CMS NOTES de la SMC

PRESIDENT'S 2004 ANNUAL REPORT

H.E.A. (Eddy) Campbell
Memorial University, St. John's, NL

IN THIS ISSUE
DANS CE NUMÉRO

2004, A Spectacular Year for Mathematics in Canada

2004 was an excellent year for mathematics in Canada. The national centre for excellence, Mathematics of Information Technology and Complex Systems (MITACS), was renewed for another 7 year period. MITACS has a wide ranging mandate across the whole community of mathematical sciences to connect us to industry and provide new opportunities for researchers and graduate students. This renewal was a very important event for us. The mathematical landscape in Canada has changed dramatically over the past decade. We now have three world-class research institutes: the Centre de recherches mathématiques (CRM) in Montreal; the Fields Institute (FI) in Toronto; and the Pacific Institute for Mathematics (PIMS) in Vancouver. There is also the Banff International Research Station (BIRS), which is supported also by institutes in the US and Mexico, and a virtual networked institute in the Atlantic Association for Research in the Mathematical Sciences (AARMS). The creation of this infrastructure has led to a tremendous increase in the quality and impact of the Canadian mathematical sciences. This in turn has led to a new sense of community, a broader view of our beloved disciplines and new cooperative ventures involving many of our sister organizations inside and outside the country as well as the institutes. It is a very exciting time to be a mathematician in Canada!

Our prizes continue to attract outstanding nominations. The quality of these nominations from all over the country speaks to the real and growing strength of mathematics in Canada. We have every reason to celebrate and to take pride. The CMS is a key player in promoting and enhancing Canadian mathematics. Our regular activities continue to flourish as you will see from the reports herein from our committees. Our regular meetings attract large numbers of participants and increasingly are held jointly with our sister organizations, we have a very active publications programme, high school mathematics competitions, Math Camps (there were 12 in 2004 with at least one camp in every province), electronic services for the community, and the Endowment Grants Competition.

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I report on our activities on a regular basis in the *Notes* – the present article is a summary.

The Meetings

The summer meeting was at Dalhousie, and 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 the 14 symposia.

The winter meeting was hosted by McGill University in Montreal. It was a treat to return to Montreal where the Canadian Mathematical Congress first met in 1945 with the hope that "the Congress will be the beginning of important mathematical developments in Canada". That has indeed been the case, and our meetings serve to recognize this and to make further contributions.

Canada School Mathematics Forum

The **2005 Canadian Mathematics Education Forum** will be held in Toronto, May 6 - 8, 2005. The three co-chairs of the 2005 Forum are **Florence Glanfield** (Saskatchewan), **Bradd Hart** (McMaster)

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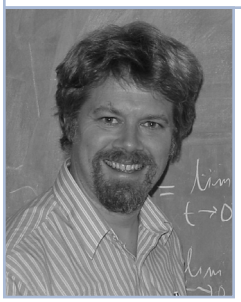
EDITORIAL

by Robert J. MacG. Dawson
Saint Mary's University, Halifax, NS



JUST IMAGINE...

A few months ago, the President of Harvard University caused considerable controversy, and some anger, by speculating that innate differences between males and females might go some way to explaining the comparatively small number of women in mathematics. Many groups responded publicly, in some cases stating as fact the diametrically opposite view that there could be no such differences.

President Summers' statements were made in a conference not open to the media, and no exact transcript of his words appears to exist; therefore it is difficult to know exactly what he said, and in particular whether his words could reasonably have been interpreted as claiming the existence of such differences. In this column, I would like to argue that, at least now and in the immediate future, any definite statement on either side of this argument is, at best, theorizing in advance of the data.

Last month, we discussed John Mighton's JUMP program, as described in his book "The Myth of Ability". Mighton appears to have shown not only that almost every child has the potential to perform above current grade level expectations in mathematics, but that almost any older volunteer can carry out the necessary tutoring. An easy corollary of this is that, in general, children who have difficulty with basic mathematics are not being limited by their own ability. Another is that we can no more observe the real limits of children's ability in today's classrooms than we can study the relativistic "lightspeed barrier" by watching cars driving down the highway.

At a higher level, anybody who follows high school mathematical competitions in Canada will notice that there are a few schools that regularly provide one or more CMO finalists and members for the IMO team. Perhaps some of this can be explained in terms of ambitious parents of gifted children arranging to have their sons and daughters attend a certain school. However, it appears clear that there are some schools that have math programs that can consistently train a few students out of every year's intake to the level of the national elite.

This sort of training is still at the "Jaime Escalante" stage. Evidently a few people can do it, but we don't yet seem to know how to make such teaching into a transferrable skill. Is is too much to dream that some day we will know how? And while it is true that mathematics competitions are not all there is to mathematics, it seems likely that if that specialized subset of mathematical skills can be taught so much more widely than it is now and to such a level, so can others. Has anybody got any good ideas?

Until we can do everywhere what a few pioneering teachers have shown us is a possibility, speculating about differences in innate limitations seems pointless. Not only have we little evidence to go on, but there are far, far more important and exciting things about to happen - if we make the effort. Imagine...

Imagine a world in which almost everybody really understands high school mathematics and, when in school, exceeded our current system's graduation expectations. Imagine a world in which the top few students in most high schools have realized a mathematical ability comparable to the top few students in Canada today. Imagine a world in which subjects like statistics do not have to be divided into a rigorous discipline studied by a few and a soft, math-free version for the masses.

Imagine a world in which most people enjoy mathematics.

Just imagine.

NOTES DE LA SMC

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ÉDITORIAL

IMAGINEZ...

Il y a quelques mois, le recteur de l'Université Harvard a déclenché une vive controverse doublée d'une certaine colère en affirmant que des différences innées entre hommes et femmes contribueraient à expliquer le petit nombre de femmes en mathématiques. Plusieurs groupes ont réagi publiquement, dont certains en soutenant un point de vue diamétralement opposé selon lequel une telle différence n'existerait pas.

M. Summers a tenu ces propos au cours d'une conférence fermée aux médias dont il n'existe aucune transcription. Par conséquent, il paraît difficile de savoir précisément ce qu'il a déclaré, en particulier s'il prétendait réellement défendre l'existence d'une telle différence. J'aimerais ici montrer qu'au moins pour l'instant et dans un avenir immédiat, toute affirmation appuyant l'une ou l'autre des deux parties ne correspond, au mieux, qu'à une thèse soutenue avant même d'avoir obtenu les données nécessaires.

Le mois dernier, je vous ai parlé du programme Junior Undiscovered Math Prodigies (JUMP), mis sur pied par John Mighton et décrit dans son ouvrage intitulé *The Myth of Ability*. M. Mighton a montré non seulement que presque tous les enfants ont le potentiel de dépasser les attentes de leur niveau en mathématiques, mais encore que presque toute personne plus âgée peut servir de tuteur. De ces principes se dégage un premier corollaire : en général, ce n'est pas la capacité des enfants éprouvant des difficultés en mathématiques de base qui pose problème. Un autre corollaire serait d'affirmer qu'il n'est pas plus possible de déterminer les limites réelles de la capacité des élèves d'aujourd'hui que d'étudier la relativiste « barrière de la vitesse de la lumière » en observant les voitures rouler sur une autoroute.

À un niveau plus élevé, toute personne qui s'intéresse aux concours mathématiques de niveau secondaire au Canada remarquera que seul un petit nombre d'écoles réussissent régulièrement à amener au moins un élève au rang des finalistes de l'OMC et à le faire admettre au sein de l'équipe de l'OIM. Peut-être est-ce parce que des parents ambitieux d'enfants doués dirigent leurs enfants vers une école en particulier? Il paraît néanmoins évident que certaines écoles présentent des programmes de mathématiques qui permettent à quelques élèves de surpasser les attentes de leur niveau et d'atteindre l'élite nationale.

Ce type de programme se situe encore à la phase « Jaime Escalante ». De toute évidence, quelques personnes réussissent à enseigner de cette façon, mais nous ne savons pas encore comment transférer cette compétence aux autres. Est-ce rêver en couleur de penser qu'un jour nous y arriverons? Même s'il est vrai que les concours ne sont pas le seul but de l'enseignement des mathématiques, il semble que si ce sous-ensemble spécialisé de compétences mathématiques pouvait être enseigné à plus grande échelle qu'il ne l'est maintenant et à un niveau aussi élevé, d'autres pourraient l'être également. Est-ce que quelqu'un a de bonnes idées à proposer?

Jusqu'à ce que nous étendions à tout le pays ce qu'une poignée d'enseignants ont réussi à faire à titre de pionniers dans leur domaine, se poser des questions sur les différences de limites innées semble inutile. Non seulement les preuves sont-elles insuffisantes pour continuer le débat, mais encore y a-t-il des choses beaucoup plus importantes et passionnantes qui s'en viennent, si nous investissons les efforts voulus. Imaginez...

Imaginez un monde où presque tous les élèves du secondaire comprennent vraiment les mathématiques et dépassent les attentes pédagogiques de notre système actuel. Imaginez un monde où les meilleurs élèves de la plupart des écoles secondaires développent des compétences mathématiques comparables à celles de l'élite canadienne actuelle. Imaginez un monde où des matières comme la statistique n'aurait plus à être divisées, d'un côté, en une discipline rigoureuse étudiée par une poignée de personnes et, de l'autre, en une discipline allégée, sans mathématiques, pour la masse.

Imaginez un monde où la plupart des gens aiment les mathématiques.

Imaginez!

CALL FOR SITES

DEMANDES DE PROPOSITIONS D'EMPLACEMENTS

Interested in hosting a CMS Meeting?

The summer and winter meeting sites are confirmed to the year 2008 (Summer Meeting - see Calendar of Events). The CMS Research Committee invites requests from departments interested in hosting a CMS Meeting for Winter 2008 onwards. The head of the department should write to the chair.

Êtes-vous intéressés à être l'hôte d'une réunion de la SMC?

Les lieux des réunions d'été et d'hiver sont confirmés jusqu'à l'an 2008 (réunion d'été - voir le calendrier des événements). Le Comité de la recherche de la SMC invite les départements intéressés à tenir l'une de ces réunions en hiver 2008 ou plus tard à soumettre une proposition. Les chefs de département intéressés doivent soumettre leur propositions au président.

Dr. Finnur Lárusson, Chair/Président
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In the March issue a review of Counting and Configurations: Problems in Combinatorics, Arithmetic, and Geometry, by Herman, Kučera, and Šimša, erroneously gave the publisher as Princeton University Press. It is in fact published by Springer, as part of their CMS Books in Mathematics series.

BOOK REVIEW

A Highly-Recommended Survey

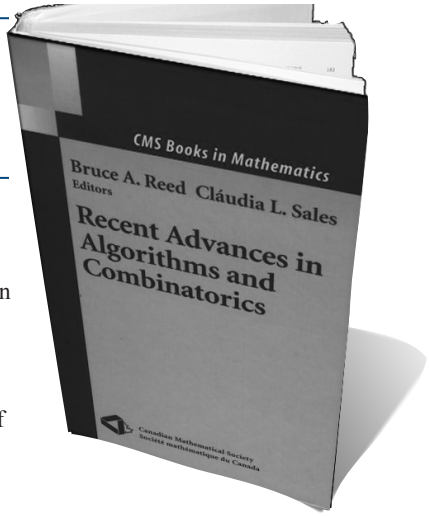
Odile Marcotte, Université du Québec à Montréal

Recent Advances in Algorithms and Combinatorics

edited by Bruce A. Reed and Cláudia L. Sales

CMS Books in Mathematics 11

Springer 2003 xiii + 351 page



Recent Advances in Algorithms and Combinatorics, edited by Bruce Reed and Cláudia Sales and published in the series CMS Books in Mathematics, contains nine chapters on topics in graph theory, combinatorial optimization, complexity theory and pattern matching. I found the nine chapters to be very readable surveys of their respective topics, and I recommend this book to anyone interested in algorithms and combinatorics.

The first chapter, by M.H. de Carvalho, C.L. Lucchesi and U.S.R. Murty, is a survey on the matching lattice of a graph and concludes with a characterization of this lattice and a list of open problems. Given a simple graph G containing a perfect matching, the matching lattice of G is the lattice generated by the incidence vectors of its perfect matchings (considered as subsets of the edge set of G). Recall that the lattice generated by a set of vectors, say, S, is the set of all vectors that can be expressed as integral combinations of elements of S. The study of the matching lattice is closely related to some classical problems in graph theory, because finding a 3-edge-colouring of a biconnected cubic graph $H=(V,E)$ amounts to showing that w, the incidence vector of E, can be expressed as the sum of the incidence vectors of perfect matchings. Seymour and Lovász have studied the matching lattice, and Lovász has given a characterization of the matching lattice in a deep article that is the main source for this chapter. The authors introduce the notions and machinery necessary to understand the proof of the characterization: matching covered graphs, bricks and braces, and graph decompositions (tight cut, separating cut and ear decompositions). Overall, this chapter is an excellent introduction to a difficult topic.

The second chapter, by Colin McDiarmid, is entitled "Discrete Mathematics and Radio Channel Assignment". Broadly speaking, the channel assignment problem consists of assigning channels to cells of a communication system in such a way that there is little or no interference between the communications that will take place on these channels. Before making any further comment, I emphasize that Section 2.8 is a perfect introduction to the channel assignment problem; the author gives precisely the kind of technical details necessary to understand the modelling of the problem. The channel assignment problem can be modelled by a simple graph $G=(V,E)$ together with a set T_e of natural numbers for each edge e of G, where 0 is always a member of T_e. In practice, T_e is the set of *forbidden differences*. An assignment ϕ is a function from V to the set $\{1,2,...,t\}$ and ϕ is said to be *feasible* if for any edge $e = uv$ of G, $|\phi(u)-\phi(v)|$ does not belong to T_e. The vertices of G represent the cells of the communication system, $\phi(u)$ (for a given vertex u) represents the channel (or colour) assigned to cell u, and the constraint $|\phi(u)-\phi(v)| \notin T_e$ is an interference constraint (there are several kinds of these, and they are well described in Section 2.8).

The channel assignment problem is that of finding a feasible assignment (or colouring) optimizing some criterion. Note that if one must assign more than one channel to a given cell (say, u), $\phi(u)$ is a subset of $\{1,2,...,t\}$ rather than a member of that set. In most of the sections, McDiarmid considers the constraint matrix model, where each T_e is of the form $\{0,1,2,...,\ell_e\}$ and the criterion to be minimized is the *span* (i.e., the parameter t in the above definition). In Section 2.3, the author presents results for channel assignments that are analogous to those for ordinary graph colouring; in particular, he discusses lower bounds, sequential assignment, an integer programming model, counting of feasible solutions and cyclic channel distances. The author also discusses the complexity of channel assignment in Section 2.4, the "planar case" (where G is embedded in the plane and the interference is proportional to the distance) in Section 2.5, the case where one must assign more than one channel to a given cell in Section 2.6 and random models in Section 2.7. The chapter contains well-known results and recent ones, is very well written and concludes with an interesting list of references.

Chapter 3, by Frédéric Maffray, surveys the results on the colouring of perfect graphs. A graph G is *perfect* if for any induced subgraph H of G, the chromatic number of H is equal to the size of its largest clique (i.e., largest complete subgraph). One of the most important conjectures in graph theory, recently proved by Chudnovsky, Seymour, Robertson and Thomas, states that a graph is perfect if and only if it contains no odd hole and no odd antihole (a hole being an induced cycle and an antihole the complement of a hole). Given a perfect graph G, it is possible to compute its clique number (and hence its chromatic number) by an algorithm due to Grötschel, Lovász and Schrijver, but this algorithm relies on the ellipsoid method and is not combinatorial. There has thus been a lot of research on combinatorial algorithms to colour special classes of perfect graphs. Maffray presents the method by contraction and the sequential method for colouring graphs; the latter may be enhanced by bichromatic or trichromatic exchanges. He shows that these methods (or a combination of the two) can be used to find optimal colourings for many graph classes, and he discusses these and other classes (claw-free perfect graphs, perfectly orderable graphs, perfectly contractile graphs, and so on).

In Chapter 4, Bruce Reed gives an introduction to one of the most important topics in algorithmic graph theory, namely, graphs of bounded tree width. To introduce this notion, let us define a k-tree by the following axioms: (a) the empty graph is a k-tree, and (b) every graph obtained from a k-tree G by adding to it a vertex v and the edges joining v to a clique of size at most k in G is also a k-tree. A partial k-tree is any subgraph of a k-tree. Finally, a graph is said to have *tree*

width at most k if it is a partial k-tree. Actually, one can define the concept of tree width by means of tree decompositions, and the author shows that the two definitions are equivalent in Section 4.2. Loosely speaking, if a graph has a small tree width, it contains many cutsets of small cardinality, and it is possible to solve many optimization problems on this graph by decomposing the graph along such a cutset, solving the problem on the graph components and glueing the solutions together. This strategy (known as dynamic programming) leads to linear algorithms for many optimization problems on graphs of bounded tree width. Reed also discusses algorithms for finding bounded width decompositions, an approximate duality result for tree width and the k-rooted routing problem. In Section 4.5, the author gives a forbidden subgraph characterization of graphs of bounded tree width (a tantalizing glimpse into the work of Robertson and Seymour on graph minors!).

In Chapter 5, J.L. Swarcfiter presents a survey of clique graphs, a subclass of intersection graphs. The clique graph of a simple graph $G=(V,E)$, denoted $K(G)$, is defined as follows: the vertices of $K(G)$ are the maximal cliques of G and there is an edge between two vertices of $K(G)$ if and only if the corresponding cliques have a nonempty intersection. G is then said to be a clique inverse graph of $K(G)=H$ and is denoted by $K^{-1}(H)$. There is a characterization of clique graphs, given in Section 5.3, but it does not yield a polynomial time algorithm for recognizing clique graphs in general. For some families $\mathcal{F}$ of graphs, however, it is possible to characterize more precisely the graphs of the form $K(G)$ for some G in $\mathcal{F}$, or of the form $K^{-1}(H)$ for some H in $\mathcal{F}$. Swarcfiter describes some of these families, discusses iterated clique graphs and the behaviour of their diameters, and finally gives a list of open problems, the most interesting of which deal with characterization or recognition of clique graphs.

Almost every combinatorial optimization problem can be formulated as an integer programming problem, and the first step in solving such a problem consists of solving its linear programming relaxation, i.e., the program obtained by discarding the integrality constraints. The optimal value of this relaxation, however, may be very different from the "integral" optimal value, and the gap between the two values is a reliable measure of the difficulty of solving the original problem. Thus in recent years, there has been a lot of interest in the formulations of combinatorial optimization problems as semidefinite programs, which yield better relaxations than linear programs. In a semidefinite program, the decision variables are the entries of a positive semidefinite matrix X, the objective function is of the form CX and the constraints of the form $D_i X = d_i$, where the matrices C and D_i (for all i) are symmetric. Note that the two methods that solve linear programs in polynomial time, the ellipsoid method and the interior point method, can also be used to solve semidefinite programs in polynomial time.

In Chapter 6, László Lovász gives a wonderful introduction to semidefinite programming and its relationship to combinatorial optimization. After some introductory examples and preliminaries, he outlines the theory of semidefinite programs, including two versions of Farkas's lemma and a duality theorem. The author then shows how to apply semidefinite programming in several areas (unit distance graphs, discrete linear and quadratic programs, spectra of graphs and finally engineering). In Section 6.5, he discusses the use of semidefinite programming in proofs, in particular the proof that the colouring problem can be solved in polynomial time for perfect graphs. This proof relies on the fact that the famous (but esoteric) parameter $\theta(G)$ is the optimal value of a semidefinite program. The result follows from the sandwich theorem (i.e., the statement "$\omega(G) \leq \theta(\overline{G}) \leq \chi(G)$") and the existence of a polynomial time algorithm for semidefinite programming. In Section 6.6, the author presents applications of semidefinite programming to the design of approximation algorithms (especially the celebrated approximation algorithm of Goemans and Williamson for the maximum cut problem), in Section 6.7, the generation of constraints for linear and quadratic integer programs, and in Section 6.8, a list of extensions and problems.

Chapter 7, by A. Steger, is an excellent survey of the approximability of difficult (that is, $\mathcal{NP}$-complete) optimization problems. The theory of $\mathcal{NP}$-completeness was first formulated for *decision problems*, whose solution is either "yes" or "no". The concept of reduction (Turing reduction, Karp reduction, or log-space reduction) is central to this theory. Adapting the concepts of the $\mathcal{NP}$-completeness theory to optimization problems, however, is not straightforward. In the introduction, Steger gives a precise definition of the class $\mathcal{NPO}$, and in Section 7.3, a precise definition of reduction between optimization problems. This notion (called AP-reduction) is due to Crescenzi, Kann, Silvestri and Trevisan, who proposed it in 1999. For optimization problems, the notion of reduction must preserve the "approximability" properties of a given problem. For instance, if problem Π_1 reduces to Π_2 and an approximate solution of Π_1 cannot be computed in polynomial time unless $\mathcal{P} = \mathcal{NP}$, this non-approximability result should also apply to Π_2. The author discusses various techniques for proving non-approximability results (including the famous PCP-Theorem), introduces a hierarchy for $\mathcal{NP}$-optimization problems and finally gives many examples of reductions.

Chapter 8, by M.-F. Sagot and Y. Wakabayashi, deals with pattern inference in a biological context. Let s be a string (or word) over a fixed alphabet representing a biological sequence such as a DNA or RNA sequence. Let us assume that s is the concatenation of the letters $s_1, s_2, \ldots, s_n$ (where a letter may occur more than once). A substring of s is any string u of the form $s_i s_{i+1} \ldots s_j$. The length of u is $j - i + 1$ and u is said to occur at position i in s. If u occurs more than once in s, that is, if there exists an ℓ different from i such that $s_{i+t} = s_{\ell+t}$ for $0 \leq t \leq j - i$, we say that u is a *repeated pattern* in s. A simplified version of an important problem in computational biology is the following: given a fixed length k, find the positions of all the repeated patterns of length k in S. The first efficient algorithm for solving this problem was proposed by Karp, Miller and Rosenberg. In "real" computational biology, however, the condition $s_{i+t} = s_{\ell+t}$ is often replaced by s_{i+t} R $s_{\ell+t}$ for some relation R between letters of the alphabet (which represent nucleotides, for instance). R need not be an equivalence relation; indeed, it need not be transitive. In the first part of the chapter, Sagot and Wakabayashi use these concepts to introduce several notions

of similarity between substrings of a given string. In the second part, they present algorithms for computing measures of similarity.

In Chapter 9, Y. Kohayakawa and V. Rödl present a survey of results related to Szemerédi's regularity lemma. To quote the authors, this lemma "tells us that *any* large graph may be written as a union of induced, random looking bipartite graphs". Alon, Duke, Lefmann, Rödl and Yuster have shown how to make this lemma constructive, i.e., how to construct in polynomial time a partition with the properties described in the lemma. Using the constructive version of the regularity lemma, A. Frieze has then proposed polynomial time approximation schemes for several problems in dense graphs, including the maximum cut problem and the graph bisection problem. There are also many applications of the regularity lemma in graph theory, and the authors present such an application (the proof of a conjecture by Erdős) in Section 9.3. In Section 9.5, the authors prove a version of the regularity lemma for sparse graphs, which is a generalization of the original lemma by Szemerédi. They discuss a key tool for the constructive version of the regularity lemma in Section 9.6 and a new quasi-random graph property in Section 9.7. The reader of this chapter should not be deterred by the statements of the lemmas and theorems; they often look formidable, but the authors have succeeded in writing an excellent survey of a difficult topic.

APPEL DE PROPOSITIONS - CONCOURS DE BOURSES DU FONDS DE DOTATION 2005

La Société mathématique du Canada (SMC) est heureuse d'annoncer la tenue du Concours de bourses du fond de dotation 2005 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.

De façon générale, le CABFD favorise 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 2005.**

Le président du comité invite les courriels décrivant votre intérêt au fond dès que possible.

Dr. Karl Dilcher
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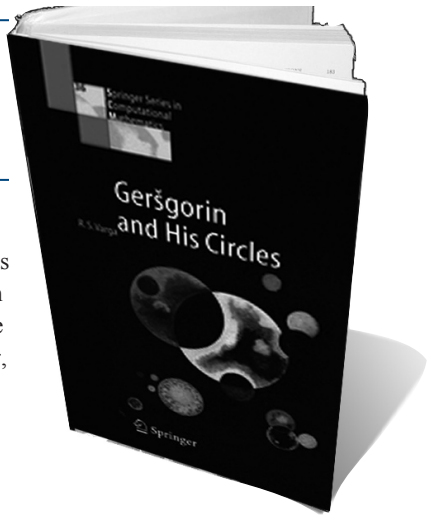
BOOK REVIEW

Expert Guidance in a Labour of Love
Douglas R. Farenick, University of Regina

Geršgorin and His Circles

Richard S. Varga
Springer Series in Computational Mathematics, Vol. 36
Springer-Verlag, 2004. 226 pages.



This book is devoted to a well-known theorem in linear algebra dating from 1931 called Gershgorin's Circle Theorem. Although the result appears to have been known at least implicitly decades earlier, Gershgorin was the first to give an explicit statement and proof of the theorem. The Circle Theorem, which is easily stated and proved, is both delightful and useful.

Assume that A is a $n \times n$ matrix with complex entries a_{ij}. For every $i = 1,..., n$, let $D_i(A)$ denote a closed disc in the complex plane with centre a_{ii} and radius $\rho_i(A) = \sum_{j \neq i} |a_{ij}|$ (the sum of the moduli of the off-diagonal entries in row i of A), and let $G(A)$ be the union of these n discs. Gershgorin's theorem asserts that the eigenvalues of A are contained in the set $G(A)$. An argument based on continuity yields further information: if the union of any k of the discs $D_i(A)$ is disjoint from the union of the remaining $n-k$ discs, then the former region contains at most k distinct eigenvalues. In particular, if a single disc $D_i(A)$ is disjoint from all other discs, then $D_i(A)$ contains exactly one eigenvalue λ of A and the algebraic multiplicity of λ is 1.

In his paper, Gershgorin also turns things around and views his theorem from the point of view of determinants: if $|a_{ii}| > \rho_i(A)$, for each i, then A is nonsingular. Why? Because under the stated hypothesis, 0 does not lie in the set $G(A)$, and so 0 is not an eigenvalue of A—in other words, the determinant of A is nonzero. In fact Gershgorin went a little farther and stated that if $|a_{ii}| \geq \rho_i(A)$, for each i, and if strict inequality $|a_{kk}| > \rho_k(A)$ holds for at least one k, then A is nonsingular. However, this is not true unless one makes an additional assumption about the structure of A, a fact gently pointed out by Olga Taussky in an influential article on determinants in the 1940s. The additional hypothesis is that the matrix A should be irreducible, which is a connectivity property of the directed graph of A. Specifically, if one considers a graph $\Gamma(A)$ on n vertices labeled by the diagonal entries of A, and if the edges of $\Gamma(A)$ are such that an edge is directed from vertex i to vertex j if and only if $a_{ij} \neq 0$, then A is irreducible if one can move from each vertex of $\Gamma(A)$ to every other vertex along some directed path.

The usefulness of Gershgorin's Circle Theorem is quickly seen in numerical analysis, for if one has perturbed one or more entries of a matrix A, then Gershgorin's theorem gives an easily computable bound for the effect of the perturbation on the eigenvalues of A. Indeed, the initial impetus for work on extensions and enhancements of the Gershgorin Circle Theorem arose from issues involving computation and numerical analysis. However, many pure mathematicians were also attracted to Gershgorin's theorem by its simplicity and through the sense that much more could be said. A substantial literature on Gershgorin's theorem now exists and Richard S. Varga's book *Gersgorin and His Circles* deals with a wide selection of special topics from this literature.

Varga himself has contributed much to the subject. He was, in particular, responsible for what is called the minimal Gershgorin set. The idea is this. Note that if X is a diagonal matrix with diagonal entries $x_i > 0$, then the transformation $A \rightarrow X^{-1}AX$ leaves the eigenvalues and diagonal of A unchanged but changes the sum of the moduli of the off-diagonal entries in each row: $\rho_i(X^{-1}XA) = [1/(x_i)]\sum_{j \neq i} |a_{ij}|x_j$. A Gershgorin-type set $\gamma(A)$ is obtained by forming the intersection of $G(X^{-1}AX)$ over all diagonal matrices X with positive diagonal entries. This set is non-empty, for it contains all of the eigenvalues of A. But what else does it contain? To answer this question, we make a second observation about Gershgorin's Theorem: the radii of the discs $D_i(A)$ depend only on the moduli $|a_{ij}|$ of the off-diagonal entries a_{ij}, whereas the eigenvalues of A depend on both the moduli and arguments of the a_{ij}. Therefore, if A is a fixed $n \times n$ matrix and if ΩA consists of all n×n matrices B for which $b_{ii} = a_{ii}$ and $|b_{ij}| = |a_{ij}|$, for all $j \neq i$, then $\gamma(A)$ contains the eigenvalues of every $B \in \Omega_A$. Varga proves that this set is minimal in the sense that its boundary contains nothing extra: if λ is a point of the boundary of $\gamma(A)$, then λ is an eigenvalue of some matrix $B \in \Omega_A$. But that's not all. By incorporating permutation matrices into the mix, some further work (too involved to discuss here) leads to a minimal Gershgorin set $H(A)$ and a striking theorem: λ belongs to $H(A)$ if and only if λ is an eigenvalue of some $B \in \Omega_A$. In this sense, Gershgorin's Circle Theorem is sharp.

The book has two main themes to it, the first of which links eigenvalue inclusion regions such as the Gershgorin set with theorems on determinants and nonsingularity. The second theme concerns the role played by special classes of real matrices, such as M- and H-matrices, in the development of regions of inclusion for the eigenvalues of arbitrary complex matrices. For example, the theorems on the minimal Gershgorin set are obtained by using these classes. An attractive aspect of the subject and book is the manner in which ideas from the Perron-Frobenius theory of matrices with nonnegative real entries, as well as the graph theory that goes with it, coalesce with complex methods to yield Gershgorin-type theorems.

Varga expertly takes the reader through the high points of the extensive Gershgorin literature, and includes an assortment of results from 1931 to present day. Although the treatment is not exhaustive and a second volume is planned, there is considerable detail here. Much less attention than one might expect is given to applications of Gershgorin's theorem in numerical analysis and approximation theory. However, Varga's aim is clearly to set out the mathematical aspects, first and foremost. To that end, Varga presents the material in a manner that is accessible to

mature undergraduate students and beginning graduate students. Two appendices provide the reader with the required background material from linear analysis and Perron-Frobenius theory. Nevertheless, an important early theorem in the book, Theorem 1.6, is proved in a fashion that is not to my taste and which may be confusing for students. The issue has to do with connected components of the Gershgorin set $G(A)$. Define the spectrum of A to be a list of n complex numbers consisting of the eigenvalues of A, with each eigenvalue repeated according to its algebraic multiplicity. Theorem 1.6 asserts that if the union X of k discs $D_i(A)$ are disjoint from the remaining $n–k$ discs, then there are precisely k elements of the spectrum in X. The proof is achieved by considering a continuous family of matrices $A(t)$, where $t \in [0,1]$, such that $A(0)$ is the diagonal of A and $A(1)=A$. What is needed is that the sum of the algebraic multiplicities of the eigenvalues of $A(t)$ in X is constant as t varies; this can be readily verified using the argument principle from complex analysis—a tool familiar to undergraduates. Varga's proof appears to be based on results in the spectral theory of matrices depending on a parameter, which is a little beyond what most students know and is possibly less convincing.

Varga includes a photo-reproduction of Gershgorin's original article from 1931, which was written in German and was published in the Soviet journal *Izvestia Akademie Nauk SSSR*, and he provides some biographical information about Gershgorin. Gershgorin lived and worked in Leningrad; he died at age 32.

The book is affectionately dedicated to Olga Taussky-Todd and John Todd, who were instrumental in drawing attention to the Circle Theorem and setting the record straight on the issue of irreducibility. Although this a serious mathematics treatise, I have the sense that it is also a labour of love. It is destined to become the standard reference on Gershgorin-type regions of inclusion for the eigenvalues of matrices.

Simplifying the World Graphically

Dr. Vida Dujmović has sought a mathematical compromise with Nature: if the whole answer is too much, at least give us part of it. Her insights could have applications from engineering to genetics, and have earned her a 2005 NSERC Doctoral Prize – one of Canada's premier graduate student awards. Dr. Dujmović's attention is focused on graph theory, and in particular the problem of representing graphs visually in ways that are easy to read or make.

"When a graph drawing is to be displayed on a page or a computer screen, or is to be used for integrated circuit design, it is important to keep the area of the drawing small to avoid wasting space. And more often than not, the idea of a nice graph drawing, regardless of its purpose, coincides with having no, or very few, edge crossings," says Dr. Dujmović, who's presently an NSERC Postdoctoral Fellow at Carleton University in Ottawa.

However many graph problems – dubbed "intractable problems" – are just too difficult to solve computationally without having a computer whirring away for days or months. Rather than trying to crack this whole nut, Dr. Dujmović and her doctoral supervisor Dr. Sue Whitesides, developed efficient algorithms, or computational commands, that solve these problems by seeking the best possible answer when the ideal is not achievable. Called fixed parameter tractable algorithms, they are able to rapidly solve otherwise intractable graph problems by setting a fixed parameter, such as no more than 100 edge crossings, as a constant. Given a graph input, the algorithm automatically generates a two-dimensional drawing with a small number of edge crossings.

This doctoral research also turned new ground in the realm of 3-D graphs. Here, like organizing clothes in a stuffed suitcase, the challenge is to pack the graph into as small a volume as possible. Dr. Dujmović discovered types of graphs for which "crossing-free" 3-D drawings with a small volume always exist.

(From a press release by NSERC Canada)

BRIEF BOOK REVIEWS

Peter Fillmore, Dalhousie University, Halifax, NS

Mathematical Physics in Mathematics and Physics: Quantum and Operator Algebraic Aspects

edited by Roberto Longo
Fields Institute Communications 30
AMS 2001 xxii + 451 pages.

This volume contains the proceedings of the conference of the same name held in Siena in June of 2000, dedicated to Sergio Doplicher and John Roberts on the occasion of their sixtieth birthdays. The 29 papers describe recent work in various fields of mathematical physics, primarily concerning quantum physics and operator algebras. Congratulatory letters from Alain Connes, Daniel Kastler and Rudolph Haag are included; as this suggests the list of participants constitutes a virtual who's who of the field.

Nonoscillation and Oscillation: Theory for Functional Differential Equations

by Ravi P. Agarwal, Martin Bohner and Wan-Tong Li
Pure and Applied Mathematics 267
Marcel Dekker 2004 vii + 376 pages.

This monograph investigates oscillatory and nonoscillatory properties of differential equations, with or without delays. Much of it is based on recent work of the authors. After laying the groundwork in Chapter 1, first order equations are considered in Chapters 2 and 3. Chapters 4 and 5 are devoted to the case of second order equations, and Chapter 6 to higher order equations. Chapter 7 looks at systems of two first order nonlinear equations, and the concluding Chapter 8 gives some first results on oscillation on "time scales"– subsets of the real numbers, introduced to unify the continuous and discrete cases. The authors state that the book "can be used as a textbook at the graduate level", but no exercises are provided. There is a bibliography of 302 items and the book will be useful as a reference for physical science disciplines.

On the Tangent Space to the Space of Algebraic Cycles on a Smooth Algebraic Variety

by Mark Green and Phillip Griffiths
Annals of Mathematics Studies 157
Princeton 2005 vi + 200 pages

From the publisher: In recent years, considerable progress has been made in studying algebraic cycles using infinitesimal methods. These methods have usually been applied to Hodge-theoretic constructions such as the cycle class and the Abel-Jacobi map. Substantial advances have also occurred in the infinitesimal theory for subvarieties of a given smooth variety, centered around the normal bundle and the obstructions coming from the normal bundle's first cohomology group. Here, Mark Green and Phillip Griffiths set forth the initial stages of an infinitesimal theory for algebraic cycles.

[They] aim in part to understand the geometric basis and the limitations of Spencer Bloch's beautiful formula for the tangent space to Chow groups.

Luck, Logic and White Lies: The Mathematics of Games

by Jörg Bewersdorff
A.K.Peters 2005 xvii + 486 pages

This is a new edition and translation into English of the German original published in 2001. The preface contains a brief discussion of the role of uncertainty in games, which leads to a division of games into three main types: games of chance, in which chance is more influential than decisions of the players; games whose uncertainty rests on the large number of possible moves, called combinatorial games; and strategic games, where uncertainty arises primarily from the fact that not all players have the same information about the current state of the game. Some games fall clearly into one of these categories (roulette, chess, rock-paper-scissors), but most combine features of two or all three. The book is divided into three parts, according to these game types, and each part into some 15 chapters, each devoted to a single problem, usually a game. The chapters are each introduced by an interesting question, for example: "It is hardly to be expected that in 37 spins of the roulette wheel, all 37 numbers will appear exactly once. How many different numbers will appear on average?" Among the games discussed, in addition to those already mentioned, are dice, lotteries, poker, backgammon, Risk, Monopoly, snakes and ladders, blackjack, chess, nim, go, and baccarat.

The aim is to introduce the mathematics that will allow analysis of the problem or game. This is done in gentle stages, from chapter to chapter, so as to reach as broad an audience as possible. The opening chapters introduce the basic concepts of elementary probability, building from there to random variables, Markov chains and some statistics by the end of Part I. In Parts II and III we find discussions of strategy, the minimax theorem, algorithms, the halting problem, Gödel's Incompleteness Theorem, complexity theory, and linear optimization. Anyone who likes games and has a taste for analytical thinking will enjoy this book, and for those who wish to go deeper there are plenty of suggestions for further reading.

by Ed Barbeau
University of Toronto

In January, the Mathematics Education Forum at the Fields Institute in Toronto heard about some developments in mathematical education research in Ontario, and the presenters were invited to submit to the *Notes* an account of their work. Two did so. The first article is by Ann Kajander, who is at the Faculty of Education of Lakehead University and has examined the competencies and values of cadet teachers. The second is from Patricia Byers, who is a faculty member at the Barrie Campus of Georgian College in Ontario. She interviewed two teachers, one at the secondary and the other at the tertiary level, to get an understanding of what they might expect of students graduating under the new Ontario curriculum. At the time of the study, no such students were actually in college, so she had to rely on the past experience of the teachers, the secondary teacher having taught courses recently in the curriculum. This curriculum gives heed to social-constructivist theory, which holds that student learning is fostered through social interactions with peers, mentors, teachers and role models. Students build knowlege through a series of well-designed learning activities intention of synthesizing what is learned for further applications and creation of new knowledge.

The Mathematical Knowledge And Values Of Preservice Elementary Teachers And The Connection To Mathematics Education Reform

Introduction. Mathematics reform in the classroom requires greater mathematical knowledge on the part of the teacher than ever before. Nowhere is the challenge greater than in the elementary classroom where teachers have to teach many different subjects. Since the new elementary curriculum was introduced in Ontario in 1997, teacher candidates entering faculties of education this year still had not experienced this new curriculum as students. Yet the demands on teachers for understanding the mathematics content of the new curriculum are significant. Mathematics reform requires that students have the opportunity to do open-ended problem solving and discuss and share their solutions. Errors may show a starting point or incomplete (but not completely incorrect) student thinking, and so should not simply be marked wrong. Reform-style learning requires deeper mathematical understanding of the teacher than ever before.
It is well documented that preservice teachers' knowledge of mathematics is generally poor (Ma, 1999; Ball, 1990; Raymond, 1997; Ambrose, 2004). Yet taking a larger number of undergraduate courses in mathematics has not been shown to help teachers develop the kind of understandings they need (Hill and Ball, 2004; Foss, 2000; Fennema and Franke, 1992). Whether such courses are procedural or conceptual in nature may be more important that the number taken (Hill and Ball, 2004).

The relationship of procedural knowledge and conceptual knowledge is important in studying knowledge of mathematics for teaching (Hill and Ball, 2004; Rittle-Johnson and Kroedinger, 2002; Hiebert, 1999; Lloyd, 1998). Procedural knowledge may be thought of as a sequence of actions while conceptual knowledge is rich in relationships (Hiebert, 1992, p. 78), for example, the relationship between appropriate physical materials and written symbols. A mathematical idea is understood thoroughly if it is linked to existing networks with stronger or more numerous connections (*ibid*, p. 67). In summary, procedural knowledge has been described as referring to computational skills, while conceptual knowledge refers to the underlying mathematical structure (Eisenhart *et al*, p. 9). While both types of mathematical knowing (and the connections between them) are clearly important, many teachers with a traditional background have likely had more experience in procedural methods which are not connected to conceptual understanding.

Teacher beliefs and relationship to practice. One's conceptualization of the nature of mathematics as well as mathematical knowledge relates to beliefs about teaching (Thompson, 1992). Beliefs and values also play a role in teachers' learning and knowing of mathematics (Ambrose, 2004; Stipel *et al*, 2001; Foss, 2000). Influencing teachers' beliefs may be essential to changing teachers' practice (Stipek *et al*, 2001), particularly beliefs about mathematics itself (Raymond, 1997). This is particularly important in light of recent research, which shows that teachers' self-reported beliefs may relate to student achievement (Ross, McDougall, Hogaboam-Grey and LeSage, 2003).

"Math Reform". What kinds of conceptions of mathematics are assumed by the term "Math Reform"? Does it imply valuing and knowing about *both* connected ideas as well as procedures? Or the conceptions used mainly to facilitate procedural learning? Alternatively, are the conceptions themselves what mathematics is all about? Differing interpretations about what is important have led to controversy, and in the extreme, have given rise to recent arguments often referred to as the "math wars". Thus before an agreement can be reached about how mathematics should be *taught*, and what knowledge is thus needed on the part of the teachers to teach effectively, it is necessary also to agree on what mathematical understanding in fact *means*.

Developing and measuring procedural and conceptual knowledge. The lack of measures of teachers' content knowledge may be a difficulty in determining what features of professional development contribute to teacher learning (Hill and Ball, 2004, p. 330).
A particular problem in helping preservice teachers deepen their conceptual understanding is that learners who possess well-practised rules for manipulating symbols are reluctant to connect the rules with other representations that might give them meaning (Hiebert, 1992, p. 78). Such students may initially resist learning conceptually.

The Study. My study examined preservice teachers' initial beliefs about the nature of mathematics itself and what is important to these teachers in mathematical learning. As well, incoming mathematical knowledge of preservice teachers was examined, with a view to studying their procedural and conceptual understanding. Four factors were defined. *Procedural knowledge* was defined as the use of methods which generate correct answers. *Conceptual knowledge* was measured by looking at the connections made to other appropriate mathematical ideas, such as to a suitable diagram with explanation, which shows why a solution method is reasonable or makes sense mathematically. *Procedural values* were defined as beliefs about the importance of knowing and teaching procedural knowledge, and *conceptual values* were beliefs about the importance of knowing and teaching conceptual knowledge.

An initial survey was conducted with 145 preservice junior intermediate teachers in a B.Ed. program. It was administered before or after the third class and will be repeated at the end of the course for changes. Its format was based on a previous study of mathematics students (Lovric and Kajander, *in press*), except that conceptual understanding was examined more deeply. That is to say, for each mathematical question, students were asked to provide as much explanation as possible about the method they were using, as well as a diagram, model or example that clarified the meaning of the questions and explained the method used in their response.

The mean scores from the first survey provided some expected results and some surprises. Procedural knowledge on the questions asked yielded an average score of 5.9 out of a possible 10; however, revising a flaw on the survey (which treated a question of a more conceptual kind as procedural) would likely have made this score one to two points higher. The questions included items on subtracting integers, multiplying a whole number by a single digit, and dividing two fractions. However, the conceptual knowledge component yielded a much lower mean score of 1.1 out of 10, with many students scoring 0. Keeping in mind that these people will be introducing children to mathematical ideas and helping them think about misconceptions in their work, we see what an important area for improvement this represents for these teachers.

The initial values placed on mathematical understanding by these preservice teachers was quite high; procedural values scored 6.3 on average and conceptual values 7.3. A number of students wrote in their initial feedback on the questionnaire that their conceptual valuing in mathematics was highly influenced by the first two or three weeks of the course in which learning through problem-solving was discussed and experienced; had they taken the survey on the first day, the score would have been much lower.

Implications. Preservice programs that are short on time need to focus on areas where teachers are weakest. The current study provides evidence that a great weakness for preservice teachers is in conceptual understanding. The timing of the survey may indicate that beliefs about conceptual learning may have improved during the first few weeks of the course, but the resiliency of these beliefs is unclear.

Preliminary evidence (*e.g.*, subsequent test results showing a mean of 80% on items similar to the conceptual items on the survey) indicate that teachers can make substantial improvements in conceptual understanding if the learning is focussed on such needs.

Of greatest importance to mathematics faculty charged with the responsibility of teaching mathematics courses to preservice teachers before they enter their B.Ed. program, is the implication that these preservice teachers need a great deal of support to develop conceptual understanding of such elementary concepts as operations, and number systems including whole numbers, fractions, integers and decimals. Such learning might be enhanced by work with manipulatives and other hands-on materials to help construct meaning. Asking such teachers to take a less specialized (and more abstract) introductory mathematic course to support their mathematical knowleedge is likely not the answer.

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Ann Kajander, Lakehead University

A Comparison of Secondary Students' Mathematics Skills

The study was conducted in the Fall of 2002, the second year of Ontario's revised secondary curriculum implementation. At this time, no students under the new curriculum had graduated from high school. So, the study did not directly evaluate the students' performance in mathematics upon exiting high school. Rather, it sought to capture the perspectives of two teachers on likely student success. The first was a grade 12 teacher, who had taught and was still teaching in the revised curriculum. With students graduating and entering college studies within the year, the study also attempted to capture the perspective of a college teacher, predicated on his understanding of the revised secondary curriculum and his knowledge of the mathematical demands of a college program. With this focus, the study attempted to anwer the following questions:

- Which mathematics skills do secondary school and college teachers identify that students entering college need to be successful in college programs, and how will each set of skills compare?
- How do these identified skills compare with those established by curriculum standards founded on social constructivism?

To connect what is taught to students with what they learn, that qualitative research provided the most effective method of extracting the teachers' perceptions on this issue. A quantitative approach using a *checklist* of mathematical skills predetermined by the research would present one dimension. It was not deemed to be an effective way to unveil and analyze these issues. In the words of Hargreaves and Evans (1997), "Surveys give no voice to ordinary teachers".

Interviews, conducted separately with the teachers, were semi-structured and open-ended. They allowed each teacher to express himself completely. From the transcripts of the interviews, common themes were identified from the frequency of the comments. The data underwent three processes of analysis which initially presented three major themes: Mathematics Competencies of Secondary School Graduates, The Role of the Revised Secondary School Mathematics Curriculum and Aids and Obstacles to Achieving Mastery in Secondary School Mathematics. A fourth category emerged, Teachers' Experiences and Concerns, representing the need for each teacher to have his "voice" heard and his comments validated through his experience and knowledge.

1. In general, the two teachers welcomed and believed in mathematics curriculum reform. The curriculum provides a rich learning environment employing real life applications and utilizes technology. There was lack of consensus as to whether an exit test should be implemented to ensure that the criteria are met. On the other hand, money could be better spent on other classroom initiatives supporting the curriculum model. Two additional concerns were the fact that the curriculum is too in-depth and moves too quickly to help the students achieve mastery. The spiralling once found in the previous curriculum is lacking but still required to support learning for the applied stream student.
2. Both teachers agreed that many secondary graduates exhibited weak algebra and basic mathematics skills, a reliance on calculators for basic calculations, the inability to analyze calculator output and estimate answers, and the inability to integrate the basics into complex ideas. Additional ancillary skills are not being supported by the revised curriculum. This is consistent with the work of Savicki (2004), who found that metacognitive skills, such as taking risks, doing homework, being self-directed, tenacity and possessing strong study skills are lacking in graduating students.

2.1. The teachers cited other obstacles to achieving mastery in seconday mathematics. There is generally no academic counselling for applied stream students and their parents. Bridging courses allowing students to move freely between the academic and applied streams have not been put into place. Finally, no technical mathematics courses are being taught. As a result, colleges are admitting students who lack the preparedness for mathematically demanding programs.

3. While the teachers identified similar mathematical skills required, these did not necessarily reflect the skills endorsed by the revised curriculum. The research supports the learning of problem-solving skills in mathematics, the application of technology to support investigations grounded in real-world applications, effective communication of mathematical thinking to enhance student understanding and an increased responsibility and willingness to learn mathematics. However, these skills were not identified by either teacher. Further study is needed to reveal the nature of these omissions and an exploration into others that may be more subtle.
4. While this study did not set out to describe the voice of the two teachers with respect to the implementation of the new curriculum, this element emerged repeatedly from the analysis of the data. Both respondents tried hard to establish their credibility. Each has concerns about the students' algebraic skills and their own powerlessness over the situation. While both are able to articulate their concern and identify possible solutions, neither is in a position to rectify the situation.
5. Yet, each teacher is a key component in the microcosm of educational change that is currently taking place. Fullan (2003) identifies five action/mind sets to be implemented in the change process: a strong sense of moral purpose, an understanding of the dynamics of change, great emotional intelligence as relationships are built, a commitment to new knowledge and a capacity to create coherence. In each mind set, each teacher exhibited leadership in the process of change currently occurring in Ontario schools. For Fullan, this reflects the complex environment for change. While the government may set the wheels of change in motion at the macro level (influenced by societal and technological demands), it is the teacher at the micro level who is responsible for the success of the changes.
6. This study engenders a number of recommendations for the colleges to explore. Here are some ways to help:

6.1. The college curricula need to be examined in light of situated learning principles and social constructivist theory.

6.2. The skills level of incoming students should be assessed, and they should be taught accordingly to fill gaps in their knoweldge.

6.3. We should try to develop the ability of students to construct knowledge missed in previous learning.

6.4. Effective study skills in mathematics and heuristics as endorsed by Schönfeld need to be included in college curricula.

6.5. Communities of learning among college mathematics teachers to enhance student learning need to be organized to engage faculty in mathematics education dialogue as supported by Hargreaves (1997).

7. The implications for further study fall into five key areas of educational research.

7.1. The college students' perceptions of their mathematics learning as they make the transition from the social-constructivist model to a more traditional model is a critical area requiring examination.

7.2. While the elementary and secondary schools are experiencing educational change in the light of current pedagogical theory, college mathematics curricula too requires a similar scrutiny.

7.3. The life experience of mathematics teachers who examine their role in the change process of curriculum reform needs to be compared with the outcomes of this study.

7.4. The role of technology (specifically calculators) in the college classroom needs to be critically investigated.

7.5. Finally, research into constructing mathematical knowledge that should have been previously learned for the adult learner would support the pedagogy of college mathematics education.

This study provided a beginning framework for understanding teachers' perceptions of the mathematics skills they believe graduates will have and should have entering college programs. It emphasized the need for teacher involvement in the educational change process. It is the success of students in college programs that will subsequently determine the effectiveness of the revised mathematics curriculum.

Patricia Byers, Georgian College, Barrie, ON

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CALL FOR PROPOSALS - 2005 ENDOWMENT GRANTS COMPETITION

The Canadian Mathematical Society is pleased to announce the 2005 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 tends 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, 2005.

The Chair of the Endowment Grants Committee invites emails expressing interest in the grant as soon as possible

Dr. Karl Dilcher
Chair, Endowment Grants Committee
Canadian Mathematical Society
577 King Edward
Ottawa, ON K1N 6N5
chair-egc@cms.math.ca

CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE

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

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

Prix Coxeter-James Prize Lectureship — 2006

Le prix Coxeter-James rend hommage à l'apport exceptionnel à la recherche de jeunes mathématiciens. Il est possible de proposer la candidature d'une personne qui a obtenu son doctorat il y a au plus dix ans. Les propositions pourront être mises à jour et demeureront actives pendant un an, à moins que la mise en candidature originale ne corresponde à la dixième année d'obtention du doctorat. La personne choisie présentera sa conférence à la Réunion d'hiver. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles ainsi qu'un curriculum vitae récent, si disponible. Le récipiendaire doit être membre de la communauté mathématique canadienne.

The Coxeter-James Prize Lectureship recognizes young mathematicians who have made outstanding contributions to mathematical research. Nominations may be made up to ten years from the candidate's Ph.D. A nomination can be updated and will remain active for a second year unless the original nomination is made in the tenth year from the candidate's Ph.D. The selected candidate will deliver the prize lecture at the Winter Meeting. Nomination letters should include at least three names of suggested referees as well as a recent curriculum vitae, if available. The recipient shall be a member of the Canadian mathematical community.

Prix Jeffery-Williams Prize Lectureship — 2007

Le prix Jeffery-Williams rend hommage à l'apport exceptionnel à la recherche de mathématiciens d'expérience. Les propositions pourront être mises à jour et demeureront actives pendant trois ans. La conférence sera présentée à la Réunion d'été. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles ainsi qu'un curriculum vitae récent, si disponible. Le récipiendaire doit être membre de la communauté mathématique canadienne.

The Jeffery-Williams Prize Lectureship recognizes mathematicians who have made outstanding contributions to mathematical research. A nomination can be updated and will remain active for three years. The prize lecture will be delivered at the Summer Meeting. Nomination letters should include three names of suggested referees as well as a recent curriculum vitae, if available. The recipient shall be a member of the Canadian mathematical community.

Prix Krieger-Nelson Prize Lectureship — 2007

Le prix Krieger-Nelson rend hommage à l'apport exceptionnel à la recherche de mathématiciennes. Les propositions pourront être mises à jour et demeureront actives pendant deux ans. La conférence sera présentée à la Réunion d'été. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles ainsi qu'un curriculum vitae récent, si disponible. Le récipiendaire doit être membre de la communauté mathématique canadienne.

The Krieger-Nelson Prize Lectureship recognizes outstanding research by a female mathematician. A nomination can be updated and will remain active for two years. The prize lecture will be delivered at the Summer Meeting. Nomination letters should include three names of suggested referees as well as a recent currculum vitae, if available. The recipient shall be a member of the Canadian mathematical community.

La date limite pour les mises en candidature est le 30 juin 2005. Faire parvenir vos lettres à l'adresse suivante :
The deadline for nominations is June 30, 2005. Letters of nomination should be sent to the address below.

Dr. Finnur Lárusson, Chair/Président
CMS Research Committee / Comité de recherches de la SMC
Department of Mathematics
The University of Western Ontario
London, Ontario N6A 5B7 Canada

The 2005 Krieger-Nelson and Jeffery-Williams Prizes will be presented at the CMS Summer 2005 Meeting in Waterloo, Ontario, June 4 to 6.

Les prix Krieger-Nelson et Jeffery-Williams seront présentés à la Réunion d'été 2005 de la SMC à Waterloo (Ontario) du 4 au 6 juin.

CMS WINTER 2005 MEETING / RÉUNION D'HIVER 2005 de la SMC

December 10 - 12 décembre

Victoria Conference Centre, Victoria, BC

The Department of Mathematics and Statistics, University of Victoria, is happy to announce the provisional outline for the Canadian Mathematical Society Winter 2005 Meeting, to be held at the Victoria Conference Centre in Victoria, BC. Look for the First Announcement in the September 2005 issue of the CMS Notes and at www.cms.math.ca/Events/winter05/ for the latest updates.

Le département de mathématiques et statistiques de l'Université de Victoria est heureux d'annoncer les détails provisoires pour la Réunion d'hiver 2005 de la SMC, qui se tiendra au Victoria Conference Centre, C.-B. Veuillez consulter la première annonce officielle dans le numéro de septembre des Notes de la SMC ainsi que notre site web www.cms.math.ca/Reunions/hiver05/ pour les informations les plus à jour.

PLENARY LECTURERS / CONFÉRENCIERS PLENIERS

Robert Guralnick (USC)
Uffe Haagerup (South Denmark University)
Bryna Kra (Northwestern)
Andrew Majda (Courant Institute, NYU)
Oded Schram (Microsoft)

PRIZES / PRIX

Conférencier Coxeter-James Lecture:
Dr. Robert McCann (University of Toronto)

Prix de doctorat / Doctoral Prize Lecture:
Dr. Vasilisa Shramchenko (Concordia University)

Prix pour service méritoire de la SMC / CMS Distinguished Service Award: to be announced / à venir

Prix Adrien Pouliot Prize: to be announced / à venir

Prix G. de B. Robinson Award: to be announced / à venir

Meeting Director / Directeur de réunion
Ahmed R. Sourour

Local Arrangements / Logistique locale
David Leeming

SESSIONS

Applied Partial Differential Equations
Équations différentielles appliquées
Org: Anne Bourlioux (Montreal) Reinhard Illner, Boualem Khouider (Victoria)

Biological Models
Modèles en biologie
Org: Fred Brauer (UBC), Pauline van den Driessche (Victoria)

Combinatotics
Combinatoire
Org: Peter Dukes, Frank Ruskey (Victoria)

Discrete and Convex Geometry
Géométrie discrète et convexe
Org: Karoly Bezdek, Jozsef Solymosi (Calgary)

Ergodic Theory
Théorie ergodique
Org: Christopher Bose (Victoria), Andres del Junco (Toronto)

Graph Theory
Théorie des graphes
Org: Jing Huang (Victoria)

Matrix Analysis
Analyse matricielle
Org: Man-Duen Choi (Toronto), Douglas Farenick (Regina)

Operator Algebras
Algèbres d'opérateurs
Org: Marcelo Laca, John Phillips (Victoria)

Probability
Probabilité
Org: Martin Barlow, Edwin Perkins (UBC)

Theoretical Computer Science
Informatique théorique
Org: Gary Macgillivray, Venkatesh Srinivasan (Victoria)

Topology / Topologie
Org: Dale Rolfsen (UBC)

Variational Analysis and Optimization
Analyse variationnelle et optimisation
Org: Jane Ye (Victoria)

Contributed Papers
Communications libres
Org: C. Robert Miers (Victoria)

and **Frédéric Gourdeau** (Laval). The Forum will bring together mathematics educators and administrators from universities and schools across the country. The goal, of course, is to improve the teaching of mathematics in our schools. The overall theme of the 2005 Forum will be "Why Teach Mathematics?" The format of the forum will consist of plenary or key note sessions and working group sessions. Some of the discussion and working group themes that have been identified so far include: approaches to early numeracy and age-appropriate mathematics education; strategies for increasing the number of highly qualified students in mathematically intense programs in science and engineering; mathematics education for students at risk; effective approaches to the education of all mathematics educators; and mathematics education and the aboriginal community. It is the intent that groups working together in this forum will develop *projects*, *initiatives*, and *statements* that will outline ways in which Canadians may address these issues and concerns.

Moreover, many provincial associations of mathematics teachers wish to stay in contact and further develop the links created at the first Forum in 2003. The Advancement of Mathematics Committee has recommended that these Fora be held every three or four years.

Math in Moscow

The Mathematics in Moscow program, in collaboration with NSERC, offers three scholarships of $10,000 each to support three Canadian students registered in a mathematics or computer science program to attend a semester at the Independent Moscow University. There are two competitions per year.

ICM 2010

Last year, we approached the International Mathematical Union (IMU) and National Research Council (NRC) about a possible bid from Canada to host the International Congress of Mathematicians in Montreal in 2010 (ICM 2010). We reached a decision to make a bid, and have done so, with the help of the three research institutes and MITACS. the IMU should have reached a decision on the site of the ICM by the time you read this.

Coxeter Commemorative Events

The CMS is a partner in the Renaissance Banff Conference, July 31 – August 3, 2005. The Banff Renaissance Conference will be part of the International Bridges Conferences on Mathematical Connections in Art, Music and Science. The Conference is an initiative of Robert Moody and a collaborative effort by PIMS, the Banff Centre, the CMS and the Bridges Conferences. The last day of the event will be a Coxeter Day in commemoration of the life and mathematics-arts connections of Donald Coxeter. The proceedings will be published and distributed. You will find information on the Bridges Conference 2004 in Winfield (Kansas) and in general on the Bridges Conferences at: **www.sckans.edu/~bridges**. The link to the 2005 Conference is **http://www.pims.math.ca/RenaissanceBanff/**

A conference in the honour of Coxeter was held at the University of Toronto in May 2004, featuring more than 20 speakers and a public lecture. **Michele Emmer** (Rome), an expert on arts and mathematics, spoke on *The Visual Mind: Math, Art, Cinema* while **Doris Schattschneider** (Moravian College PA), an expert on unusual and surprising tilings, spoke on *Coxeter and the Artists: two-way inspiration.*

The **First Canada-France Meeting** took place in Toulouse, July 12-15, 2004. We plan to hold a second meeting here in Canada in 2008.

Financial difficulties of the CMS

In the fall of 2003, Christiane Rousseau, 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 and a position was declared redundant. 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 of our available resources, and a deficit is forecast for the current budget year. One of the consequences has been that the Executive took steps to solicit proposals from fund-raising firms 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.

Challenges

The CMS is facing many challenges for the next year: balancing the budget and generating new revenues so that we can maintain our activities, making sure that newly hired faculty join the CMS and become volunteers for our activities, increasing the visibility of mathematics everywhere in the country and working so that mathematics becomes more popular in our schools. I would ask each of you to consider doing some recruiting in your own institution: the Executive Office can help you by sending you a brochure on the benefits of membership: **mpdesk@cms.math.ca.**

Thanks

We are extremely grateful to all the volunteers who work throughout the country bringing success to our activities: scientific and local organizers of meetings, members of our committees, organizers of our educational activities, editors of our journals, contributors to our publications. Special thanks go to the members of the staff of the Executive Office: each new activity brings fresh work to the Office (for example, the 2003 Forum and the 2004 Canada-France Meeting in Toulouse). Moreover, due to the unforeseen absence of Monique Bouchard during the preparations for the 2003 Winter Meeting, the remaining staff had to take on additional demands. I also wish to thank the retiring members of our committees, of the Executive Committee and the Board of Directors. I owe a particular vote of thanks to Graham Wright and Christiane Rousseau who have been a tremendous help and whose support has been invaluable.

RAPPORT ANNUEL 2004 DU PRÉSIDENT

H.E.A. (Eddy) Campbell
Université Memorial de Terre-Neuve

2004, UNE ANNÉE SPECTACULAIRE POUR LES MATHÉMATIQUES AU CANADA

L'année 2004 a été une excellente année pour les mathématiques au Canada. Le Réseau de centres d'excellence en mathématiques des technologies de l'information et des systèmes complexes (MITACS) a vu son financement renouvelé pour sept ans. Le Réseau MITACS, qui a un mandat très large auprès de toute la communauté mathématique, est notre contact privilégié avec l'industrie et offre de nouvelles avenues aux chercheurs et aux étudiants diplômés. Ce renouvellement est d'une grande importance pour nous. Le profil mathématique du Canada a subi une profonde transformation au cours des dix dernières années. Nous avons désormais trois instituts de recherche de renommée mondiale : le Centre de recherches mathématiques (CRM) à Montréal; l'Institut Fields (FI) à Toronto et l'Institut du Pacifique pour les sciences mathématiques (PIMS) à Vancouver. Nous avons aussi la Station de recherche internationale de Banff (SRIB), qui reçoit aussi du financement des É.-U. et du Mexique, ainsi qu'un institut virtuel au sein de l'Association pour l'avancement de la recherche mathématique en Atlantique (AARMA). La création de cette infrastructure a rehaussé considérablement la qualité et l'influence des mathématiques canadiennes, ce qui s'est traduit pas un nouveau sentiment d'appartenance, un perspective élargie de nos chères disciplines et la création de nouveaux partenariats avec de nombreux homologues et instituts du pays et de l'étranger. La profession mathématique ne manque certes pas d'intérêt au Canada ces temps-ci!

Nos prix suscitent toujours autant de candidatures exceptionnelles. La qualité des candidats de toutes les régions du pays illustre la force réelle et croissante des mathématiques au Canada. Nous avons de nombreuses raisons de nous réjouir et d'être fiers. La SMC est un acteur important de la promotion et du développement des mathématiques au Canada. Nos activités habituelles évoluent toujours, comme vous le verrez dans le rapport de nos comités. Nos Réunions attirent de plus un grand nombre de participants et sont de plus en plus souvent tenus en partenariat avec d'autres associations sœurs. Nous avons en outre un programme de publications très chargé, des concours de mathématiques pour élèves du secondaire, des camps mathématiques (12 en 2004, dont au moins un par province), des services électroniques offerts à l'ensemble de la communauté et le concours de bourses du fonds de dotation.

Je produis souvent des rapports d'activités pour les *Notes*, mais je vous en livre tout de même un résumé.

Réunions

La Réunion d'été s'est tenue à l'Université Dalhousie et a été organisée 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 participants se sont inscrits à la Réunion, dont le programme comptait 14 symposiums.

La Réunion d'hiver s'est tenue à l'Université McGill, à Montréal. Ce fut une joie de retourner à Montréal, où s'est tenu le premier Congrès canadien de mathématiques, en 1945, les mathématiciens d'alors ayant souhaité que « la Société soit le déclencheur d'importants développements mathématiques au Canada ». Leur souhait a certainement été exaucé, comme en témoignent nos Réunions, véhicule privilégié des nombreuses réalisations du milieu mathématique.

Forum canadien sur l'enseignement des mathématiques

Le Forum canadien sur l'enseignement des mathématiques 2005 se tiendra à Toronto du 6 au 8 mai 2005. La coprésidence du forum 2005 est assurée par Florence Glanfield (Saskatchewan), Bradd Hart (McMaster) et Frédéric Gourdeau (Laval). Ce forum réunira des enseignants et des administrateurs d'universités et d'écoles de tout le pays, toujours dans l'optique d'améliorer l'enseignement des mathématiques dans nos écoles. Le forum 2005 se déroulera sous le thème « Pourquoi enseigner les mathématiques? » Il proposera des conférences pléniè res ou principales ainsi que des séances de travail en groupe. Quelques thèmes des discussions et groupes de travail sont déjà décidés : stratégies d'enseignement des notions de calcul à la petite enfance et enseignement des mathématiques adapté à l'âge des enfants; stratégies d'augmentation du nombre d'étudiants très forts en mathématiques dans les programmes de sciences et de génie à forte teneur mathématique; l'enseignement des mathématiques aux élèves à risque; méthodes efficaces d'enseignement aux futurs enseignants de mathématiques; l'enseignement des mathématiques aux autochtones. On s'attend à ce que les groupes de travail qui participeront au forum élaborent des projets, des programmes et des énoncés qui aideront le Canada à trouver des solutions à ces difficultés.

On constate de plus une volonté, chez les associations provinciales d'enseignants de mathématiques, d'entretenir et de renforcer les liens créés au Forum de 2003. Le Comité pour l'avancement des mathématiques a recommandé que ces forums se tiennent tous les trois ou quatre ans.

Math à Moscou

Le programme Math à Moscou, en collaboration avec le CRSNG, offre trois bourses d'une valeur de 10 000 $ chacune pour permettre à trois étudiants du Canada inscrits à un programme de mathématiques ou d'informatique de suivre un semestre d'études à l'Université indépendante de Moscou. Il y a deux concours par année.

CIM 2010

L'an dernier, nous avons communiqué avec l'Union mathématique internationale (UMI) et le Conseil national de recherches du Canada (CNRC) au sujet de la candidature possible du Canada comme hôte du Congrès international des mathématiciens à Montréal en 2010 (CIM 2010). Nous avons depuis soumis la candidature du Canada, avec l'aide de nos trois instituts de recherche et du Réseau MITACS. Au moment où vous lirez ces lignes, l'UMI devrait déjà avoir fait connaître sa décision quand à l'hôte du CIM 2010.

Activités en hommage à Donald Coxeter

La SMC est partenaire de la Banff Renaissance Conference qui se déroulera du 31 juillet au 3 août 2005, dans le cadre des International Bridges Conferences on Mathematical Connections in Art, Music and Science. La conférence de Banff est une initiative de Robert Moody et un effort concerté du PIMS, du Banff Centre, de la SMC et des Bridges Conferences. 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. Pour de plus amples renseignements sur les Bridges Conferences 2004 tenus à Winfield (Kansas) ou sur ces conférences en général, consultez le **www.sckans.edu/~bridges**. Le site des conférences de 2005 est logé au **www.pims.math.ca/ RenaissanceBanff/**

Un symposium en l'honneur de Donald Coxeter s'est tenu à l'Université de Toronto en mai 2004. Plus de 20 conférenciers étaient au programme, ainsi qu'une conférence populaire. **Michele Emmer** (Rome), spécialiste des arts et des mathématiques, a prononcé une conférence intitulée « The Visual Mind: Math, Art, Cinema », et **Doris Schattschneider** (Moravian College, PA), spécialiste des pavages inhabituels et surprenants, une conférence intitulée « Coxeter and the Artists: two-way inspiration ».

La **première réunion conjointe Canada-France** s'est tenue à Toulouse du 12 au 15 juillet 2004. On prévoit tenir la deuxième au Canada en 2008.

Difficultés financières de la SMC

À l'automne 2003, 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, et l'un des postes a été éliminé parce qu'il a été jugé redondant. Toutefois, ce groupe avait surtout pour mission de se pencher sur la situation financière de la Société. En effet, nos activités ne cessent de croître, et nous avons atteint la limite des ressources disponibles pour les financer. Nous prévoyons même un déficit pour l'exercice en cours. Par conséquent, le comité exécutif a commencé à solliciter les services de 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.

Enjeux

La SMC a de nombreux obstacles à surmonter au cours des prochaines années : équilibrer son budget et générer des revenus de manière à maintenir ses activités; faire en sorte que les jeunes professeurs embauchés dans les établissements du pays se joignent à la SMC et deviennent bénévoles pour nos activités; accroître la visibilité des mathématiques à la grandeur du Canada et augmenter la popularité des mathématiques dans nos écoles. J'aimerais demander à chacun d'entre vous de faire du recrutement actif dans votre établissement : demander notre dépliant sur les avantages de l'adhésion à la SMC en écrivant au bureau administratif à l'adresse suivante : **adhesions@smc.math.ca**.

Remerciements

Nous sommes extrêmement reconnaissants envers les bénévoles qui contribuent, d'un bout à l'autre du pays, au succès de nos activités : ceux et celles qui organisent le programme scientifique et la logistique des Réunions, qui siègent à un comité, qui organisent nos activités éducatives, qui assurent la rédaction de nos revues ou qui collaborent à nos publications. Je remercie tout particulièrement le personnel du bureau administratif, pour qui chaque nouvelle activité de la SMC amène un surcroît de travail (le FCEM 2003, le congrès Canada-France 2004 à Toulouse, etc.). En outre, en raison de l'absence imprévue de Monique Bouchard durant les préparatifs de la Réunion d'hiver 2003, le reste du personnel a dû prendre les bouchées doubles. Je tiens aussi à remercier les membres sortants de nos comités, du Comité exécutif et du Conseil d'administration. Je dois un merci tout particulier à Graham Wright et à Christiane Rousseau pour leur aide si précieuse et leur soutien inestimable.

CANADIAN PUTNAM STUDENTS PLACE WELL

Two Canadian teams ranked among the top ten in the 65th Putnam Competition written on December 4, 2004. Our congratulations go out to the **University of Waterloo**, whose team consisting of **Olena Bormashenko**, **Ralph Furmaniak** and **Michael A. Lipnowski**, ranked fourth among the 411 teams who competed. Olena Bormashenko ranked between 6th and 15th inclusive, while Ralph Furmaniak and Michael Lipnowski each received honourable mention (between 27th and 75th inclusive). **Xiannan Li** from the same university ranked between 16th and 26th inclusive, while **Cory Fletcher** received honourable mention.

The team from the **University of Toronto** consisting of **Robert Barrington Leigh**, **Roger Mong** and **Jacob Tsimerman** received honourable mention (ranking in the 6th to 10th position). Robert Barrington Leigh and Jacob Tsimerman both ranked individually between 6th and 15th inclusive. **Tianyi (David) Han** from this university received honourable mention.

There were students from two other universities who received honourable mention: **Daniel Brox** and **Wei-Lung D. Tseng** from the **University of British Columbia**, and **Alexander R. Fink** from the **University of Calgary**. In all, twenty-seven students from six Canadian universities (UBC, Calgary, McGill, Montreal, Toronto, Waterloo) ranked among the top 200. A total of 3733 students from 515 North American colleges and universities took part in the competition.

ADVANCEMENT OF MATHEMATICS COMMITTEE

H.E.A. Campbell, Memorial University

The Advancement of Mathematics Committee (AMC) was created in July 2001, and includes the Fundraising Committee as a sub-committee. 2004 was a very active year for this committee.

ICM 2010

As mentioned in the 2003 President's Report, the CMS had approached the International Mathematical Union (IMU) and the National Research Council (NRC) about a possible bid from Canada to host the International Congress of Mathematicians in Montreal in 2010 (ICM'2010). Canada has submitted a bid to host ICM'2010 and a decision is expected from the IMU in 2005.

Fund Raising Campaign

The Committee and Executive issued a Request for Proposals to several professional fundraising companies and four bids were received. The Executive Committee will be evaluating the bids in early 2005.

On behalf of the Society, based on our planning documents and after wide consultation with the community, we identified key priorities for the Society and focused on a number of projects with significant fund-raising potential. These projects will be further refined with our partner.

The Imperial Oil Foundation continues to be the Title Sponsor of the National and Regional Math Camps and Sun Life Financial also continues as the Major Sponsor for the Canadian Mathematical Olympiad. Approaches have been made to provincial ministries of education to support our wide array of education activities. The NSERC PromoScience grant has been renewed for 3 years in support of our Math Camps program and the CMS was invited to put another application in support of the Canadian Math Trail and the Mathematics Career Posters in September 2004. Unfortunately, the CMS did not receive support from NSERC PromoScience for these initiatives. Significant fundraising efforts were directed to the 2003 Forum which generated sufficient revenues and part of the surplus from the 2003 Forum will be used to support the 2005 Forum.

New Prize

With the aid of a generous donation from the Borwein family, the CMS created a new prize to honour mathematicians who have made exceptional, broad and continued contributions to Canadian mathematics. The prize is the David Borwein Distinguished Career Award. The recipients will be chosen by the AMC and it is anticipated that one or two prizes will be presented every even year at the Summer Meeting of the Society. The award will be a sculpture designed by the renowned Helaman Ferguson.

New positions

Jonathan Borwein was appointed Associate Publisher for Books and New Media.

Membership Drive

Letters, signed by Eddy Campbell and Christiane Rousseau, highlighting the advantages of being a CMS member were sent to all Board members. It was hoped that each director can convince three of their colleagues to become members. Another initiative being considered is to have each vice-president visit departments to promote the CMS. A source of potential new members is researchers in theoretical computer science as there colleagues have no "home" society in Canada. Plenary lectures and sessions with such a focus could be featured at our semi-annual meetings.

Forum 2005

The Forum will be held at the Fields Institute May 6-8 2005. Attendance is by invitation only. The Forum provides an occasion for various professional societies, provincial education associations and specialists in math education to exchange ideas and build collaborations with the intent of improving mathematics education in Canada.

http://www.cms.math.ca/Events/CMEF2005/

We are grateful for the support of the Fields Institute as well as the hard work of the co-chairs: Florence Glanfield (University of Saskatchewan), Bradd Hart (McMaster University) and Frédéric Gourdeau (Université Laval).

Many provincial associations of mathematics teachers wish to stay in closer contact and to further develop the links that have been established through these Fora. The Advancement of Mathematics Committee supports this initiative. To maintain the momentum, it is envisioned that similar Fora will take place every three or four years. The next forum will likely take place in the *West for 2008 or 2009 with PIMS* as the possible host. However, the impact upon the work-load of the Executive Office of on-going Fora needs to be considered.

Poster on Careers in Mathematics

Intensive work by Judith McDonald and Harley Weston resulted in the "Math @ Work" poster. It is a really impressive document, a must see, at **www.careers.math.ca**

Banff Renaissance Conference

The CMS is 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 conference will be a special "Coxeter Day" to commemorate the life and mathematics and arts connections of Donald Coxeter. The proceedings of the conference will be published.

www.pims.math.ca/RenaissanceBanff/

Toulouse 2004

Sponsored by the three Canadian research institutes (the CMS, the Statistical Society of Canada, and the Canadian Applied and Industrial Mathematics Society), the *Société Mathématique de France* (SMF), the *Société de Mathématiques Appliquées et Industrielles de France* (S.M.A.I.) and the *Société Française de Statistique* (S.F.d.S), this first meeting was a great success. It was held at Toulouse July 12-15, 2004. There was a program of students and postdoctoral fellow travel awards of $500 each . There were 17 symposia offered on a wide variety of topics with many speakers.

Math in Moscow

The joint NSERC-CMS Math in Moscow Scholarships Program was renewed for a third year. The Math in Moscow Program allows for three undergraduate or beginning graduate students at a Canadian University to spend a semester at the Moscow Independent University. Further details can be found at **www.cms.math.ca/bulletins/Moscow_web.html**

REPORT OF THE PUBLICATIONS COMMITTEE

Dana Schlomiuk, Université de Montréal

One of the tasks of the Publications Committee during 2004 was to consider new Editors-in-Chief for the CMB and the CMS Book Series and Associate Editors for these publications.

The mandates of the three Editors-in-Chief of the Canadian Mathematical Bulletin (CMB), James Lewis (Alberta), Arturo Pianzola (Alberta) and Noriko Yui (Queen's) will end their term in December 2005. The Editors-in-Chief informed the Publications Committee that they were willing to serve for another five years. The Publications Committee also received an application from Nantel Bergeron and Jianhong Wu (York). The Publications Committee felt that the work done by Lewis, Pianzola and Yui had been splendid and the CMB is getting a lot of very good and excellent papers from all over the world. As both applications were very strong with all five candidates having excellent curriculum vitaes, it was a hard decision. Finally the Committee voted in favor of recommending to the CMS Board Directors that Nantel Bergeron and Jiang Wu be appointed as Editors-in-Chief of the CMB for the period 2006-2010. The Committee felt that their expertise covered new areas (in particular applied mathematics) and that their respective fields were complimentary.

The mandates of three of the associate editors for the Journal and Bulletin - Martin Barlow (UBC), Peter Borwein (SFU) and Nicholas Pippenger (Princeton) ended in December 2004. The Publications Committee recommended and the Board of Directors appointed three new associate editors to replace them. The new associate editors are Luc Devroye (McGill) Thomas Ransford (Laval) and Ravi Vakil (Stanford) and their mandate is five years: January 1, 2005 to December 31, 2009.

The mandate of Jonathan Borwein (Dalhousie) and Peter Borwein (SFU) as Editors-in-Chief for the CMS Book Series ended on December 31, 2004. Peter Borwein wished to step down as an Editor-in-Chief but Jonathan Borwein was willing to continue. The Publications Committee recommended that Jonathan Borwein and Karl Dilcher (Dalhousie) be appointed as the Editors-in-Chief for a five-year period, January 1, 2005 to December 31, 2009. The Publications Committee also recommended the following be appointed as associate editors for the Book Series; Peter Borwein, for two years (January 1, 2005 to December 31, 2006), Samuel Shen (Alberta), for three years (January 1, 2005 to December 31, 2007) and Richard Kane (Western), for a period of four years (January 1, 2005 to December 31, 2008).

The mandate of Iliya Bluskov as a Problems Editor for Crux Mathematicorum with Mathematical Mayhem ended in December 2004 and, as he was willing to serve for another term, the Publications Committee approved extending his mandate for five years (January 2005 to December 2009).

The Publications Committee also agreed to extend the mandate of Bruce Gilligan as the Articles Editor for CRUX with MAYEM for three years (January 1, 2005 to December 31, 2007). The Publications Committee approved Robert Bilinsky (CEGEP) as the Skoliad Editor for CRUX with MAYHEM for a three-year term. An extension of the term of Edward Barbeau as Notes Education Editor for three years (January 1, 2005 to December 31, 2007) was also approved.

The Committee was delighted that Michael Doob (Manitoba) was willing to continue as Consultant to the Publishing Office and his mandate was renewed for a period of three years (January 1, 2005 to December 31, 2007). The mandate of Srinivasa Swaminathan (Dalhousie) as Assistant Technical Editor was also renewed for the same period.

For the 2004 G. de B. Robinson Prize, I acted as the Chair of the Jury. The G. de B. Robinson Prize for the best article which appeared in the CJM during the period 2002-2003 was awarded jointly to Viktor Havin (St. Petersburg) and Javad Mashreghi (Laval) for their joint papers regarded as one paper: "Admissible majorants for model subspaces of H^2, I : Slow winding of the generating inner function", Canad. J. Math. 55 (2003) no.6, 1231-1263, and "Admissible majorants for model subspaces of H^2, II: Fast winding of the generating inner function", Canad. J. Math. 55 (2003) no.6, 1264-1301. Javad Mashreghi received his prize certificate at the 2004 Winter Meeting in Montreal and Victor Havin's certificate has been sent to him.

At the 2004 summer and winter meetings, reports were presented by representatives from all publications boards and these reports reflected a sustained and healthy activity.

Finally, at the beginning of 2003, the Royal Society made a proposal to the CMS that the Mathematical Reports/ Comptes Rendus become a joint RS/CMS publication. As was reported last year, the Publications Committee was involved in the study of this proposal. A written response to this proposal was sent to the Royal Society in 2003 for consideration. At this time, it appears no decision has been reached regarding this joint initiative.

RESEARCH COMMITTEE

Ragnar-Olaf Buchweitz (Toronto), Chair

The 2004 Summer Meeting of the CMS was held jointly with the Canadian Applied and Industrial Mathematics Society (CAIMS), with the participation of the 16th Canadian Symposium on Fluid Dynamics (CSFD) and the Canadian Society for History and Philosophy of Mathematics (CSHPM), in Halifax (June 13-15).

The joint meeting welcomed the large number of 448 participants and was hosted by Dalhousie University with Richard Wood (Dalhousie - CMS) and Raymond Spiteri (Dalhousie - CAIMS) as Meeting Directors, and Peter Fillmore (Dalhousie) as Chair, Local Arrangements.

The Public Lecture, entitled "Getting at the Truth", was given by Edward Barbeau (University of Toronto).

The 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)
Mikhail Zaicev (Moscow State University)

The CMS Jeffery-Williams Lecture was delivered by Joel Feldman (UBC) and Leo Jonker (Queen's University) received the first CMS Excellence in Teaching Award.

CAIMS contributed the following Award Lectures:

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

There were 15 symposia as described below and a Contributed Paper Session organized by Richard Sutherland (Dalhousie University).

16th Canadian Symposium on Fluid Dynamics (Org: Richard Karsten, Acadia University and Serpil Kocabiyik, Memorial University)

Applications of Invariant Theory to Differential Geometry (Org: Robert Milson, Dalhousie University and Mark Fels, Utah State University)

Classical Analysis in honour of David Borwein's 80th Birthday (Org: Jonathan Borwein, Dalhousie University, and Mike Overton, New York University)

Dynamical Systems (Org: Michael A. Radin, Rochester Institute of Technology)

Financial Mathematics (Org: Joe Campolieti, David Vaughan, and Yongzeng Lai, Wilfrid Laurier University)

General Topology and Topological Algebra (Org: Ilijas Farah, York University and Vladimir Pestov, University of Ottawa)

Graphs, Games and the Web (Org: Anthony Bonato, Wilfrid Laurier University, Jeannette Janssen, Dalhousie University, and Richard Nowakowski, Dalhousie University)

History of Mathematics (Org: Thomas Archibald, Acadia University)

Hopf Algebras and Related Topics (Org: Yuri Bahturin, Memorial University, Margaret Beattie, Mount Allison University, Luzius Grunenfelder, Dalhousie University, Susan Montgomery, University of Southern California, and Earl Taft, Rutgers University)

Mathematical Education (Org: Richard Hoshino, Dalhousie University and John Grant McLoughlin, University of New Brunswick)

Nonlinear Dynamics in Biology and Medicine (Org: Shigui Ruan, Dalhousie University)

Numerical Algorithms for Differential Equations and Dynamical Systems (Org: Tony Humphries, McGill University)

Qualitative Behaviour and Controllability of Partial Differential Equations (Org: Holger Teismann, Acadia University)

Topology (Org: Keith Johnson, Dalhousie University and Renzo Piccinini, University of Milan)

Topos Theory (Org: Myles Tierney, Rutgers University and University of Quebec at Montreal)

Three related activities were organized separately from the meeting. The 2004 Project NExTMAC National Workshop on June 12, the 5th Annual MITACS Conference, June 10-12, and the 11th Canadian Undergraduate Mathematics Conference, June 16-20.

Moreover, NSERC staff and the Grant Selection Committee members organized an NSERC Workshop on "Tips to prepare your next Discovery Grant Application" (June 15), a very welcome initiative.

The 2004 Winter Meeting of the CMS was held in Montreal on December 11-13, 2004. The meeting was hosted by the Department of Mathematics and Statistics, McGill University, where also the first Canadian Mathematical Congress took place in 1945.

It welcomed more than 475 participants.

The Meeting Director was Olga Kharlampovich (McGill) and the Chair - Local Arrangements - was William G. Brown (McGill).

The Public Lecture on "Complexity of Computations and Cryptography" was delivered by Alexei G. Myasnikov (McGill).

The plenary speakers were:

Michael Bennett (British Columbia)
Persi Diaconis (Stanford)
Rostislav Grigorchuk (Texas A&M)
François Lalonde (Université de Montréal)
Rainer Steinwandt (Karlsruhe)

The CMS Coxeter-James Prize Lecture was presented by Izabella Łaba (UBC), and the CMS Doctoral Prize Lecture was given by Nicolaas Spronk (Waterloo).

Moreoever, Victor Havin (St. Petersburg) and Javad Mashreghi (Laval) received the CMS G. de B. Robinson Award, and the CMS Distinguished Service Award went to Edgar Goodaire (Memorial). Jean-Marie De Koninck (Laval), winner of the CMS Adrien Pouliot Prize, gave a very spirited presentation at the Participants' Luncheon.

There were 16 sessions as described below and a Contributed Paper Session, organized by the Chair, Local Arrangements.

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

Approximation Theory - Org: Richard Fournier and Paul Gauthier (Montreal)

Arithmetic Geometry - Org: Eyal Goren (McGill) and Adrian Iovita (Concordia)

Combinatorial and Geometric Group Theory - Org: Inna Bumagin (Carleton) and Dani Wise (McGill)

Commutative Algebra - Org: Sara Faridi (Ottawa), Sindi Sabourin (York), Will Traves (US Naval Academy) and Adam van Tuyl (Lakehead)

Discrete Geometry - Org: Karoly Bezdek (Calgary), Rob Calderbank (Princeton), Robert Connelly (Cornell) and Bob Erdahl (Queen's)

Dynamical Systems and Applications - Org: Michael A. Radin (RIT)

Groups, Equations, Non-commutative Algebraic Geometry Org: Olga Kharlampovich and Alexei G. Myasnikov (McGill)

Harmonic Analysis - Org: Galia Dafni (Concordia)

History of Mathematics - Org: Thomas Archibald (Acadia, Dibner Institute MA), Rich O'Lander (St. John's), Ron Sklar (St. John's) and Alexei Volkov (UQAM)

Interactions between Algebra and Computer Science Org: Olga Kharlampovich (McGill), Alexei G. Myasnikov (McGill) and Vladimir Shpilrain (CUNY)

Mathematical Methods in Statistics - Org: Russell Steele, Alain Vandal and David Wolfson (McGill)

Mathematics for Future Teachers - Org: Leo Jonker (Queen's)

Number Theory - Org: Chantal David (Concordia) and Andrew Granville (Montreal)

Special Structures in Differential Geometry - Org: Gordon Craig (Bishop's) and Spiro Karigiannis (McMaster)

Universal Algebra and Complexity - Org: Jennifer Hyndman (UNBC), Benoit Larose (Concordia) and Denis Therien (McGill)

The next four meetings of the CMS will be held in Waterloo (University of Waterloo, Summer 2005), Victoria (University of Victoria, Winter 2005), Calgary (University of Calgary, Summer 2006), and Toronto (University of Toronto, Winter 2006).

The Research Committee chose Robert McCann (University of Toronto) as the 2005 Coxeter-James Prize Lecturer for the CMS Winter 2005 Meeting, Andrew Granville (Université de Montréal) as the 2006 Jeffery-Williams Prize Lecturer, and Penny Haxell (University of Waterloo) as the 2006 Krieger-Nelson Prize Lecturer for the CMS Summer 2006 Meeting.

The pool of nominations for these prizes was again very wide and deep this year, testifying to the health and strength of mathematical research in Canada.

STUDENT COMMITTEE

Joy Abramson (Toronto) and Antoine Khalil (Concordia)

2004 was another productive and exciting year for the CMS Student Committee (often referred to as Studc). Along with a faculty supervisor, Studc is comprised of ten students, both undergraduate and graduate, whose mission is to foster the development of a vibrant and highly interactive community of Canadian post-secondary mathematics students that leads to the continued creation of important long-term bonds between individuals. More information on the goals of Studc and its membership can be found on the CMS web site: **www.cms.math.ca/Students.**

Change of Membership:

We thank all our past members, in particular Susan Cooper and Robert Juricevic, the terrific past co-chairs of Studc. Susan and Robert gave a great deal of time to Studc over a number of years, and we greatly appreciate all their hard work. In July 2005, we will have three vacancies, including our webmaster position.

Operations Manual for the Student Committee:

Duana Kipling and Susan Cooper have completed the first version of an operations manual for Studc, a projected initiated by Dan Piché. The operations manual describes the ongoing Studc activities. It is continually updated, and has been very helpful with easing the transition of membership.

Student Newsletter:

One way in which Studc promotes the interaction between Canadian post-secondary mathematics students is through our semiannual newsletter, "The Student Mathematical Communicator", which is distributed to all mathematics departments in Canada. The newsletter communicates information of interest to students about Studc and the CMS. Studc usually publishes and distributes two student newsletters a year, one in each of the fall and winter semesters. In 2004, one issue was distributed in print, and the second was made available online only. We plan to return to distributing two newsletters in 2005. Dan Pollock has just begun a two-year term as the newsletter editor, taking over from Antoine Khalil, who oversaw the previous four issues.

Graduate Student Events:

As in past years, Studc organized a social event for graduate students at each of the CMS meetings in 2004. The events are becoming more popular and are always greatly enjoyed by the students in attendance. Studc plans to continue organizing these events at which Studc and the CMS are promoted to students attending the meeting as well as to

local mathematics students. The next graduate student event will be held in Waterloo during the CMS 2005 Summer Meeting. The graduate student socials are organized by the Studc co-chairs, Joy Abramson and Antoine Khalil. We wish to thank the local organizers of the CMS meetings for their enthusiastic co-operation in planning these socials.

Regional Conferences:

Each year Studc has a goal of financially supporting four student activities, one in each of the four regions across Canada. In 2004 we supported two regional conferences: the Fourth Canadian Summer School in Quantum Information and the AARMS Summer School. An amount of $125 was given to each group. In exchange for the funding, Studc asks that its promotional poster (designed by Renato Dedic) be displayed at the activity funded so that Studc's support can be acknowledged, and that photos or descriptions of the activity be given to Studc to be put on the Studc web page. Adriana Dawes looked after this project in 2004. The Committee hopes to support four events in 2005, each in the amount of $125.

Maintaining a Student Web Site:

Boris Reitman is completing his term as our webmaster, having created the Studc website available at www.cms.math.ca/Students. During his term, Boris created a web design for Studc and also worked with CUMC organizers on the CUMC web pages. We are currently looking for a new webmaster for Studc. Nithum Thain is creating monthly problem sets to be posted to the webpage and hopes to implement an associated online discussion forum.

Canadian Undergraduate Mathematics Conference:

CUMC 2004, the 11th annual Canadian Undergraduate Mathematics Conference, was held at Dalhousie University from June 16 to June 20, just after the CMS Summer Meeting. The CUMC 2004 president, Gillman Payette, did a fantastic job, along with his committee! The conference was a huge success and very well attended. Studc, on behalf of the CMS, once again gave $1,000 towards the conference. A CUMC operations manual, originally developed by Dan Piché, Benoit Charbonneau, and the CUMC 2002 Committee, is currently being updated by Studc member Sandra Gregov. This manual has proved very helpful to aid in the continuity of the CUMC. We are now looking forward to CUMC 2005, which is being organized by Erica Blom and her team, and will be held July 13 to July 17 at Queen's University in Kingston. For more details, see **www.cumc.math.ca**.

Future Studc Projects:

Studc is embarking on some very exciting new projects. Some of these include setting up student email lists in order to communicate with students from across Canada, further exploring how to promote the CMS to Canadian students, an updated advertising poster, and exploring new ways to encourage students to join the CMS and attend CMS meetings. We look forward to reporting on these projects in 2005!

WOMEN IN MATHEMATICS COMMITTEE

Judith J. McDonald (Washington State)

The Committee on Women in Mathematics is charged with monitoring the status of women within the Canadian mathematical community, recommending and initiating actions that will help to ensure equitable treatment of women in this community, and with encouraging the participation of women in mathematics at all levels.

The Committee has put together a survey to be sent to mathematics departments in universities across Canada. The survey will be sent out to the chairs of mathematics departments early in 2005. The purpose of the survey will be to get a general picture of the demographic profile of mathematics departments in Canada.

The Committee continues to maintain the Directory of Canadian Women in the Mathematical Sciences: a collection of web pages of Canadian women who are actively involved in research or studies in mathematics, or any other aspects of the mathematical sciences. The Directory is a valuable source for information about Canadian women in mathematics.

In June of 2003, the CMS Committee on Women in Mathematics, together with PIMS, hosted the first "Connecting Women in Mathematics Across Canada" conference. We are planning a similar conference for the summer of 2005 at BIRS. This year the Committee worked on fund raising for graduate student travel, and on planning the event.

The CMS Women in Mathematics Committee meeting at the 2004 CMS Winter Meeting was held as an open luncheon (funded by Leah Edelstein-Keshet and the CMS Women in Mathematics Committee). Many issues regarding Women in Mathematics were discussed. This format has proven to be very useful for the Committee to get a barometer of the issues facing women in the academic community in Canada, and has been an opportunity for women within the community to speak out about issues they are facing.

The complete 2004 Annual Report to Members will be presented at the Summer 2005 Meeting and will be available on the Web site, after approval, at: **www.cms.math.ca/Reports/**

CALL FOR NOMINATIONS - NOMINATING COMMITTEE
APPEL DE MISES EN CANDIDATURE - COMITÉ DES MISES EN CANDIDATURE

The term of office of the Chair and one member of the Nominating Committee ends on December 31, 2005. The positions to be filled are as follows:

One vacancy: Chair
One vacancy: Representative for the Western region

The term of office of the Chair is two years plus an additional two years as a member of the committee for the appropriate region. The term for the other members is four years.

The deadline for submission of candidates is September 15, 2005. Names, together with the candidate's agreement to serve, should be sent to the address below.

Les mandats de la présidente et d'un membre du comité des mises en candidature prennent fin le 31 décembre 2005. Les postes à combler sont les suivants:

Un poste : Président
Un poste : Représentant pour la région de l'Ouest

Le mandat du président est de deux ans plus deux années supplémentaires comme membre du comité pour la région appropriée. Pour les autres membres le mandat est de quatre ans.

L'échéance pour porposer des candidats est le 15 septembre 2005. Les noms, avec le consentement du candidat, devraient être acheminés à l'addresse ci-dessous.

Dr. Graham Wright, Secretary / Secrétaire
Canadian Mathematical Society / Société mathématique du Canada
577 King Edward
Ottawa, Ontario K1N 6N5

The continuing members will be / Les membres qui continueront sont

Dr. H.E.A. (Eddy) Campbell (Memorial) Ex-officio (President) / d'office (Président)
Dr. Christiane Rousseau (Montréal) Ex-officio (Past-President) / d'office (Présidente-sortante) to/au 2005/06/30
Dr. Jacques Hurtubise (McGill)
Dr. Lisa Jeffrey (Toronto)
Dr. Keith Taylor (Dalhousie)

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

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

The Publications Committee of the CMS solicits nominations for an Editor-in-Chief for "A Taste of Mathematics" (ATOM). The appointment will be for five years beginning January 1, 2006.

The deadline for the submission of nominations is September 15, 2005. 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 candidature pour un poste de rédacteur-en-chef de "Aime-T-On les Mathématiques" (ATOM). Le mandat sera de cinq ans et débutera le 1er janvier 2006.

L'échéance pour proposer des candidat(e)s est le 15 septembre 2005. Les mises en candidature, accompagnées d'un curriculum vitae ainsi que du consentement du candidat(e), devraient être envoyées à l'adresse ci-dessous.

Dr. Juris Steprans, Chair / Président
CMS Publications Committee / Comité des publications de la SMC
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chair-pubc@cms.math.ca

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Victoria
British Columbia
Canada

Pacific Institute for the Mathematical Sciences

International Symposium on Analytic Function Theory, Fractional Calculus and Their Applications

in Honour of

Professor H. M. Srivastava

on his 65th Birth Anniversary

At the University of Victoria

Victoria, British Columbia, Canada

August 22 (Monday) to August 27 (Saturday), 2005

WEBSITE : http://www.pims.math.ca/science/2005/05hms

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

MAY 2005 MAI

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

11-14 MITACS 6th Annual Conference, Mathematics of Energy (University of Calgary, Calgary, AB) **www.mitacs.ca/AC2005/**

13-14 6th Mississippi State-UAB Conference on Differential Equations & Computational Simulations; Dedicated to Louis Nirenberg's 80th birthday and Klaus Schmitt's 65th birthday (Mississippi State University, Mississippi State, MS) **www.msstate.edu/dept/math/de2005/**

13-15 Frontiers in Applied and Computational Mathematics, All Areas of Applied Mathematics (New Jersey Institute of Technology, Newark, New Jersey, USA). **suttons@adm.njit.edu; www.math.njit.edu/Events/FACM05/**

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

15-21 43rd International Symposium on Functional Equations (Batz-sur-Mer, France) **Nicole.Belluot@ec-nantes.fr, romanger@us.edu.pl**

22-25 ICCS 2005: International Conference on Computational Science, Advancing Science through Computation (Atlanta, GA) **Iccs2005@mathcs.emory.edu**

27-31 Annual meeting of the Canadian Mathematics Education Study Group - Ottawa University / Rencontre annuelle du Groupe canadien d'études en didactique des mathématiques - Université d'Ottawa **www.gcedm.math.ca**

31-Jun 4 2nd Conference on Analysis and Probability on Fractals (Cornell University, Ithaca, N.Y.) **www.math.cornell.edu/Colloquia/fractals.html**

JUNE 2005 JUIN

1-5 Stochastic Modelling in Financial Mathematics (CRM, Montreal, Quebec) **crm@ere.umontreal.ca**

4-6 **CMS/CSHPM Summer 2005 Meeting / Réunion d'été 2005 de la SMC/SCHPM (University of Waterloo)** **www.cms.math.ca/Events**

7-17 Fields Institute Summer School on Operator Algebras (University of Ottawa, Ottawa, ON) **www.fields.utoronto.ca/programs/scientific/04-05/opalg_school/**

9-10 Southern Ontario Matrices and Statistics Days (University of Windsor, Windsor, Ontario) **seahmed@uwindsor.ca**

10-12 Groups, Rings and Algebras, a Conference in honour of Donald S. Passman (University of Wisconsin, Madison, WI) **http://condor.depaul.edu/~chin/dsp.htm**

19-July 8 Random Processes, random matrices and integrable systems (CRM short program) Centre de recherches mathematiques, Universite de Montreal, Montreal, Quebec) **crm@ere.umontreal.ca**

20-Jul 15 Clay Mathematics Institute Summer School: Ricci Flow, 3-Manifolds and Geometry (including Perelman's recent work) (MSRI, Berkeley, CA) **www.claymath.org/summerschoo**

JULY 2005 JUILLET

4-7 The 6th Iberoamerican Conference on Topology and its Applications, CITA 2005 (Puebla, Mexico) **http://docencia.izt.uam.mx/cita**

4-8 Eighth International Symposium on Generalized Convexity and Monotonicity (Insubria University, Varese, Italy) **www.eco.uninsubria.it/gcm8**

4-8 Conference on Universal Algebra and Lattice Theory (University of Szeged, Hungary) **www.math.u-szeged.hu/conf/algebra**

10-13 The 20th Summer Conference on Toplogy and its Applications (Denison University, Granville, OH) **sumtopo2005@denison.edu**

11-22 SMS 2005-NATO Advanced Summer Institute: Equidistribution in Number Theory **www.dms.umontreal.ca/sms/index.html; belanger@dms.umontreal.ca**

15-18 HPCS 2005: New HPC Culture in Canada, The 19th Annual Symposium on High Performance Computing Systems and Applications (University of Guelph, Guelph, ON) **www.scharcnet.ca/events/hpcs2005/**

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

18-22 VI Brazilian Workshop on Continuous Optimization (West Side Hotel Residence, Goiania, Brazil) **vibwco@mat.ufg.br**

25-30 International Conference on Difference Equations, Special Functions and Applications (Munich, Germany) **www-m6.ma.tum.de/~ruffing/Conference2005/**

31-Aug 5 **Bridges: Mathematica Connections in Art, Music and Science (The Banff Centre, Banff, AB)** **www.sckans.edu/~bridges/, rsaranghi@towson.edu**

AUGUST 2005 AOÛT

8-12 NSF-CBMS Regional Conference on Algebraic and Topological Combinatorics of Ordered Sets (San Francisco State University, San Francisco, CA) **http://math.sfsu.edu/gubeladze/cbms.html**

17-21 Third Pacific Rim Conference on Mathematics, All Areas of Mathematics (Fudan University, Shanghai, China). **clzhou@fudan.edu.cn www.prcm3.fudan.edu.cn/**

SEPTEMBER 2005 SEPTEMBRE

12-16 p-adic Representations (CRM, Montreal, Quebec) **http://www.crm.montral.ca/Number 2005/**

12-16 CASC' 2005 The 8th International Workshop on Computer Algebra in Scientific Computing (Kalamata, Greece) **http://www.cargo.wlu.ca/casc2005/**

26-30 49th Annual meeting of the Australian Mathematical Society (The University of Western Australia, Perth) **www.maths.uwa.edu.au/~austms05/**

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

OCTOBER	2005	OCTOBRE
17 - 21	Nonlinear parabolic Problems (Helsinki, Finland) www.math.helsinki.fi/research/FMSvisitor0506	
4-6	Geometric and Probabilistic Methods in Group Theory and Dynamical Systems (Texas A&M University, College Station, TX)| www.math.tamu.edu/~sunik/05tamu	

DECEMBER	2005	DÉCEMBRE
10-12	CMS Winter 2005 Meeting / Réunion d'hiver 2005 de la SMC (University of Victoria) www.cms.math.ca/Events	

APRIL	2006	AVRIL
6-12	Additive Combinatorics (CRM, Montreal, Quebec) http://www.crm.montral.ca/Number 2005/	

JUNE	2006	JUIN
3-5	CMS Summer 2006 Meeting - University of Calgary www.cms.math.ca/events	
27-Jul 3	International Commission on Mathematical Instruction: Challenging Mathematics in and beyond the Classroom (Trondheim, Norway) www.amt.canberra.edu/icmis16.html/, barbeau@math.utoronto.ca	

AUGUST	2006	AOÛT
2-6	Eighth IMS North American New Researchers Conference (Minneapolis,Minnesota) galin@stat.umn.edu	

DECEMBER	2006	DÉCEMBRE
	CMS Winter 2006 Meeting - University of Toronto www.cms.math.ca/events, meetings@cms.math.ca	

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