CMS NOTES de la SMC

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FROM THE PRESIDENT'S DESK

Eddy H.E.A. Campbell

Français page 12

This report is my first as President, and I would like to express my admiration and gratitude to Christiane Rousseau who has done such a superb job as President over the past two years. It has been a great pleasure to work with her this past year. Her energy, enthusiasm, calm demeanour, and good humour have been an inspiration. Thank you, Christiane.

A number of significant events took place this summer, the first of which was our Summer Meeting in Halifax at Dalhousie University, June 13-15. This meeting was held jointly with our sister organization the **Canadian Applied and Industrial Mathematics Society** (CAIMS) with the participation of the **Canadian Symposium on Fluid Dynamics** and the **Canadian Society for History and Philosophy of Mathematics**. As well, the **MITACS** meeting was held just prior to ours and attracted a large number of graduate students and others. There were some 447 registered participants at the meeting attending some of the 14 symposia.

The public lecture was delivered by **Edward Barbeau** (University of Toronto), and our plenary speakers were **Peter Cameron** (Queen Mary University), **Craig Fraser** (University of Toronto), **Mark Lewis** (University of Alberta), **Alan C. Newell** (University of Arizona/University of Warwick), **Peter Olver** (University of Minnesota) **Frank T. Smith** (University College London), and **Mikhail Zaicev** (Moscow State University).

The **CMS Jeffery-Williams Prize** Lecture was given by **Joel Feldman** (University of British Columbia).

The **CAIMS Research Prize** Lecture was given by **Robert D. Russell** (Simon Fraser University), and the **CAIMS Cecil Graham Doctoral Dissertation Award** Lecture was given by **Ramadan Akila** (University of Guelph). **Keith Ranger**, University of Toronto, was the recipient of the **CAIMS Arthur Beaumont Distinguished Service Award**.

Leo Jonker (Queen's University) received the first **CMS Excellence in Teaching Award**. This award is supported by **Nelson & Brooks/ Cole**, and we offer our sincere thanks to **Janet Piper** for her key role in creating the award in the first place.

The meeting directors were **Richard Wood** and **Raymond Spiteri** and the chair of the local organizing committee was **Peter Fillmore**, all of Dalhousie University. A small army of volunteers helped organize the symposia and look after the local arrangements, all of which were superb. We owe them our gratitude for a wonderful meeting.

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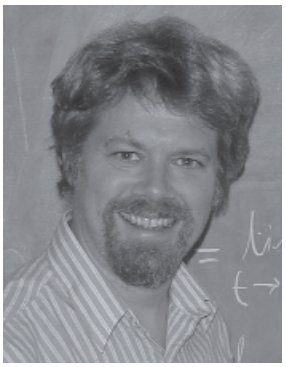
EDITORIAL



Robert J. MacG. Dawson

What do you do on your sabbaticals?

By the time this issue of the *NOTES* comes out, I shall be on sabbatical leave. That started me thinking about the question of what people do on sabbaticals, what they stop doing - and what they keep on doing. While I recognize that many valuable members of the CMS do not work in an environment where sabbaticals are a custom, enough do that these questions do shed some light on what is important to us, in the same way that questions about what one would take to a desert island do.

Obviously, just about everybody spends a fair amount of time on some scholarly activity. In most cases, it involves research that is intended to be published in one or more refereed journals - in my case, I've got a backlog of several papers that will get written as soon as I have the time. But it's also known for somebody to spend a sabbatical leave writing a textbook, learning a new topic with a view to teaching it, or developing materials and techniques for the classroom. These are all important, and it will be a loss to our profession if they ever cease to be legitimate sabbatical activities.

Travel? One jokes about the importance of finding a research topic that just cannot be studied effectively outside (say) Provence, Whistler (in winter), or Tahiti. But even more modest relocations are not always the easiest thing if you have school-aged children. Sometimes it makes sense to travel and take them along. Professors who have settled in a country and culture other than the one they grew up in sometimes combine a sabbatical leave in their mother country, perhaps working with those who influenced them early in their careers, with a year of schooling there for their children: a particularly felicitous combination. But for some of us it may be better to take Littlewood's advice, who famously suggested that when a true vacation was not practical, many of the advantages may be had by simply getting up later for a while. If the children will permit even that…

What I found particularly interesting to contemplate was what existing activities I will and won't be setting aside. Classes and committees are, of course, out of the question; and it is not entirely a coincidence that my term as Chair at Saint Mary's Mathematics and Computing Science Department is ending as my sabbatical starts. Nor would I want to continue with any of these; I have (mostly) enjoyed all of them, but their nature, requiring major regular time commitments, is contrary to the sabbatical spirit.

However (and I hope this does not disappoint too many readers) I will still continue to help edit the *NOTES*. While proofreading can take up an evening here and there, and editorials need to be written, the times are flexible enough that I don't foresee any problems. Similarly, I won't mind writing the occasional review, and may even be a little prompter about them than I have sometimes been in recent years.

Another thing that I don't expect to drop is my involvement with the local CMS math camp. In most recent years I have put on a workshop on raytracing, showing the campers how to create pictures (often bizarre) of geometric objects with a computer. The high school students attending the camp always seem to enjoy this, and by the end of the camp there are usually quite a few converts who have downloaded the freeware program (POV-Ray) that we use, to continue their explorations at home.

Everybody has their own favorite extra tasks that they particularly enjoy. Perhaps thinking of these activities as ordinary work carried over into a sabbatical leave is missing the point. Perhaps we should think of them as – at least in terms of their refreshing effect on the spirit – as a little piece of sabbatical leave that won't end when classes resume in a year's time.

ÉDITORIAL

Que faites-vous durant vos congés sabbatiques?

Lorsque vous lirez ces *NOTES*, je serai déjà en sabbatique. D'où mon questionnement : Que font mes collègues durant leur congé sabbatique? Quelles activités poursuivent-ils et lesquelles mettent-ils de côté? Je reconnais que de nombreux membres éminents de la SMC ne travaillent pas dans un milieu où l'on accorde de tels congés, mais le grand nombre de personnes qui y ont droit justifie une réflexion sur ce qui compte pour nous. Un peu comme lorsqu'on demande : « Qu'apporteriez-vous sur une île déserte? »

De toute évidence, nous consacrons tous une bonne partie de ce congé à quelque activité savante. Dans la plupart des cas, il s'agit de recherche destinée à la publication dans une ou plusieurs revues avec comité de lecture. Moi, par exemple, j'ai toute une série d'articles à écrire dès que j'aurai le temps. D'autres passent plutôt leur congé à rédiger un manuel, à se familiariser avec un nouveau sujet en vue de l'enseigner, ou encore à concevoir du nouveau matériel pédagogique ou de nouvelles méthodes d'enseignement. Ce sont toutes là des tâches importantes, et notre profession essuiera toute une perte si l'on en vient un jour à ne plus considérer ces activités comme légitimes pour un congé sabbatique.

Un voyage? On dit souvent à la blague qu'il est important de trouver un sujet de recherche impossible à étudier ailleurs, disons, qu'en Provence, à Whistler (en hiver) ou à Tahiti. Toutefois, même les déplacements les plus simples ne le sont pas toujours si vous avez des enfants d'âge scolaire. Il est parfois préférable d'amener les enfants avec soi. Certains professeurs qui vivent dans un pays et une culture d'adoption profitent d'un congé sabbatique pour retourner dans leur pays d'origine, par exemple pour travailler avec des personnes qui les ont influencés au début de leur carrière; certains décident d'y emmener leurs enfants pour leur faire vivre une année scolaire dans ce pays : un mariage particulièrement réussi! Mais pour certains d'entre nous, il vaut mieux suivre le célèbre conseil de Littlewood : s'il est impossible de prendre de vraies vacances, il peut être tout aussi avantageux de se lever tout simplement un peu plus tard pendant quelque temps. Si les enfants le permettent, bien sûr...

J'ai trouvé particulièrement intéressant de constater quelles activités je laisserai tomber et lesquelles je compte poursuivre. Pas de cours ni de comités, c'est hors de question. Ce n'est donc pas par pure coïncidence que mon mandat de directeur du département des sciences mathématiques et informatique à Saint Mary's s'achève au début de mon année sabbatique. Je ne voudrais pas non plus poursuivre ces activités; je les ai bien appréciées (pour la plupart), mais parce qu'elles demandent un engagement important et continu, elles contreviennent à l'esprit d'une sabbatique.

Toutefois (et j'espère ici ne pas décevoir trop de lecteurs), je poursuivrai la rédaction des *NOTES*. Malgré les quelques soirées de relecture et de révision nécessaires et la rédaction des éditoriaux, ces tâches ne sont pas problématiques puisqu'elles offrent assez de souplesse. Ainsi, je poursuivrai sans doute mes critiques occasionnelles, et serai peut-être même plus empressé à m'y atteler qu'au cours des dernières années.

Je ne songe pas non plus à suspendre mes activités dans le cadre du camp mathématique local de la SMC. À chacune des dernières années ou presque, j'ai organisé un atelier sur le lancer de rayons; j'ai montré aux jeunes comment créer des images (souvent étranges) d'objets géométriques à l'ordinateur. C'est un atelier que les élèves du secondaire participant au camp semblaient beaucoup apprécier, si bien qu'à la fin du camp, plusieurs d'entre eux avaient téléchargé le gratuiciel (POV-Ray) que nous utilisions, afin de poursuivre leur exploration à la maison.

Nous avons tous nos activités de prédilection. Peut-être faisons-nous fausse route en considérant ces activités comme des tâches ordinaires que nous conservons durant la sabbatique. Pourquoi ne pas plutôt les considérer – du moins pour leur effet « rafraîchissant » – comme une parcelle de sabbatique qui perdurera même une fois les cours repris dans un an?

CONCORDIA UNIVERSITY
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The Department of Mathematics and Statistics at Concordia University invites applications for a tenure-track position in Actuarial or Financial Mathematics, **starting July 1, 2005**. The position is at the rank of Assistant Professor. Applicants should have a PhD, and strong research and teaching records both at the undergraduate and graduate levels. Review of applications will begin on **November 15, 2004** and continue until the position is filled. Applications should consist of a letter of intent, a curriculum vitae, copies of recent publications, a statement of teaching and research interests and objectives and three letters of reference.

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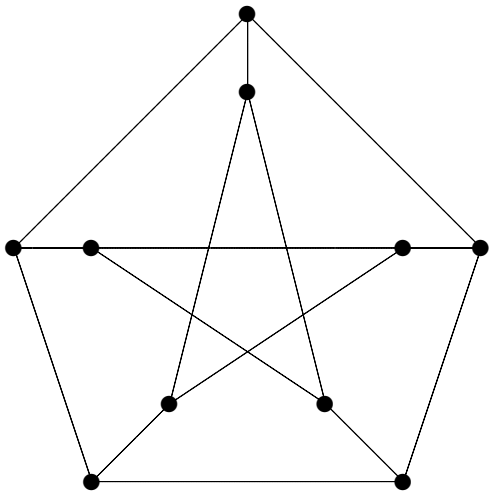
RAMANUJAN GRAPHS AND ZETA FUNCTIONS

M. RAM MURTY, QUEEN'S UNIVERSITY

The theory of Ramanujan graphs[1] is a fertile meeting ground for graph theory, number theory, representation theory and arithmetic algebraic geometry. Ramanujan graphs are also expander graphs and these have applications to the "real world" in the optimal construction of telephone networks. (See [2] for a detailed exposition.) In this talk, we will focus on the "pure" mathematical aspect of the theory and refer the reader to [13] for an expanded survey.

We will be considering only simple graphs, that is, graphs with no loops or multiple edges. Our graphs will also be undirected and finite. Any finite graph $X = (V, E)$ with vertex set V and edge set E is completely determined by its adjacency matrix $A = A_X$ whose rows and columns are parametrized by vertices. We put a 1 in the (i, j)-th position if (i, j) is an edge in X and 0 otherwise. As our graphs are undirected, the matrix A is symmetric. Observe also that given a connected graph, we may define a metric on it as follows. The *distance* between any two vertices is the minimal number of edges needed to traverse from one vertex to the other. The *diameter* of the graph X, denoted $\mathrm{diam}(X)$, is the maximal value of the distance function. The figure below is the celebrated Petersen graph. Here $|V| = 10$ and $|E| = 15$ and the degree of every vertex is 3. It has diameter 3.



The Petersen Graph

[1]This is a summary of the Jeffery-Williams Lecture delivered in Edmonton, Alberta on June 15, 2003, at the summer meeting of the Canadian Mathematical Society.

A graph is called *k-regular* if every vertex has degree k. Thus, the Petersen graph is a 3-regular graph. The complete graph K_n is the graph on n vertices in which any two distinct vertices are adjacent. It is an $(n-1)$-regular graph.

The study of the eigenvalues of A and relating them back to properties of the graph X is called spectral graph theory. The process is analogous to the study of prime numbers via the study of the zeros of the Riemann zeta function or the study of Riemannian manifolds by examining the nature of the eigenvalues of the Laplace operator.

As A is a real symmetric matrix, all of its eigenvalues are real and the matrix can be diagonalized by an orthogonal transformation. In particular, if $|V| = n$, we can order the eigenvalues as:

$$\lambda_1 \geq \lambda_2 \geq \lambda_3 \cdots \geq \lambda_n.$$

For a k-regular graph, it is easy to see that $\lambda = k$ is an eigenvalue. Indeed,

$$A \begin{pmatrix} 1 \\ 1 \\ \vdots \\ 1 \end{pmatrix} = k \begin{pmatrix} 1 \\ 1 \\ \vdots \\ 1 \end{pmatrix}$$

In fact $\lambda_1 = k$ for a k-regular graph and all eigenvalues lie in the interval $[-k, k]$. Moreover, one can prove easily that $-k$ is an eigenvalue if and only if X is bipartite, which means that V can be partitioned into two independent sets.

It is also not hard to show that the multiplicity of $\lambda_1 = k$ is equal to the number of connected components of X. For a k-regular graph, we call any eigenvalue $\lambda \neq \pm k$, a non-trivial eigenvalue.

A *Ramanujan graph* is a connected k-regular graph such that all the non-trivial eigenvalues λ satisfy

$$|\lambda| \leq 2\sqrt{k-1}.$$

In other words,

$$\lambda(X) = \max_{\lambda_i \neq \pm k} |\lambda_i| \leq 2\sqrt{k-1}.$$

This definition seems rather dry without any motivation of why these graphs should be interesting. It also raises the question of what Ramanujan had to do with them. Both of these questions will be answered by the end of the talk.

The complete graph K_n is a Ramanujan graph. Its adjacency matrix has characteristic polynomial

$$(\lambda - (n-1))(\lambda + 1)^{n-1}.$$

This involves the computation of the determinant of a circulant matrix which we leave as an exercise to the reader.

The Petersen graph is also Ramanujan. Its characteristic polynomial is

$$(\lambda - 3)(\lambda + 2)^4(\lambda - 1)^5$$

and to ensure that it is Ramanujan, we must check that

$$2 \leq 2\sqrt{2}$$

which is true.

Why are Ramanujan graphs interesting? Of the many reasons, we give one. If we think of a graph as modeling a communication network, then the diameter measures, in some sense, the efficiency of communication of the network. The

smaller the diameter, the better is the communication. The following theorem [3] makes the relationship between the diameter and $\lambda(X)$ precise.

Theorem 1. (Chung, 1989) *Let X be a k-regular graph with n vertices. If X is not bipartite,*

$$\operatorname{diam}(X) \leq \frac{\log(n-1)}{\log(k/\lambda(X))} + 1.$$

If X is bipartite,

$$\operatorname{diam}(X) \leq \frac{\log(n-2)/2}{\log(k/\lambda(X))} + 2.$$

Thus, to minimize the diameter of X, we must minimize $\lambda(X)$. So how small can we make $\lambda(X)$? There are several results one can obtain concerning the size of $\lambda(X)$. We begin with the most elementary. For simplicity, we assume X is not bipartite. Consider the matrix A^2. It is not hard to see that $\operatorname{tr}(A^2) = kn$. But $\operatorname{tr}(A^2)$ is equal to

$$\sum_{i=1}^{n} \lambda_i^2.$$

This is

$$\leq k^2 + \lambda(X)^2(n-1).$$

Thus,

$$\lambda(X) \geq \left(\frac{n-k}{n-1}\right)^{1/2} \sqrt{k}.$$

Hence,

$$\lim_{n\to\infty} \lambda(X) \geq \sqrt{k}.$$

The first non-trivial lower bound is given by the Alon-Boppana theorem [16] which states that:

$$\liminf_{n\to\infty} \lambda(X) \geq 2\sqrt{k-1}.$$

Serre [16] gave the following refinement of this theorem. Fix $\epsilon > 0$. Then, there is a positive constant $c = c(k, \epsilon)$ depending only on k and ϵ such that the every adjacency matrix of a k-regular graph on n vertices has at least cn eigenvalues larger than

$$(2-\epsilon)\sqrt{k-1}.$$

From these results, we see that in trying to construct k-regular graphs with increasing number of vertices, we cannot hope to do better than $\lambda(X) \leq 2\sqrt{k-1}$. These results now give partial motivation for our definition of a Ramanujan graph.

In this context, we mention two more related results. Nilli (also known as Alon) proved the following inequality for λ_2. Let X be a k-regular graph with diameter d. Then

$$\frac{\lambda_2}{2\sqrt{k-1}} \geq 1 + O(1/d).$$

The Alon-Boppana theorem follows from this because as n grows, so does d (exercise) so that λ_2 is positive and we have

$$\lambda(X) \geq \lambda_2.$$

λ_2 plays an important role in many problems of graph theory. A striking theorem of Colin de Verdière [15] appeared more than ten years ago. Given a graph X, consider the family $\mathcal{A}$ of weighted adjacency matrices $A = (a_{ij})$ where $a_{ij} > 0$ if

(i, j) is an edge and zero otherwise. For each such matrix, let k_2 be the multiplicity of λ_2 and define

$$\mu(X) = \max_{\mathcal{A}} k_2.$$

In [15] it is proved that X is planar if and only if $\mu(X) \leq 3$. If $\chi(X)$ denotes the chromatic number of X (that is, the minimum number of colors needed to color the vertices of X so that no two adjacent vertices receive the same color), then it is conjectured that

$$\mu(X) + 1 \geq \chi(X).$$

If true, the conjecture would give us a spectral proof of the four color theorem.

Returning to the study of $\lambda(X)$, the Alon-Boppana theorem tells us that to minimize $\lambda(X)$, the best we can hope for is $\lambda(X) \leq 2\sqrt{k-1}$. The question now arises if for each k, there exists a sequence of graphs X_i with an increasing number of vertices, satisfying this bound. That is, can we give an explicit construction of Ramanujan graphs? The only case known for which such sequences have been constructed is when $k-1$ equals a prime power. In all these cases, the proof that the eigenvalues satisfy the required bound is by means of the Ramanujan conjecture in the theory of modular forms, proved by Deligne [4] in 1974 in the case when $k-1$ is prime, and by the work of Drinfeld [6] in the case when $k-1$ is a prime power [12]. This explains how Ramanujan's name has entered into the definition of these graphs.

When $k-1$ is prime, the first explicit construction seems to be due to Ihara [9] in 1965. He used the theory of modular curves. Later Margulis [11] and independently Lubotzky, Phillips and Sarnak [10] gave explicit constructions using the theory of automorphic forms.

F. Chung [3] and Winnie Li [16], have constructed more examples of Ramanujan graphs using an idea to be described below. However, their constructions do not give infinite families of k-regular Ramanujan graphs. In a sense to be made precise below, these examples are "abelian" and in some recent joint work with J. Friedman and J.-P. Tillich [7], it is shown that such constructions always lead to only a finite number of such examples. The argument in this paper can be refined to show that one must consider "highly non-abelian" Cayley graphs (defined below) to produce infinitely many examples of k-regular graphs which are Ramanujan.

When $k-1$ is a prime power, Morgenstern (1994) constructed Ramanujan graphs of degree k using Drinfeld's theory of automorphic representations of function fields over finite fields, where the Ramanujan conjecture is known.

The first open case is $k = 7$. Are there infinitely many 7-regular graphs which are Ramanujan? A partial answer to this question is provided by:

Theorem 2. (Friedman, 1991) *A random k-regular graph has*

$$\lambda_2 < 2\sqrt{k-1} + 2\log k + O(1).$$

Cayley graphs give us a natural family of regular graphs. They are defined as follows. Let G be a finite group and S a symmetric subset. That is $s \in S$ implies $s^{-1} \in S$. We can construct a k-regular graph with $k = |S|$ as follows. The vertex set is the set of elements of G. We join x and y if and only if $xy^{-1} \in S$. We will denote this graph by $X(G, S)$.

If G is abelian and S symmetric, then, it is not hard to show that the eigenvalues of $X(G,S)$ can be given explicitly by

$$\lambda_\chi = \sum_{s\in S} \chi(s),$$

as χ ranges over all the irreducible characters of G.

This is the theorem used by Chung[3] and Winnie Li [16] in their construction of Ramanujan graphs.

The proof that graphs constructed in this way are Ramanujan reduces to the estimation of character sums in number theory. Here is a concrete example. Let $G = \mathbb{Z}/p\mathbb{Z}$ and join x to y if and only if xy^{-1} is a square. This gives a $(p+1)/2$-regular graph. The eigenvalues turn out to be

$$\frac{1}{2} + \sum_{x \bmod p} \left(\frac{x}{p}\right) e^{2\pi i a x/p}$$

The last sum is a classical Gauss sum with absolute value $\sqrt{p}$.

If G is non-abelian, the description of the eigenvalues of $X(G,S)$ is more difficult. However, if S is assumed to be invariant under conjugation, one can show the eigenvalues are parametrized by

$$\lambda_\chi = \frac{1}{\chi(1)} \sum_{s\in S} \chi(s).$$

This was discovered independently by L. Babai[1] and Diaconis-Shahshahani[5].

In 1988, Lubotzky, Phillips, and Sarnak [10] gave the following construction. Let p and q be unequal primes $p \equiv q \equiv 1 (\mathrm{mod}\, 4)$. Let u be an integer with $u^2 \equiv -1 (\mathrm{mod}\, q)$.. By a classical theorem of Jacobi, there are exactly $8(p+1)$ ways of writing p as a sum of four squares:

$$p = a^2 + b^2 + c^2 + d^2.$$

If we specify $a > 0$, b, c, d even, there are exactly $p+1$ solutions $v = (a,b,c,d)$. To each such v, we associate

$$\tilde{v} = \begin{pmatrix} a+ub & c+ud \\ -c+ud & a-ub \end{pmatrix}$$

a matrix in $G = GL_2(\mathbb{Z}/q\mathbb{Z})$. One can verify the set S of such matrices $\tilde{v}$ is a symmetric subset. To prove that $X(G,S)$ is Ramanujan, one needs the Jacquet-Langlands correspondence and the full strength of the Ramanujan conjecture for weight 2 forms (proved by Eichler).

There is an alternate formulation of the whole problem due to Ihara [9] which is highly suggestive. Let us first observe that the (i,j)-entry of A^r counts the number of walks of length r from i to j. Let A_r be the matrix whose (i,j)-th entry is the number of "proper" walks of length r from i to j without backtracking. Then, it is easy to show that

$$AA_r = A_{r+1} + (k-1)A_{r-1}.$$

Using this recurrence, one can show the formal identity

$$\sum_{r=0}^{\infty} A_r t^r = (1-t^2)\left(1 - At + (k-1)t^2 I\right)^{-1}.$$

Following Ihara, a proper walk whose endpoints are equal is called a closed geodesic. If γ is a closed geodesic, then γ^r is just the closed geodesic obtained by repeating γ r times. A closed geodesic which is not the power of another one is called a prime geodesic. Two closed geodesics $(x_0, ..., x_a)$ and $(y_0, ..., y_b)$ are called equivalent if $a = b$ and there is a d such that $y_i = x_{i+d}$ for all i. An equivalence class of a prime geodesic is called a prime geodesic cycle.

Inspired by the theory of the Selberg zeta function, Ihara defined the zeta function of X as follows: put $q = k - 1$.

$$Z_X(s) = \prod_p \left(1 - q^{-s\ell(p)}\right)^{-1}$$

where the product is over prime geodesic cycles and $\ell(p)$ is the length of any element in the cycle p.

Theorem 3. (Ihara, 1966) *Let X be a k-regular graph. Put $g = (q-1)|X|/2$ and $u = q^{-s}$. Then*

$$Z_X(s) = (1-u^2)^{-g} \det(1 - Au + qu^2 I)^{-1}.$$

Moreover, $Z_X(s)$ satisfies the "Riemann hypothesis" (that is, all the singular points of $Z_X(s)$ in the region $0 < \Re(s) < 1$ lie on $\Re(s) = 1/2$) if and only if X is a Ramanujan graph.

Hashimoto [8] as well as Stark and Terras [14] have extended the notion of a zeta function for an arbitrary graph. Let N_r be the number of closed walks γ of length r such that neither γ or γ^2 have backtracking. Let

$$Z_X(t) = \exp\left(\sum_{r=1}^{\infty} \frac{N_r t^r}{r}\right).$$

By a theorem of Hyman Bass, this is a rational function of t. What is the meaning of a "Riemann hypothesis" for this zeta function? This zeta function is not well-understood. However, some theory is slowly emerging. For example, Hashimoto has proved that the residue at $t = 1$ is related to the number of spanning trees of the graph X. This is analogous to the class number formula for the Dedekind zeta function of an algebraic number field. It is hoped that this analogy would lead to new insights in graph theory.

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FROM THE PRESIDENT'S DESK *(continued)*

This summer the CMS was also involved in a joint meeting with La Société Mathématique de France in Toulouse, July 12-15. Christiane attended on behalf of the Society and will provide a full report next month. There was a host of other organizations involved in the meeting, including the **Statistical Society of Canada** and **CAIMS**. There were 16 symposia which attracted some 430 participants. The chair of the Scientific Committee was **Francis Clarke** (Université de Lyon and Institut universitaire de France) and the chair of the local organizing committee was **Jean-Pierre Ramis** (Université Paul Sabatier - Toulouse III).

The CMS was a partner in a meeting in honour of **H. S. M. (Donald) Coxeter** at the University of Toronto this May just past. We will also be a partner in the Banff Renaissance Conference meeting in July 2005, part of the International Bridges Conferences on Mathematical Connections in Art, Music and Science. This is a collaborative effort of PIMS, the Banff Centre, the CMS and the Bridges Conferences. The last day of the event will be Coxeter Day in commemoration of the life and mathematics arts connections of Donald Coxeter. The proceedings of the conference will be published.

As you may know, the **Math in Moscow** program offered in collaboration with NSERC offers three scholarships of $10,000 each to support three Canadian students registered in a mathematics of computer science program to attend a semester at the Math in Moscow program offered at the Independent Moscow University. Two students were awarded scholarships in the spring competition. They are **Ashley Evans Blacquière** (UPEI) and **Timothy Peter Kusalik** (Queen's University).

Last fall, Christiane, Arthur Sherk and I formed a task force on the future of the CMS and its impact on the Executive Office. This resulted in a reorganization of that office which has been previously reported on. However, one of the most important motivating factors for the Task Force was the financial situation of the Society. As our activities continue to grow, the cost of these activities has used all the available resources. In fact, a small deficit is forecast for the current budget year. One of the consequences has been that the Executive is considering whether or not to hire a fund-raising firm with a view to a campaign to providing additional endowment funds in support of some of our activities. Such a campaign would require widespread support from our membership – including donations, and much work from the Executive and Board members.

The Winter Meeting of the CMS will take place at McGill University, December 11-13 at McGill University in Montreal. We already know one of the prize winners, my colleague **Edgar Goodaire** (Memorial University of Newfoundland). Edgar will receive the CMS Distinguished Service Award at that meeting.

Finally, I should mention the next Canadian School Mathematics Forum will take place in Toronto at the Fields Institute next May. The co-chairs are **Bradd Hart** (McMaster) **Florence Glanfield** (Saskatchewan) and **Frédéric Gourdeau** (Laval). These fora bring together math educators, administrators and bureaucrats to help improve mathematics education across the country.

UNIVERSITY OF WATERLOO

Department of Pure Mathematics / Tenure-Track Position

The Department of Pure Mathematics at the University of Waterloo invites applications for a tenure-track position starting July 1, 2005. The Department is particularly interested in candidates with research interests in algebra, geometry or topology, though outstanding candidates in all areas of pure mathematics will be considered.

A candidate must have a Ph.D. by the start of the appointment. Postdoctoral experience is preferred. An appointment will be offered only to someone with outstanding research and teaching qualifications.

Applicants should submit their curriculum vitae, together with the names of at least three referees, and should arrange for letters of reference to be sent directly from the referees.

The deadline for applications is **December 1, 2004**.

All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, aboriginal people, and persons with disabilities.

Please send applications to:

Dr. F. Zorzitto, Chair
Department of Pure Mathematics
University of Waterloo
Waterloo, Ontario Canada N2L 3G1

The department's Web page is at *www.math.uwaterloo.ca/PM_Dept/index.shtml*

NEW DIRECTOR OF THE FIELDS INSTITUTE

FIELDS

Barbara Lee Keyfitz, Professor of Mathematics, University of Houston, has been appointed Director of Fields Institute for Research in Mathematical Sciences beginning July 1, 2004.

Keyfitz has made profound and original contributions to applied mathematics, particularly in the study of partial differential equations such as those arising in the study of fluid flow or transonic shock waves. She has a distinguished record of research, mentoring, and service to her profession. Her undergraduate traiing took place at the University of Toronto, and she obtained her Ph.D. from New York University's Courant Institute, prior to holding positions at Columbia, Princeton and Arizona State Universities. She continues as John and Rebecca Moores Professor at the University of Houston. She is a Fellow of AAAS and is chair of their Mathematics section. She is an officer of the International Council for Industrial and Applied Mathematics and has made numerous contributions as reviewer and advisor to the Canadian Natural Sciences and Engineering Council. She was recently awarded the Krieger-Nelson Prize, has served as Vice-President of SIAM, and is President-Elect of the Association for Women in Mathematics.

DU BUREAU DU PRÉSIDENT

Eddy H.E.A. Campbell

Comme il s'agit de mon premier rapport à titre de président, j'aimerais exprimer mon admiration et ma gratitude envers Christiane Rousseau, qui a fait un travail superbe à la présidence au cours des deux dernières années. Ce fut un réel plaisir de travailler avec elle cette année. Son énergie, son enthousiasme, son calme et sa bonne humeur ont été pour nous une source d'inspiration. Merci Christiane.

Plusieurs activités importantes se sont déroulées cet été. La Réunion d'été a été tenue à l'Université Dalhousie, à Halifax, du 13 au 15 juin. Ce congrès a été organisé de concert avec notre partenaire, la **Société canadienne de mathématiques appliquées et industrielles** (SCMAI), avec la participation du **Symposium canadien sur la dynamique des fluides** et la **Société canadienne d'histoire et de philosophie des mathématiques**. En outre, la réunion du réseau MITACS, qui a eu lieu juste avant la nôtre, a attiré un grand nombre d'étudiants diplômés et d'autres participants. En tout, 447 personnes se sont inscrites à la Réunion, dont le programme comptait 14 symposiums.

La conférence populaire a été donnée par **Edward Barbeau** (Université de Toronto), et **Peter Cameron** (Université Queen Mary), **Craig Fraser** (Université de Toronto), **Mark Lewis** (Université de l'Alberta), **Alan C. Newell** (Université de l'Arizona/Université de Warwick), **Peter Olver** (Université du Minnesota), Frank T. Smith (Collège universitaire de Londres) et **Mikhail Zaicev** (Université d'État de Moscou) étaient les conférenciers principaux.

La **conférence Jeffery-Williams de la SMC** a été prononcée par **Joel Feldman** (Université de la Colombie-Britannique).

Robert D. Russell (Université Simon Fraser) a donné la conférence du **Prix de recherche de la SCMAI**, et **Ramadan Akila** (Université de Guelph), la **conférence du Prix Cecil-Graham pour thèse de doctorat de la SCMAI**. **Keith Range**r (Université de Toronto) a pour sa part reçu le **Prix Arthur-Beaumont pour service distingué de la SCMAI**.

Leo Jonker (Université Queen's) a remporté le premier **Prix d'excellence en enseignement de la SMC**. Ce prix est commandité par **Nelson & Brooks/Cole**, et nous remercions sincèrement **Janet Piper** de son rôle d'instigatrice dans la création de ce prix.

Richard Wood et **Raymond Spiteri** ont codirigé la Réunion, tandis que **Peter Fillmore** présidait le comité de logistique. Tous trois sont de l'Université Dalhousie. Grâce à une petite armée de bénévoles qui ont contribué à l'organisation des symposiums et à la coordination des détails logistiques, la Réunion a connu un franc succès. Nous leur devons pour cette réussite une fière chandelle.

Cet été, la SMC a également participé, avec la Société mathématique de France, à l'organisation d'un congrès tenu à Toulouse du 12 au 15 juillet. Christiane y a représenté la SMC et nous fera un rapport détaillé de son expérience le mois prochain. Plusieurs autres associations ont participé à ce congrès, dont la **Société statistique du Canada** et la **SCMAI**. Un total de 16 symposiums ont attiré quelque 430 participants. **Francis Clarke** (Université de Lyon et Institut universitaire de France) a présidé le comité scientifique, et **Jean-Pierre Rami**s (Université Paul Sabatier – Toulouse III), le comité de logistique.

La SMC a en outre contribué à l'organisation d'un colloque en l'honneur de **H. S. M. (Donald) Coxeter** tenu à l'Université de Toronto en mai dernier, et participera à la *Renaissance Banff Conference* en juillet 2005, dans le cadre des *International Bridges Conferences on Mathematical Connections in Art, Music and Science*. Cette dernière est le fruit d'une collaboration entre le PIMS, le *Banff Centre*, la SMC et les conférences Bridges. Le dernier jour de cette rencontre sera consacré à Donald Coxeter, en hommage à la vie de cet homme et aux liens qu'il a créés entre les mathématiques et l'art. Les actes de ce congrès seront publiés.

Comme vous le savez sans doute, le programme **Math à Moscou** de la SMC, en collaboration avec le CRSNG, offre trois bourses d'une valeur de 10 000 $ chacune pour permettre à trois étudiants ou étudiantes du Canada inscrits à un programme de mathématiques ou d'informatique de suivre un semestre d'études à l'Université indépendante de Moscou. Au concours du printemps, deux bourses ont été décernées, l'une à **Ashley Evans Blacquière** (UPEI), l'autre à **Timothy Peter Kusalik** (Queen's).

L'automne dernier, Christiane, Arthur Sherk et moi avons formé un groupe de travail sur l'avenir de la SMC et ses répercussions sur le bureau administratif. Il s'en est suivi une réorganisation du bureau, dont vous avez déjà été mis au courant. Toutefois, ce groupe avait surtout pour mission de se pencher sur la situation financière de la Société. La problématique est la suivante : nos activités ne cessent de croître, et nous avons atteint la limite des ressources disponibles pour les financer. En fait, nous prévoyons même un petit déficit budgétaire pour l'exercice en cours. Le comité exécutif étudie donc en ce moment la possibilité d'engager des professionnels pour organiser une campagne de financement qui contribuerait à grossir le fonds de dotation et ainsi à financer certaines de nos activités. Une telle campagne nécessiterait un appui massif de nos membres – notamment sous forme de dons – et une somme de travail considérable de la part de l'exécutif et du conseil d'administration.

La Réunion d'hiver de la SMC se déroulera à l'Université McGill, à Montréal, du 11 au 13 décembre 2004. Nous connaissons déjà l'un de nos lauréats : mon collègue **Edgar Goodaire** (Memorial) recevra à cette occasion le Prix de la SMC pour service méritoire.

En terminant, j'aimerais mentionner que le prochain Forum canadien sur l'enseignement des mathématiques se tiendra à Toronto, à l'Institut Fields, en mai prochain. **Bradd Hart** (McMaster), **Florence Glanfield** (Saskatchewan) et **Frédéric Gourdeau** (Laval) en sont les coprésidents. Ces forums réunissent des enseignants, des administrateurs et des fonctionnaires du domaine de l'éducation dans l'optique d'améliorer l'enseignement des mathématiques à la grandeur du pays.

UNIVERSITY OF VICTORIA
Department of Mathematics and Statistics

The Department of Mathematics and Statistics at the University of Victoria invites applications for **two tenure-track positions** in Statistics to commence on 1 July, 2005. The first is a position in Statistics at the Assistant Professor level and the second is a position in Statistics at the Assistant Professor or Associate Professor level. Eligible candidates may be nominated for an NSERC University Faculty Award.

Applicants for either position must have a Ph.D. in Statistics or related discipline and have an outstanding research record in Statistics. Highest priority will be given to candidates with an excellent publication record in statistical genetics or bioinformatics. Other preferred areas, in order of priority, are spatial statistics, biostatistics and areas of Statistics that supplement the research interests of the Statistics group in the Department. The successful applicant must be able to interact in a research capacity with the Statistics group and beyond and be prepared to be involved with the activities of the Statistics Consulting Centre. A record of, or the demonstrated potential for, excellence in undergraduate and graduate teaching in Statistics is required.

Information about the Department, including descriptions of courses offered and research areas of the Statistics group, can be found at its website: *www.math.uvic.ca/*

Applicants should submit curriculum vitae and a teaching dossier (or equivalent documentation) that outlines their teaching experience and effectiveness. They should also provide names and contact information for three referees. Applications should be directed to:

Dr. Gary MacGillivray, Chair
Department of Mathematics and Statistics
University of Victoria
PO Box 3045 STN CSC, Victoria, B.C. V8W 3P4 CANADA

Telephone: (250) 721-7436 FAX: (250) 721-8962 *statcomp@math.uvic.ca*

The closing date for applications is **November 30, 2004**. However, applications will be processed as they are received. Interviews will be conducted and the position(s) offered as soon as excellent candidates are identified.

UNIVERSITY OF VICTORIA
Department of Mathematics and Statistics

The Department of Mathematics and Statistics at the University of Victoria invites applications for a **Senior Instructor** position to commence July 1, 2005, or as soon as possible after that date. Applicants should have at least a Masters degree in Mathematics or a related discipline, a strong commitment to teaching, and the ability to teach all Mathematics and Statistics courses at the first and second year levels including calculus, differential equations, linear algebra, finite and discrete mathematics, and statistics. The initial appointment is for three years, with a normal expectation of subsequent 4-year re-appointments. The successful applicant will be expected to teach eight one-term courses per year.

Information about the department, including descriptions of courses offered, can be found at its website: *www.math.uvic.ca/*

Applicants should submit a curriculum vitae and teaching dossier (or equivalent documentation) that outlines their teaching experience, philosophy and effectiveness. Applicants should arrange for three letters of reference to be sent. Applications and letters of reference should be sent to:

Dr. Gary MacGillivray, Chair
Department of Mathematics and Statistics
University of Victoria
PO Box 3045 STN CSC Victoria BC V8W 3P4 Canada

Telephone: (250) 721-7436 Fax: (250) 721-8962 Email: instcomp@math.uvic.ca

The CLOSING DATE for applications is **February 15, 2005**.

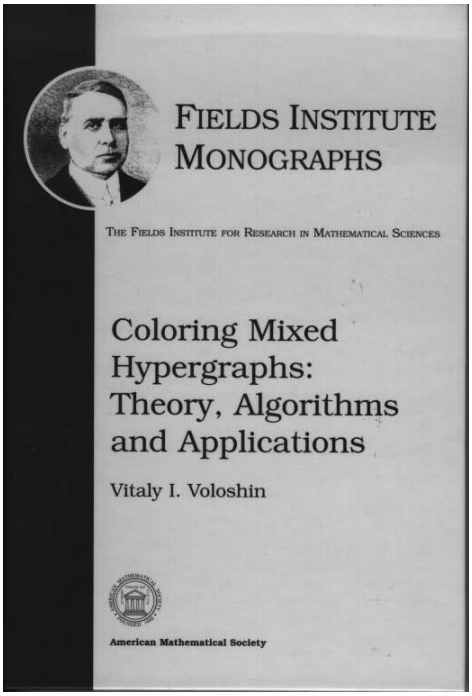
The **University of Victoria** is an equity employer and encourages applications from women, persons with disabilities, visible minorities, aboriginal peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University.

All qualified candidates are encouraged to apply; however, in accordance with Canadian Immigration requirements, Canadians and permanent residents will be given priority.

SIREN SONGS FAIL TO SEDUCE

Book review by Jason Brown, Dalhousie University

COLORING MIXED HYPERGRAPHS: THEORY, ALGORITHMS AND APPLICATIONS
by Vitaly I. Voloshin
Fields Institute Monographs 17
xiii + 181 pages, AMS 2002



Graph colourings have been a siren's song to many a graph theorist since the four colour problem debuted in the 1850s, with combinatorialists happily throwing themselves into the sea of research. The first research problem I worked on, as an undergraduate back in the early 80's in Calgary, was a variant of graph colourings, and the more I heard the sweet song, the more I needed to investigate, from vertex colourings to colour-critical graphs to edge colourings to chromatic polynomials. It even drew me near to hypergraph colourings, a topic that Lazlo Lovász had so creatively used to provide constructions of graphs that had no small cycles but needed many colours. I couldn't get away from chromatic theory in my thesis. I don't think I have yet, twenty years later, escaped chromatic theory's attraction.

The book *Coloring Mixed Hypergraphs: Theory, Algorithms and Applications* introduces the idea of a mixed hypergraph and how to colour it. First, a few definitions are certainly in order. A *hypergraph* is a set V (called the *vertex set*), and a set $\mathcal{E}$ (called the *edge set*) of subsets of V (a graph is merely a hypergraph where every edge has size 2). A mixed hypergraph consists of a vertex set V and two edge sets $\mathcal{C}$ and $\mathcal{D}$. For positive integer λ, a proper λ-colouring of the mixed hypergraph is an assignment of one of the "colours" $1,2,\ldots,\lambda$ to each vertex so that every edge in $\mathcal{C}$ has at least two vertices coloured the same, and every edge in $\mathcal{D}$ has at least two vertices coloured differently. If $\mathcal{C}$ is empty, then the notion reverts to the usual definition of a hypergraph colouring (and if all the edges are of size 2, to the usual definition of a graph colouring). Thus the author poses mixed hypergraph colourings as a broad generalization of hypergraph colourings.

Mixed hypergraph colourings do provide some interesting results. First, clearly not all mixed hyperpgraphs have *any* colourings, and the author devotes a chapter to understanding when a mixed hypergraph is uncolourable. The author shows that the problem determining uncolourability of mixed hyeprgraphs is difficult (i.e. NP-complete), but that result is perhaps not unexpected. It is also noted, somewhat surprisingly, that the numbers λ for which a mixed hypergraph has proper λ-colouring can have gaps (again, unlike for usual hypergraph/graph colourings), and a variety of results along these lines are proven.

Much of the remainder of the text is devoted to extending ideas and theorems from graph and hypergraph chromatic theory. Greedy algorithms for colourings are extended, as are uniquely colourable hypergraphs and chromatic polynomials. The colourabilility of certain families of hypergraphs (perfect, interval, pseudo-chordal, circular, planar, steiner systems – all extending known graph and hypergraph families) is explored, but the arguments are rather straightforward (I had hoped for some flashes of other areas of mathematics in the proofs, as I have grown to love in chromatic theory, but couldn't find them in the pages). All of the results are either due to the author or to the author and a small number of colleagues.

Throughout my reading of the text, I kept hoping that the author would suddenly show me how important colourings of mixed hypergraphs could be. After all, Lovász, Toft, Nešetřil, Rödl (to name but a few!) have provided refreshing examples of solutions to outstanding problems in graph colourings by using hypergraph colourings in essential ways. The text attempts to provide a myriad of applications, ranging from list colourings and Ramsey theory to "real" applications like resource allocation, parallel computing and molecular biology. There is even a hope that there might be broad applications as a philosophical model. Yet I am left with only observations, and my desire to see a new result in any one of these areas via colourings of mixed hypergraphs is left unfulfilled. Colourings of mixed hypergraphs may yet prove to be of importance, but a much stronger case needs to be made before others seek its song.

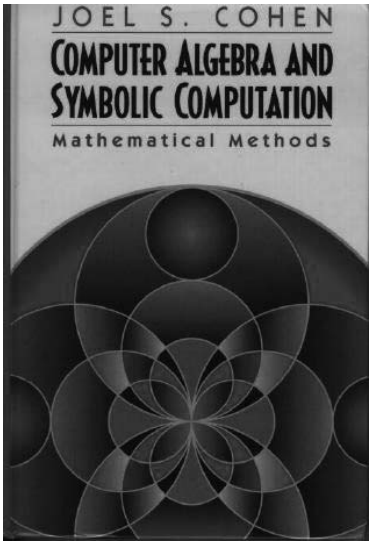
THE INNER WORKINGS OF COMPUTER ALGEBRA SYSTEMS

Book review by Keith Johnson, Dalhousie University

COMPUTER ALGEBRA AND SYMBOLIC COMPUTATION: MATHEMATICAL METHODS

by Joel S.Cohen

A.K.Peters 2003, xvii + 448 pages



With the use of computer algebra systems such as MAPLE and MATHEMATICA becoming ubiquitous there are frequent requests for mathematics or computer science departments to offer courses explaining the inner workings of such systems. This book (together with its companion volume "Computer Algebra and Symbolic Computation - Elementary Algorithms" by the same author) is a possible textbook for such a course at the undergraduate level. It gives an informal development of that part of abstract algebra relevant to computations with polynomials of one or several variables,with programs provided for most of the algorithms discussed (written in a generic algorithmic language, called MPL, with versions in programming languages for MAPLE etc. given on an accompanying CD). The choice of topics – arithmetic operations on polynomials, automatic simplification, polynomial decomposition, polynomial simplification using Grobner bases, factoring – leans toward the computer science side of the subject; however there is some material, such as representing and computing with algebraic numbers, which will appeal to a mathematical audience also. The book's strength is its large supply of examples illustrating each topic. Its weakness is a fairly narrow choice of topics and an absence of any discussion of the complexity of the algorithms presented. The latter makes this book unsuitable as a text for a graduate-level course (where "Algorithms for Computer Algebra" by K.O. Geddes, S.R. Czapor and G. Labahn might be used).

MATH IN MOSCOW / MATH À MOSCOU

Ashley Evans Blacquière, of University of Prince Edward Island and **Timothy Peter Kusalik** of Queen's University are the two winners of the Spring competition of the NSERC-CMS Math in Moscow scholarship. They will use the scholarship to attend the Fall semester of Math in Moscow in Moscow Independent University. We wish them a very fruitful Fall semester.

The deadline of the next NSERC-CMS Math in Moscow scholarship competition is **September 30 2004**.

www.cms.math.ca/bulletins/Moscow_web.html

Ashley Evans Blacquière, de l'UNiversité de l'Île du Prince-Édouard et **Timothy Peter Kusalik** de l'Université Queen's à Kingston sont les heureux gagnamts du concours de printemps pour la bourse CRSNG-SMC Math à Moscou. Ils utiliseront leur bourse pour passer le trimestre d'automne à l'Université indépendante de Moscou. Nous leur souhaitons un très bon trimestre d'automne.

La date limite pour le prochain concours de la bourse CRSNG-SMC Math à Moscou est le **30 septembre 2004**.

www.cms.math.ca/bulletins/Moscou_web.html

BRIEF BOOK REVIEWS

by Srinivasa Swaminathan, Dalhousie University, Halifax, NS

PUZZLES 101, A PUZZLEMASTER'S CHALLENGE

by Nobuyuki Yoshigahara
translated by Richard Weyhrauch and Yasuko Weyhrauch
A. K. Peters, 2003, x + 121 pp

This little book is a collection of 101 puzzles from a huge pile of puzzles of the internationally acclaimed puzzle master Nobuyuki Yoshigahara who says in his Preface "I used to be a maniac about solving hard puzzles and I had a lot of fun (and some frustration) doing it. Now I have become a taskmaster who creates puzzles for others to enjoy and agonize over. Let me tell you that the reward of such agonizing is the great joy of 'Eureka!'".

The variety of puzzles in the book ranges from physical to visual and conceptual to mathematical. Solutions are provided in a separate section. The puzzles are original and interesting. The book is a welcome addition to any library. One can browse through it, focus on a puzzle and have fun thinking about it.

Here are a couple of interesting ones:
Puzzle 4: What comes next?
2, 4, 6, 30, 32, 34, 36, 40, 42, 44, 46, 50, 52, 54, 56, 60, 62, 64, 66, ? , … What comes after 66?

Puzzle 94: Height and Weight.
A man says, "I am the average height and average weight of a Japanese man. Thus, I am an average man." However, he is still considered to be a little overweight. Why?

After you have had a chance to think about these two puzzles, turn to page 42 for the solutions.

MATHEMATICAL TECHNIQUES FOR ANALYZING CONCURRENT AND PROBABILISTIC SYSTEMS

edited by Prakash Panangaden and Franck van Breugel
CRM Monograph Series, vol. 23
American Mathematical Society, viii + 215 pp

The volume consists of two sets of notes based on lectures at a workshop on 'Mathematical Techniques for Analyzing Systems', held as part of the *Année Thématique of the Centre de Recherche Mathématiques* devoted to theoretical computer science, September-October 2002.

In their Preface the editors say "that the impact of mathematics and logic in theoretical computer science has been great from its very birth. It is perhaps less widely known among general mathematicians that mathematics has had a profound impact on computer systems."

It has been 40 years since a firm mathematical underpinning to the study of programming languages was provided. It is also about 30 years since concurrent systems were looked at from a mathematical point of view.

The theory of concurrency has now become a rich subject with annual conferences and journals devoted to its research. The first set of lectures presents a new way of thinking about concurrency. Delivered by Jan Rutten it develops a calculus of streams (a generalization of the set of natural numbers) based on the coinduction principle coming from the theory of coalgebras. The interplay of algebra (for describing structure) and coalgebra (for describing dynamics) is crucial for understanding concurrent systems. A striking analogy exists between streams and formula calculus similar to quantum calculus.

The second set of lectures (delivered by Marta Kwiatkowska, Gethin Norman and David Parker) deals with methods for automatically verifying probabilistic systems using techniques of model checking. The main emphasis of the lectures is on both theory (models, specification languages and model checking algorithms) and practice (implementation, symbolic model checking and case studies) of probabilistic model checking.

Both sets of lectures are expository. They are suitable for graduate courses in theoretical computer science.

MATHEMATICAL PUZZLES, A CONNOISSEUR'S COLLECTION

by Peter Winkler
A. K. Peters, 2004, xi + 163 pp

Mathematician Peter Winkler has been collecting puzzles ever since his school days. He presents in this book a hundred or so of his favorite puzzles – puzzles that are easy to state and of moderate difficulty to solve. Most of them are amusing and suggest some general mathematical truth. The puzzles are organized into chapters, classified loosely by mathematical area of statement or solution. The solutions are presented at the end of each chapter, except the last which consists of unsolved puzzles. If there is information about the background and source of a puzzle, these are provided at the end of the solution. No professional acquaintance with mathematics is necessary to enjoy this book. Thus it is a book for amateur mathematicians, scientists and bright high school or college students. Professors and teachers of mathematics may also find it instructive to use some of the puzzles in their classroom.

Here is a sample, one which arose from a particular event (described below).

It is called 'The Malicious Maitre D'. At a mathematics conference banquet, 48 male mathematicians, none of them knowledgeable about table etiquette, find themselves assigned to a big circular table. On the table, between each pair of settings, is a coffee cup containing a cloth napkin. As each person is seated (by the maitre d'), he takes a napkin from his left or right; if both napkins are present, he chooses randomly (but the maitre d' doesn't get to see which one he chose). In what order should the seats be filled to maximize the expected number of mathematicians who don't get napkins?

The famous Princeton mathematician John H. Conway came to Bell Labs (where the author is Director of Fundamental Mathematics Research) on March 30, 2001 to give a 'general research colloquium'. At lunchtime, Peter Winkler was sitting between Conway and computer scientist Rob Pike (now of Google), and the napkins and coffee cups were as described above. Conway asked how many diners would be without napkins if they were seated in random order and Pike said, "Here's an easier question – what's the worst order?"

The solution discusses first the strategy of maitre d' if he happens to see which napkin is grabbed each time. The case where he does not, as stated in the puzzle, is discussed next. It is too long to be reproduced here.

MATHEMATICAL JOURNEYS

by Peter D. Schumer

John Wiley and Sons, Inc., 2004, xi + 199 pp

It is well known that it is difficult for a lay person to appreciate mathematical concepts and ideas.

Many mathematicians who are also expert writers have written books and articles that describe fascinating mathematical topics in an interesting manner. The present book belongs to this category.

Writing with a light touch Peter Schumer introduces the reader to historical facts, number theory, combinatorics, geometry, graph theory and recreational mathematics. Each chapter of the book focuses on some interesting topic like Fermat numbers, Mersenne primes, primality testing, Putnam Problems, Josephus Problem, Nim and Wythoff's Games, magic squares, pizza slicing, map coloring, calculating pi, partitions and Paul Erd\..os and his mathematics. Theorems, propositions and proofs are included in such a way that they blend easily with the text. Exercises under the title 'Worth Considering' are appended to each topic. Comments and solutions are provided in the appendix. The chapters do not depend on each other so that 'you can jump in anywhere and sample whatever tempts you'. There are facts in this book which college instructors may profitably use in their classes to add a bit of spice to their courses.

ACROSS THE BOARD: THE MATHEMATICS OF CHESSBOARD PROBLEMS

by John J. Watkins

Princeton University Press, 2004, x+ 257 pp.

This book is not simply about chess but about the fascinating mathematics of the chessboard (the simple grid of squares so common to games around the world) itself. Many beautiful solutions have emerged for basic chessboard problems since mathematicians such as Euler began working on them over three centuries ago. From Knight's Tour problem (Can a knight follow a path covers every square once, ending on the starting square?) and Queens Dominion (How many queens are needed so that every square is targeted or occupied by one of the queens?) to their many variations, Watkins surveys all the well-known problems in this fertile area of recreational mathematics. Extensions to three-dimensional chessboards and chessboards on toruses and cylinders are discussed.

No particular level of training or experience in either mathematics or chess is assumed; the necessary mathematical techniques, such as graph theory, are introduced and explained. Exercise problems are given along with the text with a discussion of their solutions at the end of each chapter. The final two chapters concern Latin square, Eulerian squares and Polynominoes.

Students, teachers, chess enthusiasts and puzzle chasers will find this book instructive and enjoyable.

MATHEMATICAL TECHNIQUES IN FINANCE

by Aleš Černý

Princeton University Press, 2004, xviii + 378 pp.

With the subtitle 'Tools for Incomplete Markets' this book offers an introduction to the mathematical tools that are needed to price uncertain income streams such as derivative securities. It is primarily intended as a textbook for Masters in Finance courses with a significant quantitative content. Modern finance overlaps with many fields of mathematics such as probability theory, linear algebra, calculus, partial differential equations, stochastic calculus, numerical analysis and programming. The book focuses on active and practical use of mathematical techniques in three interrelated financial topics: asset pricing, portfolio allocation, and risk management. Mixing theory with applications, the chapters include a number of worked examples, figures, simple ready-to-run computer programs and spread sheets Exercises are provided in each chapter with solutions made available on the book's website.

RADICAL THEORY OF RINGS

by B. J. Gardner and R. Wiegandt

Marcel Dekker, Inc., 2004 , xii + 387 pp.

One of the central problems in ring theory is to determine the structure of rings in terms of linear transformations of vector spaces. J. H. M. Wedderburn suggested the idea in 1908 and G. Kothe (1930) used an ingenious technique of considering a 'bad' property, γ, of rings and discarding or ignoring a certain 'bad' ideal, $\gamma(A)$, called the γ–radical of a ring A, such that the factor ring $A/\gamma(A)$ is 'good'. The 'good' rings are then described, in most cases, by a decomposition theorem in which the components admit faithful representations in terms of linear transformations. S. A. Amitsur and A. G. Kurosh were, independently, the first to discover that the classical radicals all had certain common properties and they used these algebraic properties to axiomatically define abstract radical classes.

This book introduces and characterizes radical classes, semisimple classes, and torsion theories in a universal class which may consist of any of the following: associative rings, alternative rings, not necessarily associative rings, near-rings, associative rings with involution, algebras over a commutative ring with unity element. A final chapter discusses some special features of the general radical theory.

CMS AWARDS ANNOUNCEMENTS

2004 JEFFERY-WILLIAMS PRIZE PRIX JEFFERY-WILLIAMS 2004

Citation and biography

Dr. Joel Feldman obtained his B.Sc. from the University of Toronto in 1970, and his Ph.D. from Harvard University in 1974, under the direction of Arthur M. Jaffe. Prior to joining the University of British Columbia in 1977, he was a Moore Instructor at the Massachusetts Institute of Technology.

Dr. Feldman attained the rank of full professor in 1987. He was elected as a fellow of the Royal Society of Canada in 1990, and, in 1996, he received the John L. Synge Award from the Royal Society of Canada.

Joel Feldman
University of British Columbia

Dr. Joel Feldman has risen to a position of international prominence in the field of mathematical physics with a thirty year record of sustained output of the highest calibre. He has made important contributions to quantum field theory, many body theory, Schrödinger operator theory and the theory of infinite genus Riemann surfaces. Feldman's work is characterized by mathematical depth coupled with great technical power.

Dr. Feldman began his career in constructive quantum field theory, where the goal is to construct nontrivial examples of quantum field models satisfying the Wightman axioms. Feldman made many contributions to these areas in the 1970's and 1980's. The work of Feldman, together with Jacques Magnen, Vincent Rivasseau and Roland Sénéor, on a rigorous approach to renormalization group methods was very influential.

Feldman's most important work of the last decade is his work with Horst Knörrer and Eugene Trubowitz on many body theory. In December, 2001, the three released a series of ten preprints containing the first construction of an interacting Fermi liquid at temperature zero in two space dimensions. These results have been called the "best in mathematical physics in the last decade".

The Jeffery-Williams Prize recognizes mathematicians who have made outstanding contributions to mathematical research.

Présentation et note biographique

Joel Feldman a obtenu son B.Sc. de l'Université de Toronto en 1970 et son doctorat de Harvard en 1974, avec M. Arthur M. Jaffe comme directeur de thèse. Avant d'arriver à l'UBC en 1977, il a enseigné au Massachusetts Institute of Technology (Moore Instructor).

M. Feldman est devenu professeur titulaire en 1987. En 1990, il s'est fait élire à la Société royale du Canada, qui lui a également décerné le Prix John L. Synge en 1996.

Joel Feldman s'est élevé, au fil des ans, au rang de sommité internationale en physique mathématique, notamment grâce à un dossier de publication continu de très haut calibre. Il a fait d'importantes contributions à la théorie des champs quantifiés, à la théorie à *n* corps, à la théorie des opérateurs de Schrödinger et à la théorie des surfaces de Riemann du genre infini. Les travaux de M. Feldman se démarquent par leur profondeur mathématique et leurs prouesses techniques.

M. Feldman a commencé sa carrière en étudiant la théorie des champs quantiques. Son but était de composer des exemples non triviaux de modèles de champs quantiques en accord avec les axiomes de Wightman. Il a beaucoup contribué à ces domaines dans les années 1970 et 1980. Ses travaux, combinés à ceux de Jacques Magnen, Vincent Rivasseau et Roland Sénéor, sur une approche rigoureuse aux méthodes groupées de renormalisation constituent une contribution fondamentale au domaine.

Les travaux les plus importants de Joel Feldman, au cours des dix dernières années, sont ceux qu'il mène avec Horst Knörrer et Eugene Trubowitz sur la théorie à n corps. En décembre 2001, les trois chercheurs ont publié une série de 10 exemplaires en tirage préliminaire annonçant le premier liquide de Fermi capable d'interaction à zéro degré dans un espace bidimensionnel. On a dit qu'il s'agissait « des meilleurs résultats de la dernière décennie en physique mathématique ».

Le prix Jeffery-Williams rend hommage aux mathématiciens ayant fait une contribution exceptionnelle à la recherche mathématique.

For more information about the Jeffery-Williams Prize please visit:
Pour de plus amples renseignements au sujet de ce prix, veuillez visiter :

www.cms.math.ca/Prizes/info/jw.html

CMS AWARDS ANNOUNCEMENTS

2004 CMS EXELLENCE IN TEACHING AWARD
PRIX D'EXCELLENCE EN ENSEIGNEMENT DE LA SMC 2004

Citation and biography

Leo Jonker of the Mathematics and Statistics Department at Queen's University is the first recipient of the Canadian Mathematical Society Excellence in Teaching Award. Leo's performance in teaching is exceptional; his teaching of engineers and of elementary school teachers is particularly remarkable.

One of Leo's great successes is the Introductory Engineering calculus course. Using a combination of strategies (well-trained tutors, carefully planned tutorials, superb lectures, and interactive course notes specially developed for the course), Leo has managed to raise the students' enthusiasm for mathematics. Particularly successful was his switch to undergraduate students as tutors in this large course. For his work in this course, Leo was awarded the Applied Science First Year Teaching and learning Award four times since 1998.

Leo Jonker
Queen's University

A second great success is Leo's work with elementary school students and prospective elementary school teachers. More than 20 years ago Leo started working with the students in an area elementary school. Over the years he has built up a series of enrichment tasks which have since appeared in two volumes. These books, aimed at grade 7 and 8 students, are intended to open the students' eyes to the beauty and power of mathematical ideas. More recently, Leo decided to combine his enrichment work with his concern for mathematics anxiety among elementary school teachers to establish a new course, Fundamental Concepts in Elementary Mathematics for Teachers. The audience of this course, consisting almost entirely of students with little or no university mathematics, very quickly grew to over 50 students. At the same time, Leo's contacts in the elementary schools enabled him to find placements in which these students conduct enrichment classes, in pairs. Former students all say that the course has transformed their vision of mathematics. Ryanne Flattery puts it like this: "He essentially changed us from a bunch of non-math minded students who lacked confidence in our abilities to teach it effectively, to a group of people who were excited and eager to go into our schools every week and teach math to our students."

Leo summarizes his teaching objectives as follows: "Love of the subject, love of its beauty and its power, should be the primary motivation for all mathematics education and the basis of all communication between teacher and student. The beauty of the subject can be equally evident at all levels of the education system." One of Leo's first year engineers writes this of his classroom experience: "It is like painting an entire picture for us rather than just drawing one object in the middle of the

Présentation et note biographique

Leo Jonker, du département de mathématiques et de statistique de l'Université Queen's, est le premier lauréat du Prix d'excellence en enseignement de la Société mathématique du Canada (SMC). La feuille de route de Leo Jonker en enseignement est exceptionnelle, et son rôle dans la formation des ingénieurs et des enseignants du primaire, particulièrement remarquable.

L'une des grandes réussites de Leo est sans aucun doute son cours d'introduction au calcul différentiel et intégral pour ingénieurs. À l'aide de stratégies diversifiées (tuteurs compétents, séances de tutorat préparées avec soin, cours magistraux fascinants et notes de cours interactives rédigées pour ce cours en particulier), il soulève l'enthousiasme des étudiants pour les mathématiques. Son idée de prendre comme tuteurs pour ce cours populeux des étudiants de mathématiques de premier cycle a particulièrement bien réussi. Pour son travail entourant ce cours, Leo Jonker a reçu le Applied Science First Year Teaching and learning Award quatre fois depuis 1998.

Son travail auprès d'élèves du primaire et de futurs enseignants est également digne de mention. Il y a plus de 20 ans, Leo a commencé à travailler avec les élèves d'une école primaire de son voisinage. Au fil des ans, il a conçu une série d'exercices d'enrichissement, publiés depuis dans deux ouvrages. Destinés aux enfants de 7e et de 8e année, ces ouvrages ont pour objectif de faire découvrir aux élèves la beauté et la puissance des concepts mathématiques. Plus récemment, préoccupé par les difficultés qu'éprouvaient les enseignants du primaire, il a conçu un nouveau cours intitulé Concepts fondamentaux de mathématiques élémentaires pour enseignants. Ce cours a tôt fait d'attirer plus d'une cinquantaine d'étudiants, la plupart n'ayant jamais étudié les mathématiques à l'université ou les ayant très peu étudiées. Grâce à ses contacts dans les écoles primaires, il pouvait aussi trouver des stages où ses étudiants pourraient donner des cours d'enrichissement, deux par deux. Les personnes qui ont suivi ce cours affirment toutes qu'il a complètement transformé leur perception des mathématiques. Ryanne Flattery l'exprime ainsi : « Essentiellement, il a fait de nous, qui n'étions pas portés sur les maths ni rassurés quant à notre capacité de les enseigner efficacement, des enseignants stimulés et impatients d'aller donner des cours de mathématiques dans nos écoles. »

Quant à Leo, il résume ainsi ses objectifs d'enseignement : « L'amour du sujet, de sa beauté et de sa puissance devrait être la motivation principale de tout enseignement des mathé-matiques, et la base de la

CMS AWARDS ANNOUNCEMENTS

(continued)

canvas. It helps us understand the concepts behind the method we are using and the very nature of the problem itself. I walk out of his lectures thinking to University of Toronto, where he got his Ph.D. in 1967. Following a postdoctoral position at the University of California, he has been at Queen's University since 1969. He was Head of his department for the period 1990-1995. His field of research is dynamical systems; he has combined an active research career, including the supervision of several graduate students, with his commitment to education. He is regularly invited to give talks on pedagogy. Leo received a number of Teaching Awards at Queen's University, including the 1997 W.J. Barnes Teaching Excellence Award, the 1999 Alumni Teaching Award, and the Engineering Society's Golden Apple in 2000. As well, in 2000, he was one of the recipients of the Ontario Confederation of University Faculty Associations' Award for Excellence in Teaching.

Nelson & Brooks/Cole, Thomson Businesses are proud sponsors of this award.

For more information about the CMS Exellence in Teaching Award please visit:
Pour de plus amples renseignements au sujet de ce prix, veuillez visiter:
www.cms.math.ca/Prizes/info/et.html

communication maître-élève. La beauté du sujet peut être tout aussi évidente à tous les paliers du système d'éducation. » Un des étudiants de Leo en première année d'ingénierie raconte ainsi ce qu'il a vécu en classe : « Au lieu de peindre un objet au milieu d'une toile, c'est comme s'il peignait pour nous la toile au complet. Il nous aide ainsi à comprendre les concepts qui se cachent derrière les méthodes et la nature intrinsèque des problèmes. En sortant de son cours, je me dis souvent "Incroyable! Je comprends tout ça!" »

Leo a fait toutes ses études à l'Université de Toronto, où il a obtenu son doctorat en 1967. Après un stage postdoctoral en Californie, il est entré à Queen's en 1969 et y est toujours. Il a été directeur de son département de 1990 à 1995. Son domaine de recherche : les systèmes dynamiques. Il a combiné une carrière de recherche active, y compris la direction de plusieurs étudiants aux cycles supérieurs, à son engagement envers l'éducation. On l'invite d'ailleurs souvent à donner des conférences sur la pédagogie. Leo a reçu un certain nombre de prix d'excellence en enseignement de l'Université Queen's, dont le prix W.J. Barnes en 1997, celui des Anciens en 1999, et le Engineering Society's Golden Apple en 2000. En 2000, il a également reçu le prix d'excellence en enseignement de l'Union des associations des professeurs des universités de l'Ontario.

Nelson et Brooks/Cole, Entreprises Thomson sont fiers de commanditer ce prix.

CMS Excellence in Teaching Award

for post-secondary undergraduate teaching in Mathematics

Prix d'exellence en enseignement de la SMC

pour l'enseignement collégial et de premier cycle universitaire en mathématiques

Recognizing sustained and distinguished contributions in teaching. Full-time university, college, two-year college, or CEGEP teachers in Canada with at least five years teaching experience at their current institution can be nominated.

For details regarding nomination procedure, please visit *www.cms.math.ca/prizes* **or** *http://hed.nelson.com*

Deadline for nomination is: November 15, 2004

Ce prix récompense des contributions exceptionnelles et soutenues en enseignement. Il s'addresse aux professeures et professeurs d'université, de collège ou de cégep au Canada ayant au moins cinq ans d'expérience dans leur institution présente.

Pour les détails sur la procédure de mise en nomination voir *www.cms.math.ca/prizes* **ou** *http://hed.nelson.com*

Date limite pour soumettre une candidature : 15 novembre 2004

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EDUCATION NOTES

Ed Barbeau, University of Toronto

The Halifax meeting

The education session on June 14 at the 2004 CMS-CAIMS Summer Meeting focussed on bridges: the transition from school to university. This issue has been actively pursued by universities across Canada and delegates learned about programs at Regina, Queen's and UNB.

Harley Weston from the University of Regina reported that a committee established some years ago by the Regina Board of Education and the University led to good relations between those at the school and tertiary levels. Two manifestations of the University's outreach are its Math Camp, a day of hourlong sessions involving activities supervised by mathematics education students, for invited students, and the Math Central website (*http://MathCentral.uregina.ca/*). These activities have led to collaboration between the faculties of science and education. Students admitted to the University of Regina are supported by review sessions during the first two weeks in which prerequisite topics are outlined and sample exercises provided, drop-in sessions for all first year courses, laboratory sessions for the first two semesters and the option of a slower-paced calculus course. Grant money has allowed the production of a poster, Mathematics with a human face, describing careers for mathematics graduates; this may be viewed on the Math Central website.

According to **Caroline Jones**, the University of New Brunswick too offers a slower-paced calculus course, as well as a 30-item advisory placement test. For a fee of $100, incoming students may enrol in *Successful Transformations*, a three-day mathematics preparation workshop on prerequisite topics that includes a workbook and a sample test. Continually during the academic year, students have access to other workshops, drop-in sessions and private or group tutoring.

Leo Jonker of Queen's University, recipient of the first CMS Teaching Award, teaches first year engineers. The course is highly organized, with the text supplemented by interactive purchased by the students and later notes purchased by the students and later posted on the web. The notes constitute overheads that are used during lectures and have space for students to make their own jottings and work out examples. The website for the course has a chat room, and students become fluent with Maple. The pace of the course is deliberately more leisurely during the first term to keep students on track. Tutorials are given by upper year students in the Mathematics and Engineering Program; students with severe difficulties can be transferred to a "rescue" section. However, the best students who might otherwise be bored are given the opportunity to undertake challenge problems and investigations; between 5% and 10% of the class participate. Here is one such problem. *Let* $p(x) = x^3 - \epsilon x - \delta$, *where* ϵ *is a parameter that drifts in the neighbourhood of 2. Suppose that* δ *is a controllable parameter and that* X *is the real root of* $p(x)$ *(when* $(\delta, \epsilon) = (4, 2)$, $X = 2$*). How should* δ *be manipulated to ensure that* X *remains at 2?.*

Richard Hoshino of Dalhousie University described three initiatives in Atlantic Canada. The High School Mathematics League for school students meets on Saturday mornings for group activities. With attendance growing from 20 students at 5 schools to 177 from 22 schools and about 40% female participation, it moves among the Halifax universities. Students come from as far away as Cape Breton Island. Here is a problem posed in the league in October, 2003; you will know when you find the correct answer.

Suppose that a, b, c, d, e *are positive integers for which (a)* $a < b < c < d < e$*; (b) exactly four of them are prime; (c)* $d = b + c$*; (4)* $a + b + c + d + e$ *is prime, and (5)* $e - a$ *is the square of a prime number. Determine the value of* $a^3 + b^3 + c^3 + d^3 + e^3$.

Hoshino also described a student Math Circle that meets biweekly on Wednesday evenings and Combinatorial Institutes held in Moncton and Truro. These two-day seminars, supported by a CMS Endowment Grant, are designed to introduce new topics to high school students and get them working on rich combinatorial problems.

The education session concluded with a panel discussion chaired by John Grant McLoughlin, of the University of New Brunswick. First up was **David McKillop**, the mathematics coordinator of the Chignecto-Central Regional School Board of Nova Scotia, who pointed to difficulties within the school system: increasing demands on teachers, reduced time allocation for preparation and instruction, misplacing of students and scarcity of qualified teachers. He decried the poor image of mathematics in which children "learn scales" but do not get to "play a tune". An important recommendation is to acknowledge the maturity of upper year secondary students by respecting their autonomy and granting them more responsibility and independence.

Jim Totten of the University College of the Caribou in British Columbia looked at the tertiary side of the bridge. He described five stategies to help student succeed, but warned how difficult it was to assess their effectiveness. These were streaming of students, mathematics help centres, extra courses such as a voluntary credit rescue course at his institution, the coordinated science program at the University of British Columbia (*www.science.ubc.ca/~csp/*; consult *nagata@math.ubc.ca*) and the Supplemental Learning Project at the University of Missouri in Kansas (*www.umkc.edu/cad*), which includes coaching in study skills and extra sessions for difficult parts of courses.

David Poole of Trent University in Peterborough, ON discussed the Ontario double cohort and found that those teachers and university instructors who had met to plan how to deal with it were very willing to continue to monitor future developments.

EDUCATION NOTES *(continued)*

Challenge Down Under

Since 1992, middle school and junior secondary students in Australia have been able to participate in the *Mathematics Challenge for Young Australians*. This is a comprehensive program with the aim of encouraging among students mainly in Years 7-10 an interest in mathematics, a desire to succeed at it and pleasure in solving problems. Its other goals are to serve as a vehicle for recognizing talent and providing professional development for teachers in the form of accessible problems (along with solutions, extensions and discussion) and statistics of student achievement across the country. There are three independent stages.

The first stage is the *Mathematics Challenge* stage given at three levels. The Intermediate and Junior levels present students with six problems to be worked on over three weeks. Four must be done individually, but the remaining two can be discussed by each student with a partner, although solutions must be sent in individually. There is also a Primary level (Years 5-6) with four problems that students may work on in groups of up to three, but whose solutions must be sent in individually. In 2003, there were 3169 Primary level entries, 5039 Junior level entries and 3271 Intermediate level entries.

The problems in the first stage can be numerical, geometrical, combinatorial or recursive. Many are cast as stories. For example, on both the Junior and Intermediate papers in 2003, was the following investigation, entitled Bulgarian goats:

Yenko the Bulgarian goatherd drives his father's goats into a valley each morning and lets them browse there all day before driving them home in the evening. He notices that each morning the goats immediately separate into groups and begin to feed. The number and sizes of the initial groups vary. Some days there are nine or more groups; on other days, there are three or fewer. There can be groups of one or the whole herd can form a single group. About every five minutes one goat breaks away from each feeding group and these breakaway goats form into a new group. Yenko has noticed that by the afternoon, even though the goats continue their regrouping, the sizes of the groups have stabilized, and there are always seven feeding groups.

a. How many goats are there in the herd? What are the sizes of the feeding grouos once they have stabilized?

Yenko's father then sells two of the goats. Over the next week, Yenko notices that things have changed. The sizes of the feeding groups no longer stabilize. There are not always seven groups. Nevertheless, a cyclic pattern of sizes develops every day.

b. Find at least two possible cyclic patterns of sizes.

In the previous year, Intermediate students had to solve this problem:

The sum of the digits of 27 is 9; the sum of the digits of 3055 is 13. Dividing 27 by the sum of its digits gives 3 and dividing 3055 by the sum of its digits gives 235.

a. Find the first three consecutive integers greater than 10 each of which is divisible by the sum of its digits.

b. Find all the integers, each of which gives 37 when divided by the sum of its digits.

Teachers are provided with solution books and a marking scheme as well as an enrichment book which suggests extensions to the problems that some of their pupils might be interested in following up.

The second stage of the program is the Mathematics Enrichment Stage which runs from April until September of each year. There are six parallel series of comprehensive student and teacher support notes designed for students at different levels. Each students picks only one of these. The highest levels are the Noether Enrichment series for the top 5-10% students of year 9 or 10 and the Polya Enrichment series for the top 5% of students in year 10. These two series attracted 872 and 303 students, respectively, in 2003; these students can participate in the third stage of the program, the *Australian Intermediate Mathematics Olympiad*, a four-hour examination based on work in the Challenge stage and in the Polya or Noether Enrichment series that attracted 791 entries in 2003.

This venture comes under the auspices of the Australian Mathematics Trust at the University of Canberra, which also runs secondary school multiple choice contests and the Australian Mathematics Olympiad. It operates training schools to prepare students for the Asian-Pacific Mathematical Olympiad and the International Mathematical Olympiad. The website of the Trust is ***www.amt.edu.au***.

NEWS FROM DEPARTMENTS

University of Victoria, Victoria, BC

Appointments: Peter Dukes (Assistant Professor, Combinatorics, July 2004).
Promotions: Rod Edwards(Associate Professor, July 2004).
Retirements: David Leeming (Professor, June 2004)
Resignations: Marc Fabbri

Dalhousie University, Halifax, NS

Appointment: Jonathan Borwein (Canada Research Chair in Computer Science, June 2004).

NEWS FROM THE FIELDS INSTITUTE

This summer, the Fields Institute welcomed a new Director, Barbara Lee Keyfitz, from the University of Houston. The influence of her leadership is already being felt at the Institute, and is sure to contribute significantly to its continuing development, as well as that of the Canadian mathematics community.

The past year's thematic program on partial differential equations, organized by Walter Craig (McMaster), Nick Ercolani (Arizona) and Catherine Sulem (Toronto), has been one of the most active the Fields Institute has seen. There was a steady progression of graduate courses, workshops, symposiums, special lectures, not to mention new mathematics. See www.fields.utoronto.ca/programs/scientific/03-04/pde/index.html for a more complete list.

The thematic program for the coming year (September, 2004 to July, 2005) is the Geometry of String Theory, a joint program with the Perimeter Institute in Waterloo, organized by Kentaro Hori, Lisa Jeffrey, Mikhail Kapronov, Boris Khesin and Amanda Peet from the University of Toronto, and Robert Myers from the Perimeter Institute. Two graduate courses are planned for the fall term, one on String Theory by Peet and the other on Mirror Symmetry by Hori. The winter term will include a course in Symplectic Geometry and Topology by Khesin. One of the highlights of the fall term will be the Coxeter Lectures, to be delivered by Nigel Hitchin of the Mathematical Institute at Oxford, on November 15 to 17. The winter edition of this important lecture series will be given by Robbert Dijkgraaf of the Institute for Theoretical Physics in Amsterdam (at a time to be determined). Edward Witten of the Institute for Advanced Study in Princeton will be the speaker in the annual Distinguished Lecture Series some time in April. A variety of workshops and other activities are planned, winding up in grand style during July 11 to 16 with the premier international conference in string theory, Strings 2005. For more details about it and the events in the string theory program, see www.fields.utoronto.ca/programs/scientific/04-05/string-theory/.

The thematic program for the fall of 2005 will be Renormalization and Universality in Mathematics and Mathematical Physics, organized by Pavel Bleher (IUPUI), Mikhail Lyubich (Toronto), and Michael Yampolsky (Toronto). The program will aim to give a broad prospective of application of renormalization ideas, and will concentrate in the areas where renormalization and scaling invariance have led to important recent progress, such as one-dimensional dynamics (real and complex), 2D conformal invariance, geometric PDEs, and their connection to the underlying physics ideas. The purpose is two-fold: to survey the recent achievements and outline new directions of research on the one hand; and to foster the interaction between various branches of the dynamics and mathematical physics communities working in renormalization. For more details, see *www.fields.utoronto.ca/programs/scientific/05-06/holodynamics/*.

In the winter of 2005, the thematic program will be Holomorphic Dynamics, Laminations, and Hyperbolic Geometry, organized by Bruce Kleiner (Michigan), Mikhail Lyubich (Toronto), Yair Minsky (Yale), Mike Shub (Toronto), and Michael Yampolsky (Toronto). The main focus of this program will be on the interaction between 3-dimensional Hyperbolic Geometry and Holomorphic Dynamics. These two fields have

flourished during the past 30 years, with numerous fruitful exchanges that have enriched both of them. Recent years have seen many exciting breakthroughs in the both fields. The program will provide an opportunity to reckon the recent achievements and to discuss further directions which they open. Along with these two main themes, the program will incorporate a number of related directions, including the theory of laminations, partially hyperbolic dynamics, and flows on moduli spaces. All of them are closely interconnected, in particular through the theory of laminations which provides a unifying framework. Tentatively, the beginning of the program will concentrate on topics in partially hyperbolic dynamics, Teichmüller flow, and laminations; the middle part will focus on one and two-dimensional holomorphic dynamics; and the last part will cover various topics in hyperbolic geometry including the recent solution of longstanding conjectures in the deformation theory of hyperbolic manifolds and recent advances in Thurston's Geometrization Program. For more details, see

www.fields.utoronto.ca/programs/scientific/05-06/holodynamics/

Autumn deadlines:

1. Letters of intent (or inquiries) for thematic programs are welcome at any time. See *www.fields.utoronto.ca/proposals/thematic.html* for details

2. General Scientific Activities (workshops, seminars, conferences,...) October 15. For details see: *www.fields.utoronto.ca/proposals/other_activity.html*.

3. CRM-Fields Prize. October 1. See *www.fields.utoronto.ca/proposals/crm-fields_prize.html*

4. Distinguished Lecture Series in Statistical Science. October 15. See *www.fields.utoronto.ca/proposals/CLSandDLS.html#dlss*

5. Postdoctoral Fellowships (for the 2005-06 academic year). December 10. See *www.fields.utoronto.ca/proposals/postdoc.html*

Carl R. Riehm
Managing Editor of Publications, The Fields Institute

RÉUNION D'HIVER DE LA SMC 2004
Université McGill, Montréal (Québec)
11-13 décembre 2004

Au nom de l'Université McGill, le Département de mathématiques et de statistique invite la communauté mathématique à la Réunion d'hiver 2004 de la Société mathématique du Canada (SMC).

Ce sera pour nous un plaisir d'accueillir à nouveau nos collègues à Montréal, lieu du premier Congrès canadien de mathématiques, en 1945. Ce congrès a réuni, entre autres participants internationaux, des noms comme Garrett Birkhoff, Claude Chevalley et John von Neumann; au nombre des participants canadiens, mentionnons John Coleman, H. S. M. Coxeter, Israel Halperin, Joachim Lambek, Nathan Mendelsohn, Louis Nirenberg, Adrien Pouliot, G. de B. Robinson et Albert Tucker. C'est en 1979 que le nom anglais de la société (Canadian Mathematical Congress) est devenu Canadian Mathematical Society.

Conformément au format habituel, la Réunion d'hiver comprendra une grande diversité de symposiums, une séance de communications libres, des conférenciers principaux, des conférences de lauréats ainsi qu'une conférence populaire.

La plupart des activités et toutes celles du programme scientifique se dérouleront à l'Hôtel Hilton Bonaventure. La soirée du vendredi 10 décembre se tiendra au Best Western Europa, à quelques pas de là. Vous trouverez l'information la plus récente sur les programmes, y compris les horaires, sur ce site Web.

Vous trouverez les formulaires d'inscription et de réservation d'hôtel dans le numéro de septembre 2004 des Notes de la SMC. Ils seront aussi publiés sur notre site Web, tout comme les formulaires électroniques d'inscription et de présentation des résumés.

Conférence populaire
Alexei G. Myasnikov (McGill)
Complexity of Computations and Cryptography

Conférences principales
Michael Bennett (UBC)
Persi Diaconis (York)
Rainer Steinwandt (Karlsruhe)
Rostislav Grigorchuk (Texas A&M)

Prix
Conférence Coxeter-James de la SMC
Izabella Laba (UBC)
Conférence du Prix de doctorat de la SMC
icolaas Spronk (Waterloo)
Prix Adrien-Pouliot de la SMC
à communiquer
Prix G. de B. Robinson de la SMC
à communiquer
Prix de la SMC pour service méritoire Edgar Goodaire (Memorial)

Communications libres
Org. : **William Brown** (McGill)

Nous lançons un appel de communications libres de 20 minutes chacune.
Les résumés devront respecter les critères précisés ci-dessous et nous parvenir au plus tard le **10 octobre 2004**, accompagnés du formulaire et des droits d'inscription du conférencier. Pour faciliter la tâche des organisateurs, veuillez indiquer la classification de sujet de l'AMS (*http://www.ams.org/msc/*) et préciser que vous souhaitez présenter une communication libre.

Un maximum de 20 communications libres seront acceptées.

Séances de travail
La SMC tiendra les séances de travail suivantes à l'occasion de cette Réunion :

Le **Comité exécutif de la SMC** tiendra une réunion le jeudi 9 décembre de 18 h à 22 h au salon Frontenac du Hilton Bonaventure.

Le **lunch du Groupe de développement de la SMC** aura lieu de 11 h à 13 h le vendredi 10 décembre au salon Castillon du Hilton Bonaventure.

La **réunion du Conseil d'administration de la SMC** aura lieu de 13 h 30 à 18 h 30 le vendredi 10 décembre au salon Westmount du Hilton Bonaventure.

Vous obtiendrez de plus amples renseignements dans les prochaines annonces et sur le site de la SMC. Un horaire détaillé des séances de travail et des autres événements est disponible à la page des horaires du site Web.

Activités sociales
La **Réception d'accueil** aura lieu le vendredi 10 décembre de 20 h à 22 h à l'Hôtel Best Western Europa (1240, rue Drummond, à l'angle de la rue Sainte-Catherine).

Le **Banquet** se tiendra au Hilton Bonaventure le dimanche 12 décembre à 19 h. Il y aura un service de bar payant dès 18 h. Des billets sont en vente au coût de 60 $ par personne.

Le **lunch des participants** se tiendra le samedi 11 décembre, de 11 h 30 à 13 h 30, au Hilton Bonaventure. Ce repas est compris dans toutes les catégories d'inscription.

Alexei G. Myasnikov (McGill) prononcera la conférence populaire le vendredi 10 décembre à 19 h au Best Western Europa.

Le **Comité des femmes en mathématiques de la SMC** invite toutes les mathématiciennes qui assisteront à la Réunion d'hiver de la SMC à

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un **déjeuner de travail** du comité le dimanche 12 décembre 2004 à 11 h 30 au salon Saint-Pierre du Hilton Bonaventure. Nous profiterons de ce déjeuner de travail pour amorcer la préparation du deuxième atelier CWiMAC (Connecting women in Mathematics across Canada), qui se tiendra à l'été 2005, à la Station de recherche internationale de Banff (BIRS), et pour discuter de l'avenir du comité.

Le premier déjeuner de travail public du Comité des femmes en mathématiques a eu lieu lors de la Réunion d'hiver 2003 de la SMC. Comme les membres du comité et les autres personnes qui ont assisté à la rencontre ont trouvé l'expérience très enrichissante, le comité a décidé d'en faire une activité annuelle. Le comité aimerait remercier la SMC et Leah Edelstein-Keshet (UBC) d'avoir commandité le déjeuner de travail. Le comité est à la recherche d'autres commanditaires pour ses rencontres des prochaines Réunions d'hiver.

Du café et des jus seront servis durant les pauses prévues à l'horaire.

L'horaire détaillé des activités sociales et autres se trouve sur le site de la réunion.

Exposants

Exposants : les kiosques d'exposition seront ouverts de 9 h 30 à 16 h les 11 et 12 décembre au salon Fontaine A du Hilton Bonaventure.

Exposition conjointe : on y présentera des produits de maisons d'édition et d'autres sociétés et organismes non représentés à la Réunion. On trouvera des bons de commande sur place, que la Société transmettra aux sociétés concernées après la Réunion. Les livres et autres produits qui seront présentés à cette exposition seront offerts à l'université hôte.

Comptoir d'adhésion et exposition de livres de la SMC : nous vous invitons à visiter le comptoir d'adhésion et l'exposition de livres de la SMC. Un représentant sera sur place de 8 h à 17 h les 11 et 12 décembre, et de 9 h à 16 h le 13 décembre pour fournir des renseignements sur l'adhésion, les Réunions à venir, les publications et les autres activités de la Société. Ce kiosque sera aménagé dans l'aire d'inscription.

Kiosque de renseignements : à la demande de nos membres, un kiosque de renseignements sera aménagé dans l'aire d'inscription. Veuillez envoyer une copie de votre annonce à la coordinatrice des expositions, au bureau administratif de la SMC, par télécopieur (613) 565-1539. ou à *reunions@smc.math.ca*.

Toute annonce doit être approuvée au préalable. Les participants pourront apporter jusqu'à 100 copies de leur annonce approuvée. Il leur incombe de fournir eux-mêmes les copies et de récupérer celles qui seront restées sur la table avant 15 h le dernier jour de la Réunion; autrement, elles seront détruites.

Il est interdit d'afficher des annonces dans l'aire d'inscription ou dans les salles de réunion, ou de distribuer des annonces aux passants. Les annonces d'événements entrant en conflit avec le programme de la Réunion ne seront pas acceptées.

Le kiosque n'est pas destiné à promouvoir des biens et services achetables. Ceux qui désirent faire la promotion de tels produits doivent communiquer avec la coordinatrice des expositions pour obtenir des renseignements sur l'exposition conjointe.

Envoi de résumés

Tous les résumés paraîtront dans le programme de la Réunion et seront accessibles sur le site Web.

Les conférenciers sont priés de remettre leur résumé le plus tôt possible. **La date limite est fixée au 10 octobre 2004**. Les organisateurs remercient les conférenciers de bien vouloir respecter cette importante échéance.

Pour envoyer votre résumé électroniquement, rendez-vous à la section des formulaires du site Web de la Réunion.

Vous pouvez aussi nous faire parvenir par courriel un message comprenant le nom de la séance (dans la ligne « sujet » ou « objet » du message), le nom du conférencier, son affiliation, son adresse de courriel, le titre de la conférence et le résumé à l'une des adresses suivantes :

resumes-h04@smc.math.ca (conférenciers invités), ou
cl-resumes-h04@smc.math.ca (communications libres).

Pour faciliter la tâche des organisateurs des séances de communications libres, veuillez préciser la classification de sujets AMS 2000 (*http://www.ams.org/msc/*).

Inscription

Préinscription électronique

Un formulaire d'inscription est aussi disponible auprès de la SMC :

Bureau administratif de la SMC
577, av. King-Edward
Ottawa (Ontario) CANADA K1N 6N5
Tél. : (613) 562-5702 ; Fax : (613) 565-1539
reunions@smc.math.ca

Les frais (en devises canadiennes) sont payables par chèque, VISA ou MasterCard. Les paiements en devises américaines seront acceptés, mais nous vous demandons de contacter votre institution financière pour prendre connaissance du taux de change en vigueur.

Le paiement doit nous **parvenir à Ottawa** au plus tard le **1er novembre** pour que vous ayez droit aux tarifs réduits. Pour que votre

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inscription soit traitée avant la Réunion, votre paiement doit nous parvenir au plus tard **le 30 novembre**.

	Avant le 1er novembre	Après le 1er novembre
Conférences principales lauréats/populaire	0 $	0 $
Symposiums	225	290
Organisateurs	150	195
Non-membres	450	585
Membres SMC/AMS/MAA avec subvention	300	390
Membres SMC/AMS/MAA sans subvention	150	195
Frais d'une journée	200	260
Postdocs/retraités	115	150
Enseignants (prim./sec./cégep) /étudiants/sans emplois	60	80
Lunch des participants inclus	0	0
Banquet (gratuit pour conf. principaux et lauréats)	60	60

SMC = Société mathématique du Canada
AMS = American Mathematical Society
MAA = Mathematical Association of America

À quoi sert de s'inscrire à l'avance?

Vous vous demandez si vous devriez vous inscrire à l'avance ou le faire sur place? Voici quelques-uns des avantages de la préinscription :

- plusieurs personnes ont droit à une réduction en s'inscrivant avant la date limite pour tarifs réduits (voir section ci-dessus)
- votre nom figure dans la liste des participants sur le Web
- votre trousse d'inscription sera déjà prête à votre arrivée le vendredi soir
- vous n'aurez pas besoin de faire la file pour vous inscrire à la première heure samedi matin
- les billets pour le banquet sont en vente maintenant, mais il pourrait ne plus en rester sur place

Pour ces raisons, nous vous encourageons à vous inscrire à l'avance, soit avant ou après la date limite pour tarifs réduits. Pour vous inscrire à l'avance et profiter des avantages ci-dessus, rendez-vous sur notre site Web et remplissez les formulaires appropriés.

Politique de remboursement

Les participants qui désirent annuler leur inscription doivent en aviser le bureau administratif de la SMC par écrit avant le 30 novembre pour se voir rembourser leurs frais d'inscription (moins 40 $). Les participants dont les communications libres n'auront pas été acceptées seront remboursés intégralement sur demande.

Êtes-vous admissible à une adhésion gratuite à la SMC?

Les membres de l'AMS et de la MAA qui s'inscrivent à une Réunion semestrielle de la SMC et qui ne sont pas membres de la SMC sont admissibles à une année d'adhésion gratuite à la SMC (offre unique).

Si vous êtes admissible, présentez-vous au kiosque de la SMC pour remplir une demande d'adhésion. Veuillez fournir une preuve d'adhésion à l'AMS ou à la MAA. Cette offre est destinée aux nouveaux membres seulement.

Hébergement

Il est fortement recommandé aux participants de réserver à l'avance. Tous les participants doivent faire leurs propres réservations. Des chambres ont été retenues aux endroits ci-dessous jusqu'au **8 novembre 2004**. Après cette date, les hôtels ne prendront vos réservations que s'il reste des chambres et demanderont les tarifs affichés. Les tarifs sont par nuit, par personne, et sont indiqués en devises canadiennes. Les tarifs préférentiels s'appliquent généralement aux trois jours qui précèdent et qui suivent la Réunion. Au moment de réserver, veuillez donner le code de groupe. Toute réservation doit être garantie par le paiement d'une nuit ou par une carte de crédit reconnue.

HILTON BONAVENTURE
900, rue de La Gauchetière Ouest, Montréal, QC H5A 1E4

Taxes : 7 % TPS, 7,5 % TVQ; taxe d'hébergement : 2 % par nuitée
Code de groupe : Société mathématique du Canada
Téléphone : (514) 878 2332, **sans frais** : 1 800 445-8667
Fax : (514) 878-3881
Stationnement : 15 $/jour, 22 $/jour avec service voiturier

Tarifs : 135 $ chambre de luxe, occupation simple ou double
20 $ par adulte additionnel
159 $ étage affaires*, occupation simple
189 $ étage affaires*, occupation double
*avec accès au salon

Gratuit pour les enfants (18 ans et moins) qui occupent la même chambre que leurs parents ou grands-parents.

BEST WESTERN EUROPA
1240, rue Drummond, Montréal, QC H3G 1V7 (à l'angle de Sainte-Catherine, à 10 minutes de marche du Hilton Bonaventure)

Taxes : 7 % TPS, 7,5 % TVQ; 2,31% taxe touristique
Code de groupe : 161285 ou Société mathématique du Canada
Téléphone : (514) 866-6492; sans frais 1 800 361-3000 (après le 5e coup, l'appel est acheminé au siège social du Best Western, et les tarifs ordinaires pourraient s'appliquer)
Fax : (514) 861-4089

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Courriel : *hotel@europahotelmtl.com*
Stationnement : 17 $ par jour avec privilèges d'entrée/sortie, 20 $ par jour pour les fourgonnettes.

Tarifs : 99 $ grand lit, occupation simple ou double
10 $ par personne additionnelle
Accès gratuit à la station santé.

Gratuit pour les enfants de moins de 12 ans qui occupent la même chambre que leurs parents.

RÉSIDENCES DE L'UNIVERSITÉ MCGILL
3625, avenue du Parc, Montréal, QC H2X 3P8

Taxes : 7 % TPS, 7,5 % TVQ
Téléphone : (514) 398-3471
Fax : (514) 398-4521
Courriel : *reservation.nrh@mcgill.ca*
Stationnement : 8 $ par nuit (16 h - 9 h) ou 15 $ pour 24 heures, billets en vente à la réception

Tarifs : 94,55 $ occupation simple ou double
10 $ par personne additionnelle
Le prix comprend un déjeuner continental pour deux, 4 $ par déjeuner additionnel. Les chèques ne sont pas acceptés.

Au moment de faire votre réservation, n'oubliez pas de vérifier les modalités de paiement et d'annulation, car celles-ci varient d'un établissement à l'autre. Demandez un numéro de confirmation pour toute communication ultérieure.

Nous publierons sur le site Web tout nouveau renseignement concernant l'hébergement dès que nous le recevrons.

Services de garde
Des renseignements sur les services de garde seront sans doute fournis par les hôtels prévus pour la Réunion. Nous vous recommandons de faire vos démarches et vos réservations à l'avance.

Veuillez communiquer directement avec les hôtels si vous avez des questions. Nous publierons tout nouveau renseignement sur le site Web dès que nous le recevrons.

Déplacements
Vous trouverez des renseignements détaillés concernant l'Université McGill, la ville de Montréal et la province de Québec (renseignements touristiques, température et climat locaux, cartes de la ville et des attractions touristiques, circuits touristiques piétonniers, etc.) sur les sites Web suivants :

www.mcgill.ca/
www.tourisme-montreal.org/
www.bonjourquebec.com/
www.meteomedia.com – Météo Média

Subventions
Les étudiants diplômés du Canada ou de l'étranger ont accès à un fonds limité pour financer 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.

Cette lettre doit parvenir à la SMC avant le 10 octobre 2004 et peut être envoyée par courriel (*gradtravel-w04@cms.math.ca*). Les décisions seront annoncées au début de novembre.

Si une subvention est accordée à l'étudiant, ce dernier se verra rembourser ses dépenses après la Réunion sur présentation du formulaire de remboursement approprié accompagné des **reçus originaux**.

Pour de plus amples renseignements, veuillez communiquer avec le Comité de coordination à l'adresse suivante : *subventions-w04@cms.math.ca*.

Remerciements
Nous remercions les organismes ci-dessous de leur soutien financier. Nous publierons de plus amples renseignements sur le financement de la Réunion dès qu'ils nous parviendront.

Le vice-principal exécutif de l'Université McGill
Le doyen de la Faculté des sciences de l'Université McGill
Le Département de mathématiques et de statistique de l'Université McGill
Le Centre de recherches mathématiques
L'Institut Fields
Le Réseau MITACS
L'Institut Pacific

La Société mathématique du Canada tient à remercier les membres du Comité de coordination pour l'organisation de cette Réunion.

THE CMS WINTER MEETING 2004 / RÉUNION D'HIVER DE LA SMC 2004

SESSIONS / SÉANCES

By invitation of the Meeting Committee, there will be sessions in the following areas. Following is the preliminary list of speakers. Participants interested in delivering a talk in one of the sessions, should contact one of the organizers of that session.

À l'invitation du comité de coordination, des séances sont prévues dans les domaines ci-dessous. Vous trouverez également plus bas la liste préliminaire des conférenciers. Les participants qui aimeraient présenter une communication sont priés de communiquer avec les organisateurs de la séance qui les intéresse.

Algebraic Combinatorics / Combinatoire algébrique

Org: François Bergeron, Riccardo Biagioli, Peter McNamara, and Christophe Reutenauer (UQAM)

Nantel Bergeron (York), Franceso Brenti (Rome), Sergey Fomin (Michigan), Adriano Garsia (San Diego), Ian Goulden (Waterloo), David Jackson (Waterloo), Mercedes Rosas (York), Mark Skandera (Dartmouth), John Stembridge (Michigan), Mike Zabrocki (York)

Approximation Theory / Théorie d'approximation

Org: Richard Fournier and Paul Gauthier (Montréal)

Andre Boivin (Western), Thomas Bloom (Toronto), Maxim Burke (PEI), Dimiter Dryanov (Concordia), Serge Dubuc (Montréal), Richard Fournier (CRM, Dawson), Paul Gauthier (Montréal), Javad Mashreghi (Laval), Thomas Ransford (Laval), Jie Xiao (Memorial)

Arithmetic Geometry / Géométrie arithmétique

Org: Eyal Goren and Adrian Iovita (McGill)

Gil Alon (CICMA), David Boyd (UBC), Pete Clark (CICMA), Henri Darmon (McGill), Samit Dasgupta (Harvard), Alexandru Ghitza (CICMA), Yoshitaka Hachimori (CICMA), Ernst Kani (Queen's), Payman Kassaei (CICMA), Hershy Kisilevsky (Concordia), Mark Kisin (UIC), Manfred Kolster (McMaster), James Lewis (Alberta), Ram Murty (Queen's), Ken Ono (Maddison), David Savitt (CICMA), Romyar Sharifi (McMaster), Ye Tian (CICMA), Mak Trifkovich (CICMA), Hui-June Zhu (McMaster)

Combinatorial and Geometric Group Theory / Théorie des groupes combinatoire et géométrique

Org: Inna Bumagin (Carleton) and Dani Wise (McGill)

Gregory Bell (Penn State), Yuly Billig (Carleton), Bob Burns (York), Indira Chatterjee (Cornell), Sean Cleary (CUNY), Yair Glasner (UIC), Boris Goldfarb (Albany), Kanta Gupta (Manitoba), John Meier (Lafayette), Bogdan Nica (Vanderbilt), Akbar Rhemtulla (Alberta), Tim Riley (Yale), Benjamin Steinberg (Carleton), Jennifer Taback (Bowdoin), Francis Tang (Waterloo), Kevin Wortman (Cornell)

Commutative Algebra / Algèbre commutative

Org: Sara Faridi (UQAM), Sindi Sabourin (York), Will Traves (UQAM), and Adam van Tuyl (Lakehead)

Ragnar-Olaf Buchweitz (Toronto), Jaydeep Chipalkatti (Manitoba), Brian Coolen (Queen's), Susan Cooper (Queen's), Daniel Daigle (Ottawa), Anthony Geramita (Queen's, Genova), Nicole Lemire (Western), Graham Leuschke (Toronto), Ping Li (Queen's), Claudia Miller (Syracuse), Leslie Roberts (Queen's), Michael Roth (Queen's), Peter Russel (McGill), Gregory Smith (Queen's), David Whelau (RMC,Queen's)

Discrete Geometry / Géométrie discrète

Org:Karoly Bezdek (Calgary) and Bob Erdahl (Queen's)

Dynamical Systems and Applications / Systèmes dynamiques

Org:Michael A. Radin (RIT)

William Basener (RIT), Bernard Brooks (RIT), Sharene Bungay (Waterloo), Harold Hastings, (Hofstra), Vassilios Kovanis (RIT), Herbert Kunze (Guelph), Franklin Mendivil (Acadia), Haishen Yao (UIC), Weiguang Yao (York)

Groups, Equations, non-commutative Algebraic Geometry / Groupes, équations, géométrie algébrique non-commutative

Org: Olga Kharlampovich and Alexei G. Myasnikov (McGill)

Ben Fine (Fairfield), Ian Chiswell (Queen Mary College, London), Evelina Daniyarova (Omsk State), Andrew Dunkan (Newcastle), Antony Gaglione (Naval Academy), Kanta Gupta (Manitoba), Olga Kharlampovich (McGill), Ilya Kazatchkov (Omsk State), Alexei Myasnikov (McGill), Vladimir Remeslennikov (Omsk State), Dennis Serbin (McGill), Dennis Spellman (Temple)

Harmonic Analysis / Analyse harmonique

Org: Galia Dafni (Concordia)

Der-Chen Chang (Georgetown), James Colliander (Toronto), Paul Gauthier (Montréal), Pengfei Guan (McGill), Katharine Hare (Waterloo), Alex Iosevich (Missouri), Marianne Korten (Kansas State), Isabella Laba (UBC), Akos Magyar (Georgia), Javad Mashreghi (Laval), Ming Mei (Concordia), Marius Mitrea (Missouri), Tom Ransford (Laval), Ricardo Saenz (Colima), Eric Sawyer (McMaster), Dimiter Vassilev (McGill,UQAM), Jie Xiao (Memorial)

THE CMS WINTER MEETING 2004 / RÉUNION D'HIVER DE LA SMC 2004

SESSIONS / SÉANCES

History of Mathematics / Histoire des mathématiques
Org: Thomas Archibald (Acadia), Rich O'Lander, Ron Sklar (Memorial), and Alexei Volkov (UQAM)

Robert Barone (Buffalo State), Ryan Beaton (McGill), Paul Corey (Toronto), Michael Helfgott (SUNY), Jim Lambek (McGill), Niky Kamran (McGill), Christiane Rousseau (Montréal)

Interactions between Algebra and Computer Science / Intéractions entre la science informatique et l'algèbre
Org: Alexei G. Myasnikov (McGill) and Vladimir Shpilrain (CUNY)

Patrick Dehornoy (Caen), Ben Fine (Fairfield), Dorian Goldfeld (Columbia), Dennis Hofheinz (Karlsruhe), Ilya Kapovich (UIUC), Martin Kreuzer (Dortmund), Leonid Makar-Limanov (Wayne State), Alexei Myasnikov (CUNY), Gerhard Rosenberger (Dortmund), Paul Schupp (UIUC), Alexander Ushakov (CUNY), Mark Sapir (Vanderbilt), Alexander Olshanskii (Vanderbilt), Vladimir Shpilrain (CUNY)

Mathematical Methods in Statistics / Méthodes mathématiques en statistique
Org: Russell Steele, Alain Vandal, and David Wolfson (McGill)

Jean-Francois Angers (Montréal), Masoud Asgharian (McGill), Pierre Legendre (Montréal), Brenda MacGibbon (UQAM), Neal Madras (York), Paul Marriot (Waterloo), Bruno Remillard (Montréal), Louis-Paul Rivest (Laval), Russ Steele (McGill), Alain Vandal (McGill)

Mathematics for Future Teachers / Mathématiques pour futur professeur(e)s
Org: Leo Jonker (Queen's)

France Caron (Montréal), Brent Davis (Alberta), Jean-Marie DeKoninck (Laval), John Grant-McLoughlin (UNB), Cathy Kessel (Berkeley), Morris Orzech (Queen's), Christiane Rousseau (Montréal)

Number Theory / Théorie des nombres
Org: Andrew Granville (Montréal)

Special Metrics and Submanifolds in Riemannian Geometry / Distances et sous-variétés spéciales de la géométrie Riemanienne
Org: Gordon Craig (McGill) and Spiro Karigiannis (McMaster)

Vestislav Apostolov (UQAM), Adrian Butscher (Toronto), Marco Gualtieri (Fields), Marianty Ionel (McMaster), Niky Kamran (McGill), Maung Min-Oo (McMaster)

Universal Algebra and Complexity / Algèbre universelle et complexité
Org: J. Hyndman (McGill), B. Larose (Concordia), and Denis Therien (McGill)

D. Mix Barrington (Massachusetts), M. Beaudry (Sherbrooke), M. Bodirsky (Berlin), V. Dalmau (UPF, Barcelona), R. Gavalda (TUC, Barcelona), P. Hell (Simon Fraser), R. McKenzie (Vanderbilt), S. Seif (Louisville), H. Straubing (Boston College), M. Valeriote (McMaster), R. Willard (Waterloo)

DALHOUSIE UNIVERSITY
Department of Mathematics & Statistics

Applications are invited for a **tenure-track position** in Applied Mathematics at the Assistant Professor level commencing July 1, 2005. Applicants should have completed, or almost completed, a PhD. The successful candidate will be expected to develop excellence in research and teaching, supervise graduate students and interact with related established groups within the department. Exceptional candidates may be considered in other fields. Applicants should send a current curriculum vitae including a list of publications, statement of research and teaching objectives and the name, address and email address of 3 referees. The deadline for applications is Tuesday, **January 4, 2005**.
Applications should be sent to:

Dr. P. Keast, Chair
Department of Mathematics & Statistics
Dalhousie University
Halifax, NS B3H 3J5, Canada
e-mail keast@mathstat.dal.ca

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. Dalhousie University is an Employment Equity/Affirmative Action employer. The University encourages applications from qualified Aboriginal people, persons with a disability,racially visible persons and women.

THE CMS WINTER 2004 MCGILL UNIVERSITY MONTREAL, QUEBEC

December 11-13, 2004

On behalf of McGill University, the Department of Mathematics and Statistics invites the mathematical community to the Winter 2004 Meeting of the Canadian Mathematical Society (CMS).

We look forward to welcoming our colleagues back to Montreal where the first Canadian Mathematical Congress took place in 1945. Among the international participants in 1945 were Garrett Birkhoff, Claude Chevalley, and John von Neumann; among the Canadian participants were John Coleman, H. S. M. Coxeter, Israel Halperin, Joachim Lambek, Nathan Mendelsohn, Louis Nirenberg, Adrien Pouliot, G. de B. Robinson, Albert Tucker. In 1979 the Congress was incorporated as the Canadian Mathematical Society.

Following the usual format of the CMS Winter Meeting, the program will include a wide variety of sessions, a contributed paper session, plenary and prize lectures, and a public lecture.

Most activities and all scientific talks will be held at the Hilton Bonaventure Hotel. The activities of the evening of Friday, December 10, will be held at the nearby Best Western Hotel Europa. The most up-to-date information concerning the program, including detailed schedules, will be made available at this web site.

Meeting registration forms and hotel accommodation forms will appear in the September 2004 issue of the CMS Notes, and will be available on the web site, which will also provide on-line forms for registration and submission of abstracts.

Public Lecture

Alexei G. Myasnikov (McGill)
Complexity of Computations and Cryptography

Plenary Speakers

Michael Bennett (British Columbia)
Persi Diaconis (York)
Rainer Steinwandt (Karlsruhe)
Rostislav Grigorchuk (Texas A&M)

Prizes and Awards

CMS Coxeter-James Prize Lecture	Izabella Laba (British Columbia)
CMS Doctoral Prize Lecture	Nicolaas Spronk (Waterloo)
CMS Adrien Pouliot Prize	to be announced
CMS G. de B. Robinson Award	to be announced
CMS Distinguished Service Award	Edgar Goodaire (Memorial)

Contributed Papers Session

Org: **William Brown** (McGill)

Contributed papers of 20 minutes duration are invited. Abstracts for contributed papers should be prepared as specified below. For an abstract to be eligible, the abstract, the contributor's registration form, and payment of fees have to be received **before October 10, 2004**. To assist the organizers, please include the Primary AMS Classification (*http://www.ams.org/msc/*) and specify your wish to participate in the contributed papers session.

There will be a maximum of 20 papers in this session.

Business Meetings

The CMS will be holding the following business meetings:

The **CMS Executive Committee Meeting** will be on Thursday, December 9, from 6:00 p.m. to 10:00 p.m., in the Frontenac Room of the Hilton Bonaventure Hotel.

The **Development Group Luncheon** will be held on Friday, December 10, from 11:00 a.m. to 1:00 p.m., in the Castillon Room of the Hilton Bonaventure Hotel.

The **CMS Board of Directors Meeting** will be held on Friday, December 10, from 1:30 p.m. to 6:30 p.m., in the Westmount Room of the Hilton Bonaventure Hotel.

Additional information will be provided in later announcements and on the CMS website. A detailed schedule of business meetings and other events is available from the schedule page of the meeting web site.

Social Events

The **Welcoming Reception** will be held on Friday, December 10, from 8:00 to 10:00 p.m., at the Best Western Hotel Europa (1240 rue Drummond, corner of Ste-Catherine).

The **Banquet** will take place at the Hilton Bonaventure Hotel on Sunday, December 12, commencing at 7:00 pm, preceded by a cash bar at 6:00 p.m. Tickets to this event are available at $60.00 each.

The **Participants Luncheon** will be held on Saturday, December 11, from 11:30 a.m. to 1:30 p.m., at the Hilton Bonaventure Hotel. A ticket to this luncheon is included in all registration fee categories.

The **Public Lecture** will be delivered by **Alexei G. Myasnikov** (McGill) on Friday, December 10, at 7:00 p.m. at the Best Western Hotel Europa.

The **CMS Committee for Women in Mathematics** is inviting all women mathematicians attending the CMS Winter Meeting to an open

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December 11-13, 2004

Lunch Meeting of the Committee, to be held on Sunday, December 12th, 2004 at 11:30 a.m. in the St. Pierre Room at the Hilton Bonaventure Hotel. The purpose of the meeting is to discuss preparations for the second CWiMAC workshop, to be held in summer 2005 at BIRS, and future directions for the work of the Committee.

The first open lunch meeting of the Committee or Women in Mathematics was held at the CMS 2003 Winter Meeting. The Committee and those attending the luncheon, found the experience quite valuable, and it was decided that such a lunch meeting will became an annual event. The Committee would like to thank the CMS and Leah Edelstein-Keshet (UBC) for their sponsorship of this luncheon. Additional sponsors are sought for future Winter Meeting luncheons.

Complimentary coffee and juice will be available during the scheduled breaks.

A detailed schedule of all social and other events is available from the schedule page of the meeting web site.

Exhibits

Exhibits: Exhibits will be open from 9:30 a.m. to 4:00 p.m. on December 11 and 12 in the Fontaine A Room of the Hilton Bonaventure Hotel.

Joint Exhibit: This exhibit features books and other products from publishers and other companies and organizations not represented at the meeting. Order forms will be available at the exhibit for your convenience. The CMS will forward any orders to the corresponding company after the meeting. Books and other materials that will be displayed at this Joint Exhibit will be donated to the host university.

CMS Membership Booth and Book Display: We invite participants to visit the CMS Membership Booth and Book Display. A representative will be available from 8:00 a.m. to 5:00 p.m. on December 11 and 12 and from 9:00 a.m. to 4:00 p.m. on December 13 to answer questions about membership, future meetings, publications, and other programs. The booth is located in the registration area.

Information Table: In response to members' suggestions, this table will be set up in the registration area for information of interest to participants. Please send a copy of your announcement to the CMS Meetings Coordinator at the Executive office, by facsimile (613) 565-1539 or at *meetings@cms.math.ca*.

All announcements require prior approval. Once approved, the delegate may display up to 100 copies of the announcement. The delegate is responsible for providing all copies for display and for removing any remaining copies before 3:00 p.m. on the last day of the meeting. After that time, all remaining material will be discarded.

Announcements may not be posted in the registration or meeting area. Personal distribution of announcements and announcements of events competing in time or place with the meeting program are not permitted.

This table is not meant for material promoting products or services for sale. Those wishing to promote products for sale should contact the Meetings Coordinator for information on the Joint Exhibit.

Submission of Abstracts

Abstracts of talks will be published on-line and in the meeting programme.

Speakers are asked to submit their abstracts as soon as possible. **The deadline for submission of abstracts is October 10, 2004**. The organizers appreciate the cooperation of all speakers in observing this important deadline.

Abstracts must be submitted electronically, either by using the on-line form or by sending a file to

abstracts-w04@cms.math.ca (for session speakers)
cp-abstracts-w04@cms.math.ca (for contributed papers)

The subject line should contain the session name; the body of the email should contain the speaker's name, affiliation, email address, title of talk and abstract.

For contributed papers, to better assist organizers, please include the 2000 AMS Subject Classification (http://www.ams.org/msc/).

Registration

Electronic pre-registration

The registration form is also available from:

CMS Executive Office
577 King Edward
Ottawa, Ontario CANADA K1N 6N5
Tel: 613-562-5702
Fax: 613-565-1539
meetings@cms.math.ca

Payment for pre-registration may be made by cheque, or by VISA or MasterCard. Although registration fees are given in Canadian dollars, participants may send cheques in US dollars by contacting their financial institution for the current exchange rate.

Please note that payment must be **received in Ottawa** on or before **November 1** in order to qualify for reduced rates. In order for your payment to be processed before the meeting, it should be received by **November 30**.

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	Before November 1	After November 1
Plenary/Prize/Public Lecturers	$ 0	$ 0
Session Speakers	$ 225.00	$ 290.00
Organizers	$ 150.00	$ 195.00
Non-Members	$ 450.00	$ 585.00
CMS/AMS/MAA Members with grants	$ 300.00	$ 390.00
CMS/AMS/MAA Members without grants	$ 150.00	$ 195.00
One-day fee	$ 200.00	$ 260.00
Postdocs/Retired	$ 115.00	$ 150.00
Teachers (K-12, CEGEP)/ Students/Unemployed	$ 60.00	$ 80.00
Participants Luncheon included	$ 0	$ 0
Banquet (free for plenary/prize lecturers)	$ 60.00	$ 60.00

CMS = Canadian Mathematical Society
AMS = American Mathematical Society
MAA = Mathematical Association of America

Why Pre-register?

Wondering whether to pre-register or wait until you arrive? Here are some advantages to pre-registering.

- many can take advantage of reduced fees until the early registration deadline (see above)
- your name would appear on the list of participants on our web site
- your Meeting Kit will be waiting for you at the reception on Friday evening
- no waiting in line early Saturday morning to process your registration!
- banquet tickets are available now but may no longer be available on site

For all these reasons, we encourage you to pre-register, whether it be before or after the early registration deadline. If you'd like to pre-register and enjoy the above benefits, please visit our web site to use our online forms.

Refund Policy

Participants wishing to cancel their registration must notify the CMS Executive Office in writing before November 30 to receive a refund less a $40 processing fee. Those whose contributed paper has not been accepted will upon request be fully refunded.

Do you qualify for free CMS membership?

An AMS or a MAA member who registers at a semi-annual meeting of the CMS and who is not a member of the CMS, is eligible for a one-time only, one-year free membership in the CMS.

If you qualify, please visit the CMS booth to complete a membership application form. Please provide proof of current AMS or MAA membership. This offer applies to new members only.

Accommodation

It is recommended that bookings be made early in order to avoid disappointment. All participants must make their own reservations. Blocks of rooms will be held at the locations given below until **November 8, 2004**. Reservations made after this date will be on a space available basis. Rates are per room per night and are quoted in Canadian dollars. The conference rate is usually available up to three days before and after the meeting; please quote the Group code. Reservations must be guaranteed by a one-night deposit or a major credit card.

HILTON BONAVENTURE HOTEL
900 Rue de La Gauchetière Ouest, Montréal, QC H5A 1E4

Applicable taxes: 7% GST, 7.5% PST, $2.00 occupancy tax per room night; **Group code**: Canadian Mathematical Society
Phone: (514) 878 2332, **toll free**: 1 800 445-8667 **Fax**: (514) 878-3881
Parking: $15.00 per day, $22.00 per day for Valet parking
Rates:
$135.00 Regular deluxe room, single or double occupancy
$20.00 each additional adult
$159.00 Executive floor rooms*, single occupancy
$189.00 Executive floor rooms*, double occupancy
*access to lounge

There is no charge for children, 18 and under, when they occupy the same room as their parents or grandparents.

BEST WESTERN HOTEL EUROPA
1240 Rue Drummond, Montréal, QC H3G 1V7 (corner of Ste-Catherine, 10 minutes walk to Hilton Bonaventure Hotel)

Applicable taxes: 7% GST, 7.5% PST, 2.31% tourism tax
Group code: 161285 or Canadian Mathematical Society
Phone: (514) 866-6492; **toll-free** 1 800 361-3000 (after 5th ring call is routed to the Best Western Head Office and regular rates might apply) **Fax**: (514) 861-4089 *hotel@europahotelmtl.com*
Parking: $17.00 per day with in/out privilege, $20.00 for minivans
Rates:
$99.00 Queen bed, single or double occupancy
$10.00 each additional person

Complimentary use of health spa. Children under 12 stay for free when they occupy the same room as their parents.

McGILL RESIDENCE
3625 Avenue du Parc, Montréal, QC H2X 3P8

Applicable taxes: 7 % GST, 7.5% PST
Phone: (514) 398-3471
Fax: (514) 398-4521
E-Mail: reservation.nrh@mcgill.ca
Parking: $8.00 overnight (4:00 p.m. to 9:00 a.m.) or $15.00 for 24 hours, tickets available at the front desk

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Rates: $94.55 Single and double occupancy
$10.00 each additional person

Complimentary continental breakfast for 2 included, $ 4.00 for additional continental breakfast. Cheques not accepted.

When making your reservation, please clarify payment and cancellation policies as these vary from hotel to hotel. You should get a confirmation number for future reference.

Additional information regarding accommodation choices will be posted to the meeting web site as it becomes available.

Child Care

Information regarding available child care may be provided by the meeting hotels. Advance research and arrangements are recommended.

Please contact the hotels directly to make enquiries. Additional information will be posted to the meeting web site as it becomes available.

Travel

Detailed information regarding McGill University, the City of Montreal, and the Province of Quebec, including tourism information, local weather and climate, site and street maps, and itineraries for self-guided tours, are available at the following websites:

www.mcgill.ca/
www.tourisme-montreal.org/
www.bonjourquebec.com/anglais/
http://weatheroffice.ec.gc.ca/canada_e.html

Travel Grants

Limited funds 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.

This letter should be sent before October 10, 2004 and may be emailed to *gradtravel-w04@cms.math.ca*. Applicants will be notified early in November of the funding decision.

If successful, the student will receive a cheque for reimbursement of expenses after the meeting and upon completion and submission of the standard Travel Expense Claim Form, along with appropriate **original** receipts.

For more information, please contact the Meeting Committee at *gradtravel-w04@cms.math.ca*.

Acknowledgements

Support from the following is gratefully acknowledged. Additional information regarding support for this meeting will be posted to the meeting web site as it becomes available.

McGill University, Provost
McGill University, Dean of Sciences
McGill University, Department of Mathematics and Statistics
le Centre de Recherches Mathématiques
The Fields Institute for Research in Mathematical Sciences
MITACS
Pacific Institute for the Mathematical Sciences

The Canadian Mathematical Society wishes to acknowledge the contributions of the Meeting Committee.

UNIVERSITY OF WINDSOR
Department of Mathematics and Statistics

The University of Windsor invites applications for **two tenure-track faculty positions** in the Department of Mathematics and Statistics in the areas of Analysis/Convexity and Statistics at the rank of Assistant Professor commencing July 1, 2005. For detailed position descriptions visit our website at: *www.uwindsor.ca/facultypositions*. Contact:

Dr. S. E. Ahmed
Head
Mathematics & Statistics
University of Windsor
Windsor, ON, N9B 3P4
Tel: 519.253.3000, Ext. 3015; Fax: 519.971.3649; Email: *mthsta2@uwindsor.ca*.

For information on the University of Windsor or the City of Windsor, contact Dr. Janice Drakich, Director, Faculty Recruitment at 877-665-6608 (toll free) or recruit@uwindsor.ca. Deadline for applications **October 29/04**.

CMS WINTER 2004 MEETING - RÉUNION D'HIVER 2004 DE LA SMC

Hotel Hilton Bonaventure – Montréal, Québec

FRIDAY/VENDREDI DECEMBER 10	SATURDAY/SAMEDI DECEMBER 11	SUNDAY/DIMANCHE DECEMBER 12	MONDAY/LUNDI DECEMBER 13
	7:00 – 5:00 Registration/Inscription CMS Booth/Stand SMC **9:30 – 4:00** Exhibits/Exposants	**8:00 – 5:00** Registration/Inscription CMS Booth/Stand SMC **9:30 – 4:00** Exhibits/Exposants	**8:00 – 4:00** Registration/Inscription CMS Booth/Stand SMC
	8:30 – 9:00 Opening/Ouverture		
	9:00 – 9:45 Plenary Lecture Conférence principale	**8:30 – 10:30** Sessions/Séances	**8:30 – 10:30** Sessions/Séances
	9:45 – 10:15 Break/Pause		
	10:15 – 11:45 Sessions/Séances	**10:30 – 11:00** Break/Pause	
		11:00 – 11:45 Plenary Lecture Conférence principale	**11:00 – 11:45** Plenary Lecture Conférence principale
11:00 – 1:00 Development Group Luncheon Lunch du groupe de développement (Hilton Hotel)	**11:45 – 1:45** Participants' Luncheon Lunch des participants	**11:45 – 1:30** Lunch (no event scheduled/libre)	
	1:45 – 2:45 **Nicolaas Spronk** **Doctoral Prize Lecture**	**1:30 – 2:30** **Izabella Laba** **Coxter James Prize Lecture**	**1:30 – 2:30** Plenary Lecture Conférence principale
	2:45 – 3:15 Break/Pause	**2:30 – 3:00** Break/Pause	
1:30 – 6:30 Board of Directors Meeting Réunion du conseil d'administration de la SMC (Hilton Hotel)	**3:15 – 4:00** Plenary Lecture Conférence principale		
	4:00 – 5:30 Sessions/Séances	**3:00 – 5:30** Sessions/Séances	**3:00 – 5:30** Sessions/Séances
		6:00 – 7:00 Reception (cash bar) Réception (bar payant) (Hilton Hotel)	
7:00 – 8:00 **Alexei G. Myasnikov** Public Lecture Conférence populaire (Hotel Europa)		**7:00 – 10:00** Banquet (Hilton Hotel)	
8:00 – 10:00 Welcoming Reception Réception d'accueil (Hotel Best Western Europa)			

For the latest schedule details please visit the web site: www.cms.math.ca/Events/winter04/
La version la plus récente du programme est en ligne au www.cms.math.ca/Reunions/hiver04/

REGISTRATION FORM – CMS WINTER MEETING 2004

www.cms.math.ca/events/winter04/forms.html

CMS ID DR. PROF. MS. MRS. MR.

LAST NAME

FIRST NAME

INSTITUTION (FOR NAME TAG)

ADDRESS

ADDRESS

CITY

PROV/STATE **POSTAL/ZIP CODE**

COUNTRY

TELEPHONE

EMAIL

I WILL BE ATTENDING THE FOLLOWING SESSIONS

Algebraic Combinatorics
Approximation Theory
Arithmetic Geometry
Combinatorial and Geometric Group Theory
Commutative Algebra
Discrete Geometry
Dynamical Systems and Applications
Groups, Equations, Non-Commutative Algebraic Geometry
Harmonic Analysis
History of Mathematics
Interactions Between Algebra and Computer Science
Mathematical Methods in Statistics
Mathematics for Future Teachers
Number Theory
Special Metrics and Submanifolds in Riemannian Geometry
Universal Algebra and Complexity
Contributed Papers

DESIGNATION

Plenary/Prize/Public Speaker
Organizer
Participant
Session Speaker, Specify Session

_____

MEMBERSHIP

CMS
AMS
MAA
Provincial Ass'n _____
School Board _____
Other _____

PROFESSION

University Professor
College/CEGEP Teacher
School Teacher
Public Sector
Private Sector
Undergraduate Student
Graduate Student
Postdoc
Retired
Other_____

ACCOMMODATION

Hilton
Best Western
Residence
Other
Not Required

SPECIAL DIET

Kosher
Vegetarian
Diabetic
Low Fat
Milk Allergy
Nut Allergy
Other

_____

ARRIVAL DATE

DEPARTURE DATE

VOLUNTARY INFORMATION
MALE
FEMALE

I AGREE TO HAVE MY NAME APPEAR IN THE PARTICIPANTS LIST ON THE CMS MEETING WEBSITE YES NO

I WILL ATTEND THE PARTICIPANTS LUNCHEON YES NO

I WILL ATTEND THE WOMEN'S LUNCHEON YES NO

I WOULD LIKE TO DELIVER A CONTRIBUTED PAPER YES NO

DEADLINE FOR REGISTRATION FEES AND ABSTRACT IS OCTOBER 10, 2004.
ABSTRACTS WILL NOT BE CONSIDERED UNLESS REGISTRATION FEE IS PAID.

FEES

ALL CATEGORIES INCLUDE A TICKET TO THE PARTICIPANTS LUNCHEON. SHOULD MORE THAN ONE CATEGORY APPLY, PLEASE CHOOSE THE LOWER FEE.

	BEFORE NOV 1	AFTER NOV 1
Plenary/Public Lecturer (1 free banquet ticket)	$ 0	$ 0
Prize Lecturer (2 free banquet ticket)	$ 0	$ 0
Session Speaker	$ 255	$ 290
Organizers	$ 150	$ 195
Non Members	$ 450	$ 585
CMS/CAIMS/AMS/MAA Members with grants	$ 300	$ 390
CMS/CAIMS/AMS/MAA Members without grants	$ 150	$ 195
One-Day Fee	$ 200	$ 260
Postdocs/ Retired	$ 115	$ 150
Teachers (K-12, CEGEP)/Students/Unemployed	$ 60	$ 80
Banquet _____ X	$ 60	$ 60

REGISTRATION $_____+ BANQUET $_____= **TOTAL** $_____

DEADLINES

REDUCED FEES	NOVEMBER 1
PRE-REGISTRATION	NOVEMBER 30
CANCELLATION (LESS $40 ADMIN FEE)	NOVEMBER 30

CHEQUES PAYABLE TO THE CANADIAN MATHEMATICAL SOCIETY

CREDIT CARD PAYMENT

MASTER CARD **VISA**

CARD NUMBER _____

EXPIRY DATE _____

CARDHOLDER NAME _____

SIGNATURE _____
FORM MUST BE SIGNED BY CARDHOLDER

PLEASE SEND YOUR COMPLETED FORM WITH PAYMENT TO: CMS, 577 KING EDWARD, OTTAWA, ON CANADA K1N 6N5
FAX: 613-565-1539 (FOR CREDIT CARD PAYMENTS ONLY)

FORMULAIRE D'INSCRIPTION – HIVER 2004

www.smc.math.ca/Reunion/hiver04/forms.html

Nº SMC | **Pr** **Pre** **Mme** **M.**

NOM

PRÉNOM

ÉTABLISSEMENT (POUR LE BADGE)

ADRESSE POSTALE

ADRESSE POSTALE

VILLE

PROV./ÉTAT **CODE POSTAL**

PAYS

TÉLÉPHONE

COURRIEL

J'ASSISTERAI AUX SÉANCES SUIVANTES :

Combinatoire algébrique
Théorie d'approximation
Géométrie arithmétique
Théorie des groupes combinatoire et géométrique
Algèbre commutative
Géométrie discrète
Systèmes dynamiques
Groupes, équations, géométrie algébrique non-commutative
Analyse harmonique
Histoire des mathématiques
Intéractions entre la science informatique et l'algèbre
Méthodes mathématiques en statistique
Mathématiques pour futur professeur(e)s
Théorie des nombres
Distances et sous-variétés spéciales de la géométrie Riemanienne
Algèbre universelle et complexité
Communications libres

STATUT

Conf. Principal/Primé/Populaire
Organisateur
Participant
Conf. De Séance (Précisez)
_____

AFFILIATIONS

SMC
AMS
MAA
Assoc. Provinciale _____
Comm./Cons. Scolaire_____
Autre _____

CATÉGORIE

Professeur D'université
Enseignant-Collège/CEGEP
Enseignant primaire/secondaire
Secteur Public
Secteur Privé
Étudiant 1er cycle
Étudiant 2e/3e cycle
Postdoc
Retraité
Autre
_____

HÉBERGEMENT

Hilton
Best Western
Résidence Univ.
Autre
Pas Nécessaire

MENUS SPÉCIAUX

Kosher
Végétarien
Diabétique
Léger
Allergie-Lait
Allergie-Noix
Autre
_____

DATE D'ARRIVÉE

DATE DE DÉPART

RENS. FACULTATIFS
HOMME
FEMME

J'ACCEPTE QUE MON NOM FIGURE DANS LA LISTE DES PARTICIPANTS SUR LE SITE WEB DE LA SMC OUI NON

J'IRAI AU LUNCH DES PARTICIPANTS OUI NON

J'IRAI AU LUNCH DES FEMMES OUI NON

J'AIMERAIS PRÉSENTER UNE COMMUNICATION LIBRE OUI NON

LES DROITS D'INSCRIPTION ET LES RÉSUMÉS DOIVENT NOUS PARVENIR AU PLUS TARD LE 10 OCTOBRE 2004. AUCUN RÉSUMÉ NE SERA ÉVALUÉ AVANT LE RÈGLEMENT DES DROITS D'INSCRIPTION.

DROITS

LES PARTICIPANTS DE TOUTES LES CATÉGORIES RECEVRONT UN TICKET POUR LE LUNCH DES PARTICIPANTS. SI VOUS ENTREZ DANS PLUSIEURS CATÉGORIES, VEUILLEZ COCHER LA MOINS CHÈRE.

	AVANT 1er NOV.	APRÈS 1er NOV.
Conf. princ./pop. (1 billet banquet incl.)	0 $	0 $
Conf.primé (2 billet banquet incl.)	0 $	0 $
Conférencier	255 $	290 $
Organisateur	150 $	195 $
Non-membre	450 $	585 $
Membre SMC/CAIMS/AMS/MAA avec subvention	300 $	390 $
Membre SMC/CAIMS/AMS/MAA sans subvention	150 $	195 $
Droits d'une journée	200 $	260 $
Postdoc/ Retraité	115 $	150 $
Enseignant (Mat.-12e, CEGEP)/Étudiant/Sans-Emploi	60 $	80 $
Banquet _____ X	60 $	60 $

INSCRIPTION _____ $ + BANQUET _____ $= **TOTAL** _____ $

DATES LIMITES

PRÉ-INSCRIPTION À PRIX RÉDUIT	1er NOVEMBRE
PRÉ-INSCRIPTION	30 NOVEMBRE
ANNULATION, MOINS 40 $ DE FRAIS	30 NOVEMBRE

LIBELLEZ VOTRE CHÈQUE AU NOM DE LA SOCIÉTÉ MATHÉMATIQUE DU CANADA

PAIEMENT PAR CARTE DE CRÉDIT

MASTER CARD **VISA**

Nº DE LA CARTE _____

DATE D'EXPIRATION _____

NOM DU TITULAIRE _____

SIGNATURE _____
SEUL LE TITULAIRE PEUT SIGNER

VEUILLEZ ENVOYER CE FORMULAIRE ET VOTRE PAIEMENT À : BUREAU DE LA SMC, 577, AV. KING-EDWARD, OTTAWA ON CANADA K1N 6N5
TÉLÉCOPIEUR : (613) 565-1539 (POUR LES PAIEMENTS PAR CARTE DE CRÉDIT SEULEMENT)

CANADIAN MATHEMATICAL SOCIETY
Winter Meeting 2004

ACCOMMODATION RESERVATION FORM

Send completed form with payment (if applicable) **directly to the hotel.** Do not mail forms to the Executive Office.

First and Last Name		
Home Institution		
Address		
City	**Prov/State**	**Postal Code**
Telephone	**Fax**	**Email**

Payment type	Ã Cheque	Ã Other (Specify)	
Credit Card	Ã VISA	Ã MasterCard	Ã American Express
Card Number	Expiry	Signature	

Blocks of rooms will be held at the locations given below until November 8, 2004. Reservations made after this date will be on a space available basis. Rates are per room per night and are quoted in Canadian dollars. The conference rate is available up to three days before and after the meeting. All delegates must make their own reservations. Payment and cancellation policies should be clarified with the hotel, as these vary from hotel to hotel. Reservations must be guaranteed by a one-night deposit or a major credit card.

Accommodation choice: **Group code:**		Ã Non-Smoking Ã Smoking UPON AVAILABILITY
Additional room occupants:		
2.	3.	4.
Arrival date and time	Departure date and time	
Guaranteed reservation for late arrival required Ã Yes Ã No		
Special accommodation requirements		

Accommodation	Daily Rates
Hilton Bonaventure Hotel **Group code: Canadian Mathematical Society** 900 Rue de La Gauchetière Ouest, Montréal, QC H5A 1E4 Applicable taxes: 7% GST, 7.5% PST, $2.00 occupancy tax per room night Phone: (514) 878 2332, toll free: 1 800 445-8667, Fax: (514) 878-3881 Parking: $15.00 per day, $22.00 per day for Valet parking No charge for children, 18 and under, in the same room as parents or grandparents	_____$135.00, Deluxe room, single/double occupancy _____$20.00, each additional adult _____$159.00, Executive floor with access to lounge single occupancy _____$189.00, Executive floor with access to lounge double occupancy
Best Western Hotel Europa **Group code: 161285 or Canadian Mathematical Society** 1240 Rue Drummond, Montréal, QC H3G 1V7 Applicable taxes: 7% GST, 7.5% PST, 2.31% tourism tax Phone: (514) 866-6492; toll-free 1 800 361-3000, Fax: (514) 861-4089 E-Mail: hotel@europahotelmtl.com Parking: $17.00 per day with in/out privilege, $20.00 for minivans	_____$99.00, Queen bed, single/double occupancy _____$10.00, each additional person Complimentary use of health spa. Children under 12 stay for free when they occupy the same room as their parents.
McGill Residence 3625 Avenue du Parc, Montréal, QC H2X 3P8 Applicable taxes: 7 % GST, 7.5% PST Phone: (514) 398-3471, Fax: (514) 398-4521 E-Mail: reservation.nrh@mcgill.ca Parking: $8.00 overnight (4:00 p.m.-9:00 a.m.) or $15.00 for 24 hours	_____$94.55, Single/double occupancy _____$10.00, each additional person Complimentary continental breakfast for 2 included $4.00 add. Breakfast. Cheques not accepted.

SOCIÉTÉ MATHEMATIQUE DU CANADA
Réunion d'hiver de la SMC 2004

FORMULAIRE DE RÉSERVATION D'HÉBERGEMENT

Remplir et envoyer **directement à l'hôtel** avec votre paiement (s'il y a lieu). N'envoyez pas ce formulaire au bureau de la SMC.

Prénom et nom		
Établissement		
Adresse postale		
Ville	**Prov./état**	**Code postal**
Téléphone	**Fax**	**Courriel**

Paiement	Ã chèque	Ã autre (préciser)	
Carte de crédit	Ã visa	Ã mastercard	Ã american express
Numéro de la carte	Date d'expiration	Signature	

Des blocs de chambres sont réservés aux endroits indiqués ci-dessous jusqu'au 8 novembre 2004. Après cette date, les réservations sont conditionnelles à la disponibilité des chambres. Les tarifs des chambres sont à la nuitée et sont indiqués en dollars canadiens. Le tarif spécial est offert jusqu'à trois jours avant et après la réunion. Tous les délégués doivent faire leurs propres réservations. Prière de vous adresser aux établissements d'hébergement en ce qui concerne les politiques de paiement et d'annulation, qui varient d'un endroit à l'autre. Les réservations doivent être garanties par un dépôt équivalant à une nuitée ou par une carte de crédit reconnue.

Choix d'hébergement **Code de groupe**			Ã Non-fumeur Ã Fumeur SOUS RÉSERVE DES DISPONIBILITÉS
Occupants additionnels			
2.	3.	4.	
Date et heure d'arrivée		Date et heure de départ	
Veuillez retenir ma chambre pour une arrivée tardive	Ã Oui	Ã Non	
Besoins particuliers			

Hébergement	**Tarifs à la nuitée**
Hôtel Hilton Bonaventure **Code de groupe : Société mathématique du Canada** 900, rue de La Gauchetière Ouest, Montréal, QC H5A 1E4 Taxes applicables : 7 % TPS, 7,5 % TVP, 2 $ taxe d'hébergement par nuitée Téléphone : (514) 878 2332, sans frais : 1 800 445-8667, fax : (514) 878-3881 Stationnement : 15 $ par jour, 22 $ par jour avec service de voiturier Gratuit pour les enfants (18 ans et moins) qui occupent la même chambre que leurs parents ou grands-parents.	_____135 $, chambre de luxe, occupation simple ou double _____20 $ par adulte additionnel _____159 $, étage affaires avec accès au salon, occupation simple _____189 $, étage affaires avec accès au salon, occupation double
Hôtel Best Western Europa **Code de groupe: Société mathématique du Canada ou 161285** 1240, rue Drummond, Montréal, QC H3G 1V7 Taxes applicables : 7 % TPS, 7,5 % TVP, 2,31% taxe touristique Téléphone : (514) 866-6492, sans frais : 1 800 361-3000, fax : (514) 861-4089 Courriel : *hotel@europahotelmtl.com* Stationnement : 17 $ par jour avec privilèges d'entrée/sortie, 20 $ par jour pour les fourgonnettes.	_____99 $, grand lit, occupation simple ou double _____10 $ par personne additionnelle Accès gratuit à la station santé. Gratuit pour les enfants de moins de 12 ans qui occupent la même chambre que leurs parents.
Résidence de l'Université McGill 3625, avenue du Parc, Montréal, QC Taxes applicables : 7 % TPS, 7,5 % TVP Téléphone : (514) 398-3471, fax : (514) 398-4521 Courriel : reservation.nrh@mcgill.ca Stationnement : 8 $ par nuit (16 h - 9 h) ou 15 $ pour 24 heures	_____94,55 $, occupation simple ou double _____10 $ par personne additionnelle Le prix comprend un déjeuner continental pour deux. 4 $ par déjeuner additionnel. Les chèques ne sont pas acceptés.

CALL FOR NOMINATIONS / APPEL DE NOMINATIONS

Editors-in-Chief, Books in Mathematics Series / Éditeurs-en-chef, Ouvrages de mathématiques

The Publications Committee of the CMS solicits nominations for **two Editors-in-Chief** for the *Books in Mathematics* Series. The appointment will be for five years beginning January 1, 2005.

The deadline for the submission of nominations is October 15, 2004. Nominations, containing a curriculum vitae and the candidate's agreement to serve should be sent to the address below.

Le comité des publications de la SMC sollicite des mises en candidatures pour **deux postes de rédacteurs-en-chef** des *Ouvrages de mathématiques*. Le mandat sera de cinq ans et débutera le 1 janvier 2005.

L'échéance pour proposer des candidats est le 15 octobre 2004. Les mises en candidature, accompagnés d'un curriculum vitae ainsi que du consentement du candidat(e), devrait être envoyées à l'adresse ci-dessous.

Dana Schlomiuk, Chair / Présidente
CMS Publications Committee
Comité des publications de la SMC
Département de mathématiques et de statistique
Université de Montréal, CP-6128 Centre-ville
Montréal, Québec H3C 3J7
chair-pubc@cms.math.ca

TRIVIA

1) A certain object is referred to in the Bible as: "it was 10 cubits across, round all about and 30 cubits did compass it round", thus implying that pi is 3. What was this object?

a) God's head
b) A very large bowl
c) A wading pool
d) A fountain

2) What is the title of a short story by Larry Niven in which the protagonist fools a demon by painting a pentagram on its belly, causing the demon to continually try to rematerialize in the pentagram?

a) Tiling the Nether plane
b) Convergent series
c) Within epsilon of zero
d) Infinitesimal Hell

3) What percentage of numbers that arise naturally have 1 as the first digit (a fact used by the IRS to sniff out fake income tax data)?

a) 11%
b) 30%
c) 43%
d) 22%

4) What former U.S. president believed that the Great Pyramid of Egypt was built by God and was a member of an organization that lobbied for the adoption of the "Pyramid cubit" (a measurement supposedly mathematically derived from the dimensions of the Great Pyramid) instead of the "athiestic" meter?

a) Reagan
b) Lincoln
c) Eisenhower
d) Garfield

5) What prominent mathematician espoused the belief that the Earth was hollow with an internal sun, and that the interior surface of the Earth was populated by an advanced civilization?

a) Karl Frederick Gauss
b) Blaise Pascal
c) Leonard Euler
d) David Hilbert

Readers are invited to send their favorite mathematical trivia to Gordon MacDonald — *gmacdonald@upei.ca* — for possible inclusion.

ANSWERS ON PAGE 43

UNIVERSITY OF WATERLOO
Department of Applied Mathematics
Tenure Track Position in Mathematical Medicine

The Department of Applied Mathematics, University of Waterloo, invites applications for a tenure-track faculty position in the area of mathematical medicine, to begin on or after July 1, 2005. Appointment at the Assistant Professor level is preferred, but extraordinarily strong candidates would be considered for a more senior position. Salary will be commensurate with experience and research record. Current research in this area includes projects being carried out in collaboration with medical practitioners at Princess Margaret Hospital and the Hospital for Sick Children, which focus on the development of mechanical models that accurately describe a variety of diseases and clinical conditions. Candidates should exhibit potential for outstanding research, and should have a strong mathematical background. We are looking for applicants with enthusiasm for teaching at both the undergraduate and graduate level. Applicants should send a curriculum vitae (including a statement of research interests and teaching philosophy) and the names and addresses of at least three referees to **J. Wainwright, Chairman, Department of Applied Mathematics, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1** (reference letters should not be sent at this stage). Screening of applications will begin on December 15, 2004, and the final deadline for receiving applications is **January 15, 2005**. Applications received after this date will be considered only if the position has not been filled.

The Department of Applied Mathematics, together with the Departments of Combinatorics & Optimization, Pure Mathematics, Statistics & Actuarial Science and the School of Computer Science, form the Faculty of Mathematics, which is a major centre for research in the mathematical sciences. There are also close collaborations with the Faculties of Engineering and Science in the University. Further information about the Department may be obtained from our webpage at www.math.uwaterloo.ca/AM_Dept/index.html.

The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples, and persons with disabilities. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority. This appointment is subject to the availability of funds.

UNIVERSITY OF WATERLOO
Department of Applied Mathematics
Tenure Track Position in Control Theory

The Department of Applied Mathematics, University of Waterloo, invites applications for a tenure-track faculty position in the area of control theory, to begin on or after July 1, 2005. The position is at the Assistant Professor level and salary will be commensurate with experience and research record (in exceptional cases, an appointment at a higher level may be possible). Candidates should show evidence of potential for outstanding research, should have a strong mathematical background and an active interest in applications of their discipline in science or engineering. We are looking for applicants with enthusiasm for teaching at both the undergraduate and graduate level. Applicants should send a curriculum vitae (including a statement of research interests and teaching philosophy) and the names and addresses of at least three referees to **J. Wainwright, Chairman, Department of Applied Mathematics, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1**. The deadline for receiving applications is **January 15, 2005**. Applications received after this date will be considered only if the position has not been filled.

The Department of Applied Mathematics, together with the Departments of Combinatorics & Optimization, Pure Mathematics, Statistics & Actuarial Science and the School of Computer Science, form the Faculty of Mathematics, which is a major centre for research in the mathematical sciences. There are also close collaborations with the Faculties of Engineering and Science in the University. Further information about the Department may be obtained from our webpage at www.math.uwaterloo.ca/AM_Dept/index.html.

The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples, and persons with disabilities. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority. This appointment is subject to the availability of funds.

2004 ENDOWMENT GRANTS COMPETITION
CALL FOR PROPOSALS

The Canadian Mathematical Society is pleased to announce the 2004 Endowment Grants Competition to fund projects that contribute to the broader good of the mathematical community. The Endowment Fund is used to fund such projects and the Endowment Grants Committee (EGC) administers the distribution of the grants and adjudicates proposals for projects. Depending on the performance of the CMS Endowment Fund, the funds available for this year's competition may be less than past years.

Proposals must address the goal and statement of purpose of the Canadian Mathematical Society.

The goal of the Canadian Mathematical Society is to support the promotion and advancement of the discovery, learning, and application of mathematics. The CMS Statement of Purpose is:

1. To unify and support Canadian mathematicians through effective communication, broad membership, sponsorship of diverse activities, and partnerships with like professional societies.
2. To support mathematics research through the communication of current research to both the specialist and non-specialist, public recognition of research accomplishments and collaboration with the research institutes and granting agencies.
3. To support the advancement of mathematics education through joint projects with mathematics educators at all levels, promotion of educational advancements, and partnerships with provincial ministries of education and organizations supporting mathematics education.
4. To champion mathematics through initiatives that explain, promote and increase the general understanding of mathematics, provide extra-curricula opportunities for students, and encourage partnerships with corporate, government and not-for-profit agencies.

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 proposals for a maximum of three years. However, multi-year proposals must be funded from the funds available to the EGC in the year of application. The EGC will consider funding proposals to a maximum of $5,000 per year.

The EGC committee intends to favour proposals where CMS funds can be leveraged or where proposals have no other natural funding body to which to apply.

If it is anticipated that a proposal will generate something of lasting financial value, proposers must indicate that this is the case and declare their intent with respect to that value.

Application process. Application forms and templates as well as advice and directions are available at the CMS website *www.cms.math.ca/Grants/EGC*. Proposals must be received no later than **September 30, 2004**.

The Chair of the Endowment Grants Committee invites emails expressing interest in the grant as soon as possible *chair-egc@cms.math.ca*

Karl Dilcher
Chair, Endowment Grant Committee
Canadian Mathematical Society
577 King Edward
Ottawa, ON K1N 6N5

TOULOUSE 2004 - GRANTS/SUBVENTIONS

The program of students-postdocs travel awards for Toulouse 2004 was sponsored by CMS, CAIMS, SSC, CRM, the Fields Institute and PIMS. 16 awards of $500 each were granted to students and postdocs either giving a lecture in a special session or making a poster presentation.

Le programme de subventions de déplacement pour étudiants et chercheurs postdoctoraux pour Toulouse 2004 a été commandité par la SMC, la SCMAI, la SSC, le CRM, l'Institut Fields et le PIMS. En tout, 16 subventions de 500 $ ont été accordées à des étudiants ou chercheurs postdoctoraux qui ont présenté une communication ou participé à une séance de présentations par affiches.

Grants/Subventions

Julien Arino, postdoctoral fellow/boursier postdoctoral (McMaster); **Aboubacar Bass Bagayogo**, young professor/jeune professeur (C.U. St-Boniface); **Mark Braverman**, graduate student/étudiant diplômé (Toronto); **Bertrand Deroin**, postdoctoral fellow/boursier postdoctoral (Toronto); **Martin Frankland**, graduate student/étudiant diplômé (Montréal); **Shengda Hu**, postdoctoral fellow/boursier postdoctoral (Montréal); **Shafiqul Islam**, graduate student/étudiant diplômé (Concordia); **Payman Kassaei**, postdoctoral fellow/boursier postdoctoral CICMA (McGill); **Dima Khmelev**, postdoctoral fellow/boursier postdoctoral (Toronto); **Benjamin Klaff**, postdoctoral fellow/boursier postdoctoral (UQAM); **Said Manjra**, postdoctoral fellow/boursier postdoctoral (Ottawa); **Vladislav Panferov**, postdoctoral fellow/boursier postdoctoral (Victoria); **Leonel Robert**, graduate student/étudiant diplômé (Toronto); **John Robertson**, postdoctoral fellow/boursier postdoctoral (Toronto); **Stephan Tillmann**, postdoctoral fellow/boursier postdoctoral CRM-ISM (UQAM); **Zhuang Niu**, graduate student/étudiant diplômé (Toronto).

Three recipients finally could not make it to Toulouse: Payman Kassaei, Dima Khmelev, Vladislav Panferov.

Trois personnes ont été sélectionnées mais n'ont pas pu se rendre à Toulouse : Payman Kassaei, Dima Khmelev et Vladislav Panferov.

CONCOURS DE BOURSES DU FONDS DE DOTATION 2004

APPEL DE PROPOSITIONS

La Société mathématique du Canada (SMC) est heureuse d'annoncer la tenue du Concours de bourses du fond de dotation 2004 pour le financement d'activités qui contribuent à l'essor global de la communauté mathématique. Le Comité d'attribution des bourses du fonds de dotation (CABFD) se charge d'évaluer les propositions et d'attribuer les bourses. Selon le rendement du Fonds de dotation de la SMC, le financement disponible pour le concours de cette année pourrait être inférieur à celui des années précédentes.

Les propositions doivent être conformes à l'objectif et à l'énoncé d'intention de la SMC.

La Société mathématique du Canada s'est donnée pour objectif de promouvoir et de favoriser la découverte et l'apprentissage des mathématiques, et les applications qui en découlent. Son énoncé d'intention est le suivant :

1. Regrouper et appuyer les mathématiciens canadiens en favorisant la communication et l'adhésion à grande échelle, en commanditant diverses activités et en établissant des partenariats avec des associations professionnelles semblables à la nôtre.

2. Encourager la recherche mathématique en diffusant les résultats de recherches en cours aux spécialistes et aux non-spécialistes, en faisant reconnaître publiquement les travaux de chercheurs et en collaborant avec les instituts de recherche et les organismes subventionnaires.

3. Favoriser l'apprentissage des mathématiques en réalisant des projets avec des professeurs de mathématiques de tous les niveaux, en faisant connaître les progrès dans l'enseignement et en établissant des partenariats avec les ministères de l'éducation provinciaux et les organismes voués à l'apprentissage des mathématiques.

4. Défendre les mathématiques en créant des initiatives visant à expliquer, à promouvoir et à mieux faire connaître la discipline, en organisant des activités parascolaires et en encourageant les partenariats avec les sociétés privées, les gouvernements et les organismes à but non lucratif.

Un demandeur ne peut présenter qu'une proposition par concours en tant que demandeur principal. Les propositions 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 maximum de trois ans. Les projets s'échelonnant sur plusieurs années seront toutefois financés en fonction des fonds dont disposera le Comité l'année de la demande. Le Comité se limitera aux propositions dont le financement demandé n'excède pas 5 000 $ par année.

Le CABFD désire privilégier les propositions où les fonds de la SMC peuvent être équilibrés ou les propositions qui ne disposent d'aucun organisme de financement naturel où postuler.

Si les demandeurs prévoient tirer une valeur financière durable du projet, ils doivent l'indiquer et expliquer leur intention envers cette valeur.

Processus de demande. Le formulaire de demande et gabarits, ainsi que conseils et instructions sont disponible au site de la SMC *www.smc.math.ca/Grants/EGC/.f*. Les applications doivent être reçues au plus tard le **30 septembre 2004**.

Le président du comité invite les courriels décrivant votre intérêt au fond dès que possible *chair-egc@cms.math.ca*

Karl Dilcher
Président, Comité d'attribution des bourses du fonds de dotation
Société mathématique du Canada
577 King Edward
Ottawa, ON K1N 6N5

Brief Book Reviews: PUZZLES 101, A PUZZLEMASTER'S CHALLENGE – *page 15*

Solutions:

Puzzle 4: None of the numbers contain an 'e' when spelled out in English, e.g., two, four, … sixty-six. Therefore the next number is 2000 (two thousand).

Nobuyuki Yoshigahara adds: I waited to use this puzzle until I sent my 1999 Christmas card and 2000 New Year's card – everybody who received it was surprised.

Puzzle 94. Consider a wooden cube which is 1cm on a side and weighs 1 gram. A wooden cube which is 2 cm on a side weighs 8 grams. The average length of these two wooden pieces is 1.5 cm and the average weight is (1+8)/2 = 4.5 grams. On the other hand, the weight of a wooden cube of 1.5 cm on a side would be 3.375 grams. So, if it weighs 4.5 grams, which is the average weight, it is overweight!

TREASURER'S REPORT / RAPPORT DU TRÉSORIER

Arthur Sherk

As explained in the Report of the Executive Director, the financial report for the year ending December 31, 2003 reflects a policy change with regard to revenue from foreign exchange. Most of such revenues come from periodical subscription paid in US funds, but heretofore has been recorded as income for the year in which it was received. The new policy is that such income should be reported as unearned, similar to the way in which the actual subscription revenue is reported. Both the 2003 statements and the comparative 2002 figures reflect this change in policy.

In the light of the policy change, the Society's Operations Fund is in a reasonably satisfactory position for 2003 but the change has resulted in a cumulative deficit in the Operations Fund of just over $28,000. The adverse effect of the stronger Canadian dollar will be felt in the 2004 financial statements.

As usual, there are some danger signals in the 2003 statements. The office staff and committee chairs have been very good at working within their budgets, and we are grateful for that. However, some anticipated revenues have not materialized. We need to continue to seek new ways of generating revenue if we are to adequately support our growing program of activities.

Much attention is being paid to our Restricted Funds at the moment. We are happy to see some favourable turnaround in the performance of the investments, after some lean years. The Executive Committee is exploring ways of establishing a true Endowment Fund, separate from a portion of the investment funds that will be reserved for operational contingencies. With the help of professional fundraisers, it may be possible to radically increase the Endowment Fund, and thus provide for various future projects from the revenue earned.

Comme l'expliquait dans son rapport le directeur administratif, le rapport financier de l'exercice se terminant le 31 décembre 2003 fait état d'une nouvelle politique concernant les recettes provenant du taux de change. Ces recettes, tirées surtout des abonnements aux périodiques payés en dollars américains, étaient jusqu'à maintenant calculées dans le revenu de l'année où l'argent était reçu. Selon la nouvelle politique, ces recettes seront comptabilisées d'avance, tout comme les autres recettes d'abonnement. Ce changement transparaît dans les états financiers de 2003 et les données comparatives de 2002.

À la lumière de cette nouvelle politique, le budget de fonctionnement de la Société se trouve dans une situation raisonnablement satisfaisante pour 2003, mais il enregistre toutefois un déficit cumulatif d'un peu plus de 28 000 $. Le contre-coup de la force du dollar canadien se fera surtout sentir dans les états financiers de 2004.

Comme toujours, les états financiers de 2003 signalent quelques dangers potentiels. Le personnel administratif et les présidents de comités ont très bien respecté leur budget respectif, et nous leur en sommes très reconnaissants. Par contre, certaines recettes prévues ne se sont pas matérialisées. Nous devons donc continuer de chercher des moyens d'accroître nos recettes si nous souhaitons assurer convenablement la croissance de notre programme d'activités.

En ce moment, nous misons beaucoup sur notre fonds affecté (Restricted Funds). Nous sommes heureux de constater des rendements intéressants de nos investissements après quelques années de vache maigre. Le Comité exécutif étudie la possibilité de créer un véritable fonds de dotation, qui serait distinct du fonds réservé pour parer aux imprévus. Avec l'aide de spécialistes de la collecte de fonds, il pourrait être possible de gonfler considérablement le fonds de dotation, ce qui nous procurerait des fonds supplémentaires pour réaliser des projets de toute sorte.

CORRECTION TO MAY ISSUE - EDUCATION REPORT

In the May issue the Winners of the YSF 2003: The intermediate winner was WANDA BOYER (British Columbia), for "Prime Suspect", a study of prime numbers, not Gregory Duggan, as stated.

TRIVIA SOLUTIONS

1) B 2) B 3) B 4) D 5) C

MATHEMATICAL COMPETITIONS / COMPÉTITIONS MATHÉMATIQUES

2004 CANADIAN MATHEMATICAL OLYMPIAD

Eleven students received top honours in the 36th Canadian Mathematical Olympiad (CMO). The CMO, Canada's premier mathematics competition, is organized and administered by the Canadian Mathematical Society (CMS). A total of 79 students from 51 Canadian schools were invited to write the 2004 CMO based upon their performance in the 2003 Canadian Open Mathematics Challenge (COMC) on November 26, 2003, the CMS Correspondence Training Programme and other mathematics competitions. Students had to solve five difficult questions during the three hour 2004 CMO examination held on March 31, 2004.

2004 Prize Winners: The top winners in the 36th Canadian Mathematical Olympiad are:

FIRST PRIZE and the Sun Life Financial Cup: Yufei Zhao, Don Mills Collegiate Institute, Don Mills, Ontario. **SECOND PRIZE: Jacob Tsimerman**, University of Toronto Schools, Toronto, Ontario. **THIRD PRIZE: Dong Uk (David) Rhee**, McNally School, Edmonton, Alberta. **HONOURABLE MENTIONS: Boris Braverman**, Simon Fraser Junior High, Calgary, Alberta; **Dennis Chuang**, Strathcona-Tweedsmuir School, Okotoks, Alberta; **Gabriel Gauthier-Shalom**, Marianopolis College, Montreal, Quebec; **Oleg Ivrii**, Don Mills Collegiate Institute, Don Mills, Ontario; **János Kramár**, University of Toronto Schools, Toronto, Ontario; **Andrew Mao**, A.B. Lucas Secondary School, London, Ontario; **Richard Peng**, Vaughan Road Academy, Toronto, Ontario; and **Peng Shi**, Sir John A. MacDonald Collegiate Institute, Agincourt, Ontario.

Almost 5,000 students wrote the 2003 Canadian Open Mathematics Challenge and the winners of the 2003 Open and the 2004 CMO were honoured at the CMS Awards Banquet at the University of Waterloo on Tuesday, June 15, 2004.

OLYMPIADE MATHÉMATIQUE DU CANADA 2004

Onze élèves ont remporté des prix à la 36e Olympiade mathématique du Canada (OMC). L'OMC, premier concours de mathématiques en importance au pays, est organisée par la Société mathématique du Canada (SMC). Soixante-dix-neuf élèves, représentant 51 écoles canadiennes, ont été invités à l'OMC 2004 d'après leurs résultats au dernier Défi ouvert canadien de mathématiques (DOCM) le 26 novembre 2003, au programme de formation par correspondance de la SMC et à d'autres concours mathématiques. Les élèves devaient répondre à cinq questions difficiles pendant les trois heures de l'examen, tenu le 31 mars 2004.

Lauréats 2004 - Voici les grands gagnants de la 36e Olympiade mathématique du Canada :

PREMIER PRIX et la coupe Financière Sun Life va à **Yufei Zhao**, Don Mills Collegiate Institute, Don Mills, Ontario. **DEUXIÈME PRIX** : **Jacob Tsimerman**, University of Toronto Schools, Toronto, Ontario. **TROISIÈME PRIX** : **Dong Uk** (**David) Rhee**, McNally School, Edmonton, Alberta. **MENTIONS HONORABLES** : **Boris Braverma**n, Simon Fraser Junior High, Calgary, Alberta ; **Dennis Chuang**, Strathcona-Tweedsmuir School, Okotoks, Alberta ; **Gabriel Gauthier-Shalom**, Marianopolis College, Montréal, Québec ; **Oleg Ivrii**, Don Mills Collegiate Institute, Don Mills, Ontario ; **János Kramár**, University of Toronto Schools, Toronto, Ontario ; **Andrew Mao**, A.B. Lucas Secondary School, London, Ontario ; **Richard Peng**, Vaughan Road Academy, Toronto, Ontario ; et **Peng Shi**, Sir John A. MacDonald Collegiate Institute, Agincourt, Ontario.

Près de 5 000 élèves ont participé au Défi ouvert canadien de mathématiques 2003. Ceux et celles qui y ont obtenu les meilleurs résultats ou qui ont remporté des prix à l'OMC 2004 ont été invités au Banquet des lauréats de la SMC à l'Université de Waterloo le mardi 15 juin 2004.

Left to right: Janice Hemming (Sun Life Financial); Terry Visentin (CMO Committee Chair); Gabriel Gauthier-Shalom; Richard Peng; Peng Shi; Yufei Zhao; David Rhee; Jacob Tsimerman; Boris Braverman; Oleg Ivrii; Kathryn Hare (Waterloo) János Kramár.

MATHEMATICAL COMPETITIONS / COMPÉTITIONS MATHÉMATIQUES

A CANADIAN STUDENT OBTAINS A PERFECT SCORE AND WINS A GOLD MEDAL AT THE 2004 INTERNATIONAL MATHEMATICAL OLYMPIAD

Approximately 500 students competed at the 45th IMO. Only 45 were awarded Gold Medals of which an exceptional group of four students achieved a perfect score (42 out of 42). "**This year a Canadian student, Jacob Tsimerman, achieved this rare honor and can be considered world champion**," said Dr. Christopher Small, Canadian Team Leader.

Competing against students from 84 other countries, Canadian high school students have done extremely well, winning one Gold Medal, three Bronze Medals and two Honorable Mentions at the 45th International Mathematical Olympiad (IMO), Athens, Greece from July 4 -18, 2004.

The six students who competed for Canada were: **Oleg Ivrii**, Don Mills Collegiate Institute, Toronto (Ontario); **János Kramár**, University of Toronto Schools, Toronto (Ontario); **Dong Uk (David) Rhee**, McNally High School, Edmonton (Alberta); **Peng Shi**, Sir John A. MacDonald Collegiate Institute.Toronto (Ontario); **Jacob Tsimerman**, University of Toronto Schools, Toronto (Ontario); and **Yufei Zhao**, Don Mills Collegiate Institute, Toronto (Ontario).

The team was accompanied by the Team Leader, **Dr. Christopher Small** (University of Waterloo), the Deputy Team Leader, **Dr. Edward Wang** (Wilfrid Laurier University), and the Observer, **Professor Felix Recio** (University of Toronto).

At the Awards Ceremony, held on July 17th, 2004 in Athens, a **Gold Medal** was awarded to **Jacob Tsimerman**; **Bronze Medals** to **János Kramár, Peng Shi** and **Yufei Zhao**. **Oleg Ivrii** and **Donk Uk (David) Rhee**received **Honorable Mentions**.

Although students compete individually, country rankings are obtained by adding the team's scores. The maximum score for each student is 42 and for a team of six students the maximum is 252. The Canadian team placed 20th out of 85 competing countries with a score of 132.

Since 1981, Canadian students have received a total of 15 gold, 27 silver, and 55 bronze medals.

UN CANADIEN REMPORTE UNE MÉDAILLE D'OR GRÂCE À UN SCORE PARFAIT À L'OLYMPIADE INTERNATIONALE DE MATHÉMATIQUES 2004 À ATHÈNES

Des quelque 500 élèves qui ont participé à la 45e Olympiade internationale de mathématiques (OIM), 45 seulement ont récolté une médaille d'or, mais un petit groupe exceptionnel de quatre élèves ont obtenu une note parfaite (42 sur 42). « **Cette année, un élève du Canada, Jacob Tsimerman, a récolté ce grand honneur et mérite le titre de champion mondial** », a déclaré le chef de l'équipe canadienne, Christopher Small.

En compétition avec des élèves de 84 autres pays, l'équipe canadienne d'élèves du secondaire a réussi une superbe performance. Elle a en effet récolté une médaille d'or, trois médailles de bronze et deux mentions honorables à la 45e OIM, qui se tient à Athènes, en Grèce, du 4 au 18 juillet.

Le Canada a envoyé six représentants en Grèce : **Oleg Ivrii**, Don Mills Collegiate Institute, Toronto (Ontario); **János Kramár**, University of Toronto Schools, Toronto (Ontario); **Dong Uk (David) Rhee**, McNally High School, Edmonton (Alberta); **Peng Shi**, Sir John A. MacDonald Collegiate Institute, Toronto (Ontario); **Jacob Tsimerman**, University of Toronto Schools, Toronto (Ontario); et **Yufei Zhao**, Don Mills Collegiate Institute, Toronto (Ontario).

Le Canada a pour chef d'équipe et chef d'équipe adjoint **Christopher Small** (Waterloo) et **Edward Wang** (Wilfrid Laurier) respectivement. **Felix Recio** (Toronto) accompagne également l'équipe à titre d'observateur.

À la cérémonie de remise des médailles du 17 juillet, à Athènes, **Jacob Tsimerman** a reçu une **médaille d'or**, et **János Kramár**, **Peng** Shi et **Yufei Zhao** ont obtenus une **médaille de bronze**. Oleg **Ivrii** et **Donk Uk (David) Rhee** ont reçus pour leur part une **mention honorable**.

Même si les élèves participent à titre individuel, on consigne les classements par pays en additionnant les résultats par équipe. Le résultat maximal par élève est de 42 points, soit 252 pour une équipe de six. L'équipe canadienne s'est classée au 20e rang sur 85 pays, avec un total de 132 points.

Depuis 1981, les élèves canadiens ont remporté un total de 15 médailles d'or, 27 d'argent et 55 de bronze.

The most up-to-date information concerning all mathematical competitions, math camps and other programs, can be found at: *www.cms.math.ca/competitions/*

Vous trouverez l'information la plus récente sur les concours et les camps de mathématiques ainsi que d'autres programmes au *www.smc.math.ca/concours/*

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Department of Mathematics and Statistics

The Department of Mathematics and Statistics at the University of Victoria invites applications for a **tenure-track position** in the area of Applied Mathematics, at the Assistant Professor level, to commence on 1 July, 2005.

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Applicants should submit curriculum vitae, and a teaching dossier or equivalent documentation that outlines their teaching experience and effectiveness. They should also provide names and contact information for three referees. Applications should be directed to:

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Telephone: (250) 721-7436 FAX: (250) 721-8962
E-mail: *apldcomp@math.uvic.ca*

The closing date for applications is **December 15, 2004**.

The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, visible minorities, aboriginal peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University. All qualified candidates are encouraged to apply; however, in accordance with Canadian immigration requirements, Canadians and permanent residents will be given priority.

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

SEPTEMBER 2004 SEPTEMBRE

10-14 International Conference of Numerical Analysis and Applied Mathematics 2004 (ICNAAM 2004) (Chalkis, Greece) http://www.uop.gr/~icnaam/

13-17 V Conference on Banach Spaces (Cáceres, Spain) *http://matematicas.unex.es/conference/banach/*

16-19 Algebraic Cycles, K-theory, and Modular Representation Theory (Northwestern University, Evanston, IL) *http://www.math.northwestern.edu/conferences/friedlander/*

17-18 Zirkumferenz 2004, Aula der M\..adchenrealschule des Zisterzienserinnenklosters in Waldsaaen (Bavaria, Germany) An interdisciplinary dialogue on science, mathematics, Philosophy and art involving the number π. *http://www.zirkumferenz.de*

18-20 Workshop on Harmonic Analysis and Number Theory (University of Exeter, Exeter, UK) *a.h.j.deitmar@ex.ac.uk*

20-22 Workshop on Elliptic Curve Cryptography (Ruhr University, Bochum, Germany) *www.cacr.math.uwaterloo.ca/conference/-/2004/ecc2004/announcement/*

27-Oct.2 Workshop on Elliptic Cohomology and its relation to Geometry of Loop Spaces (Fields Institute, Toronto, ON) *abrand@fields.utoronto.ca*

OCTOBER 2004 OCTOBRE

2-6 Workshop on Algebraic K-Theory (Centre de Recherches Mathematiques, Universite de Montreal, Montreal, Quebec) *crm@ere.umontreal.ca*

13-16 Conference on Automorphic Forms and the Trace Formula in honor of James Arthur (Fields Institute, Toronto, ON) *http://www.fields.utoronto.ca/programs/scientific/04-05/arthurconf/*

14-15 DIMACS Workshop on Cryptography: Theory meets Practice (Rutgers University, Piscataway, NJ) *http://www.dimacs.rutgers.edu/Workshops/Practice/*

21-24 The Psychology of Mathematics Education - North American chapter (PME-NA) (Toronto, ON) *http://pmena.org/2004*

NOVEMBER 2004 NOVEMBRE

14-17 Multiscale Rehological Models for Fluids (Centre de Recherches Mathematiques, Université de Montreal, Montreal, QC) *crm@ere.umontreal.ca*

15-17 Coxeter Lecture Series (Fields Institute, Toronto, ON) *abrand@fields.utoronto.ca*

19-23 Workshop on Mirror Symmetry (The Perimeter Institute, Waterloo, ON) *abrand@fields.utoronto.ca*

DECEMBER 2004 DÉCEMBRE

6-10 III Joint Meeting Japan-Mexico in Topology and its Applications (Oaxaca, Mexico) *jamex@matmor.unam.mx*

11-13 **CMS Winter Meeting / Réunion d'hiver de la SMC** (McGill University, Montréal, Québec) *meetings@cms.math.ca*

16-19 International Conference on History and Heritage of Mathematical Sciences (Holkar Science College, Indore, India) *bsyadav@indiashm.com*

JANUARY 2005 JANVIER

5-8 Annual Meeting of American Mathematical Society (Atlanta,GA) *www.ams.org/meetings/*

10-14 Workshop on Topological Strings (Fields Institute, Toronto, ON) *abrand@fields.utoronto.ca*

MARCH 2005 MARS

21-25 Workshop on $N = 1$ Compactifications (Fields Institute, Toronto, ON) *abrand@fields.utoronto.ca*

28-Apr 1 Workshop on String Phenomenology (The Perimeter Institute, Waterloo, ON) *abrand@fields.utoronto.ca*

MAY 2005 MAI

2-6 Workshop on Gravitational Aspects of String Theory (Fields Institute, Toronto, ON) *abrand@fields.utoronto.ca*

14-15 Conference in honor of Heydar Radjavi's 70th Birthday (Hotel Golf, Bled, Slovenia) *Damjana.Kokol@FMF.Uni-Lj.SI, http://www.law05.si/hrc/*

15-21 ICMI Study15; The Professional Education and Development of Teachers of Mathematics (Aguas de Lindoia, Sao Paulo, Brazil) *dball@umich.edu*

JUNE 2005 JUIN

4-6 **CMS 2005 Summer Meeting**
Réunion d'été de la SMC
(University of Waterloo) *meetings@cms.math.ca*

16-19 Second Joint Meeting of American Math. Soc with the Deutsche Math.-Vereinigung and the Osterreichische Math.Gesellschft (Mainz, Germany) *www.ams.org/meetings/*

AUGUST 2006 AOÛT

22-30 International Congress of Mathematicians (ICM 2006) (Madrid, Spain) *www.icm2006.org*

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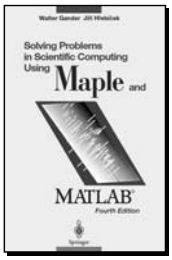

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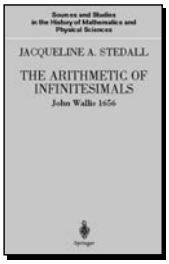

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