CMS NOTES de la SMC

IN THIS ISSUE
DANS CE NUMÉRO

FROM THE TREASURER'S DESK

David Rodgers
Treasurer

The September 19th edition of the **Ottawa Citizen** ran an article, written by Janice Tibbets, with the headline: ***Canada Falls Behind in Science Grads*** that included the following excerpt:

"While Canadians are among the most educated in the world, universities are failing to keep pace in turning out science graduates, says a report released by Organization for Economic Co-operation and Development (OECD) that compares Canada to more than two dozen developed countries."

Analysts said the report is a wake-up call that Canada has to reverse a growing trend or risk being left behind.

"Also, women now comprise the majority of university students, so institutions must find ways to attract them to science and engineering", said David Robinson, associate executive director of the Canadian Association of University Teachers.

Mathematics is the foundation discipline for all of the sciences and engineering. Quantitative reasoning is a growing requirement for disciplines in the social sciences and business. Employers report increased difficulty in finding skilled workers.

What is the Canadian Mathematical Society doing about this?

The CMS supports mathematics education (Math Camps, Competitions, Math in Moscow, CRUX with MAYHEM., the Adrien-Pouliot Award, the Excellence in Teaching Award, our education committee, Olympiad problems books, Endowment Grants, and Math Fora), research and collaboration (the Canadian Journal of Mathematics, the Canadian Mathematical Bulletin, semi-annual meetings, the G. de. B. Robinson Award), two series of research monographs as well as other national prizes.

This rich portfolio of professional activities produces a steady stream of individuals who are trained in the mathematical sciences and who contribute to Canada's global competitiveness. By encouraging students to keep studying mathematics, and by showing them that there are interesting and rewarding jobs that use mathematics, the CMS tries to keep open this pipeline of numerate graduates. These efforts are made possible only by the professional and monetary contributions of large numbers of CMS member volunteers who leverage generous donations and sponsorships by corporations and individuals.

For the past 18 months, the CMS has been working to implement a more systematic approach to fund-raising. Rising costs as well as currency fluctuations make it clear that it is impossible for the CMS to sustain all of its activities with its existing revenues.

In order to continue, we need your help:

- If you are a donor or sponsor, we want to thank you for your contribution. If not, we ask you to consider a donation or sponsorship—the Society needs <u>your</u> help.
- If you know of any organizations or individuals you believe the CMS should approach, please let us know.
- If you would be willing accompany members of the CMS fund-raising team to a meeting with a prospective donor or sponsor to <u>communicate your enthusiasm</u> for mathematics or a CMS program with which you have been associated, please let us know.

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EDITORIAL

by Robert Dawson
Saint Mary's University, Halifax

Reminiscences from the Stone Age

Let me take you in a journey back in time, to a different age. Once, as an assistant professor, I participated in a MAA workshop on teaching statistics for mathematicians, at Reed College. It was a memorable week. I remember many interesting ideas for teaching statistics. I remember the lush green campus of Reed, with an astonishing number of dogs accompanying their student masters on campus. And I remember several excellent Portland microbreweries and coffee shops.

But more importantly I remember my first exposure to two software innovations, one part of the workshop, one not. In the workshop, we were introduced to the latest version of MINITAB, which had far more graphical capability than the statistical software that I was familiar with. The crude (though effective) character-based graphics that I had been familar with were replaced by high resolution editable bitmaps. Parameters could be set interactively, data could be entered and edited easily. What a change!

But one day, between sessions, one of the instructors showed a few of us a new piece of software that had recently been installed on his Mac. It was called Mosaic, and it would display Web pages with integrated graphics. We were moderately impressed by the looks of it, but as none of us knew how to create a web page, and some of us had never even seen one, we didn't quite realize what we had just seen.

I was one of the few there who had actually used a web browser. It was a text-only program called "Lynx" (as in "links") that displayed pages of text in which a few words were boldfaced. You could move between them sequentially using (if I remember correctly) the cursor keys, and hit "Enter" to follow the link. Most of the pages I had accessed had rather little content in themselves; they existed mainly as a way to organize sets of FTP links to data files. It was not obvious to me at the time why one would need to use pictures for this purpose; I suspect that I may have thought of it as some sort of Mac users' eccentricity.

That time feels long ago now. Back then, many of my colleagues didn't use email - or even have a computer on their desks. (Instructions for the workshop had included getting an email account if we didn't already have one - at least if possible.) For those who did, while not every email message was welcome, spam as we know it today was unknown. I wrote my papers on a word processor; a few used TeX, others used a pad of paper, handed the result to the secretary to be typed on the departmental Selectric, and wrote the more obscure symbols in with a pen. Some journals would have the result typeset; others would reproduce it photographically, handwritten symbols and all.

So how long ago was this? Let me give you a hint: one evening, that week, everybody dropped what they were doing to gather round the television (yes, my children, there were televisions back then). Regular programming had been interrupted to show the view from a news helicopter. O. J. Simpson was being driven slowly down the highway with an escort of police cars, under suspicion of a double homicide.

It was only thirteen years ago.

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ÉDITORIAL

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Récit de l'âge de pierre

Si vous le permettez, je vous propose un petit voyage dans le temps. Un jour, j'ai participé à titre de professeur adjoint à un atelier de la MAA sur l'enseignement de la statistique aux mathématiciens, au Reed College. Ce fut une semaine mémorable. Je me souviens de toutes les idées intéressantes qui en sont ressorties, et du campus luxuriant de Reed, où un nombre incroyable de chiens accompagnaient leur maître un peu partout. Bien sûr, je n'ai pas oublié non plus les excellents cafés et microbrasseries qui foisonnent à Portland.

Mais ce dont je me rappelle surtout, c'est d'avoir entendu parler pour la première fois de deux nouveaux logiciels – l'un dans le cadre de l'atelier, l'autre, à l'extérieur. Durant l'atelier, on nous a présenté la dernière version de MINITAB, beaucoup plus intéressante sur le plan graphique que mon logiciel de statistique de l'époque. Les graphiques dénudés (mais efficaces) en mode image texte que je connaissais bien faisaient place à des fichiers bitmaps modifiables haute résolution. Il était désormais possible d'entrer soi-même les paramètres, et de saisir ou de modifier les données en un tournemain. Quel changement!

Un jour, entre deux séances, l'un des enseignants a présenté à quelques-uns d'entre nous un nouveau logiciel qu'il venait de faire installer sur son Mac. Le logiciel, appelé Mosaic, pouvait afficher des pages web avec images intégrées. Nous étions plus ou moins impressionnés par l'apparence de la chose, mais comme aucun d'entre nous ne savait créer une page web, et comme certains d'entre nous n'avaient même jamais vu une page web, nous n'étions pas conscients de ce que nous venions de voir.

J'étais une des rares personnes présentes à avoir déjà utilisé un navigateur web. C'était une application textuelle appelée « Lynx » (par analogie avec le mot anglais *links*, « liens ») qui affichait des pages de texte où figuraient quelques mots en gras. Il était possible de passer d'un lien a l'autre de manière séquentielle (si je me souviens bien) à l'aide des touches fléchées, et de suivre un lien en appuyant sur « Entrée ». La plupart des pages que j'avais consultées étaient pauvres en contenu; elles ne servaient en fait qu'à organiser des ensembles de liens FTP menant à des fichiers de données. À l'époque, je ne voyais pas tellement ce qui justifiait l'utilisation d'une image pour parvenir à ce résultat. J'ai dû penser qu'il s'agissait simplement de l'excentricité d'un utilisateur de Mac...

Il me semble qu'il s'est écoulé un temps fou depuis ce temps. Un grand nombre de mes collègues n'utilisaient pas le courrier électronique ou n'avaient pas d'ordinateur dans leur bureau. (Avant l'atelier, on avait demandé aux participants, dans la mesure du possible, d'ouvrir un compte courriel s'ils n'en avaient pas déjà un.) Si les courriels d'alors n'étaient pas tous désirables, le pourriel, sous sa forme actuelle, n'existait pas. J'ai rédigé des articles à l'aide d'une machine de traitement de texte; quelques personnes utilisaient TeX; d'autres encore écrivaient sur une feuille, remise à la secrétaire qui le retapait sur la Selectric du département et qui retranscrivait à la main les symboles les plus bizarres. Certaines revues composaient le résultat, d'autres procédaient par reproduction photographique, reproduisant ainsi tous les symboles manuscrits et autres marques.

Combien de temps s'est écoulé depuis, pensez-vous? Je vous donne un indice : cette semaine-là, nous avons tous laissé tomber nos occupations habituelles et nous sommes agglutinés devant le téléviseur (oui, mes enfants, la télé existait bel et bien à cette époque). On avait interrompu la programmation de la soirée pour montrer des images diffusées d'un hélicoptère d'O. J. Simpson, soupçonné de double homicide, escorté lentement sur l'autoroute par des voitures de police.

C'était il y a treize ans.

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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.

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How Mathematicians Think: Using Ambiguity, Contradiction, and Paradox to Create Mathematics

by William Byers, Concordia University
Princeton University Press 2007, US $35

Review by Robert Dawson, Saint Mary's University

It is a truth universally acknowledged (in certain circles) that the thought processes of the mathematician are characterized by clarity, consistency, and logic. So when Concordia University's William Byers suggests in his first few chapters that the main elements of mathematical thought are in fact ambiguity (chapter 1), contradiction (chapter 2) and paradox (chapters 3 and 4), we can tell that he is spoiling for a fight, in the spirit of the Viking warriors who bragged in the mead-halls of the great deeds that they would perform in the upcoming battle.

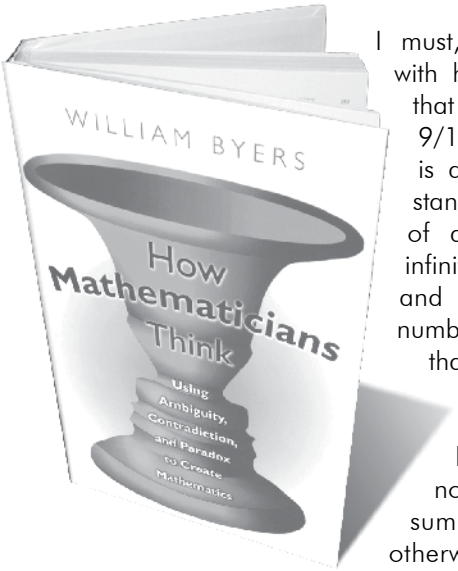
Now, with the exception of the mouse in the campfire song that licked up the spilled whiskey on the barroom floor and offered, fatally, to take on the cat, an introduction like this is rarely a complete bluff. I am pleased to report that Byers, in this book, does go on — to a significant extent — to make good on his mead-hall claims. Nonetheless, while this reader was impressed by what he accomplishes, I was left with the feeling that not quite all that was promised is ultimately delivered.

Let's begin with the claim that ambiguity plays an important part in mathematics. This is, of course, a deliberately inflammatory statement, intended to get the mathematical reader flying out of his or her chair, fists raised, ready to defend the honour of the Queen of Sciences. On page 28, we are given — deliberately repeated for emphasis, and nailed to the mast as the author's chosen definition — Arthur Koestler's statement that

Ambiguity involves a single situation or idea that is perceived in two self-consistent but mutually incompatible frames of reference.

On the next page, just to underline this, it is stated that "Ambiguity … is not mere duality." But what examples do we get? The "ambiguity" between 2+3 and 5; between $\sqrt{2}$ as a geometric concept and as an algebraic concept; between 0.999 … and 1; between functions as graphs and functions as rules; and so on. None of these are really incompatible — or we could immediately prove that 0=1, mathematics would collapse, and we could all go home.

One could, I suppose, argue that two such viewpoints could be *perceived* as incompatible, but no mathematical progress will be made while this perception lasts. On the other hand, it is very often useful to perceive such viewpoints as "different", "contrasting", "opposing", or "complementary". In fact, this is what Byers' explanations demonstrate; and by and large they do it rather well.



I must, however, take issue with his claim on page 40 that the notation 9/10 + 9/100 + 9/1000 + ⋯ is ambiguous because "it stands both for the process of adding this particular infinite sequence of fractions and for the object, the number that is the result of that process." In general, it stands for neither; the "series notation" by convention carries no implicit warranty of summability what-soever, otherwise we could not discuss or represent divergent series, let alone compare different summability methods.

In the next chapter we are offered the topic of "The Contradictory in Mathematics." After quite a good discussion of "proof by contradiction", we reach a section on "The Contradictory Within Mathematical Concepts — The Case of Zero". Here we learn that zero is both "nothing" and "something". But this is nothing more than the old philosophical joke more felicitously expressed as:

Theorem. *A ham sandwich is better than complete happiness in life.*

Proof. Nothing is better than complete happiness in life; and a ham sandwich is better than nothing.

The next two chapters, on paradoxes, could be interesting reading for the layperson (little will be new for the mathematician). Various paradoxes, mostly involving infinity, are presented. The presentations are clear, and generally the mathematical resolution of each paradox is eventually reached. However, the resolutions are not always given their proper weight; and statements such as "a paradox is something whose very existence is unacceptable" (page 111) misrepresent the author's more moderate use of the word elsewhere. (On page 266, the book states "In complexity theory there is a saying that interesting biological processes happen 'at the edge of chaos'. Now paradox is a form of chaos…" But the word "chaos" has a fairly specific technical meaning, which the author himself explains well in Chapter 5; and paradox has little to do with this.)

One of the most famous stories about "how mathematicians think" is that of Henri Poincaré, in the act of stepping onto a bus, realizing in a flash that the transformations defining the Fuchsian functions were the same as those of hyperbolic geometry. Naturally, this story appears here, (in Chapter 8, "The Truth of Mathematics".) More surprisingly, the author

goes on to state that this feeling of certainty is part and parcel of mathematical truth.

Now, Poincaré's insight was, in this instance, right. But surely I cannot be the only mathematician who has had exactly the same feeling of certainty in the morning, only to realize by lunchtime that something had been overlooked and that the "insight" was in fact a fallacy, perhaps not even a very subtle one. (As one of my colleagues likes to say, "Everything is true on Friday afternoon.") A mathematical insight arrived at by a flash of "revelation" must be judged by the same standards as one arrived at experimentation with a supercomputer: in each case, the question is, can a proof be assembled to justify it?

It may be relevant at this point to contrast Malcolm Gladwell's 2005 bestseller *Blink*, in which he writes about hunches and snap judgements. While Gladwell argues strenuously in favour of the value of decisions reached in this way, he also makes it very clear that they can be wrong, in some cases disastrously so; and he studies, at considerable length, the circumstances affecting the reliability of such judgements. Byers is not nearly so cautious about mathematical hunches, repeatedly using words like "truth", "knowledge", and "certainty" to describe them.

All of this may be related to Byers' intention, stated on pages 17-18, to apply a Zen Buddhist viewpoint to mathematics. Zen uses paradoxical "koans" to induce a nonlogical state of mind, in which — perhaps after lengthy meditation — sudden enlightenment may occur. But even Zen has a proverb "If you meet the Buddha upon the road, kill him!" which I take to be a warning against premature and false enlightenment. Mathematicians are not a species of applied mystics, like Jedi Knights, with a mysterious gift of pulling infallible truths out of thin air.

Read critically, while mentally trimming away the author's hyperbole, this is an interesting book. If we firmly substitute "counterintuitive" for "paradoxical", and drop the ambiguous idea of "ambiguity" in favour of concepts such as "able to be viewed in significantly different ways", "categorical equivalence", or "not yet fully defined", I think we can find some valuable insights in it. But the nonmathematician may have some difficulty knowing where the trimming should stop, while

Symmetry and the Monster: One of the Greatest Quests of Mathematics

by Mark Ronan, Oxford University Press, £14.99

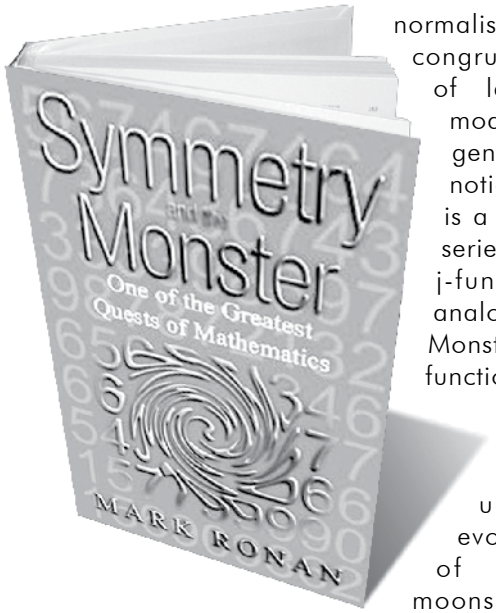
Review by Gareth Jones, University of Southampton

The quarter-century from 1955 to 1980 saw one of the most spectacular achievements of mathematics, namely the classification of finite simple groups. This was a joint effort between two overlapping teams, the constructors and the classifiers. In 1955 Chevalley showed that most of the finite simple groups then known (and some new ones) could be constructed in a uniform way from simple Lie algebras and finite fields. Soon Ree, Steinberg, Suzuki and Tits found further infinite families as subgroups of these Chevalley groups, and in a tidy world the list would have stopped there with these groups of Lie type, together with the rather obvious cyclic and alternating groups. However, in 1861 Mathieu had found five simple groups which did not seem to belong to any infinite family. Janko's discovery of a new simple group in 1964 stimulated a hunt for further examples, and within the next decade the number of such sporadic simple groups had risen to 26. Some of these were discovered as groups of automorphisms of highly symmetric objects, such as the 24-dimensional Leech lattice which yielded Conway's three groups, whereas others arose as exceptional cases in the classification process. This was a massive project, orchestrated by Gorenstein and driven forward by Aschbacher, beginning with a 255-page paper by Feit and Thompson in 1963 which proved Burnside's conjecture that every nonabelian finite simple group has even order. This suggested that such groups might be classified in terms of their properties associated with the prime 2, such as Sylow 2-subgroups and centralisers of involutions. By the early 1980s, many experts believed that this approach had found all the finite simple groups, though the final details did not appear in print until the publication in 2004 of the two-volume (and nearly 1000-page) monograph by Aschbacher and Smith on quasithin groups. The proof of the classification depends on over 100 papers, by dozens of authors, totalling more than 10,000 pages, and a revision programme, aiming to make it more concise and understandable, is well under way.

By far the largest of the 26 sporadic simple groups is the Monster group of order

$$2^{46} \times 3^{20} \times 5^9 \times 7^6 \times 11^2 \times 13^3 \times 17 \times 19 \times 23 \times 29 \times 31 \times 41 \times 47 \times 59 \times 71 \approx 10^{54}$$

conjectured by Fischer and Griess in 1973 and constructed by Griess (by hand!) in 1980 from an algebra of dimension 196884. Some intriguing numerical coincidences associated with this group soon emerged: Ogg observed that the primes p dividing its order are those for which the



normaliser of a certain congruence subgroup of level p in the modular group has genus 0, and McKay noticed that 196884 is a coefficient in the series for the modular j-function. Further analogies between the Monster and modular functions were studied by Conway, Norton and Thompson under the evocative heading of 'monstrous moonshine', and in 1998 Borcherds won a Fields Medal for solving some of their conjectures. He used vertex algebras, arising from string theory, and this link with physics may eventually justify Dyson's conjecture that the Monster group is 'built in some unsuspected way into the structure of the universe'.

Ronan's book is a bracing historical tour through this landscape, from Theaetetus and the regular solids to the present day. Most simple groups are far from simple to describe, yet he gives some impressively clear non-technical descriptions of how various groups, such as those of Mathieu, Conway and Fischer, arise. There are vivid pen-portraits of many of the leading figures: Galois, of course, tragically and mysteriously dying so young; Lie, arrested as a suspected German spy while hiking through war-time France with his clothes in his backpack (it was raining) and singing Norwegian songs; Marshall Hall, shuffling through the streets of Oxford with a small fortune in ancient gold coins in his pocket; Conway, locking out the hubbub of family life to construct his groups in one mighty 12-hour calculation.

Ronan tells a good story, and in doing so he paints a convincing picture of how mathematicians conduct their research. I wish that he had found space to mention Sylow, whose theorems are crucial to any understanding of finite groups, that he had properly stated the group axioms (even in an appendix), that he had referred to simple groups and finite fields rather than 'atoms of symmetry' and 'cyclic arithmetic', and that he had given some suggestions for further reading. Nevertheless, I greatly enjoyed this book, and I strongly recommend it to anyone interested in group theory and its history.

Reprinted from the London Mathematical Society Newsletter (www.lms.ac.uk), No. 359, May 2007.

BRIEF BOOK REVIEWS

by Srinivasa Swaminathan
Dalhousie University, Halifax

How Euler Did It

By C. Edward Sandifer
The MAA Tercentenary Euler Celebration,
MAA 2007, xiv + 235 pp. US$41.95

This book is a collection of 40 monthly columns that appeared on MAA Online between November 2003 and February 2007 about the mathematical and scientific work of Leonard Euler. Almost every column is self-contained and gives the context, significance and some of the details of a particular facet of Euler's work. The topics are presented in four parts.

Part I begins with interesting stories about Euler's work on geometry. Discussing the polyhedral formula the author speculates about whether Descartes had a role in the discovery of the formula and analyzes a flaw in the proof. Euler's solution to Cramer's paradox concerning the number of points that determine a curve of order n and the number of points of intersection of two curves of different orders (order = degree).

Part II contains Euler's proof of Fermat's Little Theorem for which he used mathematical induction, his discovery of many pairs of amicable numbers and his work on odd perfect numbers.

Part III is devoted to Combinatorics. The topics deal with the development of Venn diagrams, orthogonal matrices, foundations of calculus, mixed partial derivatives.

Part IV on Analysis contains 20 articles. Among these are (i) Euler's use of differential equations and continued fractions to show that e is irrational several years before Lambert's discovery, and (ii) Euler's observations on the number of primes less than a given number. The final topic is an interesting account of how Euler got involved in the discovery of America.

The columns use Euler's own words for the most part. The final essay is about the Euler Society and its conferences.

Geometry and Topology

By Miles Reid and Balázs Szendrői
Cambridge 2005, xviii + 196 pp. Hardback US$95,
Paperback US$45.

Geometry provides a whole range of views on the universe, serving as the inspiration, technical toolkit and ultimate goal for many branches of mathematics and physics. This book introduces the ideas of geometry using simple explanations and examples. The treatment emphasizes coordinate systems and the coordinate changes that generate symmetries. The discussion moves from Euclidean to non-Euclidean geometries, including spherical and hyperbolic geometry, and then on to affine and projective linear geometries. Group theory is introduced to treat geometric symmetries, leading to the Erlangen program. An introduction to basic topology follows with the Möbius strip, the Klein bottle and the surface with many handles exemplifying quotient topologies and the homeomorphism problem. A chapter on geometry of transformation groups follows, with applications to relativity theory and quantum mechanics. A final chapter features historical discussions and indications for further reading.

The book is intended for the early years of study of an undergraduate math course.

Each chapter ends with a set of exercises. Further teaching material is made available for teachers via the web, including assignable problems and solutions.

Logic Colloquium '02, Lecture Notes on Logic 27, Association for Symbolic Logic

Edited by Zoé Chatzidakis, Peter Koepke
and Wolfram Pohlers
A. K. Peters 2006, viii + 359 pp

This volume contains the joint proceedings of two major logic meetings which took place at the University of Münster, Germany, in August 2002: Logic Colloquium '02, the 2002 European Summer Meeting of the Association for Symbolic Logic, and Colloquium Logicum 2002, the biannual meeting of the German Association for Mathematical Logic and the Foundations of Exact Sciences. It includes papers presented at these meetings, tutorials and research articles from some of the world's preeminent logicians. Topics span all areas of mathematical logic, with particular emphasis on Computability Theory and Proof Theory.

A noteworthy article is "One is a lonely number": Logic and Communication, by Johan van Bentham. The abstract reads: Logic is not just about single-agent notions like reasoning, but also about communication between two or more people. What we tell and ask each other can be just as logical as what we infer in Olympic solitude. We show how communication and other interactive phenomena can be studied systematically by merging epistemic and dynamic logic, leading to new types of question.

Perspectives in Riemannian Geometry

Edited by Vestilov Apostolov, Andrew Dancer, Nigel Hitchin
and McKenzie Wang
CRM Proceedings and Lecture Notes, v. 40,
AMS 2006, viii + 248 pp.

This volume contains ten contributions written by participants of the 'Short Program on Riemannian Geometry,' a workshop held at the CRM, Montreal in June-July 2004.

Special geometries as well as the relation between curvature and topology have always been of interest to differential geometers. More recently these topics have turned out to be of use to string theory as well. The articles in this volume provide a unique and thorough survey on the latest developments of Riemannian geometry, special geometrical structures on manifolds, and their interactions with other fields such as mathematical physics, complex analysis and algebraic geometry.

In the Friday, September 7, 2007 issue of the Globe and Mail, there appeared on page A17 an article by Elizabeth Church on the use of online instruction at universities. One of the examples described in the article was a series of short cartoons used by Veselin Jungic of Simon Fraser University to support his first year calculus class. Professor Jungic has graciously responded to my invitation to discuss how these films were conceived and how they are are being used.

Math Girl Begins

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1 Introduction

The purpose of this article is to describe the creation and usage of animated movies with calculus themes in teaching corresponding calculus topics.

During the past 40-50 years a steady stream of books and papers on the topic of the use of cartoons and movies in teaching has been flowing. It is an interesting exercise to follow how this activity has been influenced by the development of technology. For example, in 1977 Richard A. Maynard [8] wrote, "Most teachers cannot operate standard 16 mm projectors. At first this meant that they were reluctant to use the films, since many were too proud to admit their technical ineptitude." As a contrast we mention *The Futures Channel Program* founded in 1999 with the mission, "to produce and distribute high quality multimedia content which educators in any setting can use to enliven curriculum, engage students and otherwise enhance the learning experience."[2]

There have been various ways of using cartoons and movies in classes, from starting a class with a cartoon to get students' attention to teaching a full lecture by using previously recorded material. The range of cartoons and movies used in lectures has also been very wide. Editorial cartoons, comic books, feature movies, documentaries, animated movies, or just clips from full length features, have been used to motivate lectures, stir discussion about class topics, enrich otherwise dry subjects and to demonstrate to students some rather abstract aspects of the lecture. It seems that there is not much doubt regarding the benefits of showing topic related cartoons and movies in the classroom. The real issue is still the question asked by Richard A. Lacey in 1972 [7], "What to do when the lights go on?" Reading the available literature does not lead to any universal answer to Lacey's question. It is our opinion that natural science teachers face a significantly greater challenge than social science teachers in finding the appropriate material for their lectures. Sarah Hughes [4] summarizes the science teachers' dilemma in the following question, ". . . do teachers give students a challenge, or offer less difficult material that is more likely to spark their interest?" Dr. James Kakalios from the School of Physics and Astronomy, University of Minnesota, created a Freshman Seminar titled *Everything I Know About Physics I Learned By Reading Comic Books*. An excellent example of the power of animated movies in teaching scientific topics is *Dr Quantum - Double Slit Experiment*, created by Dr. Fred Alan Wolf [9]. Another rich resource for natural science teachers is the previously mentioned *The Futures Channel Program*.

What about cartoons, comic books, or movies and teaching mathematics? Probably there are not many math students in North America or regular attendees to math seminars that have not seen a cartoon by Sidney Harris or a Dilbert or Fox Trot strip as part of a math presentation. It appears that animated calculus characters have been sadly stereotypical. See, for example, Professor Calculus from the Adventures of TinTin, or Calvin Q. Calculus featured on the Bugs Bunny Show. Dr. Sarah J. Greenwald, Appalachian State University, and Dr. Andrew Nestler, Santa Monica College, have researched the mathematical content in the sitcom *The Simpsons* [3]. A collection of clips with math themes from various feature movies and TV series and shows are collected and posted on the web by Dr. Oliver Knill from the Department of Mathematics, Harvard University [6]. An interesting approach at using (and creating) movies in teaching mathematics was described in [1].

2 Math Girl: Motivation, Goals, and Facts

For many years, lecturing on linear approximation and the differential of a function has been a source of frustration for the author of this note. The topic is usually covered in one lecture and since it requires quite a few technical details, often there is not enough time during the lecture to tell the full story about the big ideas that are behind those technicalities. An additional difficulty in presenting the notion of an approximation to a freshman class comes from the fact that the students are so used to doing all of their calculations on a calculator or a computer. Thus evaluating the square root of thirty-seven with a certain precision is not a *big deal* for them. In the author's opinion, the real challenge in teaching about differentials and linear approximation is to get across the following message. There are advanced mathematical methods that we use to describe, not necessarily exactly but always relatively quickly, some

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complicated phenomena and often we are able to get information about the degree of our imprecision. In Math Girl's words, "Close enough is sometimes good enough."

Motivated by Dr. Jonathan Borwein's remark that "in mathematics sometimes it is easier to see than to say" in early 2004 the author met with Mr. Jesai Jayhmes, an actor and director, to discuss the options of creating an animated video. The original idea was to make a film in which the small image of a math instructor would be seen traveling along the graph of a function and one of its tangent lines. While doing so the instructor would demonstrate the principles and properties of the linear approximation and differentials. This proposal was deemed to be too expensive and the notion of a cartoon was brought up. Next, together with Mr. Lou Crockett, an artist, animator, and designer, Mr. Jayhmes and the author came up with the idea of creating a superhero, who would personify all mathematical knowledge. The choice of a female character was easy. On a midterm in a 500 student strong calculus class, taught by the author of this note in 2002, only one student got 100 per cent and, when the student was asked to stand up, a tiny young woman reluctantly rose in the large lecture hall. Math Girl was born.

Three cartoon movies, *Differentials Attract, Zero!'s Dis-Continuity*, and *Rationalize This!*, about the adventures of Math Girl, a super heroine who uses her super knowledge of mathematics to protect the citizens of Calculopolis from the evil plots of a villain called Zero! have been created so far. Each episode is a short story in which the plot is based on a particular math object and its properties. The episodes are independent of each other. The ambition of the authors of the shorts was to accomplish two goals: to use a pop-culture medium to give a new view (or use) of the well known mathematical objects and at the same time to enrich the medium itself by introducing mathematics as a subject. Mathematics in the movies is strict but not detailed enough to be self-contained. In following with the medium's clichés, the stories are based on the fight between good and evil; where good is a synonym for mathematical knowledge. In her civilian clothes Math Girl is an ordinary student, a smart girl who wears glasses. When she takes her superpower alter ego, thanks to her superb understanding of mathematics, Math Girl becomes a super heroine. Other characters introduced in the Math Girl movies are Math Girl's sidekick Pat Thagoras, a young man who admires Math Girl; professorial Big Math, the mayor of Calculopolis; and Zero!, the evil character whose goal is to rule Calculopolis by exploiting people's ignorance of mathematics. Characters' appearances were inspired by Manga[1] images. The movies might be seen as a benign parody of both the pop medium and scholarship and this makes the audience often react with laughter at scenes. It is a fact that even planning to step outside of the standard delivery of an educational topic requires the involvement of people with various skills and expertise. Also, in its initial phase a proposal of creating a new type of an educational resource must be general and flexible enough to accommodate a range of constraints that may emerge during the process. There are two necessary conditions for moving the project forward. The first is to form a team of people willing to put their talents together towards making a joint product. The other is to secure enough funds to complete the task in a satisfactory manner. To meet those two conditions in academia is not a quick and simple procedure[2].

The biggest challenge for the authors of the Math Girl movies was to find the balance between the necessary mathematics and the flow of the story. The problem could be described as: what to show, what to say, and how to wrap everything up so that the viewer sees beyond three-fingered human-like images. In addition, the intent was to demonstrate to the viewer a range of properties of the particular mathematical phenomenon. The general approach that the authors had chosen was to keep all of the mathematics as simple as possible. This, for example, meant to repeat a catchy phrase that gave the idea of approximation ("Close enough is sometimes good enough"), to loosen mathematical language whenever it was possible ("The differential is very small, so I can easily reach you, Pat"), to materialize mathematical objects ("Square Root Mountain", "Linear Approximator", "Sine T Over T Roller Coaster", "Epsilon - Delta Device") etc. During the process some mathematical details were omitted. For example, a graph showing a differentiable function, its tangent line, together with the increments of independent and dependent variables for both the function and the tangent line, and the differential was part of the script for the episode called *Differentials Attract*. After a long discussion it was decided to omit the graph from the cartoon. The reason was that the information contained in it could not be absorbed in a few seconds, the time that the graph would appear on the screen.

[1]For more about Manga, The Art to Anime, please see http://www.manga.com/

[2]The funds for the Math Girl movies were obtained from the following sources: the Department of Mathematics at Simon Fraser University (SFU), the Faculty of Applied Science at SFU, the Faculty of Science at SFU, the Interdisciplinary Research in Mathematics and Computational Sciences Centre (IRMACS) at SFU, the Learning and Instructional Development Centre (LIDC) at SFU, and an NSERC PromoScience Grant.

3 Math Girl: The Lights Are On

It seems that there is no question that the Math Girl movies are entertaining for a student audience. In our view it is not realistic to expect that a 50-minute long lecture can be compressed into a 5-minute cartoon. The math involved is much too quick for students to be able to fully understand the concept being communicated from the first viewing. Thus, the idea is to utilize the Math Girl movies as a complement to the lecture.

The way that the cartoons have been used in the class is to show the short at the beginning and at the end of the lecture. During the remaining 40 minutes, the instructor covers the topic in a standard manner. The purpose of showing the movie at the beginning of the lecture is to give a motivation for the topic and to introduce the basic terms related to it. Also, stories of the first two Math Girl adventures are based on standard examples; therefore the movies contain actual links with the particular lectures. It has been noticed that when students view Math Girl just before the lecture, their participation increases and their general mood is more upbeat and positive than usual. Survey results show that these animated movies have resulted in positive responses from the majority of students, particularly female students. Another effect that the pop medium part of the Math Girl movies has on the young audience is that it demystifies the lecture topic. The reason the cartoon is shown again at the end of the class is to demonstrate to the students how much better they understand the mathematics in the cartoon after the lecture. This is also an opportunity for the instructor to underline the main points in the lecture.

The author of this note hopes that a lecture constructed in the described style would excite students' intellectual curiosity and motivate them to look at mathematics not just as a set of technicalities and applications, but also as a playground where human imagination interacts with reality. In the author's opinion that memorable moment of laughter in a calculus classroom justifies the time and effort of a dozen people working for a few months to create one Math Girl episode.

The following email message by a student illustrates the serious side of the effect of the first Math Girl episode, "Until recently, I have heard all my life in mathematics that everything must be exact and precise. So why is it now that we are told, 'Close enough is good enough?'" [5]

Since the first episode was released, Math Girl has taken on a life of her own. Apart from the classroom, the student recruiters from the Faculty of Science and the Faculty of Applied Science at Simon Fraser University have used the first two episodes for the purpose of recruiting. As well, the cartoons have been used to promote mathematics among young people in general. An example is the projection of the first episode during the Canada Wide Science Fair at Science World in Vancouver, B.C., in May 2005. Thanks to YouTube, tens of thousands of people have been able to view the first two episodes. Math Girl has also used her powers to put a graph of the function $f(t) = \frac{\sin t}{t}$ on the front page of The Globe and Mail – a first in the history of Canadian journalism. It has become clear that in front of the general public, Math Girl has been judged not only based on her own merits, but also as a piece of pop culture.

References

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[2] The Futures Channel Program, http://www.thefutureschannel.com

[3] Sarah J. Greenwald and Andrew Nestler: Engaging Students with Significant Mathematical Content From The Simpsons, PRIMUS, Vol XIV, Num 1, March, 2004, pp. 29-39.

[4] Sarah Hughes, Comic Book Science in Classroom, NPR Morning Edition, April 8, 2005.

[5] Josh Weissbock, Private Communication, 2006.

[6] Oliver Knill, Personal website, http://www.math.harvard.edu/10knill/mathmovies/index.html.

[7] Richard A. Lacey, Seeing With Feeling, Film in Classroom, W. B. Saunders Company, 1972.

[8] Richard A. Maynard, Classroom Cinema, Teachers College, Columbia University New York, London, 1977.

[9] Fred Alan Wolf, Dr Quantum - Double Slit Experiment, http://www.youtube.com/watch?v=DfPeprQ7oGc

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/

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:

January 7–11: *Recent Advances in Operator Theory and Function Theory*,
www.fields.utoronto.ca/programs/scientific/07-08/harmonic_analysis/advances/

February18–24: *Harmonic Analysis*
www.fields.utoronto.ca/programs/scientific/07-08/harmonic_analysis/harmonic/

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/

Other events:

January 14-17: *Mathematical Physics and Geometric Analysis*,
www.fields.utoronto.ca/programs/scientific/07-08/geomanalysis/

May11–13: *Carleton Graph Theory Workshop* (at Carleton University)
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/

May 21–23: *Symposium on Dependent Data Structures* (at Carleton University)
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/

July 1–August 31: *Thematic Program on Mathematical and Quantitative Oncology,*
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/

July – August, 2008: *Mathematical and Quantitative Oncology,*
Information: thematic@fields.utoronto.ca
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/

August 2–6: *VICBC Summer School on Integrative Cancer Biology*
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/

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/

January – June, 2010: *Financial Mathematics*
For more information on this program, and any other thematic programs, contact us at thematic@fields.utoronto.ca . Complete and up-to-date information on all Fields Institute activities can be found at www.fields.utoronto.ca. You can subscribe to our mailing list of Fields Institute activities at www.fields.utoronto.ca/maillist.

UNIVERSITY OF WATERLOO

Tenure-Track Position Department of Pure Mathematics University of Waterloo

Applications are being accepted for a tenure-track position at the Assistant Professor level in PureMathematics beginning July1,2008. The successful candidate must havea PhD in pure mathematics and an actively developing research program with an emphasis on algebra and its applications, particularly in geometry and topology. Duties include research, teaching at the undergraduate and graduate level, and supervising graduate students. The successful candidate will be expected to apply for external research funding through NSERC or other agencies. If the successful candidate is a Canadian woman or an aboriginal person she or he will be expected to apply for a University Faculty Award through NSERC at the earliest opportunity. Salary range commensurate with qualifications and experience. The closing date for applications is **December 15, 2007**. Send curriculum vitae and arrange for three letters of reference to be sent to:

Professor Frank Zorzitto, Chair
Department of Pure Mathematics
University of Waterloo
Waterloo, Ontario
N2L 3G1 Canada

email: puremath@math.uwaterloo.ca.

All qualified individuals are encouraged to apply; however, Canadians and permanent residents will be given priority. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples and persons with disabilities. This appointment is subject to the availability of funds.

The Brookfield Research Instructorship

The Department of Pure Mathematics at the University of Waterloo is proud to announce the inaugural competition for the *Brookfield Research Instructorship*. This prestigious academic position is made possible through the visionary, ongoing support of Mr. J. Frank Brookfield of Waterloo, Ontario. This international competition is aimed at outstanding new mathematicians. The *Brookfield Research Instructorship* will have a duration of two years, renewable for a third year subject to mutual agreement between the candidate and the Department.

The goal of the Instructorship is to enhance research intensity in Pure Mathematics at Waterloo, to provide an opportunity for young researchers to diversify and intensify their research capacity, and to interact with students as teachers and mentors. The *Brookfield Research Instructor* will be someone who can demonstrate leadership and bring fresh ideas to our research enterprise through collaborations with departmental colleagues as well as teaching of graduate and undergraduate courses. The Department will seek to appoint a candidate who is expert in one of the areas of departmental activity: functional analysis, geometry and topology, algebra and logic, or number theory.

The first *Brookfield Research Instructor* will be appointed on July 1, 2008. The fellowship salary will be at least $50, 000 per year, and comes with a $5, 000 annual research grant. In addition to doing research, the Brookfield Research Instructor will be expected to teach five semester-long course (12 weeks) over a three year period.

The closing date for the competition is **December 15, 2007**. Interested candidates should apply to the address below by submitting their curriculum vitae plus a description of research interests and accomplishments, as well as ensure that at least three letters of reference are sent directly to this address.

Professor Frank Zorzitto
Chair, Department of Pure Mathematics
University of Waterloo
Waterloo, Ontario
CANADA, N2L 3G1
e-mail: fazorzit@uwaterloo.ca

We appreciate all replies to this advertisement, but only highly ranked individuals will be contacted. Waterloo is committed to employment equity and encourages applications from all qualified candidates, including aboriginal peoples, persons with disabilities, and members of visible minorities.

CALL FOR NOMINATIONS - 2008 DOCTORAL PRIZE
APPEL DE MISES EN CANDIDATURE - PRIX DE DOCTORAT 2008

La SMC a créé ce Prix de doctorat pour récompenser le travail exceptionnel d'un étudiant au doctorat. Le prix sera décerné à une personne qui aura reçu son dipôme de troisième cycle d'une université canadienne l'année précédente (entre le 1er janvier et le 31 décembre) et dont les résultats pour l'ensemble des études supérieures seront jugés les meilleurs. La dissertation constituera le principal critère de sélection (impact des résultats, créativité, qualité de l'exposition, etc.), mais ne sera pas le seul aspect évalué. On tiendra également compte des publications de l'étudiant, de son engagement dans la vie étudiante et de ses autres réalisations.

Les mises en candidature qui ne seront pas choisies dans leur première compétition seront considérées pour une année additionelle (sans possibilité de mise à jour du dossier), et seront révisées par le comité de sélection du Prix de doctorat l'an prochain.

Le lauréat du Prix de doctorat de la SMC aura droit à une bourse de 500 $. De plus, la SMC lui offrira l'adhésion gratuite à la Société pendant deux ans et lui remettra un certificat encadré et une subvention pour frais de déplacements lui permettant d'assister à la réunion de la SMC où il recevra son prix et présentera une conférence.

Candidatures

Les candidats doivent être nommés par leur université; la personne qui propose un candidat doit se charger de regrouper les documents décrits aux paragraphes suivants et de faire parvenir la candidature à l'adresse ci-dessous. Aucune université ne peut nommer plus d'un candidat. Les candidatures doivent parvenir à la SMC au plus tard le **31 janvier 2008**.

Le dossier sera constitué des documents suivants :

- Un curriculum vitae rédigé par l'étudiant.
- Un résumé du travail du candidat d'au plus dix pages, rédigé par l'étudiant, où celui-ci décrira brièvement sa thèse et en expliquera l'importance, et énumérera toutes ses autres réalisations pendant ses études de doctorat.
- Trois lettres de recommandation, dont une du directeur de thèse et une d'un examinateur de l'extérieur (une copie de son rapport serait aussi acceptable). Le comité n'acceptera pas plus de trois lettres de recommandation.

The CMS Doctoral Prize recognizes outstanding performance by a doctoral student. The prize is awarded to the person who received a Ph.D. from a Canadian university in the preceding year (January 1st to December 31st) and whose overall performance in graduate school is judged to be the most outstanding. Although the dissertation will be the most important criterion (the impact of the results, the creativity of the work, the quality of exposition, etc.) it will not be the only one. Other publications, activities in support of students and other accomplishments will also be considered.

Nominations that were not successful in the first competition, will be kept active for a further year (with no possibility of updating the file) and will be considered by the Doctoral Prize Selection Committee in the following year's competition.

The CMS Doctoral Prize will consist of an award of $500, a two-year complimentary membership in the CMS, a framed Doctoral Prize certificate and a stipend for travel expenses to attend the CMS meeting to receive the award and present a plenary lecture.

Nominations

Candidates must be nominated by their university and the nominator is responsible for preparing the documentation described below, and submitting the nomination to the address below. No university may nominate more than one candidate and the deadline for the receipt of nominations is **January 31, 2008**.

The documentation shall consist of:

- A curriculum vitae prepared by the student.
- A resumé of the student's work written by the student and which must not exceed ten pages. The resumé should include a brief description of the thesis and why it is important, as well as of any other contributions made by the student while a doctoral student.
- Three letters of recommendation of which one should be from the thesis advisor and one from an external reviewer. A copy of the external examiner's report may be substituted for the latter. More than three letters of recommendation are not accepted.

Président du Comité de sélection du Prix de doctorat
Chair, Doctoral Prize Selection Committee
Société mathématique du Canada / Canadian Mathematical Society
577 King Edward
Ottawa, Ontario Canada K1N 6N5

Call for Sessions – CMS Winter 2008 Meeting
Appel de sessions – Réunion d'hiver 2008 de la SMC

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 (December 6-8, 2008) in Ottawa, Ontario. 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 Ottawa, Ontario, du 6 au 8 décembre 2007. 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 le 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: December 21, 2007
Date limite : 21 décembre, 2007

Meeting Director / Directeur de la Réunion :
Matthias Neufang
School of Mathematics and Statistics
4364 Herzberg Laboratories
Carleton University
Ottawa, Ontario, K1S 5B6 Canada
Email: mneufang@math.carleton.ca

The following invited (partially funded) sessions have been confirmed for this conference:
Les sessions suivantes (partiellement subventionnées) ont été confirmées :

Applied Partial Differential Equations
Equations différentielles partielles appliquées
Org: D. Amundsen, L. Campbell (Carleton), F. Poulin (Waterloo)

Dynamics of Large Groups and Semigroups
Dynamique des groupes infini-dimensionnels et des semigroupes
Org: Alica Miller (Louisville), Vladimir Pestov (Ottawa)

Geometric Group Theory
Théorie Géométrique des Groupes
Org: Inna Bumagin (Carleton), Benjamin Steinberg (Carleton)

Infinite-Dimensional Lie Theory
Théorie infini-dimensionnelle de Lie
Org: Yuly Billig (Carleton), Alistair Savage (Ottawa)

Operator Algebras
Algèbres d'opérateurs
Org: Benoit Collins (Ottawa), Thierry Giordano (Ottawa)

Probability
Probabilité
Org: Antal Jarai (Carleton), Yiqiang Zhao (Carleton)

FROM THE TREASURER'S DESK *continued*

- If you have suggestions about the message that should be communicated to prospective donors or sponsors, please let us know.

We have been continually surprised by the number of leads for prospective corporate and individual donors or sponsors that have come to mind when our members actually focus some energy on it. In many cases, members have been able to think of the names of industry contacts (e.g., former students, former participants in camps and competitions programs, prize winners). Approaching an organization through an inside contact who can either champion a request or refer it to the appropriate person or group within their organization *significantly* improves our chances of success. Please spend a few minutes and help us with this indispensable activity.

If you have questions or want more details about the CMS fund-raising initiative, please contact Graham Wright (gpwright@cms.math.ca, 613-562-5800 ext 3528) or David Rodgers (drodgers@umich.edu, 321.777.2156).

Hilton Hotel, London (Ontario)
December 8-10 décembre
Host / Hôte : University of Western Ontario

On behalf of the University of Western Ontario, the Department of Mathematics invites the mathematical community to the CMS Winter 2007 Meeting. The program will include plenary and prize lectures, and a wide variety of sessions, including a contributed paper session.

Au nom de l'Université Western Ontario, le Département de mathématiques invite la communauté mathématique à la Réunion d'hiver 2007 de la Société mathématique du Canada (SMC). Au programme : des conférenciers pléniers et des conférences de lauréats, ainsi qu'une grande diversité de sessions, y compris une session de communications libres.

Prizes and Awards / Prix

Prix Coxeter-James Prize
Vinayak Vastal (University of British Columbia)

Prix de doctorat / Doctoral Prize
Lap Chi Lau (Chinese University of Hong Kong)

Prix Adrien Pouliot Prize
Richard Nowakowski (Dalhousie University)

Prix G. de B. Robinson Award
Dr. Ronald van Luijk (PIMS Postdoctoral Fellowship - Simon Fraser University and the University of British Columbia)

Plenary Speakers / Conférenciers pléniers

Erich Kaltofen (North Carolina State)
Mikhail Kapranov (Yale)
Blaine Lawson (SUNY/Stony Brook)
Giovanni Landi (Trieste)
Seth Lloyd (MIT)
Otmar Venjakob (Heidelberg)
Marcelo C. Borba (UNESP - São Paulo at Rio Claro)

All activities and scientific talks will be held at the Hilton Hotel and the Delta Armories Hotel.

For the most up-to-date information concerning the program, detailed schedules, registration forms and abstract submission forms, please visit the meeting website at `www.cms.math.ca/Events/`.

Toutes les activités, y compris celles du programme scientifique, se dérouleront à l'hôtel Hilton et au Delta Armories.

Vous trouverez l'information la plus récente sur les programmes, y compris les horaires détaillés, les formulaires d'inscription et les formulaires électroniques pour l'envoi des résumés au `www.smc.math.ca/Events/f`.

Sponsors

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

Nous remercions les organismes ci-dessous de leur soutien financier. Nous publierons de plus amples renseignements sur le financement du congrès dès qu'ils nous parviendront.

le Centre de Recherches Mathématiques
The Fields Institute
MITACS
Pacific Institute for the Mathematical Sciences
University of Western Ontario
- Department of Mathematics
- Faculty of Education
- Faculty of Science
- Research Western
- Department of Applied Mathematics

Lethbridge University

Meeting Director / Directeur de la réunion :
Dr. J.F. Jardine (Western)

Chair, Local Arrangements / Logistique locale :
Dr. David Riley (Western)

Book Donations

The Canadian Mathematical Society wishes to thank the following publishers for generously donating a selection of books to the 2007 CMS Math Camps.

La Société mathématique du Canada (SMC) remercie les éditeurs suivants de leur généreux don d'ouvrages à l'organisation des camps mathématiques 2007 de la SMC.

A.K. Peters Ltd.
John Wiley and Sons Canada Ltd.
McGraw-Hill
Nelson Thomson Learning

SESSIONS

Algebraic Combinatorics, Representations and Geometry
Combinatoire algébrique, représentations et géométrie

Org: Lex Renner (Western), Benjamin Steinberg (Carleton)

Marcelo Aguiar (Texas A&M), Mahir Can (Western), John Fountain (York, UK), Eddy Godelle (Caen), Christophe Hohlweg (UQAM), Zhenheng Li (South Carolina), Zhuo Li (Xiangtan University, China), Martin Malandro (Dartmouth), Claus Mokler (Wuppertal), Lex Renner (Western), Franco Saliola (UQAM), Benjamin Steinberg (Carleton), Hugh Thomas (UNB), Hamid Usefi (UBC), Steven Wang (Carleton).

Algebraic Stacks
Champs algèbriques

Org: Ajneet Dhillon (Western)

Jarod Alper (Stanford), Arend Bayer (Utah), Renzo Cavalieri (Michigan), Mike Fried (California-Irvine), Yufeng Jiang (UBC), Kiumars Kaveh (Toronto), Daniel Krashen (Yale), Manish Kumar (Purdue), Suresh Nayak (Chennai Mathematical Institute), Behrang Noohi (Florida State), Pramath Sastry (East Carolina), Greg Smith (Queen's), Razvan Veliche (Utah).

Algorithmic Challenges in Polynomial and Linear Algebra
Défis algorithmiques dans l'algèbre polynomiale et l'algèbre linéaire

Org: Stephen Watt (Western)

Carlos Beltran (Toronto), Jon Borwein (Dalhousie), Jacques Carette (McMaster), Wayne Eberly (Calgary), William M. Farmer (McMaster), Mark Giesbrecht (Waterloo), Michael Jacobson (Calgary), Ilias Kotsireas (Wilfrid Laurier), George Labahn (Waterloo), Songxin Liang (Western; Maplesoft), John May (Maplesoft), Marc Moreno-Maza (Waterloo), Eric Schost (Waterloo), Arne Storjohann (Waterloo), Yuzhen Xie (Waterloo).

Calculus of Variations in Physics, Geometry and Economics
Calcul des variations, géométrie et économie

Org: Robert McCann (Toronto), Benjamin Stephens (Toronto)

Almut Burchard (Toronto), Adrian Butscher (Stanford), Albert Chau (UBC), Alessio Figalli (Pisa), Yuxin Ge (Paris XII; Washington), Nassif Ghoussoub (UBC), Marc Henry (Montreal), Young-Heon Kim (Toronto), Abdeslem Lyaghfouri (Toronto), Abbas Moameni (Queen's), Santiago Moreno (UBC), Truyen Nguyen (Akron), Daniel Offin (Queen's), Alexander Shnirelman (Concordia), Alina Stancu (Concordia), Dennis The (McGill), Maxim Trokhimtchouk (Berkeley).

Combinatorics and its Applications to Mathematical Physics
Combinatoires et ses applications en physique mathématique

Org: Michael Gekhtman (Notre Dame), Michael Shapiro (Michigan State)

Renzo Cavalieri (Michigan), Leonid Chekhov (Steklov Mathematical Institute, Moscow), Shaun Fallat (Regina), Anna Felikson (Moscow Independent University), Sergei Fomin (Michigan), Christof Geiss (UNAM, Mexico), Ian Goulden (Waterloo), David Jackson (Waterloo), Peter Magyar (Michigan State), Bruce Sagan (Michigan State), Mark Skandera (Lehigh), John Stembridge (Michigan), Ravi Vakil (Stanford), Dave Wagner (Waterloo).

Complex Analytic Geometry
Géométrie analytique complexe

Org: Tatyana Foth (Western), Finnur Larusson (Adelaide), Rasul Shafikov (Western)

Janusz Adamus (Western), Edward Bierstone (Toronto), Alexander Brudnyi (Calgary), Debraj Chakrabarti (Western), Peter Ebenfelt (UCSD), Xianghong Gong (Wisconsin), Jaehong Kim (Purdue), Damir Kinzebulatov (Toronto), Blaine Lawson (SUNY Stony Brook), Jiri Lebl (UIUC), Laszlo Lempert (Purdue), Eugene Poletsky (Syracuse), Sophia Vassiliadou (Georgetown).

Error Control Codes, Information Theory and Applied Cryptography
Codes de contrôle d'erreurs, théorie de l'information et cryptographie appliquée

Org: Aiden Bruen (Calgary), David Wehlau (Queen's and RMC)

Tim Alderson (UNB), Elwyn Berlekamp (Berkeley), Richard Blahut (Illinois), Keldon Drudge (Prism Valuations, Toronto), Peter Dukes (Victoria), Vincent Gaudet (Alberta), Martin Hassner (IBM Hitachi, San José), Olof Heden (Royal Inst. of Technology, Stockholm), Peter Lisonek (SFU), Jim McQuillan (Western Illinois), Michele Mosca (Waterloo), Aidan Roy (Calgary), Christian Schlegel (Alberta), Claude Tardif (RMC), Dmitry Trukhachev (Alberta).

Graph Theory
Théorie des graphes

Org: Sebastian Cioaba (UC-San Diego), Stephen Kirkland (Regina), Claude Tardif (RMC)

Andrea Burgess (Ottawa), Steve Butler (UC San Diego), Sebastian Cioaba (UC San Diego), Danny Dyer (Memorial), Randy Elzinga (Queen's), Steve Kirkland (Regina), Cynthia Loten (Fraser Valley), Gary MacGillivray (Victoria), Odile Marcotte (UQAM), Dan McQuillan (Norwich), Karen Meagher (Regina), Wendy Myrvold (Victoria), Hamed Shirazi (Waterloo), Claude Tardif (Royal Military College).

History and Philosophy of Mathematics
Histoire et philosophie des mathématiques

Org: Tom Archibald (SFU), Deborah Kent (Hillsdale College)

Tom Archibald (SFU), John Bell (Western), David Bellhouse (Western), James Robert Brown (Toronto), Robert Dawson (St. Mary's), David DeVidi (Waterloo), Jackie Feke (Toronto), Alexander Jones (Toronto), Deborah Kent (Hillsdale College), Zoë Misiewicz (Toronto), Glen van Brummelen (Quest University).

Homotopy Theory
Théorie de l'homotopie
Org: Kristine Bauer (Calgary)

Kristine Bauer (Calgary), Julia Bergner (Kansas), Sunil Chebolu A (Western), Sunil Chebolu B (Western), Dan Christensen (Western), Veronique Godin (Harvard), Izak Grugric (UBC), Dan Isaksen (Wayne State), Rick Jardine (Western), Brenda Johnson (Union College), Keith Johnson (Dalhousie), Jack Morava (Johns Hopkins), Hugo Rodriguez Ordonez (Regina), Paul Pearson (Rochester), Kate Ponto (Chicago), Dorette Pronk (Dalhousie), Laura Scull (UBC), Don Stanley (Regina), Enrique Torres (UBC), Tian Yang (Rutgers), Peter Zvengrowski (Calgary).

Iwasawa Theory
Théorie d' Iwasawa
Org: Manfred Kolster, Romyar Sharifi (McMaster)

Mahesh Agarwal (McMaster), Ben Howard (Boston College), Adrian Iovita (Concordia), Jennifer Johnson-Leung (Idaho), Byoung-du Kim (Northwestern), Kumar Murty (Toronto), Jeehoon Park (McGill), Al Weiss (Alberta), Bei Zhang (Columbia).

Mathematical Applications of Category Theory
Applications mathématiques de la théorie des catégories
Org: F. William Lawvere (SUNY-Buffalo), Walter Tholen (York)

Bernard Badzioch (Buffalo), Michael Barr (McGill), John Bell (Western), Marta Bunge (McGill), Jonathon Funk (West Indies), Gabor Lukacs (Manitoba), Ernie Manes (Massachusetts), Matias Menni (Universidad Nacional de La Plata), Susan Niefield (Union College), Open Discussion (chaired by F. William Lawvere), Robert Pare (Dalhousie), Dorette Pronk (Dalhousie), Bob Rosebrugh (Mount Allison), Myles Tierney (UQAM), Richard Wood.

Mathematical Imagination
Imagination mathématique
Org: George Gadanidis (Western)

Presenters: Robert Bilinski (Collège Montmorency), Michelle Cordy (Thames Valley District School Board), Stewart Craven (Toronto District School Board), William Higginson (Queen's), John Kezys (Mohawk College), Donna Kotsopoulos (Wilfrid Laurier)

Panelists: William Higginson (Queen's), Donna Kotsopoulos (Wilfrid Laurier), Peter Taylor (Queen's), Immaculate Namukasa (Western)

Performances: Calculus: The Musical! by Sadie Bowman & Mark Guzman, Matheatre; Math-e-Motion by Stewart Craven (Toronto District School Board); Math Imagination Musical Performance by George Gadanidis (Western), Daryn Bee (Western), Jenna Bee and friends.

Mathematics of Finance
Finance mathématique
Org: Matt Davison (Western), Rogemar Mamon (Western), Mark Reesor (Western)

Alex Badescu (Calgary), Dave Bolder (Bank of Canada), Abel Cadenillas (Alberta), Joe Campolieti (Wilfrid Laurier), Matt Davison (Western), Keldon Drudge (Prism Valuation, Waterloo), Marcos Escobar-Anel (Ryerson), Matheus Grasselli (McMaster), Jeremy Graveline (Minnesota), Tom Hurd (McMaster), Cody Hyndman (Concordia), Sebastian Jaimungal (Toronto), Madhu Kalimipalli (Wilfrid Laurier), Valery Kholodnyi (Platts Ltd.), Adam Kolkiewicz (Waterloo), Hua Li (Calgary), Roman Makarov (Wilfrid Laurier), Marianito Rodrigo (Instituto Tecnologico Autonomo de Mexico), Dave Saunders (Waterloo), Luis Seco (Toronto), Anatoliy Swishchuk (Calgary), Ken Vetzal (Waterloo), Xikui Wang (Manitoba).

Non-Commutative Geometry
Géométrie non commutative
Org: Masoud Khalkhali (Western)

Paul Baum (Penn State), Katia Consani (Johns Hopkins), George Elliott (Toronto), Heath Emerson (Victoria), Sasha Gorokhovsky (Boulder), Li Guo (Rutgers), Piotr Hajac (Warsaw, Poland), Jerry Kaminker (Davis), Marcelo Laca (Victoria), Hanfeng Li (Buffalo), Snigdhayan Mahanta (Fields Institute), John Phillips (Victoria), Raphael Ponge (Toronto), John Roe (Penn State), Claude Schochet (Wayne State), Xiang Tang (St. Louis).

Nonlinear Wave Equations and Applications
Équations d'ondes non linéaires et leurs applications
Org: Walter Craig (McMaster), Catherine Sulem (Toronto)

Stephen Anco (Brock), Oliver Diaz-Espinosa (McMaster), Clement Gallo (McMaster), Jiansheng Geng (McMaster ; Nanjing), Philippe Guyenne (Delaware), Konstantin Khanin (Toronto), David Lannes (Bordeaux), Jeremy Quastel (Toronto).

Quantum Information Theory in Quantum Gravity
Théorie de l'information quantique en gravité quantique
Org: David Kribs (Guelph), Fotini Markopoulou (Perimeter Institute)

Cedric Beny (Waterloo), Louis Kauffman (Illinois-Chicago), Achim Kempf (Waterloo), Robert Martin (Waterloo).

Contributed Papers
Communications libres
Org: Tatyana Foth (Western)

Amal Amleh (St. Mary's), Michael Cavers (Regina), Virginie Charette (Sherbrooke), Alexei F. Cheviakov (UBC), Franklin Mendivil (Acadia), Paul Potgieter (South Africa), Freydoon Rahbarnia (Ferdowsi University of Mashhad, Iran), Yongjun Xing (Regina).

UQAM, Montréal (Québec)
June 1-6 juin

Prix / Prizes and Awards
Prix Cecil Graham pour thèse de doctorat de la SCMAI / CAIMS Cecil Graham Doctoral Dissertation Award
Prix de recherche de la SCMAI / CAIMS Research Prize
Prix d'excellence en enseignement de la SMC / CMS Excellence in Teaching Award
Prix Krieger-Nelson de la SMC / CMS Krieger-Nelson Prize - Izabella Laba (UBC)
Conférence Jeffery-Williams de la SMC / CMS Jeffery-Williams Prize - Martin Barlow (UBC)
Prix étudiants du Réseau MITACS / MITACS Student Awards
Prix du concours de présentations par affiches de MITACS / MITACS Poster Competition Prizes

Conférenciers pléniers / 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)
Nicole Tomczak-Jaegermann (Alberta)
Nizar Touzi (CREST-Paris)
Jianhong Wu (York)

Conférence populaire / Public Lecture
Yvan Saint-Aubin (Montréal)

Sessions
Combinatoire algébrique / Algebraic Combinatorics
Org: Christophe Hohlweg (Fields Institute) and Franco Saliola (UQAM)

Groupes algébriques et sujets reliés / Algebraic Groups and Related Topics
Org: Phillippe Gille (Paris-Sud), Zinovy Reichstein (UBC)

Topologie algébrique / Algebraic Topology
Org: Alejandro Adem (UBC), Bob Oliver (Paris XIII)

Théorie analytique des nombres / Analytic Number Theory
Org: Philippe Michel (Montpellier), Ram Murty (Queen's)

Géométrie arithmétique et théorie des nombres Arithmetic Geometry and Number Theory
Org: Gaëtan Chenevier (CNRS-ENS, Paris), Henri Darmon (McGill)

Formes automorphes / Automorphic Forms
Org: Stephen Kudla (Toronto), Colette Moeglin (CNRS-IMJ)

Lois d'échelle critiques pour polymères et percolation Critical Scaling for Polymers and Percolation
Org: Edwin Perkins (UBC), Wendelin Werner (Paris Orsay)

Analyse complexe et théorie des opérateurs / Complex Analysis and Operator Theory
Org: Emmanuel Fricain (Lyon), Javad Mashreghi (Laval) and Thomas Ransford (Laval)

Systèmes dynamiques complexes / Complex Dynamical Systems
Org: Xavier Buff (Toulouse), Misha Lyubich (Toronto), Tan Lei (Cergy-Pontoise)

Mathématiques financières / Financial Mathematics
Org: Nizar Touzi (CREST-Paris), Thomas Salisbury (York)

Analyse géométrique et nonlinéaire / Geometric and Nonlinear Analysis
Org: Pengfei Guan (McGill), Emmanuel Hebey (Cergy)

Mécanique des fluides industrielle / Industrial Fluid Mechanics
Org: Neil Balmforth (UBC), Jean Frédéric Gerbeau (INRIA), Bertrand Maury (Paris Orsay)

Méthodes cinétiques en EDP / Kinetic Methods in Partial Differential Equations
Org: François Castella (Rennes), Reinhard Illner (Victoria)

Éducation Mathématique / Mathematics Education
Org: Michèle Artigue (Paris), Bernard Hodgson (Laval)

Théorie des modèles et applications à la géométrie Model Theory and Applications to Geometry
Org: Zoé Chatzidakis (CNRS), Patrick Speissegger (McMaster)

Géométrie non commutative et K-théorie pour algèbres d'opérateurs / Non-Commutative Geometry and K-Theory for Operator Algebras
Org: Alain Connes (Collège de France-IHES), George Elliott (Toronto)

Dynamique nonlinéaire dans les sciences de la vie Nonlinear Dynamics in Life Sciences
Org: Jacques Bélair (Montréal), Pascal Chossat (CIRM-Marseille), Fahima Nekka (Montréal), Jianhong Wu (York)

Analyse numérique des systèmes hyperboliques Numerical Analysis for Hyperbolic Systems
Org: Marc Laforest (École Polytechnique de Montréal) and Emmanuel Lorin (Paris-Sud XI)

Équations aux dérivées partielles / Partial Differential Equations
Org: Henri Berestycki (Paris), Robert Jerrard (Toronto)

Théorie des probabilités / Probability Theory
Org: Martin Barlow (UBC), J.F. Le Gall (Paris XI-ENS)

Calcul scientifique / Scientific Computing
Org: Christine Bernardi (CNRS-Paris VI), Anne Bourlioux (Montréal), Bryan Wetton (UBC)

Théorie des ensembles et ses applications / Set Theory and its Applications
Org: Alain Louveau (Paris VI) and Stevo Todorcevic (Toronto; Paris Dauphine)

Statistique / Statistics
Org: Yannick Baraud (Nice), Boris Levit (Queen's)

Processus stochastiques en évolution, écologie et génétique / Stochastic Processes in Evolution, Ecology and Genetics
Org: Donald Dawson (Carleton), Sylvie Méléard (Ecole Polytéchnique-Paris X)

Topologie symplectique et de contact / Symplectic and Contact Topology
Org: Emmanuel Giroux (CNRS-ENS Lyon), Yael Karshon (Toronto)

Topologie, noeuds et sujets reliés / Topology, Knots and Related Fields
Org: Michel Boileau (Toulouse), Stephen Boyer (UQAM)

Méthodes variationnelles et numériques en géométrie, physique et chimie / Variational and Numerical Methods in Geometry, Physics and Chemistry
Org: Lia Bronsard (McMaster), Eric Cances (ENPC), Maria Esteban (CNRS - Paris-Dauphine)

Femmes en mathématiques / Women in Mathematics
Org: Barbara Keyfitz (Fields), Marie-Françoise Roy (Rennes)

Directeurs scientifiques du Congrès / Scientific Directors:
Octav Cornea (Montréal), Nassif Ghoussoub (UBC), François Loeser (École normale supérieure)

Comité scientifique / Scientific Committee:
Jean-Pierre Bourguignon (Institut des Hautes Études Scientifiques)
Étienne Ghys (ENS, Lyon)
Arvind Gupta (SFU and MITACS)
Barbara Keyfitz (Fields and Houston)
François Lalonde (CRM and 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)

SCHEDULE / HORAIRE

<table>
<tr><th>THURSDAY/JEUDI
December 6 décembre</th><th>SATURDAY/SAMEDI
December 8 décembre</th><th>SUNDAY/DIMANCHE
December 9 décembre</th><th>MONDAY/LUNDI
December 10 décembre</th></tr>
<tr><td rowspan="3">18:00 – 22:00
Executive Committee Meeting
Réunion du Comité exécutif</td><td>8:00 – 17:00
Registration/Inscription
9:30 – 16:00
Exhibits/Expositions</td><td>8:00 – 17:00
Registration/Inscription
9:30 – 16:00
Exhibits/Expositions</td><td>8:00 – 16:00
Registration/Inscription</td></tr>
<tr><td>8:30 – 9:00
Opening/Ouverture
9:00 – 9:45
Marcelo C. Borba</td><td>8:30 – 10:00
Scientific Sessions</td><td>8:30 – 10:00
Scientific Sessions</td></tr>
<tr><td colspan="3">10:00 – 10:30
Break/Pause</td></tr>
<tr><td>FRIDAY/VENDREDI
December 7 décembre</td><td rowspan="7">10:30 – 12:30
Scientific Sessions</td><td>10:30 – 11:30
Scientific Sessions</td><td>10:30 – 11:30
Scientific Sessions</td></tr>
<tr><td rowspan="6">11:00 AM – 1:00 PM
Development Group Luncheon
Lunch du groupe de développement

1:30 – 6:30
Board of Directors Meeting
Réunion du conseil d'administration de la SMC</td><td>11:30 – 12:15
Blaine Lawson</td><td>11:30 – 12:15
Otmar Venjakob</td></tr>
<tr><td colspan="2">12:30 – 14:00
Lunch Break</td></tr>
<tr><td>14:00 – 14:45
Giovanni Landi</td><td>14:00 – 14:45
Lap Chi Lau</td><td>14:00 – 14:45
Vinayak Vatsal</td></tr>
<tr><td>15:00 – 15:45
Seth Lloyd</td><td>15:00 – 15:45
Mikhail Kapranov</td><td>15:00 – 15:45
Erich Kaltofen</td></tr>
<tr><td colspan="2">15:45 – 16:00
Break/Pause</td></tr>
<tr><td rowspan="2">16:00 – 17:30
Scientific Sessions</td><td>16:00 – 17:30
Scientific Sessions
17:30 – 18:30
Richard Nowakowski</td><td rowspan="2">16:00 – 17:30
Scientific Sessions</td></tr>
<tr><td>7:00 –9:00
Welcome Reception
Réception d'accueil</td><td></td><td>18:00 – 19:00
Reception (cash bar)
Réception (bar payant)

19:00 – 22:00
Banquet</td></tr>
</table>

For the latest schedule details please visit the web site: www.cms.math.ca/events
La version la plus récente du programme est en ligne au www.cms.math.ca/reunions

ALEJANDRO ADEM NAMED NEW PIMS DIRECTOR

The Pacific Institute for the Mathematical Sciences is pleased to announce that Alejandro Adem has been appointed the new Director of PIMS. He will commence his five-year term on July 1, 2008.

Presently the PIMS Deputy Director, Professor Adem is a Professor of Mathematics at the University of British Columbia in Vancouver, Canada, and holds the Canada Research Chair in Algebraic Topology. He received his BSc in 1982 from the National University of Mexico, and his PhD from Princeton University in 1986. After holding a Szegö Assistant Professorship at Stanford University and spending a year at the Institute for Advanced Study in Princeton, he joined the faculty of the University of Wisconsin-Madison in 1990, where he remained until 2004. Professor Adem has held visiting positions at the ETH-Zurich, the Max Planck Institute in Bonn, the University of Paris VII and XIII, and at Princeton University.

Professor Adem's mathematical interests span a variety of topics in algebraic topology, group cohomology and related areas. He has written numerous research articles as well as two highly regarded monographs. He has given over 200 invited talks on his research throughout the world, and has supervised several PhD students and postdoctoral fellows. He was awarded the US National Science Foundation Young Investigator Award in 1992, a Romnes Faculty Fellowship in 1995 and a Vilas Associate Award in 2003. He has extensive editorial experience and is currently an editor for the Memoirs and Transactions of the American Mathematical Society.

Professor Adem brings extensive administrative experience to PIMS. He served as Chair of the Department of Mathematics at the University of Wisconsin-Madison during the period 1999-2002 and since 2005 he has been the Deputy Director at PIMS. Professor Adem has outstanding credentials as a scientific organizer. He served for four years as Co-Chair of the Scientific Advisory Committee at the Mathematical Sciences Research Institute at Berkeley (MSRI) and as member of their Board of Trustees. Since 2005 he is a member of the Scientific Advisory Board for the Banff International Research Station (BIRS).

"The process of looking for the next PIMS Director started with a call for applications in January, 2007," said Ivar Ekeland, current PIMS Director. "I am very grateful to the Search Committee to have come up with such an outstanding candidate, and for UBC to have made this appointment possible. This is excellent news for PIMS and I am looking forward to working with my successor, both before and after July 1."

Professor Adem said, "It is a great honour for me to assume the position of Director of PIMS. Under the leadership of Ivar Ekeland, PIMS has developed into a world-class centre for mathematical research, industrial collaboration and educational outreach. The recent designation of PIMS as a Unité Mixte International of the French CNRS is a recognition of PIMS' high standing in the international community. I am extremely grateful to all of my colleagues in the PIMS community for their support and look forward to working with them to further develop PIMS as one of the leading mathematical institutes in the world."

Professor Adem brings a wealth of experience in organizing international collaborations connecting Canadian mathematical scientists with colleagues abroad. This includes his leadership in organizing the first joint meeting between the Canadian and Mexican mathematical societies in 2006, as well as his crucial role in the development of the Pacific Rim Mathematical Association (PRIMA). He will continue to build on PIMS' outstanding record of mathematical collaboration between academic, industrial and international partners.

Reprinted from the Pacific Institute for the Mathematical Sciences
www.pims.math.ca/The_News/Latest_News/Alejandro_Adem_Named_New_PIMS_Director/

Letters to the Editors
Lettres aux Rédacteurs

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

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

MOT DU TRÉSORIER

par **David Rogers**
Saint Mary's University, Halifax

Le 19 septembre dernier, le *Ottawa Citizen* publiait un article signé Janice Tibbets intitulé « Canada Falls Behind in Science Grads », dont voici un extrait :

> *Si le peuple canadien est l'un des plus instruits au monde, les universités ne produisent plus suffisamment de diplômés en sciences, souligne un rapport de l'Organisation de coopération et de développement économiques (OCDE) qui compare le Canada à plus de vingt-quatre pays développés.*
>
> *D'après les analystes, ce rapport lance un signal d'alarme : le Canada doit renverser cette tendance de plus en plus marquée s'il ne veut pas rater le coche.*
>
> *« De plus, les femmes sont désormais majoritaires au sein de la population étudiante universitaire. Les universités doivent donc trouver des moyens de les attirer vers les sciences et le génie, explique David Robinson, directeur général adjoint de l'Association canadienne des professeures et professeurs d'université. »*

Les mathématiques sont à la base de toutes les disciplines en sciences et en génie. Le raisonnement quantitatif est en demande croissante en sciences sociales et dans le milieu des affaires. Les employeurs ont de plus en plus de mal à trouver de la main-d'œuvre qualifiée.

Que peut y faire la Société mathématique du Canada?

La SMC soutient l'éducation mathématique (camps mathématiques, concours, Math à Moscou, *CRUX with MAYHEM*, prix Adrien-Pouliot, Prix d'excellence en enseignement, Comité d'éducation, recueils de problèmes des Olympiades, bourses du fonds de dotation et forums sur l'enseignement des mathématiques), la recherche et la collaboration (*Journal canadien de mathématiques*, *Bulletin canadien de mathématiques*, Réunions semestrielles, prix G. de. B. Robinson), deux collections de monographies consacrées à la recherche ainsi que d'autres prix nationaux.

Ce vaste éventail d'activités professionnelles produit un flot ininterrompu d'hommes et de femmes ayant une formation en mathématiques qui contribuent à la compétitivité du Canada sur la scène mondiale. En encourageant les étudiants à poursuivre leurs études en mathématiques et en leur présentant des emplois intéressants et enrichissants qui font appel aux mathématiques, la SMC s'efforce de maintenir ce flot de diplômés forts en mathématiques. Ces efforts ne sont possibles que grâce à la contribution professionnelle et financière d'un grand nombre de bénévoles de la SMC qui sollicitent de généreux donateurs et concluent des partenariats avec des sociétés et des individus.

Depuis 18 mois, la SMC met en place une démarche de financement plus systématique. La hausse des coûts et les variations du taux de change font en sorte que la SMC ne peut manifestement pas maintenir toutes ses activités avec son revenu actuel.

Pour poursuivre nos activités, nous avons besoin de votre aide :

- Si vous avez déjà fait un don ou commandité une activité, nous vous en remercions. Si vous ne l'avez pas encore fait, nous vous invitons à y réfléchir. La Société a besoin de votre aide.
- Si vous connaissez des entreprises, organismes ou personnalités que la SMC devrait solliciter, faites-nous part de vos idées.
- Si vous aimeriez accompagner l'équipe de la campagne de financement de la SMC lors d'une rencontre avec un donateur potentiel afin de transmettre votre enthousiasme pour les mathématiques ou pour une activité de la SMC à laquelle vous avez pris part, dites-le-nous.
- Pour toute suggestion quant au message que la Société devrait livrer à ses donateurs ou commanditaires potentiels, n'hésitez pas à communiquer avec nous.

Nous sommes toujours étonnés du nombre de suggestions de donateurs et de commanditaires commerciaux et individuels que nous récoltons lorsque nos membres s'y mettent vraiment. Bien souvent, nos membres sont en mesure de fournir des noms de personnes à contacter directement au sein des entreprises (anciens étudiants, anciens participants à un camp ou à un concours mathématique, lauréats, boursiers, etc.). Le fait de communiquer avec une organisation par l'entremise d'un contact interne qui accepte de pousser le dossier ou de le présenter à la bonne personne ou au groupe concerné au sein de l'entreprise rehausse *considérablement* le taux de réussite. Nous vous demandons d'y réfléchir quelques minutes et de nous aider à réaliser cette activité indispensable.

Pour toute question ou pour obtenir des détails sur les activités de financement de la SMC, veuillez communiquer avec Graham Wright (gpwright@smc.math.ca, 613-562-5800 poste 3528) ou David Rodgers (drodgers@umich.edu, 321-777-2156).

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

DECEMBER 2007 DÉCEMBRE

8-10 **CMS Winter 2007 Meeting, Host: University of Western Ontario; Hilton Hotel, London, Ontario**
www.cms.math.ca/Events/winter07

11-14 Workshop on Chaos and Ergodicity of Realistic Hamiltonian Systems (CRM, University of Montreal, Montreal,Quebec)
www.crm.math.ca/Dynamics2007/

11-15 "Operator Spaces and Quantum Groups", (Fields Institute workshop)
www.fields.utoronto.ca/programs/scientific/07-08/operator_algebras/

12-15 First Joint International Meeting between the AMS and the New Zealand Mathematical Society (NZMS) (Wellington, New Zealand)
www.ams.org/amsmtgs/internmtgs.html

JANUARY 2008 JANVIER

4-5 AMS Short Course - Applications of Knot Theory (San Diego, CA)
www.ams.org

6-9 Joint Mathematics Meetings (San Diego, CA)
www.ams.org/amsmtgs/national.html

7-11 Workshop on Recent Advances in Operator Theory and Function Theory, (Fields Institute, Toronto, ON)
www.fields.utoronto.ca/programs/scientific/07-08/harmonic_analysis/

14-17 Conference on Mathematical Physics and Geometric Analysis
www.fields.utoronto.ca/programs/scientific/07-08/geomanalysis/

18-19 Young Mathematicians' Conference (CRM, Montreal,QC)
activities@crm.umontreal.ca

24-26 Initial Conditions Workshop (CRM, Montreal,QC)
activities@crm.umontreal.ca

FEBRUARY 2008 FÉVRIER

4-14 Advance Course on Simplicial Methods in Higher Categories (Centre de Recerca Matematica, Bellaterra, Italy)
www.crm.cat/ACQuasiCategories

18 - 24 Joint Mathematics Meetings (San Diego, CA)
www.ams.org/amsmtgs/national.html

18 - 24 Workshop on Harmonic Analysis, (Fields Institute, Toronto, ON)
www.fields.utoronto.ca/programs/scientific/07-08/harmonic_analysis/

MARCH 2008 MARS

5-7 The ICMI Centennial Symposium (Accadèmia dei Lincèi, Rome, Italy)
www.unige.ch/math/EnsMath/Rome2008/

8 The ICMI Centennial Symposium (Istituto dell'Enciclopedía Italiana, Rome, Italy)
www.unige.ch/math/EnsMath/Rome2008/

4-14 Advance Course on Geometric Flows and Hyperbolic Geometry (Centre de Recerca Matematica, Bellaterra, Italy)
http://www.crm.cat/ACGeometryFlows

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/

7-11 Workshop: Spectrum and Dynamics (CRM, Montreal,QC)
activities@crm.umontreal.ca

MAY 2008 MAI

10-13 SIAM Conference on Optimization (Boston, MA)
www.siam.org/meetings/op08/

12-16 Workshop: Singularities, Hamiltonian and Gradient Flows (CRM, Montreal,QC)
activities@crm.umontreal.ca

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

1-6 **Second Canada-France Congress (UQAM, Montréal, QC)**
www.cms.math.ca/Events

16-19 2nd International Conference, Athens Institute for Education and Research (ATINER), (Athens, Greece)
www.atiner.gr/docs/Mathematics.htm

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

JULY 2008 JUILLET

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

Groups of Homotopy Equivalences and Related Topics
June 29 - July 5, 2008
Dalhousie University

This will be the third international meeting on this topic. The first was held at the CRM, Montreal (1988) and the second at the Palazzo Feltrinelli of the Universita di Milano at lake Garda (1999). Proceedings of these were published in Springer Lecture Notes in Mathematics v. 1425 (1990) and Contemporary Mathematics (AMS) v. 274 (2001).

For information please visit the website:
http://www.mathstat.dal.ca/~keast/homotopy.html

Organizing Committee:

Martin Arkowitz (Dartmouth College)
Keith Johnson (Dalhousie University)
Ken-Ichi Maruyama (Chiba University)
Renzo Piccinini (Dalhousie University)

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