



# CMS NOTES de la SMC

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## FROM THE VICE-PRESIDENT'S DESK

Gordon MacDonald

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"My math teacher says a square is not a rectangle," said my niece last year, once again complaining about her teacher's grasp of basic math. I had heard similar comments for the previous two years as she had the same math teacher in both Grade 7 and Grade 8. This time she wanted some action taken: she wanted me to write her teacher a letter explaining why a square is a rectangle. The word of a math professor at UPEI would surely carry some weight.

After some cajoling, I agreed to write the letter. I kept it friendly, explained that if we agree that the definition of rectangle is a quadrilateral with four equal interior angles (hence each of 90 degrees), then a square is obviously a rectangle. I prefaced my discussion by saying that I thought this was probably just a misunderstanding and concluded by saying that if he wanted to discuss the issue further, feel free to contact me.

I thought that would be the end of the matter, and was quite surprised when I got a phone call from the teacher a week later. Our conversation

## Math Education on PEI

was very cordial; he told me that he thought my niece was an excellent student, but in this case she had misunderstood, and that he indeed knew that a square was a rectangle. Just as we were wrapping up our conversation he said: "While I have you on the phone, I have a question for you. How many axes of symmetry does a rhombus have?"

I was very careful in responding, since I was not sure if he was trying to trip me up to exact some small measure of revenge for the letter. "My definition of rhombus is a quadrilateral with sides of equal length," I began. He agreed that was a good definition.

We then agreed on the definition of an axis of symmetry of a planar object: *a line in the plane about which the object can be reflected without changing shape of the object.* "So a square is a rhombus," I said. (I was stalling for time looking for any errors in the answer which was forming in my head.) He agreed a square was a rhombus.

"Excluding that special case, the answer is obviously two ... the two lines which extend the diagonals of the rhombus."

"OK," he responded. "The reason I asked is that the

answer in the back of the book is one, but when I called the math expert at the Department of Education, they said the answer is three."

If you modified the definition I could see how three was possible, but I could not think of any definition which would allow one as the answer. "But if you agree with our definitions, the answer is clearly two ... right," I insisted.

There was some hesitation and then "yes, I see that now... thanks for your time."

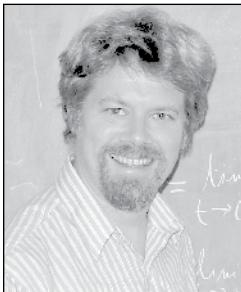
That was that, or so I thought. A few days later I saw my niece again and asked her how math class was going. She told me that there had been little fall-out from my letter, but that the teacher had taken her aside and told her that she had misunderstood him, and that a square was indeed a rectangle.

Moving on, I asked her, "So, how many axes of symmetry does a rhombus have?"

"Well, I think the answer is two," she said. "But the teacher says the answer is one, two, or three!"

What is the problem?

Last Fall, the latest PISA



## Stewardship

It's always easy to spend somebody else's money. Moreover, when it involves your job, it's particularly easy to rationalize it.

One only needs to look at the name "business" or "executive class". By and large, the people who choose to spend \$2898 each way rather than

\$229 (actual figures for Air Canada flights from Halifax to Heathrow at the time of writing) are spending somebody else's money. Perhaps in some cases the greater ease of sleeping in the bigger seats might genuinely justify the extra expenditure. But most of us who travel to conferences would take our chances on a sleepless night for a couple thousand dollars - even if we were speaking on the first day.

I think perhaps our culture tends to accept the explanation "It's business" rather uncritically. As shareholders, we do not insist that executives demonstrate a specific reason for the six-thousand-dollar ticket each time before the company will pay for it. As voters, we implicitly recognize "legitimate business expenses" for tax purposes that we would not consider as reasonable ways of spending our own money on ourselves.

In our own lives, we have to be careful of the temptation to spend our own research grant money inefficiently. I do not think that very many of us spend money in ways that have no expected benefit for our research; it is the conference or expenditure that has benefits, but disproportionately small ones, that is the trap. Ours is essentially an inexpensive science, and it is easy to tell ourselves that when particle physicists, or sociologists, or whoever, are spending so much, we should not stint our own field. But we must ask ourselves: is what we are doing so important, and is this so important to it, that the expenditure is justified?

Moreover, these days, it can be argued that the carbon cost of long-distance travel is more significant than the financial cost. Many of us – and many others – are walking to work, or carpooling, or taking public transit, in order to use less fossil fuel. Can we then assume that all conference travel, no matter how many of the speakers we've heard recently, is so important that as mathematicians we are above the little conservation efforts that we make as private citizens? Please understand that I am not saying that conferences are wrong; but we have to weigh the benefits against the costs objectively. (And "I've always wanted to go to..." is not one of the benefits I'm referring to.)

There is also the risk of what Veblen (Thorstein, not Oswald!) described as "conspicuous consumption." I am not talking here, of course, about ostentatious jewellery, or private jets, or quarter-million-dollar sports cars. Rather, I am thinking about pressures upon researchers to travel more, or buy more equipment, as an end in itself: of the researcher judged not as a source of theorems but as a sink of cash.

I don't see this as a major problem right now in mathematics. However, there have been recurring suggestions that NSERC should give larger, but fewer, research grants. Should this occur, I can foresee a time in which careful stewardship of research money could be counted against the grantholder. The researcher who travels only when necessary and spends money frugally might be judged to have a research program too "small" to be worth funding. The model would be the researcher who kept spending past the point of diminishing returns. And the corollary would be that we, and the world, would get less benefit, not more, from the money spent.

Research funding is a wonderful privilege, and benefits mathematics greatly. We have an obligation to use it wisely. Judgements about how money should be spent will differ, and an atmosphere of ostentatious parsimony could be as damaging as the alternative. But let us always keep good stewardship in mind.

### NOTES DE LA SMC

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## Une gestion saine

S'il est toujours facile de dépenser l'argent des autres, il est particulièrement facile de rationaliser les dépenses quand son emploi en dépend.

Prenons par exemple la « Classe affaires ». En général, les gens qui choisissent de dépenser 2898 \$ au lieu de 229 \$ pour un aller simple Halifax-Heathrow (prix réels d'Air Canada au moment où j'écris ces lignes) dépensent l'argent des autres. Il y a sans doute des cas où la possibilité de dormir grâce aux grands sièges confortables justifie vraiment le surplus. La plupart d'entre nous, toutefois, prennent le risque de dormir peu pour deux mille dollars de moins, même si nous avons une communication à livrer dès le lendemain.

Dans notre culture, nous acceptons généralement les explications du type « c'est par affaire » sans trop broncher. En tant qu'investisseurs, nous n'exigeons pas que les dirigeants d'entreprises justifient chaque fois l'achat d'un billet à six mille dollars avant que l'entreprise ne fasse le paiement. En tant qu'électeurs, nous acceptons implicitement des « dépenses d'affaires légitimes » déductibles d'impôt, qui, s'il fallait les payer de notre poche, ne seraient pas considérées comme des dépenses raisonnables.

Dans notre milieu, il faut résister à la tentation de dépenser nos propres fonds de recherche de façon irréfléchie. Je ne crois pas que nous soyons très nombreux à dépenser sans prévoir de retombées positives sur nos recherches. Le problème, ce sont les congrès et les dépenses dont le coût, proportionnellement parlant, dépasse de beaucoup les avantages. Notre domaine n'en est pas un qui engage des sommes faramineuses. Il serait facile de se dire qu'à voir combien dépensent les physiciens des particules, les sociologues ou d'autres chercheurs, nous ne devrions pas être chiches. Il faut toutefois s'interroger sur l'importance de ce que l'on fait et se demander si nos dépenses sont justifiées.

De nos jours, il faut aussi penser que le coût environnemental (en émissions polluantes) des longs déplacements est parfois plus élevé que le coût comme tel. Bon nombre d'entre nous – et bien d'autres – vont travailler à pied, font du covoiturage ou prennent le transport en commun pour réduire leur consommation de combustible fossile. Peut-on alors considérer que tout déplacement pour congrès, peu importe le nombre de conférenciers entendus récemment, est d'une importance telle qu'en tant que mathématiciens, nous pouvons faire fi des efforts de conservation que nous faisons en tant que simples citoyens? Ne croyez surtout pas que je m'oppose à l'organisation de congrès. Je crois toutefois qu'il faut peser objectivement les avantages par rapport au coût. (Les raisons du genre « J'ai toujours voulu aller à... » ne font pas partie de ce que je j'appelle des avantages...)

Il y a aussi ce risque que Veblen (Thorstein Veblen, et non pas Oswald!) appelle la « consommation ostentatoire ».

Évidemment, je ne parle ici pas de bijoux de luxe, de jets privés ou de voitures sport d'un quart de million de dollars. Je pense plutôt à la pression de voyager ou d'acheter du matériel que subissent les chercheurs, comme une fin en soi, au chercheur considéré non pas comme une source de théorèmes, mais comme un vidange financier.

Pour l'instant, je ne crois pas que ce problème soit très criant en mathématiques. J'ai toutefois entendu suggérer à maintes reprises que le CRSNG devrait accorder des subventions de recherche plus généreuses, mais en moins grand nombre. Si cette suggestion devait être retenue, j'entrevois déjà que la gestion minutieuse d'un budget de recherche pourrait désavantager les chercheurs. Celui ou celle qui ne voyagera qu'au besoin et qui dépensera son budget avec parcimonie pourrait se voir refuser du financement sous prétexte que son programme de recherche est « trop petit » pour mériter une subvention. On encouragerait ainsi les chercheurs qui continuent de dépenser même lorsque le coût dépasse largement les avantages. Une telle mesure aurait donc pour effet de réduire et non d'accroître le rendement sur l'investissement, tant pour nous que pour l'ensemble du monde.

Les subventions de recherche constituent un merveilleux privilège et contribuent grandement à l'avancement des mathématiques. Nous avons l'obligation d'en faire un usage responsable. Les opinions quant à la manière de dépenser continueront de diverger, et une parcimonie ostentatoire pourrait être aussi dommageable que le contraire. L'important, c'est de ne jamais perdre de vue les principes d'une saine gestion.



## 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](mailto: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](mailto:notes-lettres@smc.math.ca).

## A History of Mathematics: Brief Edition

editor Victor J Katz

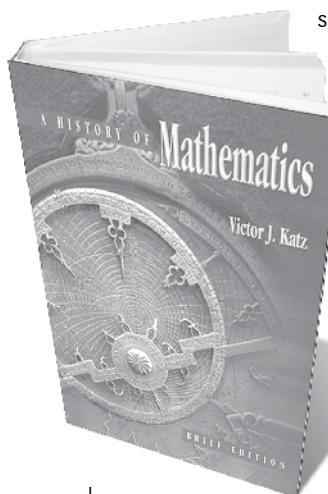
Pearson Addison Wesley, 2004, 560 pp,  
\$117.30. ISBN 0321161939.

### Review by Jackie Stedall, The Queen's College, Oxford

Victor Katz's *A history of mathematics: an introduction* has been for some years the most comprehensive general textbook in the history of mathematics at undergraduate level. Its coverage runs from the mathematics of Mesopotamia in 1800 BC to the use of computers in the later twentieth century. It does not shy away from discussing mathematics as well as its history in some detail and inevitably it is long, with 856 pages in the second edition (1998). The new 'brief edition' is streamlined, updated, and more clearly organised, all of which are welcome improvements. Obviously some material has been cut, but this has generally been done by shortening rather than removing individual topics.

Indeed in many ways the new edition offers a welcome expansion. There are now individual sections or chapters on Mesopotamian, Egyptian, Chinese, and Indian mathematics and it is encouraging to see modern scholarship of a high standard on these regions making its way into a textbook. Similarly, the twentieth century, notoriously difficult to handle in a general book of this kind, has also been given more space. Between these chronological extremes the book is clearly organised by century and topic.

Much of the original text, of course, remains unchanged, which means that certain flaws from the previous edition have unfortunately also been retained. One of these is the lack of a good system of references: foreign titles are almost always translated into English (though Katz is not entirely consistent in this), which makes it difficult at times to seek out the originals;



secondary sources are listed at the end of each chapter, but, in a disturbing separation of research from author, material that has been drawn from them within the chapter has not been attributed; and quotations lack page references or the name of the translator. It is not easy, therefore, to pursue further lines of research using this book as a starting point.

More seriously, Katz has translated much of the mathematics he discusses into modern mathematical language. This was a common thing to do even twenty years ago, but there is now a growing understanding that such translations can too easily obscure the real mathematical thinking of the past. I have seen more than one student who relied on Katz's explanations tumble into the pitfall of believing, for example, that the asymptotes of Fermat's hyperbola (page 291) were  $x$ - and  $y$ -axes, which for Fermat they certainly never were.

Unfortunately, it would be impossible to eliminate such anachronisms without writing a completely new text, which would probably require several years of work. In the meantime we can be grateful instead for the enormous labour and distillation of ideas that Katz has already put into this new and useful brief edition.

Reprinted from the London Mathematical Society Newsletter ([www.lms.ac.uk](http://www.lms.ac.uk)) No. 364, November 2007

### NSERC - CMS Math in Moscow Scholarships

The Natural Sciences and Engineering Research Council (NSERC) and the Canadian Mathematical Society (CMS) support scholarships at \$9,000 each. Canadian students registered in a mathematics or computer science program are eligible.

The scholarships are to attend a semester at the small elite Moscow Independent University.

#### Math in Moscow Program

[www.mccme.ru/mathinmoscow/](http://www.mccme.ru/mathinmoscow/)

#### Application details

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For additional information please see your department or call the CMS at 613-562-5702.

Deadline **March 31, 2008** to attend the Fall 2008 semester.



### Bourse CRSNG/SMC Math à Moscou

Le Conseil de Recherches en Sciences Naturelles et en Génie du Canada (CRSNG) et la Société mathématique du Canada (SMC) offrent des bourses de 9,000 \$ chacune. Les étudiantes ou étudiants du Canada inscrit(e)s à un programme de mathématiques ou d'informatique sont éligibles.

Les bourses servent à financer un trimestre d'études à la petite université d'élite Moscow Independent University.

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Date limite le **31 mars 2008** pour le trimestre d'automne 2008.



### A Tour Through Mathematical Logic

by Robert S. Wolf

Carus Mathematical Monographs 30  
MAA 2005 xv + 397pp US\$52.95

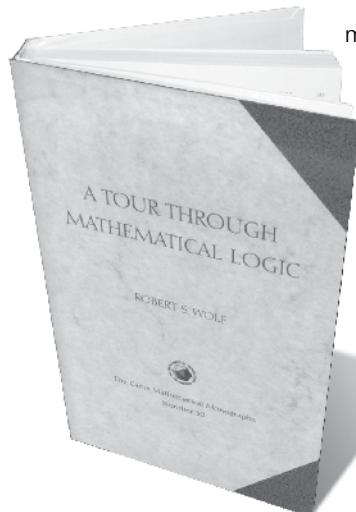
Review by Philip J. Scott, Department of Mathematics and Statistics, University of Ottawa

The study of formal logic and the axiomatic method dates from the classical Greek mathematicians and philosophers. Almost all mathematicians value this inherited notion of proof. Indeed, it is perhaps the main feature distinguishing modern mathematics from the other sciences. Ultimately, a contemporary mathematical theory must be formulated and must be able to be formulated in a precise formal language, with clearly defined primitive operations and relations. The theory should be based upon some heuristically acceptable nonlogical axioms, and its theorems should (in principle) be provable rigorously using a commonly accepted set of logical axioms and rules of inference.

While such ideas date back to Euclid, the modern precise notion of proof, and the set-theoretical foundations of mathematics, owe a special debt to the works of many remarkable logicians and mathematicians in the mid to late 19th century. These scholars gave themselves the often thankless task of rigorously redeveloping the foundations of their subject. We recall familiar names such as Weierstrass and Bolzano and later Boole, De Morgan, Dedekind, Frege, Peano and, above all, Georg Cantor, founder of modern set theory.

The 20th century saw the development of mathematical logic as an autonomous discipline, beginning with Russell and Whitehead, and the important foundational school of Hilbert, as well as work of Zermelo in set theory. The 1920s marked the beginning of seminal developments in the subject, with such names as Ramsey, Post, Skolem, von Neumann, and the Russian and Polish schools of descriptive set theory. However, it was really the maelstrom of the 1930s, with a series of extraordinary works by Church, Gödel, Tarski and Turing, that set the stage for contemporary logic and its role in modern mathematics and computing.

This book is a lively survey of several branches of traditional mathematical logic. Topics include: (i) Axiomatic and Contemporary Set Theory; (ii) Recursion Theory; (iii) Gödel's Incompleteness Theorems; (iv) Model Theory; (v) Nonstandard Analysis; and (vi) Constructive Mathematics. The book is written for roughly fourth-year or beginning graduate students (in North America). It is definitely a reader-oriented text and is a useful addition to a standard course. However the pace is quite fast, and the depth of topics varies considerably, so that some of the chapters



may merely entice the reader to look to the literature. Throughout the book, the author includes brief but lively historical essays of some of the fascinating (and, alas, often tragic) lives of major logicians.

I found the book both exhilarating and frustrating. Let me go from the former to the latter.

In Chapter 5, the author gives an interesting introduction to model theory. Of all the branches of logic, model theory is arguably the subject with the closest connections to mainstream mathematics. Indeed, modern model theory has deep connections with many advanced areas of contemporary mathematics, with applications ranging from algebra and algebraic geometry to the study of complex manifolds and differential fields, classification theory and the use of finite model theory in computer science. Most ordinary mathematicians find the model theorists' sophisticated uses of transfer and preservation theorems quite striking (the author gives several elementary examples, a typical one being Ax's proof that every injective polynomial function  $K^n \rightarrow K^n$ , where  $K$  is an algebraically closed field, is automatically bijective.). Wolf rapidly and interestingly discusses such modern topics as definability (e.g. definable sets in algebraic and real closed fields), quantifier elimination, and axiomatizability.

As an application of model theory, Chapter 7 is devoted to an elementary exposition of nonstandard analysis. Using logical methods, Wolf shows how to build nonstandard models of analysis, and develops much of the early features of basic analysis using nonstandard techniques, including the Intermediate Value theorem, Heine-Borel, and Tychonoff's Theorem. The student gets a good taste of the use of infinitesimals and transfer principles.

Another important topic in contemporary logic is "Axiomatic Set Theory". The author devotes two interesting chapters to surveying the subject. In Chapter 2 he introduces elementary naive set theory through ordinals, cardinals and the cumulative hierarchy; then, in the more advanced Chapter 6, he rapidly discusses recent consistency and independence results, descriptive set theory, determinacy and games, ending with a brief description of Woodin's program. While this will be useful for students who wish to have a quick overview of this vast area, the technical depth of the material (if it were done in detail) is quite

overwhelming: any single topic could be the subject of an entire one-term advanced course. But the author carries the reader through with aplomb.

In Chapter 4 (Gödel's Incompleteness Theorems) the author sketches modern treatments of Gödel's famous theorems concerning formally undecidable (but true) statements in formal Peano Arithmetic. The treatment is clean and compact, but the student may need to consult the literature for a full understanding of the details. The author discusses a clever example of a "genuine" mathematical sentence which is true but undecidable, due to Paris and Harrington. It is a finite version of Ramsey's Theorem. However, as the author points out, such sentences are still rather artificial, although less so than Gödel's self-referential sentence. The author misses the chance to describe a more natural example of undecidability. One such, which also occurs commonly in theoretical computer science, is the termination algorithm for rewriting terms of the simply typed lambda calculus with iteration (reducing them to normal form). It is a natural question that one encounters frequently in proof theory: one shows by an elaborate induction (due to Tait and also Girard) that the algorithm terminates. But amazingly, this termination proof cannot itself be carried out within arithmetic, for it implies the consistency of arithmetic and thus contradicts Gödel's second theorem.

The chapter on recursion theory and computability is a very compressed introduction to this important area, beginning with the fundamental work of Turing, Kleene, and Post on recursive and recursively enumerable sets and the theory of undecidability. The author briefly mentions the unsolvability of Hilbert's 10th problem, and ends with a few pages on nondeterminism, complexity, and P vs NP. This chapter's coverage is rapid, and the student will have to work hard to understand the rather shallow explanations and curt proofs. No other models of computing are given, so modern notions like register or counter machines or lambda calculus are ignored; nor is any mention given of important topics like degree theory or higher-type recursion.

The final chapter (Constructive Mathematics) is one of the most interesting topics in logic: the question of intuitionism and effectivity in mathematics. Alas, the author's short chapter, while fun to read, does not do justice to the topic. Even the most classical of mathematicians is familiar with the nonconstructive uses of the Axiom of Choice. However the depth of Brouwer's criticisms of idealist mathematics, his epic battles with Hilbert, and his attempt to develop a serious alternative philosophy of constructivity are fundamental to the history of mathematics. Wolf gives a rapid introduction to Brouwer's critiques (he mistakenly attributes to Brouwer the Heyting-Kolmogorov view of intuitionist proofs as constructions, obeying certain natural laws); ironically,

Brouwer himself had no love for formal logic. The author only mentions in passing one of Brouwer's most fundamental theorems (which can be given serious logical analysis): that every intuitionistically well-defined real-valued function is automatically continuous. The author then goes on to discuss very briefly the brilliant work of the analyst Errett Bishop (in the 1960's) whose book on Constructive Analysis showed how to develop Brouwer's philosophy to a modern level. There are brief mentions of the Russian schools of constructive mathematics (e.g. Markov's school) and recursive analysis, but the chapter simply misses too many important topics to help the serious student. For the logician, two fundamental missing topics are any real discussion of intuitionist logic and also its mathematical models. The latter include both Kripke models and the more profound sheaf and topological models. In the latter, one can actually study the meaning of Brouwer's continuity theorem, and even connect intuitionism with the model theory of sheaves.

What is most seriously frustrating about a tour is to miss a major landmark. And indeed, among the missing topics in this book is a profound one: there is essentially no mention of proof theory (begun by Hilbert's school) — in particular no discussion of Gentzen's profound Cut-Elimination Theorem. This is the most important algorithm in logic, and deserves some mention. Indeed, there is little or no discussion of different proof systems, a curious lacuna for a book about formal logic.

Students should see the so-called Curry-Howard correspondence (formulas-as-types), as a profound expansion of the Brouwer-Heyting-Kolmogorov interpretation of proofs-as-constructions mentioned above in the author's last chapter; this interpretation has deep connections with theoretical computer science, as well as computability theory, via the lambda calculus, and even category theory (see below) via Lawvere's notion of cartesian closed category.

Finally, on a more profound note (which is outside the scope of this book), there has recently been considerable discussion on the changing role of the foundations of mathematics among working mathematicians, beginning with the influential later works (not all published) of Alexander Grothendieck. While traditional logic has not necessarily followed these changes, the increasing use of category theory by many research mathematicians, and the profound ideas of F. W. Lawvere in categorical logic, have had a considerable influence on foundational studies. I would personally recommend the student also see some of these ideas in action, before judging the current state of Foundations of Mathematics.

## Singularities and Computer Algebra

Edited by Christoph Lossen and Gerhard Pfister  
London Mathematical Society Lecture Notes 324

Cambridge University Press 2006, xxxvi + 371 pp. US \$75

In October 2004 a conference 'Singularities and Computer Algebra' was held at the University of Kaiserlautern on the occasion of Gert-Martin Greuel's 60th birthday.

This volume contains ten of the invited lectures, supplemented by four articles written by participants of the conference; the focus is on computational aspects. Most of the articles give an overview of a particular aspect of singularities and describe the development of important areas of singularity theory over the past years. Some open questions are discussed. The leading article on 'Aspects of Gert-Martin Greuel's Mathematical Work', written by the editors of the volume, deals with some cornerstones of Gert-Martin's mathematical work including his Ph.D thesis, Habilitationsschrift, the SINGULAR project, work on moduli spaces and on equisingular families.

Research workers in singularity theory, computer algebra or related subjects will find useful the wealth of information contained in this volume.

## Fundamentals of Hyperbolic Manifolds: Selected Expositions

Edited by Richard Canary, David Epstein and Albert Marden  
London Mathematical Society Lecture Notes 328

Cambridge University Press 2006, xii + 335 pp. US \$70

During 1983/84 two symposia took place at the Universities of Warwick and Durham on hyperbolic geometry, Kleinian groups and 3-dimensional topology. The proceedings of these meetings were published in LMS Lecture Notes 111 and 112. Taking account of the demand it was decided to reprint certain articles from these; the result is the present volume consisting of four parts.

Part I is an exposition of Chapters 8 and 9 of W. P. Thurston's pioneering Princeton Notes with a new introduction describing recent advances and with an updated bibliography.

Part II deals with the theory of convex hull boundaries and their bending laminations. Of particular significance is the first full proof of Sullivan's theorem that the geometry of the convex hull boundary component is closely tied to the hyperbolic geometry of the region it faces on the sphere at infinity. An addendum gives a description of recent work.

Part III is Thurston's famous paper that presents the notion of earthquakes in hyperbolic geometry and proves the

earthquake theorem. This can be viewed as an analogue for hyperbolic geometry of quasiconformal mappings in complex analysis.

Part IV introduces the theory of measures on the limit set, drawing attention to related ergodic theory and the exponent of convergence.

## Spaces of Kleinian Groups

Edited by Yair Minsky, Makoto Sakuma and Caroline Series  
London Mathematical Society Lecture Notes 329  
Cambridge University Press 2006, vii + 390 pp. US \$70

The subject of Kleinian groups and hyperbolic 3-manifolds has had fast development recently. Many long-standing conjectures have been resolved. This volume contains the proceedings of a conference on the subject held at the Isaac Newton Institute of Cambridge in 2003. Proofs of Thurston's ending lamination conjecture, the Bers-Sullivan-Thurston density conjecture for general tame groups were announced at the meeting. Since then the picture was completed with the achievement of two independent proofs of Marden's tameness conjecture. The volume contains important expositions and original work by some of the main contributors of topics such as topology and geometry of 3-manifolds, curve complexes, classical Ahlfors-Bers theory, computer explorations and projective structures.

Researchers in these and related areas will find much of interest in this book.

## Foundations of Computational Mathematics, Santander 2005

Edited by Luis M. Pardo, Allan Pinkus, Endre Süli and Michael J. Todd

London Mathematical Society Lecture Notes 331

Cambridge University Press 2006, viii + 394 pp. US \$75

This volume is a collection of articles based on the plenary talks at the 2005 meeting, in Santander, Spain, of the Society for the Foundations of Computational Mathematics. The talks were given by some of the authorities in computational mathematics. The topics covered are: Non-universal polynomial equation solving, Accurate polynomial evaluation in rounded arithmetics, Sparse grids for higher dimensional problems, Long-time energy conservation, Dispersive properties of numerical schemes for nonlinear Schrödinger equations, Eigenvalues and nonsmooth optimization, Discrete Noether theorems, Computational aspects of hyperbolic 3-manifolds, Smoothed analysis of algorithms, and Greedy approximations.

## Undergraduate Students Experience Research Firsthand at Nipissing University

Andrew Dean and Murat Tuncali  
Nipissing University, North Bay, ON

Nipissing is a university in Northern Ontario where the development of synergies in the mathematics department has led to unusual strengths in research, teaching and student involvement.

It is the smallest university in Ontario. Situated in North Bay, about 3.5 hours north of Toronto, it was founded in 1967 as Nipissing Liberal Arts College affiliated with Laurentian University in Sudbury. On its silver anniversary in 1992, the Nipissing University Act was signed into law and it received its charter as a university. At this time, it was quite small and operated without academic departments. The disciplines were grouped into four broad divisions: Humanities, Social Sciences, Geography/Science and the School of Business and Economics. Not until 2001 did Nipissing University's Faculty of Arts and Science adopt a formal departmental structure and the Department of Computer Science and Mathematics come into being.

The university has a long history of educating teachers and the majority of students who attend as undergraduates plan to go to teachers' college. But in the past few years, the university has seen substantial growth in all areas of arts and science. Many students are planning to go to graduate or other professional schools. There has also been a major increase in research, and plans are underway for Masters degrees in a number of areas.

Just as Nipissing is small, so is the mathematics department. There are four fulltime permanent faculty, one limited term contract faculty and a number of part-time teachers. But the department has a healthy number of students with over 70 majors, most of whom are doing honours degrees. The department offers nine different degrees, including a concurrent degree with the Faculty of Education.

The department is very research-focussed and has established a well-known research cluster in the area of topology. From his initial arrival in 1991, Dr. Murat Tuncali has kept an active research program in this area, mainly in continuum theory. He organized workshops and seminars in North Bay, and in 1997, Nipissing hosted the international Twelfth Annual Seminar Conference on Topology and its Applications. Since this conference, Nipissing has partnered with Auburn University in publishing the journal *Topology Proceedings*.

When the time came to add another faculty member in mathematics in 2002, an important strategic decision was taken. Rather than hiring someone from a different area as would have been normal, a conscious choice was made to establish a niche area in topology. This resulted in the appointment of Dr. Vesko Valov. With the introduction of the Honours Mathematics Program in 2003, Dr. Alex Karassev was added to the department, further consolidating the topology research cluster. Last year, the department became the only mathematics department in Ontario without a graduate program to become an affiliate of the Fields Institute. Plans are underway to hold workshops on topological methods in algebra, analysis and dynamical systems in May, 2008 that will be partially funded by the Fields Institute.

For three years, using NSERC grant money and support from the University, Professors Karassev, Valov and Tuncali were granted full course releases and brought in visiting scholars: Taras

Banakh in 2004/5, Andriy Zadorodnyuk from Lviv, Ukraine in 2005/6 and Paweł Krupski from Wrocław, Poland in 2006/7. These scholars enhanced the research culture and exposed students to new ways of thinking, showing them how universal mathematics is.

### The undergraduate program

The increased focus and dynamism of the department inspired the students. With the introduction of the honours degree in 2003, more students have been heading off to graduate school and winning NSERC scholarships. Because the course offerings are relatively limited, the faculty have made special efforts to involve upper-year students in research projects. Each summer, the department uses USRA (NSERC Undergraduate Student Research Awards) funding and internal research grants to employ a number of them.

Each honours student must complete two three-credit courses of independent research. The students apply for them in third year and are expected to do some preliminary research on a topic before submitting their application. Once the topics have been agreed upon, the students are paired with professors as mentors, whom they usually meet once a week during the term.

At the end of the term, students submit written reports and make twenty-minute oral presentations of their work to their fellow students and professors. The grade is based on work done during the term and the quality of the presentations and the report. All mathematics majors are invited to the presentations and refreshments are provided. Last year, with the double cohort graduating, there were 21 projects completed in the fall term and 17 in the winter term. Presentations occupied two days in each term.

Topics of the projects last year included generalized Fibonacci sequences, applications of topology in chemistry, quantum mechanics, area-preserving transformations and map-making, and voting systems. The expectation is that each student study a topic not covered in any course and be able to internalize and present it. In 2005, the department went through a standard external review. The reviewers spoke very positively about the research experience of the undergraduate students: "The department runs regular seminars that upper year students attend. It was clear in talking to the students that this had a significant positive impact on their understanding of the nature and spirit of mathematics."



### The students

The mathematics program has a good reputation locally; some of the best students have come from the vicinity. Last year's winner of the Governor General's Silver Medal (highest graduating average from an undergraduate degree) was Nick

Mailloux from a rural community near Sudbury. He obtained an NSERC graduate scholarship and is pursuing a Masters in Cryptology at the University of Ottawa. Nick writes:

*The faculty members are truly dedicated to helping the students succeed. Although the professors are specialized in their own particular areas of preference, they are well educated in many areas of mathematics. With such a broad range of knowledge, they can accommodate the research interests of all the students. In my personal experience, my research supervisor was not completely familiar with my particular area of study. With my best interests in mind, he studied the topic on his own, ensuring that he could offer me the best possible assistance in my research. This shows a level of dedication that is rarely seen in larger universities.*

Natasha May is from Huntsville, ON, 100 km south of North Bay. She completed her undergraduate degree in 2005 and finished her Masters degree at York University in 2006. She is now enrolled in a doctorate program also at York.

*At Nipissing, there was much exposure to the research of math professors and other great mathematicians from around the world, through seminars and workshops. I benefited from the wide array of research covered because the introduction to different areas of research in mathematics helped me to discover my interests and abilities.*

Kaitlyn Church, from the small nearby community of Powassan, is pursuing a Masters degree at the University of Ottawa in category theory.

*In creating a welcoming environment for students to attend weekly research seminars, which focussed on current research, more students were exposed to higher-level mathematics in a supportive environment, which is crucial to learning and creating a desire to participate in research. In addition, all students were welcome to attend the yearly topology conference held at Nipissing, where we could see the benefits of conducting and sharing ideas and research areas. Through inviting outside mathematicians who were collaborating with the professors, students were exposed to the community aspects of research, and how outside collaboration greatly benefits research.*

Jill Lazarus started her undergraduate degree with the intention of going into the consecutive B.Ed. program upon graduating. She was involved with a research project, jointly supervised by mathematics and education faculty, that analyzed the current high school mathematics curriculum. Upon graduation, she was accepted into the M.Ed. program at Queen's University. Jill reports:

*All of the research experiences, and particularly my work with curriculum analysis projects, have influenced my decision to pursue graduate studies in mathematics education.*

### Outreach

In 2005, the mathematics department, the Faculty of Education and local mathematics teachers collaborated on a project, NUMERIC (*Nipissing University Mathematics Education and Research Information Council*; see <http://www.nipissing.ca/numeric/index.asp>). The purpose is to develop a community of mathematics in North Bay. Council activities include mathematics competitions, mathematics fairs and talks aimed at the high school level. In October, Dr. Karassev delivered a talk to about 25 students entitled, "Why do we need four dimensions?" NUMERIC keeps a database of students who are willing to volunteer their time to work with local high school students in any area of mathematics. Our students have been actively involved in helping teachers maintain their mathematics clubs.

The department has operated a mathematics drop-in centre since 1992. Similar to those at other universities, it is staffed by upper-year students and is used mainly for tutoring and help with assignments. On any given day, there may be as many as twenty-five students seeking assistance. But the room has taken on a life of its own; it has become a "home" for mathematics students, and many majors simply stay put there. There are chess and Go sets, and a small set of reference books and journals. Almost all seminars and upper-year classes are held in the room. While the room is officially known as A223, it is usually just called the "math room" on campus.



### Conclusion

Many students graduating from the mathematics program will become high school teachers. Fundamental research in mathematics may not be important in their future. But the department believes strongly that by having seen and experienced research as students, they will have a greater appreciation of mathematics that they will be able to pass on to their own students. The research component in their degree lets them see that mathematics is a continually evolving subject related to many diverse areas. Moreover, because of NUMERIC, it would be possible to provide an opportunity for those students who are going to be teachers to do research projects related to mathematics education. Some of the ideas for collaboration among mathematicians and education faculty were presented at the conference on "The Mathematics Education into the 21st Century Project"<sup>1</sup>. We are currently in the process of implementing these ideas.

As Nipissing University grows, so does the mathematics program. The department works closely with its colleagues in computer science; new courses in computational geometry and game design are being introduced and cross-listed between the two departments. Preliminary plans are underway to develop a Masters program.

The department feels very fortunate to have had so many good and keen students over the past five years, and believes that an active research component is essential for an honour degree. Both professors and students have created a dynamic department in which doing mathematics creates new opportunities for research, teaching and further study.

### Footnote

<sup>1</sup> Douglas Franks and H.M. Tuncali, Building a relationship between undergraduate mathematics and mathematics teacher education: innovation in teacher education. The Mathematics Education into the 21st Century Project, Seventh International Conference, "The Future of Mathematics Education", June 26 – July 1, 2004, Ciechocinek, Poland.

# AIDEZ NOUS PAR CONTRIBUER À LA COMMUNAUTÉ SMC

**Nous encourageons nos membres d'inviter leurs collègues qui ne sont pas membres de la SMC de prendre avantage du spéciale d'adhésion 2 pour 1 pour les nouveaux membres! Veuillez demander votre collègue de remplir ce formulaire et l'envoyer par télécopieur au 613-565-1539.**

## Formulaire d'adhésion INDIVIDUEL 2008

RENSEIGNEMENTS SUR LE MEMBRE		*CHAMPS OBLIGATOIRES			
*Nom:		SMC N°#:			
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*Pays:	*Code Postal/Code Zip:				
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* Employeur:	* Poste:				
* Plus haut diplôme obtenu:	*Année :	* Établissement :			
Ne publiez pas mon nom dans le répertoire des membres: <input type="checkbox"/>		Langue de correspondance Anglais <input type="checkbox"/> Français <input type="checkbox"/>			
<b>J'aimerais recevoir les Notes de la SMC en format électronique SEULEMENT:</b> <input type="checkbox"/> (Tous les membres de la SMC reçoivent les Notes en format papier à moins d'avis contraire et ils ont accès à la version électronique.)					
ADHÉSION		PÉRIODE D'ADHÉSION: 1 <sup>er</sup> JANVIER AU 31 DÉCEMBRE 2008      CONDITIONS ET RÈGLES : <a href="http://www.cms.math.ca/docs/conditions">www.cms.math.ca/docs/conditions</a>			
BASÉS SUR LE REVENU D'EMPLOI PROFESSIONNEL ANNUEL		TARIF RÉGULIER		MEMBRE À VIE	
90,000\$ +	216\$ <input type="checkbox"/>	MOINS DE 35 ANS	3 000 \$		
70,000\$ TO 90,000\$	176\$ <input type="checkbox"/>	DE 36 - 44 ANS	2 750 \$		
AU-DESSOUS DE 70,000\$	114\$ <input type="checkbox"/>	DE 45 - 54 ANS	2 500 \$		
RETRAITÉS	44\$ <input type="checkbox"/>	DE 55 -64 ANS	2 250 \$		
NOTER: LE SPÉCIALE 2 POUR 1 N'EST PAS DISPONIBLE AUX ÉTUDIANTS ET LES PROFESSEURS PRÉ-UNIVERSITAIRE		65 ANS ET PLUS	1 500 \$		
		QUATRE VERSEMENTS EGALÉ ACCEPTÉS			
SOCIÉTÉ RÉCIPROCTAIRE		MAA		TARIFS OFFERTS AUX MEMBRES DE LA MAA OU D'UNE SOCIÉTÉ RÉCIPROCTAIRE RÉSIDANT HORS DU CANADA SEULEMENT.	
90,000\$ +	108\$ <input type="checkbox"/>	184\$ <input type="checkbox"/>			
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AU-DESSOUS DE 70,000\$	57\$ <input type="checkbox"/>	97\$ <input type="checkbox"/>			
RETRAITÉS	22\$ <input type="checkbox"/>	37\$ <input type="checkbox"/>			
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JOIGNEZ MAINTENANT ET ÉCONOMISEZ! OUI, J'AIMERAIS JOINDRE LA SMC ADHÉSION SPÉCIALE 2 POUR 1 (l'année 2008 et 2009) :		\$ <input type="text"/>
RENOUVELLEMENT AUTOMATIQUE <b>Voulez-vous renouveler automatiquement en 2009? Les renouvellements se feront en novembre 2008 pour l'année 2009</b>		
OUI <input type="checkbox"/> NON <input type="checkbox"/>	CARTE DE CRÉDIT <input type="checkbox"/>	INDIQUEZ VOS INITIALE(S) : _____
MODE DE PAIEMENT		
MODE DE PAIEMENT :	Carte de crédit: Visa <input type="checkbox"/> MasterCard <input type="checkbox"/>	Chèque n° _____
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## HELP CONTRIBUTE TO THE CMS MEMBERSHIP COMMUNITY

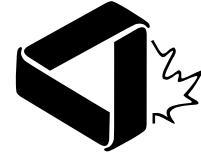
We encourage members to invite their fellow colleagues who are not members of CMS to join by taking advantage of the special 2 for 1 membership for new members! Please have your colleague fill this form and fax to 613-565-1539.

### ***2008 INDIVIDUAL Membership Application***

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*Granting institute:	



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(Please note all CMS Members receive the CMS Notes in paper format unless indicated. All CMS Members have electronic access to the CMS Notes).

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\$70,000 TO \$90,000	\$ 88 <input type="checkbox"/>	\$150 <input type="checkbox"/>	
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RETIRED + UNEMPLOYED	\$ 22 <input type="checkbox"/>	\$ 37 <input type="checkbox"/>	

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# CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE

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

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

## Prix Coxeter-James Prize Lectureship

2009

The Coxeter-James Prize Lectureship recognizes young mathematicians who have made outstanding contributions to mathematical research. The selected candidate will deliver the prize lecture at the Winter Meeting.

The recipient shall be a member of the Canadian mathematical community. Nominations may be made up to ten years from the candidate's Ph.D.: researchers having their PhD degrees conferred in 1998 or later will be eligible for nomination in 2008 for the 2009 Coxeter-James prize. 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.

Le prix Coxeter-James rend hommage aux jeunes mathématiciens qui se sont distingués par l'excellence de leur contribution à la recherche mathématique. La personne choisie prononcera sa conférence à la Réunion d'hiver.

Cette personne doit être membre de la communauté mathématique canadienne. Les candidats sont admissibles jusqu'à dix ans après l'obtention de leur doctorat : ceux qui ont obtenu leur doctorat en 1998 ou après seront admissibles en 2008 pour le prix Coxeter-James 2009. Toute mise en candidature est modifiable et demeurera active l'année suivante, à moins que la mise en candidature originale ait été faite la 10e année suivant l'obtention du doctorat.

## Prix Jeffery-Williams Prize Lectureship

2010

The Jeffery-Williams Prize Lectureship recognizes mathematicians who have made outstanding contributions to mathematical research. The prize lecture will be delivered at the Summer Meeting. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for three years.

Le prix Jeffery-Williams rend hommage aux mathématiciens ayant fait une contribution exceptionnelle à la recherche mathématique. La personne choisie prononcera sa conférence à la Réunion d'été. Cette personne doit être membre de la communauté mathématique canadienne. Toute mise en candidature est modifiable et demeurera active pendant trois ans.

## Prix Krieger-Nelson Prize Lectureship

2010

The Krieger-Nelson Prize Lectureship recognizes outstanding research by a female mathematician. The prize lecture will be delivered at the Summer Meeting. The recipient shall be a member of the Canadian mathematical community. A nomination can be updated and will remain active for two years.

Le prix Krieger-Nelson rend hommage aux mathématiciennes qui se sont distinguées par l'excellence de leur contribution à la recherche mathématique. La lauréate prononcera sa conférence à la Réunion d'été. La lauréate doit être membre de la communauté mathématique canadienne. Toute mise en candidature est modifiable et demeurera active pendant deux ans.

The deadline for nominations is **June 30, 2008**. Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline, to [research-prizes@cms.math.ca](mailto:research-prizes@cms.math.ca).

La date limite de mises en candidature est le **30 juin 2008**. Veuillez faire parvenir les mises en candidature et lettres de référence par voie électronique, de préférence en format PDF, avant la date limite à : [prix-recherche@smc.math.ca](mailto:prix-recherche@smc.math.ca)

Nominators should ask at least three referees to submit letters directly to the Chair of the CMS Research Committee by September 30, 2008. Some arms length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available.

Les proposants doivent faire parvenir trois lettres de référence au président du Comité de recherche de la SMC au plus tard le 30 septembre 2008. Nous vous incitons fortement à fournir des références indépendantes. Le dossier de candidature doit comprendre le nom des personnes données à titre de référence ainsi qu'un curriculum vitae récent du candidat ou de la candidate, dans la mesure du possible.

Dr. Edward Bierstone  
Chair, Research Committee / Président, comité de recherches  
CMS Prize Lectureships / Prix de conférence de la SMC  
Department of Mathematics, University of Toronto  
40 St. George Street  
Toronto, Ontario M5S 2E4

The 2008 Krieger-Nelson and Jeffrey-Williams Prizes will be presented at the Second Canada-France Congress 2008 in Montréal, Québec, June 1-5.  
Les prix Krieger-Nelson et Jeffrey-Williams 2008 seront présentés à la Deuxième congrès Canada-France 2008 à Montréal (Québec) du 1-5 juin.

## CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE

### Prix Adrien-Pouliot Award

2008

Nous sollicitons la candidature de personnes ou de groupe de personnes ayant contribué d'une 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](http://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 2008**. Veuillez faire parvenir vos mises en candidature en six exemplaires à l'adresse ci-dessous :

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](http://www.cms.math.ca/Prizes/info/ap). 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 last year can renew this nomination by simply indicating their wish to do so by the deadline date. In this case, only updating materials need be provided as the original has been retained. Nominations must be received by the CMS Office no later **April 30, 2008**. Please send six copies of each nomination to the address given below.

The Adrien Pouliot Award / Le Prix Adrien-Pouliot  
Canadian Mathematical Society / Société mathématique du Canada  
577 King Edward  
Ottawa, Ontario K1N 6N5

### Graham Wright Award for Distinguished Service Prix Graham-Wright pour service méritoire

2008

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 award is being renamed as of the 2008 competition, in recognition of Graham Wright, who will retire this year after serving 30 years as CMS Executive Director.

Nominations should include a reasonably detailed rationale and be submitted by **March 31, 2008**, to the address below.

En 1995, la Société mathématique du Canada a créé un prix pour récompenser les personnes qui contribuent de façon importante et soutenue à la communauté mathématique canadienne et, notamment, à la SMC. Ce prix sera renommé à compter de 2008 en hommage à Graham Wright, qui quittera la Société cette année après avoir occupé pendant 30 ans le poste de directeur administratif de la SMC.

Pour les mises en candidature prière de présenter des dossiers avec une argumentation convaincante et de les faire parvenir, le **31 mars 2008** au plus tard, à l'adresse ci-dessous :

Selection Committee / Comité de sélection  
Graham Wright Award for Distinguished Service / Prix Graham-Wright pour service méritoire  
Canadian Mathematical Society / Société mathématique du Canada  
577 King Edward  
Ottawa, Ontario K1N 6N5

The 2008 Adrien-Pouliot Award will be presented at the CMS Winter 2008 Meeting in Ottawa, ON, December 6 to 8.  
Le prix Adrien-Pouliot seront présentés à la Réunion d'hiver 2008 de la SMC à Ottawa (Ontario), du 6 au 8 décembre.

# CMS SUMMER 2009 MEETING / RÉUNION D'ÉTÉ 2009

## Appel de sessions – Réunion d'été 2009 de la SMC Call for Sessions – CMS Summer 2009 Meeting

Additional self-supported sessions play an important role in the success of our meetings. We welcome and invite proposals for self-supported sessions for this meeting, taking place in early June 2009 in St. John's, Newfoundland. Proposals should include a brief description of the focus and purpose of the session, the expected number of the talks, as well as the organizer's name, complete address, telephone number, e-mail address, etc. These additional sessions will be incorporated with the other sessions in time blocks allocated by the Meeting Director. All sessions will be advertised in the CMS NOTES, on the web sites and, if possible, in the Notices of the AMS and in publications of other societies. Speakers in these additional sessions will be requested to submit abstracts which will be published on the web site and in the meeting programme. Those wishing to organize a session should send a proposal to the Meeting Director by the deadline below.

Les sessions complémentaires autonomes jouent un rôle important dans le succès de nos réunions. Nous vous invitons à proposer des sessions autonomes pour ce congrès qui se tiendra à St. John's (Terre Neuve) au début de juin 2009. Votre proposition doit inclure une brève description de l'orientation et des objectifs de la session, le nombre de communications prévues et leur durée, ainsi que le nom, l'adresse complète, le numéro de téléphone, l'adresse courriel et les autres coordonnées de l'organisateur. Ces sessions complémentaires seront intégrées aux autres sessions du programme, dans des cases horaires prévues à cet effet par le directeur de la Réunion. Toutes les sessions seront annoncées dans les Notes de la SMC, sur le site Web et, si possible, dans les Notices de l'AMS et les publications d'autres sociétés. Les conférenciers de ces sessions complémentaires devront présenter un résumé qui sera publié sur le site Web et dans le programme de la Réunion. Toute personne qui souhaiterait organiser une session est priée de faire parvenir une proposition au directeur de la Réunion avant la date limite indiquée ci-dessous.

**Deadline: March 31, 2008**  
**Date limite : 31 mars 2008**

The following invited (partially funded) sessions have been confirmed for this conference:

Les sessions suivantes (partiellement subventionnées) ont été confirmées :

### Combinatorial Designs and Related Topics

#### Designs combinatoires et sujets connexes

Org: Vaclav Linek (Winnipeg), Nabil Shalaby (Memorial)

### Geometric Harmonic Analysis and Partial Differential Equations

#### Analyse harmonique géométrique et équations aux dérivées partielles

Org: Jie Xiao (Memorial)

### Groups and Hopf Algebras

#### Groupes et algèbres de Hopf

Org: Yuri Bahturin, Mikhail Kotchetov (Memorial), David Radford (Illinois), Earl Taft (Rutgers)

### Mathematical Physics

#### La physique mathématique

Org: Marco Merkli, Chris Radford (Memorial)

### Nonlinear Dynamics and Applications

#### La dynamique non linéaire et ses applications

Org: Gail Wolkowicz (McMaster), Yuan Yuan, Xiaoqiang Zhao (Memorial)

### Reaction-Diffusion Systems and Their Applications

#### Les systèmes de réaction-diffusion et leurs applications

Org: David Iron, Theodore Kolokolnikov (Dalhousie), Chunhua Ou (Memorial)

Meeting Director / Directeur de la Réunion

David A. Pike

Department of Mathematics and Statistics

Memorial University of Newfoundland

St. John's, Newfoundland, Canada A1C 5S7

dapike@math.mun.ca

## 2008 CMS MEMBERSHIP RENEWALS RENOUVELLEMENTS 2008 À LA SMC

**REMINDER:** Your membership reminder notices have been mailed. Please renew your membership as soon as possible. You may also renew on-line by visiting our website at [www.cms.math.ca/members/](http://www.cms.math.ca/members/)



**RAPPEL :** Les avis de renouvellements ont été postés. Veuillez s'il-vous-plaît renouveler votre adhésion le plus tôt possible. Vous pouvez aussi renouveler au site Web [www.cms.math.ca/members.f/](http://www.cms.math.ca/members.f/)

# CONGRÈS CANADA-FRANCE 2008 / CANADA-FRANCE CONGRESS 2008

## Deuxième Congrès Canada-France 2008 UQAM, Montréal 1-5 juin [www.canada-france-math.ca](http://www.canada-france-math.ca)

À cause du Grand Prix qui se tiendra à Montréal immédiatement après le congrès et des activités reliées qui le précédent, il pourrait être difficile de trouver à se loger à prix abordable ailleurs qu'aux deux endroits où nous avons réservé des blocs de chambres. Nous recommandons fortement que vous fassiez vos réservations de logement le plus rapidement possible car les tarifs des hôtels en dehors de notre bloc de chambres seront beaucoup plus élevés (au moins le double).

### Conférenciers pléniers

Yves André (CNRS-ENS, Paris)

Olivier Biquard (Strasbourg)

Luc Devroye (McGill)

Andrew Granville (Montréal)

Alice Guionnet (CNRS-ENS, Lyon)

Rick Kenyon (UBC)

Gérard Laumon (CNRS-Orsay)

Mary Pugh (Toronto)

Eric Sere (Paris-Dauphine)

Jean-Pierre Serre (Collège de France)

Nicole Tomczak-Jaegermann (Alberta)

Nizar Touzi (CREST-Paris)

Jianhong Wu (York)

### Prix

Prix Arthur Beaumont pour service distingué de la SCMAI

Prix Cecil Graham pour thèse de doctorat de la SCMAI

Prix de recherche de la SCMAI

Prix Jeffery-Williams de la SMC : Martin Barlow (UBC)

Prix Krieger-Nelson de la SMC : Izabella Laba (UBC)

Prix d'excellence en enseignement de la SMC

Prix du concours de présentations par affiches de MITACS

Prix étudiants du Réseau MITACS

### Conférence grand public

Yvan Saint-Aubin (Montréal)

### Inscription

Les tarifs sont indiqués en dollars canadiens dans le tableau. Nous acceptons les paiements par chèque (dollars CAN ou US), VISA ou MasterCard. Le paiement doit nous parvenir au plus tard le 1er avril pour que vous ayez droit aux tarifs réduits; les inscriptions électroniques prennent fin le 15 mai. Les reçus seront remis sur place.

### L'inscription donne droit à toutes les activités au programme, notamment :

Écouter d'éminents conférenciers canadiens ou internationaux

Assister à des sessions scientifiques

Faire valoir la recherche étudiante en présentant une affiche

Participer à des ateliers pour étudiants

Se créer un bon réseau de contacts grâce à des activités diversifiées

Assister à toutes les activités sociales, y compris la réception d'accueil.

Les droits d'inscription des étudiants comprennent aussi

un billet pour l'activité sociale des étudiants. Nous avons réduit les droits d'inscription pour stimuler la participation étudiante.

### Avantages de la préinscription

Tarifs réduits pour les personnes qui s'inscrivent avant le 1er avril.

Votre nom figurera dans la liste des participants sur le site du congrès.

Votre trousse d'inscription sera déjà prête à votre arrivée le dimanche soir.

Vous n'aurez pas besoin de faire la file pour vous inscrire!

### Politique de remboursement

Les participants qui désirent annuler leur inscription doivent en aviser le Réseau MITACS <[rockwood@mitacs.ca](mailto:rockwood@mitacs.ca)> par écrit avant le 15 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.

Tarifs d'inscription (en \$ CAN)	Tarif réduit (avant le 1 <sup>er</sup> avril)	Tarif normal (1 <sup>er</sup> avril - 15 mai)	Sur place (après le 31 mai)
Conférencier primé, principal ou conférence grand public	0 \$	0 \$	0 \$
Participants avec fonds de recherche ou du secteur privé	250 \$	300 \$	350 \$
Participant sans fonds de recherche	100 \$	125 \$	150 \$
Étudiants, chercheurs postdoctoraux	75 \$	100 \$	125 \$
Tarif quotidien (sur place seulement)	-	-	175 \$

### Hébergement

Pour y avoir droit, vous devez réserver avant les dates limites indiquées en mentionnant le code de groupe. Les réservations faites après la date limite ne seront acceptées que s'il reste des chambres, et il se pourrait que le tarif préférentiel ne soit plus en vigueur.

Les tarifs sont par nuit, par personne, et sont indiqués en devises canadiennes. Toute réservation doit être garantie par le paiement d'une nuit ou par une carte de crédit reconnue. Nous vous recommandons de vérifier les modalités de paiement et d'annulation au moment de faire votre réservation, car celles-ci varient d'un établissement à l'autre.

### Résidences de l'UQAM de l'Ouest

2100, rue Saint-Urbain, Montréal, QC, H2X 4E1

Tél : 1-514-987-7747, Fax : 1-514-987-0159

Courriel : [delouest-residences@uqam.ca](mailto:delouest-residences@uqam.ca)

Web : [www.residences-uqam.qc.ca](http://www.residences-uqam.qc.ca)

Nom de groupe : Congrès Canada-France

Tarifs à partir de 41 \$ la nuit

Date limite pour la réservation : 16 avril

# CONGRÈS CANADA-FRANCE 2008 / CANADA-FRANCE CONGRESS 2008

## Four Points by Sheraton

L'hôtel est situé à environ 5 minutes de marche de l'UQAM, au 475, rue Sherbrooke Ouest, Montréal, QC, H3A 2L9

Tél : 1-514-842-3961, Fax : 1-514-842-0945

Web : [www.fourpointsmontreal.com](http://www.fourpointsmontreal.com)

Tarifs à partir de 120 \$ la nuit

Date limite pour la réservation : 30 avril

Pour confirmer une réservation, composez le numéro de téléphone ci-dessus ou écrivez à Benjamin Magazzinich à [benjamin@fourpointsmontreal.com](mailto:benjamin@fourpointsmontreal.com). Veuillez indiquer "Canada-France Congress reservation" dans le titre du message, donner les dates de départ et d'arrivée, spécifier une arrivée tardive, le cas échéant, et donner vos préférences pour le type de chambre (fumeur, non fumeur, type de lit). La réservation doit être confirmée par une carte de crédit.

## Déplacements

Le trajet en taxi de l'aéroport au centre-ville coûte autour de 40 \$.

Un service de navette est disponible au coût de 14 \$ pour un aller simple et de 24 \$ pour un aller-retour. Veuillez consulter le [www.admtl.com](http://www.admtl.com) pour plus de détails.

Vous trouverez des renseignements détaillés concernant la ville de Montréal et le Québec (renseignements touristiques, température et climat locaux, cartes de la ville et des attractions touristiques, circuits touristiques piétonniers, etc.) sur les sites web suivants :

Tourisme Montréal ([www.tourisme-montreal.org](http://www.tourisme-montreal.org))

Tourisme Québec ([www.bonjourquebec.com](http://www.bonjourquebec.com))

Service météorologique du Canada ([www.meteo.gc.ca](http://www.meteo.gc.ca))

## Séances de travail

SCMAI :

Assemblée générale annuelle: 3 juin

Réunion du conseil d'administration: 1er juin

SMC :

Assemblée générale annuelle: 3 juin

Réunion du conseil d'administration: 1er juin

Lunch du Groupe de développement: 1er juin

Réunion du comité exécutif: 31 mai

MITACS :

Assemblée générale annuelle: 4 juin

Réunion du conseil d'administration: 3 juin

Réunion du conseil consultatif scientifique international: 31 mai

Réunion des responsables de projets: 4 juin

Réunion du comité de gestion de la recherche: 1er juin

Réunion du comité consultatif étudiant: 4 juin

## Activités sociales et connexes

Réception de bienvenue : 1er juin

Activité sociale des étudiants : 2 juin

Réception et cérémonie de remise de prix aux étudiants : 3 juin

Banquet : 3 juin

Réception de la conférence grand public : 4 juin

## Directeurs scientifiques du congrès

Octav Cornea, Université de Montréal

Nassif Ghoussoub, UBC

François Loeser, École normale supérieure

## Comité scientifique

Jean-Pierre Bourguignon (IHES)

Ivar Ekeland (UBC / PIMS)

Etienne Ghys (ENS, Lyon)

Arvind Gupta (SFU / MITACS)

Barbara Keyfitz (Fields / Houston)

François Lalonde (CRM / Montréal)

William F. Langford (Guelph)

Claude Le Bris (École nationale des Ponts et Chaussées)

Etienne Pardoux (Université de Provence)

Gilles Pisier (Paris VII)

Christiane Rousseau (Montréal)

## Logistique locale

Alexandra Haedrich (UQAM)

Christiane Rousseau (Montréal)

Gertrud Jeewanjee (CMS, ex-officio)

Jo-Anne Rockwood (MITACS, ex-officio)

## Partenaires

Centre de recherches mathématiques (CRM)

Institut Fields

Institut des sciences mathématiques (ISM)

Mathematics of Information Technology & Complex Systems (MITACS)

Pacific Institute for the Mathematical Sciences (PIMS)

Société canadienne de mathématiques appliquées et industrielles (SCMAI)

Société de mathématiques appliquées et industrielles (SMAI)

Société mathématique de France (SMF)

Société mathématique du Canada (SMC)

Université du Québec à Montréal (UQAM)

## WANTED: Books for Review RECHERCHÉS : Livres pour critiques littéraires

### Have you written a book lately?

Would you like to see it reviewed in the CMS Notes? If so, please arrange to have a review copy sent to our Book Review Editor.

### Vous avez récemment écrit un livre?

Vous aimeriez une critiques littéraires de celui-ci dans les Notes de la SMC? Si oui, veuillez faire parvenir une copie au rédacteur des critiques littéraires.

# CONGRÈS CANADA-FRANCE 2008 / CANADA-FRANCE CONGRESS 2008

## Second Canada-France Congress 2008 UQAM, Montreal June 1-5 [www.canada-france.math.ca](http://www.canada-france.math.ca)

Due to the Montreal Grand Prix taking place immediately after the Congress and the preliminary activities linked to it, affordable accommodation is limited to the two venues covered by our group contract. We strongly recommend completing your hotel reservations as early as possible, as hotel rates outside the reserved block will be much more expensive (at least double).

### Plenary Speakers

Yves André (CNRS-ENS, Paris)  
Olivier Biquard (Strasbourg)  
Luc Devroye (McGill)  
Andrew Granville (Montréal)  
Alice Guionnet (CNRS-ENS, Lyon)  
Rick Kenyon (UBC)  
Gérard Laumon (CNRS-Orsay)  
Mary Pugh (Toronto)  
Eric Sere (Paris-Dauphine)  
Jean-Pierre Serre (Collège de France)  
Nicole Tomczak-Jaegermann (Alberta)  
Nizar Touzi (CREST-Paris)  
Jianhong Wu (York)

### Prizes

CAIMS Arthur Beaumont Distinguished Service Award  
CAIMS Cecil Graham Doctoral Dissertation Award  
CAIMS Research Prize  
CMS Jeffery-Williams Prize : Martin Barlow (UBC)  
CMS Krieger-Nelson Prize : Izabella Laba (UBC)  
CMS Excellence in Teaching Award  
MITACS Poster Competition Prizes  
MITACS Student Awards

### Public Lecture

Yvan Saint-Aubin (Montréal)

### Registration

Registration fees are given in Canadian dollars. Payment may be made by cheque (Canadian or US dollars), or by VISA or MasterCard. To qualify for the reduced rate, payment must be received by April 1; online registration closes on May 15. Receipts will be provided at the congress.

### Registration covers admission to all aspects of the conference, including:

Listen to leading Canadian and International speakers  
Attend scientific sessions  
Showcase student research by presenting a poster  
Participate in Student workshops  
Develop contacts through networking opportunities  
Attend all social events, including Opening Reception.  
Student registrations fees also include a ticket to the Student Social. We have discounted the registration fee to encourage students to attend.

### Advantages to Pre-Registration:

reduced fees for early registration before April 1  
your name appears on the list of participants on the congress web site  
your registration package is waiting for you at the reception on Sunday evening  
no waiting in line to process your registration!

### Refund Policy

Participants wishing to cancel their registration must notify MITACS <[jrockwood@mitacs.ca](mailto:jrockwood@mitacs.ca)> in writing by May 15 to receive a refund less a \$40 processing fee. Those whose

contributed paper has not been accepted will upon request be fully refunded.

Registration Fees (in CAN\$)	Early rate (before April 1)	Regular rate (April 1 - May 15)	Onsite rate (after May 31)
Prize, Plenary and Public Lecturer	\$0	\$0	\$0
Participant with Grant or Private Sector Participant	\$250	\$300	\$350
Participant without Grant	\$100	\$125	\$150
Students, Postdocs	\$75	\$100	\$125
One-day fee (onsite only)	-	-	\$175

### Accommodation

To be eligible for the reduced room rates, participants must make their reservations before the date indicated, quoting the group code. After the deadline, the group rate will no longer apply.

Rates are per room per night and are quoted in Canadian dollars. Reservations must be guaranteed by a one-night deposit or a major credit card. It is recommended to clarify payment and cancellation policies when making the reservation, as these vary from hotel to hotel.

### Résidences de l'UQAM de l'Ouest

2100 rue Saint-Urbain, Montréal, QC, H2X 4E1  
Tel: 1-514-987-7747, Fax: 1-514-987-0159  
Email / Courriel: [delouest-residences@uqam.ca](mailto:delouest-residences@uqam.ca)  
Web: [www.residences-uqam.qc.ca](http://www.residences-uqam.qc.ca)  
Group name: Canada-France Congress  
Rates start at \$41.00 per night  
Reservation deadline: April 16

### Four Points by Sheraton

The hotel is located approximately five minutes walk from UQAM at 475 Sherbrooke Street West, Montréal, QC, H3A 2L9

Tel: 1-514-842-3961, Fax: 1-514-842-0945  
Web: [www.fourpointsmontreal.com](http://www.fourpointsmontreal.com)  
Rates start at \$120.00 per night  
Reservation deadline: April 30

Reservations can be confirmed by calling the above phone number or emailing Benjamin Magazzinich at [benjamin@fourpointsmontreal.com](mailto:benjamin@fourpointsmontreal.com). Please indicate "Canada-France Congress reservation" in the subject line, and provide the arrival and departure dates, possible late arrival and room preference (smoking, non-smoking, bed type). Credit card information must be supplied to confirm your reservation.

### Travel

A taxi fare from the airport to downtown costs approximately \$40.

A shuttle services is available at the cost of \$14 for a one-way ticket and \$24 for a return ticket. Please consult [www.admtl.com](http://www.admtl.com) for details.

Detailed information regarding the city of Montréal and the Province of Quebec, including tourism information, local weather and climate, site and street maps, and itineraries for self-guided tours, are available at the following websites:  
Tourism Montréal ([www.tourism-montreal.org](http://www.tourism-montreal.org))  
Tourism Quebec ([www.bonjourquebec.com](http://www.bonjourquebec.com))  
Canada Weather Forecast ([www.weatheroffice.ec.gc.ca](http://www.weatheroffice.ec.gc.ca))

# CONGRÈS CANADA-FRANCE 2008 / CANADA-FRANCE CONGRESS 2008

## Business Meetings

CAIMS Annual General Meeting: June 3  
CAIMS Board of Directors Meeting: June 1  
CMS Annual General Meeting: June 3  
CMS Board of Directors Meeting: June 1  
CMS Development Group Luncheon: June 1  
CMS Executive Committee Meeting: May 31  
MITACS Annual General Meeting June 4  
MITACS Board of Directors Meeting: June 3  
MITACS International Scientific Advisory Board (ISAB) Meeting: May 31  
MITACS Project Leaders Meeting: June 4  
MITACS Research Management Committee (RMC) Meeting: June 1  
MITACS Student Advisory Committee (SAC) Meeting: June 4

## Social and Related Events

Welcoming Reception: June 1  
Student Social: June 2  
Reception and Student Award Ceremony: June 3  
Banquet: June 3  
Public Lecture Reception: June 4

## Congress Scientific Directors

Octav Cornea, Université de Montréal  
Nassif Ghoussoub, UBC  
Francois Loeser, École normale supérieure

## Scientific Committee

Jean-Pierre Bourguignon (Institut des Hautes Études Scientifiques)

Iyar Ekeland (UBC / PIMS)  
Étienne Ghys (ENS, Lyon)  
Arvind Gupta (SFU / MITACS)  
Barbara Keyfitz (Fields / Houston)  
François Lalonde (CRM / Montréal)  
William F. Langford (Guelph)  
Claude Le Bris (École nationale des Ponts et Chaussées)  
Etienne Pardoux (Université de Provence)  
Gilles Pisier (Paris VII)  
Christiane Rousseau (Montréal)

## Local Organization

Alexandra Haedrich (UQAM)  
Christiane Rousseau (Montréal)  
Gertrud Jeewanjee (CMS, ex-officio)  
Jo-Anne Rockwood (MITACS, ex-officio)

## Partners

Canadian Applied and Industrial Mathematics Society (CAIMS)  
Canadian Mathematical Society (CMS)  
Centre de recherches mathématiques (CRM)  
Fields Institute  
Institut des sciences mathématiques (ISM)  
Mathematics of Information Technology & Complex Systems (MITACS)  
Pacific Institute for the Mathematical Sciences (PIMS)  
Société de Mathématiques Appliquées & Industrielles (SMAI)  
Société Mathématique de France (SMF)  
Université du Québec à Montréal (UQAM)

# NEWS FROM THE FIELDS INSTITUTE

The 2008 Winter/Spring thematic program at the Institute will be *New Trends in Harmonic Analysis*, organized by Alex Iosevich (University of Missouri-Columbia), Izabella Laba (UBC, lead organizer), Michael Lacey (Georgia Institute of Technology) and Eric Sawyer (McMaster University).

Information: thematic@fields.utoronto.ca  
[www.fields.utoronto.ca/programs/scientific/07-08/harmonic-analysis/](http://www.fields.utoronto.ca/programs/scientific/07-08/harmonic-analysis/)

The Coxeter Lecture Series will be given by Jill Pipher (Brown) on February 25-27, and Tim Gowers (Cambridge) will deliver the Distinguished Lecture Series in the latter half of March.

### Workshops in the program:

**April 5–13:** Clay-Fields Conference on Additive Combinatorics, Number Theory, and Harmonic Analysis (Co-organized with the Clay Mathematics Institute)  
[www.fields.utoronto.ca/programs/scientific/07-08/harmonic-analysis/combinatorics/](http://www.fields.utoronto.ca/programs/scientific/07-08/harmonic-analysis/combinatorics/)

### Other events:

**May 11–13:** Carleton Graph Theory Workshop (at Carleton University)  
[www.fields.utoronto.ca/programs/scientific/07-08/graph\\_theory/](http://www.fields.utoronto.ca/programs/scientific/07-08/graph_theory/)

**May 20–23:** Workshop on Taylor Model Methods,  
[www.fields.utoronto.ca/programs/scientific/07-08/taylor-model/](http://www.fields.utoronto.ca/programs/scientific/07-08/taylor-model/)

**May 21–23:** Symposium on Dependent Data Structures (at Carleton University)  
[www.fields.utoronto.ca/programs/index.html?2008-05](http://www.fields.utoronto.ca/programs/index.html?2008-05)

**June 30–July 11:** Summer School in Analytic Number Theory and Diophantine Approximation (at the University of Ottawa)  
[www.fields.utoronto.ca/programs/scientific/07-08/analytic/](http://www.fields.utoronto.ca/programs/scientific/07-08/analytic/)

**July 1–August 31:** Thematic Program on Mathematical and Quantitative Oncology,  
[www.fields.utoronto.ca/programs/scientific/08-09/mathoncology](http://www.fields.utoronto.ca/programs/scientific/08-09/mathoncology)

**July 13–18:** Canadian Number Theory Association X Meeting (at the University of Waterloo)  
[www.fields.utoronto.ca/programs/scientific/08-09/CNTAX/](http://www.fields.utoronto.ca/programs/scientific/08-09/CNTAX/)

**July – August, 2008:** Mathematical and Quantitative Oncology,  
Information: thematic@fields.utoronto.ca  
[www.fields.utoronto.ca/programs/scientific/08-09/mathoncology/](http://www.fields.utoronto.ca/programs/scientific/08-09/mathoncology/)

### Workshops in this program:

**July 30–August 2:** Society for Mathematical Biology (SMB) Conference (Hosted by the Centre for Mathematical Medicine (CMM) at the Institute)  
[www.fields.utoronto.ca/programs/scientific/08-09/mathoncology/](http://www.fields.utoronto.ca/programs/scientific/08-09/mathoncology/)

**August 2–6:** VICBC Summer School on Integrative Cancer Biology  
[www.fields.utoronto.ca/programs/scientific/08-09/mathoncology/](http://www.fields.utoronto.ca/programs/scientific/08-09/mathoncology/)

### Future thematic programs:

**September – December, 2008:** Arithmetic Geometry, Hyperbolic Geometry and Related Topics  
Information: thematic@fields.utoronto.ca  
[www.fields.utoronto.ca/programs/scientific/08-09/arith-hypergeo/](http://www.fields.utoronto.ca/programs/scientific/08-09/arith-hypergeo/)

**January – June, 2009:** o-Minimal Structures and Real Analytic Geometry  
Information: thematic@fields.utoronto.ca  
[www.fields.utoronto.ca/programs/scientific/08-09/o-minimal/](http://www.fields.utoronto.ca/programs/scientific/08-09/o-minimal/)

# CONGRÈS CANADA-FRANCE 2008 / CANADA-FRANCE CONGRESS 2008

## Sessions

### Analyse complexe et théorie des opérateurs

#### **Complex Analysis and Operator Theory**

Org: E. Fricain (Lyon), J. Mashreghi (Laval), T. Ransford (Laval)

### Analyse géométrique et nonlinéaire

#### **Geometric and Nonlinear Analysis**

Org: P. Guan (McGill), E. Hebey (Cergy)

### Analyse numérique des systèmes hyperboliques

#### **Numerical Analysis for Hyperbolic Systems**

Org: M. Laforest (Ecole Polytechnique de Montréal), E. Lorin (Paris-Sud XI)

### Calcul scientifique

#### **Scientific Computing**

Org: C. Bernardi (CNRS-Paris VI), A. Bourlioux (Montréal), B. Wetton (UBC)

### Combinatoire algébrique

#### **Algebraic Combinatorics**

Org: C. Hohlweg (UQAM), F. Saliola (UQAM)

### Dynamique nonlinéaire dans les sciences de la vie

#### **Nonlinear Dynamics in Life Sciences**

Org: J. Bélair (Montréal), P. Chossat (CIRM-Marseille), F. Nekka (Montréal), J. Wu (York)

### Éducation Mathématique

#### **Mathematics Education**

Org: M. Artigue (Paris), B. Hodgson (Laval)

### Équations aux dérivées partielles

#### **Partial Differential Equations**

Org: H. Berestycki (Paris), R. Jerrard (Toronto)

### Femmes en mathématiques

#### **Women in Mathematics**

Org: B. Keyfitz (Fields), M.F. Roy (Rennes)

### Formes automorphes

#### **Automorphic Forms**

Org: S. Kudla (Toronto), C. Moeglin (CNRS-IMJ)

### Géométrie arithmétique et théorie des nombres

#### **Arithmetic Geometry and Number Theory**

Org: G. Chenevier (CNRS, Paris XIII), H. Darmon (McGill)

### Géométrie non commutative et K-théorie pour algèbres d'opérateurs

#### **Non-Commutative Geometry and K-Theory for Operator Algebras**

Org: A. Connes (Collège de France-IHES), G. Elliott (Toronto)

### Géométrie symplectique et de contact

#### **Symplectic and Contact Geometry**

Org: E. Giroux (CNRS-ENS Lyon), Y. Karshon (Toronto)

### Groupes algébriques et sujets reliés

#### **Algebraic Groups and Related Topics**

Org: P. Gille (Paris-Sud), Z. Reichstein (UBC)

### Mathématiques financières

#### **Financial Mathematics**

Org: N. Touzi (CREST-Paris), T. Salisbury (York)

### Mécanique des fluides industrielle

#### **Industrial Fluid Mechanics**

Org: N. Balmforth (UBC), J.F. Gerbeau (INRIA), B. Maury (Paris Orsay)

### Méthodes cinétiques en EDP

#### **Kinetic Methods in Partial Differential Equations**

Org: F. Castella (Rennes), R. Illner (Victoria)

### Méthodes variationnelles et numériques en géométrie, physique et chimie

#### **Variational and Numerical Methods in Geometry, Physics and Chemistry**

Org: L. Bronsard (McMaster), E. Cancès (ENPC), M. Esteban (CNRS - Paris-Dauphine)

### Probabilités

#### **Probability**

Org: M. Barlow (UBC), J.F. Le Gall (Paris XI-ENS), E. Perkins (UBC), W. Werner (Paris Orsay)

### Processus stochastiques en évolution, écologie et génétique

#### **Stochastic Processes in Evolution, Ecology and Genetics**

Org: D. Dawson (Carleton), S. Méléard (Ecole Polytechnique-Paris X)

### Statistique

#### **Statistics**

Org: Y. Baraud (Nice), B. Levit (Queen's)

### Systèmes dynamiques complexes

#### **Complex Dynamical Systems**

Org: X. Buff (Toulouse), M. Lyubich (Toronto), T. Lei (Cergy-Pontoise)

### Théorie analytique des nombres

#### **Analytic Number Theory**

Org: P. Michel (Montpellier), R. Murty (Queen's)

### Théorie des ensembles et ses applications

#### **Set Theory and its Applications**

Org: A. Louveau (Paris VI), S. Todorcevic (Toronto; Paris Dauphine)

### Théorie des modèles et applications à la géométrie

#### **Model Theory and Applications to Geometry**

Org: Z. Chatzidakis (CNRS), P. Speissegger (McMaster)

### Topologie algébrique

#### **Algebraic Topology**

Org: A. Adem (UBC), B. Oliver (Paris XIII)

### Topologie, noeuds et sujets reliés

#### **Topology, Knots and Related Fields**

Org: M. Boileau (Toulouse), S. Boyer (UQAM)

### Communications Libres

#### **Contributed Papers**

Org: L. Bélair, F. Bergeron (UQAM)

### Session d'affiches

#### **Poster Session**

### Minisymposia de la SCMAI / CAIMS Minisymposia

#### **Analyse asymptotique de motifs localisés dans les EDPs**

#### **Asymptotic analysis of localized patterns in PDEs**

Org: T. Kolokolnikov, D. Iron (Dalhousie)

### Modèles pour la transmission de maladies contagieuses

# CONGRÈS CANADA-FRANCE 2008 / CANADA-FRANCE CONGRESS 2008

**Models for transmission of communicable diseases**  
Org: F. Bauer (UBC), P. Van den Driessche (Victoria)

**Modèles pour les mouvements en biologie**  
**Models of motion in biology (CAIMS)**  
Org: D. Coombs (UBC)

**Modélisation des interactions fluides-structures en architecture navale et génie maritime**  
**Modeling fluid-structure interaction in naval architecture and ocean engineering**  
Org: S. Iakovlev (Dalhousie)

**Nouveaux logiciels pour la solution numérique d'équations différentielles**  
**New software for the numerical solution of differential equations (CAIMS)**

Org: P. Muir (Saint Mary's), R. Spiteri (Saskatoon)

**Perturbations singulières et le modèle de Ginzburg-Landau**  
**Singular perturbations and the Ginzburg-Landau model**  
Org: L. Bronsard, S. Alama (McMaster)

**Symposium canadien en mécanique des fluides**  
**Canadian Symposium on Fluid Dynamics (CSFD)**  
Org: J. Bowman (Alberta), L. Campbell (Carleton), Kai Schneider (Provence, Marseille) L. van Veen (Concordia)

## Ateliers de MITACS / MITACS workshops

**1er Atelier Franco-Canadien MITACS sur les bases et pratiques de la sécurité**  
**1st Canada-France MITACS Workshop on Foundations & Practice of Security**

**Atelier MITACS-IFM2 sur les développements récents en gestion des risques financiers et d'assurance**  
**MITACS-IFM2 Workshop on Recent Advances in Financial and Insurance Risk Management**

**Atelier sur les méthodes de traitement de signal appliquées à l'imagerie cérébrale**  
**Workshop on Signal Processing Methods in Brain Imaging**

## SCHEDULE / HORAIRE (AS OF FEB 6, 2008)

	Saturday / Samedi May 31 mai	Sunday / Dimanche June 1 / 1 <sup>er</sup> juin	Monday / Lundi June 2 juin	Tuesday / Mardi June 3 juin	Wednesday / Mercredi June 4 juin	Thursday / Jeudi June 5 juin
all day			8:00-17:00 - Registration / Inscription 9:30-16:00 - Exhibits / Expositions 9:30-16:00 - Poster Presentation / Présentations par affiches		8:00-16:00 Registration / Inscription	
Business Meetings Réunions	18:00-22:00 CMS Executive Committee Dinner	11:00 AM-13:00 CMS Dev. Group Lunch 13:30-18:30 CMS Board of Directors		12:30-14:00 CMS Annual General Meeting		
Work shops	all day <b>Security Workshop</b>	all day <b>Security Workshop</b>	all day <b>Security Workshop</b> Finance & Insurance Workshop 12:30-14:30 Mathematics & Industry Workshop	all day <b>Finance &amp; Insurance Workshop</b> 12:30-14:00 Student Workshop	all day <b>Medical Imaging Workshop</b>	all day <b>Medical Imaging Workshop</b>
Scientific and Social Events / Activités scientifiques et sociales			8:00-8:30 <b>OPENING / OUVERTURE</b>	8:00-9:30 <b>Sessions</b>	8:00-9:30 <b>Sessions</b>	8:00-9:30 <b>Sessions</b>
			8:30-9:30 <b>Plenary lecture</b> <b>conférence plénière</b>			
				9:30 – 10:00 Break/Pause		
			10:00-11:30 <b>Sessions</b>	10:00-11:30 <b>Sessions</b>	10:00-11:30 <b>Sessions</b>	10:00-11:30 <b>Sessions</b>
			11:30-12:30 <b>Prize Lecture</b> <b>conférence de lauréat</b>	11:30-12:30 <b>Prize Lecture</b> <b>conférence de lauréat</b>	11:30-12:30 <b>Prize Lecture</b> <b>conférence de lauréat</b>	11:30-12:30 <b>Prize Lecture</b> <b>conférence de lauréat</b>
			12:30-14:30 Break / Pause		12:30-14:00 Break / Pause	
				14:00-15:00 <b>Plenary lecture</b> <b>conférence plénière</b>	14:00-15:00 <b>Plenary lecture</b> <b>conférence plénière</b>	14:00-15:00 <b>Plenary lecture</b> <b>conférence plénière</b>
				15:00 - 16:00 <b>Plenary lecture</b> <b>conférence plénière</b>	15:00 - 16:00 <b>Plenary lecture</b> <b>conférence plénière</b>	15:00 - 16:00 <b>Plenary lecture</b> <b>conférence plénière</b>
			15:00-15:30 Coffee break		16:00-16:15 Break/Pause	
			15:30-17:00 Poster Judging	16:15 – 17:15 <b>Plenary lecture</b> <b>conférence plénière</b>	16:15 – 17:15 <b>Plenary lecture</b> <b>conférence plénière</b>	16:15 – 17:15 <b>Plenary lecture</b> <b>conférence plénière</b>
			18:00-19:00 <b>Registration / Inscription</b>	17:15 – 18:15 <b>Plenary lecture</b> <b>conférence plénière</b>		17:15 – 18:15 <b>Plenary lecture</b> <b>conférence plénière</b>
			19:00-19:30 <b>Prix CMS Teaching Award</b>		18:30-19:30 <b>Reception and Student Award Ceremony / Réception et cérémonie de remise de prix aux étudiants</b>	17:15-17:45 <b>CLOSING / MOT DE LA FIN</b>
			19:30-21:00 <b>Welcome Reception</b> <b>Réception de bienvenue</b>	19:30-22:00 <b>Student Social – Activité sociale pour les étudiants</b>	19:30-22:30 <b>Banquet</b>	19:30-20:30 <b>Reception/Réception</b>

## L'enseignement des mathématiques à l'Île-du-Prince-Édouard

« Mon prof de maths dit qu'un carré n'est pas un rectangle. »

... a lancé ma nièce l'an dernier, en se plaignant à nouveau du manque de connaissances mathématiques de base de son enseignant. C'était la même rengaine les deux années précédentes puisqu'elle a eu le même enseignant en 7<sup>e</sup> et en 8<sup>e</sup> année. Cette fois, elle voulait qu'on fasse quelque chose : elle m'a demandé d'écrire à son enseignant pour lui expliquer qu'un carré est bel et bien un rectangle. L'avis d'un professeur de mathématiques de l'université de l'Île (UPEI) aurait sans doute un certain poids...

Après une séance de persuasion en règle, j'ai accepté d'écrire à l'enseignant. Je lui ai expliqué, sur un ton amical et posé, que si nous nous entendions pour définir un rectangle comme un quadrilatère à quatre angles internes égaux (donc, de 90 degrés chacun), alors un carré était de toute évidence un rectangle. J'ai commencé ma lettre en lui écrivant que c'était sans doute un simple malentendu, et j'ai conclu en lui disant de ne pas hésiter à communiquer avec moi s'il voulait discuter de tout cela.

Je croyais bien ne plus jamais entendre parler de cette histoire. Quelle ne fut pas ma surprise quand j'ai reçu un appel de l'enseignant en question une semaine plus tard. Notre conversation a été très cordiale; il m'a dit que ma nièce était une excellente élève, mais qu'elle avait mal compris ce qu'il voulait dire et qu'il savait, bien sûr, qu'un carré était un rectangle. Juste avant de clore notre entretien, il ajoute : « Puisque je vous ai au bout du fil, est-ce que je peux vous poser une question? Combien d'axes de symétrie y a-t-il dans un rhombe? »

J'ai répondu en pesant chacun de mes mots, car je craignais qu'il ne cherche à me piéger pour exercer une douce vengeance à cause de la lettre. « Ma définition d'un rhombe est un quadrilatère ayant des côtés égaux », dis-je pour commencer. Il était d'accord que c'était une bonne définition.

Nous nous sommes ensuite entendus sur la définition d' « axe de symétrie d'un objet plan » : droite du plan par rapport à laquelle une figure peut se refléter sans se transformer. « Un carré est donc un rhombe », dis-je pour gagner du temps (et pour éviter de commettre une bêtise en préparant mentalement ma réponse). Il était d'accord avec moi qu'un carré était un rhombe.

« Mis à part ce cas particulier, la réponse est évidemment deux, soit les deux lignes qui forment les diagonales de la figure. »

« D'accord, me répond-il. La raison pour laquelle je vous pose cette question, c'est que la réponse donnée à la fin de mon manuel est un, mais que le spécialiste en mathématiques du ministère de l'Éducation me dit que c'est plutôt trois. »

En modifiant la définition, je peux voir que trois soit une réponse possible, mais je ne pouvais penser à aucune définition qui

donnerait un comme réponse. « Mais si vous êtes d'accord avec nos définitions, vous êtes d'accord que la réponse est bien deux, n'est-ce pas? », insistai-je.

« Oui, je vois maintenant, me répond l'enseignant après quelques secondes d'hésitation. Merci de votre temps. »

Nous avons raccroché là-dessus, et je croyais bien que ce chapitre était clos. Quelques jours plus tard, je rencontre ma nièce et lui demande comment va son cours de mathématiques. Elle me répond que ma lettre n'avait pas changé grand-chose, mais que l'enseignant lui avait parlé et lui avait expliqué qu'elle l'avait mal compris et qu'un carré était bien un rectangle.

« Bien. Alors dis-moi, combien d'axes de symétrie y a-t-il dans un rhombe? »

« Euh... Je crois que la réponse est deux, répond-elle. Mais mon prof dit que la réponse est un, deux ou trois! »

Quel est donc le problème?

Les résultats de la dernière évaluation du Programme international pour le suivi des acquis des élèves (PISA), qui comprenait un test de mathématiques de 9<sup>e</sup> année, sont sortis l'automne dernier. Comme à toutes les épreuves du PISA ou du PIRS (Programme d'indicateurs du rendement scolaire), l'Île-du-Prince-Édouard s'est encore classée en queue de peloton au Canada. Après les discussions que je venais d'avoir avec ma nièce et son enseignant, cette nouvelle m'a amené à réfléchir à l'enseignement des mathématiques dans la province. Il y a une dizaine d'années, en raison de l'inquiétude grandissante quant aux compétences en mathématiques des étudiants admis à l'UPEI, notre département a instauré un test de mathématiques. Or, notre inquiétude n'a pas diminué depuis.

Jusqu'à tout récemment, le reste de la province ne s'inquiétait pas tellement des lacunes mathématiques des élèves et des étudiants de l'Île. Au printemps 2002, à la publication des résultats du PIRS, où les écoles de l'Île ont fini presque dernières au Canada, le gouvernement provincial n'a pas semblé s'inquiéter autre mesure. Voici un extrait de journal qui illustre parfaitement l'attitude du gouvernement en la matière : « Le ministre de l'Éducation, Jeff Lantz, a minimisé l'importance des piètres résultats [des élèves]. Ces résultats ne l'ont pas étonné, a-t-il dit, puisque les élèves de l'Île n'ont jamais été bons en mathématiques de toute façon. » (traduction libre - *The Guardian*, 14 avril 2002)

Quelques jours plus tard, je reçois un appel d'un journaliste qui me demande si, comme le ministre, je considère que ces résultats n'ont rien d'inquiétant. (En tant que directeur du Département de mathématiques de l'UPEI à l'époque, et l'Île-du-Prince-Édouard étant une petite province, je n'étais pas trop surpris d'avoir été contacté.) En préambule, j'ai répondu que malgré ma connaissance limitée de la façon dont on enseignait

les mathématiques dans nos écoles, on pourrait sans doute améliorer la situation en faisant en sorte que les enseignants de mathématiques de nos élèves du secondaire aient une formation en mathématiques. J'ai poursuivi en racontant des anecdotes rapportées par certains de nos diplômés en mathématiques qui enseignent maintenant dans les écoles secondaires de l'Île : il était fréquent qu'on leur fasse enseigner autre chose que les mathématiques alors que l'on confiait les cours de mathématiques à des enseignants ayant peu ou n'ayant pas du tout de formation dans cette discipline. Le lendemain, le *Guardian* titrait : « Nos enseignants de mathématiques sont sous-utilisés », affirme un prof de mathématiques de l'UPEI. » [traduction libre]

Les attitudes commencent à changer. Après la parution des résultats de l'évaluation en mathématiques du PIRS en février 2005, où nos élèves se sont classés au rang habituel, le gouvernement a fourni une réponse très différente. Le retard chronique des élèves de l'Île en mathématiques (et dans d'autres matières) commençait à soulever de grandes inquiétudes. Le gouvernement a donc formé un groupe de travail ayant pour mandat d'analyser les études sur l'enseignement, de consulter le public et de recommander des stratégies pour rehausser le rendement des élèves. Même si les travaux de ce groupe ont été en grande partie motivés par les résultats provinciaux aux dernières évaluations du PIRS en mathématiques, on a élargi le mandat du groupe de travail au rendement des élèves en général.

J'ai fait une présentation devant ce groupe de travail au nom de mon département, dans laquelle nous avons proposé certaines étapes qui permettraient d'améliorer les résultats des élèves en mathématiques, notamment le perfectionnement des compétences en mathématiques des enseignants, la création d'une évaluation commune et l'augmentation du nombre d'heures d'enseignement en mathématiques. Dans son rapport final ([www.upei.ca/studentachievement/Reportfrencha.pdf](http://www.upei.ca/studentachievement/Reportfrencha.pdf)), le groupe de travail ne dit rien sur les mathématiques en particulier, mais il recommande un mécanisme provincial d'évaluation. Ma présentation devant le groupe de travail (et un résumé paru dans le *Guardian* le lendemain) a déclenché d'autres discussions avec les acteurs clés de l'enseignement des mathématiques. La bonne nouvelle, c'est que l'on sent une volonté de s'attaquer au problème de la qualification des enseignants en mathématiques au secondaire, mais la mauvaise, c'est que le problème est probablement encore pire au niveau intermédiaire (premier cycle du secondaire).

J'ai donc senti le besoin de me renseigner sur la formation spécialisée de nos enseignants de mathématiques. Voici ce que j'ai découvert : 1) La plupart des enseignants de l'Île ont obtenu leur baccalauréat en éducation de la Faculté d'éducation de l'UPEI. Ce baccalauréat est un programme de deux ans suivant l'obtention d'un grade et ne comporte aucune exigence en mathématiques (à moins de vouloir enseigner les mathématiques en 10<sup>e</sup>, 11<sup>e</sup> ou 12<sup>e</sup> année, auquel cas une mineure en mathématiques est exigée). 2) Environ 90 % des étudiants admis au programme ont un baccalauréat ès arts, qui n'a aucune exigence en mathématiques. 3) Les mathématiques

ne sont pas obligatoires pour l'admission au programme de B.A. (il faut un diplôme d'études secondaires, mais il est possible d'obtenir ce diplôme sans avoir suivi de cours de mathématiques après la 10<sup>e</sup> année). Il est donc possible (et probable, en fait) que certains enseignants de mathématiques des écoles intermédiaires de la province ont soigneusement évité tous les cours de mathématiques depuis la 10<sup>e</sup> année et se demandent pourquoi leurs élèves se désintéressent des mathématiques ou, pire encore, en développent une phobie.

En discutant avec un collègue de la Faculté d'éducation de l'UPEI, j'ai appris que les connaissances en mathématiques des étudiants inscrits au cours de didactique des mathématiques pour la 5<sup>e</sup> à la 9<sup>e</sup> année étaient si lacunaires qu'à son avis, le tiers d'entre eux échoueraient au cours de maths de 10<sup>e</sup> année. La Faculté d'éducation songeait donc à créer un cours d'appoint en mathématiques de base pour ses étudiants inscrits au B.Ed.

### Quelle est la solution?

La communauté mathématique a beaucoup discuté des mesures à prendre pour améliorer les résultats en mathématiques des élèves du primaire et du secondaire. L'un des changements qui, selon moi, entraîneraient une amélioration marquée serait *d'insister pour que les enseignants de mathématiques au niveau intermédiaire et secondaire aient des acquis en mathématiques*.

Après tout, quelles sont les grandes qualités d'un bon enseignant? 1) se passionner pour son sujet; 2) bien comprendre son sujet; 3) pouvoir expliquer la matière en termes faciles à comprendre. Dans le cadre d'un baccalauréat en éducation, les étudiants peuvent acquérir la troisième qualité, mais ni la première ni la seconde. Un étudiant ayant des bases en mathématiques est beaucoup plus susceptible de posséder la première et la seconde qualité.

Les lacunes en mathématiques des élèves et des étudiants sont inquiétantes pour l'avenir de l'Île-du-Prince-Édouard. Le gouvernement de l'Île a déployé de grands efforts et beaucoup d'énergie (et d'argent) pour essayer de diversifier l'économie de la province et de développer, outre les activités traditionnelles comme l'agriculture, la pêche et le tourisme, des domaines comme les services financiers, les technologies de l'information, l'aérospatiale et la biotechnologie – tous des domaines à forte composante mathématique.

La situation est-elle plus rose dans le reste du Canada? Il semblerait en tout cas qu'elle ne l'est pas aux États-Unis. Dans son dernier livre, *The Age of Turbulence*, l'ancien président de la Réserve fédérale américaine, Alan Greenspan, consacre plusieurs pages à l'enseignement des mathématiques dans les écoles publiques des États-Unis. Les partisans de la mondialisation économique (dont fait partie M. Greenspan) s'attendaient à ce que les emplois peu et semi-spécialisés se déplacent vers l'étranger, mais aussi à ce que les travailleurs occupant ces emplois (et les nouveaux arrivants sur le marché du travail) aillent chercher la formation nécessaire pour occuper les nouveaux emplois moyennement ou très spécialisés nés de la mondialisation. Malheureusement, ce n'est pas ce qui se produit, ce qui amène M. Greenspan à craindre une crise imminente. À son avis, la principale raison pour laquelle ces

travailleurs ne perfectionnent pas leurs compétences est la pire qualité de l'enseignement des mathématiques dans les écoles secondaires américaines. Selon M. Greenspan, 40 % des enseignants du secondaire des États-Unis n'ont pas l'équivalent d'une mineure en mathématiques.

Ce problème « d'approvisionnement » – *Notre système d'éducation forme-t-il suffisamment de travailleurs hautement qualifiés (particulièrement en mathématiques) pour occuper les emplois d'un marché du travail de plus en plus spécialisé?* – retient désormais l'attention des deux gouvernements et du secteur privé. Peut-être ont-ils enfin la volonté de prendre des mesures pour remédier à la situation.

À mon sens, il faut avant tout régler le problème d'approvisionnement en enseignants : 1) en encourageant les étudiants (en particulier ceux qui s'intéressent à l'enseignement) à acquérir des compétences en mathématiques et 2) en veillant à ce que le système d'éducation considère comme une priorité l'usage efficace du petit bassin d'enseignants ayant une formation en mathématiques dont il dispose, soit dans les classes de mathématiques de la 5<sup>e</sup> à la 12<sup>e</sup> année.

Comment effectuer ces changements? La solution de M. Greenspan est simple : permettre aux forces du marché de fixer le salaire des enseignants. S'il est difficile de recruter du personnel pour enseigner une matière (comme les mathématiques), offrons un meilleur salaire aux enseignants qui choisissent cette matière.

Si cette solution n'est pas nécessairement fonctionnelle en pratique, il existe une foule d'autres mesures plus simples, où la SMC a un rôle important à jouer. Par exemple :

- Maintenir l'intérêt des élèves du secondaire pour les mathématiques (grâce à des activités comme les camps de mathématiques de la SMC et les concours parrainés par la SMC);
- Promouvoir les mathématiques comme discipline et profession (comme le dépliant publié récemment par la SMC);
- Élargir le consensus sur les façons d'améliorer l'enseignement des mathématiques (Forum sur l'enseignement des mathématiques de la SMC, etc.);
- Tisser des liens avec les gouvernements (national et provinciaux) et les entreprises pour obtenir du financement destiné à des projets visant à rehausser la qualité de l'enseignement des mathématiques (depuis que j'ai été élu vice-président de l'Atlantique, j'ai appris que notre président et notre trésorier consacrent beaucoup d'énergie à cet égard).

Avant de terminer, je dois avouer autre chose. J'ai deux fils au cycle intermédiaire. Au-delà de mon inquiétude générale quant à la vitalité économique de l'Île-du-Prince-Édouard, je m'inquiète particulièrement de l'éducation mathématique de mes fils. Hier, cette inquiétude a encore monté d'un cran lorsqu'un de mes fils m'a raconté le débat qui s'est déclenché ce jour-là entre les élèves de sa classe et son enseignant. Le cours portait sur la loi distributive, soit  $x(a+b)=ax+xb$ ; l'enseignant leur a dit que cette loi s'appliquait aussi aux multiplications, soit que  $x(ab)=(xa)(xb)$ .

Je sens que je vais devoir écrire une autre lettre...

### Call for nominations CJM/CMB - Associate Editors Appel de mises en candidature JCM/BCM - Rédacteurs associés

The Publications Committee of the CMS solicits nominations for 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, 2009. The continuing members (with their end of term) are below.

The deadline for the submission of nominations is **April 15, 2008**.

Nominations, containing a curriculum vitae and the candidate's agreement to serve should be sent to the address below.

Address for Nominations / Addresse de mise en candidatures:  
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Le comité des publications de la SMC sollicite des mises en candidatures pour des 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 2009. La liste des éditeurs qui sont en cours de mandat se trouve ci-dessous. L'échéance pour proposer des candidats est le **15 avril 2008**.

Les mises en candidature, accompagnées d'un curriculum vitae ainsi que du consentement du candidat(e), devrait être envoyées à l'adresse ci-dessous.

J. Colliander 12/2011; L. Devroye (McGill) 12/2009; A. Dow (North Carolina) 12/2010; G. Elliott (Toronto) 12/2010; P. Guan (McGill) 12/2008; K. Hare (Waterloo) 12/2011; S. Kudla (Toronto) 12/2008; T. Ransford (Laval) 12/2009; R. Vakil (Stanford) 12/2009.

(Program for International Student Assessment) results, which included an assessment of Grade 9 math, were released. As usual in the PISA or SAIP (School Achievement Indicators Program) testing, PEI had again finished near the back of the pack in Canada. This, along with my niece's issues with her math teacher, got me thinking about math education on PEI. About a decade ago, concerns with the math proficiency of incoming UPEI students led our department to implement a mathematics assessment test and over the past decade these concerns have not waned.

Until recently, there has not been much concern in other quarters of PEI about the lack of math proficiency of PEI students. In Spring 2002, when the math results for the SAIP testing were released and PEI schools finished near the back of the pack in Canada, the government of PEI did not seem too concerned. The following seem to epitomize government attitude: "Education Minister Jeff Lantz downplayed the poor grades. He said that the results were not unexpected because Island students have never done well when it comes to math." (excerpt from The Guardian newspaper, April 14, 2002).

A few days later a reporter asked me if I also was unconcerned. (I was Chair of the UPEI Math Department at the time, and PEI is a small province so I guess I should not have been surprised when I was approached.) I prefaced my remarks by saying that while I had limited knowledge of how mathematics was actually being taught in the schools, one improvement I thought could improve outcomes was to ensure that the teachers standing in front of High School math classes actually had an academic background in mathematics. I went on to relay anecdotes I had heard from a number of our mathematics majors who had become Island High School teachers: that they often were not being assigned mathematics classes to teach, while teachers with little or no mathematics background taught the mathematics courses. The headline in The Guardian the next day: "UPEI math professor says math teachers squandered."

Attitudes are starting to change. After the February 2005 release of SAIP math scores, with PEI again near the bottom, the response of the government was much different. Serious concerns were expressed about PEI schools continuing to lag behind in mathematics (and other subjects). A Task Force was struck to "...examine educational research, consult with the public and recommend strategies to improve student achievement." While largely motivated by the latest SAIP math testing results the Task Force was given a wider mandate to look at student achievement in general.

I made a presentation to the committee on behalf of our Department and we proposed a number of steps that could be taken to improve mathematics outcomes, including addressing the issue of mathematics proficiency of teachers, implementing some form of common assessment, and increasing the number of instructional hours devoted to mathematics. The task force's final report (see [www.upei.ca/studentachievement/Reporta.pdf](http://www.upei.ca/studentachievement/Reporta.pdf)) had nothing that specifically addressed math issues, but did recommend a system of province-wide evaluation. My appearance before the task force (and a write-up about it in The Guardian the next day) led to a number of further discussions with stakeholders in the math education area. The good news is that there seems there might be the will to address this issue of teacher qualifications in mathematics at the High School level,

but the bad news is that the problem in the middle grades may even be worse.

I thought I should educate myself about the academic mathematics background of mathematics teachers. I discovered that: (1) Most of the teachers in PEI schools obtained the Bachelor of Education through UPEI's Faculty of Education. This B.Ed. is a two year post-degree program and has no mathematics requirements (unless you are planning to teach math in Grade 10, 11 or 12, in which case at least a minor in mathematics is required). (2) Approximately 90% of the students accepted into the program have a Bachelor of Arts, which has no mathematics requirement. (3) There are no mathematics requirements for entrance into the B.A. program (A High School diploma is required, but that can be obtained while taking no Math after Grade 10). So, it is possible (in fact, likely) that there are teachers of mathematics in the middle grades in PEI schools who have assiduously avoided taking any math courses since Grade 10 ... and we wonder why students lose interest in math, or worse, develop math anxiety.

In discussions with one member of UPEI's Faculty of Education, I was informed that the math skills/ability of the students in the Math Methods in the Middle Years (the course for teachers planning to teach math in Grades 5-9) were so bad that most likely a third of these students/future teachers could not pass Grade 10 math. As a result the Faculty of Education is considering introducing a remedial course on basic mathematics for their B.Ed. Students.

### What is the solution?

There has been plenty of discussion in the mathematics community as to what can be done to get better outcomes in mathematics from the K-12 school system. The one change that I believe would lead to drastic improvements would be to insist that teachers who teach math in the middle and upper grades have some academic background in mathematics.

After all, what are the key characteristics of a good teacher? I would say that a teacher should: (1) have a passion for the subject, (2) understand the subject well, and (3) be able explain the subject in terms that are easy to understand. A Bachelor of Education trains teachers in (3), but not (1) and (2), but someone with an academic background in mathematics is much more likely to possess (1) and (2).

The issue of lack of mathematics proficiency is a serious issue for PEI's future. The PEI government has expended a lot of energy (and money) trying to expand PEI's economy beyond its traditional base of agriculture, fishing and tourism, into areas like financial services, information technology, aerospace and biotechnology; areas which require workers who have some mathematics proficiency.

Is the situation any better in the rest of Canada? Apparently it's not in the United States. In his recent book "The Age of Turbulence", Alan Greenspan, former chairman of the US Federal Reserve Board spends some time discussing the teaching of mathematics in US public schools. Proponents of Economic Globalization (including Mr. Greenspan), admit that it was expected that low-skill and semi-skilled jobs would move offshore, but the plan was that the workers in these jobs (and

new workers) would train for the new medium-to-high skill jobs that Globalization creates. Unfortunately it seems that this is not happening, and hence Mr. Greenspan is now worried about a looming crisis. The main reason he identifies as to why these workers aren't upgrading: poor mathematics instruction in US secondary schools. According to Mr. Greenspan, 40% of US High School teachers have qualifications below the level of a minor in mathematics.

This "pipeline" problem — "Are enough people coming through our educational system with the advanced skills (especially in mathematics) needed to do the jobs in the increasingly high-skill workplace?" is now gaining the attention of both governments and the private sector. Perhaps the will is finally there to make changes to address this issue.

The first change to be made: We need to fix the pipeline problem for teachers: (1) Encourage students (especially those with an interest in teaching) to obtain a foundation of academic mathematics and (2) Ensure that the Educational System makes it a priority that the scarce resources we have of teachers with academic mathematics training are used where they can do the most good, in front of grades 5-12 math classes.

How we do accomplish these changes? Mr. Greenspan's solution is simple: Allow market forces to dictate teacher's salaries: if there is a subject area (like mathematics) where it is difficult to find qualified teachers, pay higher salaries to teachers in that subject.

That solution may not be workable in practice, but there are many other smaller actions that can be taken, and the CMS has

a critical role to play. For example:

- Keep mathematically inclined secondary school students engaged with mathematics (e.g. events like CMS Math Camps and CMS sponsored mathematics competitions),
- Promote mathematics as a discipline and as a career (e.g. the recently published CMS pamphlet),
- Work to broaden the consensus on how the mathematics education system can be improved (e.g. CMS Math Education Forums),
- Build bridges to governments (national and provincial) and companies in the private sector to obtain support for initiatives to improve mathematics education (since I've become VP Atlantic I've learned that our President and Treasurer have been working hard in this area).

In closing, I guess I should provide full disclosure. I have two sons now in the middle grades and beyond general concerns of economic health of PEI, I have more specific concerns about my boys getting a good mathematics education. These concerns were heightened yesterday when one son came home and told me about an argument his class had with his math teacher that day. They were learning the distributive law  $x(a+b)=ax+xb$ , and the teacher told them it also worked for multiplication, that is  $x(ab)=(xa)(xb)$ .

I feel another letter coming on ...

### Call for Manuscripts – ATOM A Taste of Mathematics

The booklets in the series, ATOM, are designed as enrichment materials for high school students with an interest in and aptitude for mathematics. Some booklets in the series will also cover the materials useful for mathematical competitions.

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The Editorial Board is interested in receiving proposals for future volumes, either as a specific proposal or as a manuscript. Submitters should note that the booklets are relatively short, not exceeding 64 pages in length. So far we have published only in English because of perceived sales demand.

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À ce jour, sept tomes ont été publiés - tome I, Problems from the Olympiad Correspondence Program; tome II, Algebra - Intermediate Methods; tome III, Inequalities; tome IV, Problems for Mathematics Leagues; tome V, Combinatorial Explorations; tome VI, Problems for Mathematics Leagues, II; tome VII, Problems of the Week. Deux manuscrits sont en outre à l'étude, l'un sur la théorie des nombres, l'autre sur la trigonométrie (Problems for Mathematics Leagues, III et Homework, the CAUT Problems).

Le Conseil de rédaction sollicite vos propositions pour des livrets à venir, sous la forme d'une proposition détaillée ou d'un manuscrit. Mentionnons que les livrets sont des publications courtes (64 pages maximum). Nous ne les avons publiés qu'en anglais jusqu'à présent en raison de la demande estimée.

Faites parvenir vos propositions ou manuscrits au

Bruce Shawyer, Editor-in-Chief / Rédacteur en chef

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email atom-editors@cms.math.ca / par courriel à atom-redacteurs@smc.math.ca

# CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

## MARCH 2008 MARS

- 5-7** The ICMI Centennial Symposium (Accademia dei Lincei, Rome, Italy)  
[www.unige.ch/math/EnsMath/Rome2008/](http://www.unige.ch/math/EnsMath/Rome2008/)
- 8** The ICMI Centennial Symposium (Istituto dell'Encyclopédia Italiana, Rome, Italy)  
[www.unige.ch/math/EnsMath/Rome2008/](http://www.unige.ch/math/EnsMath/Rome2008/)
- 4-14** Advanced Course on Geometric Flows and Hyperbolic Geometry (Centre de Recerca Matemática, Bellaterra, Italy)  
[www.crm.cat/ACGeometryFlows](http://www.crm.cat/ACGeometryFlows)
- 17-19** DIMACS Workshop on Random Matrices (Rutgers University, Piscataway, NJ.)  
[www.dimacs.rutgers.edu/workshops/RandomMatrices/](http://www.dimacs.rutgers.edu/workshops/RandomMatrices/)
- 20-22** Mathematicians in Mathematics Education (University of Arizona, Tucson, AZ)  
[www.ime.math.arizona.edu/](http://www.ime.math.arizona.edu/)

## APRIL 2008 AVRIL

- 5-13** Clay-Fields Conference on Additive Combinatorics, Number Theory, and Harmonic Analysis  
[www.fields.utoronto.ca/programs/scientific/07-08/harmonic\\_analysis/](http://www.fields.utoronto.ca/programs/scientific/07-08/harmonic_analysis/)
- 7-11** Workshop: Spectrum and Dynamics (CRM, Montreal, QC)  
[activities@crm.umontreal.ca](mailto:activities@crm.umontreal.ca)
- 12-13** MIT Women in Math (MIT, Cambridge, MA)  
[www.math.mit.edu/womeninmath](http://www.math.mit.edu/womeninmath)
- 16-27** Workshop in Geometric Evolution Equations (CRM, Montreal, QC)  
[www.crm.umontreal.ca/Equations08](http://www.crm.umontreal.ca/Equations08)

## MAY 2008 MAI

- 1-3** Conference in Honour of Keith Geddes' 60th Birthday (Stonehaven Bay, Trinidad and Tobago)  
[www.orcca.on.ca/conferences/mica2008](http://www.orcca.on.ca/conferences/mica2008)
- 10-13** SIAM Conference on Optimization (Boston, MA)  
[www.siam.org/meetings/op08/](http://www.siam.org/meetings/op08/)
- 12-16** Workshop: Singularities, Hamiltonian and Gradient Flows (CRM, Montreal, QC)  
[activities@crm.umontreal.ca](mailto:activities@crm.umontreal.ca)
- 16-19** 2nd International Conference, Athens Institute for Education and Research (ATINER), (Athens, Greece)  
[www.atiner.gr/docs/Mathematics.htm](http://www.atiner.gr/docs/Mathematics.htm)
- 19-21** Conference on Frontiers in Applied and Computational Mathematics (FACM '08) New Jersey Institute of Technology (Newark, NJ)  
<http://m.njit.edu/Events/FACM08/>

- 19-24** Lie Theory and Geometry: The Mathematical Legacy of Bertram Kostant (Pacific Institute of Math Sciences, Vancouver, BC)  
[www.pims.math.ca/~dxu/08kostant](http://www.pims.math.ca/~dxu/08kostant)

- 19-24** Workshop on Floer Theory and Symplectic Dynamics (CRM, Université de Montréal, Montréal, QC)  
[http://www.crm.umontreal.ca/act/theme/theme\\_2008\\_1\\_en/floer\\_e.shtml](http://www.crm.umontreal.ca/act/theme/theme_2008_1_en/floer_e.shtml)

- 25-28** Seventh Iberoamerican Conference on Topology and its Applications(CITA 2008), (Valencia, Spain)  
<http://cita.webs.upv.es>

## JUNE 2008 JUIN

- 1-3** Canadian Society for History and Philosophy of Mathematics/Société canadienne d'histoire et de philosophie des mathématiques. The 2008 Annual Meeting will be held in conjunction with the Learned (CFHSS) (UBC, Vancouver, B.C.). The special session of the meeting will be on "Trigonometry and its applications."  
[www.cshpm.org](http://www.cshpm.org)

- 1-5** Second Canada-France Congress (UQAM, Montréal, QC)  
[www.canada-france.math.ca](http://www.canada-france.math.ca)

- 2-7** Workshop on Mathematical Aspects of Quantum Chaos (CRM, Université de Montréal, Montréal, QC)  
[www.crm.umontreal.ca/Mathphys2008/](http://www.crm.umontreal.ca/Mathphys2008/)

- 4-7** First Joint International Meeting of AMS with the Sociedade Brasileira de Matemática (Rio de Janeiro, Brazil)  
[www.ams.math.org/amsmtgs/internmtgs.html](http://www.ams.math.org/amsmtgs/internmtgs.html)

- 9-20** PIMS Industrial Problem Solving Workshop (University of Regina, SK)  
[www.pims.math.ca/ipsw](http://www.pims.math.ca/ipsw)

- 22-29** 46th International Symposium on Functional Equations (Opava-Hradec nad Moravicí, Czech Republic)  
[isfe46@math.slu.cz](mailto:isfe46@math.slu.cz), [romanger@us.edu.pl](mailto:romanger@us.edu.pl)

## JULY 2008 JUILLET

- 6-13** Eleventh International Congress on Mathematics Education (ICME-11) (Monterrey, Mexico)  
<http://icme11.org/node/12>

- 22-26** International workshop on Operator Theory and its Applications (College of William and Mary, Williamsburg, VA)  
[www.math.wm.edu/~vladi/IWOTA/IWOTA2008.htm](http://www.math.wm.edu/~vladi/IWOTA/IWOTA2008.htm)

## OCTOBER 2008 OCTOBRE

- 4-5** AMS Western Section Meeting (UBC & PIMS, Vancouver, BC)  
[www.ams.math.org/amsmtgs/sectional.html](http://www.ams.math.org/amsmtgs/sectional.html)

## DECEMBER 2008 DECEMBRE

- 6-8** CMS Winter 2008 Meeting  
[www.cms.math.ca/Events](http://www.cms.math.ca/Events)

- 17-21** First Joint International Meeting of AMS with the Shanghai Mathematical Society (Shanghai, China)  
[www.ams.math.org/amsmtgs/internmtgs.html](http://www.ams.math.org/amsmtgs/internmtgs.html)

## EMPLOYMENT OPPORTUNITY



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The seventh annual Summer School sponsored by the Atlantic Association for Research in the Mathematical Sciences (AARMS) will take place at the University of New Brunswick in Fredericton, New Brunswick, from July 13 through August 8, 2008. The school, which annually offers courses in the mathematical sciences and their applications, is intended for graduate students and promising undergraduate students from all parts of the world.

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- ◆ Mathematical Finance, by R. Mark Reesor, University of Western Ontario.
- ◆ Tropical Geometry, by Diane Maclagan, University of Warwick (and Rutgers University).
- ◆ Representation Theory of Algebras, by Ralf Schiffler, University of Massachusetts (Amherst).

For more information, or to express interest in attending, send e-mail to Barry Monson ( [bmonson@unb.ca](mailto:bmonson@unb.ca) ) and/or visit the school's web site: <http://www.aarms.math.ca/summer>.

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