CMS *NOTES*
de la SMC

RAPPORT ANNUEL 2003 DE LA PRÉSIDENTE

Christiane Rousseau

2003, une année splendide pour les mathématiques au Canada

L'année 2003 a été une année stimulante sur la scène mathématique canadienne. En mars a eu lieu l'inauguration de la Station de recherche internationale de Banff (SRIB). La SRIB procure aux mathématiciens un outil exceptionnel qui les aidera à se concentrer sur la recherche et l'échange d'idées dans un milieu exceptionnel. En mai, c'est le Forum canadien sur l'enseignement des mathématiques qui s'est tenu à Montréal : il a soulevé l'enthousiasme des participants, et plusieurs activités qui en découlent se tiennent un peu partout au Canada. Nous avons reçu plus de mises en candidatures pour nos prix que par les années passées, notamment à notre nouveau Prix d'excellence en enseignement. La qualité exceptionnelle de ces candidatures témoigne de la qualité des mathématiques et de l'enseignement des

mathématiques qui se font au Canada. Nos activités courantes connaissent en outre un essor inégalé, comme l'illustrent les rapports de nos comités : participation élevée à nos réunions semestrielles; prix et bourses; programme de publication actif; concours de mathématiques de niveau secondaire; camps mathématiques (il y en a eu 13 en 2003, dont au moins un par province); services électroniques offerts à la communauté; bourses du fonds de dotation, etc. Je me permettrai également d'ajouter que pour la deuxième année consécutive, les problèmes de la revue *Crux Mathematicorum with Mathematical Mayhem* sont publiés dans les deux langues officielles.

Réunion d'été de la SMC (Université de l'Alberta)

La Réunion a présenté treize symposiums diversifiés, dont un symposium en éducation, des communications libres, cinq conférences principales, une conférence populaire et deux conférences de nos lauréats de prix. Ram Murty (Queen's) a prononcé la conférence Jeffery-Williams — lui qui avait remporté le prix Coxeter-James en 1988 — et Leah Keshet (UBC) a donné la conférence Krieger-Nelson. Nos cinq éminents conférenciers principaux étaient Ingrid Daubechies (Princeton), Roland Glowinski (Houston), Gerhard Huisken (Tuebingen/Institut Albert Einstein), James Lepowsky (Rutgers) et Dennis Shasha (Institut Courant). La conférence populaire, intitulée « An evening excursion to the zoo » mettait en vedette Robert Moody (Alberta). Pour la première fois, la Réunion d'été de la SMC a été précédée de l'atelier « Connecting women in Mathematics across Canada », destiné aux étudiantes des cycles supérieurs inscrites dans

EDITORIAL

S. Swaminathan

OOPS – I DID IT AGAIN!

It happens often that when we go to the library to check a reference in a journal our attention is drawn to some other interesting article. Thus it was that I came across the following anecdote in an old issue of the *Mathematical Gazette*, where the author, C. A. Stewart, describes an incident from the first World War of the last century, writing on 'The Lighter Side of Mathematics.'

'In the schools of instruction established for officers many classes were conducted by army sergeants. These instructors were efficient in many ways, but it would be an exaggeration to say that their knowledge was profound. One of them was explaining to his class how the angle of elevation was measured and in the course of his argument made the statement that the diameter of the circle went exactly three times into the circumference. One of his audience was dubious of this and asked him if that was quite accurate. "Was there not a little bit left over when the division was made?" This left the instructor shaky of his position and he said that he would get the sergeant-major to explain. This particular sergeant-major had the reputation of being omniscient; in any case, being a sergeant-major, was never at a loss for a reply. He came over to the class and said that he would explain how it was that the diameter went into the circumference exactly three times. Taking a penny from his pocket and holding it up, he said, "Look at the little circle formed by this penny. If you were to measure the diameter and then the circumference, you would find the one was three times the other." "But, of course," he added disdainfully, making a large sweeping movement with his hands, "If you had a big circle, anything might happen."'

A cosmologist might argue that the sergeant-major was correct about big circles, as we still don't know if the universe has positive or negative curvature. However, for small circles it has been known for quite some time that there is indeed "a little bit left over". That the value of π was taken to be 3 in the ancient Orient and in the Bible (1 Kings 7:23) is fairly well known. Also, it is a familiar story that there was an attempt to legislate a value for it in 1897 (although there is a bit more to the story than often thought: see David Singmaster's 1985 article "Legislating pi" in the *Mathematical Intelligencer*). But Archimedes, and many of his contemporaries in other lands, knew better.

To make mistakes while lecturing is a common occurrence – we all do it, though hopefully at a higher level than the sergeant-major did. Mistakes that are not due to ignorance arise directly from the way in which the mind handles information and are not, usually, a matter of individual stupidity or carelessness. Even the most intelligent and highly educated people can make mistakes inadvertently. Howard Eves (*Mathematical Circles Adieu*, # 97) relates a story about Lazarus Fuchs who had a long teaching career at the University of Berlin. It seems that he often lectured without adequate preparation, preferring to work out details at the blackboard. Thus he occasionally made errors or cornered himself. During one of his lectures, while trying to derive a certain relation, he filled the board with a long series of complicated equations obtained by a sequence of involved substitutions. Upon simplification it turned out that Fuchs suddenly arrived at the identity $0 = 0$. Puzzled and embarrassed, he muttered to himself that something must be wrong, but finally turned to the class and said, "But zero equals zero is a very beautiful result."

If an error is made on the blackboard it is normally easy to correct. When pointed out by a student it is best to acknowledge the mistake

and rectify it. It is only trying to cover up that causes embarrassment. Yet a good preparation does not guarantee that a lecture will be free of mistakes. Steven Krantz provides an interesting example in his book *Mathematical Apocrypha* (Reviewed in the *CMS NOTES*, November 2003). His friend Glenn Schober was once teaching a class to help train graduate students to teach. For the first day he carefully crafted a lecture on elementary mathematics in which he purposely made 25 cardinal teaching errors. He walked into the class that day and began by saying that he was going to give a sample lecture. He told them that he was going to commit a number of important teaching errors during the lecture. The task of the students is to see how many they can identify. At the end of the lecture the students had identified 32 errors!

At interdisciplinary conferences, you will sometimes hear a lecturer in the humanities literally "delivering a paper" on his or her research; the talk is written out word-for-word, with each sentence carefully crafted, and read verbatim. This is uncommon in mathematics, where lecturers are more likely to pride themselves on a spontaneous delivery with little reliance upon notes. The added liveliness, however, is often paid for with a higher proportion of errors.

Many lecturers can hold forth for half an hour or longer on very advanced subjects, using no notes or overhead slides, recreating complex proofs from memory. Others – maybe just as good mathematicians – prefer to have at least an outline of their talk within reach when presenting a new and unfamiliar subject. However, the familiar has its perils here too. It

is tempting to assume that one knows everything that there is to know about, (say) first-year calculus, and that too much time spent preparing a lecture is not only insulting one's own intelligence but cramping one's style. But this is dangerous. Not only does the totally extemporaneous (critics would say "unprepared") lecturer risk missing out a favorite story or example, but even first-year calculus sometimes bites back. The reader who doubts this is invited to find a pencil and integrate $\int \sqrt{4+x^2}\ dx$, imagining at his or her back a roomful of restive students with five minutes to go until the next class.

The best lectures are well prepared. But it's never a bad thing if all that the audience can see of the preparation is a lack of errors, a confident delivery, and a tempo that brings the lecture to a smooth close in time for a couple questions from the attentive audience.

Combien de fois êtes-vous allé vérifier une référence dans une revue à la bibliothèque pour vous laisser distraire par un autre article intéressant? C'est ce qui m'est (encore) arrivé l'autre jour. Dans un ancien numéro de *Mathematical Gazette*, je suis tombé sur une anecdote où C. A. Stewart raconte un incident survenu durant la Première Guerre mondiale, dans un article intitulé « The Lighter Side of Mathematics » :

« Dans les écoles pour officiers, un grand nombre de cours étaient donnés par des sergents. Bien qu'efficaces à de nombreux égards, ces instructeurs ne maîtrisaient pas leur sujet, loin de là. En expliquant à ses étudiants comment mesurer l'angle d'élévation, l'un de ces militaires a un jour affirmé que le diamètre du cercle correspondait exactement au tiers de sa circonférence. Doutant de cette affirmation, l'un des étudiants lui demande si c'est bien vrai : "N'en reste-t-il pas une petite portion quand on fait la division?" Ébranlé, l'instructeur va chercher le sergent-major pour expliquer le concept. Ce sergent-major avait la réputation d'avoir réponse à tout; de toute façon, en tant que sergent-major, il avait le don de toujours trouver une réponse. En arrivant dans la classe, il entreprend d'expliquer que la circonférence d'un cercle correspond à précisément trois fois son diamètre. Il sort un cent de sa poche, le montre au groupe et dit ceci : "Regardez le petit cercle que forme cette

pièce. Si vous en mesurez le diamètre et ensuite la circonférence, vous verrez que le premier correspond exactement au tiers de la seconde. " Évidemment ", ajoute-il d'un ton nonchalant en faisant de grands gestes circulaires, " si vous mesurez un grand cercle, je ne garantis rien." »

Un cosmologiste dirait que le sergent-major avait raison à propos des grands cercles, puisque nous ne savons toujours pas si l'univers a une courbure positive ou négative. On sait par contre que pour les petits cercles, il en reste effectivement « une petite portion ». Il est bien connu que dans l'Orient ancien et dans la Bible (Premier livre des rois, 7:23), on avait établi à trois la valeur de π. Il est aussi bien connu que certains ont tenté de faire passer une loi sur la valeur de π en 1897 (l'histoire est toutefois un peu plus complexe qu'on le croit a priori; voir à ce sujet l'article « Legislating pi » publié en 1985 par David Singmaster dans *Mathematical Intelligencer*). Mais Archimède, comme bon nombre de ses contemporains d'autres pays, savait que ce n'était pas exact.

Il n'est pas rare de commettre des erreurs dans un cours. Nous le faisons tous, mais à un niveau qui, je l'espère, dépasse celui du sergent-major de l'histoire. Les erreurs qui ne sont pas attribuables à l'ignorance découlent directement de la façon dont notre cerveau

traite l'information; elles ne résultent généralement pas de la stupidité ni de l'inattention d'un individu. Même les plus intelligents et les plus éduqués commettent des erreurs par mégarde. Howard Eves (*Mathematical Circles Adieu*, # 97) raconte l'histoire de Lazarus Fuchs, qui a enseigné pendant des années à l'Université de Berlin. On dit qu'il a souvent donné des cours sans se préparer suffisamment, préférant régler les détails au tableau. Ainsi, il lui arrivait à l'occasion de faire des erreurs et de se coincer lui-même. Durant un de ses cours, alors qu'il tentait de dériver une relation, il a rempli le tableau d'un longue série d'équations complexes obtenues par une suite de substitutions compliquées. Après simplification, M. Fuchs est soudainement arrivé à 0 = 0. Médusé et gêné, il a murmuré qu'il devait y avoir un problème quelque part, puis s'est finalement tourné vers la classe en clamant : « Mais zéro égale zéro est un splendide résultat! »

Une erreur au tableau est habituellement facile à corriger. Si un étudiant vous en fait la remarque, vous faites mieux de la reconnaître et de la corriger. Il est beaucoup plus embarrassant d'essayer de la cacher…

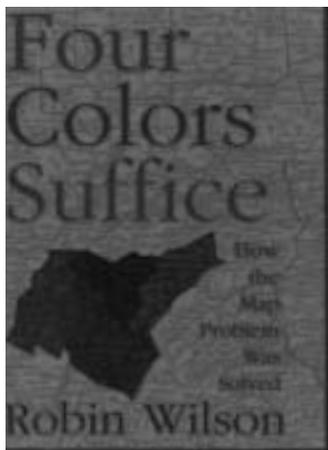# SUCCUMBING TO THE SPELL OF A MATHEMATICAL PROBLEM
Book review by J.W.Moon, University of Alberta

**FOUR COLORS SUFFICE: HOW THE MAP
PROBLEM WAS SOLVED**
by Robin Wilson
Princeton University Press, Princeton and Oxford, 2002
xii + 262 pages

This book contains an account of the history of the Four Colour Problem and its solution. Suppose one wants to assign colours to the countries on a map in such a way that no two neighbouring countries — with a common boundary consisting of more than just isolated points —receive the same colour. (We assume the map is drawn on a plane or a sphere, that each country is in one piece, and that the countries on either side of any boundary line are distinct.) It is easy to construct a examples that requires four colours for such a colouring; the problem is either to show that four colours are always sufficient or to show that there exists some map that requires at least five colours.

The first recorded reference to the problem is in a letter from Augustus De Morgan to Sir William Rowan Hamilton written in 1852. De Morgan had learned of the problem from one of his students, Frederick Guthrie, who had learned of the problem from his brother, Francis Guthrie.

In 1879 Kempe attempted to show that four colours were always sufficient by an inductive argument that started with Euler's polyhedral formula. Consider a non-trivial (connected) planar map with E boundary lines or edges, V vertices, or points where three or more boundary lines meet, and F countries or faces — including one infinite face. Then $V - E + F = 2$, by Euler's formula. We may assume the map is cubic, i.e., that every vertex is incident with exactly three boundary lines. (For, if not, we could replace each exceptional vertex v by a tiny circular country so that the resulting map would be a cubic map; after colouring the enlarged map, we could obtain a colouring of the original map by shrinking the new countries to the original vertex points.) And we may

further suppose every boundary line joins two distinct vertices, so $3V = 2E$. If every country has at least six neighbours, then $6F \leq 2E$, since every boundary line separates two distinct countries; but then $V - E + F \leq \frac{2}{3}E - E + \frac{1}{3}E = 0$, a contradiction. So every such planar map must contain a country with at most five neighbours.

Now consider any such planar map M and let C be a country with m neighbours, where $2 \leq m \leq 5$. We may suppose, as our induction hypothesis, that the map M' obtained from M by removing one boundary line of C can be 4-coloured. If $m \leq 3$, then there is certainly a colour available to assign to C when we restore the missing edge. If $m = 4$, then we may suppose the four neighbours of C in the restored map are assigned colours 1, 2, 3, and 4, in that order. Now consider the sub-map S determined by the countries of M that have been assigned colours 1 and 3. The neighbours of C with colours 1 and 3 may or may not belong to the same component of S. If they do not, then we can interchange colours 1 and 3 in the component that contains the neighbour of C originally assigned colour 1. The neighbour of C that originally had colour 1 now has colour 3 and the neighbour that originally had colour 3 still has colour 3; so colour 1 is now available for C. If the neighbours of C with colours 1 and 3 do belong to the same component of S — in which case we say there is a Kempe-chain joining these neighbours — then we consider the sub-map S' determined by the countries of M that have been assigned colours 2 and 4. In this case, there cannot be a Kempe-chain joining the neighbours of C of colours 2 and 4; so we can interchange colours 2 and 4 in the component of S' containing the neighbour of C of colour 2, say, and this will leave colour 2 available for C in the original map M.

When C has 5 neighbours assigned 4 different colours Kempe employed an extension of the foregoing argument that involved two simultaneous interchanges of colours. His argument was accepted for eleven years. But in 1890 Heawood pointed out a flaw in this case and gave an example in which the double-interchange procedure assigned the same colour to two neighbouring countries. Even though Kempe's proof was incorrect, his introduction of Kempe-chains was an important contribution and, as Heawood noted, Kempe's approach could be used to show that any planar map can be 5-coloured. (Heawood also considered the problem of colouring maps on other surfaces and showed that if h is any positive integer, then $\frac{1}{2}(7 + \sqrt{1 + 48h})$ colours suffice to colour any map on an h-holed torus. He asserted that there were maps that required this many colours for any $h \geq 1$. The proof that this is in fact true was not completed until 1968 with the bulk of the work being done by Ringel and Youngs. But that is another story.)

A collection of connected maps, or configurations, is said to be unavoidable if every planar cubic map M must contain at least one configuration from the collection as a submap. It follows from the earlier argument involving Euler's formula that the collection consisting of a di-gon, a triangle, a quadrangle, and a pentagon is unavoidable. A

configuration Q is said to be reducible if it could not be contained in any minimal counterexample to the Four Colour Conjecture; that is, if M is a planar map containing Q and all the countries of M not in Q can be properly 4-coloured, then it is possible to extend this 4-colouring, after some recolouring if necessary, to a 4-colouring of all the countries of M including those of Q. The Kempe-chain argument shows that the di-gon, triangle, and quadrangle are reducible; but it fails to show the pentagon is reducible. If one can produce an unavoidable set of reducible configurations, then it would follow by induction on the number of countries that every connected planar map was 4-colourable.

In 1976 K.Appel and W.Haken, with the assistance of J.Koch, finally obtained an unavoidable collection of 1482 reducible configurations, thereby proving the Four Colour Theorem (see [2,3]). The configurations were proved to be unavoidable by a "discharging" procedure adapted from ideas introduced earlier by H.Heesch. A certain number, or charge, is assigned to each face of a map M with the total charge being positive. It is assumed that M contains no member of a collection C. If the charges can be redistributed, in accordance with certain rules, until the charge on each face is negative or zero, it follows that the collection C must be unavoidable. The final version of Appel and Haken's discharging procedure involved over 300 rules. Configurations are proved reducible by refinements of methods introduced by G.D.Birkhoff; roughly speaking, one considers all possible 4-colourings of the ring of countries surrounding the configuration in a map and then tries to extend each such colouring to a 4-colouring of the faces of the configuration in the interior; frequently it is necessary to perform a sequence of Kempe-chain interchanges of colours, perhaps after certain modifications to the configuration. Over 1200 hours of computing time was needed to prove the reducibility of the unavoidable configurations in Appel and Haken's collection.

The heart of the book is a description of the lengthy process during which the discharging algorithms were successively refined to avoid configurations containing "obstacles" to reducibility until eventually there was found a collection of configurations that were both unavoidable and reducible. The initial reaction to the proof included a certain amount of scepticism and disappointment because of its length and the fact that it could not be verified by hand; this led to certain philosophical discussions on the nature of a proof (see [5]). Robertson, Sanders, Seymour and Thomas [4] published another proof in 1997 (see also Allaire [1]).Their discharging procedure had 32 rules and their unavoidable set of reducible configurations had 633 members. They made all the necessary programs and data available and the programs were verified independently by others. They also gave a program for 4-colouring a planar map in quadratic time.

The author has included many photographs, biographical details, and anecdotes about the people who contributed in one way or another to the solution of the Four Colour Problem. Quite apart from the information the book contains on this particular problem, it should also give the general reader insight into the spell a mathematical problem can cast, and the labour and pleasure and frustration and disappointment that can follow from succumbing to the spell.

References

[1] F.Allaire, Another proof of the four colour theorem, I, Proc. 7th Manitoba Conf. Num. Math. Comp., 1977, 3-72.

[2] K.Appel and W.Haken, Every planar map is four-colorable, Part 1: Discharging, Ill. J. Math. 21 (1977), 429-490.

[3] K.Appel, W.Haken and J.Koch, Every planar map is four-colorable, Part 2: Reducibility, Ill. J. Math. 21 (1977), 491-567.

[4] N.Robertson, D.Sanders, P.Seymour and R.Thomas, The four-color theorem, J. Comb. Th. B70 (1997), 2-44.

[5] E.R.Swart, The philosophical implications of the four-color problem, Amer. Math. Monthly, 87 (1980), 697-707.

A SELF-HELP BOOK THAT DELIVERS
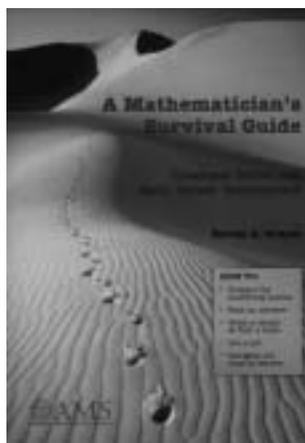### Book review by Mitja Mastnak, Dalhousie University

A MATHEMATICIAN'S SURVIVAL GUIDE: GRADUATE SCHOOL AND EARLY CAREER DEVELOPMENT
by Steven G. Krantz
AMS 2003 xv + 222 pages

Whenever in a book store, I make a point of plotting a course that steers clear of the "Self-Help, Career Advancement and Personal Growth" aisle. Thus, I was a bit lee ry, when I saw that the book I was to review had "career development" in the subtitle. When I noticed that the front page was promising to teach the reader to prepare for the qualifying exams, find an advisor, write a thesis, get a job and navigate the road to tenure I was almost alarmed.

Once I got past the cover, I was relieved that there was no "ten easy steps to become a brilliant mathematician", no "seven best kept secrets about proving lemmas", nor any "four habits and twenty sub-habits to...". Instead the author offers good, common-sense advice and shares his own bountiful experience. The book delivers on the front page promises better than I believed was possible. On the other hand, even though I did personally deal with many issues the guide describes, I do not believe that the book's advice would have impacted any of my decisions.

The style of writing is forthright and enticing. I have never before encountered a book with so many, and so many great footnotes. I am tempted to say that footnotes alone make reading it a worthwhile experience. The narrative is often spiced up with funny stories and interesting bits of trivia. For instance, in discussion about Ph.D. thesis defense, the Swedish model is mentioned. I found it very amusing to learn that in Sweden the tradition calls for a famous foreign mathematician to present the thesis on the student's behalf, one person to ask pointed questions and another to be responsible for cracking jokes and making fun of the whole proceeding.

My favourite part of the text is about the mathematics one should know. Steven Krantz managed to write a remarkably comprehensive survey of the rudiments of real analysis, complex analysis, geometry, topology and algebra in just a few pages. I like the emphasis on the interplay between these areas and I wholeheartedly support the author's belief that successful mathematics is practiced by creating a synthesis of different areas. This is one of the single most important ideas I adopted during my university years. I still chuckle, when I recall what an algebra purist I was (a little knowledge is a dangerous thing). For instance, when I first saw a proof of the Fundamental Theorem of Algebra, I felt as if algebra was being violated by complex analysis.

A Mathematician's Survival Guide starts the reader off as an undergraduate. Here, the advice ranges from what courses to take, to how to choose a graduate program and how to apply. I urge any student, who is considering a career in mathematics, to pay close attention to the discussion on which areas of mathematics you should cover in preparation for graduate school.

Later on, some elements of graduate education are described. These include the qualifying exams, teaching and thesis work. Topics like: foreign language requirement, fellow students, departmental staff , faculty and practical as well as moral "sticky wickets" are also addressed. A lot of advice here seems quite obvious to someone who already navigated these waters. But, to be fair, everything is usually clearer in retrospect.

Most matters discussed in the book also apply to Canadian universities. It would have been nice though, if the talk about Canada was extended beyond a single footnote. Any student here would certainly benefit from learning more about institutions, like CMS and NSERC, that play an important role in the life of a Canadian mathematician.

One of the main differences in Ph.D. programs in mathematics between Canada and the States is a masters program. At many Canadian universities, Dalhousie in my case, you have to get a masters degree before starting with the doctorate. In my personal experience this was, by no means, a waste of time. I was even fortunate enough to stumble across an interesting research problem that became a basis for my doctoral work.

The guide also discusses the abrupt transition from undergraduate to graduate school. Here my experience also differs. This is due to the fact that at the school from which I received my undergraduate degree, University of Ljubljana, students specialize much earlier. Krantz briefly mentions that this is true for most European universities in comparison with their North American counterparts.

I believe that *A Mathematician's Survival Guide* can be of use to an aspiring mathematician. The author's writing style and knowledge has resulted in an optimal publication of this type. If one were deciding between this book and another book of the same nature, I am certain that this book would be a good choice. The text is engaging and the footnotes make it even more enjoyable.

BRIEF BOOK REVIEWS
by Srinivasa Swaminathan, Dalhousie University

MATHEMATICAL DIAMONDS
by Ross Honsberger
Dolciani Mathematical Expositions No.26
MAA, Washington, DC, 2002, x + 245pp.

Ross Honsberger's *Mathematical Gems, Mathematical Morsels and Mathematical Plums* are well known. In the same spirit he presents in this volume a miscellaneous collection of elementary gems containing brilliant insights from many fine mathematical minds. The majority of the topics come from Euclidean geometry, combinatorial geometry, algebra and number theory. The mathematical requirements rarely go beyond the knowledge of college freshmen. The essays, written in a leisurely style, are intended as mathematical entertainment. Arranged in 25 sections, each section contains problems, some of them tantalizing and intriguing, with solutions. Many of these are reworked versions of articles published in mathematical journals. The sections are independent and may be read in any order. A few exercises are provided in some sections and a set of fifteen miscellaneous challenges (with solutions) is given at the end of the volume.

Here is a sample: One day a restless lion roamed about in his circular cage, of radius 10 meters, along a polygonal path of total length 30 kilometers. Prove that he must have turned through a total angle of at least 2998 radians.

ENTROPY
edited by Andreas Greven, Gerhard Keller and Gerald Warnecke
Princeton Series in Applied Mathematics
Princeton University Press, 2003, xiv + 358 pp.

A symposium on Entropy took place at the Max Planck Institute for the Physics and Complex Systems, Dresden (Germany), 25-28 June 2000. A program of invited talks and discussions by leading specialists ranged from expository introductions to basic concepts to various surveys of current research in the areas of thermodynamics, continuum mechanics, stochastic processes, statistical physics, dynamical systems, ergodic theory and coding.

The present volume is the result of the joint efforts of the symposium's speakers and a number of referees. An introductory chapter by the editors contains an outline of the book and provides basic concepts and terminology, illustrated by examples from both the macroscopic and microscopic lines of thought. In depth surveys are classified into four parts. Part I gives a basic introduction to thermodynamics and probability. Part II surveys the macroscopic approach of continuum mechanics and physics, Part III deals with the microscopic approach to the role of entropy as a concept in probability theory. In Part IV are presented applications to dynamical systems, ergodic, and information theory.

FUNDAMENTAL GROUPS AND COVERING SPACES
by Elon Lages Lima (translated by Jonas Gomes)
A. K. Peters Ltd, Natick, MA, 2003, x + 210 pp.

This is an introductory text for graduate students on algebraic topology. The subjects discussed are the fundamental group and covering spaces. The book has been successfully used as a text on algebraic topology in many Brazilian universities and in other Latin American countries. The use of algebraic invariants in topological problems and their immediate applications to other areas such as real and complex analysis and differential geometry are expounded with clarity. Each chapter concludes with a set of exercises. The author claims that no results from the exercises are assumed in the text.

In the chapter on 'The Winding Number', there is a section on 'Eversions'. Referring to Stephen Smale's pioneering work, the following anecdote is given: "In his early days of his career (1957), Smale spoke of his work at a meeting at the University of Chicago. In the audience was the renowned topologist S. Eilenberg, who remarked: 'This cannot be right because it implies that the antipodal map $\alpha : S^2 \rightarrow R^3$ is regularly homotopic to the natural inclusion. In other words, according to you one can evert a sphere in 3-space, which is absurd.' Smale just smiled and replied: 'I do not know how to figure geometrically the deformation. But I know that it can be done because my proof is correct.' "

ESSENTIALS OF MATHEMATICS, INTRODUCTION TO THEORY, PROOF, AND THE PROFESSIONAL CULTURE
Classroom Resource Materials Series
MAA, Washington, DC, 2003, xvii + 180 pp.

The transition from the calculations of high school to the structural and theoretical approaches of college mathematics involves many aspects: more and deeper content, new methods, a widening of perspective, experience with the various subfields of mathematics, and the influence of teachers. The aim of this book is to provide the knowledge needed to move onto advanced mathematical work and a glimpse of what being a mathematician might be like.

The chapters discuss introductions to logic and set theory, proof writing, proof discovery, and number systems. In the first six chapters, the material is presented in a fashion suitable for a Moore Method course, although the author claims such an approach is not necessary. In addition to important results for student proof, each area provides warm-up exercises. The final chapter entitled 'And Beyond' is an introduction to the professional culture. There are many things that mathematicians know but aren't exactly taught. Narratives on this kind of information are given under the headings: What is mathematical research? Famous theorems, Famous unsolved problems, professional organizations, Resources, and Extracurricular activities.

777 MATHEMATICAL
CONVERSATION STARTERS
by John dePillis
Spectrum series
MAA, Washington, DC, 2002, xvi + 344pp.

This interesting book is a collection of topics that are thought-provoking conversation starters on matters mostly mathematical. The format is unique — the topics are numbered, extensively cross-referenced and most of them are presented in short paragraphs. Many are illustrated with original cartoons and imaginative pictures drawn by the author who is a commercial artist, engineer and a mathematician teaching at the University of California, Riverside. No advanced mathematical training is necessary to enjoy this book. The book need not be read linearly. Open at any page, choose an item and read on. Alternatively one can use the table of contents or the index to pick a favorite topic. The presentation is not a dry collection of facts. It consists of quotes, poems, limericks, conversational prose and anecdotes.

Take, for example, the Pythagorean theorem. After a quick non-algebraic proof, four interesting applications are given which include (i) a solution to the question: Which gives you more pizza — a small pizza plus a medium one, or a large pizza by itself? (ii) time dilation in special relativity.

The book is humorous not only in the cartoons and the pictures but also in the text. For example, the world's funniest joke of 2001 is discussed under the induction/deduction item. Sherlock Holmes and Dr Watson go camping and pitch their tent under the stars. During the night, Holmes wakes his companion and says: "Watson, look up at the stars, and tell me what you deduce." Watson says, "I see millions of stars, and even if a few of these have planets like Earth out there, there might also be life." Holmes replies: "Watson, you idiot! Somebody stole our tent!" The author discusses how Watson, who deduces, is correct, but Holmes, who induces (or infers), is wrong.

EXPLORATORY EXAMPLES FOR REAL ANALYSIS
by Joanne E. Snow and Kirk E. Weller
Classroom Resource Materials Series
MAA, Washington, DC, 2003, xvi + 141 pp.

This text supplement contains 12 exploratory exercises designed to facilitate students' understanding of the fundamentals of real analysis. Each exercise has three basic components: making observations and generating ideas from hands-on work with examples, thinking critically about the examples and answering additional questions for reflection. Ancillary materials, including visual guide sheets for those exercises involving technology, and report guides for a lab session approach are provided online at *www.saintmarys.edu/~jsnow*.

WRITING PROJECTS FOR MATHEMATICS COURSES: CRUSHED CLOWNS, CARS AND COFFEE TO GO,
by Annalisa Crannell, Gavin La Rose, Thomas Ratliff, and Elyn Rykken
Classroom Resource Materials Series
MAA, Washington, DC, 2003, viii + 119 pp.

This slim volume is a collection of writing projects suitable in a wide range of undergraduate mathematics course from precalculus to differential equations. The projects vary in their level of difficulty and in the mathematics required, but are similar in the mode of presentation and use of applications. Students are expected to write their solutions to the problems in the projects in a paper that describes in precise mathematical prose how the problems are resolved. The projects may be assigned to individual students or to a group of students. Each project is a mathematical problem, mostly a real world application, presented as a story with fictional characters. It contains a solution section with mathematical hints. The final chapter contains two sample solution papers.

One of the projects is entitled 'Coffee to Go' and is a real life application of Newton's Law of Cooling. It is presented as a letter from a company which owns a series of quick-dining establishments to the Math 101 students of a college in Massachusetts. It concerns a law suit filed by a drive-in window customer who happened to spill 'much too hot' coffee upon himself.

ATIYAH AND SINGER TO SHARE THE ABEL PRIZE

Michael F. Atiyah and Isadore M. Singer

The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2004, jointly to Sir Michael Francis Atiyah, University of Edinburgh and Isadore M. Singer, Massachusetts Institute of Technology.

EDUCATION NOTES

By Ed Barbeau, University of Toronto

The crowded curriculum

Some time ago, I met with a grade 10 class at St. Augustine Catholic High School in Markham, ON, and gave them this problem:

Pictured below is a 10 cm square partitioned into five polygons by various lines connecting vertices to midpoints of sides. Determine the area A of the upper right polygon.
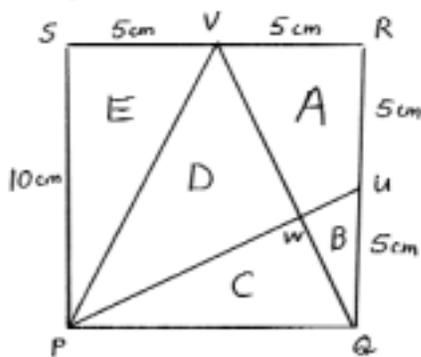

Figure 1

For convenience in the later discussion, I have indicated the areas of the other four polygons and labelled the vertices. The notation […] will denote area.

I was fortunate with the group of students; there were at least a half dozen students of both sexes who were keen participants. The discussion was rich enough to bring to light a number of mathematical issues and be the occasion for some reflection on the syllabus, on the classroom dynamic and on the goals of a mathematical curriculum. It seemed to be worth reporting on here, and invite discussion from the readers.

The students began with a sequence of guesses as to the area, none fortunately exceeding 100, without giving any reasons. When asked to hone in on the result more precisely, many students pulled out their calculators and began to compute various lengths using the Pythagorean theorem (usually to two places of decimals). When pressed for some upper and lower bounds on the answer, they pointed out that the area exceeded that of RUV and was less than that of RQV, putting it between 12.5 and 25 sq cm. However, they were unable to proceed further. So I suggested that they abandon the problem for the time being and just make some observations about the situation which might conceivably be useful.

This paid off immediately when one lad pointed out that the segments PU and QV intersected at right angles. I asked him to explain why, whereupon he came to the board and gave a garbled account that seemed to have something to do with symmetry. When asked directly

whether he was appealing to symmetry, his face brightened. I was able to explain that mathematicians could describe symmetry in quite precise terms, and that, in this case, one looked at the rotational symmetry of the square about its centre. Thus, a solid argument was possible for what seemed to be true intuitively.

The discussion turned to what could be said about the areas of all five regions realized in the partition. The equations $E = 25$, $A + B = 25$, $B + C = 25$ and $C + D = 50$ were easily discovered, and one student observed, I think to his surprise, that these implied that $A = C$. So now we had four equations in five unknowns, and needed to find out a fifth from somewhere. Suggestions were offered, but these all turned out to be consequences of the existing ones.

One girl suddenly put up her hand up and said that she knew the answer: 18.75 sq cm. She came to the board and explained. The region of area A can be split into two regions of areas F and G, as indicated in the diagram below.
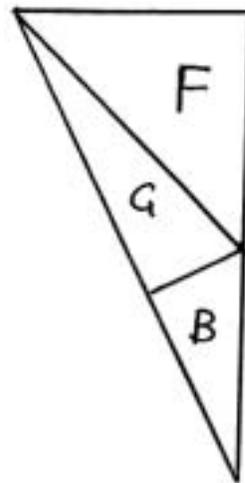
Figure 2

As was determined earlier, $F = 12.5$. Since PU "right bisected" QV, the areas G and B were equal, so that $25 = F + G + B = F + 2G$, from which $G = 6.25$ and $A = F + G = 18.75$. Did everyone agree with this? The class was divided. So we took the argument apart. No one quarreled with $F = 12.5$ *or* $F + G + B = 25$, so the difficulty, if any, lay in the equality $G = B$. The calculators came out again, so I suggested that it might be easier to look at triangle UVW and UQW as having a common base UW and consider how the areas depended on the height. Eventually, it came down to deciding whether the length of UV was equal to the length of UQ. When fingers began pressing buttons, I asked them if they really needed to calculate the length of UV; after all, they just needed to know whether it was different than that of QU and one

might get this without having to do so much work. Eventually, we got to *UV* being the hypotenuse of a right triangle, one of whose arms was equal in length to *QU*, and that did it. The answer 18.25 was rejected.

Now the students were really stuck. So I suggested that they start comparing angles, this being a way to recognize similar triangles. After noting the more obvious instances of similarity, the students arrived at the key fact that triangles *WPQ* and *WQU* were similar. Could we get any information about their relative areas? This seemed beyond the experience of the class, so it was necessary to lead them to the fact that the areas of similar figures varied as the square of the linear dimensions. This led to the equation $C = 4B$ and to the correct answer: $A = 20$.

Out of the 75 minutes, this required only 50 minutes. I later had the opportunity to discuss the same problem at a weekend mathematics camp for secondary students of the Toronto District School Board. There were some differences in how the problem was handled. The orthogonality of PU and QV was established by noting that $\angle WVR + \angle WUR = \angle WUQ + \angle WUR = 180°$ and using the sum of the angles in the quadrilateral *VRUW*. This group was familiar with fact that areas of similar figures varied as the square of the linear dimensions, but were unable without prompting to identify the similar triangles *PWQ* and *QWU*. Some of the same points about solvability of a system of equations came up here as with the St. Augustine group. As a bonus, one student came up with an elegant way of looking at the situation to bring the session to a satisfying conclusion.
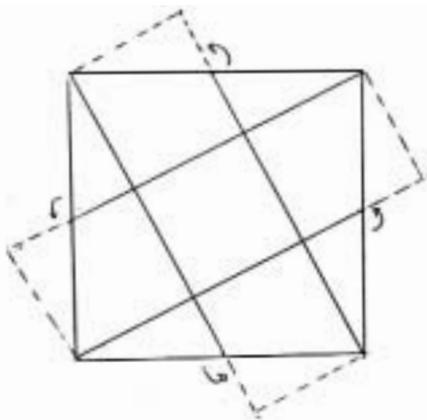

Figure 3

When the square is partitioned as indicated, one can rotate out the corner triangles to see that the square can be partitioned to form five congruent smaller squares, each of area 20 sq cm. Then a quick comparison of pieces allows one to see that $A = 20$ cm.

It is worth analyzing the issues revealed in these sessions.

(1) The students originally saw the problem solely as one in computation rather than one in relationships, so they were geared to an algorithmic approach rather than a qualitative one. In particular, it was necessary to move away from consideration of vertices and segment lengths to address how the pieces in the partition fit together. So it was an occasion to talk about the nature of mathematics and make the point that we are interested not just in solving problems, but in seeking understanding.

(2) Inequalities were briefly discussed when lower and upper bounds were established for the area.

(3) The observation that the segments *PU* and *QV* were perpendicular led directly to a discussion of transformations and their role in describing symmetry. In fact there was time to briefly refer to the symmetry of the human body (and reflections) and to point out that there was a different sort of symmetry (involving rotations) that was significant here. The use of transformations to describe symmetry was very slight here and the topic would need revisiting. It was as much inculcating a state of mind as a body of technique.

(4) The perpendicularity question also illustrated how students can intuit a mathematical fact, but lack the facility to articulate it. This is a phenomenon that I have noticed on many occasions with pupils, and underscores that one of our goals as educators should be to help students find a voice. Some students are naturally able to describe their observations and reasonings, but many others need explicit instruction on how to do this.

(5) When we got to four equations that had to be solved for five unknowns, the duscussion of how many equations needed to nail down a set of variables was joined. This led to the perception that each equation amounted to a constraint, and we would expect to need five of these to determine all five variables. The question of independence of equations arose incidentally. The equations were, of course, linear, so technically within the capability of the class to solve.

(6) The girl's suggestion that the answer was 18.25 was fortuitous, and made the session especially rich. Her assertion of the equality of *B* and *G* was plausible to many in the class, so there was a genuine disagreement that had to be settled. This allowed for a review of the right bisector of a segment as the locus of points equidistant from its end. More importantly, it allowed the class to focus on the nature of a mathematical argument and the logical connections between various statements. There was a whiff of a contradiction argument, in that the equality of the areas of the triangles implied that *VU* and *QU* had to be equal, which turned out to be false. It is also not insignificant that the students had to compare triangles *UVW* and *UQW* not in their standard orientation, and recognize that *VU* and *QU* played similar roles.

(7) There was a modest straightforward exercise in identifying equal angles, which provided a change of pace and an opportunity for wider participation among the class.

(8) The class was able to address a point not usually raised in school but which nonetheless is mathematically significant, to wit that the area of similar figures varies as the square of the linear dimensions. In the case at hand, because the factor of similarity was 2, this could be easily established by splitting the larger triangle WPQ into four pieces each congruent to triangle WQU, by the midlines of pairs of adjacent sides. The more general question of the variation of area of similar figures would have to be raised in a future class, if it was to have any traction.

(9) I wondered whether the student who had the elegant solution at the end of the mathematics camp session had, in fact, seen before the problem of determining the area of the central square in Figure 3. Even if he had, it was certainly an inspired solution, for it required some acuity to relate that problem to the one before the class.

There was a considerable amount of mathematics wrapped up in this little example. Would one expect the students to retain everything that was transacted in this particular session? This question is really beside the point. If problems like this were discussed regularly in a class, then certain mathematical facts and procedures would recur in appropriate contexts and students would over time not only become familiar with them but understand their significance. It would not matter if something was missed or forgotten on a given occasion, as there would be other opportunities to make amends.

This class offers a lesson in how we might handle a difficulty that many teachers complain of: the overcrowded syllabus. The traditional approach is to make a list of items that are then gone through in sequence. On the way, exercises and perhaps even problems are adduced to help secure them before moving on. The effect in the minds of many students is probably that of a treadmill of items without a unifying thread that helps them to coalesce the mathematics into a small number of important themes.

An alternative approach might be to list the topics that we want the syllabus to cover and categorize them as essential, desirable or optional, and then come up with an orchestrated collection of exercises and problems that cut across these topics and review others. The priority is given to key problems and propositions rather than to syllabus items. These problems can be introduced in sequence so that important ideas are reinforced from different directions. The teacher will of course teach new material, but this can be done (as with the description of symmetry or the relationships between similar figures) as they are needed to elucidate the problem situation. This is the very approach that our colleague, Peter Taylor, of Queen's University and his associates put forward in their own teaching and in the materials created for use in the schools. (See the references at the end of this article.)

For this to be successful, it seems to me that ideas can be "put in the air" some time ahead of when we actually want the students to learn and master them. After all, this is probably how we learned most things before we went to school.

To revolutionize school teaching in this way is a tall order. First, we need teachers who are comfortable with the material and who can follow what their pupils might be driving at, understand the significance of their questions and answers, and direct the discussion so that in the end the session is mathematically productive. The students themselves would need a different attitude that prizes process as much as answers. We would need to build into the educational regime the explicit goal of encouraging students to become more autonomous and responsible for their learning.

We at the universities can help out by looking out for mathematically valuable situations, by preparing analyses that highlight their mathematically significant features and by sharing these with teachers.

There is no doubt that many students enter college and university with insufficient knowledge of and facility with the necessary mathematical background. These tertiary institutions have their own imperatives of covering a syllabus, particularly in professional faculties that have to be accredited, so that it is not practicable to delay the teaching of basic mathematics to that level. Indeed, it is a colossal waste of money, professional skill and emotional capital to have to do this.

At the level of the schools, the courses in the last two years for college- and university-bound students have to be held to an appropriate standard, with alternatives provided for those who would like to study mathematics without planning to continue in the area or who have other goals in mind. This does not have to imply a wholesale expansion of the syllabus, but it must ential a deeper more consistent approach to the subject and tasks that encourage students to develop more independence in learning mathematics.

References
1. Taylor, P.D., Calculus, *The Analysis of Functions*, Wall & Emerson, Toronto, 1992. 480 pp.
2. Taylor, P.D. *Mathematical Inquirie*s, Pearson Education, Toronto, 2001, 75 pp.
3. Alexander, Taylor, Harrison, Maguire, Rajotte, Sinclair and Spry, *Functions and Relations*, Pearson Education, Toronto, 2002, 675 pp.
4. Alexander, Edwards, Harrison Lenjosek, Rajotte and Taylor, *Advanced Functions and Introductory Calculus*, Pearson Education, Toronto, 2002, 627 pp.
5. Alexander, Harrison Lenjosek and Taylor, *Geometry and Discrete Mathematics*, Pearson Education, Toronto, 2002, 421 pp.

TOULOUSE 2004

July 12-15, 2004, Centre de congrès Pierre-Baudis, Toulouse

We are happy to announce the First joint Canada-France
meeting of the mathematical sciences. This meeting is a partnership
between the following societies:

Société Mathématique de France
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J-M Azaïs (Toulouse)
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G. Wolkowicz (McMaster)

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X. Buff (Toulouse), A. Cheritat (Toulouse)
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There will be a poster session
as well as a meeting to discuss
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**Travel grants will be available for students and postdocs**
For more information visit: *www.cms.math.ca/Events/Toulouse2004/*

TOULOUSE 2004

Du 12 au 15 juillet, 2004, Centre de congrès Pierre-Baudis, Toulouse

Nous sommes heureux de vous annoncer la première réunion conjointe Canada-France des sciences mathématiques. Cette réunion est en partenariat avec les sociétés suivantes:

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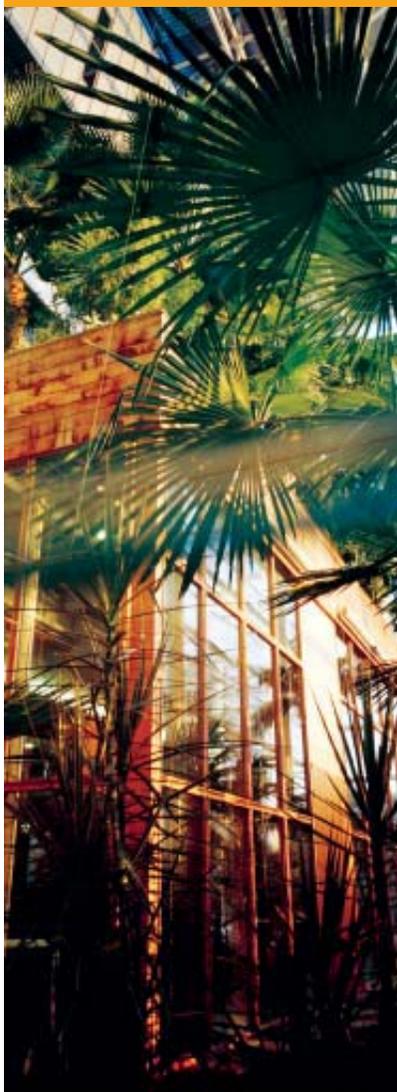
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Il y aura une session d'affiche
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Mathématiques et la francophonie.

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Des subventions pour ce voyage seront disponible pour les étudiants et les postdoctoraux.
Pour plus de renseignements: *www.smc.math.ca/Reunions/Toulouse2004*

REPORT OF THE CANADA SCHOOL MATHEMATICS FORUM 2003

Christiane Rousseau

From May 16 to 18, 2003, 148 delegates attended the Canada School Mathematics Forum in UQAM (Montreal), including school teachers, university faculty in mathematics and education, school board administrators, people working in provincial ministries, delegates from provincial associations of math teachers, a few delegates from industry, research councils and media. Pierre Reid, Minister of Education of Quebec, was Honorary President of the event.

The Forum provided an opportunity for comparing issues and best practices across the country and making links across the different levels of education and across the traditional provincial boundaries. Working groups identified issues on which subgroups will prepare detailed findings to be presented at the second meeting. The proceedings will be published both electronically and in print and will be widely distributed .

The plenary activities covered a wide spectrum of subjects. The lecture of Frederick Leung addressed the question why Asian students succeed so well. His study pointed out that Asian school teachers have a very strong training in mathematics. A panel of participants then presented the situation in different regions of the country indicating at the same time the similarity between many problems in mathematical education in all regions of the country and the success of some special initiatives. The plenary lecture of Jean-Pierre Kahane illustrated how mathematical education in schools enables students to function and innovate in the modern world. Alan Bernardi (Bell) referred, in his response,

to a wide spectrum of activities at Bell that require sophisticated mathematical techniques. Benoît Saint-Pierre, Director of Engineering at Alcan sent a written message on the importance of mathematical education.

Jean-Marie de Koninck, who gave a popular lecture on *le plaisir des mathématiques* was introduced by Pierre Reid, Minister of Education of Quebec.

A panel was devoted to several goals and challenges in the modern school: enrichment (Ravi Vakil), mathematics education for aboriginal students (Corinne Jetté), teaching after the reform (André Deschênes), making math class interesting and improving numeracy (Kanwal Neel). Hyman Bass and Deborah Ball spoke on the theme of teacher education and development and on the level of skills elementary teachers must possess in order to teach mathematics effectively. Panels on the last day addressed the question of 'vision of the future'. The first panel (The Second Forum: how to increase the collaboration of mathematics educators across educational and across provincial boundaries?) examined the following questions: "Should we consider a Canadian subcommission for ICMI?" (Bernard Hodgson), "How to have closer connections between universities and school teachers?" (John Grant McLoughlin), "How teachers associations of teachers could collaborate more closely?" (Stewart Craven), How far has the 1995 Forum in Quebec contributed to make mathematics education in B.C. more dynamic in the succeeding years?" (Malgorzata Dubiel).

The second panel was concerned with "How to publicize the ideas of the forum? How to raise awareness of the importance of learning mathematics in schools?" The panelists were: Isabelle Blain, Vice-President, NSERC, Ivar Ekeland, Professor at UBC and science writer, Véronique Morin, Radio-Canada, President of Canadian Association of Science Writers and Heather Sokoloff from The National Post.

The participants divided themselves into sixteen working groups covering a broad spectrum of issues in mathematical education.:

1. Teaching geometry effectively with software
2. Mathematics for active citizenship
3. Popularization of Mathematics
4. Learning in technological environment
5. Making school interesting
6. Mathematics and intuition
7. Education of elementary school teachers: goals and challenges
8. The needs of industry and mathematics education
9. Educating Secondary Mathematics Teachers
10. Teacher training, algebra, and teacher shortages
11. Teaching mathematics to aboriginal students: the importance of acknowledging cultural differences
12. Inservice secondary teachers
13. Rethinking mathematics in secondary classes
14. The visual: heart of mathematics
15. Teaching mathematics at the college level
16. Preparation for university engineering and science courses

Some results:

Mathematical education for aboriginal communities

The Forum discussed the question of mathematics education for aboriginal communities recognizing its importance as a national issue in the coming years, as evidenced by the demographic increase of these communities. This was the first attempt of bringing this issue on an equal footing with the other issues in mathematical education in the country. The aboriginal communities have a lot of young members. They realize that education is crucial in order to create jobs in their communities. On the other hand the level is too high for aboriginal students in our schools if no effort is made to adapt the teaching suitable to their culture and make school interesting to them. There will be a follow-up on this item at the level of the education activities of CMS in collaboration with people working in the aboriginal communities.

Elementary school teacher education and development

Too many elementary school teachers have little or no background in mathematics and in science. It is necessary to bring the message that students must have courses with math content and methodology. We should also address the problem that the courses, quite often, do not inspire people to become teachers. The CMS will consider creating a task force to examine these issues. We need more specialists.

Tough curriculum

There is a feeling that the curriculum is tough. The schools have the impression that the universities "control" the curriculum. There is no time available in schools for special activities: developing intuition, use of software to develop geometric visualization, introduction to the concept of proof, discussion of modern applications of mathematics, activities that create interest in mathematics, etc. The CMS envisages taking on a leading role in providing important guidelines to high schools.

Inservice teacher education

This issue is common to all regions of the country. There is a need for serious discussions on inservice teachers, for developing new models of inservice teacher education.

Sharing resources

Several working groups have recognized that the need for sharing resources and creating 'centers' containing quality material. A task force must be created to work on:

- Identify the resources;
- Put together some proposal and raise funds for the project;
- Make sure that there is a mechanism to control quality;
- Make sure that the group is sufficiently representative;
- Build a viable structure.
- Maintain the momentum of the Forum.

The Forum has been helpful in attracting attention and enthusiasm throughout the country on mathematics education. We will work collectively to maintain the momentum: in particular to keep up contacts with ministries, with provincial associations, etc.

Linking provincial associations of teachers

In the past provincial associations used to meet at NCTM annual meetings in the USA. The format of this meeting does not permit joint discussions on mathematics education matters in Canada. The work of this Forum is appreciated and several provincial associations (under the leadership of Donna Chanasyk, Alberta) are already planning to participate at the next Forum. A long term goal of the CMS is to consider playing a role in linking the provincial associations in Canada and also providing webspace to facilitate contacts (Eric Muller of Brock University, has volunteered to work on this).

Changing attitudes

This old issue remains a central one in mathematical education. We should unite our energies to change attitudes by all means: show the applications of mathematics, explain its power and some of the problems it can solve, make visible its universality in science and technology, show that it is beautiful and that it can be fun.

The next Forum

Starting action of some of the issues outlined above is part of the preparation for the next Forum. Efforts will also be made to attract more teachers at the next Forum.

The proceedings can be found at:
www.cms.math.ca/Events/CSMF2003/pro-ceedings/.e

The next Forum will be in Toronto on May 6-8 2005 and the three co-Chairs are Florence Glanfield (University of Saskatchewan), Frédéric Gourdeau (Université Laval) and Bradd Hart (McMaster and Fields Institute). The website (not yet active) will be at *www.cms.math.ca/Events/CSMF2005/.*

Le prochain Forum sera à Toronto du 6 au 8 mai 2005 et les 3 co-présidents sont Florence Glanfield (Université de Saskatchewan), Frédéric Gourdeau (Université Laval) et Bradd Hart (McMaster et Fields Institute). Le site internet (pas encore activé) se trouvera à *www.smc.math.ca/Reunions/FCEM2005/.*

RAPPORT DU FORUM CANADIEN SUR L'ENSEIGNEMENT DES MATHÉMATIQUES 2003

Christiane Rousseau

Du 16 au 18 mai 2003, 148 personnes ont participé, à l'UQAM (Montréal), au Forum canadien sur l'enseignement des mathématiques, notamment des enseignants du primaire et du secondaire, des professeurs de mathématiques et d'éducation à l'université, des administrateurs de commissions scolaires, des fonctionnaires provinciaux, des représentants d'associations provinciales d'enseignants de mathématiques, ainsi que quelques délégués du secteur privé, des conseils de recherche et des médias. Le Forum s'est déroulé sous la présidence d'honneur de Pierre Reid, ministre de l'Éducation du Québec.

Le Forum a permis aux participants de comparer la situation qui prévaut d'une région à l'autre du pays, de mettre en commun des pratiques exemplaires et de créer des liens avec des intervenants de tous les ordres d'enseignement et de diverses provinces, grâce à l'élimination des traditionnelles frontières provinciales. Des groupes de travail ont posé plusieurs problématiques que des sous-groupes étudieront plus en détails et présenteront à la seconde rencontre, accompagnées de pistes d'intervention. Le compte rendu du Forum sera largement diffusé sous forme électronique et conventionnelle.

Les participants ont abordé en plénières un large éventail de sujets. Frederick Leung a présenté dans sa conférence les résultats de sa réflexion sur la réussite remarquable des élèves asiatiques; il a notamment souligné la formation mathématique exceptionnelle des enseignants asiatiques. Les participants à une table ronde ont ensuite fait état de la situation qui prévaut dans les grandes régions du pays; ils ont fait ressortir la similitude entre de nombreux problèmes propres à l'enseignement des mathématiques dans toutes les régions du pays, et la réussite de quelques projets spéciaux. La conférence plénière de Jean-Pierre Kahane a montré comment les cours de mathématiques fournissent toujours aux élèves des éléments qui leur sont indispensables pour fonctionner et innover dans le monde moderne. Alan Bernardi (Bell) a présenté, dans sa réplique, la vaste gamme d'activités de Bell qui nécessitent des analyses mathématiques complexes. Dans sa réponse écrite aux participants, Benoît Saint-Pierre, directeur de l'ingénierie chez Alcan, a lui aussi renforcé l'importance de la formation mathématique.

La conférence populaire de Jean-Marie de Koninck, intitulée « Le plaisir des mathématiques », a été présentée par Pierre Reid, ministre de l'Éducation du Québec.

Un panel a porté sur plusieurs objectifs et enjeux de l'école moderne : l'enrichissement (Ravi Vakil), l'enseignement des mathématiques aux élèves autochtones (Corinne Jetté), l'enseignement à l'heure de la réforme (André Deschênes), comment rehausser à la fois l'intérêt pour les cours de mathématiques et la numératie des élèves (Kanwal Neel). Hyman Bass et Deborah Ball ont abordé le thème de la formation et du perfectionnement des maîtres, ainsi que le niveau de connaissances mathématiques que doivent posséder les enseignants du primaire pour bien enseigner les mathématiques. Le dernier jour, les participants se sont penchés, en panels, sur le thème « Une vision vers le futur ».

Le premier panel (Vers le second Forum : comment accroître la collaboration interniveau et interprovinciale entre ceux et celles qui enseignent les mathématiques?) a porté sur les questions suivantes : « Devrions-nous avoir une sous-commission canadienne pour la CIEM? » (Bernard Hodgson); « Comment resserrer les liens entre les professeurs d'université et les enseignants du primaire-secondaire? » (John Grant McLoughlin); « Comment les associations d'enseignants pourraient-elles collaborer davantage? » (Stewart Craven); « Comment le Forum de Québec en 1995 a-t-il contribué au dynamisme du milieu de l'enseignement des mathématiques en Colombie-Britannique au cours des années qui l'ont suivi? » (Malgorzata Dubiel).

Quant au second panel, « Comment amener les conclusions du Forum jusqu'au public? Comment renforcer l'importance de l'apprentissage des mathématiques dans nos écoles? », il a réuni les personnes suivantes : Isabelle Blain, vice-présidente du CRSNG, Ivar Ekeland, professeur (UBC), Véronique Morin, Radio-Canada, présidente de l'Association canadienne des rédacteurs scientifiques, Heather Sokoloff, *The National Post*.

Répartis en 16 groupes de travail, les participants ont également abordé des sujets de toutes sortes en rapport avec l'enseignement des mathématiques :
1. Enseigner la géométrie de manière effective avec des logiciels dynamiques
2. Mathématiques pour le citoyen actif
3. Vulgarisation des mathématiques
4. Apprentissage en présence de technologie

5. Rendre l'école intéressante
6. Mathématiques et intuition
7. Formation des enseignants du primaire : buts et défis
8. Formation mathématique : les besoins de l'industrie
9. Formation des enseignantes et enseignants du secondaire
10. Formation des enseignants en mathématiques, algèbre et pénuries d'enseignants
11. L'enseignement des mathématiques aux étudiants de culture autochtone : l'importance de tenir compte des différences culturelles
12. Formation continue pour les enseignants de mathématiques au secondaire
13. Repenser les mathématiques au secondaire
14. Le visuel, au cœur des mathématiques
15. L'enseignement des mathématiques au niveau collégial
16. Préparation aux études universitaires en sciences et en génie

Voici les grandes lignes des travaux issus du Forum :

L'enseignement des mathématiques dans les communautés autochtones

Nous avons abordé au Forum l'importante question de l'enseignement des mathématiques dans les communautés autochtones, compte tenu de l'importance accrue qui y sera accordée à l'échelle nationale au cours des prochaines années, en raison de la croissance démographique. C'était la première tentative d'élever l'importance de ce dossier au même niveau que les autres grands dossiers concernant l'enseignement des mathématiques au pays. Contrairement au milieu mathématique, la moyenne d'âge des communautés autochtones est très basse. Ces communautés savent qu'elles doivent relever le niveau de scolarité de leurs membres si elles veulent créer des emplois chez elles. Par contre, la marche sera trop haute pour les élèves autochtones si nous ne prenons pas des mesures particulières pour adapter l'enseignement à leur culture et accroître leur intérêt pour l'école. En collaboration avec les intervenants qui travaillent dans les communautés autochtones, il y aura un suivi à ce sujet, au niveau des activités d'éducation de la SMC.

Formation et perfectionnement des enseignants du primaire

Trop d'enseignants du primaire n'ont pas beaucoup ou pas du tout de formation en mathématiques et en sciences. Il faut accroître l'importance des cours de mathématiques (matière et méthodologie) dans la formation des futurs enseignants. Il faudrait aussi remédier au problème des cours qui, trop souvent, n'encouragent pas les jeunes à se diriger vers l'enseignement. La SMC étudiera la possibilité de créer un groupe de travail qui énoncerait les caractéristiques d'un bon cours. On a aussi mentionné qu'il faudrait plus de spécialistes.

Pression exercée sur les programmes

On ressent une pression énorme sur les programmes. Les écoles ont l'impression que ce sont les universités qui contrôlent les programmes. Les enseignants manquent de temps à consacrer aux activités spéciales : développement de l'intuition, utilisation de logiciels pour stimuler la visualisation géométrique, introduction au concept de preuve, échanges sur les applications modernes des mathématiques, activités visant à accroître l'intérêt des jeunes envers les mathématiques, etc. La SMC envisage de jouer un rôle de leadership en définissant les éléments qui sont importants dans les écoles secondaires.

Perfectionnement des enseignants

C'est un enjeu qui concerne toutes les régions. On ressent le besoin de discuter en profondeur du perfectionnement des enseignants, de développer de nouveaux modèles de perfectionnement et d'échanger des pratiques exemplaires.

Nécessité de partager le matériel de qualité

Plusieurs groupes de travail ont conclu qu'il serait fort utile de partager les ressources et de créer des « centres de dépôt » de matériel de qualité. Il faudrait créer un groupe de travail qui se chargerait de cette tâche. Ce qu'il y a à faire :
- Cerner les ressources;
- Monter une proposition et chercher les fonds nécessaires au projet;
- Mettre en place un contrôle de la qualité;
- Veiller à ce que le groupe soit suffisamment représentatif;
- Établir une structure viable;
- Profiter de la lancée du Forum.

Le Forum a tourné les projecteurs vers l'enseignement des mathématiques et a soulevé l'enthousiasme à la grandeur du pays. Collectivement, nous profiterons de la lancée du Forum, notamment en gardant contact avec les ministères, les associations provinciales, etc.

Créer des liens entre les associations provinciales d'enseignants et d'enseignantes

Auparavant, les associations provinciales se rencontraient au congrès annuel du NCTM aux É.-U. Le format de ce congrès ne permettait toutefois pas d'aborder des sujets particuliers ni d'échanger réellement sur les enjeux de l'enseignement des mathématiques au Canada. Le Forum a été particulièrement apprécié à ce sujet, et plusieurs associations provinciales (à l'initiative de Donna Chanasyk, de l'Alberta) s'organisent déjà pour se rencontrer à l'occasion du prochain Forum. À plus long terme, la SMC pourrait contribuer à réunir les associations provinciales du Canada et offrir l'espace Web nécessaire aux échanges (Eric Muller, Brocks, s'est porté volontaire pour travailler dans ce dossier).

Provoquer des changements d'attitude

Ce vieil enjeu demeure central en enseignement des mathématiques. Nous devrions regrouper nos énergies pour provoquer des changements d'attitudes par tous les moyens possibles : faire connaître les applications des mathématiques, en expliquer la puissance et certains des problèmes qu'elles permettent de résoudre, faire connaître davantage l'universalité des mathématiques dans les sciences et la technologie, démontrer la beauté des mathématiques et montrer qu'elles peuvent être amusantes.

Vers le second Forum

Des démarches préliminaires dans les dossiers décrits ci-dessus seront entreprises en vue du prochain Forum. On tentera également d'attirer davantage d'enseignants à ce Forum.

Comptes rendus sont disponibles au :
www.cms.math.ca/Reunions/FCEM20-03/proceedings/

2003 ANNUAL REPORTS FROM COMMITTEES

Editorial Note: The following were edited from the 2003 Annual Reports for the Society's Standing Committees. The Executive Director's report and other committee reports appeared in the April 2004 issue of the CMS Notes. The Treasurer's Report will appear in the September issue. The complete 2003 Annual Report to Members will be presented at the Summer 2004 Meeting and will be available on the Web site at:

www.cms.math.ca/Reports/

ADVANCEMENT OF MATHEMATICS COMMITTEE
Christiane Rousseau (University of Montreal), Chair

The Advancement of Mathematics Committee (AMC) (which, since July 2001, includes the Fundraising Committee as a sub-committee) has been very active during the past year.

ICM 2010
A feasibility study to see if Canada should bid to host the International Congress of Mathematicians in Montreal in 2010 has been started with the National Research Council and the Palais des Congrès in Montreal. The financial implications are being considered and it is hoped to determine if the project is viable by April 2004.

Fund Raising Campaign
The Imperial Oil Foundation continues to be the Title Sponsor of the National and Regional Math Camps. 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 Maths Camps program and the CMS has been invited to put another application in support of the Canadian Math Trail and the Mathematics Career Posters in September 2004. Significant fundraising efforts were directed to the 2003 Forum which generated revenues of $83,500. Part of the surplus from the first Forum will be used to support the 2005 Forum.

The possibility of engaging a professional fund raising campaign is being investigated by Eddy Campbell. It is hoped to obtain several proposals by June 2004. The Society will need to identify: key priorities, what companies are familiar with the CMS and some particular projects. To identify the projects, all CMS Committees will be contacted. For every priority identified, it is necessary to find a champion who could help fund-raise. Some possible projects for a large fund raising campaign are:
- A CMS Building Fund
- Endowment of all Society prizes,
- Endowment of the Fields Medal.

New positions
Terms of Reference for a Math Camps Coordinator have been developed and Daryl Tingley (UNB-Fredericton) was appointed to this position. Terms of Reference for an Awards Officer also have been developed and Richard Kane (Western) was appointed to the position by the Board of Directors. Revised terms of reference have been written and accepted by the Board for the CMS Publisher but the position is still vacant.

Membership Drive
Letters, signed by E. Campbell and C. Rousseau, highlighting the advantages of being a CMS member have been sent to all Board members. It is 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 they have no home society in Canada. Plenary lectures and sessions with such a focus could be featured at our semi-annual meetings.

Toulouse 2004
Sponsored by the three research institutes, the CMS, the Statistical Society of Canada, and the Canadian Applied and Industrial Mathematics Society, there will be 15 student and post-doc travel awards of $500 each. A CMS member has generously offered to sponsor one or two additional travel awards.

Canada School Mathematics Forum
The first Forum, hosted by UQAM, took place from May 16-18 and welcomed 148 delegates. The Forum was a great success and proceedings are available at:
www.cms.math.ca/Events/CSMF2003/proceedings/.e (english version).

Among the main avenues of action identified for the next Forum were; mathematics education for aboriginal students, establishing standards for teacher education at the elementary level, the need of good sources of enrichment material for teachers, and the need for a Canadian association of mathematics teachers or at least the need for the provincial associations to have closer links.

Planning for the 2005 Forum, hosted by the Fields Institute, has already started with the three co-chairs; Glanfield (University of Saskatchewan), Bradd Hart (McMaster University) and Frédéric Gourdeau (Université Laval). Several members of the program committee met during the CMS Winter in Vancouver to discuss the main themes of the 2005 Forum.

Many provincial associations of mathematics teachers wish to stay in closer contact and to further develop the links established through the 2003 Forum. The Advancement of Mathematics Committee considers that the tradition of Fora on mathematical education bringing together all partners in mathematics education in Canada should be continued beyond the 2005 Forum. With Fora taking place every three or four years, this would maintain the momentum created at each Forum. PIMS is a possible host for a future forum and the impact upon the Executive Office of on-going Fora needs to be considered.

Poster on Careers in Mathematics

There has been intensive work by Judith McDonald and Harley Weston to develop "Math with a Human Face" at Math Central and to prepare a new poster with the theme of "Math @ Work".

Banff Renaissance

The Committee has recommended that the Society be a partner in the Renaissance Banff Conference in July 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 special Coxeter Day in commemoration of the life and mathematics arts connections of Donald Coxeter. The possibility of linking the event to mathematics promotion, mathematical education and the 2005 Forum are being considered. The Proceedings will be published and the CMS may be responsible for the distribution of the proceedings in Canada. The CMS will assist with advertising the event so that as many Canadians as possible participate and consider giving a lecture or organizing a workshop session. Information on the Bridges Conferences can be found at: *www.sckans.edu/~bridges.*

Math in Moscow

The joint NSERC-CMS Math in Moscow Scholarships Program has been renewed for a second 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.

CMS Excellence in Teaching Prize

The first competition was held in November 2003 and the Committee received very strong nominations. The first recipient is Leo Jonker from Queen's University who will receive the award at the CMS 2004 Summer in Halifax.

Posting of CMS Journals on Springer Link

The Society is investigating the possibility of posting our journals on "Springer Link". This could result in significantly increased visibility and marketing for our journals and consequently increased revenues. The Executive has voted to study the feasibility of such an initiative and has expressed the wish that we also maintain the delivery of our journals on our website.

EDUCATION COMMITTEE
Richard Caron (Windsor), Chair

The Education Committee met at the 2003 Summer Meeting and the 2003 Winter Meeting. The Summer Meeting was dominated by discussions related to the 2003 Mathematical Education Forum. At the Winter Meeting, the Committee was updated on activities related to the planning of the follow-up Forum to be held in 2005. In addition, the meetings were occupied with reports on activities taking place throughout the year.

As the Adrien Pouliot Award was not awarded in 2002, we were delighted to receive two excellent applications in 2003. The winner was Dr. Andy Liu of the University of Alberta and he received the award at the 2003 Winter Meeting. The other nomination is being held for reconsideration in 2004.

The Chair acted as one of four referees for the first CMS Teaching Excellence Award. There were six superb nominations. The winner is Dr. Leo B. Jonker of Queen's University who will receive the award in Halifax in June 2004.

The Committee awarded grants to all 6 applicants for support of provincial contests. The total awarded was $3,500. The applicants were from P.E.I., Newfoundland, Québec, Ontario, Manitoba, and Alberta. Over 3000 students participate in the supported contests, with about 46% being female.

The Education sessions at the Edmonton Summer Meeting were organized by Ted Lewis. The sessions attracted a good audience, were of very good quality, and enjoyed good post-talk discussions. Malgorzata Dubiel organized the Education Sessions for the Vancouver Winter Meeting. There was one session with three talks and a panel discussion. The panel discussion topic was "School Mathematics Curriculum: Is there any hope left for "Less is More"?. This continued one of the themes raised at the 2003 Forum, and is expected to be revisited in 2005. Richard Hoshino and John Grant McLoughlin will be organizing the Education Sessions for the Summer 2004 Meeting.

The Committee selected judges for the 2003 Canada Wide Science Fair in Calgary. Thanks go to the Chief Judge Dr. Bill Sands and his team members were Dr. Robert Woodrow, Dr. Michael Lamoureux, D. Elena Braverman, Dr. Thi Dinh, and Dr. Renate Scheilder, all of the University of Calgary.

The winners were **Malcolm Stagg**, Calgary, Alberta (Junior, $200 cash & certificate) "Evaluation of 3D Object Recognition Methods"; **Gregory Duggan**, Greater Vancouver, British Columbia (Intermediate, $300 cash & certificate) "Prime Suspect"; **Adrian Maler**, United Counties, Ontario (Senior $500 cash & certificate) "We Got Rhythm."

The Chair of the Education Committee is also a referee for the Math in Moscow competition. The winners selected in 2003 were Ms. Kristin Shaw, Vancouver and Mr. Thomas Zamojski (Montreal), for Fall 2003, and Mr. Sébastien Labbé (Sherbrooke), for Winter 2004.

We were pleased to have our budget proposal approved allowing the Committee to operate as in previous years. In addition to our usual items of business, in the coming year we hope to become more involved in the following aspects of our mandate.

With the addition of Harley Weston of the University of Regina and his expertise with Math Central we expect to be able to make some progress regarding the Education Materials on Camel. As an outcome of the Forum, there is a renewed interest in the creation of a national

mathematics educators group or association. Bradd Hart's membership on the committee, together with his role at the Fields Institute and his role as a co-chair of the 2005 Forum make this an opportune time to move ahead. We also expect to become deeply involved in the planning and implementation of the next forum.

PUBLICATIONS COMMITTEE
Dana Schlomiuk (Montreal), Chair

At the beginning of 2003, the Royal Society of Canada (RSC) made a proposal to the CMS that *Mathematical Reports/Comptes rendus* become a joint RSC/CMS publication. The Publications Committee discussed the proposal at length, including a conference between Christiane Rousseau, Dana Schlomiuk, James Mingo and Peter Borwein and meetings between Rousseau, Scholmiuk, Ram Murty (one of the Editors-in-Chief of the *Comptes rendus*), and Niky Kamran and Ken Davidson, representing the Royal Society of Canada.

The Publications Committee agreed to support the proposal in a basic form and financial and other details were referred to the Executive and Financial Committees. A written response to the proposal was sent to the Royal Society of Canada and it is presently under study by the members of the Academy of Sciences.

Three Associate Editors of the Canadian Journal of Mathematics and the Canadian Mathematical Bulletin had their terms ending at the end of 2003. A call for nominations was made and the Publications Committee received nine nominations. The Committee recommended, and the Board of Directors approved three new Associate Editors; namely Stephen Boyer from UQAM (topology), Pengfei Guan from McMaster (PDE) and Stephen Kudla from Maryland (representation theory).

At the June and December meetings of the Publications Committee, the editors-in-chief of the CMS periodicals and publications gave reports on the status of the publications. Reports were also received from the Technical Editor, the Web Services Manager and the Managing Editor. As no books have appeared in the "Tracts in Mathematics" series, the Committee agreed that the series should be discontinued.

The 2003 G. de B. Robinson Prize was awarded at the CMS Winter Meeting in Vancouver to James Arthur from Toronto for his article "A note on the Automorphic Langlands Group" which appeared in the Canadian Mathematical Bulletin 45 (4) (2002).

RESEARCH COMMITTEE
Ragnar-Olaf Buchweitz (Toronto), Chair

The 2003 Summer Meeting of the CMS was held in Edmonton on June 14-16, 2003, and welcomed 350 participants. The meeting was hosted by the University of Alberta with YanPing Lin as Meeting Director and Eric Woolgar as Chair, Local Arrangements.

The meeting began with Robert Moody (Alberta) delivering a Public Lecture entitled Tilings: An Evening Excursion to the Zoo.
The plenary speakers were:
- Ingrid Daubechies (Princeton University),
- Roland Glowinski (University of Houston),
- Gerhard Huisken (Universitaet Tuebingen/Albert Einstein Institute),
- James Lepowsky (Rutgers University),
- Dennis Shasha (Courant Institute).

The CMS Jeffery-Williams Lecture was delivered by Ram Murty (Queen's University) and the CMS Krieger-Nelson Lecture by Leah Edelstein-Keshet (UBC).

There were 13 sessions as described below and a Contributed Paper Session organized by the Meeting Director.
- Algebraic and Geometric Topology (Organizers: George Peschke, University of Alberta, Laura Scull, UBC, and Peter Zvengrowski, University of Calgary)
- Approximation Theory and Applied Harmonic Analysis (Organizers: Bin Han and Rong-Qing Jia, University of Alberta)
- Computational and Analytical Techniques in Modern Applications (Organizers: Peter Minev, University of Alberta)
- Conformal Field Theory (Organizers: Terry Gannon, University of Alberta, and Mark Walton, University of Lethbridge)
- Design Theory and Coding Theory (Organizer: John van Rees, University of Manitoba)
- Discrete Mathematics (Organizer: Vaclav Linek, University of Winnipeg)
- Dynamical Systems (Organizer: Michael A. Radin, Rochester Institute of Technology)
- Industrial Mathematics (Organizers: Biao Huang, Yanping Lin and Shijie Liu, University of Alberta)
- Infinite Dimensional Dynamical Systems (Organizers: Thomas Hillen, University of Alberta, and XiaoQiang Zhao, Memorial University of Newfoundland)
- Mathematical and Computational Finance (Organizers: Tahir Choulli and Jie Xiong, University of Alberta)
- New and Successful Courses and Programmes in Mathematics (Organizer: Ted Lewis, University of Alberta)
- Physics and Geometry (Organizers: Maung Min-Oo, McMaster University, and Eric Woolgar, University of Alberta)
- Real Analysis (Organizer: Erik Talvila, University of Alberta)

Two related activities were organized separately from the meeting. The 2003 Project NExTMAC National Workshop and the Conference for Women Graduate Students in Mathematics. These events were very successful and their organizers and sponsors are to be congratulated.

The 2003 Winter Meeting of the CMS was held in Vancouver on December 6-8, 2003 with 435 participants. The meeting was hosted by Simon Fraser University with Norman Reilly as Meeting Director and Malgorzata Dubiel as Chair, Local Arrangements.

The meeting included a well received Short-course on Cryptography with lectures by:
- Doug Stinson (Waterloo) - Introduction to Cryptography
- Neal Koblitz (Washington) - Elliptic Curve Cryptography
- Hugh Williams (Calgary) - Algorithmic Number Theory
- Mike Mosca (Waterloo) - Quantum Computing and Quantum Cryptography

The plenary speakers were:
- Tom Archibald (Acadia University),
- Deborah Ball and Hyman Bass (University of Michigan),
- Robert Calderbank (AT&T Laboratories, NJ),
- Andrew Granville (University of Montreal),
- Anand Pillay (University of Illinois, Urbana-Champaign),
- Madhu Sudan (MIT).

The CMS Coxeter-James Lecture was presented by Jingyi Chen, UBC, and the CMS Doctoral Prize Lecture was given by Alina Carmen Cojocaru, who obtained her thesis at Queen's University and is now at Princeton University.

There were 14 sessions as described below and a Contributed Paper Session organized by the Meeting Director.
- Combinatorics (Organizers: Petr Lisonek, Simon Fraser University, and Brett Stevens, Carleton University)
- Dynamical Systems, Celestial Mechanics (Organizer: Florin Diacu, University of Victoria)
- Graphs and Matroids (Organizers: Luis Goddyn and Ladislav Stacho, Simon Fraser University)
- Harmonic Analysis (Organizers: Izabella Laba, UBC, and Alex Iosevich, University of Missouri, Columbia)
- History of Mathematics (Organizer: Len Berggren, Simon Fraser University)
- Mathematical Biology (Organizer: Leah Keshet, UBC)
- Mathematical Education (Organizer: Malgorzata Dubiel, Simon Fraser University)
- Model Theory and Recursion Theory (Organizers: Robert Woodrow, University of Calgary, Bradd Hart, Fields Institute, and John Baldwin, University of Illinois at Chicago)

- This Symposium was organized in honour of Alistair Lachlan on the occasion of his 65th birthday and to recognize his many contributions to Model Theory and Recursion Theory.
- Nonlinear Partial Differential Equations (Organizers: Rustum Choksi and Keith Promislow, Simon Fraser University)
- Number Theory (Organizers: Michael Bennett and David Boyd, UBC, Peter Borwein, Imin Chen, and Stephen Choi, Simon Fraser University)
- Operator Algebras (Organizers: Marcelo Laca and Ian Putnam, University of Victoria)
- Quantum Cohomology and Mirror Symmetry (Organizer: Kai Behrend, UBC)
- Representations of Associative Algebras and Related Topics (Organizers: Vlastimil Dlab, Carleton University, and Shiping Liu,Université de Sherbrooke)
- Universal Algebra and Lattice Theory (Organizer: Jennifer Hyndman, UNBC)

The next four meetings of the CMS will be held in Halifax (Dalhousie University, Summer 2004), Montreal (McGill University, Winter 2004), Waterloo (University of Waterloo, Summer 2005), and Victoria (University of Victoria, Winter 2005). Summer 2004 will as well see a special joint conference of Canadian and French mathematical societies, the First Joint Canada-France Meeting of the Mathematical Sciences from July 12-15, 2004 in Toulouse, France.

The Research Committee chose Izabella Laba (UBC) as the 2004 Coxeter-James Prize Lecturer for the CMS Winter 2004 Meeting, Edward Bierstone and Pierre Milman (University of Toronto) jointly as the 2004 Jeffery-Williams Prize Lecturers, and Barbara Keyfitz as the 2004 Krieger-Nelson Prize Lecturer for the CMS Summer 2005 Meeting.

The pool of nominations for these prizes was very wide and deep this year, reflecting no doubt the massive faculty renewal under way at Canadian universities, as well as special research initiatives, such as the Canada Research Chair Program that bring very strong and talented researchers (back home) to Canada.

The Research Committee passed the following motions that are being submitted to the CMS Executive Committee and the Board of Directors for their consideration:
- that nominations for the Krieger-Nelson Prize be active for 3 years as is the case for the Jeffery-Williams Prize;
- that the call for nominations of all prizes includes solicitation of an up-to-date CV, where available", with the aim to provide more information on the nominees to the Research Committee;
- that the deadline for nominations for the Coxeter-James, Krieger-Nelson, and Jeffery-Williams Prize be moved forward to the end of June", to increase further the number of nominations, making the nomination deadline roughly parallel with those for other major Science awards in Canada, when people's minds are already or still in nomination mode.

STUDENT COMMITTEE
Susan Cooper (Queen's) and Robert Jurivcevic (Waterloo),Co-Chairs

This past year 2003 was a very productive and exciting year for the CMS Student Committee (often referred to as Studc, thanks to email!). Many other CMS committees, such as the Education Committee and the Advancement of Mathematics Committee, deal with some student related issues. The goal of Studc is to play a direct role in issues regarding students. Studc is a group of students 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 past members, in particular Renato Dedic who designed a fantastic Studc promotional poster, Krista Galway who worked on a project concerning teaching mathematics in Canadian elementary and high schools, and Dan Piché who was the founder and a terrific past chair of Studc.

The Committee is considering nominations for four vacancies for July 2004, including the newsletter editor position.

Operations Manual for the Student Committee
Before leaving Studc, Dan Piché began work on an operations manual for Studc. The purpose of this manual is to describe the ongoing Studc activities. It is hoped that this manual will be continually updated and will ease the transition of membership. Dan left behind a wonderful start on this project. Duana Kipling is now working on updating the manual.

Student Newsletter
One way in which Studc promotes the interaction between Canadian post-secondary mathematics students is through our newsletter. Studc has the goal of publishing and distributing two student newsletters a year, one in each of the fall and winter semesters. Antoine Khalil is currently the newsletter editor. Antoine will have overseen the publication of four very successful newsletters, two in 2002 and two in 2003, by the end of his term in June 2004. The fall 2003 newsletter was distributed in December.

Graduate Student Events
As in past years, Studc organized a social event for graduate students at each of the CMS meetings in 2003. The events are becoming more popular and have been well enjoyed. The Committee hopes to continue organizing these events at which Studc and the CMS are promoted to mathematics students from across Canada.

The next graduate student event will be held in Halifax during the CMS/CAIMS 2004 Summer Meeting.

The graduate student socials are overseen by the Studc co-chairs, Susan

Cooper and Robert Jurivcevic. 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 2003 we supported three regional conferences: the APICS Conference, the AARMS Summer School, and the ISM Annual Graduate Conference. An amount of $150 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, that Studc has provided support be acknowledged, and that photos and descriptions of the activity be given to Studc as that they can appear on the Studc web page.

Youness Lamzouri masterfully looked after this project in 2003. The Committee hopes to support four events in 2004, each at the amount of $125. Youness Lamzouri and Adriana Dawes will jointly be spearheading this project.

Teaching Math in Canadian Elementary and High Schools
The goal of Krista Galway's project was to collect data on the requirements to obtain various education degrees at many Canadian universities. Her goal was also to compare this data with her research on what school boards across Canada require their teachers to have. As part of her project, Krista attended the Canadian School Mathematics Forum which was held in Montreal in May 2003. This forum was very useful for Krista's project. Krista did a wonderful job at collecting her data and ended her term with Studc by writing up her findings. We hope that this worthwhile project will be continued by a new Studc member.

Connecting Women in Math Across Canada Conference
Susan Cooper was the graduate student representative on the organizing committee for the Connecting Women in Math Across Canada Conference. This conference was organized mainly by the CMS Women in Mathematics Committee and was held in June, just prior to the CMS 2003 Summer Meeting in Edmonton. The Conference concentrated on issues facing young women mathematicians as well as celebrated their energetic presence in Canada. The conference was well attended and was very successful. Studc looks forward to future joint projects with the CMS Women in Mathematics Committee.

Maintaining a Student Web Site
Boris Reitman is the current webmaster. Boris masterfully set up a web design for Studc and also worked with the CUMC 2003 organizer on the CUMC web page, in particular on the registration page. A major goal of Studc this coming year is to update the web site.

Canadian Undergraduate Mathematics Conference (CUMC)
CUMC 2003 was the 10th anniversary of CUMC! CUMC 2003 was held at York University from May 27 to June 1. The CUMC 2003 President was Joy Abramson who, with her committee, did a fantastic job! The conference was a huge success which was largely attended. Photos of

the conference can be seen on the CUMC website. The CMS provided $1,000 towards the 2003 CUMC.

A CUMC operations manual was developed by Dan Piché, Benoit Charbonneau, and the CUMC 2002 Committee. The goal of this manual is to aid in the continuity of the CUMC. The manual was used for the CUMC 2003 was very helpful.

CUMC 2004 will be held June 16 to June 20, immediately following the CMS/CAIMS 2004 Summer Meeting, at Dalhousie University in Halifax. See *www.cumc.math.ca* for more details.

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, and fostering better communication between CUMC organizers and Studc. In addition to these projects we hope to initiate some joint work with the MITACS Student Advisory Committee (SAC) including the creation of a MITACS student representative position on Studc. We look forward to reporting on these projects in 2004!

WOMEN IN MATHEMATICS COMMITTEE
Malgorzata Dubiel (Simon Fraser), Chair

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

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 mathematical sciences. The Directory is a valuable source for information about Canadian women mathematicians.

The most important project of 2003 was the conference Connecting Women in Mathematics Across Canada (CWiMAC). The conference took place from June 11th to 13th, immediately prior to the CMS 2003 Summer Meeting. The Department of Mathematical and Statistical Sciences, University of Alberta was the host for this meeting which is also supported by the Pacific Institute for the Mathematical Sciences and Simon Fraser University.

Thirty women graduate students from Canadian universities attended the conference. They attended two plenary talks, given by Priscilla Greenwood (UBC and Arizona State University) and Christiane Rousseau (Montréal), and two panel discussions: "Balancing a Career and a Personal and Family Life", and "Career Strategies: How to Survive a Graduate School and Get a Job You Want". Both panels were followed by small group discussions. In addition, the participants presented papers on their research. Many participants remained in Edmonton for the CMS 2003 Summer Meeting.

The conference was very successful, and the Committee decided that it will attempt to make it a biannual event, and that the next conference will take place in 2005, possibly at the BIRS.

Chantal David (Concordia) ended her term on the Committee in December 2003 and my term as Chair of the Committee also ended. I will be remaining on the Committee as a member and Judith MacDonald (Western Washington), who joined the Committee in June 2003 as Chair-Elect, will take over as the new Chair in 2004.
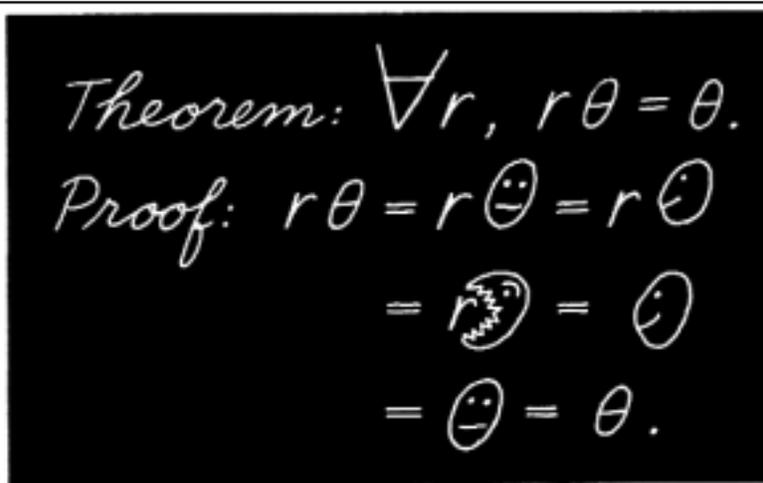
From Howard Eves, *Mathematical Circles Squared*, Quadrant IV, #330.

EXECUTIVE OFFICE TASK FORCE REPORT

by Christiane Rousseau

The Task force consisted of Eddy Campbell, President-Elect, Christiane Rousseau, President and Arthur Sherk, Treasurer.

The mandate of the Task Force was quite broad: look at the future of the CMS in view of:

- the increasing number of activities and the possible new responsibilities for the CMS;
- the workload of the office;
- the space problem - it is not possible to hire additional staff as there is no free office space to locate them. Moreover the situation of CMS inside the University of Ottawa is uncertain and we may lose some of our existing space on a short term notice;
- the possible departure of Graham Wright in 2005.

During the fall of 2003 it became evident that the Task Force should also address the financial situation facing the Society. The American dollar is very low and, according to experts, will remain very low for the next few years. As many subscriptions are paid in American dollars, this means considerably reduced revenues from subscriptions and an expected recurrent deficit in our Operating Budget for the next years. This may force a cut in valuable CMS activities.

The Task Force visited the Executive Office in Ottawa on August 27-28 and it met with each member of the staff and reviewed the tasks and concerns of the staff.

The space problem

To solve the space problem, the CMS is in negotiation with the University of Ottawa for a solution that would meet both the needs of CMS for the next years and the needs of the Department of Mathematics and Statistics in a shared building. Indeed the Department is faced with an increase of its activities, several of which come from its recent affiliation with CRM and The Fields Institute, and a lack of space. Different options are being considered, one being the construction of a new building for both the CMS and the Department of Mathematics and Statistics, another being a move of the CMS Executive Office to elsewhere on the University of Ottawa campus. For the first option, the CMS may consider putting a substantial down-payment from the endowment funds. In exchange the Society would seek a long-term lease without paying rent or maintenance during this period.

Both options being considered have the advantage of continuing a long-term relationship with the Mathematics and Statistics Department at the University of Ottawa.

CMS activities and possible directions for future development

The current level of activities is high:

- An important membership drive is required, particularly in view of the fact that many colleagues are retiring and a lot of young mathematicians are being hired in Canadian departments. Every effort should be made to convince new faculty members to join the CMS.

- For the next three years there will be three meetings a year.
- Revenues from our publications have decreased significantly and it is likely this will continue for a few years, thus requiring additional efforts in marketing our publications.
- The demand on Electronic services is always increasing and there is an impressive backlog of things to be done.
- The number of education activities is growing: more math camps every year, distribution of posters, launching of the Canadian Virtual Math Trail. Many other smaller activities which require significant work from the Executive Office are important for the vitality of our community, for instance the CMS-NSERC Math in Moscow Scholarship and the new Excellence in Teaching Prize.
- There is a need of resources in two areas: support for the meetings and support for electronic services.
- The CMS is under constant pressure to increase the number of its activities. Here are a few examples:
  - The Mathematics Education Fora should take place every 3 or 4 years.
  - The CMS has been approached by the Statistical Society of Canada to undertake the managerial aspects of its activities (memberships, subscriptions, meetings) and a feasibility study is underway. It is hoped this study will be completed by the summer.
  - CMS may be involved in the production and distribution of more publications: Comptes rendus of the Royal Society of Canada, For the Learning of Mathematics (CMESG), and perhaps the journals of other societies. If we were to assist with other publications, additional resources would be needed at the Publications Office and in the Executive Office.
  - Following the Forum, the CMS has been asked to play a leadership role in linking together the mathematics teachers and provincial associations of mathematics teachers in the country.

The Task Force has taken these factors into account and tried to build a model where expansion is possible.

Financial Constraints

The decrease in revenues has put very strong constraints on our actions. We have no choice than to decrease our recurrent expenses and to find revenue generating activities.

All activities require support from the Executive Office but revenue generating activities require more as they are less likely to be done by volunteers. The main directions where we can expect to generate revenues are:

- increasing the number of our publication subscriptions;
- selling services for memberships or subscriptions;
- contracting more services for the Publications Office.

For many years we have tried to think of ways to generate more revenues with our electronic services but it is likely and such revenues will be minimal.

The Executive Office

Taking into account the workload of the Office, the current situation and the future demands on the Executive Office personnel, a restructuring was considered necessary.

The Task force recommended that the position of Executive Director become a regular full-time position and that the Executive Director be the Head of the Executive Office. A second recommendation was to abolish the position of Operations Manager and to create a full-time position of Meetings Coordinator. These recommendations were accepted unanimously by the Executive Committee.

Revised job descriptions have been developed for all positions within the Executive Office. The consequence is that Monique Bouchard is no longer with the CMS. You will appreciate this was a very difficult decision but one that was felt to be in the best interests of the Society. We have prepared a package for Monique that takes into account the time she has worked for CMS and the dedication she has put into her position. All of us wish her well in the new stage of her career.

With the new structure CMS will be able to consider taking over new initiatives and new revenue generating projects. We still lack resources for Electronic Services but we hope our efforts to improve the financial situation will help the CMS commit more resources to this important activity in the future.

2004 ENDOWMENT GRANTS COMPETITION
CALL FOR PROPOSALS

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

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

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

1. To unify and support Canadian mathematicians through effective communication, broad membership, sponsorship of diverse activities, and partnerships with like professional societies.

2. To support mathematics research through the communication of current research to both the specialist and non-specialist, public recognition of research accomplishments and collaboration with the research institutes and granting agencies.

3. To support the advancement of mathematics education through joint projects with mathematics educators at all levels, promotion of educational advancements, and partnerships with provincial ministries of education and organizations supporting mathematics education.

4. To champion mathematics through initiatives that explain, promote and increase the general understanding of mathematics, provide extra-curricula opportunities for students, and encourage partnerships with corporate, government and not-for-profit agencies.

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

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

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

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

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

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

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

PRESIDENT'S 2003 ANNUAL REPORT
Christiane Rousseau

2003, a splendid year for mathematics in Canada

2003 was an exciting year for mathematics in Canada. In March there was the inauguration of Banff International Research Station (BIRS). BIRS provides mathematicians with an exceptional facility to concentrate on research and exchange ideas in a splendid environment. In May the Canadian School Mathematics Forum took place in Montreal: it raised a lot of enthusiasm for mathematics education in Canada and follow-up activities are taking place across Canada. We received more nominations for our prizes than in the previous years, including our new Excellence in Teaching Award. The high quality of these nominations reflects the quality of mathematics and mathematics education in Canada. Our regular activities flourish more than ever, as acknowledged by the reports from all our committees: large numbers of participants in both our semi-annual meetings, prizes and awards, an active publication programme, high school mathematics competitions, Math Camps (there were 13 in 2003 with at least one camp in every province), electronic services for the community, and the Endowment Grants Competition. Further, for the second consecutive year the problems in Crux Mathematicorum with Mathematical Mayhem are available in both official languages.

The CMS Summer meeting (University of Alberta)

There were thirteen symposia on various themes at this meeting including one on education besides contributed papers, five plenary talks, a public lecture, and two prize lectures. The Jeffery-Williams Lecture was given by Ram Murty (Queen's) who was the 1988 Coxeter-James Lecturer. The Krieger-Nelson Lecture was given by Leah Keshet (UBC). The five distinguished plenary speakers were Ingrid Daubechies (Princeton University), Roland Glowinski (University of Houston), Gerhard Huisken (Tuebingen/Albert Einstein Institute), James Lepowsky (Rutgers University), and Dennis Shasha (Courant Institute). A public lecture An evening excursion to the zoo was delivered by Robert Moody (University of Alberta). For the first time the CMS Summer Meeting was preceded by the Conference Connecting women in Mathematics across Canada intended for Women Graduate Students in Canada organized jointly by the CMS Committee for Women in Mathematics and the Pacific Institute of Mathematical Sciences. The CMS Summer Meeting was also preceded by the second NExTMAC workshop ("New Experiences in Teaching Mathematics Across Canada"), intended for relatively new Mathematics/Statistics faculty with goals to assist junior faculty to become better and more effective teachers. The meeting was followed by the Fourth Geoffrey J. Butler Memorial Conference on June 17-21 which was also held at the University of Alberta.

The CMS Winter meeting (Simon Fraser University)

Two special features of this meeting were: a short-course in cryptography, two lectures on subjects bordering mathematics and theoretical computer science and a plenary lecture in history of mathematics. The Coxeter-James Lecture was been given by Jingyi Chen (UBC) and the Doctoral Prize Lecture by Alina Carmen Cojocaru (Queen's University). Other plenary lecturers were by Thomas Archibald (Acadia University), the duo Hyman Bass and Deborah Ball (University of Michigan), Robert Calderbank (AT&T Laboratories), Andrew Granville (University of Montreal), Anand Pillay (University of Illinois at Urbana-Champaign) and Mahdu Sudan (MIT). The presence of Mahdu Sudan reminded us of the time when we honoured him at the Canadian Embassy in Beijing as the recipient of the Nevanlinna Prize during ICM 2002. The participants also had their choice among fourteen diverse symposia including one in Education and one in History of mathematics. At the banquet we honoured our four prize winners: Andy Liu, winner of the 2003 Adrien Pouliot Prize in mathematical education, James Arthur, winner of the G. de B. Robinson Prize for the best article A Note on the Automorphic Langlands Group in the Canadian Mathematical Bulletin, 2001-2002, Jingyi Chen, winner of the 2003 Coxeter-James Prize and Alina Carmen Cojocaru, winner of the CMS 2003 Doctoral Prize.

Canada School Mathematics Forum

148 delegates attended the Canada School Mathematics Forum at UQAM, May 16-18 2003, The Forum provided an opportunity to compare issues and best practices across the country and to forge links across the different levels of education and across the traditional provincial boundaries. Working groups have identified issues on which subgroups will prepare more detailed findings to be presented at the second Forum in 2005. On behalf of all delegates to the Forum and of all those who think that mathematical education is an important issue in Canada, I thank the members of the scientific committee and the local organizers, especially Louis Charbonneau from UQAM.

Discussions at the Forum were concerned with the following:

- Mathematical education for aboriginal students.
- Elementary school teachers and their development.
- Maintaining the momentum of the Forum with the provincial associations and with the ministries of education.
- Leadership role for CMS in mathematical education in the country at different levels.
- Need of networking good educational material.

Math in Moscow

The winners of the spring competition were Thomas Zamojski (McGill) and Kristin Shaw (UBC) who spent the fall 2003 in Moscow. The Math in Moscow programme has been renewed for a second year. The winner of the fall competition was Sébastien Labbé, from the Université de Sherbrooke. He will spend the winter 2004 at the Moscow Independent University. The deadline of the next competition was April 15 2004 and two scholarships will be awarded.

CMS Excellence in Teaching Award

The new CMS Excellence in Teaching Award supported by Nelson &

Brooks/Cole was announced during the Summer Meeting in presence of Janet Piper from Nelson Thompson Learning. The prize recognizes sustained and distinguished contributions at the level of post-secondary undergraduate teaching. The deadline of the first competition was November 15 and the committee received very strong nominations, thus showing the importance and quality of undergraduate teaching in many departments throughout the country.

ICM 2010
As mentioned in my report last year, we had approached the International Mathematical Union (IMU) and NRC about a possible bid from Canada to host the International Congress of Mathematicians in Montreal in 2010 (ICM 2010). We are now conducting a feasibility study, particularly regarding the financial requirements, with the National Research Council and with the Palais des Congrès in Montreal. It is hoped to reach a final decision concerning this initiative by May 2004.

Coxeter Commemorative Events
The CMS will be jointly hosting the following events: a conference in the honour of Coxeter at the University of Toronto in May 2004 and the Renaissance Banff in July 2005. The Banff Renaissance Conference will be part of the International Bridges Conferences on Mathematical Connections in Art, Music and Science. It is an initiative of Robert Moody with collaborative effort from 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 mathematical art connections of Donald Coxeter. The proceedings will be published and distributed in the country. We hope that many Canadians will decide to participate and propose to give a lecture or organize a workshop session.

First Canada-France Meeting
We are only a few months away from the Canada-France Toulouse meeting. I am very happy to announce the program of students and post-doc travel awards sponsored by the three Institutes (CRM, The Fields Institute and PIMS), together with the SSC (Statistical Society of Canada), CAIMS (Canadian Applied and Industrial Mathematical Society) and the CMS. Fifteen travel awards of $500 each will be given to students and post-docs making a poster presentation. Details regarding applications for travel support can be found at:
www.cms.math.ca/Events/Toulouse2004/announce.e#grad_travel.

Joint Meetings in Halifax
The CMS/CAIMS Summer Meeting in 2004 is a joint event with the participation of the Canadian Symposium on Fluid Dynamics and the Canadian Society for the History and Philosophy of Mathematics. This joint meeting will take place immediately after the MITACS 2004 Annual Meeting and just before the 2004 Canadian Undergraduate Mathematics Conference. We hope this will encourage the participation of many students, post-docs and applied mathematicians.

CMS Office
An Executive Office task force was formed in June 2003 to look into the future of CMS in view of:

* the increasing number of activities and the possible new responsibilities of CMS;
* the workload of the office;
* the space problem in the current building; and
* the possible departure of Graham Wright in 2005.

The Task Force comprised Eddy Campbell, President-Elect, Christiane Rousseau: President, and Arthur Sherk, Treasurer. They visited the CMS Office for two days in August 2003. During the fall of 2003 it became evident that the Task Force should also address the financial situation facing the CMS, which is expected to continue for the next few years. The Report of the Task Force was submitted in January 2004. The Report recommended a new structure for the Executive Office which should enable the CMS to consider new revenue generating projects. The Executive Director's Report provides further details on the space problem for the Executive Office.

Financial difficulties of the CMS
The financial situation of the CMS is no longer rosy. A big part of the deficit for 2003 is due to the low American dollar and to the fact that non-Canadian libraries pay their subscriptions in American dollars. As the Canadian dollar is expected to remain high compared to the American dollar, this situation is likely to continue for the next few years. The CMS will have no choice but to either increase revenues or cut expenses. The Executive Committee is working hard to raise additional revenues. Eddy Campbell is working towards a major professional fund-raising drive.

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 the 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 the Executive Committee, Board of Directors and committee members, with particular thanks for Jonathan Borwein who, in June 2003, ended a four year term as President-Elect, President and Past President.

CMS WINTER MEETING 2004
December 11 – 13 décembre
Université McGill University, Montréal, Québec

The Department of Mathematics and Statistics, McGill University is happy to announce the provisional outline for the Canadian Mathematical Society Winter Meeting 2004, to be held at the Hilton Bonaventure in downtown Montreal. Look for the First Announcement in the September 2004 issue of the *CMS Notes* and at *ww.cms.math.ca/ Events/winter04/* for the latest updates.

Le département de mathématiques et statistiques de l'Université McGill est heureux d'annoncer les détails provisoires pour la Réunion d'hiver 2004 de la SMC, qui se tiendra au Hilton Bonaventure au centre-ville de Montréal. 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/hiver04/* pour les informations les plus à jour.

PLENARY LECTURES / CONFÉRENCIERS PRINCIPAUX
Michael Bennett (UBC)
Persi Diaconis (York)
Rainer Steinwandt (Universität Karlsruhe)
Rostislav Grigorchuk (Texas A&M)

PRIZES / PRIX
Coxeter-James Lecture: Izabella Laba (UBC)
Doctoral Prize Lecture: to be announced / à venir
Adrien Pouliot Prize: to be announced / à venir
G. de B. Robinson Award: to be announced / à venir

SYMPOSIA

Algebraic Combinatorics: François Bergeron, R. Biagioli, Peter McNamara, and Christophe Reutenauer (all UQAM)
Approximation Theory: Richard Fournier and Paul Gauthier (both Montreal)
Arithmetic Geometry: Eyal Goren and Adrian Iovita (McGill)
Combinatorial and Geometric Group Theory: Inna Bumagin (Carleton) and Dani Wise (McGill)
Commutative Algebra: Sara Faridi (UQAM), Sindi Sabourin (York), Will Traves (UQAM) and Adam van Tuyl (Lakehead)
Discrete Geometry: Karoly Bezdek and Bob Erdahl (both Calgary)
Dynamical Systems: Michael A. Radin (RIT)
Groups, Equations, non-commutative Algebraic Geometry: Olga Kharlampovich and Alexei Miasnikov (both McGill)
Harmonic Analysis: Galia Dafni (Concordia)
History of Mathematics: Thomas Archibald (Acadia), Rich O'Lander, Ron Sklar (St. John's) and Alexei Volkov (McGill)

Interactions between Algebra and Computer Science: Alexei Miasnikov (McGill) and Vladimir Shpilrain (CUNY)
Mathematical Methods in Statistics: Russell Steele, Alain Vandal and David Wolfson (all McGill)
Mathematics for Future Teachers: Leo Jonker (Queen's)
Number Theory: Andrew Granville (Montreal)
Special Metrics and Submanifolds in Riemannian Geometry: Gordon Craig (McGill) and Spiro Karigiannis (McMaster)
Regularization Problems in Statistics: Jim Ramsay (McGill)
Universal Algebra and Complexity: J. Hyndman (McGill), B. Larose (Concordia), and Denis Therien (McGill)
Contributed Papers: William Brown (McGill)

Meeting Director: Olga Kharlampovich (McGill)
Local Arrangements: William Brown (McGill)

SYMPOSIUMS

Combinatoire algébrique : François Bergeron, R. Biagioli, Peter McNamara, et Christophe Reutenauer (UQAM)
Théorie d'approximation : Richard Fournier et Paul Gauthier (tous Montreal)
Géométrie arithmétique : Eyal Goren et Adrian Iovita (tous McGill)
Théorie des groupes combinatoire et géométrique : Inna Bumagin (Carleton) et Dani Wise (McGill)
Algèbre commutative : Sara Faridi (UQAM), Sindi Sabourin (York), Will Traves (UQAM) et Adam van Tuyl (Lakehead)
Géométrie discrète : Karoly Bezdek et Bob Erdahl (tous Calgary)
Systèmes dynamiques : Michael A. Radin (RIT)
Groupes, Équations, géométrie algébrique non-commutative : Olga Kharlampovich et Alexei Miasnikov (McGill)
Analyse harmonique : Galia Dafni (Concordia)
Histoire des mathématiques : Thomas Archibald (Acadia), Rich O'Lander, Ron Sklar (St. John's) et Alexei Volkov (McGill)

Intéractions entre la science informatique et l'algèbre : Alexei Miasnikov (McGill) et Vladimir Shpilrain (CUNY)
Méthodes mathématiques en statistique : Russell Steele, Alain Vandal et David Wolfson (tous McGill)
Mathématiques pour futur professeur(e)s : Leo Jonker (Queen's)
Théorie des nombres : Andrew Granville (Montreal)
Distances et sous-variétés spéciales de la géométrie Riemanienne : Gordon Craig (McGill) et Spiro Karigiannis (McMaster)
Problèmes de régularisation en statistiques : Jim Ramsay (McGill)
Algèbre universelle et complexité : J. Hyndman (McGill), B. Larose (Concordia), et Denis Therien (McGill)
Communications libres : William Brown (McGill)

Directrice de réunion: Olga Kharlampovich (McGill)
Logistique locale: William Brown (McGill)

CONCOURS DE BOURSES DU FONDS DE DOTATION 2004

APPEL DE PROPOSITIONS

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

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

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

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

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

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

4. Défendre les mathématiques en créant des initiatives visant à expliquer, à promouvoir et à mieux faire connaître la discipline, en

organisant des activités parascolaires et en encourageant les partenariats avec les sociétés privées, les gouvernements et les organismes à but non lucratif.

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

Le CABFD évaluera les projets qui s'étalent sur un maximum de trois ans. Les projets s'échelonnant sur plusieurs années seront toutefois financés en fonction des fonds dont disposera le Comité l'année de la demande. Le Comité se limitera aux propositions dont le financement demandé n'excède pas 5 000 $ par année.

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

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

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

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

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

TRIVIA

1) According to Keith Devlin in his book "The Math Gene", what activity engaged by early Homo Sapiens accounts for mankind's innate mathematical ability?
    a) Food storage   b) Rock Throwing
    c) Tool making   d) Gossip

2) Which of the following "Bond girls" majored in Mathematics and Engineering in College?
    a) Jill St. John (Diamonds are Forever)
    b) Ursula Andress (Dr.No)
    c) Jane Seymour (Live and let Die)
    d) Teri Hatcher (Tomorrow Never Dies)

3) What psychedelic rock song contains the lyric: "logic and proportion have fallen sloppy dead"?
    a) Barett's Privateers   b) Whiter Shade of Pale
    c) Lucy in the Sky with Diamonds   d) White Rabbit

4) Who was named man-of-the-20th-century by the Financial Post?
    a) Albert Einstein   b) John von Neumann
    c) Andrew Wiles   d) Bill Gates

Readers are invited to send their favorite mathematical trivia to Gordon MacDonald — *gmacdonald@upei.ca* — for possible inclusion.   ANSWERS ON PAGE 30

CALLS FOR NOMINATIONS / APPEL DE CANDIDATURES
Conférenciers Coxeter-James, Jeffery-Williams, Krieger-Nelson Prize Lectureships

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

The **Coxeter-James Prize Lectureship** recognizes young mathematicians who have made outstanding contributions to mathematical research. 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 2005 Meeting in Victoria. Nomination letters should include at least three names of suggested referees and a recent C.V., if available. The recipient shall be a member of the Canadian mathematical community.

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 2006 Meeting in Calgary. Nomination letters should include three names of suggested referees and a recent C.V., if available. The recipient shall be a member of the Canadian mathematical community.

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 2006 Meeting. Nomination letters should include three names of suggested referees and a recent C.V., if available. The recipient shall be a member of the Canadian mathematical community.

The deadline for nominations is **September 1, 2004**. Letters of nomination should be sent to the address below.

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

Le **prix Coxeter-James** rend hommage 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 2005, qui aura lieu à Victoria. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles et un C.V. récent, si disponible. Le récipiendaire doit être membre de la communauté mathématique canadienne.

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 2006 qui aura lieu à Calgary. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles et un C.V. récent, si disponible. Le récipiendaire doit être membre de la communauté mathématique canadienne.

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 2006. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles et un C.V. récent, si disponible. Le récipiendaire doit être membre de la communauté mathématique canadienne.

La date limite pour les mises en candidature est **le 1er septembre 2004.** Faire parvenir vos lettres à l'adresse suivante:

Ragnar-Olaf Buchweitz
CMS Research Committee / Comité de recherche de la SMC
Department of Mathematics
University of Toronto
Toronto, Ontario, Canada M5S 1A1

TRIVIA ANSWERS

1.D   2.D   3.D   4.B

NEWS FROM THE INSTITUTES

THE FIELDS INSTITUTE FOR MATHEMATICAL RESEARCH

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

Barbara Keyfitz has made profound and original contributions to applied mathematics, particularly in the study of nonlinear partial differential equations such as those arising in the study of fluid flow or transonic shock waves. She has a distinguished record of research, mentoring, and service to her profession. For more information, call or e-mail the Fields Institute at *geninfo@fields.utoronto.ca* **or 416-348-9710, or consult** *www.fields.utoronto.ca*

SCIENCE AND ENGINEERING ACHIEVERS HONOURED

The winners of the six 2004 NSERC Steacie Fellowships are:

Dr. Mosto Bousmina, Université Laval
Dr. Thomas Brabec, University of Ottawa
Dr. George Eleftheriades, University of Toronto

Dr. Lisa Jeffrey, University of Toronto
Dr. Eric Hessels, York University
Dr. Patrick Keeling, University of British Columbia

The Fellowships will be presented at a ceremony in Ottawa later this year. For photos and full details on the researchers and their achievement, visit *www.nserc.ca/media_e.htm*.

CMS Excellence in Teaching Award
for post-secondary undergraduate teaching in Mathematics

Prix d'exellence en enseignement de la SMC
pour l'enseignement collégial et de premier cycle universitaire en mathématiques

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

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

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

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

**Deadline for nomination is:
November 15, 2004**

**Date limite pour soumettre une
candidature : 15 novembre 2004**

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

THOMSON NELSON   THOMSON BROOKS/COLE

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

HOW NSERC DISCOVERY GRANTS IN MATHEMATICS ARE DETERMINED
Report from the Vice-President

Kathryn Hare, VP, Ontario (University of Waterloo)

For the last two years I have served on the NSERC Grant selection committee 336. This is the committee that handles grant applications for pure mathematicians. There is a separate committee (GSC 337) that handles applied mathematicians' applications and they follow similar procedures.

NSERC GSC 336 Membership
There are eight mathematicians on GSC 336, serving staggered three-year terms. Committee members are chosen by NSERC for their expertise in mathematics, good judgment and broad knowledge, with advice from the mathematical community. The committee reflects the diversity of the population of Canada and the mathematics community. In particular, the research interests of the committee members are quite varied. Both men and women serve on the committee, the different regions of Canada are reflected in the membership and the committee must be able to assess applications written in either English or French. Members are also chosen from outside Canada to bring experience with other peer review systems and more breadth in the research expertise.

Committee members do not 'represent' any particular constituency. All members are expected to read and participate in the discussion and decision-making on all applications, except when there is a conflict of interest. Conflicts of interest include such things as being a departmental colleague, supervisor of the applicant or recent collaborator. Those on the committee in a conflict of interest with respect to an applicant are not even present in the room when that application is discussed and decided upon.

Criteria for Grants
Although individual researchers and university committees may sometimes use the size of research grants as a measure of stature, it should be emphasized that excellence of the researcher is only one of four criteria used in determining the grant. The four criteria are:
- Excellence of the researcher
- Merit of the proposal
- Contribution to the training of highly qualified personnel and
- Need for funds.

It should also be emphasized that the grant selection committee has no influence on the overall size of the budget NSERC gives them to award.

Use of Preliminary Information
Although all members of the committee read all applications, two members are chosen as internal reviewers for each file. Committee members are given the titles and key words from the Form 180's submitted by the applicants in the summer, and are asked to evaluate their ability to review the application. Based on this evaluation and other information given in the Form 180 the chair assigns the two internal reviewers. It is quite important that the applicant present clear information about their proposal on this form so the most appropriate people can be chosen as internal reviewers.

Five arms-length referees are selected by one of the internal reviewers based on the information in the Form 180; two or three referees are typically chosen from the list suggested by the applicant. The referees receive the complete application, including the four samples of research contributions that the candidate provided to NSERC, and are asked to evaluate the grant application based on the four criteria mentioned above.

Merit of Proposal
As everyone on the committee reads and discusses all the applications it is beneficial to write the proposal in such a way that non-specialists can understand and appreciate the quality and impact of the research. But the proposal should also include enough detail so that experts can thoroughly evaluate it and be convinced as to its merit. The public statement could be used to give a brief overview of the research project in terms a non-specialist can appreciate.

The research proposal should clearly indicate the goals, approach and methodology, placing the problem(s) in the appropriate context. Relevant past work of both the applicant and others should be discussed. The committee is looking for credible research programs that will have impact and interest in the mathematical community. Put time and thought into the proposal. A poorly written proposal can have a detrimental effect on the size of the award and even on whether or not a grant is recommended at all.

Excellence of Researcher
The application form asks the applicant to discuss their five most significant, recent contributions. This is a good opportunity for the applicant to explain what they have done and why their work is important and exciting. The committee is interested in quality, rather than quantity, and would like to know about the significance of the past research and the impact it has had on mathematics. All research contributions of the last six years can also be listed; it is helpful if these are recorded in one place. Invited talks, awards and service to the community are other ways to provide evidence of excellence.

Training of Highly Qualified Personnel
NSERC is very interested in the training of highly qualified personnel. Provide as much information, as is reasonable, about past research involvement with undergraduates, graduate students and postdoctoral fellows, and what former students are doing today. Explain how students will be involved in the research program that is proposed. It is helpful to be reminded if the applicant's department does not have a graduate (or only a master's) program. The committee is also sensitive to the fact that recent PhD's often need time to develop their own independent research program before they are ready to supervise doctoral students and postdoctoral fellows.

Budget

In the budget the applicant should detail their needs. Since there is an expectation of training, funds should normally be budgeted for students and/or postdoctoral fellows. It is very helpful if names of (prospective) trainees can be given. Similarly, it is helpful to name collaborators to be visited and specify conferences to attend. Be aware that the committee cannot award more than is requested. On the other hand, the committee's budgetary limitations are such that it is not possible to meet most people's needs.

More advice on how to prepare an application can be found on the NSERC web site (see "How to Write a Winning Proposal" available on the Discovery Grants page of the NSERC Web site). We recommend that applicants read over their applications carefully and be sure they are complete. New people may find it beneficial to receive help from experienced applicants.

The NSERC forms and rules may seem awkward or inconvenient at times, but they impose a common structure that can be very helpful for the readers. Following instructions on font size and margins is most appreciated by the committee, as are proposals that are clearly laid out and easy to read.

Decision Making Process

In December the committee receives all the grant proposals. In addition, the two internal reviewers on each case receive copies of the four research contributions sent by the applicant. Referee reports are forwarded to all committee members as they are received. Each committee member independently reads and evaluates each proposal, without discussion with other members.

In early February the committee meets in Ottawa for deliberations. For each application, the two internal reviewers lead the discussions and present their evaluation of the proposal. Each independently recommends an amount for the grant taking into account the four criteria mentioned earlier and the NSERC budget. (There is never enough money to award all people the size of grants we think would be appropriate!) Each case is discussed thoroughly and then the committee votes on the award by the method of a Dutch auction. Voting begins with the highest amount that was suggested and the amount decreases until the majority of the committee is in agreement. After all the applications have been decided upon, the committee reviews their decisions to check for anomalies and ensure that there has been consistency across the several days of deliberations.

The time period for the grant is also determined by the committee. The normal period for an award is now five years, but the committee may choose to award a shorter period. This could happen, for example, if the committee felt it was to the candidate's advantage to reapply in less than five years or if specific concerns were noted about the application.

Finally, the committee prepares comments for new applicants and returning applicants who have not been awarded a grant, received a significant reduction in their grant or a shorter period of time than requested. We hope these comments are helpful.

It is very interesting to serve on the GSC and see the breadth and quality of mathematical research carried out in Canada, and satisfying to play a small role in fostering its development.

CALL FOR NOMINATIONS / APPEL DE NOMINATIONS

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

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

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

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

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

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

OBITUARY

Siegfried Thomeier

Siegfried Thomeier passed away peacefully and courageously in hospital on Friday March 12, 2004. He was born in 1937, to a German family in the Sudetenland region of Czechoslovakia, and trained as a mathematician at the University of Frankfurt, receiving his doctoral degree (Dr. Phil. Nat.) in Algebraic Topology in 1965. Dr. Thomeier was Assistant/Associate Professor at the University of Aarhus in Denmark from 1965 to 1968 and joined Memorial University as a Full Professor in 1968. He held that position until his retirement in 1996.

His mathematical research was on Whitehead products, an important topic related to the investigation of one of the deepest and most challenging problems of mathematics, the computation of the homotopy groups of the spheres. He was the main player in setting up the first Ph.D. programme (in the area of Algebraic Topology) in what was then the Department of Mathematics at Memorial University, in the early 1970s. He taught many graduate courses in that area. He was editor of several conference proceedings on some of these topics, and spoke on them at numerous conferences and universities in Europe and North America.

Siegfried Thomeier had an early interest in computers, owning his own Tandy in the 1970s at a time when, for many mathematicians, computers were something of a curiosity. In the 1980s he developed an interest in Coding Theory, and in particular error correcting codes, and gave talks on these topics at several conferences and universities. He was also involved with the history of mathematics.

His teaching was skilled and competent. His clear and precise teaching style translated into clear and precise lecture notes. Several of his former students have commented that both his professionalism and keen sense of humour stood out in the classroom. He took a strong interest in senior undergraduate Pure Mathematics courses at Memorial University, and over twenty-five honours students wrote their dissertations under his supervision.

He is survived by his wife Mechthild, son Wolfgang, daughter Karin and family in Germany.

Peter Booth
Memorial University of Newfoundland
St. John's, NF

RAPPORT ANNUEL 2003 DE LA PRÉSIDENTE *(SUITE)*

une université canadienne et or ganisé conjointement par le Comité des femmes en mathématiques de la SMC et l'Institut du Pacifique pour les sciences mathématiques
(PIMS). Et pour la seconde année consécutive, la Réunion a été précédée d'un atelier conçu particulièrement pour les nouveaux professeurs de mathématiques et de statistique. Cet atelier, qui porte le nom de Projet NExTMAC (New Experiences in Teaching Mathematics Across Canada), a pour but d'aider les jeunes professeurs à rehausser la qualité et l'efficacité de leur enseignement. Quant à la quatrième conférence commémorative Geoffrey J. Butler, elle s'est déroulée après la Réunion, soit du 17 au 21 juin à l'Université de l'Alberta.

Réunion d'hiver de la SMC
(Université Simon Fraser)
Cette réunion avait au programme quelques activités inhabituelles : un mini-cours de cryptographie, deux conférences sur des sujets à la frontière des mathématiques et de l'informatique, et une conférence principale sur l'histoire des mathématiques. La conférence Coxeter-James a été prononcée par Jingyi Chen (UBC), et celle du Prix de doctorat, par Alina Carmen Cojocaru (Queen's). Les autres conférences principales ont été données par Tom Archibald (Acadia), le duo Hyman Bass et Deborah Ball (Michigan), Robert Calderbank (Laboratoires AT&T), Andrew Granville (Université de Montréal), Anand Pillay (Illinois, Urbana-Champaign) et

Mahdu Sudan (MIT). La présence de Mahdu Sudan a rappelé à notre souvenir l'hommage qui lui a été rendu à l'ambassade du Canada à Beijing – où il avait reçu le prix Nevanlinna – au CIM 2002. Les participants y ont aussi eu l'occasion d'assister à 14 symposiums sur des sujets variés, dont un sur l'éducation et un autre sur l'histoire des mathématiques. Au banquet, nous avons rendu hommage à quatre des nôtres : Andy Liu, lauréat du prix Adrien-Pouliot en éducation mathématique 2003; Jim Arthur, lauréat du prix G. de B. Robinson pour le meilleur article paru dans le Bulletin canadien de mathématiques en 2001-2002, « A Note on the Automorphic Langlands Group »; Jingyi Chen, lauréat du prix Coxeter-James 2003, et Alina Carmen Cojocaru, lauréate du Prix de doctorat 2003.

Forum canadien sur l'enseignement
des mathématiques
Du 16 au 18 mai 2003, 148 personnes ont participé, à l'UQAM (Montréal), au Forum canadien sur l'enseignement des mathématiques. Le Forum a permis aux participants de comparer la situation qui prévaut d'une région à l'autre du pays, de mettre en commun des pratiques exemplaires et de créer des liens avec des intervenants de tous les ordres d'enseignement et de diverses provinces, grâce à l'élimination des traditionnelles frontières provinciales. Des groupes de travail ont posé plusieurs problématiques que des sous-groupes étudieront plus en détails et présenteront au second

Forum, en 2005, accompagnées de pistes d'intervention. Au nom de tous les participants au Forum et de tous ceux qui croient que l'enseignement des mathématiques est un enjeu d'importance pour le Canada, je tiens à remercier les membres du comité du programme et les organisateurs locaux, en particulier Louis Charbonneau de UQAM, dont les efforts ont assuré la réussite de l'activité.

Voici les principales orientations qui se dégagent du Forum :
• L'enseignement des mathématiques dans les communautés autochtones
• Formation et perfectionnement des enseignants du primaire
• Profiter de la lancée du Forum en gardant contact avec les ministères de l'Éducation et les associations provinciales
• Rôle de leadership de la SMC en enseignement des mathématiques dans le pays à divers niveaux
• Nécessité de partager le matériel de qualité

Vous trouverez de plus amples renseignements dans le rapport du Forum en page 16 de ce numéro.

Math à Moscou
Les gagnants du concours du printemps sont Thomas Zamojski (McGill) et Kristin Shaw (UBC); ils ont passé le semestre d'automne 2003 à Moscou. Le programme Math à Moscou a été reconduit pour une deuxième année. Le gagnant du concours de l'automne, Sébastien Labbé de l'Université de Sherbrooke, ira passer le semestre d'hiver 2004 à l'Université indépendante de Moscou. La date limite d'inscription au prochain concours est le 15 avril 2004. Deux bourses d'études seront alors attribuées.

Prix d'excellence en enseignement de la SMC
Le nouveau Prix d'excellence en enseignement de la SMC, commandité par Nelson & Brooks/Cole, a été annoncé à la Réunion d'été en présence de Janet Piper de Nelson Thompson Learning. Ce prix rend hommage à une personne ayant fait une contribution exceptionnelle et soutenue à l'enseignement des mathématiques au premier cycle universitaire. La date limite de mise en candidature était fixée au 15 novembre. L'excellence des candidatures reçues témoigne de l'importance accordée à l'enseignement des mathématiques et de la qualité de l'enseignement dans de nombreux départements du pays.

CIM 2010
Comme je l'ai mentionné dans mon rapport de 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). En collaboration avec le CNRC et le Palais des Congrès de Montréal, nous étudions en ce moment la faisabilité du projet, notamment sur le plan financier. Nous espérons rendre une décision finale en mai 2004.

Activités en hommage à Donald Coxeter
La SMC prendra part à un congrès en l'honneur de Donald Coxeter à l'Université de Toronto à l'été 2004, et à la Renaissance Banff Conference en juillet 2005, dans le cadre de l'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 et distribués à la grandeur du pays. Nous espérons que de nombreux Canadiens y participeront et se proposeront pour donner une conférence ou organiser un atelier.

Première rencontre Canada-France
Nous sommes à quelques mois du congrès franco-canadien de Toulouse. Je suis très heureuse d'annoncer que les trois instituts (CRM, Fields et PIMS) ainsi que la Société statistique du Canada (SSC), la Société canadienne de mathématiques appliquées et industrielles (SCMAI) et la SMC commanditeront 15 bourses de voyage de 500 $ chacune pour étudiants diplômés ou inscrits à un programme de postdoctorat qui feront une présentation par affiche. Pour de plus amples renseignements, consultez le *www.smc.math.ca/Reunions/Toulouse2004/*.

Congrès conjoint à Halifax
La Réunion d'été 2004 de la SMC et de la SCMAI se tiendra en collaboration avec le 16e Symposium canadien sur la dynamique des fluides et la Société canadienne d'histoire et de philosophie des mathématiques. Ce congrès conjoint se déroulera immédiatement après le congrès annuel du réseau MaTISC 2004, et tout de suite avant le Congrès canadien des étudiants en mathématiques 2004. Nous espérons que ces événements favoriseront la participation de nombreux étudiants, boursiers postdoctoraux et spécialistes des mathématiques appliquées.

Bureau de la SMC
En juin 2003, un groupe de travail a reçu pour mandat de passer en revue les activités du bureau administratif de la SMC en tenant principalement compte des facteurs suivants :
• le nombre croissant d'activités et les nouvelles responsabilités potentielles de la SMC;
• la charge de travail du personnel administratif;
• les contraintes d'espace dans les locaux actuels;
• le dé part possible de Graham Wright en 2005.

Le groupe de travail, composé d'Eddy Campbell (président élu), de Christiane Rousseau (présidente) et d'Arthur Sherk (trésorier), a passé deux jours au bureau en août 2003. À l'automne de la même année, il était devenu évident que le groupe de travail devait prendre des décisions en raison des difficultés financières de la Société, qui pourraient durer quelques années encore. Le groupe a présenté son rapport en janvier 2004, dans lequel il recommandait à la SMC de restructurer son bureau administratif de manière à pouvoir envisager de nouveaux projets qui généreraient des revenus. Dans son rapport, le directeur administratif décrit plus en détails le problème d'espace du bureau.

Difficultés financières de la SMC

La situation financière de la SMC n'est pas si rose ces temps-ci. Le déficit de 2003 est attribuable en grande partie à la faiblesse du dollar américain, puisqu'un grand nombre de bibliothèques étrangères paient leurs abonnements en dollars américains. Comme on s'attend à ce que la valeur du huard demeure élevée par rapport à la devise américaine, cette situation pourrait perdurer plusieurs années. La SMC n'aura alors d'autre choix que de hausser ses revenus ou de réduire ses dépenses. L'exécutif déploie des efforts considérables pour augmenter ses rentrées d'argent et espère parvenir bientôt à des résultats. Eddy Campbell a déjà entrepris des démarches en vue d'une méga campagne de financement au sein de la profession.

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.). L'absence imprévue de Monique Bouchard, en vue de la préparation de la Réunion d'hiver 2003, a alourdi considérablement la charge de travail du reste de l'effectif. Je tiens également à remercier les membres sortants du comité exécutif, du conseil d'administration et de nos divers comités, et en particulier Jonathan Borwein, qui a terminé en juin 2003 un mandat de quatre ans où il aura occupé tour à tour les postes de président élu, de président et de président sortant.

ÉDITORIAL *(SUITE)*

Même une bonne préparation n'offre toutefois pas une protection à toute épreuve. Steven Krantz donne un bon exemple dans son ouvrage *Mathematical Apocrypha* (dont vous trouverez une critique dans les NOTES de novembre 2003). Son ami Glenn Schober donnait un cours d'initiation à l'enseignement à des étudiants diplômés. Le premier jour, il est entré en classe en disant qu'il commettrait durant le cours, portant sur l'enseignement des mathématiques au primaire, 25 fautes graves d'enseignement. La tâche des étudiants consistait à relever ces fautes. À la fin du cours, ils en avaient compté 32!

Il n'est pas rare, dans les congrès interdisciplinaires de sciences humaines, d'écouter un conférencier lire sa communication mot pour mot, chaque phrase étant soigneusement composée et rendue. Ce n'est toutefois pas courant dans la communauté mathématique. Les conférenciers se font généralement une fierté de prononcer leur conférence avec spontanéité, en se fiant très peu à leurs rares notes. Toutefois, le prix à payer pour cette vitalité est sans doute une fréquence d'erreurs plus élevée.

Nombreux sont les conférenciers qui peuvent entretenir leur auditoire pendant une demi-heure ou plus sur un sujet très poussé, sans notes ni transparents, en recréant de mémoire des preuves complexes. D'autres – qui ne sont pas nécessairement de moins bons mathématiciens – préfèrent avoir au moins un plan de leur communication à portée de main s'ils présentent un sujet nouveau ou avec lequel ils sont moins à l'aise. Cependant, les sujets connus ne sont pas non plus sans dangers… On tient souvent pour acquis que l'on connaît absolument tout d'un sujet, disons le calcul différentiel et intégral de première année, et que de consacrer beaucoup de temps à la préparation d'un cours n'est pas seulement une insulte à sa propre intelligence, mais une entrave à la spontanéité. Voilà qui est périlleux. Un professeur qui manque de préparation risque non seulement d'oublier une anecdote ou un exemple qu'il affectionne particulièrement, mais aussi de se faire prendre au piège de l'apparente simplicité des notions de calcul de première année universitaire. Vous doutez de cette assertion? Prenez un crayon et calculez l'intégrale de $\int \sqrt{4 + x^2}\ dx$, en vous imaginant devant une classe bondée d'étudiants impatients de se lever, à cinq minutes de la fin du cours.

Les meilleurs cours ont été bien préparés. N'est-il pas bon, justement, que vos étudiants détectent votre degré de préparation par des signes comme l'absence d'erreurs, une prestation assurée et un rythme vous permettant de conclure la leçon en douceur, juste à temps pour répondre à quelques questions d'un auditoire attentif?

TENURE TRACK POSITION
Simon Fraser University – Department of Mathematics
Vancouver, British Columbia V5A 1S6

The Department of Mathematics at Simon Fraser University invites applications for a tenure-track position at the Assistant Professor level starting January 1, 2005 or September 1, 2005.

We seek an applicant with a strong independent research program and a commitment to undergraduate and graduate teaching. We are looking for candidates whose research interests span both pure and applied mathematics e.g. applied analysis. The department's web page can be found at *www.math.sfu.ca/*

Simon Fraser University is an equity employer and encourages applications from women, persons with disabilities, visible minorities, and First Nations people. All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority.

Applications including a statement of interest, a curriculum vitae, and descriptive statements on research plans and teaching activities, should be sent by **September 30, 2004**, to:

Pure/Applied Search
Department of Mathematics
8888 University Drive
Simon Fraser University, Burnaby, BC V5A 1S6
Email: *mcs@sfu.ca*

Applicants should arrange for at least three letters of recommendation to be sent to the same address by the closing date. Late applications may be considered at the discretion of the search committee. We thank all applicants in advance; only those short-listed will be contacted. The position is subject to final budgetary approval.

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

MAY	2004	MAI

3-8 AARMS-CRM Workshop on Singular Integrals and Analysis on CR Manifolds (Dalhousie University, Halifax, NS) *gdafni@mathstat.concordia.ca, afraser@mathstat.dal.ca www.crm.umontreal.ca/Geoanalysis/#AARMS*

4-7 Workshop on Spectral Theory and Automorphic Forms (CRM, U. de Montreal, Montreal, QC) *crm@ere.umontreal.ca*

5-9 Fields Institute Workshop on the Representation Theory of p-adic Groups, (University of Ottawa, Ottawa, ON) *www.fields.utoronto.ca/programs/scientific/03-04/p-adic/*

10-14 7th PIMS-MITACS Graduate Mathematics Modelling Camp (University of Victoria, Victoria, BC) *www.pims.math.ca/industrial/2004/gimmc*

12-14 Shape Optimisation and Applications Workshop (University of Ottawa) *www.fields.utoronto.ca/programs/scientific/03-04/shape_theory/*

12-16 **THE COXETER LEGACY - Reflections and Projections** (University of Toronto,Toronto,ON) *www.fields.utoronto.ca/programs/scientific/03-04/coxeterlegacy/*

13-15 Sixth International Joint Meeting of AMS and Soc.Mat.Mexicana (Houston, TX) *www.ams.org/meetings/*

15-25 Second Annual Spring Institute on Noncommutative Geometry and Operator Algebras (Vanderbilt University, Nashville, TN *http://math.vanderbilt.edu/~ncgoa*

MAY	2004	MAI

17-18 Canadian Symposium on Abstract Harmonic Analysis (Univ. of Western Ontario, London, Ont.) *www.math.uwo.ca/~milnes/HA04.htm*

17-21 8th PIMS-MITACS Industrial Problem Solving Workshop (PIMS-UBC, Vancouver, BC) *www.pims.math.ca/industrial/2004/ipsw*

24-28 Workshop on Hamiltonian Dynamical Systems (jointly with the Fields Institute) (CRM, U. de Montreal, Montreal, QC) *crm@ere.umontreal.ca*

JUNE	2004	JUIN

28-31 International Conference on Mathematics and its Applications (Hong Kong) *www.cityu.edu.hk/rcms/icma2004*

1-11 Workshop on Semi-classical Theory of Eigenfunctions and PDEs (CRM, U. de Montreal, Montreal, QC) *crm@ere.umontreal.ca*

6-11 International Conference on Nonlinear Dynamics and Evolution Equations (Memorial University of Newfoundland, St. John's, NL) *www.math.mun.ca/~xzou/Conf04/main.html*

7-10 6th International Conference on Monte Carlo Methods in Scientific Computing and 2nd International Conference on Monte Carlo and Probabilistic Methods for PDE (Juan-les-Pins, France) *www.sop.inria.fr/omega/MC2QMC2004*

JUNE	2004	JUIN

8-12 Projective Varieties with Unexpected Properties
The conference is in honour of the 150th anniversary of the
birth of Giuseppe Veronese, Siena, Italy.
www2.dsmi.unisi.it/newsito/PVWUP/index.html

9-12 MITACS 5th Annual Conference (Dalhousie University,
Halifax, Nova Scotia). *www.mitacs.math.ca/AC2004/*

10-14 CCWEST 2004, National Conference for the Advancement of
Women in Engineering, Science and Technology (Brock
University, St. Catharines, ON) *www.brocku.ca/fms/ccwest2004*

12 Project NExTMAC: 3rd National Workshop (Dalhousie
University). *www.math.mun.ca/~nextmac/june2004/*

13-15 **CMS/CAIMS Summer Meeting / Réunion d'été de la
SMC/SCMAI** (Dalhousie University, Halifax, Nova Scotia)
meetings@cms.math.ca

16-20 The 11th Annual Canadian Undergraduate Mathematics
Conference (CUMC) (Dalhousie) *www.cumc.math.ca/*

18-23 Mathematical Foundations of Learning Theory
(Barcelona, Spain)
Gábor Lugosi: *www.crm.es/MathematicalFoundations*

20-25 Canadian Number Theory Association VIII Meeting (University
of Toronto, Toronto, ON)
www.fields.utoronto.ca/programs/scientific/03-04/CNTAB/

20-27 42nd International Symposium on Functional Equations
Opava, Czech Republic
isfe42@math.slu.cz — www.math.slu.cz/ISFE42/

21-25 Conference on Surface Water Waves (The Fields Institute,
Toronto,ON) *www.fields.utoronto.ca/programs/*

21-July 2 SMS-NATO Advanced Summer Institute : Morse Theoretic
Methods in Non-linear Analysis and Symplectic Topology
Université de Montréal, Canada. *www.dms.umontreal.ca/sms
sms2004@dms.umontreal.ca*

16-23 5th International Conference on Functional Analysis and
Approximation Theory, FAAT 2004 (Hotel Villa de Mare,
Acquafredda di Maratea, Potenza, Italy)
http://www.dmuniba.it/faat2004

27-July 2 European Congress of Mathematics
(Stockholm, Sweden) Ari Laptev: *laptev@math.kth.se*

28-July 2 16th Annual Conference in Formal Power Series and Algebraic
Combinatorics (UBC, Vancouver, BC)
www.pims.math.ca/fpsac/ – fpsac@pims.math.ca

28-July 2 Workshop on Non-linear Differential Galois Theory
CRM, Bellaterra. Co-ordinator: Marcel Nicolau

29-July 2 International Conference on Nielsen Theory and Related Topics
(Memorial University of Newfoundland, St. John's, NL)
pheath@math.mun.ca

30-July 7 Fourth World Congress of Nonlinear Analysis(WCNA 2004)
(Hyatt Orlando, Florida)
http://kermani.math.fit.edu/ — wcna2004@yahoo.com

JULY	2004	JUILLET

4-11 The 10th International Congress on Mathematical Education
(Copenhagen, Denmark) *www.ICME-10.dk*

5-9 19th "Summer" Conference on Topology and its Applications
(University of Cape Town, South Africa)
www.mth.uct.ac.za/Conferences/Topology

5-9 2nd Annual Conference on Permutation Patterns
(Malaspina University-College, Nanaimo, BC)
www.mala.ca/math/PP/ westj@mala.bc.ca

5-16 Advanced Course on Automata Groups
(Bellaterra, Barcelona, Spain)
Warren Dicks: *www.crm.es/AutomataGroups*

6-19 International Mathematical Olympiad
(Athens, Greece) *www.imo2004.gr – imo2004@hms.gr*

7-12 Polynomial-Based Cryptography
Melbourne, Australia *www.it.deakin.edu.au/cryptography2004*

6-11 The 17h International Conference on Multiple Criteria Decision
Analysis (Whistler,BC)
www.mywhistler.com/about/2010_olympics.asp

12-15 **First Joint Canada-France meeting of the
mathematical sciences / Premier congrès Canada-
France des sciences mathématiques**, (Toulouse, France)
www.cms.math.ca/Events/Toulouse2004/

12-Aug.6 Third Annual AARMS Summer School
(Memorial University, St. John's), *edgar@math.mun.ca*

16-20 Algebraic Topological Methods in ComputerScience, II
University of Western Ontario, London, ON)
www.math.uwo.ca/~jardine/at-csII.html

18-24 International Conference on General Relativity and Gravitation
(Dublin, Ireland) *m.a.h.maccallum@qmul.ac.uk*

26-30 Workshop on Spectral Theory of Schrödinger Operators (CRM,
Université de Montreal, Montreal, QC) *crm@ere.umontreal.ca.*

26-30 Algebraic Groups, Arithmetic Groups, Automorphic Forms
and Representation Theory: an international conference in
memory of Armand Borel (Centre of Mathematical Sciences,
Zhejiang University, Hangzhou, China)
http://cms.zju.edu.ca, fangli@zju.edu.cn

AUGUST	2004	AOÛT

2-6 Workshop on Dynamics in Statistical Mechanics
(CRM, U. de Montreal, Montreal, QC) *crm@ere.umontreal.ca*

6-7 New Directions in Probability Theory (Fields Institute,
Toronto,ON) *www.imstat.org/meetings/NDPT/default.htm*

SEPTEMBER 2004 SEPTEMBRE

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

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

OCTOBER 2004 OCTOBRE

6-9 HYKE Conference on Complex Flows: Analytical and Numerical Methods for Kinetic and Hydrodynamic Equations *www.crm.ex/AutomataGroups*

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

DECEMBER 2004 DÉCEMBRE

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

JANUARY 2005 JANVIER

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

JUNE 2005 JUIN

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

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

AUGUST 2006 AOÛT

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

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Les *Notes de la SMC* sont postées la première semaine du mois de parution. L'adhésion à la SMC compred l'abonnement aux *Notes de la SMC*. Le tarif d'abonnement pour les non-membres est de 50 $ CAN si l'adresse de l'abonné est au Canada et de 50 $ US autrement.