CMS NOTES de la SMC

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EXECUTIVE DIRECTOR'S 2003 ANNUAL REPORT

Graham Wright

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Opportunities for the Future

Executive Office

The past year has seen quite a lot of activity in the Executive Office.

Nathalie Blanchard joined the CMS Staff in January 2003 as the Assistant to the Executive Director. In addition to her other responsibilities, as Editorial Assistant for the *CMS Notes*, Nathalie has brought about significant changes to the production of the *CMS Notes*. The *Notes*, which were produced using LaTeX style files, are now produced using QuarkXpress software; and this transition was accomplished in an almost seamless manner. Not only does the use of this software make it easier to compile the *Notes*, it offers other advantages and savings, both in preparation time and printing costs.

Yvette Roberts replaced Diane Ellis as the CMS Accountant in June 2004, and Yvette quickly assumed the necessary duties. With her assistance, and with help from the other Executive Office staff, the preliminary budget documents were prepared in a manner that enabled the Treasurer and me to devote more time to reviewing and analyzing the 2004 Budget Proposal.

I also wish to acknowledge and commend Alan Kelm (Web Services Manager), Liliane Sousa (Membership and Publications Agent) and Suzanne Lalonde (Administrative Clerk) as well as the part-time staff (Yann Bernard, Jean-Francois Simard, Anthony Selles and Sany Sam) for their important contributions during the past year.

In June 2003, an Ad-hoc Committee comprising Christiane Rousseau (President), Eddy Campbell (President Elect) and Arthur Sherk (Treasurer) was formed to consider the work-load on the CMS Executive Office and what steps the Society should take to take account of future demands. This was a difficult exercise and changes have been approved that will be implemented in 2004.

Publications

In 2003, Craig Platt took over responsibility of the Society's Publications Office from Michael Doob. The transition was accomplished very smoothly and Michael continues his involvement as the Technical Consultant.

The editors-in-chief of the *Canadian Journal of Mathematics* (Henri Darmon and Niky Kamran), and the *Canadian Mathematical Bulletin* (James Lewis, Arturo Pianzola, and Noriko Yui) as well as Swami Swaminathan, Associate Technical Editor, Laura Kirkland, Administrative Assistant, Shelley Ames, Technical Assistant, and Judi Borwein, Digital Assistant, all help to ensure the quality of our printed and web-based publications.

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CMS NOTES

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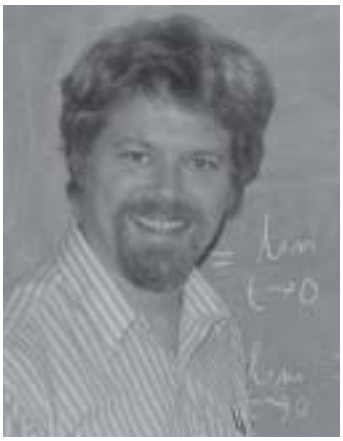
EDITORIAL



Robert J. Mac G. Dawson

Shooting the Messenger

As I write this, the streets of Halifax are lined with snowbanks so high that a driver cannot see over the top of most of them. Afternoon temperatures occasionally stray above zero; but, like most days since our record-setting storm, today has been sunny and fairly cold. For now, the hounds of Spring, far from being on Winter's traces, have abandoned the chase and sat down to search themselves for fleas.

By the time this reaches the press, however, it will be the beginning of April. Lectures will be on the point of giving way to exams. Possibly a few warm days will have resulted in a temporary outbreak of shorts and T-shirts on campus. A month is a long time in education, in meteorology, and also in journalism.

So, if I write in this column about the recent Nova Scotian Grade 12 mathematics exam, one of February's big stories around here, it is a fair bet that the story will pretty much have faded from the mainstream media by the time you read it here. Nonetheless, the tale will bear telling, because in a larger sense, it is one that won't go away.

As you probably recall, Nova Scotia had its first standardized provincial Grade 12 mathematics exam in decades in January. It was not a comprehensive exam on all of high school mathematics, but only covered the part that is in the course which is called "Mathematics 12" (though not necessarily taken in Grade 12). Thus, geometry and exponential functions were covered; linear algebra and trigonometry were not. When the grades came out in February, they were low enough — with large numbers of students failing — that fierce debate ensued as to what it meant and what should be done.

Some claimed that the test was badly constructed. Having read the questions in detail, I cannot agree with this. The questions were reasonably clear, comprehensive, and (within the limited scope of the exam) covered most of what a student entering university to study science ought to know. At my university, the pretest that students take to determine whether they are ready to enter calculus covers much of the same material. And there's no doubt about it — many of them don't know it. About half of our students are placed in the remedial course each September. My understanding is that this problem is national in scope, though the extent varies and different universities deal with it in different ways.

So what's wrong? To start with, the test covered appropriate material for a student intending to study science in university. However, it was taken, not just by that group, but by a much larger group of students, comprising two out of the three Nova Scotian high school math streams. The curriculum itself is trying to be all things to all people. Because of the reluctance to stream students systematically, students bound for vocational schools and students intending to study mathematics and physics often take the same mathematics courses.

Nonacademic students are faced with topics (graph theory, trigonometry) useful mainly to scientists; tomorrow's scientists, on the other hand, are taught this material at a level designed to be accessible to nearly everybody. It's not clear whether either group is well served by this — though it may help the large number of students who have not yet decided which group they are in. Here, perhaps, enrichment activities, like "Math Circles" and contests, may help stretch the minds of the more able students; the CMS and other groups can and do help with this across the country.

Then again, there were some teachers whose students did do consistently well — not all from schools in wealthy neighborhoods. It's possible

that in these schools more students had made a wise choice of math course, but this doesn't seem adequate to explain everything. We have to conclude that some teachers are doing a far better job of teaching mathematics than others are. This is not unexpected in a province in which there is a major shortage of trained mathematics teachers (Report of the ECF Sub-Committee on Teacher Demand and Supply, Dec. 2001).

Again, this is not a problem unique to Nova Scotia; other provinces, too, have difficulty finding enough math teachers who have actually studied the subject extensively as undergraduates. We need more programs to attract teachers to mathematics, and mathematicians to teaching.

There aren't any easy answers. But, as Louis MacNeice put it, "if you break the bloody glass, you won't hold up the weather." We need students who can pass the tests, not tests that students can pass. And we need to work in cooperation with schools and provincial departments of education to help achieve this.

À bas le messager

Au moment où j'écris ces lignes, les rues d'Halifax sont bordées de bancs de neige si hauts que les automobilistes voient à peine au-delà. En après-midi, le mercure s'aventure parfois au-dessus de zéro. Aujourd'hui, toutefois, comme la plupart des jours depuis notre tempête de neige record, il fait beau et assez froid. Les hirondelles annonciatrices du printemps semblent bien loin encore.

Au moment de mettre sous presse, par contre, ce sera le début d'avril. Les cours feront très bientôt place aux examens. Quelques journées chaudes auront peut-être fait déferler une vague temporaire de t-shirt et de shorts sur les campus. Tant en éducation qu'en météorologie ou en journalisme, c'est long un mois…

Ainsi, il y a fort à parier que mon propos sur l'examen de mathématiques de 12e année en Nouvelle-Écosse, qui a fait les manchettes ici en février, aura été mis de côté depuis longtemps par les grands médias. J'estime néanmoins que mon propos vaut la peine d'être entendu, car, d'une certaine façon, il est toujours d'actualité.

Comme vous le savez sans doute, la Nouvelle-Écosse a connu en janvier dernier son premier examen normalisé de mathématiques de 12e année depuis des années. L'examen ne couvrait pas l'ensemble des mathématiques enseignées au secondaire, mais seulement la portion enseignée dans le cours « Mathématiques 12 » (que les élèves ne suivent pas nécessairement en 12e année). Il y avait donc au programme de la géométrie et des fonctions exponentielles, mais pas d'algèbre linéaire ni de trigonométrie. Quand les notes sont sorties, à la fin de février, elles étaient suffisamment basses — dont un grand nombre d'échecs — pour soulever un débat houleux sur le bien-fondé de cet examen et les correctifs nécessaires.

Certains ont dit que le test était mal conçu. Ayant moi-même lu les questions attentivement, je ne suis pas de cet avis. Les questions étaient suffisamment claires, détaillées, et (compte tenu de la portée de l'épreuve) couvraient tout ce qu'un élève qui s'inscrit en sciences à l'université doit savoir. Dans mon université, le prétest qui détermine si les étudiants sont prêts à suivre le cours de calcul différentiel et intégral couvre essentiellement la même matière. Et il n'y a pas de doute, bien des étudiants ne maîtrisent pas cette matière. À peu près la moitié de nos étudiants doivent suivre un cours d'appoint en septembre. J'en déduis qu'il s'agit d'un problème d'envergure nationale, d'ampleur variable et auquel les universités remédient chacune à leur façon.

Alors où est le problème? D'abord, le test couvrait la matière que doit connaître un élève qui aspire à poursuivre des études en sciences à l'université. Toutefois, il n'y a pas que ces élèves qui l'ont passé, mais un bassin bien plus large, comprenant des élèves de deux des trois filières de mathématiques du secondaire.

Or, il semble que ce programme veuille tout apprendre à tout le monde. En raison d'une réticence généralisée à classer les élèves selon leurs forces, ceux qui se destinent aux écoles de métier et ceux qui comptent poursuivre des études supérieures en mathématiques ou en physique se retrouvent souvent dans les mêmes cours de mathématiques.

Ainsi, ceux qui n'iront pas à l'université apprennent des choses surtout utiles aux scientifiques (théorie des graphiques, trigonométrie), et les futurs scientifiques se font enseigner ces matières à un niveau accessible au plus grand nombre. On ne sait pas vraiment si cette façon de faire convient à chaque groupe, mais elle est peut-être pratique pour ceux qui n'ont pas choisi leur orientation professionnelle. Dans ce cas, peut-être que des activités d'enrichissement (clubs de mathématiques, etc.) et des concours contribueraient à stimuler l'esprit des élèves les plus aptes; la SMC et d'autres groupes jouent d'ailleurs un grand rôle à cet égard au pays.

Par ailleurs, et non seulement dans des écoles de milieux favorisés, certains enseignants ont des classes dont l'ensemble des élèves a généralement bien réussi l'examen. Il est possible que dans ces écoles, plus d'étudiants ont bien choisi leurs cours de mathématiques, mais cela n'explique pas tout. Nous sommes forcés de conclure que certains enseignants enseignent beaucoup mieux les mathématiques que d'autres. Ce n'est pas tout à fait surprenant pour une province qui connaît une grave pénurie d'enseignants spécialisés en mathématiques (rapport d'un sous-comité de l'ECF sur l'offre et la demande d'enseignants publié en décembre 2001). Mais je le répète, ce problème n'est pas propre à la Nouvelle-Écosse; d'autres provinces on aussi du mal à recruter des enseignants de mathématiques qui ont suffisamment étudié la discipline au premier cycle universitaire. Nous avons besoin de programmes qui attirent plus d'enseignants vers les mathématiques, et de mathématiciens vers l'enseignement.

Il n'y a pas de réponse toute faite, mais pour paraphraser le poète Louis MacNeice, ce n'est pas en cassant le baromètre qu'on retarde l'orage. Nous voulons des élèves qui réussissent les tests, pas des tests que les élèves réussiront à passer. Et pour cela, il sera nécessaire de travailler de concert avec les écoles et les ministères provinciaux de l'Éducation.

ECLECTIC SAMPLINGS FROM A FERTILE BORDERLAND

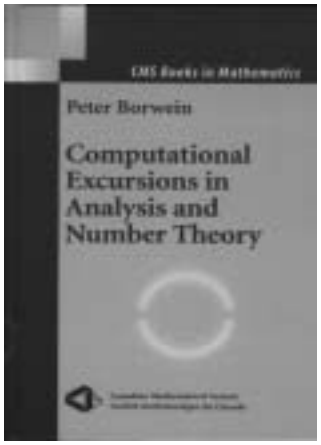
Book review by Michael Bennett, UBC

COMPUTATIONAL EXCURSIONS IN ANALYSIS AND NUMBER THEORY

by Peter Borwein

CMS Books in Mathematics 10

Springer 2002, x + 220 pages



An old and curious problem in number theory, dating back to Euler and Goldbach in the middle of the eighteenth century, is to find distinct sets of integers $[\alpha_1,\ldots,\alpha_n]$ and $[\beta_1,\ldots,\beta_n]$ with the property that

$$\sum_{j=1}^{n}\alpha_j^k = \sum_{j=1}^{n}\beta_j^k \qquad (1)$$

for $k=1, 2,\ldots, N$, where N is to be made as large as possible. Many such sets are known (though the general theory remains elusive) and a curious reader may uncover a surprisingly rich assortment of papers on the subject. My personal favorite is due to E.M. Wright. Wright, nowadays likely best known as a coauthor with G.H. Hardy of a famous textbook on number theory, objected to the (current in 1959) naming of this problem in a paper with the wonderful title "Prouhet's 1851 solution of the Tarry-Escott problem of 1910". To see how this problem may be cast in a slightly more analytic light, note that it is not too difficult to reformulate (1) as a question about polynomials; indeed it is equivalent to the statement that the polynomial $(z-1)^{N+1}$ divides

$$\sum_{j=1}^{n} z^{\alpha_j} - \sum_{j=1}^{n} z^{\beta_j}.$$

The Prouhet-Tarry-Escott problem then becomes one of finding a non-trivial polynomial with integer coefficients that is divisible by, say, $(z-1)^m$, with the sum of absolute values of its coefficients as small as possible.

This theme of viewing arithmetic problems in terms of polynomials turns out to be a surprisingly profitable one for a number theorist. It also brings us, in a roundabout fashion, to the subject of this review, namely Peter Borwein's *Computational Excursions in Analysis and Number Theory* (hereafter referred to as CEANT). This, in a loose sense, is about computational number theory, a field in which there currently exists a number of outstanding books (Henri Cohen's *A Course in Computational Algebraic Number Theory* is a good example). Many, perhaps most of these, however, are primarily concerned with algebraic aspects of the theory. CEANT, as the title suggests, is a much more analytic proposition. In fact, with its choice of subject matter, CEANT in no way resembles anything else in the literature. At heart, it is an eclectic book that strongly reflects the tastes of its author, yet despite this, for reasons I will address, is one that should have wide appeal.

As an earlier reviewer noted, a more descriptive (and rather less saleable!) title for CEANT might have been "On Problems Concerning the Size of Integer Polynomials of Restricted Height, Length, and Degree". In essense, this is what the book is about. Yet, within this framework, the author touches upon a large and diverse collection of interrelated problems at the boundary of classical analysis and number theory. CEANT is organized around 17 main open problems (labelled P1 to P17). These include not only the aforementioned Prouhet-Tarry-Escott problem (P2), but also widely-known conjectures with connections to numerous areas of mathematics, such as

P9. Lehmer's Problem. Show that if p is an irreducible monic polynomial with integer coefficients and nonzero constant term that is not a cyclotomic polynomial, then the quantity

$$M(p) = \prod_{\alpha} \max\{1, |\alpha|\}$$

where the product is taken over the roots of p, satisfies $M(p) \geq 1.1762\ldots$. This last value is $M(p)$ for

$$p(z) = 1 + z - z^3 - z^4 - z^5 - z^6 - z^7 + z^9 + z^{10}.$$

Not all the open questions considered in CEANT have quite the notoriety of this one. A more obscure, though possibly no easier problem is

P17. The Schur-Siegel-Smyth Trace Problem. Fix $\epsilon > 0$. Suppose

$$p_n(z) = z^n + a_{n-1}\, z^{n-1} + \ldots + a_0$$

where the a_i are integers such that $p_n(z)$ has real, positive roots and is irreducible. Show that, independently of n, except for finitely many explicitly computable exceptions,

$$|a_{n-1}| \geq (2 - \epsilon)\, n\ .$$

As the author stresses, the 17 main problems considered arise in a wide variety of contexts, ranging from classical number theory (P2) to signal transmission (P7 and P8). What they have in common is that

(i) They are all concerned with polynomials with integer coefficients (this is where the NT in CEANT comes from!).

(ii) They are easy to state, with few preliminaries.

(iii) They have all been around, in one disguise or another, for many years.

(iv) None are likely to be solved any time soon, but ...

(v) There is broad scope for achieving partial successes and, with the audience of the book in mind, for computational enquiry.

CEANT is structured as follows. In each chapter, the reader is first provided with an exposition of the mathematical theory (definitions, theorems and sometimes proofs) that underlie each topic. These sections are clearly written (as one might expect from the author's previous books) and gather together a collection of results likely unavailable elsewhere in book form. With this framework in place, the reader then encounters a collection of problems, under the headings of Introductory Exercises (labelled E1, E2, etc.), Computational Problems (C1, C2, ...) and Research Problems (R1, R2, ...). The first of these categories consists of 82 problems within reach of a strong undergraduate or graduate students without reliance on tools outside those presented in CEANT. The Computational Problems (40 of them) lie at the heart of the book and, underneath virtually all of them, one finds the Lenstra-Lenstra-Lovascz (LLL) algorithm for finding short vectors in an integer lattice. Many of these problems are somewhat open-ended — in some cases algorithms are provided, but the reader is left with much to do. Finally, one has the 37 Research Problems. These are themselves all open questions, less ambitious by nature than the 17 main problems, but nonetheless each undeniably formidable. The book closes with a number of appendices, including ones on inequalities and lattice basis reduction.

So, one might ask what the audience would be for such a book? Being essentially self-contained — the only prerequisite one appears to need is a basic understanding of complex analysis — it should appeal to an undergraduate embarking on a summer research project. The back cover describes it as "designed for a computationally intensive graduate course" which is also probably about right. For the professional mathematician, it collects an unusual assortment of material in one not-especially-large package and also provides a nice collection of unsolved problems (a few of which might even be tractable!). To sum up, CEANT is an intriguing selection of illuminating snapshots of the fertile borderland between number theory and analysis. I recommend it.

THE CMS/CAIMS SUMMER 2004 MEETING WITH THE PARTICIPATION OF CSFD AND CSHPM

Dalhousie University – Halifax, NS
June 13-15, 2004

The most up-to-date information for the joint Summer 2004 Meeting of the Canadian Mathematical Society (CMS) and the Canadian Applied and Industrial Mathematics Society (CAIMS), with participation from the Canadian Society for History and Philosophy of Mathematics (CSHPM) and the Canadian Symposium on Fluid Dynamics (CSFD), concerning the programmes, scheduling and invited speakers list is available on our website, as well as online registration, accomodation and submission of abstracts forms.

www.cms.math.ca/events/summer04/

Meeting registration and hotel accomodation forms can also be found in the February 2004 issue of the *CMS Notes.*

Abstracts will appear on the web site as they become available.

RÉUNION 2004 DE LA SMC/SCMAI EN COLLABORATION AVEC SCDF ET LA SCHPM

Université Dalhousie – Halifax (N.-É.)
13-15 juin 2004

L'information la plus récente de la Réunion d'été 2004 de la Société mathématique du Canada (SMC) et de la Société canadienne de mathématiques appliquées et industrielles (SCMAI), en collaboration avec le Symposium canadien sur la dynamique des fluides (SCDF) et la Société canadienne d'histoire et de philosophie des mathématiques (SCHPM), concernant les programmes, les horaires et la liste des conférenciers est disponible sur notre site web, ainsi que nos formulaires électroniques d'enregistrement, réservation d'hôtel et soumission de résumés.

www.cms.math.ca/Reunions/ete04/

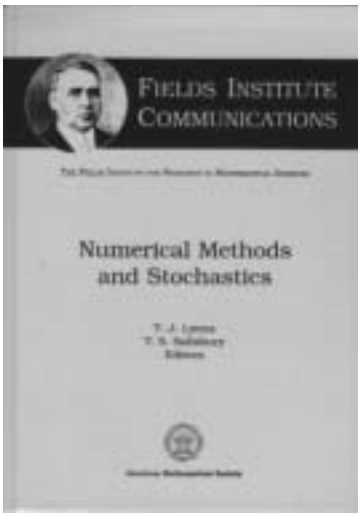
Les formulaires d'enregistrement et de réservation d'hôtel sont aussi puliés dans les *Notes de la SMC* de février 2004.

Les résumés de conférences paraîtront sur le site dès qu'ils seront disponibles.

NUMERICAL METHODS FOR STOCHASTIC DIFFERENTIAL EQUATIONS

Book review by Philip Protter, Cornell University

NUMERICAL METHODS AND STOCHASTICS
edited by T. J. Lyons and T.S. Salisbury
Fields Institute Communications
AMS 2002, vi + 121 pages



Approximately a quarter century ago, very early in my career when I was publishing rather theoretical results about stochastic differential equations, I received a letter (this predates e-mail) from a fellow researcher who had seen my work and was asking if I had an algorithm suitable for implementing my ideas on a computing machine. Not only did I not have such an algorithm, the idea had not occurred to me. Looking around, I discovered that such algorithms did exist in the electrical engineering literature, but they were ad hoc, with little or no mathematical analysis accompanying them and they were, of course, restricted to classic Itô equations. Shortly after that came the pioneering paper of E. Pardoux and D. Talay [4], followed by the seminal paper of Talay and Tubaro [5], which I now see as the birth of a mathematical theory of stochastic numerical analysis.

The fundamental problem underlying the subject is to estimate $E^x\{f(X_T)\}$, where X is the solution of the stochastic differential equation

$$dX_t = \sigma(X_s)dB_s + b(X_s)ds,\ X_0 = x\ ,$$

where B represents standard Brownian motion, and X is a standard model of a diffusion: a strong Markov process with continuous paths. (X takes its values in $\mathbb{R}^d$, and B is a k dimensional Brownian motion, so that σ is actually an $n \times k$ matrix of functions. The x which is the superscript of $E^x\{f(X_T)\}$ reminds us that $X_0 = x$.)

If one were to know the distribution of $f(X_T)$, or just X_T, then this problem would easily be solved by a Monte Carlo method, a simple idea based theoretically on the Strong Law of Large Numbers, coupled with the theory of simulation of random variables using a computer. However the rate of convergence of a Monte Carlo method is slow, and it can be further lengthened if $f(X_T)$ has a large variance. But the laws of $f(X_T)$ and X_T are in general not known.

An alternative approach is to observe that $u(t,x)=E^x\{f(X_T)\}$ solves a (backwards) partial differential equation for $0 \le t \le T$, with f giving a boundary condition at time T. Using this idea and combining it with a stochastic Euler scheme and a Monte Carlo method, Pardoux, Talay, and Tubaro gave a first mathematical analysis of a solution for this problem.

Most of the articles in this volume can be seen as outgrowths of this basic problem, albeit in quite different directions.

A first example is filtering. A typical filtering problem begins with a stochastic process, called a signal. One observes the signal, but only when it is corrupted by a (thermal style) noise. One then wishes to filter out the noise to recover as good an estimate as is possible of the signal. An elementary (and standard) formulation of the problem is to let a Markov process X denote the signal, and assume that X lives on a probability space $(\Omega,\mathcal{G},P)$ with a filtration of σ-algebras $\mathbb{G}=(\mathcal{G}_t)_{t \ge 0}$ to which it is adapted and for which it is strong Markov. Let W be a standard Brownian motion also defined on $(W,\mathcal{G},\mathbb{G},P)$. We assume the observations satisfy the heuristic equation

$$dY_t = \sigma(t,X_t)dt + \xi_t dt$$

where $\xi = (\xi_t)_{t \ge 0}$ is "white noise," a process that exists only in a generalized function sense, as the derivative of Brownian motion. The equation makes rigorous sense if it is written in integrated form:

$$Y_t = \int_0^t \sigma(s,X_s)ds + W_t.$$

Let $\mathcal{F}_t=\sigma(Y_s;s \le t)$; then $\mathbb{F}$ is a subfiltration of $\mathbb{G}$. The object of interest here is π_t, the conditional distribution of Y_t given $\mathcal{F}_t$; that is,

$P(X_t \in \Lambda|\mathcal{F}_t)$, for each Borel set Λ. This is trivially equivalent to studying $\pi_t(\phi)$, which is $E\{\phi(X_t)|\mathcal{F}_t\}$ by taking $\phi(x)=1_\Lambda(x)$, and it further suffices to consider a collection of ϕ which is rich enough, but allows all such ϕ to be smooth. A standard tool here is the Kallianpur-Striebel formula, and PDE methods giving the Kushner-Stratonovich equation, which can be linearized to obtain the Zakai equations. This is now standard. What is new are the "particle methods," which have arisen only in the last half dozen years. Dan Crisan points out in one of his two articles, "among all numerical methods for solving the filtering problem, particle filters are among the few that are rigorously proven to converge to the conditional distribution of the signal." Crisan surveys all of these approaches, and then in a companion piece written with T. Lyons he develops the particle approach (also known as sequential Monte Carlo) in a special discrete filter case.

A significant advance in the particle approach was the 2001 paper of Del Moral, Jacod, and Protter [1], where it is explained in detail, along with rates of convergence, how one can bootstrap a Monte Carlo approach to solve the filtering problem in an effective numerical way, using the convergence theory of empirical distributions. The paper in this volume of Del Moral and Jacod gives a nice resume of this approach, and then the authors take it further by establishing more general convergence results.

Two tangentially related articles in this volume are those of Alice Guionnet, who in her first article illustrates how one can use these particle methods not to solve the filtering problem per se, but rather to continue the long standing and fruitful interplay between probability and certain kinds of PDEs, such as McKean-Vlasov, Navier-Stokes, and Burgers equations. In her second paper she considers the "nonMarkovian" case, which allows for insights in other physical systems than wave equations (in particular, spin glasses). The article by Hazra and Viens is in a similar vein to Guionnet's second paper, but more on the physics side of the street.

The contribution of T. Lyons on "rough paths" is a departure from the more Brownian motion based papers we have been discussing. In this expository/proselytizing paper Lyons motivates with "concrete" examples as to why one might like to consider noise processes that in some ways are similar to Brownian motions, but have "rougher" paths. He makes precise his concept of roughness, through a fine analysis of the oscillations of the paths, extending the standard concepts of total variation and quadratic variation in a new way, The theoretical underpinnings are in a companion paper published in Rev. Mat. Iberoamericana.

The last paper in the volume, by John and Owen Walsh, brings us full circle back to the paradigm of Pardoux, Talay, and Tubaro. But of course there is a difference: here the authors study the binomial model of Cox-Ross-Rubinstein developed in a mathematical finance context, and also the trinomial model, as numerical schemes to estimate $E^x\{f(X_T)\}$. Mindful that f can be thought of as a boundary condition for a PDE, the fact that f is typically not smooth in applications [a standard example from finance is $f(x)=(x-K)_+$ *or* $f(x)=(K-x)_+$, representing calls and puts respectively] can lead to some pathological behavior. A key observation, also made by F. and M. Diener [2], [3] using different methods, is that the convergence has a non-random "wobble", which is a consequence of the discontinuities of the function f and/or its derivative. This error, it turns out, is a quasi-periodic function of the number of iterations in the scheme. This insight lets one choose n (the number of time steps) in such a way as to greatly reduce the error of the numerical scheme, especially if one combines it with Richardson extrapolation.

In conclusion this thin volume contains a collection of eight articles, all well written, superficially on disparate themes, but in reality all part of the outgrowth of the effort to understand how to solve applied problems numerically in realistic and efficient ways.

References

[1] P. Del Moral, J. Jacod, and P. Protter, 2001, *The Monte Carlo Method for filtering, with discrete time observations*, Proba. Thy. Rel. Fields, 120, 346-368.

[2] F. Diener and M. Diener, *Asymptotics of the Price Oscillations of a Vanilla Option in a Tree Model*, preprint available at *www-math.unice.fr/diener/*.

[3] F. Diener and M. Diener, *Asymptotics of the price of a barrier option in a tree model*, preprint available at *www-math.unice.fr/diener/*.

[4] E. Pardoux and D. Talay, 1985, *Discretization and simulation of stochastic differential equations*, Acta Appl. Math, 3, 23-47.

[5] D. Talay and L. Tubaro, 1990, *Expansion of the global error for numerical schemes solving stochastic differential equations*, Stochastic Anal. Appl. 8, 483-509.

BRIEF BOOK REVIEWS

by Peter Fillmore

STRANGE CURVES, COUNTING RABBITS, AND OTHER MATHEMATICAL EXPLORATIONS

by Keith Ball

Princeton 2003, xiii + 251 pages

The author of this delightful book, Keith Ball, Professor of Mathematics at University College London, is well-known for his entertaining public lectures on mathematics, in schools and to school pupils visiting his university. Here is his description:

"The book is based on these lectures, together with a few additional topics that I happen to be fond of. Although it is meant to be recreational, my aim in writing it has been not only to entertain, but also to convey some of the ideas that lie just beyond what is normally taught in the few years of school; and to do so with as few technical details as possible. I have made some effort to select material that illustrates a variety of branches of mathematics."

The book is divided into ten chapters, dealing with such topics as codes, space-filling curves, probability, the Fibonacci sequence, Stirling's formula, and irrational numbers. There are many illustrations, and each chapter contains a few problems, with solutions at the end of the chapter, intended to illustrate or extend the discussion.

MORE GAMES OF NO CHANCE

Richard J. Nowakowski, Editor

MSRI Publications No. 42, Cambridge 2002, xii + 535 pages

The subject of this book is combinatorial games theory—games not involving chance or hidden information. A conference held at MSRI in 1994 resulted in a volume entitled *Games of No Chance*; the present volume arose from a second such conference, at MSRI in 2000, and picks up where that one left off. From the cover description:

"It contains articles by some of the foremost researchers and pioneers of the theory, such as Elwyn Berlekamp and John Conway, by other researchers in mathematics and computer science, and by top game players.

"The articles run the gamut from new theoretical approaches (infinite games, generalizations of game values, two-player cellular automata, alpha-beta pruning under partial orders) to the very latest in some of the hottest games. Many of these advances reflect the interplay of the computer science and the mathematics. The book ends with an updated bibliography by A. Fraenkel and an updated version of the famous annotated list of problems by R.K.Guy, now in collaboration with R.J.Nowakowski."

LECTURES ON ALGEBRAIC MODEL THEORY

Bradd Hart and Matthew Valeriote, Editors

Fields Institute Monographs 15, AMS 2002, vii + 111 pages

This volume consists of lecture notes from three series of lectures given at the Fields Instiute in 1996-97 during the year-long programme in algebraic model theory. From the cover description:

"In recent years, model theory has had remarkable success in solving important problems as well as shedding new light on our understanding of them. The lectures collected here present recent developments in three such areas: Anand Pillay on differential fields, Patrick Speissegger on o-minimality, and Matthias Clasen and Matthew Valeriote on tame congruence theory."

Letters to the Editors / Lettres aux Rédacteurs

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

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

A FIRST COURSE IN DYNAMICS, WITH A PANORAMA OF RECENT DEVELOPMENTS

by Boris Hasselblatt and Anatole Katok

Cambridge 2003, x + 424 pages

This book is intended for senior undergraduate and beginning graduate students of mathematics, physics or engineering. The only prerequisite is a basic undergraduate analysis course; familiarity with manifolds or measure theory is not assumed. An introductory chapter gives a general description of dynamics, illustrated by a number of interesting examples from nature and from mathematics. The remainder of the book is divided into two parts, "A Course in Dynamics" and "A Panorama of Dynamical Systems", each further divided into 7 chapters. The "Course" is developed by means of a progression of examples, used "to present the the concepts and tools for describing asymptotic behavior in dynamical systems, gradually increasing the level of complexity." The "Panorama" describes modern developments and applications, for example logistic maps, hyperbolic dynamics, strange attractors, twist maps, closed geodesics, and applications to number theory. These chapters can be read selectively and in any order. The first part of the book includes a large selection of exercises, for many of which hints, answers or solutions are provided. There are suggestions for further reading, and appendices on metric spaces, differentiability and integration.

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 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

EDUCATION NOTES

Ed Barbeau

The Ontario Double Cohort

By the time this appears, almost a full academic year will have passed in which students from both the old Ontario Academic Credit curriculum and the new Ontario Grade 12 curriculum have taken first year courses at the university. In the new curriculum, the normal time for a high school diploma has been reduced from five years to four. The mathematics curriculum has been revised to put more emphasis on investigations and problem solving, communication, and technology. For the university-bound student, the old OAC menu of a calculus course, an algebra and geometry course and a finite mathematics course has been replaced by a course on functions with calculus, and algebra-geometry with proof and mathematics for data management. Students normally require two mathematics credits to enter programs in engineering or science, but most will at least have the functions course. The expectation is that students in the new regime may be less adept at technical manipulations but stronger at setting up problems and formulating solutions. One matter of concern among tertiary lecturers was that the new curriculum did not cover any trigonometry after grade 11.

At the end of January, the Mathematics Education Forum at the Fields Institute heard a report based on an informal survey of several universities: Brock, Queen's, Toronto, Waterloo, Windsor and York. Most respondents dealt with students in a first year calculus course, although some also took linear algebra or an introductory course with a broader syllabus. In general, there seemed to be no significant difference between the two cohorts. Indeed, for most universities, it was not possible to distinguish who had taken the new and the old curriculum. Some saw this as a positive thing, in that the later cohort did not lag behind students in the old curriculum who had one more year of high school and had taken more mathematics courses.

A number of weaknesses were noticed, but it usually seemed impossible to ascribe them to one or other background. Students had difficulties with arguments; they had difficulty reading and extracting information; they had poor fundamental skills; there was trouble grasping concepts and a propensity for using recipes. Since the new students did not study antidifferentiation, they had more trouble with integration. Since the new course dealt only with polynomials in in calculus, some students had "surprising" difficulty with the chain rule. One lecturer of engineers did not observe an expected weakness in the knowledge of conic sections, perhaps because they had been treated in the grade 11 functions and relations course.

Since one of the benefits of the new curriculum was supposed to be an increased ability in solving problems, lecturers were asked whether they noticed any difference between the new and old curriculum students in this regard. None was observed. However, in the discussion, some expressed the opinion that it was too soon for this effect to show up and that one might expect to see a change after teachers were more comfortable with the new regime and students had better experiences right through school.

While most institutions did not separate their classes according to cohorts, they did take account of the new syllabus in planning their courses. Virtually everyone anticipated that the students would not be adept in trigonometry, and so introduced a unit on this topic early in the course. Some based the first year course on the new grade 12 syllabus (which was regarded as weaker), with the result that the OAC students found that quite a bit of the material was review. Other adaptations were noted: three instead of two lecture hours per week; additional help sessions on trigonometry; additional hours of one-one tutoring; omission of some proofs; dealing explicitly with proof by induction; providing more examples of integration; more careful treatment of differentiation; slowing the pace of the course.

Trigonometry. The big difference that was both anticipated and regretted was the lack of trigonometry in the grade 12 course. Ontario students get some exposure in grade 11, but it seems to be quickly forgotten. Since science and engineering professors, in particular, complained about the downgrading of trigonometry at the time the new curriculum was implemented, this seems to be an area that requires some immediate attention. Trigonometry is such a fundamental part of both pure and applied mathematics that progress in a university program can be hampered by inability of students in this area.

It is hard to understand the hostility to trigonometry in some quarters. It is an elegant, practical and sophisticated codification of the mathematics of similar triangles, and an important means of describing and treating some periodic phenomena. Students with fluency in trigonometry have learned how to transform expressions into forms suitable for readily yielding up information and have a good tool for mathematical modelling. Trigonometry buttresses general skill in algebra and solving of equations. Certainly, it is a challenging subject for many students, but if there are going to be courses in high schools specifically designated for university-bound students, then curriculum planners should pay attention to what those in colleges and universities regard as essential in the school curriculum.

Four decades ago, the Ontario curriculum had a full Grade 13 trigonometry course, which allowed not only a good workout in the mechanics of the subject, but gave a glimpse of its power in solving practical problems, analyzing triangles and doing statics. To be sure, many of the topics taught then are either obsolete (solving triangles using logarithms) or of less importance, but it would not be hard to devise a modern course in trigonometry that is significant and thoroughly modern, while still giving students some experience in dealing with down-to-earth problems. Such a course would allow a strong foundation to be laid in complex numbers, treat at least finite trigonometric series, include some interesting modelling situations, discuss periodic functions, emphasize graphical analysis of trigonometric functions, and, if calculus is still on the syllabus, make that calculus richer. If geometrical visualization is held to be a value for high school students, then there might be an argument for including some spherical trigonometry. The big advantage of trigonometry as an area of study is that it has the

coherence, good range of applicability, sophistication and richness that can sustain interest over a long time period.

Individual comments. Before moving to discuss the situation at two particular institutions, I would like to give readers a flavour of the reactions to the new curriculum by noting some comments of both students and lecturers. Students from both cohorts seemed to feel that the OAC students had an advantage and that the new curriculum students had to do some catching up. Many students seemed to be prepared for a challenge, and there were several reports that described them as hardworking and conscientious.

Here is what was said by lecturers:

"I do get the feeling that the whole curriculum here was designed years ago to build on top of high school education, except that high school education has evolved since, and now there is a wide gap between high school and university level education. As we cannot change high schools, we have to adapt the way they have changed. This calls for a system-wide reorganization, not merely for changes at the level of individual courses."

"The failure rate was much lower than in the past, but also there were fewer A+ grades."

"It seems important to note that we did not restrict the use of calculators, rather encouraged the students to use them as an exploratory tool. Given that the younger half should be familiar with scientific calculators since grade 9, the experience was disappointing; many students had not previously used calculators to an extent that made them useful. The calculators were mainly used for algebraic manipulation, not exploration."

"The students are uncomfortably aware of their basic weakness in algebraic manipulations. Some cling to their calculators, but many students were not proficient in their use either."

"The mathematics grades that some students claimed they received in high school were tough to imagine as being credible indicators of ability to perform routine manipulations. The high school marks they quoted ... were mind-boggling given their performance."

"A lot of students had quite unrealistic expectations and self-evaluations throughout the course. More students than in previous years had the expectation of getting a passing mark even though they performed poorly. We had more requests and pleas this year than any other year from students who failed to simply raise their marks to a passing grade. It seemed that it was expected from them that the marks will indeed be raised. The negative response to their request seemed a surprise."

"The students seemed less willing to go to trouble with assignments. They were more likely to engage in class discussion than those in earlier years. I did not keep track of which had the new and which had the old curriculum. My guess would be that the differences would be more attributable to lesser maturity and experience than to actual knowledge of parts of the curriculum."

"Just a hunch, but it may be that the students from grade 12 were less deliberately prepared for university than their seniors. OAC, and grade 13 before it, were treated by many schools as transition years, assuming students in that year were university-bound. Grade 12 is just the last year of high school."

"It is remarkable to notice that Grade 12 students with one or more fewer mathematics courses performed as well as OAC students on a conceptual first year calculus course."

University of Toronto at Scarborough. At Scarborough, separate courses in calculus for the physical and the life sciences were terminated, and a new "general purpose" half course in calculus was established, with separate classes for the two cohorts. The new courses were less theoretical, but covered substantially the same material. Lecturers consulted regularly and were prepared to adjust to circumstances at they arose. There was more testing than usual to monitor what was happening. The courses used a Harvard reform text, which the students did not like because of the absence of worked examples. The final marks were not significantly different in the two groups, and the lecturers felt that the two curricula seemed to function about the same in preparing students for university.

University of Waterloo. All the first year calculus and algebra courses across the university are taught by the Faculty of Mathematics. There are several types of calculus courses, terminal, service and part of a two- or three-course sequence. In first year, a classical algebra course is followed by one in linear algebra. The experience at this university was consistent with what is recorded above, with the two cohorts being taught in the same classes. The performance of both cohorts on the Canadian Open Mathematics Competition and on the Euclid Contest were examined with no significant difference noted. However, all incoming mathematics and engineering students have to write a Mathematics Preparedness test (short answer for 25 items). Generally, students from outside the province perform better than Ontario students. This year, the OAC cohort scored about 4 per cent higher than the new cohort; the most noticeable difference occurred in questions on simplifying rational expressions and trigonometry. The new curriculum students did slightly better than their peers in solving polynomial equations and inequalities, but both cohorts performed similarly on calculus questions. In particular, both groups did poorly (15% success rate) on the question: *Find all* x *such that* $\ln(2 - 5x) < 0$; and did well (80% success rate) on the question: *Solve the equation* $16^{(5/x)} = 32^{(4/3)}$ *for* x; *simplify your answer*.

REPORT FROM THE VICE-PRESIDENT

Jon Thompson, VP Atlantic region

Report from the January 2004 AMS Council Meeting

The CMS has a reciprocity agreement with the AMS and each society is invited to send a representative to Council meetings of the other. Two policy matters discussed at the January 2004 AMS Council meeting were: i) revisions to the AMS Ethical Guidelines and ii) a report on the state of mathematics education in American schools (K-12). The CMS has no formal policy on professional ethics, and it would be timely for CMS to adopt one, possibly similar to the AMS Guidelines. Both societies have similar levels of interest and ranges of involvement in mathematics education in schools, as well as similar experiences of frustration, and each can benefit from the other's initiatives. The full text of the AMS Guidlines can be found at *www.ams.org/secretary/ethics.html*

Guidelines on Professional Ethics. The preamble to the AMS Ethical Guidelines says that they are set forth "to help in the preservation of that atmosphere of mutual trust and ethical behaviour required for science to prosper." They reflect the Society's "expectations of behaviour" of not only its own members, but of everyone in the wider mathematical community, including educators, employers and publishers. Although not legally enforceable, the guidelines are intended to promote individual and collective responsibility. They also provide a framework for review of complaints of misconduct brought to the AMS.

The impetus for the revisions adopted in January was a question brought to the Society on which the existing text provided no guidance. This concerned plagiarism, but it was then appreciated that more extensive revisions would improve the clarity and applicability of the document. The AMS Ethical Guidelines are organized in four parts: (I) Mathematical Research and its Presentation; (II) Social Responsibility of Mathematicians; (III) Education and Granting of Degrees; and (IV) Publications.

Part (I) deals with issues of priority in mathematical discovery, including in the revised version explicit discussions on plagiarism and on claims of results in advance of their having been achieved. It also urges mathematicians to be knowledgeable of work in their field, and to give credit and respect to the work of others. Part (II) expresses a commitment to academic freedom and urges resistance to government or corporate pressures toward secrecy. It notes that the growing economic significance of mathematics will inevitably create conflicts of interest and tendencies toward bias, and recommends steps to minimize them. The importance of fairness in refereeing manuscripts and writing letters reference is noted. This Part also suggests that the Society will consider helping mathematical "whistle-blowers," in the public interest. Finally, it urges mathematicians not to participate in exploitation of others through low salaries or excessive workloads.

Standards for graduate programs and fairness to graduate students are addressed in Part (III). The fourth Part discusses responsible treatment of manuscripts by journals and editors. It also seeks to extend its view of responsibility to commercial publishers who draw on resources of the mathematical community. It states that the Society will not cooperate with publishers who fail to respect the principles of the Ethical Guidelines.

Although on smaller scale, the CMS carries on many of the same activities as the AMS, including publication of books and journals, and involvement in education. As a mature professional society, it should have a policy on professional ethics, for the same reasons as the AMS. Disputes over priority and the resultant prestige have been with us for centuries, as everyone knows. However, as the AMS Guidelines note, the growing economic importance of mathematics can add financial considerations to those of priority in creating circumstances that could lead to inappropriate conduct.

The mathematicization of disciplines such as genomics that have enormous economic (as well as health or other) potential, bring mathematicians into close contact with scientists and commerical interests in medicine and pharmacology.[1] In such fields, large infusions of money, whether in terms of research program support, consulting fees, or shareholdings, have created circumstances where scientific principles and the public interest have sometimes been seriously compromised.[2] Journals and other organizations in these fields have been strengthening their ethical policies to contend with such adverse influences.[3]

Mathematics education in schools. Roger Howe (Yale), Chair of the AMS Committee on Education, reported on "the parlous state" of mathematics teaching in American schools. Most of his account would apply equally well to the Canadian experience, in particular the large numbers of teachers in mathematics classrooms who have little or no mathematics background. In both countries this is because school systems require no significant mathematics training for teachers of primary grades, and many such teachers subsequently diffuse into the higher grades as their careers evolve. Howe discussed the need for new curriculum standards for K-12, as well as for teacher training. In view of competing jurisdictions, the best that might be achieved are minimal standards, but even this would be a material advance. He said that more university mathematicians would have to become involved and noted that sustained commitment, including learning about pedagogy, motivation of students and curriculum structure would be required.

In the ensuing discussion it was recalled that, historically, the AMS had left these issues to the MAA, but since the MAA had long concentrated on undergraduate education, the AMS felt obligated to become involved. It was suggested by some that the mandate of the Committee on Education should be expanded, and that the possibility of a joint AMS-MAA committee should be considered.

Later in the week, several sessions in the AMS-MAA Joint Mathematics Meetings were devoted to education in schools, and Hyman Bass (Michigan) made this the subject of his Retiring AMS Presidential Address. Bass said it was important that leading research mathematicians to take

an active role, both for the prestige they would lend to the enterprise and their understanding of the discipline. He cited the involvement of Felix Klein, Hans Freudenthal and Roger Howe, among others. He described an experimental program in Michigan in which he has been working with mathematics educators and students in primary grades, and summarized positive results. Like Howe in the Council meeting, Bass stressed that mathematicians must be prepared to invest time in learning about pedagogy and motivation. Specifically, he suggested that education in schools be approached by mathematicians in a way analogous to the way applied mathematicians study problems arising in sciences such as biology — they develop an understanding both of the subject matter and of the discourse of experts in the particular science. In various sessions, speakers noted that there already is useful literature describing the problems and possible solutions (for example, the proceedings of a 1996 conference at MSRI[4]), and that what is needed now is commitment by more mathematicians to active involvement.

[1] E. Lander, *Biology as Information*, AMS Josiah Willard Gibbs Lecture (07 January 2004)
[2] *Just How Tainted has Medicine Become?* Editorial, The Lancet, 359 (06 April 2002), 1167
[3] P. Baird, *Getting it Right: Industry Sponsorship and Medical Research*, Canadian Medical Association Journal, 168 (May 2003), 1267-9
[4] E.A. Gavosto et al (editors), *Contemporary Issues in Mathematics Education*, MSRI Publications, No. 36, Cambridge University Press (1999)

NEWS FROM DEPARTMENTS

Dalhousie University, Halifax, NS

Appointment: Jonathan Borwein (Professor, Research Chair in Computer Science, Functional Analysis, January 2004).

Award/Distinction: Richard Hoshino (Action Canada Fellowship, May 2003).

Visitors: Xian Wu (Yunnan Normal University, China, Nonlinear Analysis, Jan-Feb. 2004); Shi Sheng Zhang (Sichuan University, China, Nonlinear Analysis, Feb-Mar 2004); Won Kyu Kim (Chungbuk National University, Korea, Nonlinear Analysis, Feb 2004-Feb 2005); Kyoung Hee Lee (Korea University of Technology & Education,Nonlinear Analysis, Feb 2004-Feb 2005).

University of Lethbridge, Lethbridge, Alberta

Appointment: Dave Morris (Professor, Lie Theory, July 2003).

SCIENTIFIC DIRECTOR OF BIRS

The Board of Directors of PIMS and the Board of Trustees of MSRI have announced the appointment of Dr. Nassif Ghoussoub as Scientific Director of the Banff International Research Station (BIRS) for a period of 3 years starting January 1, 2004.

Dr. Ghoussoub is presently Professor of Mathematics and Distinguished University Scholar at the University of British Columbia. He is the founding Director of PIMS (1996-2003), a co-founder of MITACS, and a member of its Board of Directors for the period 1998-2003. He is also a co-founder of BIRS and was Chair of its executive committee for the period 2000-2003.

Dr. Ghoussoub was the recipient of the Coxeter-James prize in 1990, of a Killam senior fellowship in 1992 and has been a fellow of the Royal Society of Canada since 1993. He was chair of NSERC's grant selection committee for mathematics in 1995-1996 and vice-president of the Canadian Mathematical Society from 1994 to 1996. He was Editor-in-Chief of the Canadian Journal of Mathematics from 1993 to 2002 and is currently on the editorial board of various international journals. His present research interests are in non-linear analysis and partial differential equations.

ANNUAL REPORT FROM THE EXECUTIVE DIRECTOR *(continued)*

The Publications Office and Executive Office staff has also provided production assistance for the *Canadian Applied Mathematics Quarterly* and for the Royal Society publication — *Comptes Rendus*. Some changes in the staff of the Publications Office are envisaged for 2004 but it is hoped these changes can be accomplished with a minimal impact on the delivery of the Society's journals and on the other services provided by this Office.

The past year also saw a change in the responsibilities of CRUX with MAYHEM. Jim Totten (University College of the Cariboo) took over from Bruce Shawyer (MUN) as the Editor-in Chief. I wish to acknowledge the considerable support from Memorial University of Newfoundland during Bruce Shawyer's term. Thanks are also due to Jim Totten and to the University College of the Cariboo for efficient and effective transfer of the CRUX with MAYHEM editorial responsibilities.

The CMS Book Series, published in cooperation with Springer-Verlag, now has 25 books in print, in production, or under contract. Jonathan Borwein and Peter Borwein are to be congratulated on the considerable success of this series.

Meetings

The first meeting in 2003 was the highly successful Canadian School Mathematics Forum (May 16-18). This was followed by the Summer Meeting hosted by the University of Alberta and the Winter Meeting hosted by Simon Fraser University. Both of these meetings were very successful from various standpoints. They each featured a large number of plenary, prize and special session speakers and both attracted a large number of delegates (440 for the Summer Meeting and 435 for the Winter Meeting).

An increase in the number and size of our meetings put additional demands on not only the Executive Office Staff but also on all those who volunteer with these meetings — the meeting directors, the local arrangement chairs and the session organizers. The Society is indebted to all of those who contributed to the success of the 2003 Forum, the 2003 CMS Summer Meeting and the 2003 CMS Winter Meeting.

For the past several years, all abstracts for our meetings have been processed with the assistance of Shelley Ames from the Publications Office. The large number of abstracts and the difficulties associating them with the correct session were resulting in more and more time being devoted to this project. Thanks to Alan Kelm and other Executive Office staff, in 2003, a new system was introduced for handling meeting abstracts. All abstracts are now submitted using a web-based form and only speakers associated with a particular session can submit abstracts. This new system has considerably reduced the time to process the abstracts and make them available on the meeting web pages.

Financial Limitations

Unfortunately, due to major decreases in revenue resulting from a significantly stronger Canadian dollar and the Devine/RoweCom bankruptcy, which negatively impacted journal revenues in 2003, the CMS is facing a significant budget deficit for 2003. Although every attempt was made to produce a 2004 Budget which forecasted a surplus, this was not possible. The 2004 Budget approved by the Board of Directors in December projects a deficit of $24,000. The Executive and Finance Committees are very concerned with the current situation and are investigating ways to increase revenues or decrease expenditures.

Future Opportunities

Combining a large team of volunteers and ensuring our administrative operations are as efficient as possible, results in a wide array of activities delivered very cost effectively. The Society's existing activities are getting larger in scope and the CMS is also being asked to undertake new initiatives and support other groups. Additional resources must be found if the CMS wants to be able to positively respond to such requests.

Publications revenues, particularly from periodicals, have supported our other activities in the past. It is unlikely this can continue unless additional publication revenues can be generated. A number of new publication initiatives are being considered that it is hoped will bring about a greater revenue stream. In addition, some streamlining of our subscription services are being investigated that should provide benefits not only for our periodicals but also afford the CMS the opportunity to offer such services to other societies and agencies.

Space in the current Executive Office building on the campus of the University of Ottawa cannot be increased and discussions are underway with the University to explore new or other facilities that would better meet the needs of the CMS in the future.

Both 2004 and 2005 will feature impressive meetings programs. Of particular note is the joint CMS/CAIMS Meeting in Halifax in June 2004, the Canada-France meeting in Toulouse in July 2004, involving the participation of three Canadian and three French societies, the Second Canada School Mathematics Forum, hosted by the Fields Institute in May 2005, and Renaissance Banff in July 2005. The 2004 Winter Meeting will be hosted by McGill University, the 2005 Summer Meeting will take place at the University of Waterloo and the 2005 Winter Meeting will see the CMS returning to Victoria.

In 2004, negotiations will continue for a new location for the Executive Office as will discussions with other societies for the CMS to provide administrative and other services.

Another important project that will be considered in 2004 is the possibility of obtaining professional fund raising services. It is also hoped this could result in significant new revenues for the Society and its Endowment Fund. It is going to be a busy year!

RAPPORT ANNUEL 2003 DU DIRECTEUR ADMINISTRATIF

Graham Wright

Ce que l'avenir nous réserve

Bureau administratif

La dernière année a été très mouvementée pour le bureau administratif.

Nathalie Blanchard s'est jointe au personnel de la SMC en janvier 2003 en tant qu'adjointe au directeur administratif. En plus de ses autres responsabilités, elle a contribué, en tant qu'adjointe à la rédaction des *Notes de la SMC*, à améliorer grandement la production de cette publication. Jusque là produites en LaTex, les *Notes* sont désormais réalisées à l'aide de QuarkXpress, et la transition d'un mode à l'autre s'est faite de façon quasi transparente. L'utilisation de ce logiciel facilite grandement la compilation des *Notes*, mais elle offre aussi d'autres avantages et nous permet de réaliser des économies en temps et sur le coût d'impression.

Yvette Roberts, qui a remplacé Diane Ellis comme comptable de la SMC en juin 2004, a tôt fait de prendre en mains les tâches qui lui étaient confiées. Avec son aide, et celle des autres membres du personnel du bureau, le budget préliminaire s'est fait d'une manière qui nous a permis, au trésorier et à moi, de consacrer plus de temps à l'examen et à l'analyse du budget projeté pour 2004.

J'en profite également pour remercier les personnes suivantes de leur importante contribution au cours de la dernière année : Alan Kelm, responsable des services Web; Liliane Sousa, responsable de l'adhésion et des publications; Suzanne Lalonde, adjointe administrative, ainsi que nos employés à temps partiel Yann Bernard, Jean-François Simard, Anthony Selles et Sany Sam.

En juin 2003, un comité spécial formé de Christiane Rousseau (présidente), Eddy Campbell (président élu) et Arthur Sherk (trésorier) s'est vu confier le mandat de revoir la charge de travail du bureau administratif et les mesures que la Société devrait envisager pour répondre à ses besoins dans les années à venir. Ce fut un exercice difficile, dont les changements désormais approuvés auront d'importantes répercussions sur nos activités administratives en 2004.

Publications

En 2003, Craig Platt a repris la responsabilité du bureau des publications de la SMC des mains de Michael Doob. La transition s'est faite tout en douceur, et Michael nous rend toujours de fiers services en tant que consultant technique.

Les rédacteurs en chef du *Journal canadien de mathématiques* (Henri Darmon et Niky Kamran) et du *Bulletin canadien de mathématiques* (James Lewis, Arturo Pianzola et Noriko Yui), de même que Swami Swaminathan, éditeur technique adjoint, Laura Kirkland, adjointe administrative, Shelley Ames, adjointe technique et Judi Borwein, adjointe aux publications électroniques, contribuent tous à garantir la qualité de nos publications Web et papier.

Le bureau des publications et le bureau administratif ont aussi participé à la publication du *Canadian Applied Mathematics Quarterly* et des *Comptes Rendus* de la Société royale. Quelques changements au sein du personnel du bureau des publications sont envisagés en 2004, mais nous espérons que ces changements auront un effet minime sur la production des revues de la Société et sur les autres services offerts par ce bureau.

Au cours de la dernière année, le *CRUX with MAYHEM* a lui aussi changé de mains. Jim Totten (University College of the Cariboo - UCC) a pris le relais de Bruce Shawyer (Memorial) en tant que rédacteur en chef. J'aimerais remercier l'Université Memorial de son appui considérable durant le mandant de Bruce Shawyer. Je remercie également Jim Totten et l'UCC d'avoir assuré avec efficacité le transfert des responsabilités rédactionnelles du *CRUX with MAYHEM*.

La collection Ouvrages de mathématiques de la SMC, publiée en collaboration avec Springer-Verlag, compte en ce moment 25 livres publiés, en cours de production ou à venir. Jonathan et Peter Borwein méritent nos félicitations pour le succès considérable que remporte cette collection.

Réunions

Le premier événement de 2003 a été le Forum canadien sur l'enseignement des mathématiques (16-18 mai), qui a connu un franc succès. Il a été suivi de la Réunion d'été, tenue à l'Université de l'Alberta, et de la Réunion d'hiver, à l'Université Simon Fraser. Ces deux congrès ont été de grandes réussites à plusieurs égards. Chacune avait au programme un grand nombre de plénières, de conférences de lauréats et de séances spéciales, et elles ont toutes deux attiré de nombreux participants (440 à la Réunion d'été et 435 à la Réunion d'hiver).

Une augmentation du nombre de rencontres et de leur ampleur alourdit non seulement la tâche du personnel du bureau administratif, mais aussi des bénévoles qui participent à leur organisation — les directeurs de la Réunion, les présidents du comité de logistique local et les organisateurs de séances. Aussi, la Société doit-elle une fière chandelle à toutes les personnes qui ont contribué au succès retentissant du Forum 2003 ainsi que des Réunions d'été et d'hiver 2003 de la SMC.

Depuis plusieurs années, les comptes rendus de nos Réunions sont publiés grâce à l'aide de Shelley Ames du bureau des publications. Le grand nombre de résumés et la difficulté de les associer à la bonne séance ont fait augmenter constamment le temps consacré à leur publication. Grâce à Alan Kelm et à d'autres personnes du bureau administratif, un nouveau système a été mis en place en 2003 pour le traitement des résumés des Réunions. Désormais, tous les résumés sont soumis via un formulaire Web, que seuls les conférenciers inscrits à une séance précise peuvent utiliser. Ce nouveau système a considérablement réduit la longueur du processus ainsi que le délai de publication sur les pages Web de la Réunion.

Contraintes financières

Malheureusement, en raison d'une baisse considérable de nos recettes causée par la force du dollar canadien et la faillite de Devine/RoweCom, qui ont fait diminuer nos revenus de publication en 2003, la SMC enregistre un important déficit en 2003. Même si nous avons tout fait pour déposer un budget 2004 avec surplus, la tâche s'est avérée impossible. Le budget 2004 approuvé par le conseil d'administration en décembre dernier prévoit donc un déficit de 24 000 $. La situation actuelle inquiète vivement le comité exécutif et le comité des finances, qui étudient des moyens d'augmenter les revenus ou de réduire les dépenses.

Possibilités pour l'avenir

Avec l'appui d'une grande équipe de bénévoles et en veillant à ce que notre fonctionnement administratif soit le plus efficace possible, nous sommes en mesure d'offrir une vaste gamme d'activités à peu de frais. Les activités actuelles de la Société prennent de plus en plus d'ampleur, et l'on demande à la SMC de prendre part à de nouvelles initiatives et d'appuyer d'autres groupes. Si la SMC veut pouvoir répondre à de telles demandes, elle devra nécessairement trouver des ressources supplémentaires.

Dans le passé, ce sont les recettes tirées de nos publications, en particulier de nos périodiques, qui ont financé nos autres activités. Il est peu probable que cela puisse continuer, à moins de pouvoir trouver des revenus supplémentaires. Nous étudions en ce moment de nouveaux projets de publication dans l'espoir d'augmenter nos revenus. En outre, nous examinons la possibilité de rationaliser nos services d'abonnement, ce qui pourrait non seulement s'avérer profitable pour nos périodiques, mais aussi permettre à la SMC d'offrir de tels services à d'autres sociétés ou organismes.

Vu l'impossibilité d'agrandir les locaux actuels de notre bureau administratif, logés sur le campus de l'Université d'Ottawa, nous avons entrepris des discussions avec l'Université pour nous reloger dans de nouveaux ou d'autres locaux qui répondraient mieux aux besoins futurs de la SMC.

Les années 2004 et 2005 seront de grandes années de congrès. Mentionnons en particulier la Réunion conjointe SCM/SCMAI d'Halifax en juin 2004, le congrès Canada-France de Toulouse en juillet 2004, auquel participeront trois sociétés canadiennes et trois françaises, le deuxième Forum canadien sur l'enseignement des mathématiques, à l'Institut Fields en mai 2005, et le « Banff Renaissance » en juillet 2005. La Réunion d'hiver 2004 se tiendra à l'Université McGill, celle de l'été 2005, à l'Université de Waterloo, et celle de l'hiver 2005, à Victoria.

En 2004, les négociations entourant la relocalisation du bureau administratif et les discussions avec d'autres sociétés concernant l'offre, par la SMC, de services administratifs et autres se poursuivront. Un autre important projet à l'étude pour 2004 sera la possibilité de retenir les services de professionnels des campagnes de financement. Nous aimerions ainsi accroître les recettes de la Société et grossir son fonds de dotation. Nul doute, l'année à venir s'annonce fort occupée!

TRIVIA

1) In the movie Spy Hard, Nicolette Sheridan played what role?

a) Etta Pi
b) Russian Agent 3.14
c) Hot Six
d) Agent oh oh yes

2) What spacecraft burned up in Mars' atmosphere in 1999 due to an error in converting between Imperial and Metric units?

a) Voyager II
b) Mars Climate Orbiter
c) Mariner III
d) Mars Polar Lander

3) In the episode of Seinfeld where George abstains from sex and becomes super-intelligent, which of the following did not happen:

a) George mentions "early Euclidean geometry".
b) George reads "Chaos and Fractals" by Peitgen, Jürgens and Saupe.
c) George computes the odds of ever having sex with a Portuguese waitress.
d) George discovers secret messages in the decimal expansion of π

4) What child star from the TV show "The Wonder Years" has co-authored a research paper in mathematics?

a) Josh Saviano (Paul)
b) Danica McKellar (Winnie)
c) Fred Savage (Kevin)
d) Jason Hervey (Wayne)

5) In 1998, the Arizona "Pick Three" Lottery had to be halted. What was the reason?

a) The random number generator never chose the number 9.
b) Improper calculation of the odds caused massive payouts.
c) Hackers caused 666 to be the winning number 3 weeks in a row.
d) Money launderers were making huge wagers.

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

ANSWERS ON PAGE 25

RAPPORT DU VICE-PRÉSIDENT

Jon Thompson, VP région Atlantique

Rapport de la réunion de janvier 2004 du conseil de l'AMS

La SMC ayant conclu une entente de réciprocité avec l'AMS, chacune des deux sociétés est invitée à envoyer un représentant aux réunions du conseil de l'autre. À la réunion de janvier 2004 du conseil de l'AMS, deux grands dossiers étaient à l'ordre du jour : i) la mise à jour du code de déontologie de l'AMS et ii) un rapport sur la situation de l'enseignement des mathématiques dans les écoles primaires et secondaires des É.-U. La SMC n'ayant pas de code de déontologie, il serait opportun qu'elle en adopte un, qui pourrait ressembler à celui de l'AMS. Étant donné que les deux sociétés s'intéressent et participent à peu près également à l'enseignement des mathématiques dans les écoles, et qu'elles vivent des frustrations semblables, elles auraient sans doute tout intérêt à discuter de leurs initiatives respectives.

Déontologie. En préambule au code de déontologie de l'AMS, on peut lire que ce code vise à « favoriser la confiance mutuelle et le professionnalisme nécessaires à l'essor de la science ». Il témoigne du comportement que la Société attend non seulement de ses membres, mais aussi de la communauté mathématique dans son ensemble, y compris les enseignants, les employeurs et les éditeurs. Même s'il n'a pas force de loi, le code se veut un instrument de promotion des responsabilités individuelles et collectives. Il pose également des balises à l'examen de plaintes de mauvaise conduite déposées devant l'AMS.

Pourquoi cette mise à jour? Parce que le code en vigueur n'offrait aucun élément de réponse à une question posée à la Société. C'était une question sur le plagiat, mais il a été convenu qu'une mise à jour plus approfondie clarifierait le document et en faciliterait l'application. Le code de déontologie de l'AMS se divise en quatre parties : (I) Recherche mathématique et présentation de la recherche; (II) Responsabilités sociales des mathématiciens; (III) Éducation et grades; (IV) Publications.

La partie (I) aborde la question de la priorité en ce qui concerne les découvertes mathématiques; la nouvelle version du code comprend notamment une section détaillée sur le plagiat et sur l'annonce trop hâtive de résultats. On y incite également les mathématiciens à bien connaître ce qui se fait dans leur domaine et à juger le travail d'autrui avec considération et respect. La partie (II) témoigne d'un engagement envers la liberté universitaire et exhorte les mathématiciens à résister aux pressions gouvernementales ou commerciales (confidentialité). Étant donné que l'importance économique croissante des mathématiques créera inévitablement des conflits d'intérêts et des risques de parti pris, cette partie contient des recommandations qui permettraient de réduire ces possibilités. Elle souligne également l'importance de l'équité dans l'évaluation de manuscrits et les lettres de recommandation, et sous-entend que la Société pourrait appuyer les « dénonciateurs » de la communauté mathématique, dans l'intérêt du public. Enfin, cette partie exhorte les mathématiciens d'éviter l'exploitation (salaires trop bas ou surcharge de travail).

Les normes régissant les programmes de cycles supérieurs et l'équité envers ces étudiants sont abordées dans la partie (III), et l'examen responsable des manuscrits par les revues et les éditeurs, à la partie (IV). Dans cette dernière, le code souhaite élargir son point de vue sur la responsabilité aux éditeurs commerciaux qui profitent des ressources de la communauté mathématique. On y lit en outre que la Société ne collaborera pas avec les éditeurs qui ne respectent pas les principes du code de déontologie.

Quoi qu'à une échelle réduite, les activités de la SMC s'apparentent à celles de l'AMS : publication de livres et de revues, engagement envers l'éducation, etc. En tant qu'association professionnelle bien établie, la SMC devrait se doter d'un code de déontologie, pour les mêmes raisons que l'AMS. Les conflits concernant la priorité et le prestige qui en découle ne datent pas d'hier, comme vous le savez. Toutefois, comme l'indique le code de l'AMS, l'importance économique grandissante des mathématiques peuvent ajouter des considérations financières à celles de la priorité, ce qui pourrait entraîner des cas de mauvaise conduite.

La mathématisation de disciplines comme la génomique, dont le potentiel économique (ou pour la santé, notamment) est énorme, amène les mathématiciens à côtoyer de très près des scientifiques du domaine de la médecine ou de la pharmacologie et des gens y ayant des intérêts commerciaux[1]. Dans ces domaines, de grands influx d'argent, sous forme de financement de programmes de recherche, de frais de consultation ou d'actions, ont engendré des situations où les principes scientifiques et l'intérêt public étaient grandement compromis[2]. Les revues et divers organismes de ces domaines renforcent depuis un certain temps leur code de déontologie pour faire face à de telles influences néfastes[3].

L'enseignement des mathématiques au primaire-secondaire. Roger Howe (Yale), président du comité d'éducation de l'AMS, a décrit la « situation précaire » de l'enseignement des mathématiques dans les écoles américaines. La majorité de ses propos reflétaient également la situation canadienne, en particulier en ce qui concerne le grand nombre d'enseignants ayant peu ou pas de formation en mathématiques. Dans les deux pays, cela tient au fait que les systèmes scolaires n'exigent pas de formation spécialisée en mathématiques au primaire, et que de nombreux enseignants passent du primaire au secondaire après quelques années d'expérience. M. Howe a abordé la nécessité de nouvelles normes régissant les programmes primaires et secondaires, ainsi que la formation des maîtres. Compte tenu des chevauchements de compétences, il sera difficile d'obtenir plus que des normes minimales, mais ce sera déjà un pas vers l'avant. À son avis, les mathématiciens universitaires devraient s'engager d'avantage envers l'enseignement des mathématiques, notamment en s'intéressant à la pédagogie, à la motivation des étudiants et à la structure des programmes.

Lors de la discussion qui a suivi, on a rappelé les faits : traditionnellement, l'AMS laissait ces dossiers à la MAA, mais comme la MAA se concentre depuis longtemps sur l'enseignement primaire-secondaire, l'AMS s'est sentie obligée de s'y intéresser elle aussi. Certains ont suggéré d'élargir le mandat du comité d'éducation et d'évaluer la possibilité de créer un comité AMS-MAA.

Plus tard cette semaine-là, plusieurs séances des réunions conjointes AMS-MAA ont été consacrées à l'enseignement au primaire-secondaire. Hyman Bass (Michigan) en a d'ailleurs fait l'objet de son discours de départ à titre de président de l'AMS. Selon lui, il est important que les mathématiciens-chercheurs de renom jouent un rôle actif dans ce domaine, à la fois pour le prestige que cela apporterait à l'iniative, mais aussi pour leur propre compréhension de la discipline. Il a mentionné la contribution exceptionnelle des Felix Klein, Hans Freudenthal et Roger Howe, entre autres personnes. Il a décrit un programme expérimental de l'Université du Michigan auquel il a pris part en collaboration avec des enseignants et des élèves de mathématiques du primaire, et en a résumé les résultats positifs. Comme l'avait fait M. Howe à la réunion du conseil, M. Bass a souligné que les mathématiciens devaient se préparer à investir du temps pour se renseigner sur la pédagogie et la motivation.

En particulier, il a suggéré que les mathématiciens envisagent l'enseignement au primaire-secondaire de la même façon que les spécialistes des mathématiques appliquées étudient les problèmes soulevés dans des sciences comme la biologie — ils en viennent à comprendre à la fois la matière et le discours des spécialistes du domaine scientifique. Dans plusieurs séances, les intervenants ont souligné que les problèmes et solutions possibles étaient déjà bien documentés (par exemple les actes d'un congrès de 1996 au MSRI[4]), et que le temps était venu pour un plus grand nombre de mathématiciens de jouer un rôle actif.

[1] E. Lander, *Biology as Information*, AMS Josiah Willard Gibbs Lecture (07 January 2004)
[2] *Just How Tainted has Medicine Become?* Éditorial, The Lancet, 359 (06 April 2002), 1167
[3] P. Baird, *Getting it Right: Industry Sponsorship and Medical Research*, Canadian Medical Association Journal, 168 (May 2003), 1267-9
[4] E.A. Gavosto *et al* (rédacteurs), *Contemporary Issues in Mathematics Education*, MSRI Publications, No. 36, Cambridge University Press (1999)

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www.cms.math.ca/Prix/

REPORT ON THE CANADA WIDE SCIENCE FAIR

Calgary, May 10 - 18, 2003

By Bill Sands, University of Calgary

Each year the CMS sponsors a Special Award in the Canada Wide Science Fair (CWSF). Usually there is a prize in each of three divisions: Junior (Grades 7 and 8), Intermediate (Grades 9 and 10), and Senior (Grades 11, 12, 13 and CEGEP). This year, with the CWSF held in Calgary, I was asked to be a judge for these Special Awards, and to round up a few other local experts (fellow faculty in the Department of Mathematics and Statistics, University of Calgary) to help out with the judging as well.

For most of the judges, the CWSF began in the afternoon of Monday May 12 with the Opening Ceremonies. The site of the 2003 CWSF was the University of Calgary's renowned Olympic Oval, built for the 1988 Winter Olympics and possibly the finest speedskating facility in the world. On this occasion, however, no ice was in evidence, and the entire floor area (usually two Olympic-sized hockey rinks end to end, with the 400 metre speedskating oval around that) was cleared and occupied with rows and rows of exhibits on one side, with the stage and audience seating area for the Opening Ceremonies on the other. That evening, judges were asked to attend a Judges' Briefing and Project Previewing. After being briefed on how the judging was to proceed, we judges were invited to wander among the exhibits, paying particular attention to those we were to judge, as preparation for the deliberations ahead.

The actual judging of the Special Awards, including the CMS awards, happened on Wednesday May 14. In the morning we visited most of the projects that had been self-selected for the category we had been asked to judge. In the afternoon we completed our inspections of these projects, and revisited any we felt needed a second look. By the end of the afternoon the prizewinners had been selected.

That evening came the Judges' Banquet, featuring a highly entertaining after-dinner talk by Alice Payne, who spoke of her father's career in geology, but at the same time managed to convey to the enchanted audience quite a lot about her own career and personality.

The Awards Ceremony was on Friday May 16. The winners of the CMS awards were:

Senior: ADRIAN MALER (Ontario), for "We Got Rhythm", which explored the natural circadian cycle of humans;

Intermediate: WANDA BOYER (British Columbia), for "Prime Suspect", a study of prime numbers;

Junior: MALCOLM STAGG (Alberta), for "Evaluation of 3D Object Recognition Methods".

For more information on the 2003 CWSF, readers could look at the website *http://cwsf2003.org/*. Warning: the webaddress cwsf.org does not get you to the Canada Wide Science Fair, but rather to the Country and Western Society of Finland! (which, for those who are so inclined, might be worth checking out anyway.)

As an aside, readers (especially those involved with IMO activities) may like to compare the logo of the 2003 CWSF with the logo of the 1995 IMO held in Canada. Separated at birth?

Thanks should go to the other University of Calgary Mathematics and Statistics faculty and students who were involved in the judging or organization of the 2003 CWSF. They are: Larry Bates, Elena Braverman, Thi Dinh, Danny Glin, Michael Lamoureux, Renate Scheidler, and Robert Woodrow. Apologies to any I have inadvertently omitted.

Adrian Maler and Bill Sands

Wanda Boyer, Malcom Stagg and Bill Sands

2003 ANNUAL REPORTS FROM COMMITTEES

Editorial Note: The following were edited from the 2003 Annual Reports for the Society's Standing Committees. The President's Report and additional committee reports will appear in the May 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/

ENDOWMENT GRANTS COMPETITIONS COMMITTEE

Thomas Ransford, Chair

The main task of the Endowment Grants Committee is to adjudicate proposals for projects that are requesting financial support from the CMS Endowment Grants Competition. Projects which are funded must contribute to the goals of the CMS and to the broader good of the mathematical community.

The committee was allocated $30,000 for the 2003 competition. Seven applications were received. Four of these were funded and a total of $17,000 was awarded. All applicants have been notified by the CMS Executive Office in Ottawa.

The successful applications included a project for "combinatorics institutes", supporting secondary school teachers in Atlantic Canada, science fairs in British Columbia, and an IMO training seminar to be held at York University, and support for the formation of a Canadian Mathematics Teacher Society. The details of the successful applications can be viewed on the CMS web site: *www.cms.math.ca/Grants/EGC/*

Reports on projects funded in the past can also be found at this site.

Because of the poor performance of the stock market over the last few years, we anticipate that the money available for the 2004 competition may be somewhat reduced. It was decided at the December meeting of the CMS Board of Directors that, given the serious state of the Endowment Fund, a minimum amount of $20,000 be allocated from the Endowment Fund for the 2004 Endowment Grants Competition, and that this amount be subject to review in April 2004.

ELECTRONIC SERVICES COMMITTEE

David L. Rodgers (Michigan), Chair

The Electronic Services Committee (ESC) conducted a review of services provided by, and the operations of the Web Services Office (Ottawa) and Publications Office (Manitoba) with the following outcomes:

Web Services Office

- Operations have been overhauled as the result of introducing a resource allocation scheme for prioritizing and tracking work requests;
- Staff meet bi-weekly to review status, priority, and schedule issues;
- Modest reduction in incomplete work and strong focus on the high impact tasks;
- Significantly reduced SPAM traffic.

Publications Office

- A review led to re-engineered scripts that implement best coding/documentation practices for CMS publications;
- Neither capacity nor stability pose significant short-term issues for the CMS computing environment;
- Progress towards getting MathSciNet reviews to link to CMS journals;
- Adopted the metadata scheme proposed by Zbl and AMS, with CMS implementation under the leadership of the Publications Office.

The Electronic Services Committee will be working with the President in developing a bid for producing the proceedings for ICM 2010 as part of the CMS effort to bring the congress to Canada.

In addition, the Electronic Services Committee approved the following:

- Implementing mechanisms for automated posting and updating lists of participants for CMS sponsored/supported events;
- Moving ahead with allowing Google to crawl the Journals web site and point surfers to the subscriptions page;
- Sponsorship as the preferred mechanism by which commercial organizations are recognized for supporting the CMS or its activities;
- Identifying a successor to Nathalie Sinclair for the KaBol web site;
- Exploring a subscription-based model for access to CRUX problem sets.

The Committee will review capital budget request placeholders for 2005, 2006, and 2007, based on nominal replacement cycles, and develop a formal purchasing recommendation.

The Committee welcomes Samuel Shen (Alberta), David Wehlau (RMC), and Jeremie Rostand to the Committee and thank Peter Borwein, Jason Brown and Jonathan Borwein for their terms of service just completed. The Committee recognizes excellent, ongoing work by Alan Kelm (Ottawa), Craig Platt (Manitoba), Judi Borwein (Dalhousie), Michael Doob (Manitoba), and Graham Wright (Ottawa).

The Electronic Services Committee will be expanded by up to three volunteer consultants with rotating 2-year terms to provide the CMS with the benefit of industry-based expertise.

FINANCE COMMITTEE

Michael Lamoureux (Calgary), Chair

With assets of over $2 million, and a wide range of activities across the country entailing expenditures of over $1.5 million per year, the Society is involved in a rather large financial operation. The Finance Committee is responsible for overseeing the financial activities of the Canadian Mathematical Society, including the annual budget and the Restricted Investment Funds — the Endowment Fund, the Mathematical Olympiad Fund and the Designated Activities Fund.

The Committee meets twice a year, in April and October, to discuss the Budget and to make recommendations on financial matters to the Executive Committee and to the Board of Directors. Due to certain unexpected events during the year, a significant deficit for 2003 was projected which was a concern for the Committee. The Treasurer's Report provides details of the 2003 financial year and the 2004 Budget.

The Finance Committee includes among its members the Treasurer, the Executive Director, the President, and the Past-President or the President-Elect. Dr. Murray Bremner (Saskatchewan) joined the committee as a new member in 2003, and Dr. James Mingo (Queens) will be joining in 2004. I will be completing my term as Chair and will be succeeded as Chair by Dr. Akbar Rhemtula (Alberta).

The Society's Restricted Investment Funds continues to be managed by Toronto Dominion Quantitative Capital (TDQC), wholly in indexed funds. As such, no decisions on individual equities are required and only the mix of fund weightings is re-considered from time to time to meet the needs of the Society. In 2001, the asset mix was set to 10% Canadian Equities, 40% Bonds, and 50% Global Equities. The Committee recently recommended that the Bond weighting include exposure to real return bonds.

Proceeds from the Restricted Funds are use to finance certain activities of the Society, including the Endowment Grants Competition. The Society has been greatly helped in discussions concerning the maintenance and use of the Funds by our two consultants, Tim Appelt and David Bates, as well as the staff at TDQC. We are exploring mechanisms to establish the Restricted Funds as a true Endowment Fund, which would facilitate significant fund raising activities of the Society.

With the fluctuating market situation, there is less money available for some activities funded through proceeds from the Restricted Investment Funds. In particular, this year, only a smaller amount could be guaranteed for the 2004 Endowment Grants Competition. The Society is also exploring whether an investment could be effectively used to secure long-term office space for the operations of the CMS, in a cooperative construction venture with the University of Ottawa.

INTERNATIONAL AFFAIRES COMMITTEE

Cameron Stewart (Waterloo), Chair

The International Affairs Committee was concerned with two main issues in 2003.

The first concerns a possible bid by Canada to host the the International Congress of Mathematicians in 2010. It is anticipated that the Congress would be held in 2010 and that the General Assembly would take place in Toronto. The CMS President, Christiane Rousseau, has made some preliminary steps towards this end but some significant financial hurdles remain to be overcome before a bid can proceed.

The second issue concerns Canadian speakers at the next International Congress to be held in Madrid in 2006. The Committee hopes to prepare a short list of mathematicians from Canada who have done ground breaking work in the last 6 to 8 years. These names would be submitted to the Chair of the Program Committee for ICM 2006 in the hope to increase the number of Canadian speakers at the Congress.

NOMINATING COMMITTEE

Anthony To-Ming Lau (Alberta), Chair

The biggest challenge for the Nominating Committee for Year 2003 was the proposal of the slate for the Officers and members of the Board of Directors for various regions for the 2003 Election of the Canadian Mathematical Society. The committee also approved student representatives on the Board of Directors. In addition, the committee was busy filling chairs and memberships of the following committees:

- Endowment Grant Committee
- Electronic Service Committee
- Education Committee
- Women in Math Committee
- Finance Committee
- Publication Committee
- Research Committee
- Advancement of Mathematics Committee
- Mathematical Competitions Committee

The Committee worked very hard to maintain regional balance for the various committees. I am pleased to report that all positions that needed to be filled by December, 2003 were filled by that date.

MATHEMATICAL COMPETITIONS COMMITTEE

Peter Cass (UWO), Chair

Introduction

The Mathematical Competitions Committee (MCC) is responsible for overseeing activities associated with the Society's involvement in mathematics contests. Two contests, the Canadian Open Mathematics Challenge (COMC) and the Canadian Mathematical Olympiad (CMO) are sponsored and run by the Society. The MCC is also responsible for Canada's participation in the Asian Pacific Mathematics Olympiad (APMO) and the International Mathematical Olympiad (IMO). Other activities of the MCC include the Mathematical Olympiads' Correspondence Programme and Math Camps.

Much of the work of the MCC is done by its four subcommittees and the Correspondence Coordinator. Further information, including press releases, on most of the topics in this report can be found through the CMS Competitions web page: *www.cms.math.ca/Competitions/*

The Canadian Mathematical Olympiad

The 35th Canadian Mathematical Olympiad (CMO) was held on March 26th, 2003. There were 85 competitors from 55 schools in nine provinces. There were 5 more competitors, 8 more schools and 1 more province that took part in 2003 compared to 2002.

The top winners in the 35th Canadian Mathematical Olympiad were:

FIRST PRIZE and the Sun Life Financial Cup went to **János Kramár,** University of Toronto Schools, Toronto, Ontario. **SECOND PRIZE** went to **Tianyi (David) Han**, Woburn Collegiate Institute Toronto, Ontario. **THIRD PRIZE** went to **Robert Barrington Leigh**, Old Scona Academic High School, Edmonton, Alberta. **HONORABLE MENTIONS** were awarded to: **Olena Bormashenko**, Don Mills Collegiate Institute, Toronto, Ontario; **Ali Feizmohammadi**, Northview Heights Secondary School, North York, Ontario; **Ralph Furmaniak**, A.B. Lucas Secondary School, London, Ontario; **Oleg Ivrii**, Don Mills Collegiate Institute, Don Mills, Ontario; **Andrew Mao**, A.B. Lucas Secondary School, London, Ontario; **Jacob Tsimerman**, University of Toronto Schools, Toronto, Ontario.

There is a detailed report on the 2003 CMO, including the exam paper, solutions to the problems, and graders' reports available at:

www.cms.math.ca/Competitions/CM0/

The Asian Pacific Mathematics Olympiad

The 15th Asian Pacific Mathematics Olympiad (APMO) was written in March, 2003.

The security problems that plagued the 2001 and 2002 APMO competitions did not arise in 2003. The system of writing the contest on the afternoon of a Monday or the morning of the Tuesday immediately following was a success.

Canada had 10 students write officially and received 1 gold award, 2 silver awards, 4 bronze awards, and 3 honorable mentions.

Further details about the APMO are available at:
www.cms.math.ca/Competions/APMO/

The International Mathematical Olympiad:

The 44rd International Mathematical Olympiad was held in Tokyo, Japan July 5-19, 2003. The Canadian team placed 12th (tied with Kazakhstan) out of 82 countries with a team score of 119 (maximum 252). The members of the Canadian team were:

Jacob Tsimerman, University of Toronto Schools	**Gold**
Olena Bormashenko, Don Mills Collegiate Institute, Toronto	**Gold**
Oleg Ivrii, Don Mills Collegiate Institute, Toronto	**Bronze**
Tianyi (David) Han, Woburn Collegiate Institute, Toronto	**Bronze**
Robert Barrington Leigh, Old Scona, Edmonton	**Bronze**
János Kramár, University of Toronto Schools	

The 2003 team was accompanied by Andrew Liu (University of Alberta) Leader; Richard Hoshino (Dalhousie University) Deputy Leader; Robert Morewood (Burnaby Secondary School) Leader Observer.

The Canadian results for the 2003 IMO were outstanding. It was a young team and the results matched the best performance since Canada started competing at the IMO. Olena Bormashenko was the first female member of a Canadian team to win a gold medal and Jacob Tsimerman was the youngest member of a Canadian team to win a gold medal.

Further details are available at: *www.cms.math.ca/Competitions/IMO/*

IMO Training Seminars

Two training camps are held each year to prepare students for the annual IMO. The Winter Training Seminar, which was held at York University in January 2003, is used to begin the training for the IMO and to let the team leaders meet those students who have a good chance of making the IMO team. The Summer IMO Training Seminar, which was held at the University of Calgary and at the Banff International Research Station in July 2003, is used for intensive training of the actual IMO team. Considerable thanks are due to the three host institutions and to all those who helped make the seminars very successful.

Mathematical Olympiads' Correspondence Programme:

The Mathematical Olympiads' Correspondence Programme (MOCP) is a problems based correspondence programme. It is intended for Canadian (or permanent resident) high school students with exceptional mathematical ability who are interested in mathematical problem solving at a high level or have ambitions to compete in Mathematical Olympiads. Dr. Edward Barbeau has been Coordinator of the MOCP for many years.

Further details are available at: *www.cms.math.ca/Competions/MOCP/*

Math Camps

For the past several years the MCC has been responsible for the Esso/CMS Maths Camps Programme. In 2003, there were 13 Regional

Camps, at least one in every province and one National Math Camp. This has been a highly successful programme supported by the Imperial Oil Foundation, NSERC PromoScience, CRM, Fields and PIMS, and a number of provincial governments. The support from each host university is also crucial to the success of the Math Camps. Daryl Tingley has been appointed the Math Camps Coordinator effective July 1, 2003 and responsibility will move from the MCC to him.

The National Math Camp is designed primarily for younger Canadian students with at least two years remaining in high school and with the potential to compete at the Mathematical Olympiad level. Participation in the camp is by invitation only. In 2003, students from grades 8 to 10 were invited. The initial selection (about 10 students) was made from the results in the Canadian Open Mathematics Challenge. Other students (about 15) were selected based on the Galois Contest. Other contest information, and recommendations from Regional Math Camp directors were also considered. Normally at most two students from a particular school may be invited. The National Math Camp was held at The University of Western Ontario from June 21-28, 2003. The camp was organized and run by Tom Griffiths, Marlene Griffiths, and Richard Hoshino.

Further details can be obtained at: *www.cms.math.ca/MathCamps/*

The Canadian Open Mathematics Challenge

The COMC is a contest written every year on the last Wednesday of November. The Open provides mathematical enrichment for a large number of students and serves as a qualifying paper for the Canadian Mathematical Olympiad (CMO). The results are also used in the selection of students for the Winter Training Seminar and for the National Math Camp held in the summer.

Further details can be obtained at:
www.cms.math.ca/Competitions/COMC/

Thanks

It is apparent that the Mathematical Competitions Committee and particularly its subcommittees are very active. I would like to thank all members for the enthusiasm and hard work in making everything run very smoothly. No small measure of thanks is also due to the staff at the CMS Executive Office and to the Executive Director, Graham Wright for their dedication.

TOULOUSE 2004

July 12-15 juillet

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
Société de Mathématiques Appliquées et Industrielles
Société Française de Statistique
Canadian Mathematical Society
Canadian Applied and Insdustrial Mathematical Society
Statistical Society of Canada
Institut de mathématiques de Toulouse

Travel grants will be available
for students and postdocs.

For more information visit:
www.cms.math.ca/Events/Toulouse2004/

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

Société mathématique de France
Société de mathématiques appliquées et industrielles
Société française de statistique
Société mathématique du Canada
Société Canadienne de Mathématiques Appliquées et Industrielles
Société de Statistique du Canada
Institut de mathématiques de Toulouse

Des subventions pour ce voyage seront disponible
pour les étudiants et les postdoctoraux.

Pour plus de renseignements:
www.smc.math.ca/Reunions/Toulouse2004

GERT K. PEDERSEN

The CMS Notes has been informed that Professor Gert K. Pedersen, of the University of Copenhagen, died on March 15, 2004, in Copenhagen. Professor Pedersen made many visits to Canada and was well-known to mathematicians here for his work in operator algebras.

CALL FOR SESSIONS / PROPOSITIONS DE SÉANCES

CMS Summer Meeting 2005 / Réunion d'été de la SMC 2005

Additional self-supported sessions play an important role in the success of our meetings. The CMS welcomes and invites proposals for self-supported sessions for this meeting June 4 - 6, 2005) at the University of Waterloo. Proposals should include a brief description of the focus and purpose of the session, the number and expected length of the talks, as well as the organizer's name, complete address, telephone number, e-mail address, etc. These additional sessions will be incorporated with the other sessions in time blocks allocated by the Meeting Directors. All sessions will be advertised in the CMS Notes, on the web sites and, if possible, in the Notices of the AMS and in publications of other societies. Speakers in these additional sessions will be requested to submit abstracts which will be published in the meeting programme. Those wishing to organize a session should send a proposal to the Meeting Director by the deadline below.

Les séances complémentaires autonomes jouent un rôle important dans le succès de nos Réunions. La SMC vous invitent à proposer des séances autonomes pour son congrès qui se tiendra à l'Université de Waterloo (du 4 au 6 juin 2005). Toute proposition doit inclure une brève description de l'orientation et des objectifs de la séance, le nombre de communications prévues et leur durée ainsi que le nom, l'adresse complète, le numéro de téléphone, le courriel et autres coordonnées de l'organisateur. Ces séances complémentaires seront intégrées aux autres séances du programme, dans des cases horaires prévues à cet effet par les directeurs de la Réunion. Toutes les séances seront annoncées dans les Notes de la SMC, sur les sites Web des deux sociétés et, si possible, dans le bulletin de l'AMS et les publications d'autres sociétés. Les conférenciers de ces séances complémentaires devront présenter un résumé qui sera publié dans le programme de la Réunion. Toute personne qui souhaiterait organiser une séance est priée de faire parvenir une proposition au directeur de la Réunion avant la date limite ci-dessous.

Deadline: July 15, 2004 / Date limite : 15 juillet 2004

Meeting director / directeur de la réunion :

Alexandru Nica
CMS Summer Meeting 2005 / Réunion d'été 2005 de la SMC
Department of Pure Mathematics – Faculty of Mathematics
University of Waterloo
Waterloo, Ontario, Canada N2L 3G1 *anica@math.uwaterloo.ca*

CONFIRMED SESSIONS / SÉANCES CONFIRMÉES

Nonlinear Partial Differential Equations
Org: Walter Craig (McMaster), Robert McCann (Toronto) and Catherine Sulem (Toronto).

Operator Algebras, Operator Spaces and Harmonic Analysis
Org: Ken Davidson and Brian Forrest (Waterloo).

Combinatroics and Geometry
Org: Ian Goulden (Waterloo).

String Theory and Integrable Systems
Org: Lisa Jeffrey (Toronto), Boris Khesin (Toronto) and Rob Myers (Perimeter Institute).

L-Functions and Algebraic Curves
Org: Yu-Ru Liu, David McKinnon, Michael Rubinstein (Waterloo).

Mathematics of Actuarial Finance
Org: Tom Salisbury (York/Fields).

Education Session
Org: TBA

Contributed Papers
Org: William Brown (McGill)

Plenary speakers
Dan Freed (University of Texas at Austin)
Robert McCann (University of Toronto)
Andrei Okounkov (Princeton University)
Gilles Pisier (Université Paris 6 and Texas A&M University)
Ken Ribet (University of California at Berkeley)

Equations aux derivées partielles non linéaires
Org: Walter Craig (McMaster), Robert McCann (Toronto) and Catherine Sulem (Toronto).

Algebres d'opérateurs et analyse harmonique
Org: Ken Davidson and Brian Forrest (Waterloo).

Combinatoire et géométrie
Org: Ian Goulden (Waterloo).

Théorie des cordes et systèmes intégrables
Org: Lisa Jeffrey (Toronto), Boris Khesin (Toronto) and Rob Myers (Perimeter Institute).

Fonctions L et courbes algébriques
Org: Yu-Ru Liu, David McKinnon, Michael Rubinstein (Waterloo).

Mathématiques financières actuarielles
Org: Tom Salisbury (York/Fields).

Séance d'éducation
Org: à venir

Communications libres
Org : William Brown (McGill)

Conférenciers principaux
Dan Freed (University of Texas at Austin)
Robert McCann (Université de Toronto)
Andrei Okounkov (Université Princeton)
Gilles Pisier (Université Paris 6 et Texas A&M University)
Ken Ribet (University of California at Berkeley)

PUTNAM 2003 COMPETITION - RESULTS

Five of the top sixteen from Canada

Canadians once again performed well in the 64th Putnam Competition written on December 6, 2003. **Ralph C. Furmania**k of the University of Waterloo ranked among the top five to become a Putnam Fellow. Among the next eleven highest ranking students were:

David G. Arthur of Duke University, **Robert M. Barrington Leigh** of the University of Toronto, **Alex R. Fink** of the University of Calgary, and **David A.G. Pritchard** of the Massachusetts Institute of Technology. David Arthur and David Pritchard are Canadians and past members of Canada's team to the International Mathematical Olympiad, along with several other of the top students listed.

Honorable mentions went to **Daniel S. Brox** of the University of British Columbia, **Pierre Le Van** of the University of Ottawa, **Tianyi (David) Han** and **Roger S.K. Mong** of the University of Toronto, and **Lino M. Demasi** of the University of Waterloo.

Three Canadian teams ranked between sixth and tenth, inclusive, to receive honorable mention: University of Waterloo (Olena Bormashenko, Lino M. Demasi, Ralph C. Furmaniak), University of Toronto (Robert M. Barrington Leigh, Ali Feiz Mohammadi, Roger S.K.Mong) and University of British Columbia (Daniel S. Brox, Nina Kamoosi, Max Motlitski).

Congratulations to all of these students on their fine achievement!

In all, 3615 students from 479 North American tertiary institutions participated, including 401 teams. Among the top 201 students were ranked 22 Canadian students from eight universities in five provinces. The top ranking team was from the Massachusetts Institute of Technology.

Ed Barbeau

TRIVIA ANSWERS

1.B 2.B 3.D 4.B 5.A

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

APRIL 2004 AVRIL

1-4 Midwest Several Complex Variables Meeting, in conjunction with Distinguished Lectures given by Y.-T. Siu (University of Western Ontario, London, Ontario) *www.math.uwo.ca/~larusson/scv.html*

4 -7 Fractal 2004, Complexity and Fractals in Nature, 8th International Multidisciplinary Conference (Vancouver, BC) *www.kingston.ac.uk/fractal/*

5-6 The Fifth Annual Colloquiumfest (Institut Henri Poincaré, Paris, France) *http://math.usask.ca/fvk/Mb5.htm*

22-24 SIAM International Conference on Data Mining (Hyatt Orlando, Orlando, FL) *ross@siam.org*

26-May 7 International Workshop on Wavelets — Theory and Applications: (University of Prince Edward Island, Charlottetown, PEI) *nsaad@upei.ca www.math.upei.ca/wavelets/wavelets.htm*

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/*

MAY 2004 MAI

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/*

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*

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

JUNE 2004 JUIN

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*

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

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*

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

JUNE 2004 JUIN

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

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

JULY 2004 JUILLET

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.*

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*

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) *meetings@cms.math.ca*

RATES AND DEADLINES 2004 / TARIFS ET ÉCHÉANCES 2004

Net rates Tarifs nets	Institutional Members Membres institutionels	Corporate Members Membres organisationnels	Others Autres
Full page	$ 245	$ 460	$ 615
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Back cover/plat verso	$ 310	$ 580	$ 775
Inserts: max. 4 pages*	$ 185	$ 345	$ 460

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Des suppléments sont applicables pour des places de choix - communiquer avec *notes-ads@smc.math.ca*
* Pour plus de 4 pages ou pour l'inclusion d'une copie prête-pour-l'impression, veuillez envoyer un échantillon aux bureau administratif de la SMC afin d'obtenir un estimé.

Issue/Numéro	Deadline/Date limite
February / février	December 1 décembre
March / mars	January 15 janvier
April / avril	February 15 février
May / mai	March 15 mars
September / septembre	July 1 juillet
October / octobre	August 15 août
November / novembre	September 15 septembre
December / décembre	October 15 octobre

Maximum page size / taille maximum des pages:
Back cover/plat verso: 7.5 x 8.5 in/pouces
Inside page/page intérieure: 7.5 x 10 in/pouces

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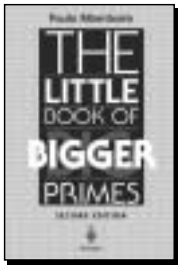
Les *Notes de la SMC* sont postées la première semaine du mois de parution. L'adhésion à la SMC compred l'abonnement aux *Notes de la SMC*. Le tarif d'abonnement pour les non-membres est de 50 $ CAN si l'adresse de l'abonné est au Canada et de 50 $ US autrement.

SPRINGER FOR MATHEMATICS



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ANALYSIS I

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R. GODEMENT, Université Paris VII, France

Functions in R and C, including the theory of Fourier series, Fourier integrals and part of that of holomorphic functions, form the focal topic of these two volumes. Based on a course given by the author to large audiences at Paris VII University for many years, the exposition proceeds somewhat nonlinearly, blending rigorous mathematics skillfully with didactical and historical considerations. It sets out to illustrate the variety of possible approaches to the main results, in order to initiate the reader to methods, the underlying reasoning, and fundamental ideas. It is suitable for both teaching and self-study. In his familiar, personal style, the author emphasizes ideas over calculations and, avoiding the condensed style frequently found in textbooks, explains these ideas without parsimony of words.

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POLYNOMIALS

E.J. BARBEAU, University of Toronto, Canada

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PROBLEM BOOKS IN MATHEMATICS

METRIC STRUCTURES IN DIFFERENTIAL GEOMETRY

G. WALSCHAP, University of Oklahoma, Norman, OK

This text is an introduction to the theory of differentiable manifolds and fiber bundles. The only requisites are a solid background in calculus and linear algebra, together with some basic point-set topology. The first chapter provides a comprehensive overview of differentiable manifolds. The following two chapters are devoted to fiber bundles and homotopy theory of fibrations. Vector bundles have been emphasized, although principal bundles are also discussed in detail. The last three chapters study bundles from the point of view of metric differential geometry: Euclidean bundles, Riemannian connections, curvature, and Chern-Weil theory are discussed, including the Pontrjagin, Euler, and Chern characteristic classes of a vector bundle. These concepts are illustrated in detail for bundles over spheres. Chapter 5, with its focus on the tangent bundle, also serves as a basic introduction to Riemannian geometry in the large. This book can be used for a one-semester course on manifolds or bundles, or a two-semester course in differential geometry.

2004/232 PP., 15 ILLUS./HARDCOVER/$69.95
ISBN 0-387-20430-X
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