lyubich également a résolu ce qui est peut-être le problème le plus célèbre de la dynamique sur la droite réelle en montrant que l'hyperbolicité est dense dans une famille quadratique réelle.

Un des problèmes les plus fondamentaux de la dynamique, pour une famille paramétrisée d'applications, est de comprendre le comportement asymptotique de presque toutes les orbites et ce pour presque chaque valeur de paramètre. Même pour la famille d'applications quadratiques sur l'intervalle, cette question a échappé aux experts pendant des années. La construction de Lyubich pour le fer à cheval de renormalisation complète, avec le travail conjoint de M. Martens et T. Nowicki, lui a permis d'obtenir une réponse définitive: presque chaque application quadratique est soit régulière ou bien stochastique.

Le travail de Lyubich a été un avancement majeur vers la célèbre conjecture MLC (l'ensemble de Mandelbrot est localement connexe). Une série de nouvelles percées est survenue dans ses récents résultats avec J. Kahn, en utilisant la loi de quasiadditivité de Kahn-Lyubich en géométrie conforme.

## Prix d'excellence en enseignement 2010 Excellence in Teaching Award Jennifer Hyndman (University of Northern British Columbia)

Jennifer Hyndman is deeply involved with all aspects of teaching both in and out of the classroom. Her first year students explore the UNBC campus, and her fourth-year students combine mathematics and a creative activity outside their comfort zone resulting in paintings, poetry, music, plays and musicals. She believes that an excellent way for students to understand mathematics is to have them teach each other. Her role becomes that of mentor, critic, and teacher of constructive criticism techniques.

Jennifer was instrumental in the creation of the Mathematical Academic Centre for Excellence, a drop-in centre at UNBC for courses with mathematical content. Curriculum development is an important companion to teaching, and Jennifer plays a major role at UNBC. She developed all the original upper year algebra courses in 1995 and coordinated a complete review of every mathematics course in 2000.

She has made a significant contribution in the area of outreach by staging numerous high school and university level workshops focusing on the teaching of algebra, the transition to university, and coping with math anxiety. She is frequently involved with events that allow her to turn her research into hands-on activities for high school students. Recently, her plenary talk Hands-free Teaching at the Sharing Mathematics, A Tribute to Jim Totten conference, was published in the CMS Notes.

Jennifer hones her craft as a teacher by being a student in dance classes and competing in dance festivals. There, she is reminded that a good teacher is passionate about what she does, expects great things from her students, and keeps the learning environment dynamic.

Jennifer Hyndman earned her Bachelor of Mathematics with a Minor in Dance from the University of Waterloo in 1986, her MA in 1989 and her PhD in 1991 from the University of Colorado at Boulder. She is one of the founding faculty of the University of Northern British Columbia. She is currently Professor and Chair of Mathematics at UNBC. Her success as a teacher and her educational accomplishments were recognized in 2003 when she received the UNBC Teaching Excellence Award.

Professor Hyndman's research interests are in natural duality theory, quasi-equations and finite basis theory, lattice theory, and mathematics education.



Peter Taylor, Jennifer Hyndman and Sean Chamberland

La professeure Hyndman s'intéresse très activement à tous les volets de l'enseignement, que ce soit dans la classe ou non. On compte parmi les travaux qu'elle donne aux étudiants de première année l'exploration du campus de la University of Northern British Columbia (UNBC). Ses projets de quatrième année sont un agencement de mathématiques et d'activités mettant à contribution l'esprit créateur des étudiants qui doivent abandonner leur zone de confort. Ces projets entraînent la création de tableaux, de poèmes, d'œuvres musicales, de pièces de théâtre et de pièces musicales.

Elle estime que le meilleur moyen d'apprendre aux étudiants les mathématiques est de leur demander de jouer eux-mêmes le rôle de professeur. Elle fait alors de l'encadrement et joue le rôle de critique et d'enseignante de techniques de critique constructives.

La professeure Hyndman a grandement contribué à la création du Mathematical Academic Centre for Excellence, centre d'aide à la UNBC pour les cours à contenu mathématique. Le développement des programmes d'études est très important en enseignement, et Jennifer y joue un rôle de premier plan à la UNBC. En 1995, elle a élaboré tous les cours d'algèbre avancés et, en 2000, elle a coordonné l'examen de chacun des cours de mathématiques.

Elle a largement contribué à sensibiliser les élèves aux mathématiques en organisant de nombreux ateliers dans des écoles secondaires et universités portant sur l'enseignement de l'algèbre, la transition vers l'université et la gestion de l'angoisse des mathématiques. Elle participe souvent à des événements qui lui permettent de transformer ses recherches en activités pratiques pour les élèves du secondaire. Récemment, la conférence Hands-free Teaching qu'elle a donnée au colloque Sharing Mathematics, A Tribute to Jim Totten, a été publiée dans les Notes de la SMC.

La professeure Hyndman réussit à parfaire ses compétences d'enseignante en s'inscrivant comme élève à des cours de danse et en participant à des concours lors de festivals de danse. Ces activités lui rappellent qu'une bonne enseignante se passionne pour ce qu'elle fait, s'attend à de grandes choses de ses étudiants et maintient un milieu d'apprentissage dynamique.

Jennifer Hyndman a obtenu un baccalauréat en mathématiques avec une mineure en danse de la University of Waterloo en 1986, une maîtrise en 1989 et un doctorat en 1991 de la University of Colorado à Boulder. Elle a fait partie du premier corps enseignant de la UNBC. Elle est maintenant professeure titulaire et occupe la chaire de mathématiques à la UNBC. On avait également reconnu la réussite de la professeure Hyndman et ses réalisations en matière d'enseignement en 2003, année où elle a reçu le Prix d'excellence en enseignement de la UNBC.

Les sujets d'intérêt de recherche de la professeure Hyndman sont la théorie de la dualité naturelle, les quasi-équations et la théorie de la base finie, la théorie du treillis et l'enseignement des mathématiques.

# 2010 PRESENTATION OF PRIZES / PRÉSENTATION DES PRIX 2010

## Student Poster Session 2010 CMS Summer Meeting in Fredericton

The first AARMS-CMS Student Poster Session was held at the 2010 CMS Summer Meeting in Fredericton. Graduate students were invited to present an overview of their current research. 11 students participated in the session.

The CMS Student Committee Award was presented to **Brendan Wood** (University of New Brunswick) for his poster entitled "Infectious Ideas: an epidemiological approach to modeling the propagation of memes in a society."

The AARMS Award was presented to **Fang Yu** (University of New Brunswick) for her poster entitled "Dynamics of Plant-Herbivore Interactions."

The CMS President's Award was presented to **Xiao Liu** (University of Toronto) for his poster entitled "Numerical Simulation of Resonant Tunneling of Fast Solitons for the Nonlinear Schrodinger Equation."



Jenna Tichon, Kseniya Garachuk, Tony Lau, Brendan Wood, Fang Yu, and Xiao Liu

La première session de présentations par affiches pour étudiants- AARMA-SMC a eu lieu lors de la Réunion d'été 2010 de la SMC à Fredericton. Les étudiants diplômés ont été invités à présenter une affiche sur les sujets de leurs recherches. 11 étudiants ont participé à la session

Le prix du comité des étudiants de la SMC a été remis à **Brendan Wood** (Université du Nouveau Brunswick) pour son affiche intitulée « des idées infectieuses : une approche épidémiologique à modeler la propagation mémétique dans une société. »

Le prix d'AARMA a été remis à **Fang Yu** (Université du Nouveau Brunswick) pour son affiche intitulée « La dynamique des interactions Plante-Herbivore. »

Le prix du président de la SMC a été remis à **Xiao Liu** (Université de Toronto) pour son affiche intitulée « Simulation numérique du tunnelling résonant des solutions rapides de l'équation non linéaire de Schrodinger. »



## Fields Institute, Toronto, Canada Postdoctoral Fellowships

Applications are invited for postdoctoral fellowship positions for the 2011-2012 academic year. The Thematic Program on Discrete Geometry and Applications will take place at the Institute July to December 2011 and the Thematic Program on Galois Representations will take place at the Institute from January to June 2012. The fellowships provide for a period of engagement in research and participation in the activities of the Institute. In addition to regular postdoctoral support, one visitor for each six-month program will be awarded the Institute's prestigious Jerrold E. Marsden Postdoctoral Fellowship. There will also be a number of two year positions available connected to the Fields-Ontario fellowship. Applicants seeking postdoctoral fellowships funded by other agencies (such as NSERC or international fellowships) are encouraged to request the Fields Institute as their proposed location of tenure, and should apply to the Institute for a letter of invitation.

**Eligibility:** Qualified candidates who will have recently completed a PhD in a related area of the mathematical sciences are encouraged to apply.

**Deadline:** December 15, 2010 although late applications may be considered.

**Application Information:** Please consult [www.fields.utoronto.ca/proposals/postdoc.html](http://www.fields.utoronto.ca/proposals/postdoc.html)

The Fields Institute is strongly committed to diversity within its community and especially welcomes applications from women, visible minority group members, Aboriginal persons, persons with disabilities, members of sexual minority groups, and others who may contribute to the further diversification of ideas.

## CALL FOR NOMINATIONS PIMS Postdoctoral Fellowship Competition



Pacific Institute *for the*  
Mathematical Sciences

The Pacific Institute for the Mathematical Sciences (PIMS) invites nominations of outstanding young researchers in the mathematical sciences for Postdoctoral Fellowships for the year 2011-2012. Candidates must be nominated by one (or more) scientists or by a Department (or Departments) affiliated with PIMS. The fellowships are intended to supplement support provided by the sponsor, and are tenable at any of its Canadian member universities: Simon Fraser University, the University of Alberta, the University of British Columbia, the University of Calgary, the University of Victoria, University of Regina and the University of Saskatchewan, as well as at the University of Lethbridge (a PIMS affiliate).

For the 2011-2012 competition, held in January of 2011, the amount of the award will be \$20,000 and the sponsor(s) is (are) required to provide additional funds to finance a minimum total stipend of \$40,000.

Rankings of the candidates are made by the PIMS PDF Review Panel based on the qualifications of the candidate, potential for participation in PIMS programs, and potential involvement with PIMS partners. PIMS Postdoctoral Fellows will be expected to participate in all PIMS activities related to the fellow's area of expertise and will be encouraged to spend time at more than one site. To ensure that PIMS Postdoctoral Fellows are able to participate fully in Institute activities, they may not teach more than two single-term courses per year.

Nominees must have a Ph.D. or equivalent (or expect to receive a Ph.D. by December 31, 2011) and be within three years of their Ph.D. at the time of the nomination (i.e., the candidate must have received her or his Ph.D. on or after January 1, 2008). The fellowship may be taken up at any time between September 1, 2011 and January 1, 2012. The fellowship is for one year and is renewable for at most one additional year.

### Details

The PIMS PDF nomination/application process take places entirely online, utilizing the MathJobs service provided by the American Mathematical Society. Having selected their nominees, sponsors direct them to apply online at [mathjobs.org/jobs/PIMS](http://mathjobs.org/jobs/PIMS). Nominees are required to upload **two letters of reference**, **a curriculum vitae** and a **statement of research interests**. Sponsors must also upload their own **reference letters** (these are in addition to the two reference letters mentioned just above) and **statements of anticipated support**.

They will receive instructions as to how to proceed from their nominees via email from MathJobs. Detailed instructions regarding all aspects of the MathJobs application procedure may be found in the online MathJobs user guides. Please note that application is by nomination only; unsolicited applications will not be considered.

Complete applications must be uploaded to MathJobs by **December 15, 2010**.

For further information, visit: [www.pims.math.ca/scientific/postdoctoral](http://www.pims.math.ca/scientific/postdoctoral).



## Correction to June 2010 issue of CMS Notes Correction au numéro du juin 2010 des Notes de la SMC

In Pengfei Guan's article, Mathematics Education in Elementary and Secondary Schools, the email address provided for the author on page 17 is incorrect.

The correct email address is [guan@math.mcgill.ca](mailto:guan@math.mcgill.ca).

The CMS apologizes for any inconvenience.

\*\*\*\*\*

Dans l'article Pengfei Guan, l'éducation des mathématiques dans les écoles primaires et secondaires, le courriel de l'auteur donné à la page 17 est incorrect.

Le correct courriel est [guan@math.mcgill.ca](mailto:guan@math.mcgill.ca).

La SMC s'excuse pour tout inconvénient causé.

**CALL FOR NOMINATIONS  
EDITORS-IN-CHIEF  
A Taste of Mathematics (ATOM)**

The Publications Committee of the CMS solicits expressions of interest for an **Editor-in-Chief position for ATOM**. The appointment will be for a five year term beginning January 1, 2012. **The deadline for submissions is November 15, 2010.**

Since editorial responsibilities often necessitate a lessening of responsibilities in an individual's normal work, individuals should review their candidacy with their university department.

Expressions of interest should include:

- a formal covering letter;
- a curriculum vitae;
- an expression of views regarding the publication; and
- an inclusion of support from their university department.

Please submit your expression of interest electronically, preferably in PDF format, to:

**ATOM-EIC-2012@cms.math.ca**

**Current ATOM Editorial Board / Conseil de rédaction ATOM à présent**

Bruce Shawyer (Memorial) Editor-in-Chief/  
Rédacteur-en-chef to/à 12/2011

Johan Rudnick (CMS) Managing Editor/  
Rédacteur-gérant

**APPEL DE MISES EN CANDIDATURE  
RÉDACTEURS-EN-CHEF  
Aime-T-On les Mathématiques (ATOM)**

Le comité des publications de la SMC sollicite des mises en candidature pour deux postes de **rédacteur-en-chef pour l'ATOM**. Le mandat sera pour cinq ans et débutera le 1er janvier 2012. **La date limite pour les soumissions est le 15 novembre 2010.**

Puisque les responsabilités de rédaction nécessitent souvent une réduction dans la charge normale de travail, les individu(e)s devraient vérifier leur candidature avec leur département.

Les mises en candidature doivent inclure :

- une lettre formelle;
- un curriculum vitae;
- l'expression de votre opinion sur la publication; et
- une inclusion d'un soutien de leur département universitaire.

Veuillez soumettre votre mise en candidature par voie électronique, de préférence en format PDF, à :

**ATOM-REC-2012@smc.math.ca**

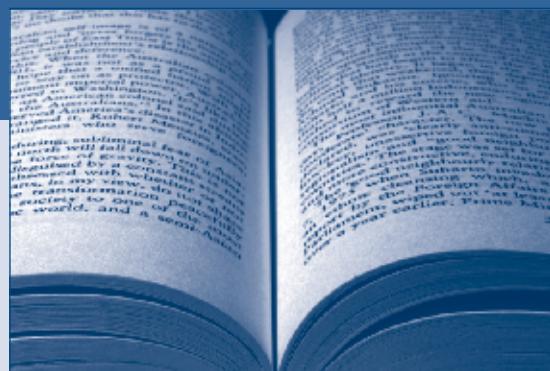
**WANTED: Books for Review  
RECHERCHÉS : Livres pour critiques littéraires**

**Have you written a book lately?**

Would you like to see it reviewed in the CMS Notes? If so, please arrange to have a review copy sent to our Book Review Editor.

**Vous avez récemment écrit un livre?**

Vous aimeriez une critiques littéraires de celui-ci dans les Notes de la SMC? Si oui, veuillez faire parvenir une copie au rédacteur des critiques littéraires.



**Keith Johnson**  
Department of Mathematics and Statistics  
Dalhousie University  
Halifax NS B3H 3J5

# NEWS FROM THE FIELDS INSTITUTE

The Institute has recently implemented a new program, Research Immersion Fellowships, which provides financial support to individuals with high potential to re-enter an active research career by participating in a thematic program, after an interruption due to personal reasons, such as family responsibilities. There are no restrictions on the nationality or country of employment of candidates for an immersion fellowship. For more information, see [www.fields.utoronto.ca/proposals/research\\_immersion.html](http://www.fields.utoronto.ca/proposals/research_immersion.html)

This fall's thematic program will be **Asymptotic Geometric Analysis**. The Distinguished Lecture Series will be delivered by Avi Wigderson (Institute for Advanced Study) during the week of September 13 and the Coxeter Lecture Series by Shiri Artstein-Avidan (Tel-Aviv University) on a date to be announced.

There will be three workshops:

- \* September 13-17 Asymptotic Geometric Analysis and Convexity
- \* October 12-16 Concentration Phenomenon, Transformation Groups and Ramsey Theory
- \* November 1-5 Geometric Probability and Optimal Transportation

More information: [www.fields.utoronto.ca/programs/scientific/10-11/asymptotic](http://www.fields.utoronto.ca/programs/scientific/10-11/asymptotic)

Next winter's thematic program will be **Dynamics and Transport in Disordered Systems**. The Distinguished Lecture Series will be delivered by Yakov Sinai (Princeton) and the Coxeter Lecture Series by Srinivasa Varadhan (Courant).

There will be three workshops:

- \* February 14-19 Disordered Polymer Models
- \* April 4-8 Fourier Law and Related Topics.
- \* June 12-17 Instabilities in Hamiltonian Systems

Future thematic programs:

- \* 2011 Summer *Constraint Satisfaction Problem*
- \* 2011 Fall *Discrete Geometry and Applications*
- \* 2012 Winter/Spring *Galois Representations*
- \* 2012 Fall *Forcing and its Applications*

For more information on these and all other Fields activities, go to

[www.fields.utoronto.ca/programs/scientific/](http://www.fields.utoronto.ca/programs/scientific/)

**CALL FOR NOMINATIONS  
EDITORS-IN-CHIEF - CRUX with MAYHEM**

**APPEL DE MISES EN CANDIDATURE  
RÉDACTEURS-EN-CHEF - CRUX with MAYHEM**

The Publications Committee of the CMS invites expressions of interest for **Editor-in-Chief position for CRUX with MAYHEM**. The appointment will be for a five year term beginning January 1, 2011.

**The deadline for submissions is September 15, 2010.**

Since editorial responsibilities often necessitate a lessening of responsibilities in an individual's normal work, individuals should review their candidacy with their university department.

Expressions of interest should include:

- a formal covering letter;
- a curriculum vitae;
- an expression of views regarding the publication; and
- an inclusion of support from your university department.

Please submit your expression of interest electronically, preferably in PDF format, to:

**CRUX-EIC-2011@cms.math.ca**

Le comité des publications de la SMC sollicite des mises en candidature pour le poste de **rédacteur-en-chef pour CRUX with MAYHEM**. Le mandat sera pour cinq ans et débutera le 1er janvier 2011.

**La date limite pour les soumissions est le 15 septembre 2010.**

Puisque les responsabilités de rédaction nécessitent souvent une réduction dans la charge normale de travail, l'individu devraient vérifier leur candidature avec leur département.

Les mises en candidature doivent inclure :

- une lettre formelle;
- un curriculum vitae;
- l'expression de votre opinion sur la publication; et
- une inclusion d'un soutien de votre département universitaire.

Veuillez soumettre votre mise en candidature par voie électronique, de préférence en format PDF, à :

**CRUX-REC-2011@smc.math.ca**

**Current CRUX with MAYHEM Editorial Board / Conseil de rédaction CRUX with MAYHEM à présent**

Václav Linek (Winnipeg) Editor-in-Chief/Rédacteur-en-chef to/à 12/2010

Jonatan Aronsson (Manitoba) Problems Editor/Rédacteur à problèmes to/à 12/2010

J. Chris Fisher (Regina) Problems Editor/Rédacteur à problèmes to/à 12/2013

Dzung Ha (Ryerson University) Problems Editor/Rédacteur à problèmes to/à 12/2010

Mogens Hansen (Yen-Hansen L.C.) Skoliad Editor/Rédacteur Skoliad to/à 12/2011

Jeff Hooper (Acadia) Associate Editor/Rédacteur associé to/à 12/2012

Johan Rudnick (CMS) Managing Editor/Rédacteur-gérant

Nicolae Strungaru (Grant MacEwan) Problems Editor/Rédacteur à problèmes to/à 12/2013

Ian VanderBurgh (Waterloo) Mayhem Editor/Rédacteur Mayhem to/à 12/2012

Edward Wang (Wilfrid Laurier) Problems Editor/Rédacteur à problèmes to/à 6/2010

Robert Woodrow (Calgary) Olympiad Editor/Rédacteur olympiade to/à 12/2010

Lily Yen (Capilano) Skoliad Editor/Rédacteur Skoliad to/à 12/2011

James Currie (Winnipeg) Articles to/à 12/2010

Amarjit Sodhi (Memorial) Book Reviews Editor/Rédacteur critiques littéraires to/à 12/2013

# CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

SEPTEMBER		2010	SEPTEMBRE
6-10	Dynamics Days (Univ. of Bristol, Bristol, UK)	<a href="http://www.enm.bris.ac.uk/~anm/ddays10/index.html">www.enm.bris.ac.uk/~anm/ddays10/index.html</a>	
7-10	Seventh Italian-Spanish Conference on General Topology and its Applications (Badajoz, Spain)	<a href="http://ites2010.unex.es">http://ites2010.unex.es</a>	
13-17	Conference on Asymptotic Geometric Analysis and Convexity (Fields Institute)	<a href="http://www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/">www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/</a>	
OCTOBER		2010	OCTOBRE
4-9	Group Actions and Dynamics (CRM, Montreal, QC)	<a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a>	
8-10	Symposium on Geometry and Low-Dimensional Topoly (University of Minnesota, Minneapolis, MN)	<a href="http://www.math.umn.edu/yamabe">http://www.math.umn.edu/yamabe</a>	
11-15	Equations and First Order Properties in Groups (CRM, Montreal, QC)	<a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a>	
18-22	Algebraic systems with only real solutions (AIM, Palo Alto, CA)	<a href="http://aimath.org/ARCC/workshops/realsolutions.html">http://aimath.org/ARCC/workshops/realsolutions.html</a>	
27-30	Differential Algebra and Related Topics (Chinese Academy of Sciences, Beijing)	<a href="http://mmrc.iss.ac.cn/~dart4/index.html">http://mmrc.iss.ac.cn/~dart4/index.html</a>	
NOVEMBER		2010	NOVEMBRE
1-5	Workshop on Geometric Probability and Optimal Transportation (Fields Institute)	<a href="http://www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/">www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/</a>	
23-27	International Conference on Mathematical Sciences dedicated to Professor Hari M. Srivastava on his 70th birthday (Izzet Baysal Kampüsü, Bolu, Turkey)		
28-Dec3	International Conference on Applied Mathematics and Informatics (San Andres Island, Columbia)	<a href="http://matematicas.univalle.edu.co/icami/">http://matematicas.univalle.edu.co/icami/</a>	
DECEMBER		2010	DECEMBRE
4-6	<b>2010 CMS Winter Meeting</b> University of British Columbia, BC	<a href="http://www.cms.math.ca/Events/winter10/">www.cms.math.ca/Events/winter10/</a>	
6-10	Waves and Multiscale Processes (AIM, Palo Alto, CA)	<a href="http://aimath.org/ARCC/workshops/multiscale.html">http://aimath.org/ARCC/workshops/multiscale.html</a>	

13-17	Random Matrices (AIM, Palo Alto,CA) <a href="http://aimath.org/ARCC/workshops/randommatrices.html">http://aimath.org/ARCC/workshops/randommatrices.html</a>	
15-16	Conference on Mathematical Education Research (Malaca, Malaysia) <a href="http://einspem.upm.edu.my/icmer2010">http://einspem.upm.edu.my/icmer2010</a>	
JANUARY	2011	JANVIER
3-5	Conference on Mathematical Sciences (A.M.Mathai) (St.Thomas Coll.Kottayam, India) <a href="http://www.cmsintl.org/">http://www.cmsintl.org/</a>	
12-14	Statistical Methods for Meteorology and Climate Change (CRM, Montreal, QC) <a href="http://www.crm.umontreal.ca/Stat2011/en/">www.crm.umontreal.ca/Stat2011/en/</a> <a href="http://www.crm.umontreal.ca/MeteoII/index_e.php/">www.crm.umontreal.ca/MeteoII/index_e.php/</a>	
17-21	Deformation theory, patching, quadratic forms and Brauer group (AIM, Palo Alto,CA) <a href="http://aimath.org/ARCC/workshops/deformbrauer.html">http://aimath.org/ARCC/workshops/deformbrauer.html</a>	
FEBRUARY	2011	FÉVRIER
7-12	Complex Geometry – Extremal Metrics: Evolution equations and stability (CIRM, Marseille, France) <a href="http://www.latp.univ-provence.fr/geom2011/index.php/welcome/week2">www.latp.univ-provence.fr/geom2011/index.php/welcome/week2</a>	
MARCH	2011	MARS
21-25	AIM Workshop: Hypergraph Turan Problem (AIM, Palo Alto,CA) <a href="http://aimath.org/ARCC/workshops/hypergraphturan.html">http://aimath.org/ARCC/workshops/hypergraphturan.html</a>	
APRIL	2011	AVRIL
18-22	Computational Statistical Methods for Genomics and Systems Biology (CRM, Montreal, QC) <a href="http://www.crm.umontreal.ca/Stat2011/">www.crm.umontreal.ca/Stat2011/</a>	
MAY	2011	MAI
2-4	Statistical Issues in Forest Management, (Laval, QC) (CRM, Montreal, QC) <a href="http://www.crm.umontreal.ca/Forest11/index-e.php">www.crm.umontreal.ca/Forest11/index-e.php</a>	
JUNE	2011	JUIN
22-25	26th Annual IEEE Symposium on Logic in Computer Science (Fields Institute event at the University of Toronto) <a href="http://www.fields.utoronto.ca/programs/scientific/10-11/lics11">www.fields.utoronto.ca/programs/scientific/10-11/lics11</a>	
JULY	2011	JUILLET
26-29	Harmonic Analysis and PDE (Eric Sawyer) (Fields Inst., Toronto, ON) <a href="http://www.fields.utoronto.ca/programs/scientific/11-12/PDE/">www.fields.utoronto.ca/programs/scientific/11-12/PDE/</a>	

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](http://www.mccme.ru/mathinmoscow)

**Application details**

[www.cms.math.ca/Scholarships/Moscow](http://www.cms.math.ca/Scholarships/Moscow)

For additional information please see your department or call the CMS at 613-733-2662.

Deadline **September 30, 2010** to attend the Winter 2011 semester.

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](http://www.mccme.ru/mathinmoscow)

**Détails de soumission**

[www.smc.math.ca/Bourses/Moscou](http://www.smc.math.ca/Bourses/Moscou)

Pour plus de renseignements veuillez communiquer avec votre département ou la SMC au 613-733-2662.

Date limite **le 30 septembre 2010** pour le trimestre d'hiver 2011.



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# AMS Books on Mathematical Modelling



 Applied Mathematics

## Modelling in Healthcare

The Complex Systems Modelling Group (CSMG), *The IRMACS Center, Simon Fraser University, Burnaby, BC, Canada*

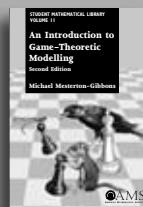
The move to deliver high-quality healthcare services while controlling escalating costs has led to the development and application of mathematical models to guide healthcare decisionmaking. This book offers informed advice on the benefits and limitations of the modeling process, using content that is understandable among modelers, administrators and clinicians alike.

Presented by the Complex Systems Modelling Group at Simon Fraser University in Canada, this book examines the processes now being used to answer questions such as how a community's changing demographics will affect long-term demand for health services. It discusses modeling's potential for developing evidence-based answers to the complex questions affecting modern healthcare.

The authors believe the book will assist in furthering a healthy relationship between academic modelers and healthcare policymakers. They believe that modelers must take into account the non-mathematical aspects of healthcare, while policymakers should not view mathematical models as mystical crystal balls.

Each chapter of the book can be read without having read earlier chapters. The presentation is self-contained, accessible to anyone with a solid background in high school mathematics. The book will benefit anyone interested in broadening their knowledge of modeling's benefits and potential drawbacks when applied to healthcare.

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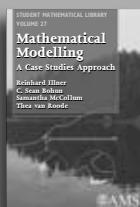
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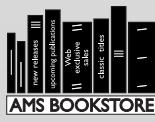
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