CMS NOTES de la SMC

# FROM THE VICE PRESIDENT'S DESK

Michael Lamoureux, *Calgary*

IN THIS ISSUE
DANS CE NUMÉRO



## BOOKS, BOOKS, BOOKS

At the beginning of term this year, the first question I got from students in all my classes was "Do we have to buy the book?"

Well, of course you have to buy the book. The answer seems like a no-brainer. It is a useful reference for everything we cover in class, I would say. It goes into more depth than what we can reasonably cover in the limited time in class. It has many useful examples and exercises, access to online resources in some cases, etc etc etc. Why wouldn't you want to get the book?

But it's the cost, they tell me. $160 for a calculus text, $180 for a statistics text, $200 for a first year discrete math text. Even the wonderful analysis text I am teaching from this year comes in at $150. That's a whole paycheque for some of my students, working their way through school.

Seems pretty steep. Out of curiosity, I researched the cost the texts I used myself as an undergraduate some thirty years ago. $18.63 for an abstract algebra text, $23.05 for Royden's analysis, the highest was $27.80 for a classic text on electromagnetism. (Scary thought that after all this time, I still have these textbooks, with the price tags attached!) Adjusted for inflation, these old books range in price from $48 to $72 in 2010 dollars. Well below the range of $150 to $200 we are seeing for current text books.

What's going on here? Surely with all the technological advances in the last thirty years, prices of books should be going down—not tripling.

Yes, of course we live in a free market society, and prices are set according to what the markets will bear. BUT -- as instructors of these courses, WE set the market! By choosing a textbook that costs $150 to $200, and requiring the students to buy the text, we are setting the market —and setting it at a very high price. And we're talking big bucks—at my school alone, it's easily half a million dollars spent just on one term of calculus textbooks.

It is time to rethink this. Cost of books is significant, and makes up a major portion of what a student spends today on the cost of a university education. As instructors, we are doing a disservice to the students when we ignore cost as we select required texts for our courses, and ignore the impact it has on the students' pocketbook.

How different would my analysis course be if I chose a cheaper solution? For instance, the publisher Dover puts out an excellent collection of inexpensive mathematics texts—often classic works that have been reprinted in a cheaper paperback form. Could I run a good analysis course using Dover's *Foundations of Mathematical Analysis*? (Johnsonbaugh & Pfaffenberger, available for thirty bucks.) With my expertise, and this excellent text, I'm sure the course would run just fine. Could my course on digital signal processing run just as well with my own lecture notes, and a copy of the paperback DSP Outline book published by Schaum's, available for $23.95? If I were to re-learn calculus myself, would I buy the recommended $150 textbook, or would I be happy enough to pick up a used copy of Stewart for $2.00 at the Student Union used book centre? There are free,

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# EDITORIAL

**by Srinivasa Swaminathan**
*Dalhousie University, Halifax*

## On Titles

Stephen Krantz writes in his book, *Mathematical Apocrypha Redux*, that he was once the host of an education conference and was the chairman of a talk. Just a few minutes before introducing the speaker, he asked the speaker, "What is your title?" She replied, "I'm a professor, but you may call me ..." and mentioned her first name. The word 'title' has different meanings. This editorial is concerned with titles of talks, addresses and research papers.

We find often that program announcements list speakers with 'Title to be announced'. This can be disconcerting to those who wish to plan on which talks to attend. If the speaker happens to be well known, then it may not matter much; whatever be the subject of the talk there would be many participants who would like to hear the talk.

A good title assures a good audience. Sometimes organizers might deliberately announce a good title to attract listeners. This happened once when I was on sabbatical at a university in another country. One of the speakers was away from the venue of a conference in Functional Analysis and would arrive only on the day of the talk. Further, it had been difficult to reach him to find out the title. So the organizers announced the title as 'Proof of the Poincaré conjecture.' This was a long time before Perelman's work. When the speaker showed up, he began, "it would be nice to talk about the Poincaré conjecture, but my talk is going to be on this partial differential equation,' and he proceeded to write it on the board. Many participants left the hall quietly.

Professor G. N. Watson gave the presidential address of the British Mathematical Association in 1933 on 'The marquis and the land-agent; a tale of the 18th century.' He began by saying that he had chosen a "seductive title which does not have a very close connection with the actual subject". He had raised the hopes of his audience by promising that he would keep off a subject on which he had been working on for some time since it was so abstruse that to talk about it even to mathematicians would induce them to empty the hall. Instead his talk focused on his work concerning arcs of ellipses and other curves leading to elliptic functions and doubly periodic functions. The address was published in the *Mathematical Gazette*, Feb.1933 issue. In the May issue there was an extract from the *Sheffield Telegraph*, containing a report that Professor G. N. Watson played a confidence trick on a hall crowded with people who had come to hear the advertised title, surely the strangest title ever chosen for a presidential address. It concluded 'as soon as Professor Watson put the lights out to show a slide, the correspondent and many others shot off at a tangent'.

Job applicants, who are chosen for an interview, are generally required to give a lecture. Here more than anywhere else, it is essential to deliver a carefully prepared talk; and to choose a good title so that prospective colleagues will take the trouble to attend. Understandably, at this stage in their careers, many applicants wish to speak on their thesis topic; but, ironically, thesis titles are, in some cases, long and contain unfamiliar words. A little time spent in retitling the work for a different audience may pay off enormously!

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209 - 1725 St. Laurent Blvd. Ottawa, ON K1G 3V4 Canada
T: (613) 733-2662 F: (613) 733-8994
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# ÉDITORIAL

par Srinivasa Swaminathan
*Dalhousie University, Halifax*

## Réflexion sur les titres

Dans son livre *Mathematical Apocrypha Redux*, Stephen Krantz raconte une anecdote qui s'est déroulée un jour où il était l'hôte d'un congrès sur l'éducation et qu'il présidait une séance de discussion. Quelques minutes avant de présenter la conférencière, il demande à celle-ci : « Quel est votre titre? » Ce à quoi elle répond : « Je suis professeure, mais vous pouvez m'appeler... », en donnant son prénom. Le mot « titre » ayant plusieurs sens, je préciserai que mon éditorial porte sur les titres de conférences, d'allocutions et de communications savantes.

Il arrive souvent que les listes de conférenciers soient suivies de la mention « Titre à venir ». Voilà qui est déconcertant pour les personnes qui veulent choisir les séances auxquelles elles aimeraient assister. Si le conférencier est bien connu, cela ne changera probablement pas grand-chose puisque le conférencier attirera sans doute de nombreuses personnes, peu importe le titre de sa conférence.

Un bon titre attire le public. Il arrive que les organisateurs annoncent délibérément un bon titre pour susciter l'attention. Une année où j'étais en sabbatique à l'étranger, un des conférenciers n'était pas sur les lieux d'un congrès sur l'analyse fonctionnelle et ne devait arriver que le jour de sa conférence. Il avait aussi été difficile de le rejoindre pour obtenir le titre de la conférence. Les organisateurs ont donc annoncé comme titre « Preuve de la conjecture de Poincaré ». C'était bien longtemps avant les travaux de Perelman. Au moment de la conférence, le conférencier annonce à l'auditoire : « J'aimerais bien vous parler de la conjecture de Poincaré, mais ma conférence portera aujourd'hui sur cette équation différentielle partielle », qu'il écrit alors au tableau. De nombreux participants ont alors quitté la salle en silence.

En 1933, le professeur G. N. Watson a prononcé la conférence présidentielle de la British Mathematical Association intitulée « The marquis and the land-agent; a tale of the 18th century ». Ses premiers mots ont été pour expliquer qu'il avait choisi « un titre attrayant qui n'avait pas grand-chose à voir avec le sujet comme tel ». Il avait élevé les attentes de son auditoire en promettant qu'il se tiendrait loin d'un sujet sur lequel il travaillait depuis un certain temps, mais qui était si obscur que d'en parler même à des mathématiciens les ferait fuir les lieux. Il a plutôt donné une conférence sur les arcs d'ellipse et d'autres courbes menant à des fonctions elliptiques et à des fonctions doublement périodiques. Sa conférence a été publiée dans la *Mathematical Gazette* en février 1933. Le numéro de mai de la même revue publiait ensuite un extrait du *Sheffield Telegraph* rapportant que le professeur G. N. Watson avait joué un vilain tour à une salle bondée de mathématiciens venus entendre la conférence annoncée, portant sans doute le titre le plus étrange jamais choisi pour une conférence présidentielle. Le journaliste concluait en ces termes : « dès que le professeur Watson a éteint les lumières pour présenter une diapositive, le correspondant et bien d'autres personnes ont cessé de suivre ».

Les candidats à un emploi invités en entrevue doivent généralement donner une conférence. Dans de tels cas, il est encore plus important que cette conférence soit préparée avec soin et qu'elle porte un bon titre qui incitera les futurs collègues potentiels à y assister. Évidemment, à cette étape de leur carrière, les candidats souhaitent bien souvent parler de leur sujet de thèse. Curieusement, toutefois, les titres de thèse sont parfois longs et contiennent des termes assez obscurs. Un peu de temps consacré à reformuler ce titre pour l'adapter à un public différent peut s'avérer très profitable!

## Letters to the Editors
## Lettres aux Rédacteurs

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

Les rédacteurs des NOTES acceptent les lettres en français ou anglais portant sur un sujet d'intérêt mathématique, mais ils se réservent le droit de les comprimer. Les lettres acceptées paraîtront dans la langue soumise. Les lecteurs peuvent nous joindre au bureau administratif de la SMC ou à l'addresse suivante : notes-lettres@smc.math.ca.

# BOOK REVIEW Examples of Elegance

## *Charming Proofs, A Journey Into Elegant Mathematics*

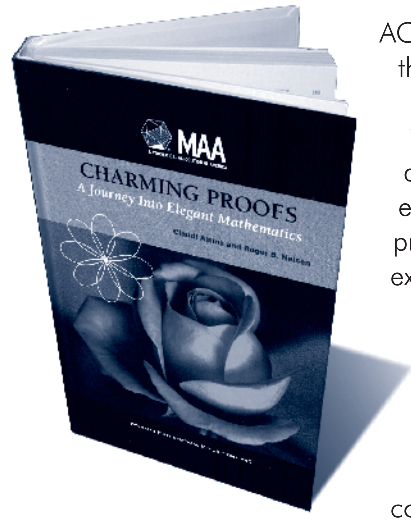
*By Claudi Alsina and Roger B. Nelson*
*Dolciani Mathematical Expositions #42*
*Mathematical Association of America 2010*
*ISBN 978-0-88385-348-1*

***Reviewed by S. Swaminathan, Dalhousie University***

Mention the word ‘proof’ in a math class of undergraduates and you will notice an allergic reaction from the students. Why do students fail to understand proofs? The reason lies in the fact that they have difficulty in grasping the need and purpose of proofs, mainly because these are not obvious to them. Any amount of explanation is of no avail due to the lack of basic knowledge of the logical principles underlying correct reasoning. Many books have been written discussing the various aspects and pointing out how ideas can be picked up from easy examples.

Many students get their first exposure to proofs from the axiomatic treatment of Euclidean geometry taught as in school. If they have had the experience of solving problems known as riders on theorems then the chances are that they would have no difficulty in understanding proofs in calculus, algebra etc. Also they get exposed to different methods of proof, such as direct proofs and reduction ad absurdum.

Proofs may be classified as routine, simple, elegant and involved. Consider the fifth proposition of the Elements of Euclid which states that the base angles of an isosceles triangle ABC are equal. The routine proof of this proposition starts with the construction of a bisector of the angle A and uses the congruence of the two triangles into which ABC gets divided. Pappus of Alexandria (c.320 A.D.) gave a proof without any construction by considering the triangles ABC and




ACB and establishing that they are congruent. One marvels at the ingenious idea of Pappus. Such a proof is regarded as elegant, whereas Euclid’s proof is routine. A recent example of involved proof is Andrew Wiles’ proof of Fermat’s Last Theorem.

The book under review presents a collection of proofs that are attractive in the sense that they are based on out-of-the-ordinary ideas that are pleasant to read. Hence the term charming proofs.

There are twelve chapters that follow a short introduction about proofs and the process of constructing proofs, a wide and varied selection of charming proofs are discussed. The chapters begin with proofs about integers and a selection of real numbers. Topics in geometry include those concerning different types of polygons. Next curves are discussed in the plane and in space followed by selections from plane tilings, proofs involving colours, and some three dimensional geometry. The concluding chapter presents a small collection of theorems, problems and proofs such as enumerability of sets, Cantor-Schröder Theorem, Cauchy-Schwarz inequality etc.

Each chapter ends with exercises, called challenges, for the reader, with solutions provided at the end of the book. Teachers would find the book very useful. Students could use it for supplementary reading.

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## *Before Sudoku: The World of Magic Squares*

*By Seymour S. Block and Santiago A. Tavares,*
*Oxford University Press, 2009, £9.99,*
*ISBN-13: 978-0-19-536790-4.*

***Reviewed by Peter J. Cameron,***
***Queen Mary, University of London***

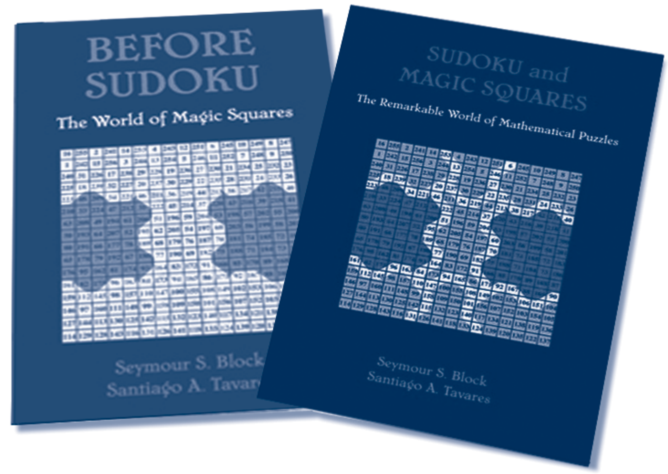
A few years ago, a supplement on Switzerland in a national newspaper included, in an item "Ten things you didn't know about Switzerland", the information that Euler invented Sudoku. In fact he didn't, but he took a crucial step on the road from magic squares (which have fascinated humankind for thousands of years) to Sudoku.

A magic square is an n × n array filled with the integers 1, 2, … , n2 in such a way that all rows, columns and diagonals sum to n (n2+1) / 2. Euler added a new construction (based on his invention, Graeco-Latin or Euler squares) to the very substantial literature on magic squares. These had been considered by Chinese, Arab and Byzantine mathematicians, and many different constructions were already known. Part of their importance came from their use as talismans, which also may have given rise to the name. A celebrated example is the magic square in Dürer's engraving Melencolia I, which was also studied much later by Benjamin Franklin.

Latin squares became an important research topic, especially in statistics where they are used in experimental design (beginning just a few years after Euler, with a study of feeding roots to sheep by Cretté de Palluel in 1788), while magic squares became mostly the preserve of recreational mathematicians. Although all the ingredients for Sudoku had been developed by statisticians studying Latin squares, it was a retired American architect, Howard Garns, who invented the puzzle Number Place in 1987. The puzzle was introduced to Japan by Maki Kaji, and re-introduced to the West by New Zealander Wayne Gould, when it became a world-wide craze.

The book under review traces some of this history (omitting most of the work by statisticians), and then turns to magic squares and their variants. The variants are of several types:

We may impose stronger conditions: for example, in a 4 × 4 square, we might also require the entries in the 2 × 2 subsquares to sum to the magic constant 34.




We may replace the rows, columns and diagonals of a square by other sets, usually defined geometrically by lines or circles in other geometric figures.

Instead of, or as well as, constant sums, we may ask for constant products, or sums of squares or higher powers.

Some magic squares can be transformed into others by reflection or other manipulation.

Many examples are given, but the book gives little insight into how the constructions are done. The authors' attitude is typified by a statement quoted approvingly from the architect Claude Bragdon: "Ours is the age of mathematics, it is the magician's wand without which our workers of magic, be they bankers, engineers, physicists, inventors could not perform their tricks."

Uses of magic squares in the arts (including the music of Peter Maxwell Davies and others) and the sciences are described.

The book is marred by several careless errors: the distance to the edge of the universe is stated to be 1088 miles, with an attribution to Martin Gardner; on page 50, a magic hexagram involving fractions, taken from a grade-five exercise booklet, is given – the authors do all the sums, but get one wrong; R.A. Fisher was at Rothamsted Experimental Station, not the University of Cambridge, when he pioneered the use of Latin squares in agricultural experiments.

The authors explain that the book is for people who enjoy Sudoku puzzles. Sad to say, it is not for mathematicians, nor for historians of mathematics.

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# BRIEF BOOK REVIEWS

by Swami Swaminathan
*Dalhousie University, Halifax, NS.*

## Analysis on Lie Groups, an Introduction

*By Jacques Faraut*
*Cambridge Studies in Advanced Mathematics 110*
*ISBN 978-0-521-71930-8, US $ 80.00*
*Cambridge University Press 2008*

Many books deal with the theory of Lie groups. The present one is an introductory text that is not concerned with the general theory which needs a knowledge of differential manifolds. Instead the book presents a study of linear Lie groups, i.e., groups of matrices, defined as a subgroup of the linear group GL(n, R). The exponential map makes it possible to associate to a linear Lie group its Lie algebra, which is the subalgebra of the algebra of square matrices M(n, R) endowed with a bracket $[X,Y] = XY - YX$. Then every linear Lie group is a manifold embedded in the finite dimensional vector space M(n, R). The Haar measure of such a group is built in terms of differential forms, and these are used to establish several integration formulae, linking geometry and analysis. The basic properties of irreducible representations of compact groups, i.e., the Peter-Weyl theory, are first presented in a general setting, and then described explicitly in the case of the simplest non-commutative compact Lie groups: the special linear group SU(2), and the special orthogonal group SO(2), then further in the case of the unitary groups U(n). The topics in analysis are based on the Laplace operator. Fourier analysis on a compact linear Lie group provides a diagonalisation of the Laplace operator. Similarly analysis on the sphere in $R^n$ uses the spherical harmonic decomposition, and makes clear the interaction which exists between the orthogonal group O(n) and Fourier analysis on $R^n$.

Each chapter is followed by numerous exercises. The book will be useful for advanced undergraduates and graduates in geometric analysis, harmonic analysis and representation theory. The tools developed will also be useful for specialists in stochastic calculations and statisticians. It can be used as a text for graduate courses on Lie groups.

## Partial Differential Equations for Probabilities

*By Daniel W. Stroock*
*Cambridge Studies in Advanced Mathematics 112*
*ISBN 978-0-521-88651-2, US $ 55.00*
*Cambridge University Press 2008*

In 1931 A. N. Kolmogorov showed that partial differential equations are the engine that drives the machinery of Markov processes. Until these equations are solved the abstract theory remains a collection of 'if, then' statements waiting to be verified that they are not vacuous. Unfortunately for probabilists, the verification usually involves ideas and techniques which they find unpalatable. In the present book the author, who is well-known for his contributions to many areas in probabilistic analysis, provides probabilists with a few tools with which they can understand how to prove on their own some of the basic facts about partial differential equations which arise in their work. The first two chapters discuss the existence and uniqueness of solutions to Kolmogorov's equations. Chapter 3 is concerned with the regularity properties of the solutions to Kolmogorov's equations with smooth coefficients which are uniformly elliptic. Chapter 4 develops quite sharp upper and lower bounds on the transition probability using a methodology, from calculus of variations, that has essentially nothing to do with probability theory. Chapter 5 returns to probabilistic techniques to localize the results proved earlier. A further application of the localisza-tion procedure is discussed in chapter 6. The concluding chapter, Chapter 7, uses techniques derived from Fourier analysis beginning with a resumé of Sobolev spaces. Pseudodifferential operators are also introduced to prove far-reaching extensions of Weyl's Lemma for the general, scalar-valued, elliptic operators, and then following J. J. Kohn, for an interesting class of second order, degenerate operators with real coefficients. This latter extension, due to Lars Hörmander, is the one of great interest to probabilists.

Each chapter ends with "Historical Notes and Commentary.' The book can be used for advanced graduate courses in probability theory.

## Conformal Fractals: Ergodic Theory Methods

*By Feliks Przytycki and Mariusz Urbański*
*London Mathematical Society Lecture Series 371*
*ISBN 978-0-521-43800-1, US $ 78.00*
*Cambridge University Press 2010*

This book is an introduction to the theory of iteration of expanding and non-uniformly expanding holomorphic maps and topics in geometric measure theory of the underlying invariant fractal sets. Probability measures on these sets yield information on Hausdorff and other fractal dimensions and properties. Beginning with a comprehensive chapter on abstract ergodic theory the book contains chapters on uniform distance-expanding maps and thermodynamical formalism. This material is applicable in many branches of dynamical systems and related fields, far beyond the applications discussed in the book.

Developed from university courses taught by the authors, the book can be used for graduate courses. Exercises are provided. It will be a valuable reference guide to researches in the large and rapidly expanding field of fractals.

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

The initial year of our editorship winds up with this issue. Readers are reminded that *Education Notes* thrives with the contributions from a broad representation of the mathematical community. Please send ideas, stories, and suggestions to Jennifer or John to sustain the strength of Education Notes. Here we wish to express appreciation to individuals who have helped us along in 2010 with contributions of articles or editorial support, among them: Laura Alyea, Ed Barbeau, Egan Chernoff, Karla Culligan, Malgorzata Dubiel, Paula Kristmanson, Steve Larocque, Susan Latreille, Josée Le Bouthillier, Michelle Manes, Annie Savard, Alyssa Sankey, Angela Siegel, Amar Sodhi, Shannon Sullivan, Peter Taylor, Harley Weston, and Lily Yen.

## *Bringing Mathematics Departments and Schools Together: Outreach as Bridging*

Outreach activities occur in many forms all across Canada. This issue of *Education Notes* features four examples of outreach that connect university mathematicians with school communities of teachers and students at elementary, junior, and secondary levels. An invitation was sent out to the four authors (Amar Sodhi, Shannon Sullivan, Angela Siegel and Lily Yen), each of whom graciously provided a short article offering glimpses into outreach in their respective endeavours. Here we share those examples from two areas of Newfoundland and Labrador, Nova Scotia, and British Columbia respectively.

## *Junior High School Math Fair*
### *by Amar Sodhi*
### *Mathematics*
### *Grenfell Campus, Memorial University of Newfoundland*

Mathematicians from both campuses of Memorial University of Newfoundland have a long tradition in providing enrichment for students in the school system. Before describing a recent initiative for Junior High School students done in partnership with the Western Regional School District, I would like to give two examples of ongoing enrichment activities within the province.

Those of you familiar with any of volumes 3, 6 and 8 of the Canadian Mathematical Society's *ATOM* series will be aware that Newfoundland and Labrador has a High School Math League, a problem solving event (established in 1987) at which teams from schools compete against each other in their region (four times annually) hoping to advance to the provincial final. Most of the problems to date have been set by Bruce Shawyer, Peter Booth and John Grant McLoughlin. This year the Provincial Final was held in Corner Brook and I was fortunate to witness the enthusiasm of all participants (see http://web.wnlsd.ca/enrichment/senior_high_prov_2010.htm).

Students at Math League Final 2010 in Corner Brook

Closer to home, Sir Wilfred Grenfell College (SWGC) has hosted a Regional Math Camp, a CMS sponsored event, almost every year since 2001. This three-day event consisting of talks, games and a contest is aimed at the grade 10 audience. Each school in the Western region of Newfoundland along with those in Southern Labrador is invited to send up to two eligible students. Not every school takes advantage of the invitation, but the camp usually attracts about 30 students including some who have to undergo both a boat ride and a long journey overland to get to Corner Brook. This selection policy may be a disadvantage to talented students in the (relatively) urban areas, but it does mean students from remote areas are exposed to "non-curriculum" mathematics which is an important facet of outreach. http://cms.math.ca/MathCamps/Past/report01/reportswc.pdf is the link to a report of our inaugural camp.

Based on my interest and experience in promoting the recreational side of mathematics within the school system, I approached Terry Pike, the itinerant for enrichment with the Western School District, with the idea of having me host a "math show" designed for students in grade 9. This idea was enthusiastically received by Terry and hence, the 2008 Western Newfoundland "Junior High School Math Fair" was born.

Because of the immense area of the School District, it was decided that we needed two performances for our inaugural year; one staged in Corner Brook, serving schools south of Deer Lake and another held in Plum Point (some 400 km north of Corner Brook) to accommodate schools on the Northern Peninsula and in Southern Labrador. About 60 students and ten teachers were to be accommodated at each site for the day-long event. Teacher involvement was important to the Western School District as the hope was teachers would find something new to take back to the classroom. To facilitate this, Terry arranged for a handbook to be issued which gave details of the various activities that were planned for the day. Although, Sir Wilfred Grenfell

College did provide some assistance, the Western School District covered most of the costs associated with the Fair. The costs included transportation and renting a venue for the Plum Point performance. Some students had to endure a three-hour journey on a yellow school bus to get to the event. The Fair itself had two main components: a session on games and a session on arithmetic and logic.

In the morning session, after welcoming remarks and a little bit of "mathemagic", the students were split into small groups to play and analyze combinatorial games such as Nim, Chomp and Sprouts. After a nutrition break other type of games were examined including a Pentomino game; a pursuit game adapted from a puzzle in Ravi Vakil's *Mathematical Mosaic*; and "Four in a Row", a variant of Go-Moku with an arithmetic twist. The nature of the games naturally meant that the students were split into pairs, but quite often two or three pairs would join together to embark on the analysis part of the game. I had four helpers (a math lab assistant and 3 upper year students from SWGC) to keep the young mathematicians on track. Before lunch, there was a general wrap-up session and I also gave an example of the art of sacrificing in the game of dots and boxes.

Arithmetic and logic come to the fore when faced with a Killer Sudoku. So after lunch, I confronted the students with three sample Killer Sudokus. I went through an example that allowed me to demonstrate what the sum of the first n integers is. After the initial Killer Sudoku, I had a bit of time to give a couple more puzzles that made use of the summation formula. All in all, the students experienced a day of mathematics quite different from what they expected.

After the success of the October 2008 Math Fairs we held another two (in Corner Brook and Stephenville) the following year. Currently, I am working on a "Math Decathlon" event to take into the elementary schools. Suggestions, please!

*Amar Sodhi is an Associate Professor at Grenfell Campus, Memorial University of Newfoundland (formally known as Sir Wilfred Grenfell College) where he has been since 1993. Outside mathematics, his interests include chess and cricket.*

### *Math Leagues*

*by Shannon Patrick Sullivan*
*Mathematics & Statistics*
*Memorial University of Newfoundland*

"Mathematics is not a spectator sport" is a popular mantra amongst mathematics educators. But it's not a solo sport, either. The popular perception of mathematicians is of researchers squirrelled away in their offices, hunched over a computer or a pad of paper, spending their working lives in virtual isolation. Of course, the truth of the matter is that this is rarely the case: mathematics is a tremendously collaborative field, inviting cooperation both intra- and inter-disciplinary in nature. Great results are often the culmination of teamwork, not solitary endeavour.

The importance of working together to understand, appreciate and solve mathematical problems is the driving force behind the Newfoundland and Labrador Senior and Junior High Math Leagues. An initiative of the Mathematics Special Interest Council of the Newfoundland and Labrador Teachers' Association (NLTA), the Senior High Math League was founded in 1987, and has been supported from the outset by members of the Department of Mathematics & Statistics at Memorial University of Newfoundland (MUN). Originally based only in the St John's area, the Senior High Math League quickly spread throughout the province, and was joined in 2004 by the Junior High Math League.

Cooperation is at the heart of the Math League concept. Schools do not send individual competitors, but instead are represented by teams of four students who work together throughout the game. The lion's share of the competition consists of a series of ten problems (or eight problems in the case of the Junior High League). Initial problems are usually fairly straightforward, and the level of difficulty normally escalates throughout the game. Unlike most post-secondary math competitions, the students work on these ten questions one after another—only after all teams have completed the first problem is the second problem distributed, and so on. Furthermore, only a final answer is required, as opposed to a detailed solution—so students can avail themselves of a number of approaches, including blind luck!

Students are allotted a certain amount of time to work on each question. This interval typically ranges between three and eight minutes, and is announced immediately prior to the problem's distribution. During this time, it is up to the members of each team to decide how they will approach the question. Should all four students discuss the problem and try to solve it together? Should they work on it individually and then compare results?

Different teams find success with different strategies, but it is rarely beneficial for the four students to work entirely on their own. This is because the scoring system used for the Math League encourages the team to agree on a final answer. Each team member is permitted to submit an individual response, but in this case only one point is granted per correct solution. Thus, if there is dissension amongst the team, the best they could hope for would be to score three points. If the four students agree on the answer and correctly submit a joint solution, however, the team earns *five* points—one for each team member, plus a bonus point for working cooperatively.

Once an answer has been collected from each team, a correct solution is demonstrated for the students. For many years, this duty fell to the faculty members from Memorial University, or to the senior undergraduate and graduate students who would often come along to a Math League game to help out. In recent times, however, the competitors themselves have been encouraged to present their solutions, thus providing them with a rare opportunity to engage in public speaking of a mathematical bent. (As added inducement, prizes may be offered for the most polished presentations!)

Once ten questions have been completed in this manner (divided into two halves by a nutrition break), a final series of questions called the "Relay" is held. This consists of four problems, and this time they are distributed together. However, the answer to the first question is required as input to the second question, and so on, meaning that the problems must be completed in order. Furthermore, cooperation now becomes even more important, because the students are no longer permitted to disagree; they *must* submit a team answer to each of the four questions. The students are given extra time to complete the Relay—a full twenty minutes—but bonus points are allotted to teams that finish the Relay swiftly. Otherwise, teams earn five points if they answer all four questions correctly; if not, they earn one point for each valid response. To further assist the competitors, once they have completed all four questions, they will be told if there are any errors, and if so, they can go back and try to find their mistake as long as time remains on the clock. However, the incorrect response is not identified for them—they have to determine where they've gone wrong on their own. Between the initial set of questions and the Relay, teams can earn up to 65 points (55 points in the Junior High League). The team that scores the highest wins the game; in the case of a tie, a sudden-death tiebreaker is held.

A season in the Junior High League consists of two standalone games. In the Senior High League, four games are held throughout the year. At the end of the season, each school's scores are added together; the top two teams in each provincial zone then meet for a Provincial Championship game, at which the problems are typically somewhat more challenging than in the regional competitions. The Provincial Championship is held as part of a weekend of activities, giving Newfoundland and Labrador's best and brightest math students the opportunity to interact.

It's not just the students who benefit from Math League, however. The competitions offer an excellent chance for MUN faculty members to meet and dialogue with junior high and high school math teachers, who accompany their teams to the games. Beyond the welcome opportunity to simply spend some time in the company of fellow mathematics educators, this represents an invaluable forum to discuss matters of curriculum and learning approaches. This has never been more important than in an era when the gap in mathematics expectations between secondary and post-secondary education appears to be ever-widening.

For more information about the NLTA Junior High and Senior High Math Leagues, please visit www.math.mun.ca/~mleague .

*Shannon Patrick Sullivan is a Visiting Assistant Professor in the Department of Mathematics & Statistics at Memorial University of Newfoundland, and is part of the team of faculty members who prepare each Math League game. He is also a Math League alumnus.*

## *Math Circles*

*by Angela Siegel*
*Mathematics & Statistics*
*Dalhousie University*

In Halifax, Nova Scotia, Math Circles has been an active part of Dalhousie University's outreach for the past seven years. Math Circles began with the efforts of graduate students, Richard Hoshino aided by Sarah McCurdy, who were later joined by Professor Richard Nowakowski. Math Circles was modeled after successful programs at Waterloo, Western, Harvard and Berkeley. At that time and for the first several years of the program, Math Circles events took place on the Dalhousie campus and primarily benefitted the local high school community. Approximately five sessions were held throughout the school year. Events took place on Wednesday evenings, lasting about 2 hours with a break for pizza in the middle. During its pilot year, there were approximately 10 to 20 participants per session, with roughly half of the participants being high school teachers. At that time, a minimal fee was in place for the events to cover the cost of pizza.

Since that time, Math Circles has grown extensively. However, these local sessions remain. The sessions consist of interactive lectures and activities led by volunteer faculty and graduate students from Dalhousie. The goal of the program is to foster interest in mathematics among enthusiastic high school students and to expose them to mathematics beyond the high school curriculum.

Five years ago, I took over as coordinator of Math Circles. In the past three years, interest in the events has grown and local events have taken place 10 times per school year on a monthly basis. Attendance has grown with 30 to 60 students attending each event. For several years, Dalhousie University funded the program fees, allowing the events to be run at no cost to the high school participants.

Teachers from across Nova Scotia had asked to have the program delivered to their region so that students outside of the Halifax region could benefit from it. In order to accommodate that request, additional funding was required to support the many travel costs associated with the expansion. Amazingly, the Imperial Oil Foundation donated the funds necessary to make the dream of this expansion a reality.

Over the past year, Math Circles began the expansion project, replicating the experience in the classroom for students and teachers around the province. By expanding the program and taking it out to the schools, the program has been able to reach more students and significantly increase its impact.

Internally, four primary staff run Math Circles including myself who serves as Program Director with a responsibility for the general organization and direction of the program. Through contact with Regional School Board members, teachers and math consultants, and monthly meetings with the Dalhousie Faculty of Science outreach team, I have worked to establish the Math Circles name beyond the reach of the Halifax borders. Richard Nowakowski, professor and Mathematics Outreach Coordinator for Dalhousie University, acts as the liaison between our program and the university. Dr. Dorette Pronk is serving as our Presentation Leader. Danielle Cox, a Ph.D. candidate in mathematics, has joined the team and is responsible for coordinating local Dalhousie events and assisting with presentations on the road.

The program is developing approximately 12 dynamic sessions, including plans for teachers, lectures, activities and presentation materials. Presentations will be flexible enough to adapt for students at various levels in grades 10, 11 and 12. Sessions include activities that involve physical movement, music, model building, technology, handouts, collaboration, teamwork, as well as discussion and questions. The activities dovetail with the math curriculum, expanding on topics covered in class. What sets these presentations apart from regular classroom lessons is that they are like performance art. Students attending the sessions are engaged; they laugh and have an entirely new experience with mathematics. Not only do they learn new concepts, but they also learn to think about math differently.

This past school year marked the exciting start to our ability to take Math Circles on the road. Geographically, the program's coverage of the province has grown; presentations were given in Nova Scotia schools from Sydney to Bridgewater and Digby. Over the school year, Math Circles was able to present to students from 23 different schools throughout 6 of the 7 Regional School Boards in Nova Scotia. In Cape Breton alone, we were able to visit 7 of the 10 schools in the Cape Breton Regional School Board as well as 3 First Nations schools in that region. In total, we gave 15 presentations over our time there to a total of 410 students. In addition to geographic growth, the breadth of students that we are reaching has also grown. Instead of reaching exclusively the students that were already passionate about mathematics, we are now able to reach the entire class spectrum. As such, we can attempt to ignite an enthusiasm for the subject in students that had not previously been as interested.

This year, we were also able to host three full-day events for schools that were able to bus their students in to the Dalhousie campus. The new initiative was called Math Fun Days and will become an annual event. For its inaugural year, the event was a tremendous success with 166 students attending from 11 schools, representing 5 of the 7 Regional School Boards within Nova Scotia. The event consisted of 3 separate days of mathematical fun. Initially planned as a 2-day event, the wait list became so large that a third day was also filled.

As Math Circles moves forward into the next school year, we are ready for bigger and better things. We hope to make use of our new connections within the School Boards. We look forward to producing several new lessons. We plan to further promote and make available the materials that we are creating over this school year by making them available on our website.

For further information or to contact Math Circles, please visit our website: www.nsmathcircles.com

*Angela Siegel is a PhD student in Mathematics at Dalhousie University. Her research is in Combinatorial Game Theory with graduation expected in May 2011. She is in her sixth year of running Math Circles and took on the role of Program Director when the program began its province-wide expansion project in the summer of 2009.*

## *SNAP Math Fairs*

*by Lily Yen*
*Mathematics & Statistics*
*Capilano University*

The students in Math-190, Mathematics for Elementary School Teachers, at Capilano University have hosted SNAP math fairs twice a year since the fall of 2007. When the idea of holding a SNAP math fair was introduced to the math department at Capilano University, the major concern was adding a new outreach program in addition to the Finals meet for the British Columbia Secondary School Mathematics Contest, a monthly Mathematics Enrichment talk for high school students, and regular local high school math teachers' meetings. After much discussion, Capilano's math department decided to try it once for the benefit of our students in the education program.

The steps in developing a SNAP math fair are roughly as follows:

1. Decide on a common theme for all puzzles, like "In the circus", "Children's literature", etc.
2. Organise groups of Math-190 students to each prepare an engaging math puzzle, making sure that the puzzles are not number-based. The groups can choose from the math fair booklet, which contains a collection of good puzzles with answers, or they can choose from the math fair website which has more resources for puzzles, or they can create their own puzzle.
3. Rephrase the chosen puzzles on the common theme.
4. Develop a variety of levels of difficulty for each puzzle. This is done by a different group than the one that created the particular puzzle.
5. Enable coaching of the solver by developing skills in giving very small hints.
6. Develop displays and rehearse among the student teachers to test durability of manipulatives.

The philosophy of the SNAP math fair is to provide students an opportunity to enjoy mathematics through interesting and challenging puzzles using all their thinking abilities, not just number based skills learned in school. The acronym, SNAP, stands for Student-centred, Non-competitive, All-inclusive, Problem-based. Therefore, the presenter's goal is to lead the solver to success on his or her own. As a result of preparing for the SNAP math fair, Math-190 students expand their idea of mathematics from number based, technical drills according to some mysterious formulae to a wide variety of logical, spatial problems. In the process of preparation for the math fair display, they also learn to teach mathematics by coaching the solver instead of solving the problem and then asking the person to mimic the procedure. On the day of the fair, our math education students have the opportunity to communicate mathematics with school children and to witness the excitement of the children solving engaging puzzles.

When the first invitations to our SNAP math fair were sent to the North Vancouver school district, the overwhelming response from teachers and school principals showed us that the SNAP math fair was to continue indefinitely. We not only filled all the spots in the fall math fair; even the spring math fair was nearly filled.

Our university students take the math fair very seriously, unlike making poster projects for the instructor only. They create well-designed puzzles that are beautifully displayed and dress up for the occasion on the day of the fair to attract more elementary school students to their booths. When the fair opens, and all the elementary school children rush in with their excitement and enthusiasm to try as many puzzles as possible, and some puzzles, more than once, our students replace their nervousness and worries by the fun of sharing their wonderful puzzles with the visitors. By the end of the day, no presenter has an audible voice.

While the school children are entertained and challenged, their accompanying teachers are invited to a small room for some refreshments and a little talk about how to run a SNAP math fair with their own students in their schools. Many teachers in North Vancouver hold SNAP math fairs regularly as a result of visiting Capilano's SNAP math fair. Last spring, we even heard of a French Immersion program holding the first French/English SNAP math fair.

Capilano University is blessed with a wonderful film department that produces award winning documentary film students. With the help of the film department, we also produced a documentary DVD the first year we held the SNAP math fair to share the reactions of Math-190 students and instructors with other teachers who would like to run a SNAP math fair. The DVD begins with the announcement and preparation and ends with rehearsals and the actual fair presentation for school children. Montroyal Elementary School in North Vancouver agreed to be filmed as one of the elementary schools that took the SNAP math fair idea back to their school and held a math fair themselves. The DVD also includes the reactions of their teachers and students through the process of making the fair.

SNAP math fair has brought our math department surprising results. We meet some of our former students as teachers bringing students to our fair and receive great teaching tips from visiting elementary school teachers. The semi-annual event has opened doors for sharing mathematics with teachers and students in elementary schools.

Taking the first step often involves anxiety and uncertainty. However, the first step towards holding a SNAP math fair will prove very rewarding for all involved.

For more information about SNAP math fairs visit www.mathfair.com

For a trailer of the DVD, please visit the website www.capilanou.ca/programs/math/SNAP.html, or search in YouTube for SNAP math fair.

*Lily Yen visited SNAP Math Fair at University of Alberta in March of 2007 and brought it back to Capilano University where she has taught for ten years. Though trained and still working in combinatorial enumeration, Lily enjoys teaching teachers how to teach mathematics and has her own experimental classes teaching mathematics to elementary school children.*

## FROM THE VICE PRESIDENT'S DESK *continued*

online calculus and statistics texts that are perfectly adequate resources for a standard course. Downloadable as PDF files, these books can be printed in hardcopy or simply read on the student's laptop.

More importantly, if we start recommending cheaper alternatives to our students, publishers should respond by developing and offering truly affordable textbooks. I really appreciate all the work that our book publishers do for us in providing a wide selection of outstanding textbooks for our many, varied courses—but we have to address costs as well. If Schaum can produce a 550 page calculus or statistics review book for $23.95, why can't a publisher come up with a complete calc text for a similar price. Paperback, black and white, to keep the costs low, but still with exercises and solutions.

A calculus text, a stats text, only lasts a semester or two for our students; it should not cost as much as an iPod!

# DU BUREAU DU VICE-PRÉSIDENT

**Michael Lamoureux**
*Calgary*

## DES LIVRES, DES LIVRES ET ENCORE DES LIVRES.

Au début des classes cette année, la première question que m'ont posée mes étudiants dans tous mes cours était la suivante : « Doit-on acheter le livre? ».

Bien sûr, vous devez acheter le livre. La réponse me semble évidente, non? C'est une référence utile qui porte sur tout ce que nous abordons en classe, je leur dirais. On y examine de plus près les sujets qu'on ne peut aborder en détail dans le peu de temps qui nous est accordé en classe. On y compte de nombreux exemples et exercices utiles, signale des ressources en direct dans certains cas et j'en passe. Pourquoi voudrait-on se priver du livre?

Mais ce sont les coûts, me disent-ils : 160 $ pour un ouvrage sur le calcul infinitésimal, 180 $ pour un ouvrage sur les statistiques, 200 $ pour un livre de mathématique discrète de première année. Même le merveilleux texte d'analyse sur lequel je fonde mes enseignements cette année coût 150 $. C'est une paye complète pour quelques-uns des mes étudiants qui doivent travailler pour payer leurs études.

Ça me paraît un peu cher. Par curiosité, j'ai vérifié ce que me coûtaient mes textes quand je faisais mes études de premier cycle, il y a une trentaine d'années de cela. C'était 18,63 $ pour un ouvrage sur l'algèbre abstraite, 23,05 $ pour l'analyse de Royden et, le plus cher, 27,80 $ pour un livre classique sur l'électromagnétisme. (Ce qui me fait le plus peur, c'est qu'après toutes ces années, j'ai toujours ces manuels, et le prix y est toujours indiqué!) Si je fais les ajustements pour tenir compte de l'inflation, ces vieux ouvrages se vendraient aujourd'hui en 2010 entre 48 $ et 72 $. C'est bien au-dessous des 150 $ à 200 $ qu'il faut verser pour acheter les manuels de cours aujourd'hui.

Mais que ce passe-t-il au juste? à coup sûr, les avances technologiques au cours des 30 dernières années auraient dû faire baisser le prix des bouquins et non pas le tripler.

Oui, je conviens qu'on vit dans une société où prime l'économie de marché et que les prix sont fixés selon ce que peut endurer le marché. MAIS – en notre qualité d'enseignants de ces cours, NOUS fixons le marché! En choisissant un manuel de cours qui coûte 150 $ à 200 $ et en exigeant que les étudiants achètent le texte, nous établissons le marché – et faisons accepter des prix très élevés. Il ne s'agit pas non plus de petites sommes – à l'institution où j'enseigne à elle seule, il en coûte facilement un demi-million de dollars pour n'acheter que les ouvrages sur le calcul infinitésimal pendant un trimestre.

Le moment est venu de revoir cette question. Le coût des manuels de cours est significatif et représente une grande partie de ce qu'un étudiant doit verser aujourd'hui pour payer ses études universitaires. Comme enseignants, nous ne rendons pas de service aux étudiants en ne tenant pas compte du prix des manuels que nous exigeons pour nos cours et des effets de nos décisions sur le budget des étudiants.

À quel point mon cours sur l'analyse serait-il différent si je choisissais une solution moins coûteuse? Par exemple, la maison d'édition Dover offre une excellente collection de textes de mathématique à bon prix – bien souvent des ouvrages classiques qui ont été réimprimés sans couverture rigide et sont vendus à moindres coûts. Pourrais-je donner un bon cours d'analyse en utilisant les *Foundations of Mathematical Analysis* de Dover? (Johnsonbaugh et Pfaffenberger, vendu 30 $.) Avec mes connaissances spécialisées et cet excellent ouvrage, je suis certain que le cours irait fort bien. Est-ce que mon cours sur le traitement du signal numérique se donnerait aussi bien si je n'employais que mes propres notes d'enseignement et une copie sans couverture rigide du DSP Outline publié par Schaum et ne coûtant que 23,95 $? Si je devais réapprendre le calcul infinitésimal, est-ce que j'achèterais le manuel de cours recommandé coûtant 150 $ ou serais-je satisfait d'acheter une copie d'occasion de Stewart à 2 $ au centre des livres usagés de l'Union des étudiants? On retrouve sur le Web des ouvrages gratuits sur le calcul infinitésimal et les statistiques. Ils sont parfaitement adaptés à un cours normal. Téléchargeables sous forme de fichier PDG, ces ouvrages peuvent être imprimés ou tout simplement lus sur ordinateur portatif.

Plus important encore, si nous commençons à recommander des versions moins coûteuses à nos étudiants, les maisons d'édition devraient s'adapter en mettant au point et en offrant des manuels de cours vraiment abordables. J'apprécie beaucoup tout le travail de nos éditeurs de livres qui nous offrent un large éventail de manuels de classe de qualité exceptionnelle pour nos nombreux cours des plus variés… mais il faut aussi tenir compte des prix. Si Schaum peut offrir un ouvrage de 550 pages sur le calcul infinitésimal ou les statistiques à 23,95 $, pour quelles raisons une maison d'édition n'arriverait-elle pas à offrir un texte sur le calcul infinitésimal à un prix semblable. Une version sans couvert rigide, en noir et blanc pour réduire les coûts, mais comptant toujours des exercices et des solutions.

Un texte sur le calcul infinitésimal, un texte sur les statistiques ne dure qu'un trimestre ou deux pour nos étudiants; ils ne devraient pas coûter autant qu'un iPod!

# RÉUNION D'ÉTÉ SMC 2011 CMS SUMMER MEETING

June 3-5 , 2011
University of Alberta (Edmonton)

## Scientific Directors / Directeurs scientifiques:

Volker Runde (University of Alberta)
vrunde@ualberta.ca, T: 780-492-3526

Hassan Safouhi (University of Alberta)
hassan.safouhi@ualberta.ca, T: 780-485-8631

## Prizes and Awards / Prix

Prix Krieger-Nelson Prize - Rachel Kuske (UBC)
Prix Jeffery-Williams Prize - Kai Behrend (UBC)

## Public Lecture / Conférence publique

Ron Graham (UC-San Diego)

## Plenary Speakers / Conférences plénières

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)

The following sessions have been confirmed for this conference:

**Applicable Harmonic Analysis and Approximation Theory**
Org: Bin Han (Alberta)

**Asymptotic Geometric Analysis and Convex Geometry**
Org: Alexander Litvak, Nicole Tomczak-Jaegermann, Vlad Yaskin (Alberta)

**Banach Spaces and Operators Between Them**
Org: Edward Odell (Texas), Thomas Schlumprecht (Texas A&M), Vladimir Troitsky (Alberta)

**Computational Partial Differential Equations**
Org: Youssef Behlhamdadia, Peter Minev (Edmonton)

**Dynamical Systems**
Org: Arno Berger, Hao Wang (Alberta)

**Geometry and Physics**
Org: Charles Doran, Vincent Bouchard (Alberta)

**Lie Theory**
Org: Terry Gannon, Nicolas Guay (Alberta)

**Mathematical Finance**
Org: Tahir Choulli, Alexander Melnikov (Alberta)

**Mathematics Education**
Org: to be confirmed

**New Mathematical Tools for the Modeling of Cellular Processes**
Org: Thomas Hillen (Alberta)

**Operator Algebras**
Org: George Elliott (Toronto), Cristian Ivanescu (Edmonton)

**Contributed Papers**
Org: to be confirmed

Les sessions suivantes ont été confirmées:

**Analyse harmonique appliquée et théorie d'approximation**
Org: Bin Han (Alberta)

**Analyse géometrique asymptotique et géométrie convexe**
Org: Alexander Litvak, Nicole Tomczak-Jaegermann, Vlad Yaskin (Alberta)

**Espaces de Banach et des opérateurs entre eux**
Org: Edward Odell (Texas), Thomas Schlumprecht (Texas A&M), Vladimir Troitsky (Alberta)

**Équations différentielles computationnelles**
Org: Youssef Behlhamdadia, Peter Minev (Edmonton)

**Systèmes dynamiques**
Org: Arno Berger, Hao Wang (Alberta)

**Géométrie et physique**
Org: Charles Doran, Vincent Bouchard (Alberta)

**Théorie de Lie**
Org: Terry Gannon, Nicolas Guay (Alberta)

**Finance mathématique**
Org: Tahir Choulli, Alexander Melnikov (Alberta)

**Éducation mathématique**
Org: à venir

**Nouveaux outils mathématiques pour modélisation des processus cellulaires**
Org: Thomas Hillen (Alberta)

**Algèbres d'opératures**
Org: George Elliott (Toronto), Cristian Ivanescu (Edmonton)

**Communications libres**
Org: à venir

## LONG RANGE PLAN FOR MATHEMATICAL AND STATISTICAL SCIENCES

In June 2010 NSERC requested that the mathematical and statistical sciences community prepare a long range plan for a five- to ten-year horizon. The exercise will be funded by NSERC, and draws on the expertise of the Canadian Mathematics Society, the Statistical Society of Canada, and the Canadian Industrial and Applied Mathematics Society, the Fields Institute, the Pacific Institute for the Mathematical Sciences, the Centre de Recherches Mathématiques, the Banff International Research Station and the communities of researchers in applied mathematics, pure mathematics and statistics.

A steering committee has been established to oversee the development of the long range plan. The membership of the steering committee is:

Alejandro Adem (PIMS), Edward Bierstone (Fields), Eddy Campbell (UNB) Charmaine Dean (SFU), Christian Genest (McGill), Niky Kamran (McGill), Rachel Kuske (UBC), Mark Lewis (U Alberta), Nancy Reid (U of T; Chair), Gail Ivanoff (NSERC Group Chair, ex-officio), Anne-Marie Thompson (NSERC, ex-officio).

The terms of reference for the long range plan have been posted to the Long Range Plan website (www.longrangeplan.ca), which will be the primary source of information about the process, and one of the most important means of communicating with the various communities. Links to this website have been added at the websites of the societies, institutes, and BIRS, and many academic departments. All relevant documents will be available there; please feel free to forward additional suggestions to Nancy Reid.

Consultation with the communities will include presentations at society meetings, town hall meetings, regular written updates, email notifications using society mailing lists, and the discussion forum available on the web site.

The goal is to complete the exercise by January, 2012. To this end, we are aiming to present a detailed outline at the summer 2011 meetings of the societies, and to have a draft plan for circulation to the communities by September, 2011.

Comments and ideas are welcome at any time, and may most easily be submitted via the website, but may also be sent to any member of the steering committee.

This is an important and exciting opportunity for the community to set out its goals and aspirations, and to influence policy for mathematical sciences research in Canada. It can only succeed with wide participation and creativity, and we urge you to take part in the process.

Nancy Reid,

On behalf of the Long-range Plan Steering Committee.
October 3, 2010.

## 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 2011, 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 2011, 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

## Lecturer - Statistics

The Department of Computer and Mathematical Sciences, University of Toronto Scarborough, invites applications for a full-time position in Statistics at the rank of Lecturer, to begin **July 1, 2011**.

Responsibilities include lecturing, conducting tutorials, grading and curriculum development in a variety of undergraduate courses. Candidates should have a post-graduate degree in Statistics or a related field, and must demonstrate potential for excellence in teaching at the undergraduate level. Salary will be commensurate with qualifications and experience.

Appointments at the rank of Lecturer may be renewed annually to a maximum of five years. In the fifth year of service, Lecturers shall be reviewed and a recommendation made with respect to promotion to the rank of Senior Lecturer.

Application materials, including curriculum vitae, a statement of career goals and teaching philosophy, at least three letters of recommendation and evidence of teaching excellence, must be submitted online at www.mathjobs.org, preferably well before our deadline of **March 1, 2011**.

For more information about the Department of Computer & Mathematical Sciences, please visit our home page (www.utsc.utoronto.ca/~scms.)

The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, members of sexual minority groups, and others who may contribute to the further diversification of ideas. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

# In Memoriam / En mémoire

It was with great sadness that the Canadian Mathematical Society learned of Richard Kane's passing on October 1, 2010. Richard Kane was a lifetime member of the CMS and was deeply dedicated to the work of the Society. He was the CMS president from 1998 to 2000, and during his membership served as chair of the Finance, International Affairs, Nominating, and Research committees. He was also an associate editor of the CMS *Books in Mathematics series*. In 2006, he received the *CMS Distinguished Service Award* and the inaugural *David Borwein Distinguished Career Award* for his outstanding service to the CMS, for his significant research accomplisments and for his many contributions to the Canadian mathematical community.

Richard's contributions to the mathematical community are numerous and extensive. He served as scientific convener of the 1996 NSERC Review of Canadian Mathematics and chaired and served on numerous NSERC committees for the mathematical sciences. His efforts in these positions raised government and public awareness of the importance of mathematics in Canada and secured and enhanced funding for mathematical research. Richard was also a member of the Royal Society of Canada and a Fields Institute Fellow.

Richard had taught at the University of Western Ontario since 1980 and served two terms as Chair of the Mathematics Department. He was a dedicated teacher and supervised four PhD theses. He was well known for his research in the field of algebraic topology.

The CMS extends its deepest condolences to Richard's family and friends. As expressions of sympathy, the family invites memorial donations to www.kidneycancercanada.org.

A tribute from Richard Kane's colleagues will be included in the February 2011 issue of CMS Notes.

Richard Kane

C'est avec grand regret et tristesse que la Société mathématique du Canada apprend le décès de Richard Kane le 1ier octobre 2010. Richard Kane était membre à vie de la SMC et était très engagé au travail de l'organisme. Il a été président de la SMC de 1998 à 2000, et, pendant qu'il était membre, président des comités de finance, des affaires internationales, de nomination et de recherche. Il a aussi été rédacteur adjoint de la série de la SMC intitulée Books in Mathematics. En 2006, il a reçu le Prix de la SMC pour service méritoire pour son service exceptionnel à la SMC et le premier Prix David-Borwein de mathématicien émérite pour l'ensemble d'une carrière pour ses réalisations significatives en recherche et sa contribution exceptionnelle aux mathématiques au Canada.

Sa contribution au monde des mathématiques au Canada est large et importante. Il a été convocateur scientifique de l'Examen des mathématiques au Canada de 1996 par le CRSNG et a siégé à de nombreux comités du CRSNG pour les sciences mathématiques et en a aussi été président. Ses efforts dans ces postes ont permis de mieux sensibiliser le gouvernement et le public à l'importance des mathématiques au Canada et ont garanti et amélioré le financement de la recherche en mathématiques. Richard était aussi membre de la Société royale du Canada et un chercheur de la Fields Institute.

Richard enseignait à la University of Western Ontario depuis 1980 et a fait deux mandats à titre de président du Département des mathématiques. Il était un professeur dévoué et supervisait quatre thèses de doctorat. Il était bien connu pour sa recherche dans le domaine de la topologie algébrique.

La SMC offre ses condoléances à la famille et aux amis de Richard. La famille invite les gens à faire un don à l'Association canadienne du cancer du rein à l'adresse suivante : www.accrweb.ca/

Un hommage à Richard Kane de ses collègues sera inclus dans la version février 2011 de Notes de la SMC.

# CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

## DECEMBER 2010 DECEMBRE

**4-6** **2010 CMS Winter Meeting**
**University of British Columbia, BC**
www.cms.math.ca/Events/winter10/

**6-10** Waves and Multiscale Processes
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/multiscale.html

**13-17** Conference on Mathematical Education Research
(Malaca, Malaysia)
http://einspem.upm.edu.my/icmer2010

**15-16** Random Matrices
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/randommatrices.html

**15-18** Joint International meeting between the AMS and the Sociedad de Matematica de Chile ( Pucón, Chile)
www.ams.org/amsmtgs/internmtgs.html

## JANUARY 2011 JANVIER

**3-5** Conference on Mathematical Sciences (A.M.Mathai)
(St.Thomas Coll.Kottayam, India)
http://www.cmsintl.org/

**12-14** Statistical Methods for Meteorology and Climate Change
(CRM, Montreal, QC)
www.crm.umontreal.ca/Stat2011/en/
www.crm.umontreal.ca/Meteo11/index_e.php/

**17-21** Deformation theory, patching, quadratic forms and Brauer group
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/deformbrauer.html

**31-Mar 4** Complex and Riemannian Geometry (CIRM, Marseille, France)
www.latp.univ-provence.fr/geom2011/index.php/welcome

## FEBRUARY 2011 FÉVRIER

**7 – 12** Complex Geometry – Extremal Metrics: Evolution equations and stability
(CIRM, Marseille, France)
www.latp.univ-provence.fr/geom2011/index.php/welcome/week2

**14 – 19** Workshop on Mathematical Methods in Quantum Mechanics
(University of Padova, Bressanone, Italy)
www.mmqum.unimore.it

## MARCH 2011 MARS

**14 – 19** International Conference on Operations Research
(Kowloon, Hong Kong)
www.iaeng.org/IMECS2011/ICOR2011.html

**17 – 19** The 45th Annual Spring Topology and Dynamical Systems Conference
(University of Texas at Tyler, Texas)
www.math.uttyler.edu/sgraves/STDC2011

**21 – 25** AIM Workshop: Hypergraph Turan Problem
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/hypergraphturan.html

**28 – Apr1** International workshop: Unlikely intersections in algebraic groups And Shimura Varieties, (Scuola Normale Superiore, Pisa, Italy)
http://aimath.org/ARCC/workshops/zilberpink.html

## APRIL 2011 AVRIL

**18 – 22** Computational Statistical Methods for Genomics and Systems Biology
(CRM, Montreal, QC)
www.crm.umontreal.ca/Stat2011/

## MAY 2011 MAI

**2 – 4** Statistical Issues in Forest Management, (Laval, QC)
(CRM, Montreal, QC)
www.crm.umontreal.ca/Forest11/index-e.php

## JUNE 2011 JUIN

**22 – 25** 26th Annual IEEE Symposium on Logic in Computer Science
(Fields Institute event at the University of Toronto)
www.fields.utoronto.ca/programs/scientific/10-11/lics11

**19 – 25** 49th International Symposium on Functional Equations
(Graz, Austria)
jens.schwaiger@uni-graz.at

## JULY 2011 JUILLET

**4 – 10** Conference on Topology and its Applications (Islamabad, Pakistan)
icta@comsats.edu.pk
http://ww2.ciit-isb.edu.pk/math

**26-29** Harmonic Analysis and PDE (Eric Sawyer)
(Fields Inst., Toronto, ON)
www.fields.utoronto.ca/programs/scientific/11-12/PDE/

## SEPTEMBER 2011 SEPTEMBRE

**7 – 9** IMA Hot Topics Workshop: Instantaneous Frequencies and Trends for
Nonstationary Nonlinear Data (Minneapolis, Minnesota)
www.ima.umn.edu/2011-2012/SW9.7-9.11/

**19 – 23** IMA Workshop: High Dimensional Phenomena
(Minneapolis, Minnesota)
www.ima.umn.edu/2011-2012/W9.19-23.11/

## OCTOBER 2011 OCTOBRE

IMA Workshop: Large Graphs, Modeling, Algoritms and Applications
(Minneapolis, Minnesota)
www.ima.umn.edu/2011-2012/W10.24-28.11/

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| October/November / octobre/novembre | August 30 / le 30 août |
| December / décembre | September 29 / le 29 septembre |

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