



CMS

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L'année 2003 s'est terminée en beauté avec la Réunion d'hiver tenue à l'Université Simon Fraser (Harbour Centre) à Vancouver, du 6 au 8 décembre. Cette réunion avait au programme quelques activités inhabituelles : un mini-cours de cryptographie, deux conférences sur des sujets à la frontière des mathématiques et de l'informatique, et une conférence principale sur l'histoire des mathématiques.

Toutes les conférences des lauréats et conférences principales ont été chaudement appréciées pour leur clarté et leur intérêt. La conférence Coxeter-James a été prononcée par Jingyi Chen (UBC), et celle du Prix de doctorat, par Alina Carmen Cojocaru (Queen's). Les autres conférences principales ont été données par Tom Archibald (Acadia), le duo Hyman Bass et Deborah Ball (Michigan), Robert Calderbank (Laboratoires AT&T), Andrew Granville (Université de Montréal), Anand Pillay (Illinois, Urbana-Champaign) et Mahdu Sudan (MIT). La présence de Mahdu Sudan a rappelé à notre souvenir l'hommage qui lui a été rendu à l'ambassade du Canada à Beijing – où il avait reçu le prix Nevanlinna – au CIM 2002. Les participants y ont aussi eu l'occasion

d'assister à 14 symposiums sur des sujets variés, dont un sur l'éducation et un autre sur l'histoire des mathématiques.

Au banquet, nous avons rendu hommage à quatre des nôtres : Andy Liu, lauréat du prix Adrien-Pouliot en éducation mathématique 2003; Jim Arthur, lauréat du prix G. de B. Robinson pour le meilleur article paru dans le Bulletin canadien de mathématiques en 2001-2002, « A Note on the Automorphic Langlands Group »; Jingyi Chen, lauréat du prix Coxeter-James 2003, et Alina Carmen Cojocaru, lauréate du Prix de doctorat 2003.

Permettez-moi maintenant de souligner quelques-uns des projets les plus intéressants pour 2004 et 2005.

Nous venons tout juste de fermer le dossier du Forum 2003, et les préparatifs du Forum 2005 vont déjà bon train. Les comptes rendus du Forum 2003 sont désormais sur le Web au : www.smc.math.ca/Reunions/FCEM2003/proceedings/.

Trois personnes se partagent la présidence du Forum 2005 : Florence Glanfield (Saskatchewan), Bradd Hart (McMaster) et Frédéric Gourdeau (Laval). En outre, plusieurs membres du comité d'organisation se sont réunis à Vancouver durant la Réunion de la SMC pour discuter des grands thèmes du Forum 2005. On constate de plus une volonté, chez les associations provinciales d'enseignants de mathématiques, d'entretenir et de renforcer les liens créés au Forum. Le Comité d'avancement des mathématiques a proposé de poursuivre l'initiative de rassembler les intervenants canadiens de l'enseignement des mathématiques au Canada et des forums sur l'enseignement des mathématiques au-delà du Forum de 2005, par exemple par la tenue d'un forum aux trois ou quatre ans, ce qui donnerait un bon élan pour aller d'un forum à l'autre.

Nous sommes également à quelques mois du congrès franco-canadien de Toulouse. Je suis très heureuse d'annoncer que les trois instituts

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EDITORIAL



Robert J. MacG. Dawson

Initial Thoughts for a New Year

As this is February... but let me explain. It is a tradition among mathematicians that — unlike the rest of the human race — we start counting from 0, not from 1. It has not always been thus; I have on my bookshelf a respectable textbook from 1940 (MacDuffee's *Introduction to Abstract Algebra*) that defines the natural numbers to start with 1, rather than with 0. Even today, it seems that the practice in some grade-school texts (and texts for schoolteachers in training) differs. This ambiguity appears in many other places. We use one convention for ages (a ten-year-old child is in his or her second decade) and another for calendar years (the third millennium began in 2001, not 2000).

There are, of course, good mathematical reasons for our custom. During the course of the last century it became clear that the most "natural" way to look at the natural numbers was as equivalence classes of finite sets — and it is more natural to include the empty set with the rest than to exclude it. Many other things that we count extend naturally back to a particularly simple "zero'th case": for instance, exponents within the natural numbers (except for the somewhat paradoxical case of 0^0); 0-dimensional spaces; and sums, products, and other inductive operations indexed by the empty set. Algebraic topologists and some combinatorists know, of course, that where the point has dimension 0, it may even be useful

to let the empty set have the spooky dimension of -1 ; but this is further than most of us can (at least at present) take this useful idea.

Less formally, this practice has become something of a sign of recognition among the wider mathematical fraternity. (I include, for instance, C and Java programmers, whose arrays similarly start from 0, as honorary lodge members. Indeed, the idea has spread further: DIN Standard 5473 defines 0 to be a natural number!) Not so very many years ago, to assign the number "0" to the introductory chapter of a book, or section of a paper, was something of an in-joke. Had it been no more than this, the joke would have worn very thin by now; but because most of the world continues to count from "1", the label "0" continues to keep the connotation of something introductory and different in quality from the sections that follow.

So, mathematicians don't start counting quite where most other people do... which brings me to my original point. As you are probably aware, time constraints make it nearly impossible to get an issue of the *CMS Notes* out for January. As a result, the first issue of the *Notes* for each calendar year is a January-February edition that comes out around the beginning of February. Therefore — it being February — we would like to take the opportunity of wishing CMS members, and all other readers, a happy and prosperous 2004 — and extending well into 2005.

Réflexions initiales pour une nouvelle année

En ce mois de février... mais laissez-moi vous expliquer. Contrairement au reste de la race humaine, les mathématiciens ont l'habitude de compter à partir de 0 et non de 1. Mais il n'en a pas toujours été ainsi. J'ai dans mes rayons un auguste manuel datant de 1940 (*Introduction to Abstract Algebra* de MacDuffee) où il est écrit que les entiers naturels commencent à 1, et non à 0. Encore aujourd'hui, l'usage varie dans les manuels destinés à nos écoliers et à leurs futurs enseignants. Cette ambiguïté se manifeste à bien d'autres endroits. Nous avons par exemple une convention pour les âges (un enfant de dix ans est

dans sa deuxième décennie) et une autre pour les années civiles (le troisième millénaire a commencé en 2001 et non en 2000).

Évidemment, notre habitude repose sur de solides fondements mathématiques. Au cours du dernier siècle, il est devenu clair que la manière la plus « naturelle » d'envisager les entiers naturels était de les considérer comme des classes d'équivalences d'ensemble finis, et qu'il était ainsi plus naturel d'inclure l'ensemble vide que de l'exclure. Bien d'autres éléments que nous comptons remontent naturellement à un « cas zéro » particulièrement simple : les exposants dans les entiers naturels (sauf dans le cas paradoxal de 00); les espaces de dimension zéro; les sommes, produits et autres opérations inductives indexées par l'ensemble vide, etc. Des spécialistes de la topologie algébrique et de la

combinatoire savent, évidemment, que si un point a une dimension 0, il peut être utile de donner à l'ensemble vide l'étrange dimension de -1; mais cela dépasse déjà ce que la plupart d'entre nous pouvons faire (pour l'instant du moins) de cette idée utile.

De manière moins formelle, cette pratique est devenue une espèce de symbole de reconnaissance au sein de la fraternité mathématique élargie (j'inclus ici notamment les programmeurs en C et en Java, dont les tableaux commencent de même avec 0, comme membres honoraires de la loge). Il n'y a pas si longtemps, on considérait à la blague l'idée d'attribuer le chiffre 0 à l'introduction d'un livre ou à la première section d'un article. Si les choses en étaient restées là, la blague serait plus qu'usée à présent, mais parce que la majorité du monde continue de compter à

partir de 1, le 0 conserve une connotation d'« introduction » et de qualité différente de ce qui suit.

Ainsi, les mathématiciens ne commencent pas à compter exactement là où le font la plupart des gens... ce qui me ramène à mon idée de départ. Comme vous le savez sans doute, il nous est quasi impossible, faute de temps, de publier les Notes de la SMC en janvier. Voilà pourquoi le premier numéro de l'année est toujours un numéro « janvier-février », qui paraît généralement au début de février. Or, puisque nous sommes en février, je me permets de souhaiter aux membres de la SMC et à nos autres lecteurs une bonne et prospère année 2004, qui durera jusqu'en 2005 et même au-delà.

CALLS FOR NOMINATIONS / APPEL DE CANDIDATURES

Adrien-Pouliot 2004

Nominations of individuals or teams of individuals who have made significant and sustained contributions to mathematics education in Canada are solicited. Such contributions are to be interpreted in the broadest possible sense and might include: community outreach programmes, the development of a new program in either an academic or industrial setting, publicizing mathematics so as to make mathematics accessible to the general public, developing mathematics displays, establishing and supporting mathematics conferences and competitions for students, etc.

Nominations must be submitted using the Nomination Form available from the CMS Web site at: www.cms.math.ca/Prizes/info/ap.html. To assure uniformity in the selection process, please follow the instructions precisely. Documentation exceeding the prescribed limits will not be considered by the Selection Committee.

Individuals who made a nomination in 2003 can renew this nomination by simply indicating their wish to do so by the deadline date. Only materials updating the 2003 Nomination need be provided as the original has been retained. Nominations must be received by the CMS Office no later **April 30, 2004**. Please send six copies of each nomination to the address given below.

Nous sollicitons la candidature de personnes ou de groupe de personnes ayant contribué de façon importante et soutenue à des activités mathématiques éducatives au Canada. Le terme « contributions » s'emploie ici au sens large; les candidats pourront être associés à une activité de sensibilisation, un nouveau programme adapté au milieu scolaire ou à l'industrie, des activités promotionnelles de vulgarisation des mathématiques, des initiatives, spéciales, des conférences ou des concours à l'intention des étudiants, etc.

Les candidatures doivent nous être transmises via le « Formulaire de mise en candidature » disponible au site Web de la SMC : www.cms.math.ca/Prix/info/ap. Pour garantir l'uniformité du processus de sélection, veuillez suivre les instructions à la lettre. Toute documentation excédant les limites prescrites ne sera pas considérée par le comité de sélection.

Il est possible de renouveler une mise en candidature présentée l'an dernier, pourvu que l'on en manifeste le désir avant la date limite. Dans ce cas, le présentateur n'a qu'à soumettre des documents de mise à jour puisque le dossier original a été conservé. Les mises en candidature doivent parvenir au bureau de la SMC avant **le 30 avril 2004**. Veuillez faire parvenir vos mises en candidature en six exemplaires à l'adresse suivante:

The Adrien Pouliot Award / Le Prix Adrien-Pouliot

Canadian Mathematical Society / Société mathématique du Canada
577 King Edward, Suite 109, P.O. Box 450, Station A / C.P. 450, Succ. A
Ottawa, Ontario K1N 6N5

HISTORY, PHILOSOPHY AND FOUNDATIONS FOR MATH STUDENTS

Book review by P.Q. Tournesol

Editorial Note

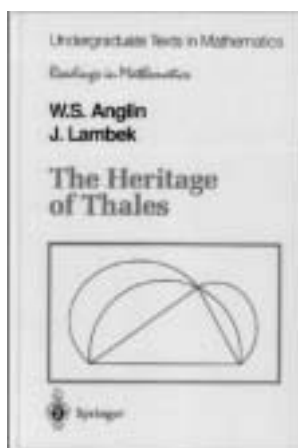
Readers who are only familiar with the reviewer through his many appearances in one of the more popular Belgian periodicals may be surprised to find him reviewing this particular work. However, it is the belief of the editors that (apart from the first author of the book under review) Prof. Tournesol and the second author are uniquely qualified to write on this particular topic.



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THE HERITAGE OF THALES

by W.S. Anglin and J. Lambek
Springer-Verlag, New York 1995/1998



When opening a book or looking at an article, the first thing many a mathematician will do is to glance at the index to see whether his or her name is mentioned. Well, I am no exception, and I was flattered to notice that my name appears in the index of "The Heritage of Thales" with two citations, even though the results attributed to me are nothing to brag about.

Before my retirement, I had been using the book successfully in two undergraduate courses to a mixed group of students, some coming from the sciences and others from the liberal arts. In class tests and in the final examination I would encourage the former to solve mathematical problems and the latter to write essays. (Unfortunately, some students, coming from the Faculty of Education, could do neither.) When I realized recently that this seven year old book had not been reviewed in any of the mathematics magazines I enjoy reading, I thought of offering my own review, prejudiced though it may be.

I must admit that my qualifications for doing so are few. An extensive teaching experience aside, I have been interested in foundational questions concerning the nature of numbers, in particular the number two. I have investigated the properties of perfect squares and

enumerated the non-squares. Most recently, I have studied non-linear logic and its application to Capulet semantics.

It is customary to start a review by looking at the authors' aim and then discussing how they succeeded. This approach is not quite honest, because the aims are usually stated in the introduction, which, though appearing at the beginning, tends to be written only when the book is completed. The authors say they had collected and edited lecture notes from two undergraduate courses aimed at a mixed audience and were hoping to convince their colleagues that history, philosophy and foundations were subjects not only for liberal arts students but also worthy of serious study by future mathematicians. The book does, in fact, try to handle some genuine mathematics in a historical context and cover some mathematics not treated in other courses. I can witness that, at my former institution, no other course looked at continued fractions or at the Renaissance method for solving cubic equations, to mention just two examples.

The first part of the book aims to deal with the history and philosophy of mathematics from about 1800 BC to about 1800 AD. For material from the next two centuries, it could not be assumed that the students were adequately prepared, so the second part concentrates on foundational questions. Let me discuss how the authors have succeeded in doing justice to (a) history, (b) philosophy, (c) mathematics and (d) foundations.

(a) History. The authors admit that neither of them had done scholarly historical research and that they had freely consulted secondary sources. They retell stories and anecdotes that have been told for centuries and vouched for by ancient writers. For example, they report the traditional view of a wise Pythagoras founding mathematics as a discipline, whereas informed scholars now believe that he was a cult leader and politician, retroactively made into a mathematician by his disciples.

They trace the stream of western mathematics to sources in ancient Egypt and Mesopotamia (modern Iraq, situated on Bush's axis of evil). My education students, some of whom were still struggling with

quadratic equations, were quite surprised that these could be solved in 1800 BC. Chinese mathematics is only touched upon, although I am told that one of the authors has since carried out some scholarly investigations in that field, and African ethnomathematics is completely ignored. Instead, we are led to follow the stream as it swells up in the Greek speaking part of the Mediterranean, for a glorious century in Athens, to continue its flow for about 800 years in Alexandria. From there we are led to India, whose earlier contributions are being ignored, and then to the Islamic world. We are told that, after a long period of dormancy in the West, mathematics re-emerges in Renaissance Italy and then, aided by the Chinese invention of printing, spreads to the rest of Europe and ultimately the whole world. We are left guessing whether the Internet will have a comparable impact on the dissemination of mathematical knowledge.

It must be admitted that, on the whole, history is treated rather superficially, some of it consisting merely of a list of names and dates. However, I share the authors' view that mathematics students should benefit from learning some interesting old mathematics in a historical context that might help broadening their education.

(b) Philosophy. It came as a surprise to my students, and even to me, how much of the early history of mathematics is tangled up with the early history of philosophy. Indeed, over the centuries many prominent philosophers were, at the same time, mathematicians: Thales, Plato, Descartes, Leibniz and Russell, to mention just a few of the most famous. This connection is ignored by many modern philosophers and mathematicians, and the authors deserve credit for pointing it out. What I found particularly interesting was the parallel development of the two dichotomies: discrete versus continuous (or atoms versus substance) in philosophy, and arithmetic versus geometry in mathematics. Many of the early philosopher-mathematicians were debating the basic question whether things should be counted or measured. While Thales and other Ionic (from modern Turkey) philosophers believed that things are made of a continuous substance that had to be measured, the Pythagorean school (primarily in Southern Italy) and the Atomists believed that things consisted of discrete entities that could be counted.

When the Pythagoreans discovered the irrationality of the square root of 2, they were faced with a crisis. How can one describe ratios of geometric quantities in terms of natural numbers? In fact, two solutions to this problem were given in Plato's Academy, anticipating the modern definitions of real numbers ascribed to Dedekind and Cauchy. Eudoxus said two ratios of geometric quantities are equal if and only if the sets of rationals below them are equal, and ditto for the sets of rationals above. Theaetetus, on the other hand, thought of a real number as what we now call a continued fraction. This concept was completely forgotten for centuries and only rediscovered in the seventeenth century. While part of the high school curriculum in the nineteenth century, this topic was again confined to oblivion in the twentieth. The authors deserve credit for offering an important mathematical tool to a wider audience. Unfortunately, their book came too soon to point out the true significance of continued fractions in Plato's philosophy. Although Plato insisted that "no one shall enter who is ignorant of geometry", most of his modern interpreters have ignored this warning and consequently missed the

importance of continued fractions to Plato's dialectical dialogues, where they appear either literally or metaphorically. This was only discovered quite recently by Stelios Negrepointis of the University of Athens.

Another debate among pre-Socratic philosophers concerned the nature of time and change. Some held with Parmenides that the world is, what we would now call a four-dimensional whole, without change, while others held with Heraclitus that it is a three-dimensional whole in constant flux. Zeno, a follower of Parmenides, criticized the latter view and showed, in his famous paradoxes, that both the continuous and the discrete could lead to contradictions. His criticism applied to the very foundations of mathematics, like that of Bishop Berkeley two millennia later. The problems he raised were only resolved in the nineteenth century with the rigorous definition of limits.

Some of my philosophical colleagues felt that the treatment of philosophical issues in this text lacked profundity. But then they would have said the same about Bertrand Russell's admirable "History of Western Philosophy", on which much of the philosophical material in this text is based. Unfortunately, my colleagues were just not interested in the older philosophical issues at the base of mathematics. On the other hand, they showed some respect for the modern insights into the nature of truth, due to the work of Gödel, which is discussed in the second part of the book and which I will take up under Foundations below. The only regret I have is that there is no discussion of the equally important work by Tarski, whose name does not even appear in the index.

(c) Mathematics. While most of my colleagues tended to regard a course on the history and philosophy of mathematics as a "Mickey Mouse course", a course based on this book contains quite a bit of genuine mathematics, even though in historical guise. Let me just mention a few of the high points.

(1) The infinitude of primes, proved in Euclid's Elements. I recall an oral examination where a Ph.D. candidate in Statistics was asked "how many primes are there?" She replied "do you mean the cardinality of the set of all primes?" When reassured that this was one way of putting it, she admitted that she had forgotten the largest prime number.

(2) The irrationality of the square root of 2. The remarkable proof of this crucial fact does not appear in Euclid's Elements, although he had set up the prerequisite machinery, but in the works of Aristotle, who needed it to bolster his belief that counting must be supplemented by measuring.

(3) The proof that a general angle cannot be trisected according to the rules laid down by Plato, which admit only constructions using straightedge and compass. Having had to fend off the occasional angle trisector haunting my office, I was surprised to learn that the proof given here is quite elementary, using nothing but basic analytic geometry and high school algebra. No Galois theory is required!

(4) The brilliant observation by Eratosthenes that the angle subtended at the center of the earth between Alexandria and Aswan could be measured at Alexandria by looking at the shadow of a vertical pole at noon on midsummer day. From this, an elementary calculation gave the

circumference of the earth, correct up to an error of ten percent. Had Columbus believed in this result, he would have had to find a different excuse for his westward journey and native Americans would never have been called "Indians"!

(5) The equally brilliant observation by Aristarchus, also in Alexandria, that, when you see half the moon in the sky, the angle subtended by the sun and the earth at the moon must be a right angle. Looking at this right-angled triangle, he was able to infer that the sun was much further from the earth, and therefore much bigger, than the moon. While his calculation was a bit off, he succeeded in disparaging the prevalent belief that the heavenly bodies are glued to a celestial sphere.

(6) For some reason, the elegant Renaissance methods for solving cubic and quartic equations seem to have disappeared from the high school and college curricula. Mathematicians are usually content with approximate solutions, such as those obtained by Newton's method. But I know of at least one case where the authors of a paper in Number Theory were trumped by another author, who improved their result by relying on the exact solution of a cubic equation. I was happy to see a detailed presentation of the Renaissance method, fortunately (for the reader) in modern notation. The solution of the cubic equation is of special historical importance, as it led to the invention of complex numbers. Indeed, there are cubic equations with real coefficients and three real solutions that require imaginary numbers for their calculations.

(7) The authors manage to show us an amazingly compact proof of the quadratic reciprocity law, originally due to Gauss himself.

(9) Quaternions are also exploited to present Maxwell's electro-magnetic equations in a form that makes it immediately obvious that they are invariant under Lorentz transformations, thus offering the students a gentle but rigorous introduction to special relativity. Even Dirac's equation of the electron is rigorously derived from the relativistic Schrödinger equation (usually attributed to Klein-Gordon) with the help of quaternions.

(d) Foundations. For most mathematicians, the only foundational questions of interest concern the number system. Indeed, the present text discusses the process leading from positive integers to quaternions, as the set of numbers was gradually enlarged. As we saw above, the transition from positive rationals to positive reals was tied to Plato's Academy. The admission of negative numbers only occurred in India centuries later. As we saw, the step from real to complex numbers was made in Renaissance Italy. The authors have discussed some interesting applications of quaternions, which, sadly, do not form part of every mathematician's bag of tricks.

Logic was not traditionally taken to be part of mathematics, but it is now, after a misguided (in my opinion) attempt to reduce all mathematics to logic around the turn of the nineteenth century. The present text contains a very superficial sketch of the history of logic up to that time. I was greatly surprised to learn that truth-tables had been invented by the ancient Stoics.

Courses in "baby logic", as taught in Philosophy and Mathematics departments, cover essentially the same material, although the former department tends to devote two semesters to what the latter covers in one. The present text attempts to cover the same material in four sections, a mere 16 pages! Much of the economy is achieved by using intuitionistic rather than classical logic, which differs from it only by a single axiom.

In my opinion, the sixteen page mini-course of Logic should benefit undergraduates from philosophy, mathematics and computer science departments. Intuitionistic mathematics is of profound philosophical importance. If the instructor is committed to classical logic, he can always add one axiom. Few people will deny that logic provides a language which helps to formulate the foundations of mathematics. While most people prefer first-order logic, the authors are all for higher-order logic, as were Russell and Whitehead a hundred years ago.

While practicing mathematicians tend to show little interest in logic, this is not the case with computer scientists, who make use not only of Boolean algebra, but also (although they may not realize it) of the proof theory of the positive intuitionistic propositional calculus. According to the current "formulas-as-types" paradigm, this comes in two guises: the lambda calculus and, more recently, cartesian closed categories. Both lambda calculus and category theory are here developed at some length, unusual for an undergraduate mathematics course.

Students of theoretical computer science will also benefit from the proof that all recursive functions can be calculated on the "abacus", aka register machine, in a manner vastly simpler than on a Turing machine. Unfortunately, the diagram on page 250, illustrating the program for the minimization scheme, is marred by a wrong connection of the arrow starting at Y^+ ; it should not end at Z^- but at "calculate $z = g\bar{x}y$ ".

What I found most intriguing, and what should attract the interest of students coming from the humanities, is Gödel's theorem and its philosophical implications. The authors dare to present the undergraduate students with a two-page proof, which is complete, except for assuming plausibly that, for any recursive binary relation, there is an arithmetic formula which can be proved when the relation holds and disproved when it doesn't. To my surprise, the undergraduates did not object and a few were even enthusiastic. Unfortunately, there is an annoying misprint at a crucial step in the middle of page 292: the symbol \Leftrightarrow should be replaced by the word "if". (There are still many other misprints in the second printing, but most of these are easily corrected by the student or the instructor.)

The authors do not accept the usual interpretation of the incompleteness theorem as saying "there are mathematical statements which are *true* but not provable". This is because the authors, or at least one of them, do not accept the notion of absolute truth in mathematics, as opposed to "truth in a model". Here they replace the word "true" in the above enunciation of Gödel's theorem by "true in any model with the *omega-property*". This property says: if an arithmetical formula $\varphi(x)$ becomes true in the model for $x=0, 50, 550, \dots$, then the universal statement $\forall_{x \in \mathbb{N}} \varphi(x)$ is true in the model. The authors do not tell us which model

with the omega-property represents the *real* world of classical mathematics, but they do offer a candidate for intuitionistic mathematics.

What the real world of mathematics is depends of course on which foundational school you adhere to. The authors claim that the traditional schools of Platonism, Formalism and Intuitionism are in fact reconcilable, provided they are formulated with sufficient moderation. I don't think my students were quite persuaded by this, instead they had much fun in a debate at the end of the course in which different teams of students defended different schools.

Some people believe that it is not logic, but category theory, that should provide a foundation for mathematics. In particular, *adjoint functors* have been viewed as guiding the growth of mathematics. Although few mathematicians will go along with this, many will allow that categories provide a unifying language for mathematics.

The authors here offer a minicourse on category theory in the last five sections, which attempts to justify its importance, with the help of a number of slogans, essentially due to Bill Lawvere. One may wonder whether it is possible to teach this obtuse subject to undergraduates. To my surprise, my students readily accepted most of this material, although they got a little bored when it came to natural transformations, which had provided the original motivation for inventing categories to Eilenberg and Mac Lane.

Criticism. I know of no other elementary text which introduces undergraduate students to such diverse topics as early Greek philosophy, quadratic reciprocity, special relativity, computability and category theory. The authors should be applauded for allowing interested students to browse in such a wide field of knowledge. Of course, few books are free from errors and the present one is no exception. Some minor misprints can easily be corrected and I hope that Springer will do so in the next printing. In the unlikely case that they will publish a second edition, I would be pleased to see a response to the following criticism.

(1) Curiously, the authors do not mention the so-called theorem of Pythagoras. Although the authorship of this theorem may be in doubt, an easy conceptual proof is readily available: place a square of side c inside a square of side $a+b$ so as to leave four right-angled triangles of area $1/2ab$ and proceed by elementary algebra.

(2) I was amused by the discussion of the pioneering algebra text by Al Khwarizmi. The authors concentrate on a word problem of sociological interest. Having difficulty in trying to understand the alleged solution, I took the trouble to look at the original. Here is what I found: "a dying man presents someone with a slave girl who is worth 300 dirhams and a dowry(!) of 100 dirhams". Al Khwarizmi poses two consecutive problems dealing with this situation, the only difference being this: in the first problem it is assumed that the legatee has slept with her and in the second that the donor has. Unfortunately, the text under review presents the first problem, but gives the solution to the second. The correct solution to the first problem is 120 dirhams and that to the second is 90 dirhams. Well, I still don't understand the argument, which pre-supposes a knowledge of Islamic law as practiced at that time and place.

(3) The authors inform us that Mersenne joined the Minim order. Of what significance is this, and what is the Minim order anyway? Was there a Maxim order?¹ It would have been more informative to point out that Mersenne was educated in the same Jesuit school at La Flèche as Descartes was to be a few years later.

(4) I found some oddities in the Index. Although I won't object to the two entries under my name, I was puzzled by the seven (!) references to God. Most of them are in connection with sayings by Pascal, Leibniz and Kronecker, but missing is one to Laplace. His famous statement is quoted in the text, but not referred to in the index. Seventeenth-century philosophers tended to claim that God is a mathematician. The only evidence in His collected works, cited here, is His assertion that $20+25+15=60$. The claim that $\pi = 3$ is attributed to Him in the text, but not referred to in the index.

Although *The Heritage of Thales* is now seven years old, I would still recommend it to my students, were I not retired. I hope that Springer will put out a corrected edition, preferably in paperback.

¹ Editorial note: No, but Rabelais describes, in his fifth book, the "Frères Fredon", which may be translated as the "Quaver order" or "Gracernote order".

Letters to the Editors / Lettres aux Rédacteurs

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

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

MESSAGE DE LA PRÉSIDENTE (Suite)

(CRM, Fields et PIMS) ainsi que la Société statistique du Canada (SSC), la Société canadienne de mathématiques appliquées et industrielles (SCMAI) et la SMC commanditeront 15 bourses de voyage de 500 \$ chacune pour étudiants diplômés ou inscrits à un programme de postdoctorat qui feront une présentation par affiche. Pour de plus amples renseignements, consultez le :

www.smc.math.ca/Reunions/Toulouse2004/.

Le programme Math à Moscou a été reconduit pour une deuxième année. Le gagnant du concours de l'automne, Sébastien Labbé de l'Université de Sherbrooke, ira passer le semestre d'hiver 2004 à l'Université indépendante de Moscou. La date limite d'inscription au prochain concours est le 15 avril 2004. Deux bourses d'études seront alors attribuées.

En outre, la SMC prendra part à un congrès en l'honneur de Donald Coxeter à l'Université de Toronto à l'été 2004, et à la Conférence Renaissance Banff en juillet 2005, dans le cadre de l'International Bridges Conferences on Mathematical Connections in Art, Music and Science. La conférence de Banff et une initiative de Robert Moody et un effort concerté du PIMS, du Banff Centre, de la SMC et des Bridges Conferences. Le dernier jour de cette rencontre sera consacré à Donald Coxeter, en hommage à la vie de cet homme et aux liens qu'il a créés entre les mathématiques et l'art. Les actes de ce congrès seront publiés et distribués à la grandeur du pays. Nous espérons que de nombreux canadiens y participeront et se proposeront pour donner une conférence ou organiser un atelier. Pour de plus amples renseignements sur la Bridges Conference 2004 de Winfield (Kansas) et sur les Bridges Conferences en général, rendez-vous au www.sckans.edu/~bridges.

Comme l'a écrit Graham Wright dans son rapport de décembre, la situation financière de la SMC n'est pas si rose ces temps-ci. Le déficit de 2003 est attribuable en grande partie à la faiblesse du dollar américain, puisqu'un grand nombre de bibliothèques étrangères paient leurs abonnements en dollars américains. Comme on s'attend à ce que la valeur du huard demeure élevée par rapport à la devise américaine, cette situation pourrait perdurer plusieurs années. La SMC n'aura alors d'autre choix que de hausser ses revenus ou de réduire ses dépenses. L'exécutif déploie des efforts considérables pour augmenter ses rentrées d'argent et espère parvenir bientôt à des résultats. Nous discutons en ce moment avec Springer de la possibilité d'ajouter nos revues à sa base de données Springer Link : nous pourrions ainsi accroître la visibilité de nos revues et possiblement augmenter le nombre d'abonnés. Les membres de la Société royale du Canada (SRC) prendront aussi une décision en juin quant à la possibilité de publier les Comptes rendus mathématiques en collaboration avec la SMC.

Comme je l'ai mentionné dans mon rapport de l'an dernier, nous avons communiqué avec l'Union mathématique internationale (UMI) et le Conseil national de recherches du Canada (CNRC) au sujet de la candidature possible du Canada comme hôte du Congrès international des mathématiciens à Montréal en 2010 (CIM 2010). En collaboration avec le CNRC et le Palais des Congrès de Montréal, nous étudions en ce moment la faisabilité du projet. Une décision finale sera rendue en mai 2004.

Le Comité des affaires internationales a longuement discuté des moyens de faire en sorte que tous les mathématiciens canadiens ayant fait de très importantes découvertes mathématiques dernièrement présentent leur candidature comme conférenciers au CIM 2006 à Madrid. Le Comité vous encourage à lui faire parvenir vos suggestions (pres-iac@smc.math.ca)

ACCOMPAGNÉES D'UNE JUSTIFICATION.

IMU-Net : l'Union mathématique internationale a lancé un bulletin électronique bimestriel sous la direction de Mireille Chaleyat-Maurel, Université René-Descartes, Paris (France). Pour plus de détails sur IMU-Net, rendez-vous au www.mathunion.org/IMU-Net/. Vous y trouverez notamment de l'information détaillée sur l'abonnement et le désabonnement au bulletin. Il est possible d'écrire à la rédactrice, Mireille Chaleyat-Maurel, à imu-net-editor@mathunion.org.

Les anciens numéros sont publiés au

www.mathunion.org/Publications/Newsletter/archive/index.html

L'académicien Andrey Andreevich Bolibruch, de l'Institut Steklov (Moscou, Russie), qui a été membre du Comité exécutif de l'UIM, est décédé le 11 novembre 2003. À son sujet, son confrère D. Anosov écrit : « L'un des moments clés de sa carrière mathématique est survenu à la fin des années 1980; il a alors découvert que le 21e problème de Hilbert (concernant une certaine classe d'équations différentielles ordinaires linéaires dans le domaine complexe) avait généralement une solution négative. C'était un résultat aussi brillant qu'inattendu. Depuis longtemps, les mathématiciens étaient convaincus que [...] la réponse au 21e problème était positive. Les résultats obtenus par M. Bolibruch ont donc causé une surprise et fait grand bruit. » Andrey Bolibruch est venu au Canada à plusieurs reprises. Il a notamment prononcé une conférence au Séminaire de mathématiques supérieures de l'Université de Montréal en juillet 2002. Il a joué un rôle très important dans l'organisation des travaux scientifiques en Russie et dans la collaboration internationale de ce pays au domaine des mathématiques. Son décès est un coup dur non seulement pour sa famille, mais aussi pour ses amis à l'étranger. Il s'agit d'une grande perte pour les mathématiques et pour la Russie.

Suite à la disparition du World Directory of Mathematicians (WDM), des collègues m'ont demandé s'il serait possible de créer une version électronique de ce répertoire. Le comité de l'UIM chargé des technologies de l'information et des communications, présidé par Jonathan Borwein (CEIC, <http://www.ceic.math.ca>), a répondu à cette demande et en a étudié la faisabilité. En raison des moyens limités de l'UIM, il est impossible d'établir et de maintenir un répertoire central équivalent à la liste combinée des membres de l'AMS de la MAA, de la SIAM, etc. Il semble possible, toutefois, de dresser une liste centrale à partir de renseignements publics et de contributions volontaires. Le CEIC propose de mettre cette initiative à l'essai en commençant par une version de base portant le nom d'Electronic World Directory of Mathematicians (EWDm). On demande aux mathématiciens qui ont une page Web personnelle de s'y inscrire en passant au www.mathunion.org/ewdm/join.php. Pour de plus amples renseignements sur le projet dans son ensemble, rendez-vous au www.mathunion.org/MPH-EWDM.

Depuis près de deux ans, la European Physical Society (Association européenne de physique) se prépare à l'année 2005, proclamée Année internationale de la physique. Physiciens et mathématiciens ont déjà des activités collectives au programme. Vous trouverez davantage de renseignements au <http://www.wyp2005.org/>.

Le Canada prendra-t-il part au mouvement?



Le 10^e Congrès international sur l'enseignement des mathématiques (ICME-10) se tiendra à Copenhague du 4 au 11 juillet 2004. Ce congrès fait partie d'une série de rencontres quadriennales organisées sous l'égide de la Commission internationale de l'enseignement mathématique (CIEM/ICMI) — le congrès ICME-7 a réuni en 1992 à l'Université Laval plus de 3400 participants. Les congrès ICME constituent les principales rencontres, sur la scène internationale, portant sur l'enseignement et l'apprentissage des mathématiques à tous les ordres, depuis le primaire jusqu'au post-secondaire. Le congrès ICME-10 se tiendra au Danemark, mais son organisation reçoit l'appui de tous les pays nordiques : Danemark, Finlande, Islande, Norvège et Suède.

Le programme du congrès repose sur de nombreuses composantes, entre autres huit activités plénières (six conférences, un débat en table ronde et une session sous forme d'entrevue) et quelque quatre-vingt conférences régulières. Un aspect novateur d'ICME-10 est la mise en place de cinq « Équipes d'investigation » invitées à présenter un rapport lors du congrès sur les derniers développements à propos de thèmes ou questions spécifiques, en particulier en ce qui concerne l'identification et la caractérisation de nouvelles connaissances, l'émergence de nouvelles perspectives et de nouveaux problèmes. Les participants au congrès peuvent soumettre une contribution à différentes composantes du programme : Groupes d'étude, Groupes de discussion, Après-midi thématique, Ateliers, Groupes de partage d'expériences, Exposition d'affiches.

Nombre de collègues canadiens sont impliqués de diverses manières dans le programme d'ICME-10. Par exemple, Gila Hanna (University of Toronto) prendra part à l'entrevue en séance plénière. Nadine Bednarz (UQÀM), Jonathan Borwein (SFU), Louis Charbonneau (UQÀM), Eric Muller (Brock University) et David Pimm (University of Alberta) sont au nombre des conférenciers réguliers. Ann Anderson (UBC), Ed Barbeau (University of Toronto), Olive Chapman (University of Calgary), Brent Davis (University of Alberta), Claude Gaulin (Université Laval), William Higginson (Queen's University), Caroline Lajoie (UQÀM), Anna Sierpinska (Concordia University), Walter Whiteley (York University) et Rina Zazkis (SFU) agissent comme responsables de divers groupes de travail (Groupes d'étude, groupes de discussion, etc.).

La date limite pour l'inscription à tarif réduit est le 28 février 2004. Pour de plus amples information sur le congrès ICME-10, vous êtes priés de vous adresser au Secrétaire général de la CIEM, Bernard R. Hodgson (bhodgson@mat.ulaval.ca), ou de vous rendre sur le site du congrès sur la Toile, www.ICME-10.dk.

The 10th International Congress on Mathematical Education (ICME-10) will be held in Copenhagen on July 4-11, 2004. This congress belongs to a series of quadrennial events organized under the auspices of the International Commission on Mathematical Instruction (ICMI) — the 7th ICME gathered in 1992 more than 3400 people at Université Laval. The ICMEs are the main meetings on mathematics education from an international perspective and concern the teaching and learning of mathematics at all levels, from primary to tertiary education. ICME-10 is held in Denmark, but the organization of the congress is supported by all Nordic countries: Denmark, Finland, Iceland, Norway and Sweden.

The program of the congress is built on many components, in particular eight plenary activities (six lectures, a panel debate and an interview session) and some eighty regular lectures. An innovative feature of ICME-10 is the appointment of five "Survey Teams" who have been invited to report at the congress on the state of the art with respect to a certain theme or issue, with particular regard to identifying and characterizing important new knowledge, recent developments, new perspectives and emergent issues. The individual congress participant may submit a contribution to the scientific program in several different components: contributions are invited to Topic Study Groups, Discussion Groups, the Thematic Afternoon, Workshops, Sharing Experiences Groups and the Poster Exhibition.

Quite a few Canadian colleagues are involved in different ways in the program of ICME-10. For instance, Gila Hanna (University of Toronto) is part of the plenary interview session. Nadine Bednarz (UQÀM), Jonathan Borwein (SFU), Louis Charbonneau (UQÀM), Eric Muller (Brock University) and David Pimm (University of Alberta) are among the regular lecturers. Ann Anderson (UBC), Ed Barbeau (University of Toronto), Olive Chapman (University of Calgary), Brent Davis (University of Alberta), Claude Gaulin (Université Laval), William Higginson (Queen's University), Caroline Lajoie (UQÀM), Anna Sierpinska (Concordia University), Walter Whiteley (York University) and Rina Zazkis (SFU) act as Chairs of various Working Groups (TSGs, DGs, etc.).

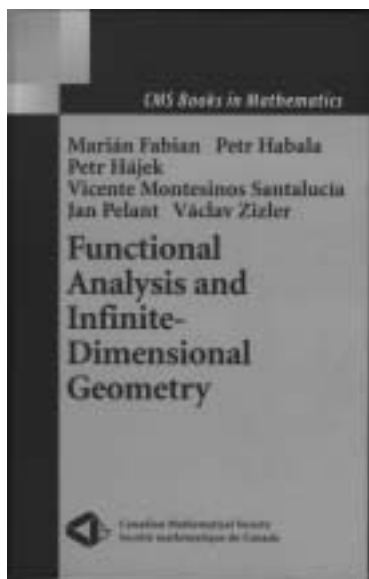
The deadline for the "early bird" registration rate is February 28, 2004. More information on ICME-10 can be obtained from the Secretary-General of ICMI, Bernard R. Hodgson (bhodgson@mat.ulaval.ca), or by visiting the congress website at www.ICME-10.dk.

NEITHER ELEPHANT NOR RACEHORSE

Book review by John Whitfield, Professor Emeritus, Lakehead University

FUNCTIONAL ANALYSIS AND INFINITE-DIMENSIONAL GEOMETRY

Marian Fabian et al., editors
CMS Books in Mathematics 8
 Springer 2002



This book concerns itself primarily with real and complex Banach spaces. This provides a framework in which linear functional analysis, non-linear analysis and structural properties of Banach spaces themselves are introduced. These topics are broad and the authors must choose items to be included in the presentation. To give some sense of the choices made, an outline of the book follows.

Chapter 1 introduces notation as well as basic notions and tools that enable the study of Banach spaces. The authors suggest that “basic courses in calculus and linear algebra” should provide an adequate prerequisite for the text. The reviewer suggests that real analysis and introductory topology be added to the list. This chapter concludes, as do all the chapters, with a lengthy set of exercises of varying difficulty.

Chapter 2 presents several versions of the Hahn-Banach Theorem. Riesz representation theorems are developed enabling a description of the duals for several classical spaces. Another basic principle, namely the open mapping theorem, is also proven. Chapter 3 continues to develop fundamental properties of Banach spaces. In this chapter weak and weak* topologies are explored, the uniform boundedness principle is presented and the extremal structure of sets in a Banach space is studied. Several results are given including the classical Krein-Milman theorem and the ever-helpful Bishop-Phelps theorem.

Chapter 4 is a bit of an aside in which the basic properties of real locally convex topological vector spaces are studied. These include local bases, the Mackey topology and the bipolar theorem. Some of the applications of the results, such as the Eberlein-Smulian characterization of weakly compact sets, relate to Banach spaces.

A short Chapter 5 begins a study of the structure of a Banach space. Among the notions presented are projections and complements, Auerbach bases and the universality of $C[0,1]$ for separable Banach spaces. Continuing on the same theme, in Chapter 6 the authors introduce Schauder bases and derive several properties of such bases. Biorthogonal sequences, block basis sequences, unconditional bases and Markushevich bases are among the topics covered. This chapter (together with the exercises) gives a nice introductory development of bases in Banach spaces.

Chapter 7 provides an excursion through compact operator theory on Banach spaces. Spectral theory and spectral decomposition are visited. As well some results on fixed point theory are developed to enable proving that compact operators on infinite-dimensional Banach spaces have nontrivial invariant subspaces.

Differentiability of norms and convex functions is studied in Chapter 8. Dual rotundity properties, possible smooth renormings and applications to the extremal structure of convex sets are also studied. Continuing on in Chapter 9, uniform convexity and uniform smoothness are considered. Some applications, for example a characterization of superreflexive spaces, are given. Next, in Chapter 10, the relationships between the (often higher order) differentiability of norms and convex functions, the existence smooth bump functions and differentiable partitions-of-unity are studied as are structural conditions on a Banach space required for the existence of such functions.

Chapter 11 explores structural and renorming results on weakly compactly generated (WCG) spaces, for example Amir and Lindenstrauss’ embedding of a WCG space into some $c_0(G)$ and Troyanski’s nice locally uniformly rotund renorming of a WCG space. Also weakly compact operators are studied and their characterization by factorization through reflexive spaces is shown.

Finally, Chapter 12 considers topological and analytic properties (and characterizations) of compact spaces, including: Eberlein, uniform Eberlein, scattered and Corson compacts.

It has been suggested that an elephant is a racehorse designed by a committee. The committee of authors for this text has produced neither an elephant nor a racehorse. Although an economy of words is desirable when publishing, a short introductory paragraph for each chapter setting the objectives of the chapter and placing it into the larger picture would be helpful for the reader learning the subject. The “infinite-dimensional

geometry" portion of the title is underemphasized in the text. The authors would have done well to take one of their hints for an exercise: "draw a picture", at least verbally.

Nonetheless, this book will serve as a source of information on Banach spaces for both the veteran and neophyte. It contains an enormous

amount of material in the text and exercises which is supported by an extensive set of references. The book arose from material developed for courses and will serve well for that purpose provided an appropriate subset of the material is chosen. The authors have provided some helpful suggestions for this. All in all this is a worthwhile text.

BRIEF BOOK REVIEWS

Peter Fillmore, Dalhousie University

LOCAL SEARCH IN COMBINATORIAL OPTIMIZATION

Emile Aarts and Jan Karel Lenstra, editors,
Princeton University Press, 2003, xii + 512 pages

This is a paperback edition of the original, published in 1997 by John Wiley & Sons. The editors have "updated some details and made a few corrections", but have "resisted the temptation to rework the book" and include more recent developments. Combinatorial optimization, the discipline of decision making in the case of discrete alternatives, lies at the interface of mathematics, computer science and operations research. The editors "invited a number of leading authorities on various aspects of local search to write a chapter on their subject of research. We provided them with a few editorial conventions, and have tried to achieve some editorial uniformity while preserving their individual styles."

After three initial chapters giving background information, Chapters 4-7 deal with the four principal search strategies: simulated annealing, tabu search, genetic algorithms, and neural networks. The remaining six chapters describe applications to the travelling salesman problem, vehicle routing, machine scheduling, VLSI layout, and coding design.

NOVEL APPROACHES TO HARD DISCRETE OPTIMIZATION

Panos Pardalos and Henry Wolkowicz, editors
Fields Institute Communications 37, AMS 2003, vii + 181 pages.

From the preface: This volume contains refereed papers presented in a workshop held at the University of Waterloo during April 26-28, 2001. During the last decade, many novel approaches have been considered to deal with computationally difficult discrete optimization problems. Such approaches include interior point methods, semidefinite programming techniques, and global optimization. More efficient computational algorithms have been developed and larger problem instances of hard discrete problems have been solved. This progress is due in part to these novel approaches, but also to new computing facilities such as massive parallelism. The volume would be suitable as complementary material for advanced courses in combinatorial optimization.

QUANTIZATION, CLASSICAL AND QUANTUM FIELD THEORY AND THETA FUNCTIONS

by Andrei Tyurin,
CRM Monograph Series 21, AMS 2003, xii + 136 pages.

This volume is based on the lecture series given by the author at the CRM in Montreal in the fall of 2001. His stated aim is to emulate the success of Arnaud Beauville's survey {*Vector bundles on curves and generalized theta functions: recent results and open problems*} (in *Current Topics in Complex Algebraic Geometry*, MSRI Publications 38, Cambridge 1995), and consequently "we do not provide any proofs or motivation. But we would like to present all constructions of this large domain of mathematics in such a way that the proofs can be guessed from the geometric picture." A year after giving these lectures, the author suffered a fatal heart attack. The book includes a foreword by Alexei Kokotov which amounts to an appreciation of Tyurin's life.

From the cover: Ordinary (abelian) theta functions describe the properties of moduli spaces of one-dimensional vector bundles on algebraic curves. Non-abelian theta functions, which are the main topic of this book, play a similar role in the study of higher-dimensional vector bundles. The book describes various aspects of the theory of non-abelian theta functions and the moduli spaces of vector bundles, including their applications to problems of quantization and to classical and quantum conformal field theories.

The most up-to-date information concerning all CMS Prize Lectureships & Awards programmes, including complete lists of recipients, can be found at:
www.cms.math.ca/Prizes/

Vous trouverez l'information la plus récente sur les prix et bourses de la SMC, y compris les listes de lauréats, sur le site Web suivant:
www.cms.math.ca/Prix/

DYNAMICAL THINKING IN NUMBER THEORY

Book review by David W. Boyd, University of British Columbia

ERGODIC THEORY OF NUMBERS

Karma Dajani and Cor Kraaikamp

Carus Monographs 29

MAA 2002 x+190 pages



The first question one might ask on seeing the title of this book is “what on earth does ergodic theory have to do with number theory?”. The answer is “a lot”.

Ergodic theory began with Boltzmann’s invention of statistical mechanics. If one considers a large number of particles whose positions q_i and momenta p_i are governed by Hamilton’s equations for a given *Hamiltonian*, then the trajectories of these particles can be considered as a flow in phase space known as the Hamiltonian flow. As shown by Liouville, this flow preserves a natural probability measure μ on a surface of fixed energy in phase space. Boltzmann’s ergodic hypothesis was that the average amount of time any given orbit spends in a set A is exactly equal to the measure of this set.

A mathematical formulation of this was proposed by G. D. Birkhoff, For simplicity, consider time to be discrete (Birkhoff treats continuous time as well) and consider a transformation T of a set Ω (the phase space) to itself as defining the time evolution of a system. For each point x in Ω , Tx tells you where this point is one unit of time later. Suppose that there is a probability measure μ on Ω that is preserved by T . If f is the characteristic function of a subset A of Ω , then the sum $S_n(x) = f(x) + f(Tx) + \dots + f(T^{n-1}x)$ counts the number of points in the orbit $x, Tx, \dots, T^{n-1}x$ that lie in the set A . Thus $A_n(x) = S_n(x)/n$ is the average amount of time the orbit of x spends in A during the time $[0, n]$. Boltzmann’s hypothesis is that this should converge to the constant $\mu(A)$ as $n \rightarrow \infty$. This is what Birkhoff proved in 1931 under the crucial assumption that T is *ergodic*, meaning that its only invariant sets are of measure 0 or 1. In

fact, Birkhoff’s proof allows $f(x)$ to be any integrable function and convergence means convergence except on a set of measure 0. Whether or not Birkhoff’s theorem really settles Boltzmann’s question depends on whether one can show that the particular Hamiltonian flow really is ergodic.

The little book by Dajani and Kraaikamp grew out of an NSA sponsored course given during the Summer Program for Women in Mathematics in 1996. It is an excellent introduction for undergraduates to the basic ideas of ergodic theory. The applications of ergodic theory to number theory are confined to the study of various expansions of real numbers, for example the binary expansion, beta-expansions, the continued fraction expansion and Luroth series. This is not intended as a criticism of the book. It is, after all, is only 190 small pages in length. Within these few pages a surprising amount of ergodic theory is introduced and clearly explained. The number theoretic examples are simple enough that the application of the theory is perfectly clear but complex enough to be challenging. Students will learn a great deal by studying this book.

A prime motivating example is the case of the continued fraction algorithm. This algorithm expresses every irrational number $x \in (0, 1]$ as a simple continued fraction, i.e. as a sum $x = 1/(a_1 + 1/(a_2 + 1/(a_3 + \dots$, abbreviated as $[a_1, a_2, \dots]$, where the a_k are positive integers. The a_k are generated by a simple algorithm: to compute a_1 just find the integer part of $1/x$, now replace x by $x_1 = \frac{1}{x} - a_1 \in (0, 1]$ and repeat to find a_2, a_3, \dots and x_2, x_3, \dots (For rationals, the process eventually terminates with some $x_n = 0$. Ignore these!). The continued fraction mapping encodes the production of the sequence x_n . It is defined by $Tx = \{\frac{1}{x}\}$, where $\{x\} = x - [x]$ means the fractional part of x . Then clearly $x_n = T^n x$. So we have a mapping T and a phase space, the irrationals in $(0, 1)$. And, as Gauss discovered in the early 1800’s, (long before measure theory or ergodic theory!), the mapping T leaves invariant the measure μ defined by $\mu(A) = \int_A (1+x)^{-1} dx$.

Applying Birkhoff’s theorem to this dynamical system gives in a very simple way some remarkable results about the behaviour of the continued fraction expansion of almost every real x . For example, taking $f(x)$ to be the characteristic function of $(1/2, 1]$, one finds that the probability that a given partial quotient is as small as possible, i.e. $a_k = 1$, is $\log_2(4/3) = .4150\dots$ so about 41.5 % of the partial quotients of a random number are 1, which seems a bit surprising at first glance since each a_k could just as well have been 2, 3, 4, 5, This theory is used by Knuth in his *Art of Computer Programming* to analyse the average running time of the Euclidean algorithm. Chapter 5 of the book under review studies continued fractions in depth and their role in diophantine approximation. The dynamical systems machinery is used to prove a number of interesting results about continued fractions.

While the book of Dajani and Kraaikamp succeeds admirably in its goal of introducing students to the “dynamical way of thinking”, it by no

means covers the many applications of ergodic theory to number theory. In the remainder of this review, we will describe a few other ways in which ergodic theory has come to the service of number theory that are beyond the scope of their book. None of these number theoretic questions seems, a priori, to have any dynamical content so it is quite remarkable how naturally the two sets of ideas fit together once the connection has been made.

In the 1950's Yu. V. Linnik undertook a study of the distribution of lattice points on 3 dimensional spheres. He was able to show under certain conditions that the points on the sphere $x^2 + y^2 + z^2 = n$ with x, y, z integers are uniformly distributed on the sphere as $n \rightarrow \infty$. His proof used ergodic properties of suitable rotations of a sphere, (see Yu. V. Linnik, *Ergodic Properties of Algebraic Fields*, Springer 1968).

In 1975, Szemerédi solved a famous problem of Erdős by proving that any set of integers of positive density contains arithmetic progressions of length k for arbitrary k . His proof was a very difficult piece of combinatorial reasoning occupying 47 pages of *Acta Arithmetica*. Not long after this proof appeared, Furstenberg showed that the result is equivalent to a result in ergodic theory concerning the mixing properties of a certain set of ergodic mappings and went on to show that this point of view leads naturally to multidimensional generalizations of Szemerédi's result. (see H. Furstenberg, *Recurrence in Ergodic Theory and Combinatorial Number Theory*, Princeton University Press, 1981).

A longstanding conjecture of Oppenheim was that the range of values of an indefinite quadratic form in $n \geq 3$ variables with real coefficients is dense in the real numbers, provided the form is not proportional to a form with rational coefficients. By the 1980's this had been proved for all $n \geq 23$ by number theoretic methods. In 1986 Margulis proved the conjecture in full generality by exploiting a connection to ergodic theory that had been observed by Raghunathan. This led to quantitative strengthenings of Oppenheim's conjecture by Dani and Margulis and finally to a complete proof of Raghunathan's conjectures by Ratner. (see S.G. Dani, in *Dynamical Systems, Ergodic Theory and Applications*, Ya. G. Sinai, ed, Springer, 2000).

Recently, Vatsal has used the results of Ratner for p-adic Lie groups to show that Heegner points are uniformly distributed along certain curves, and hence to establish a conjecture of Mazur concerning the non-vanishing of a certain twisted L-function of an elliptic curve over an imaginary quadratic field (V. Vatsal, *Invent. Math.* 148 (2002), no.1, 1-46, MR 1892842 (2003j:11070)), a result that seems very far from ergodic theory.

It should be clear from all this that ergodic theory has a lot to contribute to number theory in unexpected ways. One may hope that some of the students who are attracted to ergodic theory and number theory by the book under review will be inspired to go on to a deeper study of this connection and perhaps even contribute to our understanding of it.

CALL FOR NOMINATIONS / APPEL DE CANDIDATURES

Associate Editors - CJM and CMB / Rédacteurs associés - JCM et BCM

The Publications Committee of the CMS solicits nominations **for three Associate Editors** for the Canadian Journal of Mathematics (CJM) and the Canadian Mathematical Bulletin (CMB). The appointment will be for five years beginning January 1, 2005. The continuing members (with their end of term) are below.

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

CJM Editors-in-Chief / Rédacteurs-en-chef du JCM

Henri Darmon and/et Niky Kamran, McGill (2006)

CMB Editors-in-Chief / Rédacteurs-en-chef du BCM

James Lewis, Arturo Pianzola; Alberta and/et Noriko Yui; Queen's (2005)

Le comité des publications de la SMC sollicite des mises en candidatures **pour trois** postes de rédacteurs associés du Journal canadien de mathématiques (JCM) et Bulletin canadien de mathématiques (BCM). Le mandat sera de cinq ans et débutera le 1 janvier 2005. Les membres qui continuent suivent.

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

Associate Editors / Rédacteurs associés

W. Craig, McMaster (2007)	G. Elliott, Toronto (2005)
A. Geramita, Queen's (2006)	V. Kac, MIT (2006)
S. Boyer, UQAM (2008)	S. Kudla (2008)
R. Murty, Queen's (2006)	F. Shahidi, Purdue (2005)
P. Guan, McMaster (2008)	M. Zworski, California (2006)

Dana Schlomiuk Chair / Présidente

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

EDUCATION NOTES

Ed Barbeau

Family Math in London

Programs for at-risk school students were on the agenda of the October meeting of the Fields Institute Mathematics Education Forum. The two main speakers, John Mighton, of the Fields Institute, and **Barry Onslow**, of the Faculty of Education at the University of Western Ontario, described two quite different ventures that shared the common goal of building confidence and helping pupils become comfortable with mathematics. Mighton's *JUMP* program has already been described in September, 2003, issue, so I will devote the rest of this column to the *Esso Family Math Project* of which Onslow is an organizer. (Members of the Society may be aware of the significant contributions made by Imperial Oil Esso to its work with gifted students through the Esso Math Camps that are held each year across the country.)

Family Math is a program that first appeared in California in the early 1980s and has been adopted by jurisdictions all over the world. It recognizes that many parents are keenly interested in and want to assist in the educational development of their children, but often lack confidence in their abilities and are unfamiliar with many parts of the modern curriculum. The program seeks to remedy this by organizing sessions that allow pupils and parents to work together on mathematical tasks, and to discover how much mathematics can be found in activities of everyday life, as well as in literature, games and puzzles. It is hoped that through a shared enjoyable experience with their children, parents will have a positive attitude towards our discipline and have a better understanding of what teachers are trying to achieve with their classes.

Indeed, the importance and significance of this program rests precisely in helping to achieve a consensus between home and school about the nature of mathematics and the goals of the curriculum. The loss of our former consensus about the goals of education has bedevilled reforms in the schools and led to bitter political battles over the past three decades.

The *Esso Family Math Program* is based on a set of six principles: (1) Parents want to help their children learn and can acquire the skills to do so. (2) Cooperative learning creates a positive environment for parents; the sessions model approaches that inspire confidence and positive attitudes. (3) Acceptance and respect for differences is critical. (4) Enjoyment is a critical part of learning; in a judgment-free environment, parents and children are encouraged to build on an existing base of knowledge. (5) Learning mathematics is a problem-solving process; people are encouraged to focus on the process as well as the end result. (6) Family Math is a step towards lifelong learning; mathematics should be connected to real life.

For the past three years, members of the Esso Family Math Centre at the University of Western Ontario have created resources and built on ideas from other centres. Volunteers are trained to work in community settings

with at-risk parents and their children to improve attitudes and increase the involvement of parents in their children's education. Rather than going into schools, the organizers have found it productive to work with communities and churches. Programs exist at two levels, according as the children are in kindergarten and Grade 1, or in Grades 2-5. Each Family Math group involves about ten families (about thirty people) with an experienced teacher leader and four or five volunteer facilitators. Many of the instructors are students from the faculty of education or from Fanshawe College's early childhood program, and they all receive ten hours of training in the philosophy of Family Math and their mathematical responsibilities.

The Centre contracts with a community to organize three evening sessions, which can be extended to six if the interest is there (and it invariably is) each year for three years. The plan is to devolve the logistical details more and more to the community so that by the fourth year it can continue the program on its own and look to the Esso Centre for mathematical support only. Two centres have advanced to this stage. Each evening session starts with a meal which serves to break down barriers and reduce diffidence. This is followed by a portion called *Where's the Math?* in which the participants play a game, read a story or engage in some activity, which is then analyzed for its mathematical significance. During the last ten minutes, the leader talks with the parents alone while the remaining facilitators might review some of the activities with the children and help them where they might not have fully understood something. Parents are reminded that practice at home during the week is an important component for improving their children's skills; occasionally, they are asked to fill in a questionnaire about what they enjoyed, found challenging, or found difficult to understand. In order that the connection with what is going on at school is made, the Resource Guide for the program specifically relates activities to expectations in the Ontario Mathematics Curriculum.

Of course, there is a research component to all of this. Parents are interviewed about their experiences and attitudes, and indications are that the program is generally successful. Further information can be obtained from the website <http://www.edu.uwo.ca/essofamilymath/>. Barry Onslow and his colleagues have also published articles in the journals *Child and Family* (Fall, 2002, pp. 6-14) and the *OAME/AOEM Gazette* (June and September, 2002).

Mighton's *JUMP* program is built on engendering confidence through skill-development, while the *Family Math* program does it through an environment where the participants explore and savour the mathematics inherent in many situations in their own time and space. They ought to be regarded as complementary, each approach contributing to the more successful achievement of the other.

Slow schooling

The September 27 issue of the *Globe and Mail* ran a story by Alanna Mitchell in its *Focus* section on “Slow schooling”. This movement started with a manifesto by Marurice Holt published in the August, 2002 issue of the journal *Phi Delta Kappa*. Dismayed by the current back-to-the-basic politics of education and the drilling for tests, Holt took a leaf from the “slow food” movement to posit that, just as for food, it is better for children to savour information and have time to digest it rather than to swallow it whole. Knowledge should be explored deeply and savoured, and in the process children discover how to learn, how to question, how to understand and how to make linkages. This philosophy has been adopted at the Institute of Child Study, an laboratory elementary school connected with the Faculty of Education at the University of Toronto. It marks a return to some of the values of the Hall-Dennis Report, *Living and Learning*, that was published in 1968 and began a more progressive turn in Ontario schools. While the highly-focused standardized philosophy of much of the current curriculum may seem to offer improvements in the short term through better test results, proponent of slow learning feel that there is a price to pay in higher stress for teachers and their pupils, less joy in learning and less ability to retain knowledge in the long term. The article quotes Kathy Hirsh-Pasek, one of the authors along with Roberta M. Golinkoff of the book *Einstein never used flash cards: how our children really learn—and why they need to play more and memorize less*, as recording that the “pressure to boost children’s brainpower is harmful, because it threatens to erode aspects of childhood that are crucial to social, emotional, and cognitive development”. A study of 120 children revealed that, while children attending a more academic preschool initially had the edge in tests of their knowledge of numbers and words, this advantage had vanished within a year in comparison to children who had a more relaxed experience. Furthermore, the children from the academic preschool “were less creative and less enthusiastic about learning”.

Educational reporters’ enthusiasm for a new development may sometimes reflect the excellent teaching of the innovator, and the excitement associated with novelty, as much as the inherent value of the innovation. However, it is certainly worth searching for an alternative to the present regime. The current movement to rigorize education, enforce accountability and use testing has gone too far, as attested by an increasing list of medical problems that many children seem to be having. Finding the golden mean where the joy of learning is never lost while at the same time

children acquire the necessary knowledge and skills to meet the challenges of higher education or a career is a very difficult task. Let me give an example that might help to put the issues into focus.

In an informal setting, I was sitting with a high school student who was working on the following problem from an old Olympiad paper:

Let a, b, c, d be positive integers. Prove that 30 divides the number $a^{4b+d} - a^{4c+d}$.

This is a nice starter question for a national competition, and a seasoned competitor might factor the expression as a product of a^d and a difference of fourth powers, $a^{4b} - a^{4c}$, and then notice that fourth powers of integers are congruent to 0 or 1, modulo 2, 3 or 5, to finish off the solution. Readers will probably recognize that much of what students have to negotiate in a university mathematics course has at least this level of complexity.

However, the student in question was completely bogged down by the problem. Now this was one who seemed to be quite intelligent and was attending an enrichment session of his own volition. Certainly it did not help that his level of technical proficiency was poor; he had trouble with the law of indices and in identifying the constant factor (he initially tried to factor out a , rather than a^d). But his difficulties went much deeper than this. I suspect, from his comments, that he had done a fair number of drill exercises, but that for some reason these had little impact in putting him into the picture. If we reflect on what it takes to complete this problem, we realize that a lot of it is not technical mastery in isolation, but an ability to look through the notation to the structural aspects of an expression to see those characteristics that are pertinent to the problem. For example, one needs to recognize a^{4b} as a fourth power, or even as a square. He had undoubtedly been exposed to the prime factorization of integers, but did he really understand that checking divisibility by any number could be handled by dealing with the prime powers in that factorization? There are difficulties of notation, of interpretation and significance, and of judgment, all of which are subsumed easily by competent students but each of which can be an insurmountable stumbling block for those unable to grasp the whole situation.

Was this a situation that could have been helped by “slow learning”?

NEWS FROM THE DEPARTMENTS - CMS NOTES

This is a request for news items to appear in the next issue of the NOTES.

REPLY to notes-editors@cms.math.ca by the deadlines indicate at the back of this issue.

Our intention is to circulate this reminder at least once per term, but this column will appear in all 8 issues (Sept, Oct, Nov, Dec, Feb, Mar, Apr, May) and your news will always be welcome. We hope that departments will submit news at least once per term.

Thanks for your cooperation.

Robert Dawson and S. Swaminathan, Editors-in-Chief.

PLEASE USE THE FORMAT GIVEN BELOW.

Appointments (rank, date, field):

Promotions (rank, date):

Retirements (rank, date):

Resignations:

Death (rank, date):

Awards/Distinctions :

Visitors (name, country, area, dates):

Other News:

THE CMS/CAIMS SUMMER 2004 MEETING WITH THE PARTICIPATION OF CSFD AND CSHPM Dalhousie University – Halifax, Nova Scotia June 13-15, 2004

On behalf of Dalhousie University, the Department of Mathematics and Statistics invites the mathematical community to 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).

We look forward to welcoming our colleagues back to Halifax and sharing the pleasures of summertime here — the CMS meeting was last at Dalhousie in 1990 and the CAIMS meeting was last in Halifax in 1990 (at the Technical University of Nova Scotia which has since joined Dalhousie). Following the usual formats of both societies, the meeting will include a wide variety of symposia, a session of contributed papers, plenary speakers, prize lecturers, a graduate student poster session, and a Public Lecture.

Most activities and all scientific talks will be held on the Dalhousie campus, with the main hub of activity being at the Marion McCain Arts and Social Sciences Building.

The most up-to-date information concerning the programmes, including detailed schedules, will be made available at the meeting web site.

<http://www.cms.math.ca/Events/summer04/>

Meeting registration forms and hotel accommodation forms will appear in this issue of the CMS Notes, will be sent out to CAIMS members in March 2004, and will be available on the web site, which will also provide on-line forms for registration and submission of abstracts.

Public Lecture

Edward Barbeau (University of Toronto)

Plenary Speakers

Peter Cameron (Queen Mary University), Alan C. Newell (University of Arizona/University of Warwick), Peter Olver (University of Minnesota), Mark Lewis (University of Alberta), Mikhail Zaicev (Moscow State University), and Frank T. Smith (University College London).

Prizes and Awards

The CMS Jeffery-Williams Prize Lecture will be given by Joel Feldman, University of British Columbia. The recipients of the CAIMS Doctoral Dissertation Award and the CAIMS Research Prize will be awarded during the meeting.

Symposia

16th Canadian Symposium on Fluid Dynamics

(Org: Richard Karsten, Acadia University and Serpil Kocabiyyik, Memorial University) Additional information is available at <http://ace.acadiau.ca/~rkarsten/CSFDweb/CSFD.htm>

Andreas Acrivos (CUNY), Yakov Afanasyev (Memorial), John C. Bowman (Alberta), John Clements (Dalhousie), Aline Cotel (Michigan), Serge D'Alessio (Waterloo), Anthony M.J. Davis (Alabama), Kevin Dempsey (Clarkson), Stan C.R. Dennis (Western Ontario), Robert W. Derksen (Manitoba), J. Maciej Floryan (UWO), Jannette B. Frandsen (Louisiana State), Wendy C. Gentleman

(Dalhousie), James Gottlieb (Toronto), Seon Han (WHOI), Alexander E. Hay (Dalhousie), David M. Holland (Courant), Serguei Iakovlev (Dalhousie), Nicholas Kevlahan (McMaster), Maria L. Kilfoil (McGill), Kevin Lamb (Waterloo), Ulrike Lohmann (Dalhousie), Pier Marzocca (Clarkson), Madrugá Matos (LAAFA, Portugal), Catherine Mavriplis (GWU), Patrick Montgomery (UNBC), Bryant Moodie (Alberta), Yuri Muzychka (Memorial), Richard Peltier (Toronto), Keith Ranger (Toronto), Barry R. Ruddick (Dalhousie), Siv Sivaloganathan (Waterloo), John Stockie (Simon Fraser), David Straub (McGill), Bruce Sutherland (Alberta), Gordon E. Swaters (Alberta), Laurette S. Tuckerman (CNRS, France), Henry van Roessel (Alberta), Michael J. Ward (British Columbia), Mary Williams (NRC-IOT), Pei Yu (Western Ontario).

Applications of Invariant Theory to Differential Geometry

(Org: Robert Milson, Dalhousie University and Mark Fels, Utah State University)

Stephen Anco (Brock), I. Anderson (Utah State), Sergio Benenti (Turin), Claudia Chanu (Turin), Charles Torre (Utah State), Alan Coley (Dalhousie), Steve Czapour (Laurentian), Mark Fels (Utah State), P. Gilkey (Oregon), Niky Kamran (McGill), Irina Kogan (Yale), Kayll Lake (Queen's), Benjamin McKay (Utah), Rob Milson (Dalhousie), Nicos Pelavas (Dalhousie), Roberto Pérez (Madrid), Juha Pohjanpelto (Oregon State), Denis Pollney (Max Planck), V. Pravda (Prague), Vojtech Pravda (Acad Sci Czech R), Alena Pravdova (Acad Sci Czech R), Roman Smirnov (Dalhousie), Dennis The (McGill), Jing Ping Wang (Brock).

Classical Analysis in honour of David Borwein's 80th Birthday

(Org: Jonathan Borwein, Simon Fraser University, and Mike Overton, New York University)

Heinz Bauschke (Guelph), Grahame Bennett (Indiana), Peter Borwein (Simon Fraser), Peter Cass (UWO), Bloris Mordukhovich (Wayne State), Bruce Shawyer (Memorial), Bruce Watson (Memorial), Jim Zhu (Western Michigan).

Dynamical Systems

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

Luk Arbuckle (Guelph), Pavan Aroda (Guelph), Chris Bauch (Guelph), Bernard Brooks (Rochester Tech), Monica Cojocar (Guelph), Abba Gumel (Manitoba), Kris Heidler (Guelph), Candace Kent (Virginia Commonwealth), Witold Kosmala (Appalachian State), Herbert Kunze (Guelph), Michael A. Radin (Rochester Tech), Allan Williams (Guelph), Dashun Xu (Memorial).

Financial Mathematics

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

Joe Campolieti (Wilfrid Laurier), Oliver Chen (Toronto), George Lai (Wilfrid Laurier), Roman Makarov (Wilfrid Laurier), Ping Wu (McMaster).

General Topology and Topological Algebra

(Org: Ilijas Farah, York University and Vladimir Pestov, University of Ottawa)

Max Burke (UPEI), Alex Chigogidze (North Carolina), Neil Hindman (Howard), Oleg Okunev (Ryerson), Sławomir Solecki (Urbana-Champaign), Juris Steprans (York), Murat Tuncali (Nipissing), Vesko Valov (Nipissing).

Graphs, Games and the Web

(Org: Anthony Bonato, Wilfrid Laurier University, Jeannette Janssen, Dalhousie University, and Richard Nowakowski, Dalhousie University)
 Michael Albert (Otago), Erwin Berlekamp (Berkeley), Anthony Bonato (Wilfrid Laurier), Nancy Clarke (Acadia), Shannon Fitzpatrick (UPEI), Xiangwen Li (Regina), Richard Nowakowski (Dalhousie), Paul Ottaway (Dalhousie), David Pike (Memorial), Aaron Siegel (Berkeley), Peter Winkler (Bell Labs), David Wolfe (Gustavus Adolphus).

History of Mathematics

(Org: Tom Archibald, Acadia University)
 Thomas Archibald (Acadia), Eisso Atzema (Maine), Lennaert Berggren (SFU), Craig Fraser (Toronto), Fernando Gouveia (Colby), Hardy Grant (York), Glen van Brummelen (Bennington).

Hopf Algebras and Related Topics

(Org: Yuri Bahturin, Memorial University, Margaret Beattie, Mount Allison University, Luzius Grunenfelder, Dalhousie University, Susan Montgomery, University of Southern California, and Earl Taft, Rutgers University)
 Yuri Bahturin (Memorial), Margaret Beattie (Mount Allison), William Chin (DePaul), Alexei Davydov (Macquarie), Luzius Grunenfelder (Dalhousie), Thomas Guedenon (Mount Allison), Erik Jespers (Brussels), Yevgeniya Kashina (DePaul), Louis Kauffman (Illinois), Vladislav Kharchenko (UNAM), Mikhail Kochetov (Carleton), Yuanlin Li (Brock), Mitja Mastnak (Dalhousie), Akira Masuoka (Tsukuba), Susam Montgomery (USC), Richard Ng (Iowa State), Mike Parmenter (Memorial), David Radford (Illinois), David Riley (UWO), Sudarshan Sehgal (Alberta), Earl Taft (Rutgers), Qiang Wang (Carleton), Sarah Witherspoon (Amherst College), Mikhail Zaicev (Moscow State).

Mathematical Education

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

Nonlinear Dynamics in Biology and Medicine

(Org: Shigui Ruan, Dalhousie University)
 Ovide Arino (Pau), Jacques Bélair (Montréal), Edoard Beretta (Urbino), Mark Chaplain (Dundee), Odo Diekmann (Utrecht), David Earn (McMaster), Karl Haderl (Tubingen), Herb Hethcote (Iowa), Leah Keshet (UBC), Denise Kirschner (Michigan), Suzanne Lenhart (Tennessee), Philip Maini (Oxford), Glenn Webb (Vanderbilt), Jianhong Wu (York).

Numerical Algorithms for Differential Equations and Dynamical Systems

(Org: Tony Humphries, McGill University)
 Sebius Doedel (Concordia), Martin Gander (McGill), Tony Humphries (McGill), Harbir Lamba (George Mason), Ned Nedialkov (McMaster), Ray Spiteri (Dalhousie).

Qualitative Behaviour and Controllability of Partial Differential Equations

(Org: Holger Teismann, Acadia University)
 David Amundsen (Carleton), C. Bardos (Paris), Sean Bohun (Penn State), R. Choksi (SFU), J. Colliander (Toronto), S. Gustafson (UBC), R. Illner (Victoria), L. Jonsson (Toronto), Horst Lange (Cologne), Hailiang Li (Osaka), Kirsten Morris (Waterloo), D. Pelinovsky (McMaster), Keith Promislow (SFU / MSU), M. Sigal (Toronto), J. Stockie (UNB), C. Sulem (Toronto), B. Zhang (Cincinnati).

Topology

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

Topos Theory

(Org: Myles Tierney, Rutgers University)
 Marta Bunge (McGill), Denis-Charles Cisinski (Paris 7), Eduardo Dubuc

(Buenos Aires), Johnathan Funk (Saskatchewan), André Joyal (UQAM), F. William Lawvere (Buffalo), Bob Pare (Dalhousie), Dorette Pronk (Dalhousie), Walter Tholen (York).

Contributed Papers Session

(Org: Dick Sutherland, Dalhousie University)
 Contributed papers of 20 minutes duration are invited. Abstracts for CMS contributed papers should be prepared as specified below. For an abstract to be eligible, the abstract must be received before April 10, 2004. The abstract must be accompanied by its contributor's registration form and payment of the appropriate fees.

To assist the organizers, please include the Primary AMS Classification (<http://www.ams.org/msc>).

Poster Session

There will be a poster session for graduate students on Sunday, June 13th. Graduate students attending the conference are invited to submit an abstract describing their poster presentation. Abstracts should be prepared as described below. Please specify your wish to participate in the poster session and send your abstract to *ps-abstracts-s04@cms.math.ca*. The abstract must be received before April 10, 2004 and must be accompanied by its contributor's registration form and payment of the appropriate fees.

Travel Grants

Information on funding for graduate students and post-docs for the CMS/CAIMS 2004 Meeting, June 13-15, 2004, and for the MITACS (Mathematics of Information Technology and Complex Systems) 2004 Annual Conference, June 10-12, 2004.

CMS/CAIMS Meeting Grants

Limited funds are available to partially fund the travel and accommodation costs for graduate students. Applicants must be bona fide graduate students, at a Canadian or other university. Preference is given to Canadian students. To apply for this funding, applicants should submit a letter written by the supervisor or departmental graduate advisor, providing the following: name of student, area of study and level, how the student will benefit from the meeting, whether or not the student be speaking or giving a poster presentation, and what support is available from other sources.

This letter should be sent before April 10, 2004 and may be emailed to *gradtravel-s04@cms.math.ca*. Applicants will be notified early in May of the funding decision.

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

For more information, please contact the Meeting Committee at *gradtravel-s04@cms.math.ca*.

MITACS Funding

MITACS will provide funding for graduate students and postdoctoral fellows studying in the field of mathematics at a Canadian university to attend the MITACS 2004 conference. The funds are meant to provide financial assistance, rather than paying for all costs in their entirety. The reimbursement funds will range from \$100 – \$400 per person, depending on which region the student or fellow is traveling from. The funds will cover travel and accommodation costs only. MITACS has arranged many choices for affordable accommodation, which will be posted on the MITACS web site

(www.mitacs.ca) in the near future.

Students or fellows must register to attend the MITACS conference. After attending the conference, they should submit their original receipts to MITACS using a MITACS Expense Reimbursement Form, which will be included in the MITACS conference registration package.

Anyone requiring further information should contact the MITACS event coordinator Jo-Anne Rockwood, Tel: (604)291-3711, Fax: (604)268-6657, email: jrockwood@mitacs.ca.

Canadian Graduate Students attending both MITACS and the CMS/CAIMS Meeting

MITACS will try to provide funding assistance for travel to and from Halifax as well as accommodation for the three days of the MITACS meeting. The CMS/CAIMS will try to provide funding assistance for accommodation for the three days of the CMS/CAIMS/CSFD/CSHPM Meeting.

Social Events

The MITACS opening reception will take place on Thursday, June 10 at the Maritime Museum of the Atlantic.

The MITACS Banquet is scheduled for Friday, June 11, from 6:00 p.m. at the Lord Nelson Hotel.

The Joint Meetings welcoming reception will be held on Saturday, June 12, from 7:00 to 9:00 p.m. at the Lord Nelson Hotel.

The Joint Meetings Lobster Banquet will take place at Pier 21 National Historic Site on Sunday, June 13, commencing at 7:30 pm, preceded by a cash bar at 6:00 p.m. Pier 21 was the gateway to Canada for nearly one million immigrants from 1928 to 1971. Complimentary tours of the museum will be available during the cocktail hour. Tickets to this event are available at \$60.00 each.

The Delegates Luncheon will be held on Monday, June 14, from 11:45 a.m. to 1:45 p.m. in the McInnis Room of the Dalhousie Student Union Building. A ticket to this luncheon is included in all registration fee categories.

A Public Lecture will be presented by Edward Barbeau (University of Toronto) on Monday, June 14, at 8:00 p.m. The lecture will be preceded by a reception at 7:00 p.m. in the foyer of the Marion McCain Arts and Social Sciences Building.

There will be a social event for graduate students. When details are available, they will be posted on the schedule page of the meeting website.

Coffee and juice will be available during the scheduled breaks.

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

Related Activities

2004 Project NExTMAC National Workshop - June 12

A professional development workshop for junior mathematics and statistics faculty, as well as graduate students intent on pursuing careers in academia, is being planned to take place on Saturday June 12th 2004 (the day immediately prior to the 2004 CMS Summer Meeting). The workshop will take place at Dalhousie University in Halifax. As details of the workshop sessions and related events become finalised, they will be made available online at www.math.mun.ca/~nextmac

This annual workshop is the central component of Project NExTMAC (New Experiences in Teaching Mathematics Across Canada), the primary

goal of which is to provide junior mathematics and statistics faculty, many of whom do not have a wealth of teaching experience, with information and resources that will enable them to become better and more effective teachers of mathematics and/or statistics. In addition to sessions that focus on pedagogical issues related to teaching mathematics and statistics at the university level, the workshop aims to provide a setting in which junior faculty can freely share their ideas and concerns with a group of peers.

Since activities and responsibilities that are not directly tied to teaching can have profound effects on teaching effectiveness, we also plan to address other issues that impact on the overall success and well-being of junior faculty. These can include avoiding taking on too many academic service commitments, struggling to establish and maintain a research program, coping with academic politics, protecting one's personal time from being overwhelmed by professional duties, and other issues that junior faculty face as they make the adjustment from being graduate students to being university faculty.

To register for the workshop, mark the "NExTMAC Workshop" item in the "Related Events" section of the CMS Meeting registration form. A nominal registration fee of \$15 will be charged, and a lunch will be provided.

5th Annual MITACS Conference, June 10-12

MITACS is federally-funded Network of Centres of Excellence on the Mathematics of Information Technology and Complex Systems. Each year MITACS holds an Annual Conference and Interchange which in 2004 will be held from June 10-12 on the Dalhousie University campus, immediately prior to the CMS/CAIMS Joint meeting.

The theme of the 5th Annual MITACS Conference is "The Mathematics of Environment and Sustainable Resources". This year, the Annual Conference will also include the Atlantic Interchange, which is a one-day networking event that brings together the best and the brightest from across the region including leading-edge industry, government representatives, university professors and research associates, graduate and undergraduate students. We expect over 500 attendees at this year's conference.

The first day of the event is the Interchange, a networking event for students, industry and government. Students and postdocs are given the opportunity to present their research in poster form, and prizes are awarded for the best posters. Talks are given in parallel, highlighting various applications of mathematical sciences research and aimed at a general level accessible to all participants. The second day, June 11, is the Annual Conference, which this year is focused on the theme of "Environment and Sustainable Resources." Talks are given throughout the day by speakers from MITACS projects, industry and government partners, with an emphasis on topics related to this year's theme. On June 12, the MITACS students have organized a full day consisting of student presentations, as well as two short courses on "hot topics" in mathematical sciences research.

MITACS events have been designed with one common purpose - to bring together partner organizations in the academic, public, private and not-for-profit sectors with university researchers to generate solutions. The 5th Annual Conference and Atlantic Interchange is your opportunity to participate with others in the mathematical community by listening to top speakers, network at the Atlantic Interchange, showcase your research work by presenting a poster, and socialize with your peers at a national level.

More details about MITACS and the event can be found on the MITACS web site <http://www.mitacs.ca>.

11th Canadian Undergraduate Mathematics Conference June, 16-20

The 11th Annual Canadian Undergraduate Mathematics Conference (CUMC) will take place at Dalhousie University, June 16-20, 2004.

More details about the CUMC can be found at the web site <http://www.cms.math.ca/Students/en/CUMC/>.

Business Meetings

The CMS and CAIMS will be holding business meetings during the course of the meeting. Additional information will be provided in later announcements and may be found on the CMS and CAIMS websites.

The CMS Executive Committee Meeting will be on Friday, June 11, from 2:00 p.m. to 4:00 p.m. in the Vanguard Room II of the Lord Nelson Hotel.

A joint luncheon for the CMS and CAIMS Executive and Committee Chairs will be held on Saturday, June 12, from 11:00 a.m. to 1:00 p.m. in the Admiral Room of the Lord Nelson Hotel.

The CMS Board of Directors Meeting will be held on Saturday, June 12, from 1:30 p.m. to 6:30 p.m. in the Imperial Ballroom of the Lord Nelson Hotel.

The CAIMS Board of Directors Meeting will be on Saturday, June 12, from 1:30 p.m. to 6:30 p.m. in the Vanguard Room II of the Lord Nelson Hotel.

The CMS Annual General Meeting will be held on Sunday, June 13, from 11:45 a.m. to 1:45 p.m. at Dalhousie University. Lunch will be provided. All CMS members are invited to attend.

The CAIMS Annual General Meeting will be held on Sunday, June 13, from 11:45 a.m. to 1:00 p.m. at Dalhousie University. Lunch will be provided. All CAIMS members are invited to attend.

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

Exhibits

Exhibits: Exhibits will be open during specified hours in the foyer of the Marion McCain Building. The CMS exhibit will be open throughout the course of the meeting.

Submission of Abstracts

Abstracts for talks will be published in the meeting programme and will also be available on-line.

Abstracts may be sent electronically, following instructions given below. Electronic submission of abstracts is preferred. If this is not possible, abstracts may also be prepared on the standard form available from the CMS Executive Office, 577 King Edward Street, Suite 109, Ottawa, ON K1N 6N5, Canada.

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

For electronic submission of abstracts, go to the 'forms' section of the meeting website or send a file, containing session name, speaker's name, affiliation, address, title of talk, and abstract to abstracts-s04@cms.math.ca (for session speakers).

cp-abstracts-s04@cms.math.ca (for contributed papers)

ps-abstracts-s04@cms.math.ca (for poster session)

Include your session name in the subject line of your mail. For contributed papers, to better assist organizers, please include the 2000 AMS Subject Classification (<http://www.ams.org/msc>). The important deadline for submission of all abstracts is **April 10, 2004**.

Registration

The registration form is also available from:

CMS Executive Office, 577 King Edward, Suite 109, P.O. Box 450, Station A, Ottawa, Ontario CANADA K1N 6N5, Tel: 613-562-5702 FAX: 613-565-1539, Email: meetings@cms.math.ca

Electronic pre-registration is also available.

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

Please note that payment must be RECEIVED IN OTTAWA on or before May 1 in order to qualify for reduced rates. In order for your payment to be processed before the meeting, it should be received by May 31.

	Before May 1	After May 1
Plenary Speaker	\$ 0	\$ 0
Session Speakers	215	280
Organizers	145	185
Non-members	430	560
CMS/C/AIMS/CSFD/CSHPM/AMS/MAA members with grants	290	375
CMS/C/AIMS/CSFD/CSHPM/AMS/MAA members without grants	145	190
One-day fee	195	255
Post-docs, retired	110	145
Teachers (K-12, CEGEP), students, un employed	55	70
NEXTMAC Workshop (additional fee)	15	15
Banquet (Sunday, June 13, Pier 21)	60	60

CMS = Canadian Mathematical Society

CAIMS = Canadian Applied and Industrial Mathematics Society

CSFD = Canadian Symposium on Fluid Dynamics

CSHPM = Canadian Society for History and Philosophy of Mathematics

AMS = American Mathematical Society

MAA = Mathematical Association of America

Why Pre-register?

Wondering whether to pre-register or wait until you arrive? Here are some advantages to pre-registering. Many can take advantage of reduced fees until the early registration deadline (see above)

- your name would appear on the list of participants on our web site
 - your Meeting Kit will be waiting for you at the reception on Saturday evening
 - no waiting in line early Sunday morning to process your registration!
 - banquet tickets are available now but may no longer be available on site
- For all these reasons, we encourage you to pre-register, whether it be before or after the early registration deadline. If you'd like to pre-register and enjoy the above benefits, please visit our web site to use our online forms.

Refund Policy

Delegates wishing to cancel their registration must notify the CMS Executive Office in writing before May 31 to receive a refund less a \$40 processing fee. Those whose contributed paper has not been accepted will upon request be fully refunded.

Do you qualify for free CMS membership?

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

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

Accommodation

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

Lord Nelson Hotel

1515 South Park Street, Halifax NS B3J 2L2

15 minute walk to campus; bus #1 or 10.

Check-in 3 pm; check-out 1 pm

Applicable taxes: 15% HST, Marketing Levy 1.5%

Deadline: 10 May 2004 Group code: MATHS 2004

Phone: 902-423-6331; toll-free in Canada 800-565-2020

Fax: 902-423-7148; www.lordnelsonhotel.com

Parking: valet parking at \$12.50 daily plus tax Rates: \$129 single or double occupancy

\$20 each additional person

Suites are available at higher cost

Holiday Inn Select Halifax Centre

1980 Robie Street, Halifax NS B3H 3G5

15 minute walk to campus; bus # 7

Check-in 3 pm; check-out 12 noon

Applicable taxes: 15% HST; 1.5% Marketing Levy

Deadline: 10 May 2004 Group code: MAT01

Phone: 902-423-1161; toll-free 888-810-7288

Fax: 902-423-9069; www.hiselect.com/halifax-centre

Parking: \$9 daily plus tax

Rates: \$135 single or double occupancy

\$10 each additional person

\$145 Priority Club Floor

\$155 Executive Floor

Howe Hall Residence 6230 Coburg Road, Halifax

Address for reservations: Conference Services

Room 407, Student Union Building

6136 University Avenue, Halifax NS B3H 4J2

Check-in 3 pm; check-out 10 am

Applicable taxes: included in room rates

Deadline: 12 Apr 2004 Group code: Math Society Conference

Phone: 902-494-8840 (24 hours)

Fax: 902-494-1219; www.dal.ca/confserv

Parking: \$4 daily including tax

Rates: \$39.59 single, taxes included

\$59.33 double, taxes

Breakfast: in dining hall on a cash basis

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

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

Child Care

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

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

Travel

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

www.dal.ca

www.halifaxinfo.com

www.novascotia.com

www.weatheroffice.ec.gc.ca

Acknowledgements

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

- Dalhousie University
- Centre de Recherches Mathématiques
- The Fields Institute for Research in Mathematical Sciences
- The Pacific Institute for the Mathematical Sciences

The Canadian Mathematical Society would like to acknowledge the contribution of the members of the Meeting Committee for organizing this meeting.

Meeting Committee

Programme

Meeting Directors: Richard Wood (Dalhousie - CMS)

and Raymond Spiteri (Dalhousie - CAIMS)

Tom Archibald (Acadia), Yuri Bahturin (Memorial), Margaret Beattie (Mount Allison), Anthony Bonato (Wilfrid Laurier), Jonathan Borwein (Dalhousie), Joe Campolieti (Wilfrid Laurier), Alan Coley (Dalhousie), Ilijas Farah (York), Mark Fels (Utah State), Peter Fillmore (Dalhousie), Luzius Grunenfelder (Dalhousie), Richard Hoshino (Dalhousie), Tony Humphries (McGill), Jeannette Janssen (Dalhousie), Keith Johnson (Dalhousie), Richard Karsten (Acadia), Serpil Kocabiyik (Memorial), Yongzeng Lai (Wilfrid Laurier), John Grant McLoughlin (UNB), Franklin Mendivil (Acadia), Rob Milson (Dalhousie), Susan Montgomery (USC), Paul Muir (Saint Mary's - CAIMS ex-officio), Richard Nowakowski (Dalhousie), Mike Overton (NYU), Vladimir Pestov (Ottawa), Renzo Piccinini (Milan), Michael Radin (Rochester Tech), Shigui Ruan (Dalhousie), Dick Sutherland (Dalhousie), Earl Taft (Rutgers), Holger Teismann (Acadia), Myles Tierney (Rutgers), David Vaughan (Wilfrid Laurier), Graham Wright (CMS, ex-officio)

Local Arrangements

Chair: Peter Fillmore (Dalhousie)

Richard Nowakowski (Dalhousie), Gretchen Smith, Paula Flemming, Pillai Balagopal, Tara Taylor, Gillman Payette, Monique Bouchard (CMS, ex-officio).

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

Dalhousie University - Halifax (Nouvelle-Écosse)

13-15 juin 2004

Au nom de l'Université Dalhousie, le Département de mathématiques et de statistique souhaite inviter la communauté mathématique à 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 16e Symposium canadien sur la dynamique des fluides (SCDF) et la Société canadienne d'histoire et de philosophie des mathématiques (SCHPM).

Nous avons hâte de recevoir à nouveau nos collègues à Halifax et de partager avec eux les plaisirs de l'été en Nouvelle-Écosse. La dernière Réunion de la SMC à Halifax remonte en effet à 1990, tout comme celle de la SCMAI (à la Technical University of Nova Scotia), qui avait aussi tenu un congrès à Dalhousie en 1990. Conformément au format habituel, la Réunion comprendra une grande diversité de symposiums, une séance de communications libres, des conférenciers principaux, des conférences de lauréats des deux sociétés, une séance de présentations par affiches pour étudiants diplômés ainsi qu'une conférence populaire.

La plupart des activités et toutes celles qui sont au programme scientifique se dérouleront sur le campus de l'Université Dalhousie, au nouveau pavillon McCain ou à proximité.

Vous trouverez l'information la plus récente sur les programmes, y compris les horaires détaillés, sur ce site Web.

<http://www.cms.math.ca/Reunions/ete04/>

Vous trouverez les formulaires d'inscription et de réservation d'hôtel dans ce numéro des Notes de la SMC. Ils seront acheminés aux membres de la SCMAI en mars 2004 et seront déposés sur le site de la Réunion, tout comme les formulaires électroniques d'inscription et de présentation des résumés.

Conférence Populaire

Edward Barbeau (Université de Toronto)

Conférenciers principaux

Peter Cameron (Université Queen Mary), Alan C. Newell (Université de l'Arizona/Université de Warwick), Peter Olver (Université du Minnesota), Mark Lewis (Université de l'Alberta), Mikhail Zaicev (Université d'Etat de Moscou), et Frank T. Smith (Collège Universitaire de Londres).

Prix

La conférence Jeffery-Williams de la SMC sera donnée par Joel Feldman de l'Université de la Colombie-Britannique. Le Prix pour thèse de doctorat de la SCMAI et le Prix de recherche de la SCMAI seront décernés durant la réunion.

Symposiums

16ième Symposium Canadien sur le dynamique des fluides

(Org: Richard Karsten, Université Acadia et Serpil Kocabiyik, Université Memorial) Pour renseignements supplémentaires, voir <http://ace.acadiau.ca/~rkarsten/CSFDweb/CSFD.htm>

Andreas Acrivos (CUNY), Yakov Afanasyev (Memorial), John C. Bowman (Alberta), John Clements (Dalhousie), Aline Cotel (Michigan), Serge

D'Alessio (Waterloo), Anthony M.J. Davis (Alabama), Kevin Dempsey (Clarkson), Stan C.R. Dennis (Western Ontario), Robert W. Derksen (Manitoba), J. Maciej Floryan (UWO), Jannette B. Frandsen (Louisiana State), Wendy C. Gentleman (Dalhousie), James Gottlieb (Toronto), Seon Han (WHOI), Alexander E. Hay (Dalhousie), David M. Holland (Courant), Serguei Iakovlev (Dalhousie), Nicholas Kevlahan (McMaster), Maria L. Kilfoil (McGill), Kevin Lamb (Waterloo), Ulrike Lohmann (Dalhousie), Pier Marzocca (Clarkson), Madrugá Matos (LAAFA, Portugal), Catherine Mavriplis (GWU), Patrick Montgomery (UNBC), Bryant Moodie (Alberta), Yuri Muzychka (Memorial), Richard Peltier (Toronto), Keith Ranger (Toronto), Barry R. Ruddick (Dalhousie), Siv Sivaloganathan (Waterloo), John Stockie (Simon Fraser), David Straub (McGill), Bruce Sutherland (Alberta), Gordon E. Swaters (Alberta), Laurette S. Tuckerman (CNRS, France), Henry van Roessel (Alberta), Michael J. Ward (British Columbia), Mary Williams (NRC-IOT), Pei Yu (Western Ontario).

Applications de la théorie des invariants à la géométrie différentielle

(Org: Robert Milson, Université Dalhousie
et Mark Fels, Utah State University)

Stephen Anco (Brock), I. Anderson (Utah State), Sergio Benenti (Turin), Claudia Chanu (Turin), Charles Torre (Utah State), Alan Coley (Dalhousie), Steve Czapour (Laurentian), Mark Fels (Utah State), P. Gilkey (Oregon), Niki Kamran (McGill), Irina Kogan (Yale), Kayll Lake (Queen's), Benjamin McKay (Utah), Rob Milson (Dalhousie), Nicos Pelavas (Dalhousie), Roberto Pérez (Madrid), Juha Pohjanpelto (Oregon State), Denis Pollney (Max Planck), V. Pravda (Prague), Vojtech Pravda (Acad Sci Czech R), Alena Pravdova (Acad Sci Czech R), Roman Smirnov (Dalhousie), Dennis The (McGill), Jing Ping Wang (Brock).

Analyse classique en l'honneur du 80^{ème}

anniversaire de David Borwein

(Org: Jonathan Borwein, Université Simon Fraser et Mike Overton, Université de New York)

Heinz Bauschke (Guelph), Grahame Bennett (Indiana), Peter Borwein (Simon Fraser), Peter Cass (UWO), Bloris Mordukhovich (Wayne State), Bruce Sawyer (Memorial), Bruce Watson (Memorial), Jim Zhu (Western Michigan).

Systèmes dynamiques

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

Luk Arbuckle (Guelph), Pavan Aroda (Guelph), Chris Bauch (Guelph), Bernard Brooks (Rochester Tech), Monica Cojocar (Guelph), Abba Gumel (Manitoba), Kris Hiedler (Guelph), Candace Kent (Virginia Commonwealth), Witold Kosmala (Appalachian State), Herbert Kunze (Guelph), Michael A. Radin (Rochester Tech), Allan Williams (Guelph), Dashun Xu (Memorial).

Mathématiques financières

(Org: Joe Campolieti, David Vaughan et Yongzeng Lai, Université Wilfrid Laurier)
Joe Campolieti (Wilfrid Laurier), Oliver Chen (Toronto), George Lai (Wilfrid Laurier), Roman Makarov (Wilfrid Laurier), Ping Wu (McMaster).

Topologie générale et algebra topologique

(Org: Ilijas Farah, Université York et Vladimir Pestov, Université d'Ottawa)
Max Burke (UPEI), Alex Chigogidze (North Carolina), Neil Hindman

(Howard), Oleg Okunev (Ryerson), Slawomir Solecki (Urbana-Champaign), Juris Steprans (York), Murat Tuncali (Nipissing), Vesko Valov (Nipissing).

Graphes, jeux et la Toile

(Org: Anthony Bonato, Université Wilfrid Laurier, Jeannette Janssen, Université Dalhousie et Richard Nowakowski, Université Dalhousie)

Michael Albert (Otago), Erwin Berlekamp (Berkeley), Anthony Bonato (Wilfrid Laurier), Nancy Clarke (Acadia), Shannon Fitzpatrick (UPEI), Xiangwen Li (Regina), Richard Nowakowski (Dalhousie), Paul Ottaway (Dalhousie), David Pike (Memorial), Aaron Siegel (Berkeley), Peter Winkler (Bell Labs), David Wolfe (Gustavus Adolphus).

Histoire des mathématiques

(Org: Tom Archibald, Université Acadia)

Thomas Archibald (Acadia), Eisso Atzema (Maine), Lennaert Berggren (SFU), Craig Fraser (Toronto), Fernando Gouveia (Colby), Hardy Grant (York), Glen van Brummelen (Bennington).

Algèbres de Hopf et sujets connexes

(Org: Yuri Bahturin, Université Memorial, Margaret Beattie, Université Mount Allison, Luzius Grunenfelder, Université Dalhousie, Susan Montgomery, University of Southern California et Earl Taft, Université Rutgers)

Yuri Bahturin (Memorial), Margaret Beattie (Mount Allison), William Chin (DePaul), Alexei Davydov (Macquarie), Luzius Grunenfelder (Dalhousie), Thomas Guedenon (Mount Allison), Erik Jaspers (Brussels), Yevgeniya Kashina (DePaul), Louis Kauffman (Illinois), Vladislav Kharchenko (UNAM), Mikhail Kochetov (Carleton), Yuanlin Li (Brock), Mitja Mastnak (Dalhousie), Akira Masuoka (Tsukuba), Susam Montgomery (USC), Richard Ng (Iowa State), Mike Parmenter (Memorial), David Radford (Illinois), David Riley (UWO), Sudarshan Sehgal (Alberta), Earl Taft (Rutgers), Qiang Wang (Carleton), Sarah Witherspoon (Amherst College), Mikhail Zaicev (Moscow State).

Education mathématique

(Org: Richard Hoshino, Université Dalhousie et John Grant McLoughlin, Université du Nouveau-Brunswick)

Dynamique non linéaire en physiologie et en médecine

(Org: Shigui Ruan, Université Dalhousie)

Ovide Arino (Pau), Jacques Bélair (Montréal), Edoard Beretta (Urbino), Mark Chaplain (Dundee), Odo Diekmann (Utrecht), David Earn (McMaster), Karl Hadeler (Tubingen), Herb Hethcote (Iowa), Leah Keshet (UBC), Denise Kirschner (Michigan), Suzanne Lenhart (Tennessee), Philip Maini (Oxford), Glenn Webb (Vanderbilt), Jianhong Wu (York).

Algorithmes numériques pour les équations différentielles et les systèmes dynamiques

(Org: Tony Humphries, Université McGill)

Sebius Doedel (Concordia), Martin Gander (McGill), Tony Humphries (McGill), Harbir Lamba (George Mason), Ned Nedialkov (McMaster), Ray Spiteri (Dalhousie).

Comportement qualitatif et contrôlabilité des EDP

(Org: Holger Teismann, Université Acadia)

David Amundsen (Carleton), C. Bardos (Paris), Sean Bohun (Penn State), R. Choksi (SFU), J. Colliander (Toronto), S. Gustafson (UBC), R. Illner (Victoria), L. Jonsson (Toronto), Horst Lange (Cologne), Hailliang Li (Osaka), Kirsten Morris (Waterloo), D. Pelinovsky (McMaster), Keith Promislow (SFU / MSU), M. Sigal (Toronto), J. Stockie (UNB), C. Sulem (Toronto), B. Zhang (Cincinnati).

Topologie

(Org: Keith Johnson, Université Dalhousie et Renzo Piccinini, Université de Milan)

Théorie des topos

(Org: Myles Tierney, Université Rutgers)

Marta Bunge (McGill), Denis-Charles Cisinski (Paris 7), Eduardo Dubuc (Buenos Aires), Johnathan Funk (Saskatchewan), André Joyal (UQAM), F. William Lawvere (Buffalo), Bob Pare (Dalhousie), Dorette Pronk (Dalhousie), Walter Tholen (York).

Communications libres

(Org: Dick Sutherland, Université Dalhousie)

Nous lançons un appel de communications libres de 20 minutes chacune. Les résumés devront respecter les critères précisés ci-dessous et nous parvenir au plus tard le 10 avril 2004. Nous demandons à chacun de joindre au résumé le formulaire d'inscription et le règlement des frais pertinents.

Pour les communications libres, veuillez indiquer la classification de sujet AMS 2000 (veuillez consulter <http://www.ams.org/msc/>).

Présentations par affiches

(Org: Alan Coley, Université Dalhousie et Franklin Mendivil, Université Acadia)

Une séance de présentations par affiches pour étudiants diplômés aura lieu le dimanche 13 juin.

Les étudiants diplômés qui assisteront à la Réunion sont invités à présenter un résumé descriptif de leur présentation en suivant les indications ci-dessous. Veuillez indiquer votre souhait de participer à la séance de présentations par affiches et faire parvenir votre résumé à par-theses-e04@smc.math.ca.

Les résumés devront nous parvenir avant le 10 avril 2004 et être accompagnés du formulaire d'inscription du participant ainsi que du paiement des frais applicables.

Subventions

Information sur les subventions de voyage pour étudiants diplômés et chercheurs postdoctoraux, pour la Réunion d'été SMC/SCMAI (13-15 juin 2004) et le congrès annuel du réseau MaTISC - mathématiques des technologies de l'information et des systèmes complexes (10-12 juin 2004).

Subventions pour la Réunion d'été SMC/SCMAI

Les étudiants diplômés ont accès à un fonds limité pour financer une partie de leurs frais de déplacement et de séjour. Les demandeurs doivent être des étudiants de deuxième ou de troisième cycle inscrits dans une université canadienne ou étrangère. Toute demande de financement doit être accompagnée d'une lettre du superviseur de l'étudiant ou de la personne responsable des études supérieures de son département, dans laquelle il ou elle indiquera le nom de l'étudiant, son domaine et son niveau d'études, en quoi la Réunion sera profitable à l'étudiant, si l'étudiant présentera une communication ou participera à la présentation par affiches, et si l'étudiant a accès à d'autres sources de financement de son université.

Cette lettre doit parvenir à la SMC avant le 10 avril 2004 et peut être envoyée par courriel (subventions-e04@smc.math.ca). Les décisions seront annoncées au début de mai.

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

Pour de plus amples renseignements, veuillez communiquer avec le Comité de coordination à l'adresse suivante : subventions-e04@smc.math.ca.

Subventions pour le congrès annuel du réseau MaTISC

Le réseau MaTISC offre du financement aux étudiants diplômés et aux chercheurs postdoctoraux qui travaillent en mathématiques dans une université canadienne et souhaitent assister au congrès annuel du réseau MaTISC 2004. Ce financement se veut une forme d'aide financière et non une bourse servant à couvrir tous les frais. Le réseau rembourse de 100 \$ à 400 \$ de frais (déplacement et hébergement seulement) par personne, selon la région d'où vient l'étudiant ou le chercheur. Le réseau MaTISC a prévu plusieurs options d'hébergement à coût modique, qui seront publiées sur le site du réseau MaTISC (www.mitacs.ca) prochainement.

Étudiants et chercheurs intéressés doivent d'abord s'inscrire au congrès du réseau MaTISC. Après le congrès, ils devront présenter leurs reçus originaux accompagnés de la demande de remboursement de dépenses du réseau MaTISC, qu'ils trouveront dans la trousse d'inscription au congrès.

Pour de plus amples renseignements, communiquer avec la coordonnatrice des activités du réseau MaTISC, Jo-Anne Rockwood, tél. : (604) 291-3711, fax : (604) 268-6657, courriel : jrockwood@mitacs.ca

Étudiants diplômés canadiens qui assisteront au congrès du réseau MaTISC et à la Réunion d'été SMC/SCMAI

Le financement offert par le réseau MaTISC pourra servir au remboursement des frais de déplacement à destination et en provenance d'Halifax, ainsi que des frais d'hébergement pour les trois jours du congrès du réseau MaTISC. Les subventions de la SMC et de la SCMAI devraient couvrir une partie de l'hébergement pour les trois jours de la Réunion conjointe SMC/SCMAI/ SCDF/SCHPM.

Activités sociales

Une réception pour la réunion MITACS aura lieu le jeudi 10 juin, au Musée Maritime de l'Atlantique.

Le banquet MITACS se tiendra le vendredi 11 juin, à compter de 18 h, à l'hôtel Lord Nelson.

Une réception pour la réunion conjointe aura lieu le samedi 12 juin, de 19 h à 21 h, à l'hôtel Lord Nelson.

Le Festin de homard de la réunion conjointe se déroulera le dimanche 13 juin, à compter de 19 h 30, au Lieu historique national du Quai 21. Il y aura un service de bar payant dès 18 h 00. De 1928 à 1971, le Quai 21 aura été la porte d'entrée au Canada de près d'un million d'immigrants. Il sera possible de faire une visite guidée du musée durant le cocktail. On peut se procurer des billets pour cette activité au coût de 60 \$ chacun.

Le lunch des participants se tiendra le lundi 14 juin, de 11 h 45 à 13 h 45, au salon McInnis du pavillon de l'association étudiante de l'Université Dalhousie (Student Union Building). Ce repas est compris dans toutes les catégories d'inscription.

Edward Barbeau (Université de Toronto) prononcera la conférence populaire le lundi 14 juin à 20 h. Une réception est prévue avant la conférence, à compter de 19 h, au foyer du pavillon McCain.

Une activité sociale pour les étudiants diplômés est aussi au programme. Dès que nous aurons des détails à ce sujet, nous les publierons à la page Horaire du site de la Réunion.

Du café et des jus seront servis pendant les pauses.

Pour consulter l'horaire détaillé de toutes les activités sociales et autres événements, rendez-vous sur notre site, sous Réunion d'été 2004, section Horaire.

Activités connexe

Atelier national annuel NEXTMAC 2004 - 12 juin

Un atelier de perfectionnement destiné aux nouveaux professeurs de mathématiques et de statistique ainsi qu'aux étudiants diplômés songeant à une carrière universitaire est prévu pour le samedi 12 juin 2004 (la veille de la Réunion d'été 2004 de la SMC). L'activité se tiendra à l'Université Dalhousie, à Halifax. Nous publierons l'information à ce sujet à mesure qu'elle nous parviendra au www.math.mun.ca/~nextmac.

Cet atelier annuel est la composante centrale du projet NEXTMAC (New Experiences in Teaching Mathematics Across Canada), dont l'objectif principal consiste à fournir de l'information et des ressources aux nouveaux professeurs, qui souvent ne possèdent pas une vaste expérience d'enseignement, pour les aider à mieux enseigner les mathématiques et la statistique, et de manière plus efficace. En plus de comprendre des séances de perfectionnement en enseignement des mathématiques et de la statistique à l'université, l'atelier permettra aux nouveaux professeurs de discuter librement de leurs idées et de leurs difficultés avec un groupe de collègues.

Comme les activités et les responsabilités qui ne sont pas directement liées à l'enseignement ont parfois des conséquences considérables sur l'efficacité de l'enseignement, nous prévoyons aussi aborder dans le cadre de cet atelier des sujets qui ont une influence sur la réussite globale et le bien-être général des jeunes professeurs. Quelques exemples : le risque d'accepter un trop grand nombre d'engagements professionnels; la difficulté de bâtir et de suivre un programme de recherche; composer avec la politique universitaire; apprendre à protéger sa vie personnelle de trop nombreuses obligations professionnelles, et autres obstacles que les nouveaux membres du corps professoral doivent surmonter lorsqu'ils passent du statut d'étudiant à celui de professeur d'université.

Pour s'inscrire, il suffit d'aller au point "Atelier NEXTMAC" de la section "Activités connexes" du formulaire d'inscription à la Réunion de la SMC. Les droits d'inscription minimes (15 \$) comprendront le repas du midi.

5e congrès annuel du réseau MaTISC, 10-12 juin

Le réseau MaTISC (Mathématiques des technologies de l'information et des systèmes complexes) - ou MITACS - est un réseau de centres d'excellence canadiens financé par le gouvernement fédéral. Une fois l'an, le réseau MaTISC organise un congrès annuel qui, en 2004, se tiendra du 10 au 12 juin à l'Université Dalhousie, juste avant la réunion conjointe SMC/SCMAI.

Le congrès 2004 aura pour thème "Les mathématiques de l'environnement et des ressources durables". Il comprendra cette année l'activité "Atlantic Interchange", journée de réseautage qui réunit la "crème" de la région dans le domaine, dont des représentants de secteurs industriels de pointe et des gouvernements, des professeurs d'université et leurs partenaires de recherche, ainsi que des étudiants de tous les cycles. Plus de 500 personnes sont attendues au congrès de cette année.

Le premier jour du congrès sera consacré au réseautage (Interchange), activité qui réunit étudiants, industries et gouvernements. Les étudiants et chercheurs postdoctoraux ont alors l'occasion de présenter leurs travaux de recherche dans le cadre d'une séance de présentations par affiches; des prix sont d'ailleurs décernés aux meilleures affiches. Les présentations, qui se font en parallèle, font ressortir diverses applications de la recherche en sciences mathématiques et visent un niveau général accessible à tous les participants. Le deuxième jour, soit le 11 juin, commence le congrès annuel, cette année sous le thème de l'environnement et des ressources durables. Des conférenciers du réseau MaTISC abordent toute la journée des projets en collaboration avec des

partenaires de l'industrie et des gouvernements sur des sujets liés au thème du congrès. Le 12 juin, les étudiants du réseau ont organisé une journée entière de présentations par des étudiants ainsi que deux mini-cours sur des sujets brûlants d'actualité en recherche mathématique.

Les activités du réseau MaTISC sont conçues dans une optique commune - rassembler les partenaires des milieux universitaire, public, privé et sans but lucratif et les chercheurs universitaires dans le but de résoudre divers problèmes. Le 5e congrès annuel et l'Atlantic Interchange vous donneront l'occasion de collaborer avec des membres de la communauté mathématique et d'écouter des conférenciers de renom, de réseauter, de faire connaître vos travaux de recherche à la séance de présentations par affiche et de vous divertir avec des collègues de tout le pays.

Pour en savoir davantage sur le réseau MaTISC et sur le congrès, passez sur le site du réseau au www.mitacs.ca/fr.

11^e Congrès canadien des étudiants en mathématiques, 16-20 juin

Le 11^e Congrès canadien des étudiants en mathématiques (CCEM) se tiendra à l'Université Dalhousie du 16 au 20 juin 2004.

Pour de plus amples renseignements sur le CCEM, consultez le www.smc.math.ca/Etudiants/fr/CUMC [anglais seulement].

Séances de travail

La SMC et la SCMAI organiseront des séances de travail à l'occasion de cette Réunion. Vous obtiendrez de plus amples renseignements à ce sujet dans les prochaines annonces et sur les sites de la SMC et de la SCMAI.

Le Comité exécutif de la SMC tiendra une réunion le vendredi 11 juin de 14 h à 16 h dans la salle Vanguard II de l'hôtel Lord Nelson.

Un lunch conjoint pour l'exécutif et les présidents de comités de la SMC et de la SCMAI aura lieu de 11 h à 13 h le samedi 12 juin dans la salle Admiral du Lord Nelson.

La réunion du Conseil d'administration de la SMC aura lieu de 13 h 30 à 18 h 30 le samedi 12 juin dans la salle de bal Imperial du Lord Nelson.

La réunion du Conseil d'administration de la SCMAI aura lieu de 13 h 30 à 18 h 30 le samedi 12 juin dans la salle Vanguard II du Lord Nelson.

L'assemblée générale annuelle de la SMC aura lieu de 11 h 45 à 13 h 45 le dimanche 13 juin à l'Université Dalhousie. Un lunch sera servi. Tous les membres de la SMC sont invités.

L'assemblée générale annuelle de la SCMAI aura lieu de 11 h 45 à 13 h le dimanche 13 juin à l'Université Dalhousie. Un lunch sera servi. Tous les membres de la SCMAI sont invités.

Un horaire détaillé des séances de travail et des autres événements est disponible dans la section Horaire du site Web de la Réunion.

Exposition

Les kiosques d'expositions seront ouverts aux heures indiqués dans le foyer du Pavillon Marion McCain.

Envoi des résumés

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

Les participants peuvent envoyer leur résumé sous forme électronique en suivant les instructions ci-dessous. Il est préférable de remettre les résumés par voie électronique, mais si ce n'est pas possible, vous pouvez utiliser le formulaire standard que vous pourrez vous procurer au Bureau administratif de la SMC, 577, avenue King-Edward, bureau 109, Ottawa (Ontario) Canada K1N 6N5.

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

Pour envoyer votre résumé, rendez-vous à la section des formulaires du site Web de la Réunion ou faire parvenir par courriel un fichier comprenant le nom de la séance, le nom du conférencier, son affiliation, son adresse complète, le titre de la conférence et le résumé à l'une des adresses suivantes :

resumes-e04@smc.math.ca (conférenciers invités), ou
cl-resumes-e04@smc.math.ca (communications libres), ou
pa-resumes-e04@smc.math.ca (présentations par affiches)

N'oubliez pas de préciser le nom de la séance dans le sujet de votre message. Pour les communications libres, veuillez indiquer la classification de sujet AMS 2000 (veuillez consulter www.ams.org/msc). Important - Date limite de remise des résumés : **10 avril 2004**.

Inscription

Un formulaire d'inscription est disponible auprès de la SMC: Bureau administratif de la SMC, 577, av. King-Edward, bureau 109 C.P. 450, Succursale A, Ottawa (Ontario) CANADA K1N 6N5 Téléphone : 613-562-5702, Télécopieur : 613-565-1539

Courriel : reunions@smc.math.ca

Vous pouvez aussi vous inscrire sur le Web.

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

Le paiement doit nous PARVENIR À OTTAWA au plus tard le 1er mai pour que vous ayez droit aux tarifs réduits. Pour que votre inscription soit traitée avant la Réunion, votre paiement doit nous parvenir au plus tard le 31 mai.

	Avant 1 mai	Après 1 mai
Conférenciers principaux ou primes	0\$	0\$
Conférenciers	215	280
Organisateurs	145	185
Non-membres	430	560
Membres SMC/SCMAI/SCDF/SCHPM/AMS/MAA avec subvention	290	375
Membres SMC/SCMAI/SCDF/SCHPM/AMS/MAA sans subvention	145	190
Frais d'une journée	195	255
Professeurs, retraités	110	145
Enseignants (élem, second, CÉGEP, étudiant(e), sans-emploi)	55	70
ATELIER NEXT/MAC (frais additionnelle)	15	15
Banquet (dimanches, 13 juin, Pier 21)	60	60

SMC = Société mathématique du Canada

SCMAI = Société Canadienne de Mathématiques Appliquées
et Industrielles

SCDF = Symposium canadien sur la dynamique des fluides

SCHPM = Société canadienne d'histoire et de philosophie
des mathématiques

AMS = American Mathematical Society

MAA = Mathematical Association of America

À quoi sert de s'inscrire à l'avance?

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

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

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

Politique de remboursement

Les participants qui désirent annuler leur inscription doivent en aviser le bureau administratif de la SMC par écrit avant le 31 mai pour se voir rembourser leurs frais d'inscription (moins 40 \$). Les participants dont les communications libres n'auront pas été acceptées seront remboursés intégralement sur demande.

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

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

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

Hébergement

Il est fortement recommandé aux participants de réserver à l'avance. Des chambres ont été retenues aux endroits ci-dessous jusqu'aux dates précisées. Après ces dates, les hôtels ne prendront vos réservations que s'il reste des chambres et demanderont les tarifs affichés. Les tarifs sont par nuit, par personne, et sont indiqués en devises canadiennes. Généralement, les tarifs préférentiels s'appliquent aussi aux deux jours qui précèdent et qui suivent la Réunion. Les participants doivent faire eux-mêmes leur réservation et donner le code de groupe. Toute réservation doit être garantie par le paiement d'une nuit ou par une carte de crédit reconnue.

Hôtel Lord Nelson

1515 South Park Street, Halifax NS B3J 2L2
15 minutes à pied du campus; autobus 1 ou 10.

Arrivée : 15 h; départ : 13 h

Taxes applicables : TVH (15 %), taxe d'hébergement (1,5 %)

Réserver au plus tard le 10 mai 2004

Code de groupe : MATHS 2004

Téléphone : 902-423-6331;

Sans frais au Canada : 1-800-565-2020

Télécopieur : 902-423-7148; www.lordnelsonhotel.com

Stationnement : service voiturier seulement
à 12,50 \$ / nuit + taxes

Tarifs : 129 \$ 1 ou 2 personnes

20 \$ en sus par personne additionnelle

L'hôtel offre des suites à un coût supérieure

Holiday Inn Select Halifax Centre

1980 Robie Street, Halifax NS B3H 3G5

15 minutes à pied du campus; autobus 7

Arrivée : 15 h; départ : 12 h

Taxes applicables : TVH (15 %), taxe d'hébergement (1,5 %)

Réserver au plus tard le 10 mai 2004

Code de groupe : MAT01

Téléphone : 902-423-1161;

Sans frais : 1-888-810-7288

Télécopieur : 902-423-9069; www.hiselect.com/halifax-centre

Stationnement : 9 \$ / jour + taxes

Tarifs : 135 \$ 1 ou 2 personnes

10 \$ en sus par personne additionnelle

145 \$ étage " Priority Club

155 \$ étage " Executive "

Résidences Howe Hall

6230 Coburg Road, Halifax

Adresse pour réservations: Conference Services

Room 407, Student Union Building

6136 University Avenue, Halifax NS B3H 4J2

Arrivée : 15 h; départ : 10 h

Taxes applicables : comprises dans le prix de la chambre

Réserver au plus tard le 12 avril 2004

Code de groupe : Math Society Conference

Téléphone : 902-494-8840 (24 heures)

Télécopieur : 902-494-1219; www.dal.ca/confserv

Stationnement : 4 \$ par jour + taxes

Tarifs : 39,59 \$ chambre simple, taxes incluses

59,33 \$ chambre double, taxes incluses

Petit-déjeuner servi tous les jours à la cafétéria - paiement comptant seulement

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

Nous publierons tout nouveau renseignement sur le site Web dès qu'il nous parviendra.

Services de garde

Des renseignements sur les services de garde seront fournis par les hôtels prévus pour la Réunion. On vous recommande de faire vos démarches et vos réservations à l'avance.

Prière de communiquer avec les hôtels directement pour faire une demande. Nous publierons tout nouveau renseignement sur le site Web dès que nous le recevrons.

Déplacements

Vous trouverez des renseignements détaillés sur l'Université Dalhousie, la ville d'Halifax, et la province de la Nouvelle-Ecosse, incluant les renseignements touristiques, température et climat locaux, cartes de la ville et des attractions touristiques, sur les sites Web suivants :

www.dal.ca

www.halifaxinfo.com

www.novascotia.com

www.weatheroffice.ec.gc.ca

Remerciements

Nous remercions sincèrement les organismes suivants de leur soutien financier. Nous publierons au fur et à mesure sur notre site Web les renseignements que nous recevrons concernant le soutien financier.

- l'Université Dalhousie
- le Centre de Recherches Mathématiques
- l'Institut Fields de recherche en sciences mathématiques
- l'Institut Pacific pour les sciences mathématiques

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

Comité de coordination

Programme

Présidents et coordinateurs: Richard Wood (Dalhousie - SMC)
et Raymond Spiteri (Dalhousie - SCMAI)

Tom Archibald (Acadia), Yuri Bahturin (Memorial), Margaret Beattie (Mount Allison), Anthony Bonato (Wilfrid Laurier), Jonathan Borwein

(Dalhousie), Joe Campolieti (Wilfrid Laurier), Alan Coley (Dalhousie), Ilijas Farah (York), Mark Fels (Utah State), Peter Fillmore (Dalhousie), Luzius Grunenfelder (Dalhousie), Richard Hoshino (Dalhousie), Tony Humphries (McGill), Jeannette Janssen (Dalhousie), Keith Johnson (Dalhousie), Richard Karsten (Acadia), Serpil Kocabiyik (Memorial), Yongzeng Lai (Wilfrid Laurier), John Grant McLoughlin (UNB), Franklin Mendivil (Acadia), Rob Milson (Dalhousie), Susan Montgomery (USC), Paul Muir (Saint Mary's - SCMAI d'office), Richard Nowakowski (Dalhousie), Mike Overton (NYU), Vladimir Pestov (Ottawa), Renzo Piccinini (Milan), Michael Radin (Rochester Tech), Shigui Ruan (Dalhousie), Dick Sutherland (Dalhousie), Earl Taft (Rutgers), Holger Teismann (Acadia), Myles Tierney (Rutgers), David Vaughan (Wilfrid Laurier), et Graham Wright (SMC, d'office).

Logistique

Président du comité local: Peter Fillmore (Dalhousie)

Richard Nowakowski (Dalhousie), Gretchen Smith, Paula Flemming, Pillai Balagopal, Tara Taylor, Gillman Payette, Monique Bouchard (SMC, d'office)

SÉMINAIRE DE MATHÉMATIQUES SUPÉRIEURES/NATO ADVANCED STUDY INSTITUTE

Université de Montréal, 43rd session
June 21-July 2 2004

MORSE THEORETIC METHODS IN NON-LINEAR ANALYSIS AND SYMPLECTIC TOPOLOGY

LECTURERS :

- Alberto Abbondandolo (Scuola Normale di Pisa)** – *The Morse complex for infinite dimensional manifolds*
Paul Biran (Tel-Aviv) – *Lagrangian geometry and topology*
Ralph Cohen (Stanford) – *Morse theory, graphs, and loop spaces*
Octav Cornea (Montréal) – *Homotopy theoretic tools in finite and infinite dimensional Morse theory*
Michael Farber (Tel-Aviv) – *Topology of robot motion planning*
Kenji Fukaya (Kyoto) – *Floer homology, D-brane and Mirror symmetry*
Helmut Hofer (Courant Institute) – *The analysis behind symplectic field theory*
Marek Izydorek (Technical University of Gdansk) – *Conley index in Hilbert spaces with applications*
Yong-Geun Oh (Madison) – *Chain level Floer theory and the geometry of the Hamiltonian diffeomorphism group*
Leonid Polterovich (Tel-Aviv) – *Floer homology and symplectic dynamics*
Matthias Schwarz (Leipzig) – *Floer-homological methods in symplectic geometry*
Claude Viterbo (École Polytechnique) – *Generating functions and applications*

ORGANIZING COMMITTEE : P. Biran, O. Cornea, F. Lalonde, L. Polterovich, Y. Saint-Aubin, M. Schwarz, C. Viterbo

APPLICATION DEADLINE : March 8, 2004

INFORMATION – APPLICATION FORM : www.dms.umontreal.ca/sms ; sms2004@dms.umontreal.ca

CMS/CAIMS Joint Meeting 2004 – Réunion conjointe de la SMC et SCMAI 2004						
Dalhousie University - Université Dalhousie						
Halifax, Nova Scotia – Halifax, Nouvelle Écosse						
June 13 – 15 juin						
Time Heure	Thursday / jeudi June 10 juin	Friday / vendredi June 11 juin	Saturday / samedi June 12 juin	Sunday / dimanche June 13 juin	Monday / lundi June 14 juin	Tuesday / mardi June 15 juin
8:00				8 am – 5 pm Exhibits / Expositions Registration / Inscription	8 am – 5 pm Exhibits / Expositions Registration / Inscription	8 am – 5 pm Registration / Inscription
8:30				Opening / Ouverture		
9:00			MITACS SESSIONS	9:00 – 9:45 Peter Cameron (graphs, web)	9:00 – 9:45 Peter Olver (invariants)	9:00 – 9:45 Mark Lewis (biomath)
10:00			NEXTMAC WORKSHOP		Coffee / Café	
10:45		MITACS SESSIONS		10:00 – 10:45 Craig Fraser (history)	10:00 – 10:45 Joel Feldman CONFERENCE JEFFERY-WILLIAMS LECTURER	10:00 – 10:45 Plenary T6A (fluids)
11:00			11:00 – 1:00 Joint Lunch for CMS / CAIMS Executive and Committee Chairs / Lunch conjoint des exécutifs et représentants de comités SMC et SCMAI (Lord Nelson)	10:45 – 11:30 CAIMS Prize Lecture	10:45 – 11:30 CAIMS Prize Lecture	10:45 – 11:30 Mikhail Zaicev (hydro) Plenary T6A (fluid session)
1:30				11:30 – 2:00 LUNCH	11:45 – 1:45 Delegates' Luncheon / Lunch des Participants	11:30 – 1:00 LUNCH
2:00		2:00 – 4:00 CMS Executive Committee Meeting / Réunion du Comité exécutif de la SMC (Lord Nelson)	1:30 – 6:30 CMS Board CAIMS Board Meetings / Réunions des Conseils de la SMC et SCMAI (Lord Nelson)	2:00 – 6:00 SESSIONS	2:00 – 6:00 SESSIONS	1:00 – 5:00 SESSIONS
6:00				6:00 – 7:30 Cash Bar Bar – Payant (Pier 21)	6:30 – 7:00 Public Lecture Reception	
6:30	MITACS OPENING RECEPTION (Maritime Museum of the Atlantic)	MITACS BANQUET Prizes and Awards (Lord Nelson)	7:00 – 9:00 WELCOMING RECEPTION (Lord Nelson)	7:30 – 10:30 BANQUET Prizes and Awards (Pier 21)	7:00 – 8:00 Ed Barbéau PUBLIC LECTURE CONFERENCE POPULAIRE	

MITACS: Sessions will be held at the Marion McCain Building, Dalhousie University.

Poster exhibition, school displays and all related meals/food will be at the Student Union Building, Dalhousie University.

For the latest schedule details, please visit the web site : <http://www.cms.math.ca/Events/summer04/>

Revised / révisé: January 14, 2004

**CANADIAN MATHEMATICAL SOCIETY
REGISTRATION FORM – CMS/ CAIMS JOINT MEETING 2004
Dalhousie University, Halifax, Nova Scotia – June 13-15**

To register electronically, go to <http://www.cms.math.ca/Events/summer04/forms.html>

Dead lines:	Preregistration for reduced rates	May 1
	Arrival of payments to be processed before the meeting	May 31
	Cancellation (refundless \$40 penalty)	May 31

LASTNAME: _____ FIRST NAME _____ TITLE (Dr. Mr. Etc.) _____ CMS ID # _____

Institution (for badge): _____

Mailing Address: <input type="checkbox"/> home OR <input type="checkbox"/> office	Voluntary Information <input type="checkbox"/> Male <input type="checkbox"/> Female
---	---

Telephone: _____ Email: _____

Arrival date: _____ Departure date: _____

PLEASE MAKE YOUR HOTEL RESERVATIONS. DEADLINES: April 12 for Howe Hall Residence May 10 for Lord Nelson & Holiday Inn

Where will you be staying? The Lord Nelson Holiday Inn Select Halifax Centre
 Howe Hall Residence Other hotel No housing required

Special diets: Kosher Vegetarian Diabetic Low fat Milk allergy Nut allergy Other:

I am: a Plenary Speaker a Prize Recipient a Session Speaker an Organizer none of the above

SPEAKER SESSION: _____ ABSTRACT DEADLINE: APRIL 10

I would like to deliver a contributed paper.

CONTRIBUTED PAPER DEADLINE (ABSTRACT & REGISTRATION) : APRIL 10

Please remember, we cannot consider the contributed paper abstracts until registration fees are received.

TO SUBMIT YOUR ABSTRACT, GO TO <http://www.cms.math.ca/Events/summer04/forms.html>

Member of: CMS CAIMS CSFD CSHPM CORS SSC CMESG NCTM AMS MAA SIAM AUOM
 Provincial Ass'n (specify): _____ School board (specify): _____ Other org'n (specify): _____

University Professor Elementary teacher Middle School teacher High School teacher College teacher
 CEGEP teacher Student Postdoc Public sector Private sector Other (specify): _____

PLEASE INDICATE WHICH SPECIAL OR RELATED EVENT(S) YOU MIGHT BE ATTENDING _____ Public Lecture (June 14) _____ MITACS (June 10-12)
 _____ NEXTMAC (June 12) _____ CUMC (June 16-20)

PLEASE INDICATE WHICH SESSION(S) YOU MIGHT BE ATTENDING	_____ Hopf Algebras and Related Topics
_____ Apps of Invariant Theory	_____ Mathematical Education
_____ Classical Analysis	_____ Nonlinear Dynamics
_____ Dynamical Systems	_____ Numerical Algorithms
_____ Financial Mathematics	_____ Qualitative Behaviour/Controllability of PDEs
_____ Fluid Dynamics	_____ Topology
_____ General Topology/Topological Algebra	_____ Topos Theory
_____ Graphs, Games and the Web	_____ Contributed Papers
_____ History of Mathematics	_____ Poster Presentations

All categories include a ticket to the Delegates' Luncheon.
Should you fit into more than one fee category, choose whichever is less.

Please circle one of the registration categories in the chart below	Before May 1	After May 1
Plenary Speaker (1 free banquet ticket) Prize lecturers (2 free banquet tickets)	\$0	\$0
Session Speakers	215	280
Organizers	145	185
Non-members	430	560
CMS/CAIMS/CSFD/CSHPM/AMS/MAA members with grants	290	375
CMS/CAIMS/CSFD/CSHPM/AMS/MAA members without grants	145	190
One-day fee	195	255
Post-docs, retired	110	145
Teachers (K-12, CEGEP), students, unemployed	55	70
NEXTMAC Workshop (please note additional fee)	15	15
Banquet (Sunday, June 13, Pier 21) - LIMITED QUANTITY	60	60

Registration: \$ _____ NEXTMAC: \$ _____ # BANQUET = \$ _____ TOTAL \$ _____

Payment method: Cheque (payable to CMS) VISA Master Card Purchase Order (attached)

Credit Card # _____ Expiry: _____

If this is your credit card, please print your name as it appears on the card and sign your name. If this is not your card, please print holder's name as it appears on the credit card and have the card holder sign.

Print name on card _____ Signature _____

Send completed form with payment to:
 CMS Executive Office, 577 King Edward, POB 450, Station A, Ottawa, ON CANADA K1N 6N6
 Phone: 613-562-6702 FAX: 613-565-1539 (Please use the FAX# for credit card payments only.)

Revised January 19, 2004

SOCIÉTÉ MATHÉMATIQUE DU CANADA
FORMULAIRE D'INSCRIPTION – RÉUNION CONJOINTE SMC/SCMAI 2004

Université Dalhousie, Halifax, Nouvelle-Écosse – 13 au 15 juin

Vous pouvez aussi vous inscrire sur le Web au <http://www.smc.math.ca/Reunion04/forma.html>

Dates importantes:	Pré-inscription à prix réduit	paiement avant le 1er mai
	Arrivée de paiement pour traiter l'inscription avant la Réunion	31 mai
	Annulation – Pré-inscription (remboursement moins 40 \$)	31 mai

NOM: _____ PRÉNOM: _____ TITRE (Prof, Dr, Etc.): _____ No. SMC _____

Établissement (pour le "badge"): _____

Adresse postale: _____ Information optionnelle: _____
 domicile OU Homme
 travail Femme

Téléphone: _____ Courriel: _____

Date d'arrivée: _____ Date de départ: _____

VOUS ÊTES PRIÉS DE FAIRE VOS PROPRES RÉSERVATIONS D'HÔTEL – S/P NOTER DATES LIMITES

Votre choix d'hôtel? Hotel Lord Nelson (10 mai) Holiday Inn Select Halifax Centre (10 mai)
 Résidences Howe Hall (12 avril) Autre hôtel Aucune réservation nécessaire

Kasher Végétarien Diabétique Pauvre en mat grasses Allergie-lait Allergie-noix Autre:

Je suis un: organisateur conférencier primé conf. principal conf. de séance participant

DATE LIMITE – CONFÉRENCIER PRIME/ PRINCIPAL/ DE SÉANCE (RÉSUMÉ) : 10 AVRIL

J'aimerais présenter une communication libre. Le résumé sera évalué une fois que les frais d'inscription seront reçus.

DATE LIMITE – COMMUNICATIONS LIBRES (RÉSUMÉ ET INSCRIPTION) : 10 AVRIL

PAGE WEB POUR ENVOI DE RÉSUMÉS: <http://www.smc.math.ca/Reunion04/forma.html>

Adhésions: SMC SCMAI CSFD SCHPM SCRO SSC NCTM AMS MAA SIAM AOMM

GCEDM Assoc. provincial (préciser): _____ Comm. Scolaire (préciser): _____ Autre org. (préciser): _____

Prof. d'univ. Enseignant-élem. Enseignant-inter. Enseignant-sec. Enseignant-collège

Enseignant-Cégep Étudiant Post-doc Secteur public Secteur privé Autre (préciser): _____

VEUILLEZ INDIQUER À QUEL(S) _____ Conférence publique (14 juin) _____ MATISC (10-12 juin)

ÉVÈNEMENT(S) VOUS PARTICIPEREZ _____ NEXTMAC (12 juin) _____ CCEM (16-20 juin)

VEUILLEZ INDIQUER À QUELLE(S) SÉANCE(S) VOUS PARTICIPEREZ

<input type="checkbox"/> Apps de la théorie des invariants à la géométrie différentielle	<input type="checkbox"/> Algèbres de Hopf et sujets connexes
<input type="checkbox"/> Analyse classique en l'honneur du 80ème anniversaire de David Borwein	<input type="checkbox"/> Éducation mathématique
<input type="checkbox"/> Systèmes dynamiques	<input type="checkbox"/> Dynamique non linéaire en physiologie et en médecine
<input type="checkbox"/> Mathématiques financières	<input type="checkbox"/> Algorithmes numériques pour les équations différentielles et les systèmes dynamiques
<input type="checkbox"/> Symposium Canadien sur le dynamique des fluides	<input type="checkbox"/> Comportement qualitatif et contrôlabilité des EDP
<input type="checkbox"/> Topologie générale et algèbre topologique	<input type="checkbox"/> Topologie
<input type="checkbox"/> Graphes, jeux et la Toile	<input type="checkbox"/> Théorie des topos
<input type="checkbox"/> Histoire des mathématiques	<input type="checkbox"/> Communications libres
	<input type="checkbox"/> Présentations par affiches

Un billet pour le lunch des délégués sont inclus dans toutes les catégories d'inscription.

Si vous vous trouvez dans plus d'une catégorie, choisissez le montant moins élevé.

Veillez encadrer la catégorie d'inscription choisie	Avant le 1er mai		Après le 1er mai	
Confé. principaux (1 billet banquet gratuit)/ conf. primés (2 billets banquet gratuits)	\$0		\$0	
Conférenciers	215		280	
Organisateurs	145		185	
Non-membres	430		560	
Membres SMC/SCMAI/CSFD/SCHPM/AM/S/MAA avec subvention	290		375	
Membres SMC/SCMAI/CSFD/SCHPM/AM/S/MAA sans subvention	145		190	
Frais d'une journée	195		255	
Postdocs, retraités	110		145	
Enseignant (élem., second, Cégep), étudiants, sans-emploi	55		70	
Atelier NEXTMAC (sup noter les frais additionnelles)	15		15	
Banquet (dimanche le 13 juin, Pier 21) – QUANTITÉ LIMITÉ	60		60	

Inscription: \$ | NEXTMAC: \$ | # Banquet = \$ TOTAL \$

Mode de paiement Chèque (au nom de la SMC) VISA Master Card Bon de commande

Carte de crédit #: _____ Date d'expiration: _____

Veillez inscrire votre nom (tel qu'il apparaît sur votre carte) en lettres moulées et signer.

Si vous utilisez la carte d'une autre personne, veuillez inscrire le nom du détenteur et le faire signer.)

Lettres moulées: _____ Signature: _____

Veillez envoyer ce formulaire et votre paiement à:

Bureau de la SMC, 577, av. King-Edward, C.P. 450, Succursale A, Ottawa, (Ontario) CANADA K1N 6N5

Téléphone: (613) 562-5702 Télécopieur: (613) 565-1539 (Utiliser pour paiements par carte de crédit seulement)

Révisé le 19 janvier 2004

CANADIAN MATHEMATICAL SOCIETY
CMS/CAIMS Joint Meeting 2004
 Dalhousie University, Halifax, Nova Scotia, June 13-15
ACCOMMODATION RESERVATION FORM

Send completed form with payment (if applicable) DIRECTLY TO THE HOTEL. Do not mail forms to the Executive Office.

Name:			
Home Institution:			
Address:			
City:	Prov/State:	Postal Code:	
Telephone:	FAX:	Email:	
Arrival date:	Time of arrival:	Departure date:	Departure time:
Please guarantee reservation for late arrival <input type="checkbox"/> GUARANTEE WITH A CREDIT CARD			
Payment type <input type="checkbox"/> Cheque <input type="checkbox"/> VISA <input type="checkbox"/> MasterCard <input type="checkbox"/> American Express <input type="checkbox"/> Other (Specify)			
Credit Card #:	Expiry:	Signature:	

WHEN RESERVING, PLEASE QUOTE THE GROUP CODE

HOUSING CHOICE:		<input type="checkbox"/> Smoking <input type="checkbox"/> Non-Smoking UPON AVAILABILITY
Room occupants: Print or type names:	1. _____	3. _____
	2. _____	4. _____
Do you require special accommodation because of physical limitations? Please specify:		

Blocks of rooms will be held at the locations given below until the specified deadlines. Reservations made after these dates will be on a space available basis. Rates are per room per night and are quoted in Canadian dollars. The conference rate is usually available up to two days before and after the meeting. All delegates must make their own reservations; please quote the Group code. When making your reservation, please clarify payment and cancellation policies as these vary from hotel to hotel. You should get a confirmation number for future reference. Additional information regarding accommodation choices will be posted to the meeting web site as it becomes available.

Reservations must be guaranteed by a one-night deposit or a major credit card.

Accommodation Choices	Daily Rates
Lord Nelson Hotel 1515 South Park Street, Halifax NS B3J 2L2 15 minute walk to campus; bus #1 or 10. Check-in 3 pm; check-out 1 pm Applicable taxes: 15% HST, Marketing Levy 1.5% Deadline: 10 May 2004 Group code: MATHS2004 Phone: 902-423-6331; toll-free in Canada 800-565-2020 Fax: 902-423-7148; www.lordnelsonhotel.com Parking: valet parking at \$12.50 daily plus tax	_____ \$129 single or double occupancy _____ \$20 each additional adult Suites are available at higher cost
Holiday Inn Select Halifax Centre 1980 Robie Street, Halifax NS B3H 3G5 15 minute walk to campus; bus #7 Check-in 3 pm; check-out 12 noon Applicable taxes: 15% HST; 1.5% Marketing Levy Deadline: 10 May 2004 Group code: MAT01 Phone: 902-423-1161; toll-free 888-810-7288 Fax: 902-423-9063; www.hisselect.com/halifax-centre Parking: \$9 daily plus tax	_____ \$135 single or double occupancy _____ \$10 each additional person _____ \$145 Priority Club Floor _____ \$155 Executive Floor
Howe Hall Residence 6230 Coburg Road, Halifax Address for reservations: Conference Services Room 407, Student Union Building 6136 University Avenue, Halifax NS B3H 4J2 Check-in 3 pm; check-out 10 am Applicable taxes: included in room rates Deadline: 12 Apr 2004 Group code: Math Society Conference Phone: 902-494-8840 (24 hours) Fax: 902-494-1219; www.dal.ca/about/sew Parking: \$4 daily including tax	_____ \$39.59 single, taxes included _____ \$59.33 double, taxes included Breakfast in the dining hall every day on a cash basis

In the event that your preferred hotel is not available, please contact your second choice.

Revised January 19, 2004

SOCIÉTÉ MATHÉMATIQUE DU CANADA
Réunion conjointe de la SMC et la SCMAI 2004
 Université Dalhousie, Halifax, Nouvelle-Ecosse, 13 au 15 juin
FORMULAIRE DE RÉSERVATION D'HÉBERGEMENT

Remplir et retourner DIRECTEMENT À L'HÔTEL avec votre paiement (s'il y a lieu). N'envoyez pas ce formulaire au Bureau de la SMC.

Nom:			
Établissement:			
Adresse postale:			
Ville:	Prov./État:	Code postal:	
Téléphone:	FAX:	Courriel:	
Date d'arrivée:	Heure d'arrivée:	Date de départ:	Heure de départ:
S.V.P. faire retourner ma chambre pour une arrivée tardive <input type="checkbox"/> AVEC CARTE DE CRÉDIT			
Paiement <input type="checkbox"/> Chèque <input type="checkbox"/> VISA <input type="checkbox"/> MasterCard <input type="checkbox"/> American Express <input type="checkbox"/> Autre (Préciser)			
# de la carte de crédit:	Date d'expiration:	Signature:	

POUR RÉSERVATION VEUILLEZ S'Y PRÉCISER LE CODE DE GROUPE

CHOIX D'HÉBERGEMENT:		<input type="checkbox"/> Fumeur <input type="checkbox"/> Non-fumeur
		SELON DISPONIBILITÉ
Occupants: noms en lettres	1. _____	3. _____
moulées	2. _____	4. _____
Avez-vous besoin d'assistance en raison d'un handicap physique? Veuillez préciser:		

Des chambres ont été retenues aux endroits ci-dessous jus qu'aux dates précisées. Après ces dates, les hôtels ne prendront vos réservations que s'il reste des chambres et demanderont les tarifs affichés. Les tarifs sont par nuit, par personne, et sont indiqués en devises canadiennes. Généralement, les tarifs préférentiels s'appliquent aussi aux deux jours qui précèdent et qui suivent la Réunion. Les participants doivent faire eux-mêmes leur réservation et donner le code de groupe. Au moment de faire votre réservation, n'oubliez pas de vérifier les modalités de paiement et d'annulation, car celles-ci varient d'un établissement à l'autre. Demandez un numéro de confirmation pour toute communication ultérieure. Nous publierons tout nouveau renseignement sur le site Web dès qu'il nous parviendra. Toute réservation doit être garantie par le paiement d'une nuit ou par une carte de crédit reconnue.

Choix d'hébergement	Tarifs par nuit
Hôtel Lord Nelson 1515 South Park Street, Halifax NS B3J 2L2 15 minutes à pied du campus; autobus 1 ou 10. Arrivée: 15 h; départ: 13 h Taxes applicables: TVH (15%), taxe d'hébergement (1,5%) Réservez au plus tard le 10 mai 2004 Code de groupe: MATHS 2004 Téléphone: 902-423-6331; Sans frais au Canada: 1-800-565-2020 Télécopieur: 902-423-7148; www.lordnelsonhotel.com Stationnement: service voiturier seulement à 12,50 \$ / nuit + taxes	_____ 129 \$ 1 ou 2 personnes _____ 20 \$ en sus par personne additionnelle L'hôtel offre aussi des suites à un coût supérieur
Holiday Inn Select Halifax Centre 1980 Robie Street, Halifax NS B3H 3G5 15 minutes à pied du campus; autobus 7 Arrivée: 15 h; départ: 12 h Taxes applicables: TVH (15%), taxe d'hébergement (1,5%) Réservez au plus tard le 10 mai 2004 Code de groupe: MAT01 Téléphone: 902-423-1161; Sans frais: 1-888-810-7288 Télécopieur: 902-423-9069; www.hisselect.com/halifax-centre Stationnement: 9 \$ / jour + taxes	_____ 135 \$ 1 ou 2 personnes _____ 10 \$ en sus par personne additionnelle _____ 145 \$ étage " Priority Club " _____ 155 \$ étage " Executive "
Résidences Howe Hall 6230 Coburg Road, Halifax Adresse pour réservations: Conference Services, Room 407, Student Union Building 6136 University Avenue, Halifax NS B3H 4J2 Arrivée: 15 h; départ: 10 h Taxes applicables: comprises dans le prix de la chambre Réservez au plus tard le 12 avril 2004 Code de groupe: Math Society Conference Téléphone: 902-494-8840 (24 heures) Télécopieur: 902-494-1219; www.dal.ca/officew Stationnement: 4 \$ par jour + taxes	_____ 39,59 \$ chambre simple, taxes incluses _____ 59,33 \$ chambre double, taxes incluses Petit-déjeuner servi tous les jours à la cafétéria - paiement comptant seulement

Si votre premier choix d'hôtel n'est pas disponible, veuillez communiquer avec un autre établissement.

TOULOUSE 2004

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

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

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



SPECIAL SESSIONS and ORGANIZERS

Operator Algebras
 C. Anantharaman (Ottawa) and L. Patern (Victoria)

Symplectic Topology and Geometry
 D. Auroux (MIT) and F. Lalonde (Montreal)

Number Theory
 D. Boyd (Ottawa) and M. Waldschmidt (Paris)

The Langlands Program
 W. Casselman (UNC) and J. Labesse (Marseille)

Spectral and Geometric Analysis
 O. Hijzel (Nancy) and M. Kuran (McGill)

Partial Differential Equations
 M. Esteban (Paris) and C. Sirean (Toronto)

Dynamical Systems
 K. Inoue (Osaka) and C. Rousseau (Montreal)

Differential Equations and Control
 F. Chirilus (Lyon) and K. Sören (Colorado)

Variational Analysis and Optimization
 J-H. Hiriart-Urruty (Toulouse) and A. Lewis (SFU)

Stochastic Analysis
 M. Isakov (UNC) and D. Ito (Toulouse)

Multifractals and Long Memory
 J-M. Azaïs (Toulouse) and A. Kneibler (HEC, Montreal)

The Probability/Statistics Interface
 F. Basse (Toulouse) and L. Devroye (McGill)

Statistical Analysis of Functional Data
 J. Ramsay (McGill) and H. Cadot (INRA Castanet-Tolosan)

Numerical Analysis
 A. Fautin (Laval) and J. J. N. H. (Wisc)

Éducation mathématique
 J-L. Dorier (UFR Lyon) and E. Müller (Frank)

Low Dimensional Topology and Geometrical Group Theory
 M. Helein (Toulouse) and S. Boyer (UQAM)

Mathematical Biology
 G. W. H. (McMaster)

Complex Dynamical Systems
 X. Buff (Toulouse), A. Chéritat (Toulouse) and M. Yampolsky (Toronto)

There will be a poster session as well as a meeting to discuss *Les mathématiques et la francophonie*.

PLENARY LECTURERS

Géraldine Allaire (Ecole Polytechnique)
 Michèle Artigue (Jussieu)
 Mathieu Beigneux (Ottawa)
 Jon Borwick (Simon Fraser)
 David Brillinger (Berkeley)
 Abilio Connes (IHES) (to be confirmed)
 Walter Craig (McMaster)
 Henri Duminil (McGill)
 Emmanuel Ghys (ENS-Lyon)
 Laurent Lafforgue (IHES)
 Gabo Lopus (Barcelona)
 Wilfrid Lynck (Toronto)
 Christophe Rousseau (UQAM)
 Abilio-Sol Skutman (ETH Zurich)
 Wajid Taqvi (Ottawa)
 Henry Wulbowitz (Waterloo)

SCIENTIFIC COMMITTEE

Chair: Frank Chirilus
 Université Lyon et Institut des Sciences de France
 Claude Anantharaman - Université d'Ottawa-CMS
 Jean-Marc Azaïs - Université Paul Sabatier - Toulouse III
 Guy Barles - Université F. Jabelet-Toronto
 Martin T. Barlow - University of North Carolina
 Philippe Biane - Université Paul Sabatier - Toulouse III
 Jacques Biane - Université de Nice Sophia-Antipolis
 James Ramsay, McGill University
 Pierre Collet - Institut des Hautes Études Scientifiques
 François Lalonde - Université de Montréal
 Eric M. Walker - York University
 Bruno Salvy - INRIA Rocquencourt
 Catherine Sirean - University of Toronto

LOCAL ARRANGEMENTS

Charles-Henri Romb
 Université Paul Sabatier - Toulouse III

Members from the Institut de mathématiques de Toulouse

Serge Cohen, Anne Corlette, Anne Connes, Thierry Delmotte, Fabrice Gamboa, Jean-Baptiste Hiriart-Urruty, Michel Ledoux, Marcel Maugon, Bernard Morcrette, Marc Nevers, Jean-Marc Schlenker.

Travel grants will be available for students and postdocs
 For more information visit www.cms.math.ca/Events/Toulouse2004/

TOULOUSE 2004

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

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

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



SYMPOSIUMS et ORGANISATEURS

Algèbres d'opérateurs
C. Anantharaman (Orléans) et I. Putman (Victoria)

Topologie et géométrie symplectiques
D. Auroux (MIT) et F. Lalonde (Montréal)

Théorie des nombres
D. Boyd (Ottawa) et M. Waldschmidt (Paris)

Le programme de Langlands
W. Casselman (UNC) et J.F. Labesse (Marseille)

Analyse géométrique et spectrale
O. Hijazi (Nancy) et N. Kamran (McGill)

Équations aux dérivées partielles
M. Estéban (Paris) et C. Sulem (Toronto)

Systèmes dynamiques
K. Inoue (Osaka) et C. Rousseau (Montréal)

Équations différentielles et commande
F. Chabre (Lyon) et K. Sreen (Cairo)

Analyse variationnelle et optimisation
J.H. Hubbard (Toulouse) et A. Lewis (SFU)

Analyse stochastique
M. Iasnaw (UNC) et D. Ialy (Toulouse)

Processus multifractals et à longue mémoire
J.M. Azaïs (Toulouse) et V. Kenchad (HRC, Montréal)

L'interface entre les probabilités et la statistique
F. Bessie (Toulouse) et L. Devroye (McGill)

Analyse statistique des données fonctionnelles
J. Ramsay (McGill) et H. Cardot (INRA Castanet-Tolosan)

Analyse numérique
A. Fathi (Lava) et J. Hillen (Nize)

Topologie de petite dimension et théorie géométrique des groupes
M. Ito (Toulouse) et S. Ito (UQAM)

Biologie mathématique
G. Wollwitz (McMaster)

Systèmes dynamiques complexes
X. Buff (Toulouse), A. Cheritat (Toulouse) et M. Yampolsky (Toronto)

Il y aura une session d'affiche ainsi qu'une discussion sur les mathématiques et la francophonie.

CONFÉRENCIERS PRINCIPAUX

Géorgie Albiac (Ecole Polytechnique)
Michèle Artigue (Jussieu)
Mathieu Beigneux (Orléans)
Jon Borwick (Simon Fraser)
David Brillinger (Berkeley)
Abile Connes (IHES) (to be confirmed)
Walter Craig (McMaster)
Henri Duminil (McGill)
Emmanuel Ghoul (ENS-Lyon)
Laurent Lafforgue (IHES)
Gabriel Lagozi (Barcelona)
Wilhelm Lynck (Toronto)
Christophe Letrounev (UQAM)
Abile-Sol Skutman (ETH Zurich)
Wassil Tarjov (Moscow)
Henry Wollwitz (Waterloo)

COMITÉ SCIENTIFIQUE

Président: Franck Chabre
(Université Lyon et Institut des Mathématiques de France)
Claire Anantharaman - Université d'Orléans-CNRS
Jean-Marc Azaïs - Université Paul Sabatier - Toulouse III
Guy Barles - Université F. Jabelet-Toulon
Walter Craig - Université de l'Ontario à Columbia
Philippe Bessie - Université Paul Sabatier - Toulouse III
Jacques Hillen - Université de Moncton
James Ramsay, McGill University
Pierre Cardot - Institut des Mathématiques de Toulouse
François Lalonde - Université de Montréal
Eric M. Walker - York University
Imma Salvy - INRIA Rocquencourt
Catherine Sulem - University of Toronto

LOGISTIQUE LOCALE

Président: Jean-Pierre Lami
Université Paul Sabatier - Toulouse III

Membres de l'Institut de Mathématiques de Toulouse

Serge Cohen, Laure Costin, Anne Corneille, Thierry Delmotte, Fabrice Gamboa, Jean-Luc Lemaître, Michel Ledoux, Marcel Maugin, Le Grand Mathébauc, Marc Neversat, Jean-Marc Schlenker.

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

MESSAGE FROM THE PRESIDENT

Christiane Rousseau

We have finished the year 2003 with the exciting Winter Meeting, hosted by Simon Fraser University at the Harbour Centre in Vancouver, on December 6-8. Particular features of this meeting included the short-course in cryptography, the two lectures at the border of mathematics and theoretical computer science and the plenary lecture in history of mathematics.

All prize and plenary talks were particularly appreciated for their clarity and interest. The Coxeter-James Lecture was given by Jingyi Chen (UBC) and the Doctoral Prize Lecture by Alina Carmen Cojocaru (Queen's University). The other plenary lecturers were Tom Archibald (Acadia University), the duo Hyman Bass and Deborah Ball (University of Michigan), Robert Calderbank (AT&T Laboratories), Andrew Granville (University of Montreal), Anand Pillay (University of Illinois at Urbana-Champaign) and Mahdu Sudan (MIT). The presence of Mahdu Sudan reminded us of honouring him at the Canadian Embassy in Beijing when he received the Nevanlinna Prize during ICM 2002. The participants also had the pleasure to participate in the fourteen diverse symposia including one in Education and one in History of Mathematics.

At the Banquet we honoured our four prize winners: Andy Liu, winner of the 2003 Adrien Pouliot Prize in mathematical education, Jim Arthur, winner of the G. de B. Robinson Prize for the best article "A Note on the Automorphic Langlands Group" in the Canadian Mathematical Bulletin in the years 2001-2002, Jingyi Chen winner of the 2003 Coxeter-James Prize and Alina Carmen Cojocaru, winner of the CMS 2003 Doctoral Prize.

Let me now highlight to you some of our interesting projects for 2004 and 2005.

We have just finished closing the files on the 2003 Forum and the planning for the 2005 Forum is already started: the Proceedings of the 2003 Forum are posted on the web:

www.cms.math.ca/Events/CSMF2003/proceedings/e.

The three co-chairs of the 2005 Forum are Florence Glanfield (University of Saskatchewan), Bradd Hart (McMaster University) and Frédéric Gourdeau (Université Laval): several members of the program committee met in Vancouver during the CMS meeting to discuss the main themes for the 2005 Forum. Moreover there is a will amongst many provincial associations of mathematics teachers to stay in contact and further develop the links created at the Forum. The Advancement of Mathematics Committee suggested that the tradition of Fora on mathematical education bringing together all partners in mathematics education in Canada be continued after the 2005 Forum, for instance with Fora every three or four years: this would ensure to maintain the momentum created at each Forum.

We are just a few months from the Canada-France Toulouse meeting. I am very happy to announce a program of graduate students' and post-docs'

travel awards sponsored by the three Institutes: CRM, The Fields Institute and PIMS, together with the SSC (Statistical Society of Canada), CAIMS (Canadian Applied and Industrial Mathematical Society) and CMS. 15 travel awards of \$500 each will be given to students or post-docs making a poster presentation: details for applying at www.cms.math.ca/Events/Toulouse2004/.

The program "Math in Moscow" has been renewed for a second year. The winner of the fall competition was Sébastien Labbé, from the Université de Sherbrooke. He will spend the winter 2004 at the Moscow Independent University. The deadline of the next competition is **April 15 2004** and two scholarships will be awarded.

The CMS will be partner in the following events: a conference in honour of Donald Coxeter at the University of Toronto in Summer 2004, and the Renaissance Banff Conference in July 2005. The Renaissance Banff Conference will be part of the International Bridges Conferences on Mathematical Connections in Art, Music and Science. The Conference is an initiative of Robert Moody and a collaborative effort by PIMS, the Banff Centre, the CMS, and the Bridges Conferences. The last day of the event will be a Coxeter Day in commemoration of the life and mathematics arts connections of Donald Coxeter. The proceedings will be published and distributed in the country. We hope that many Canadians will decide to participate and propose to give a lecture or organize a workshop session. You will find information on the Bridges Conference 2004 in Winfield (Kansas) and, in general, on the Bridges Conferences at: www.sckans.edu/~bridges.

As described by Graham Wright in his December report, the financial situation of the CMS is more difficult these days. An important part of the deficit for 2003 is explained by the low American dollar as many foreign libraries pay their subscriptions in American dollars. As the Canadian dollar is expected to remain high compared to the American dollar this situation is likely to be recurrent for several years. The CMS will then have no choice either to increase its revenues or to cut its expenses. The Executive is hoping to be able to realize the first alternative and is working hard for that. We have discussions with Springer to post our journals on Springer Link: this would increase their visibility with the potential of increasing the number of subscriptions. Also, a decision will be taken in June by the Fellows of the Royal Society of Canada if the Mathematical Reports will become a joint RSC-CMS publication.

As mentioned in my report a year ago, we had approached the International Mathematical Union (IMU) and NRC about a possible bid from Canada to host the International Congress of Mathematicians in Montreal in 2010 (ICM 2010). Together with NRC and the Palais des Congrès in Montreal we are now doing the number crunching to determine the feasibility of the project, with a final decision to be made by May 2004.

The International Affairs Committee discussed at length of how to make sure that all Canadian mathematicians that have obtained very significant

recent mathematical results be presented as potential speakers for ICM 2006 in Madrid. You are welcome to send your suggestions to the Committee (chair-iac@cms.math.ca) together with a justification of your recommendation.

IMU-Net: the International Mathematical Union is starting a bimonthly Email Newsletter edited by Mireille Chaleyat-Maurel, University René Descartes, Paris, France. More details about IMU-Net can be found at: www.mathunion.org/IMU-Net/. You can find, for instance, detailed information about subscribing to the IMU-Net mailing list and unsubscribing from it. Letters to the editor can be sent to Mireille Chaleyat-Maurel, imu-net-editor@mathunion.org. Previous issues can be seen at: www.mathunion.org/Publications/Newsletter/archive/index.html.

The Academician Andrey Andreevich Bolibruch, of the Steklov Institute (Moscow, Russia), who was a member of the IMU Executive Committee passed away on 11 November 2003. Academician D. Anosov writes: "A crucial moment in his mathematical career came at the end of the 80's, when he discovered that Hilbert's 21st problem (concerning a certain class of linear ordinary differential equations in the complex domain) generally has a negative solution. This was an unexpected and brilliant achievement. For a long time people were convinced that ... the answer to the 21st problem was positive. Thus Bolibruch's result was unexpected and made a strong impression." Andrey Bolibruch visited Canada on several occasions. He has been lecturer of the Séminaire de Mathématiques Supérieures in Université de Montréal in July 2002. He played a very important role in the organization of scientific work in Russia and international collaboration in mathematics. His death is a

terrible shock, not only to his relatives but to his friends in many countries. It is a great loss for mathematics and for Russia.

After the discontinuation of the World Directory of Mathematicians (WDM), a number of colleagues asked whether it would be possible to establish an electronic version of WDM. The IMU Committee on Electronic Information and Communication Chaired by Jonathan Borwein (CEIC, see www.ceic.math.ca) has attended to this request and investigated the possibilities. Due to the limited financial means of the IMU there is no way to set up and maintain a central registry such as the combined membership list of AMS/MAA/SIAM/etc. It seems feasible, though, to keep a central list based on distributed input and voluntary contributions. CEIC proposes to give this idea a try and start with a basic version of an Electronic World Directory of Mathematicians (EWDM). Every mathematician who has a homepage is asked to register the homepage through the EWDM registration mechanism, see www.mathunion.org/ewdm/join.php/

For more detailed information on the whole initiative click on www.mathunion.org/MPH-EWDM.

For nearly two years, the European Physical Society (EPS) has been engaged in making 2005 the World Year of Physics (WYP). Some joint actions between physicists and mathematicians are already planned for this World Year. For information, see: www.wyp2005.org/.

Are we going to join the movement in Canada?

TRIVIA

1) What caused the destruction of the spacecraft Mariner I in 1962?

- a) Division by zero in navigation program
- b) Brittle O-rings
- c) Aliens on the dark side of the moon
- d) Failure to average velocities in trajectory computation

2) Who boasted in the 1970's that the rate of increase of inflation was decreasing, becoming the first US President to cite a third derivative as a reason for re-election?

- a) Reagan
- b) Carter
- c) Ford
- d) Nixon

3) The premiere episode of what TV comedy series has the main character writing a math exam, in which he mistakenly gets a Calculus question sheet instead of the Trigonometry question sheet he was expecting?

- a) Malcolm in the Middle
- b) Ferris Bueller
- c) Mr. Bean
- d) Fresh Prince of Bel-Air

4) In "The Hitchhikers Guide to the Galaxy" series of books, what breakthrough led to a technology to replace the Infinite Improbability Drive?

- a) Bistromathics
- b) Finite probability theory
- c) Asymptotic suction
- d) Strange detractors

5) On the "Who wants to be a Millionaire?" TV show, what celebrity got the question: "In what area of endeavor is the Fields Medal awarded?" (They got it right.)

- a) Norm MacDonald
- b) Rosie O'Donnell
- c) Drew Carey
- d) Vanessa Williams

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

ANSWERS ON PAGE 41

ELKSWHERE IN THE WORLD

Leader's Report on the Canadian participation in the 2003 International Mathematical Olympiad, Japan

Andy Liu

"I am surprised by the abundance of elk," said János Kramár. Where in the world could he have said that but in scenic Banff, in the midst of the majestic Rocky Mountains? The Pacific Institute for the Mathematical Sciences had generously invited the 2003 Canadian National Team, which would compete in the International Mathematical Olympiad in Japan, to train in its superb facility — the Banff International Research Station. Here good food was just as abundant as elk, but fortunately with empty intersection.

It was the first visit to Alberta for János, a grade 10 student at the University of Toronto Schools, where teammate Jacob Tsimerman attended grade 9. Both were selected to the National Team for the first time, as was Oleg Ivrii, a grade 10 student at Don Mills Collegiate in Toronto. Olena Bormashenko from the same school but in Grade 12, was a Silver Medalist in 2002, as was David Han, a grade 12 student at Woburn Collegiate in Toronto. Robert Barrington Leigh, the only Albertan and native born Canadian on the Team, was a grade 12 student at Old Scona Academic High School in Edmonton. He was one point shy of a Silver Medal last year.

The road to Banff began early in the life of each of the six team members, but the jump-start was the Winter Training Seminar at York University, Toronto, where fifteen of the top mathematical talents in Canadian high schools were assembled. Five of the six team members were chosen from this select group, the sole exception being young János who rode his victory in the Canadian Mathematical Olympiad and successes in other competitions to Banff. History was repeating itself as David Han missed the Seminar last year, won the national contest and made the team.

The campers were invited on the basis of their performances in a year-round Correspondence Program and a self-administered test set by the Team Leader. The last item consisted of eight problems, and three students distinguished themselves by solving six of them. Two were alumni David Han and Ralph Furmaniak, the latter very disappointed later when he faltered in the major contests and failed to make the team again. The third was young Jacob, his solutions neatly typed on the computer.

At York, the campers were introduced to one another and to Deputy Team Leader Richard Hoshino, as well as Mr. Rob Morewood and Ms. Lily Yen. They were scheduled to accompany the Team Leader and the Deputy Team Leader, respectively, as official observers representing Canada. Under the watchful eyes of Committee Chair Prof. Bill Sands, the four trainers toiled for four days



in early January, giving lecture-workshops in the mornings, administering and grading various tests in the afternoons, and leading discussion groups in the evenings.

The main criterion in team selection was performance in the three major contests, the Asian-Pacific Mathematical Olympiad, the Canadian Mathematical Olympiad and the United States of America Mathematical Olympiad. The top five choices were clear-cut, and after his performance during the Seminar, Oleg was chosen as the sixth.

Prior to the Summer Camp at Banff, we had a pre-camp at Calgary. A Media Day was scheduled there in any case, as Banff was not as accessible. However, the extra funding was made available because Lily, in a family way, could not go overseas as originally envisaged. So three Calgary students, Sarah Sun, Dennis Chuang and Peter Zhang, along

with three Edmonton students, Radoslav Marinov, David Rhee and Brian Yu, got to spend three days with the team at the University of Calgary. Two other Calgary students, Boris Braverman and Hongyi Li, attended the lectures during the day.

David Rhee, dubbed little David in deference to David Han, was quite a character. He was anything but shy in nature, and stuck his nose into everything. His written English was quite good, but he stubbornly refused to speak it. Since nobody else understood his native Korean, he made do by saying "Ugh" in many variations, expressing different meanings. The other kids were determined to make him speak by the end of the pre-camp. Instead, everyone learned Davidian and said "Ugh"!

The absence of Lily was a big loss. Not only was she an outstanding lecturer, she was both stern and popular with the students. Fortunately, Elena, the mother of Boris, was a faculty member at the University of Calgary, and she stepped in to fill the void at the Summer Camp. Later, Prof. Terry Gannon of the University of Alberta joined the group after the departure of the Team Leader and the accompanying Observer. The students had nothing but praise and admiration for Elena and Terry.

Two excursions were scheduled during the Summer Camp, but where in the world could you go when you were already in Banff? The first excursion coincided with the first day of bad weather, so we drove away to the Columbia Icefield and rode the Snow Coach on the Athabasca Glacier. We also stopped by famous Lake Louise on the way back. The second excursion was a lengthy hike into the mountains.

Jacob and János took full advantage of our bearings and climbed mountains every evening. Soon, Richard and Rob were too tired to keep up with their pace. Robert was originally assigned to look after Oleg since Oleg had been Robert's house guest in 2002, but since Oleg showed no interest in anything other than computer games, we switched Robert, who loved the outdoor lifestyle, to accompany the two young mountaineers. David Han, a computer addict himself, played with Oleg. Olena was very much in her own world, and was not often sighted.

Rob, who had been reading bedtime stories to his nine-year-old daughter by long-distance phone every evening, left the camp on July 5 to spend a night with his family before going overseas. He linked up with me in the Vancouver airport the next day. The flight to Japan was uneventful except that Air Canada managed to lose my luggage again. The delay caused us to miss our bus from Narita Airport to Tokyo, and we had to catch a much later one. During the two-hour ride, we both dozed off until awakened on arrival at the Olympic Youth Centre.

Originally, Rob was supposed to be packed off to the Washington Hotel, but there were some spare rooms at the Centre, and he gladly accepted a switch. The rooms were small but cozy, and adequately furnished. It was not luxurious but very comfortable. We also managed to miss the reception dinner and had to settle for some Japanese take-out. Ironically, this was one of the few times we got to taste Japanese food. Regular meals were served buffet style but consisted mainly of standard dishes such as spaghetti.

The Jury meetings went smoothly and the paper was chosen in only two days. Soon, it was time for the rest of the teams to arrive, at the same Centre where we were. It turned out that we were to be moved to another location, and would return to our rooms after the competition was written. Fortunately, my luggage was recovered in time. Later, the American Team Leader and the Secretary of the Advisory Board, who shared my misfortune, got theirs back too.

Our new locale was Makuhari, in the prefecture of Chiba, and about halfway between Tokyo and Narita Airport. The Prince Hotel was a posh place. My only complaint was that there was no facility in the room for making tea. Tea and ice were available in the hallway, tea free but ice with a nominal charge, quite the opposite of what I expected. This arrangement was unsatisfactory when one suddenly got thirsty during the night.

Here, the Jury meetings unexpectedly ran into a snag. We were discussing marking schemes. I found some of our Japanese hosts quite inflexible, in particular, Prof. Ryuichi Ito, Chair of the Problem Selection Committee and Chief Coordinator. While this had also been the case in Korea in 2000, the Japanese tended to take contrary opinions as insults to their nation. It was the supreme skill of the Jury Chair Prof. Yuji Ito which smoothed things over eventually.

Other business was taken care of during our stay in Makuhari. Rob chaired a meeting on the Asian-Pacific Mathematical Olympiad. Some election procedures for the Advisory Board were also established. John Webb's term as Secretary would end in 2004, as would that of Nazar Agakhanov as regular member. Both were standing for reelection, John Webb unopposed. Nazar had to fight it out with two other candidates. One of them was Matti Lehtinen of Finland, who was nominated by Canada and some other countries.

We were brought back to the Centre for the Opening Ceremony, a low-key but well-run affair. The students were already seated when we entered through the stage, waving madly to a sea of applause. Later, each team got its fifteen seconds of fame on the stage too, a nice touch. The Mexicans got a lot of attention because of their fancy hats.

We stayed in Makuhari during the competition, questions being fed through to us by fax. A lot of transparency sheets were burnt during the entire process as questions and answers were projected overhead. Where they kept needless record of which countries had fielded questions, they could have posted the answers to the most frequently asked questions, and avoided the long queue of Team Leaders basically saying the same thing over and over again. I must have dozed off, as I dreamt that a Mexican student asked whether he could take off that silly hat now.

The scripts for the First Day were available late that evening. With some trepidation, Rob and I flipped through them quickly. Olena solved two problems, including the difficult Problem 3. David and Robert each had one complete solution, while Oleg had two partial solutions with some promise. János seemed to have had a bad day.

Jacob, on the other hand, had a very good day. He claimed to have solved all three problems in two and a half hours, and had time to copy everything out again, along with a drawing of a big happy face. His handwriting had become an issue during the Winter Camp, and there was no improvement at all through the Summer Camp. It might now haunt him.

After the second question-and-answer period, we returned to the Centre to reclaim our old rooms. I took the opportunity to do a much needed round of laundry. Halfway through the wash cycle, I discovered to my horror that I was using the Ladies' Laundry Room, which was side by side with the Gentlemen's, with both doors ajar. I failed to see the logic of this distinction. At the end of the wash cycle, I moved my wet clothes over to the Gentlemen's Laundry Room for drying. Then I smiled broadly as a Japanese girl brought her load into the same room.

Olena, David and Robert were quite consistent in that their performance in the Second Day was similar to that in the First Day. Oleg finally managed a complete solution while János was still out of luck. Jacob got one problem and some minor stuff on the other two. However, we were so concerned about his poor handwriting that we decided to make good copies of what he wrote before we defended his papers in front of the Japanese coordinators. In writing $x+t$, Jacob produced three identical symbols. I remarked that we could get him a perfect score because we could make his handwriting out to be whatever we wanted it to be.

The coordination went fairly smoothly for us, and we got more or less what we expected. The appointment of Richard was very strategic since he conducted most of our coordination sessions in Japanese. The coordinator for Problem 4 wanted to deduct one point from Jacob for poor handwriting, but this was overridden by the Coordination Team Captain since this was not spelt out in the marking scheme. As consolation, the coordinator secured our promise that Jacob would be traded to the Egyptian team.

We ran into a bit of a snag in Problem 2. We felt that Oleg had essentially

solved the problem and deserved a 5, while the coordinators thought 3 would be appropriate. As the discussion in Japanese progressed, I sat with the Coordination Team Captain Titu Andreescu and chatted. When time was up, the team waiting to come in asked me when I might be ready to coordinate their papers! With Titu sitting on our side, they had mistakenly assumed that Richard and I were the coordinators.

Richard asked me if it was worth continuing the argument in an evening session. I really did not see that it would get us anywhere, and we both agreed that we would concede. Ironically, the coordinators insisted that the decision should be postponed, as they reserved the right to award Oleg 5 points. Richard was disappointed as he had another engagement later, but I said I would come to sign the unconditional surrender, which was pretty well what it was.

Jacob indeed got 21 out of 21 on the First Day, and ended up with 30. Olena had 31, so both were at the Gold/Silver borderline. Robert got 18, and both David and Oleg had 16, near the Silver/Bronze borderline. Poor János managed only 8 points. However, for a first-time appearance, anything could happen. There were no losers in Tokyo, only winners and bigger winners. Had we fielded a team with only Jacob, János and Oleg, we would still have beaten teams like Finland.

Jacob and Olena spent much of their time in the room where scores were posted. Although their scores would remain the same no matter how long they stared at them, it was human nature that made it hard to tear them away. I believed Robert got the most out of this competition, even though his 18 points were once again one shy of a Silver Medal. He had spent much time talking to students from other countries, taking walks around and observing things, and asked many questions. He had captured the true spirit of the International Mathematical Olympiad.



Robert Barrington-Leigh receiving his award

In the end, Olena and Jacob got their Gold Medals, the Closing Ceremony being presided by the Crown Prince of Japan. David felt that he had regressed as he got a Bronze Medal after winning a Silver Medal the year before. However, it was a different contest, a different place, a different set of opponents, and a different David too. He should be satisfied with having gone twice and winning a Silver and a Bronze. Oleg also looked

devastated, although I thought he should be jumping for joy. All three young team members will be eligible next year.

With most of the work done, the leaders finally got a chance to relax, and I joined a tour of Kamakura, the ancient capital of Japan. The tour company which hired out the buses also provided beautiful Japanese girls who explained to us various sights along the way. However, the interpreters provided by the I.M.O. left a bit to be desired. After a flurry of words from the tour girls, the interpreters often turned to us and asked, "How do you say that in English?"

My good friend Mr. Wen-Hsien Sun, of Chiu Chang Mathematics Publishers, Taipei, came to Tokyo on July 17. In his entourage was Jerry Lo, a fourteen-year-old Taiwanese student who had spent a year in Canada and knew Robert and Oleg. When Mr. Sun found out that neither our team nor the team from China could leave Japan on July 19, he treated all of us to a sumptuous dinner in a restaurant on the thirty-ninth floor of a building in Ebisu, a posh district of Tokyo.

That night, we stayed in the Washington Hotel, as arranged by the Canadian Mathematical Society through the I.M.O. I found this five-star hotel more expensive but inferior to the Century Hyatt where Mr. Sun's group stayed. Upon checkout the next day, the hotel asked us to fill in a form in which we had to say where we were going. Most put down "Vancouver", but Robert and I put down "Century Hyatt".

With our luggage secured, Mr. Sun took us on a tour of the Tokyo Municipal Government Building, with its twin observation towers. Narration was provided by Mrs. Bian, a noted architect from Taiwan who had joined Mr. Sun's group along with her son and daughter.

The team went home after lunch, minus Richard, Robert and me. Richard was staying behind with friends and relatives, while Robert went on to Taiwan to stay with Jerry, before joining another Canadian National Team which competed in the International Physics Olympiad. He got a Silver Medal in that event. Meanwhile, I went on a lecture tour in Taiwan, Hong Kong, Macau, China and the Philippines.

Looking back, I am very satisfied with our team's performance, especially since I had no preconceived expectations. It has occurred to me that our team is very young, but I also know that it is very good. I think that 1981, our very first year of participation, was the only other time when the Canadian team received two Gold Medals.

A lot of people congratulated me on this double Gold performance, but it was the students who earned them. Much credit should go to Richard and Rob, who had been involved in the competition on a more regular basis than I. Their preparation for the Training Camps was meticulously thorough and well-crafted, their delivery of lecture-workshops flawlessly animated, and their performance overseas a credit to the nation. When choosing future Team leaders, the Canadian Mathematical Society should keep both of them in mind.

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. 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. 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. 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 **2004, qui aura lieu à Montréal**. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles. 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 2005**. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles. 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 2004**. Les lettres de mise en candidature devraient inclure les noms d'au moins trois répondants possibles. Le récipiendaire doit être membre de la communauté mathématique canadienne.

La date limite pour les mises en candidature est le **1^{er} 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

Distinguished Service Award / Prix de la SMC pour service méritoire

In 1995, the Society established this award to recognize individuals who have made sustained and significant contributions to the Canadian mathematical community and, in particular, to the Canadian Mathematical Society.

The 2003 award was presented to William Moser (McGill).

Nominations should include a reasonably detailed rationale and be submitted by **March 31, 2004**, to the address below.

En 1995, la Société mathématique du Canada a créé un nouveau prix pour récompenser les personnes qui contribuent de façon importante et soutenue à la communauté mathématique canadienne et, notamment, à la SMC.

Le lauréat 2003 a été présenté à William Moser (McGill).

Pour les mises en candidature prière de présenter des dossiers suffisamment détaillés et de les faire parvenir, le **31 mars 2004** au plus tard, à l'adresse ci-dessous.

Selection Committee / Comité de sélection

Distinguished Service Award / Prix pour service méritoire
Canadian Mathematical Society / Société mathématique du Canada
577 King Edward, Suite 109, P.O. Box 450, Station A / C.P. 450, Succ. A
Ottawa, Ontario K1N 6N5

POSTE EN MATHÉMATIQUES APPLIQUÉES

Département de mathématiques et de statistique
Faculté des arts et des sciences
Université de Montréal

Le Département de mathématiques et de statistique de la Faculté des arts et des sciences de l'Université de Montréal recherche une professeure ou un professeur au rang d'adjoint ou d'agrégé à plein temps en mathématiques appliquées. Pour toute information sur le Département et le Centre de recherches mathématiques avec qui le Département entretient des liens étroits, veuillez visiter les sites www.dms.umontreal.ca et www.crm.umontreal.ca.

Fonctions

Enseignement aux trois cycles, encadrement d'étudiants aux cycles supérieurs, activités de recherche.

Exigences

Détenir un doctorat en mathématiques appliquées ou dans une discipline connexe. La qualité du dossier en recherche est primordiale. En particulier la candidate ou le candidat doit avoir démontré des expertises en mathématiques et dans une autre discipline, par exemple en sciences naturelles, en médecine ou dans une technologie en émergence, avec le potentiel de développer un solide programme de recherche pluridisciplinaire. La candidate ou le candidat doit posséder une excellente aptitude pour l'enseignement.

Traitement

L'Université de Montréal offre un salaire concurrentiel jumelé à une gamme complète d'avantages sociaux.

Date d'entrée en fonction

A compter du 1er juin 2004 (sous réserve d'approbation budgétaire).

Les personnes intéressées doivent faire parvenir un curriculum vitae complet incluant une courte description des intérêts de recherche, au moins trois lettres de recommandation et au maximum trois tirés à part des plus importantes contributions à la recherche à l'adresse suivante. Le Comité commencera l'étude des dossiers en février 2004. La soumission de dossiers par voie électronique est découragée.

Directeur

Département de mathématiques et de statistique
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal QC H3C 3J7
Téléphone : (514) 343-6710 Télécopieur : (514) 343-5700
Courriel : directeur@dms.umontreal.ca

Selon les règles de nomination de l'Université de Montréal, tous les professeurs réguliers du Département ont accès aux dossiers soumis. Pour que le dossier ne soit accessible qu'au comité de sélection, la candidate ou le candidat doit en faire la demande dans sa lettre d'accompagnement. Cette restriction de l'accessibilité d'un dossier se termine si le candidat est convoqué en entrevue.

Conformément aux exigences prescrites en matière d'immigration au Canada, cette annonce s'adresse en priorité aux citoyens canadiens et aux résidents permanents. L'Université de Montréal souscrit à un programme d'accès à l'égalité en emploi pour les femmes et au principe d'équité en matière d'emploi.

POSITION IN APPLIED MATHEMATICS

**Département de mathématiques et de statistique
Faculté des arts et des sciences
Université de Montréal**

The Département de mathématiques et de statistique of the Faculté des arts et des sciences of the Université de Montréal invites applications for a tenure-track position in applied mathematics at the rank of assistant or associate professor. For information about the Département and the Université, the candidates are invited to visit the webpage of the Département (www.dms.umontreal.ca) as well as that of the Centre de recherches de mathématiques (www.crm.umontreal.ca) with which it has close collaborations.

Duties

Undergraduate and graduate teaching, supervision of graduate students, and research.

Requirements

To hold a Ph.D. in applied mathematics or in a closely related field. The research record must be outstanding. In particular the candidate must have shown expertise in mathematics and in another field, e.g. in one of the natural sciences, in medicine or an emerging technology, and must have the potential to develop a multidisciplinary research program. The candidate must possess excellent teaching skills. Teaching at Université de Montréal is done in French. Candidates who do not speak French must acquire an adequate knowledge of it within a reasonable period after the appointment.

Salary

The Université de Montréal offers competitive salaries and a complete package of social benefits.

Starting Date

June 1, 2004, or thereafter (subject to final budgetary approval).

The interested candidates must submit a curriculum vitae including a concise statement of their research interests, at least three letters of reference, and copies of at most three of their most important research publications to the following address. The Selection Committee will start studying applications during February 2004. Electronic applications are discouraged.

Chair

Département de mathématiques et de statistique
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal QC H3C 3J7
Phone: (514) 343-6743
FAX: (514) 343-5700
email: chair@dms.umontreal.ca

The selection process of Université de Montréal gives access to submitted files to all regular professors of the Department unless the candidate explicitly states that access to the file should be limited to the selection committee in her or his covering letter. In all cases this restriction on accessibility will be lifted if the candidate is invited for an interview.

In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. The Université de Montréal subscribes to an affirmative action program for women and to employment equity.

TRIVIA ANSWERS

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

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

FEBRUARY	2004	FÉVRIER	JUNE	2004	JUIN
2-13 Advanced Course on Contemporary Cryptology (Bellaterra, Barcelona, Spain) <i>Paz Morillo: www.crm.es/ContemporaryCryptology</i>			1-11 Workshop on Semi-classical Theory of Eigenfunctions and PDEs (CRM, U. de Montreal, Montreal, QC) <i>crm@ere.umontreal.ca</i>		
9-13 Session on Geometric Aspects of Functional Analysis (GAFA) of the Joint Meeting of the New Zealand Mathematical Society and Israeli Mathematical Union <i>www.mcs.vuw.ac.nz/~mathmeet/vic2004/index.shtml</i>			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) <i>www.sop.inria.fr/omega/MC2QMC2004</i>		
23-25 The Point of Point Processes (Fields Institute/University of Ottawa Workshop Series 2004) <i>www.mathstat.uottawa.ca/fields/fields.htm</i>			8-12 Projective Varieties with Unexpected Properties The conference is in honour of the 150th anniversary of the birth of <i>Giuseppe Veronese</i> , Siena, Italy. <i>http://www2.dsmi.unisi.it/newsito/PVVWUP/index.html</i>		
MARCH	2004	MARS	10-14	CCWEST 2004, National Conference for the Advancement of Women in Engineering, Science and Technology (Brock University, St. Catharines, ON) <i>http://www.brocku.ca/fms/ccwest2004</i>	JUIN
4-6 Workshop on Spectral Geometry (CRM, U. de Montreal, Montreal, QC) <i>crm@ere.umontreal.ca</i>			13 - 15 CMS Summer Meeting / Réunion d'été de la SMC (Dalhousie University, Halifax, Nova Scotia) <i>Monique Bouchard: meetings@cms.math.ca</i>		
15-19 Workshop on Nonlinear Wave Equations (The Fields Institute, Toronto, ON) <i>www.fields.utoronto.ca/programs/scientific/03-04/kinetic_theory/index.htm</i>			18-23 Mathematical Foundations of Learning Theory (Barcelona, Spain) <i>Gábor Lugosi: www.crm.es/MathematicalFoundations</i>		
29-April 2 Workshop on Kinetic Theory (The Fields Institute, Toronto, ON) <i>www.fields.utoronto.ca/programs/scientific/03-04/kinetic_theory/index.htm</i>			20-25 Canadian Number Theory Association VIII Meeting (University of Toronto, Toronto, ON) <i>www.fields.utoronto.ca/programs/scientific/03-04/CNTAB/</i>		
APRIL	2004	AVRIL	20-27 42nd International Symposium on Functional Equations Opava, Czech Republic <i>isfe42@math.slucz — www.math.slucz/ISFE42/</i>		
1-4 Midwest Several Complex Variables Meeting, in conjunction with Distinguished Lectures given by Y.-T. Siu (University of Western Ontario, London, Ontario) <i>www.math.uwo.ca/~larusson/scv.html</i>			21-25 Conference on Surface Water Waves (The Fields Institute, Toronto, ON) <i>www.fields.utoronto.ca/programs/</i>		
4 - 7 Fractal 2004, Complexity and Fractals in Nature, 8 th International Multidisciplinary Conference (Vancouver, BC) <i>www.kingston.ac.uk/fractall</i>			21-July 2 SMS-NATO Advanced Summer Institute : Morse Theoretic Methods in Non-linear Analysis and Symplectic Topology Université de Montréal, Canada. <i>www.dms.umontreal.ca/sms/sms2004@dms.umontreal.ca</i>		
22-24 SIAM International Conference on Data Mining (Hyatt Orlando, Orlando, FL) <i>ross@siam.org</i>			27 - July 2 European Congress of Mathematics (Stockholm, Sweden) <i>Ari Laptev: laptev@math.kth.se</i>		
MAY	2004	MAI	28-July 2 16 th Annual Conference in Formal Power Series and Algebraic Combinatorics (UBC, Vancouver, BC) <i>http://www.pims.math.ca/fpsac/ fpsac@pims.math.ca</i>		
3-8 AARMS-CRM Workshop on Singular Integrals and Analysis on CR Manifolds (Dalhousie University, Halifax, NS) <i>http://math.mun.ca/aarms</i>			28-July 2 Workshop on Non-linear Differential Galois Theory CRM, Bellaterra. Co-ordinator: Marcel Nicolau		
4-7 Workshop on Spectral Theory and Automorphic Forms (CRM, U. de Montreal, Montreal, QC) <i>crm@ere.umontreal.ca</i>			30-July 7 Fourth World Congress of Nonlinear Analysis(WCNA 2004) (Hyatt Orlando, Florida) <i>http://kermani.math.fit.edu/ — wcna2004@yahoo.com</i>		
17-18 Canadian Symposium on Abstract Harmonic Analysis (Univ. of Western Ontario, London, Ont.) <i>www.math.uwo.ca/~milnes/HA04.htm</i>			JULY	2004	JUILLET
24-28 Workshop on Hamiltonian Dynamical Systems (jointly with the Fields Institute) (CRM, U. de Montreal, Montreal, QC) <i>crm@ere.umontreal.ca</i>			4 - 11 The 10th International Congress on Mathematical Education (Copenhagen, Denmark) <i>www.ICME-10.dk</i>		
28 - 31 International Conference on Mathematics and its Applications (Hong Kong) <i>http://www.cityu.edu.hk/rcms/icma2004</i>					

JULY **2004** **JUILLET**

5-9 19th "Summer" Conference on Topology and its Applications (University of Cape Town, South Africa)
<http://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

7 - 12 Polynomia-Based Cryptography (Melbourne, Australia) www.it.deakin.edu.au/cryptography2004

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/
www.smc.math.ca/Reunions/Toulouse2004/

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

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)
<http://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
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11 - 13 CMS Winter Meeting / Réunion d'hiver de la SMC, (McGill University, Montréal, Québec)
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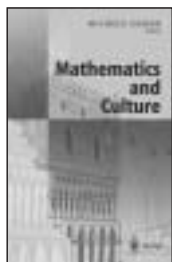
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