CMS NOTES de la SMC

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GRADUATE STUDIES

Michael Bennett
University of British Columbia

Some questions, but no answers

Once upon a time, before it became my stated goal to end up a cautionary tale for younger faculty, I was, I freely confess, a graduate student. Quite likely, this is true of many members of the Canadian Mathematical Society. We mostly remember these times for their challenges and rewards, for academic and personal growth. Probably, many of us believe that graduate school today is, by and large, pretty similar to what we experienced. Perhaps this is even true. But what does the future hold for graduate studies in Canada? At many Canadian universities, mathematics graduate programs are approaching historically high enrollments. While funding and other opportunities appear to be keeping pace with these developments, will the traditional job market continue to support such an expansion, or is it necessary to consider alternatives? Can we as a community afford to adopt a "business as usual" approach? Most importantly, from the viewpoint of this article, what can the Canadian Mathematical Society do to help and what resources can we provide graduate programs and, more particularly, the students in them?

When I was an undergraduate twenty-five years ago, I was lured into mathematics from studying history, at least partially because the job prospects seemed so rosy at the time. The most recently published data from the American Mathematical Society at the time listed the unemployment rate for recent graduates with Ph.D.s in mathematics as 0%, and the talk of the day, with the pending retirement of many of the baby-boomers, was that things were only going to get better! Well, due to an economic downturn (sound familiar?), the fall of the Berlin Wall (and subsequent availability of top-notch eastern European faculty), and other factors, when I actually finished my dissertation a number of years later, the unemployment rate for math Ph.D.s was the highest on record, at 10.7% (note that the AMS undercounts their unemployment statistics by listing "unknown" and "part-time" as separate categories from "unemployed").

The moral of this story is that it is remarkably difficult to predict with any great degree of certainty what the job market will be like, academically or otherwise, next year let alone five or ten years down the line. But this is precisely what we are doing if we expand our graduate programs, and there is a fair amount of evidence that graduate enrollment in mathematics (and indeed in the sciences more generally) is increasing. At the University of British Columbia, in the mid 1980s, there were fewer than 30 graduate students in mathematics despite roughly the same number of faculty members as we have today. We now have 98 graduate students in Mathematics, an increase of approximately 20% from only 5 years ago. At the University of Alberta, the current figure stands at 127 students (including Statistics), while at the University of Toronto, there are, by my count, 148 graduate students. In part, the ability to sustain graduate programs at these levels is due to increased funding opportunities in conjunction with initiatives at the provincial and federal government levels. But are these increased enrollments indicative of increased future employment opportunities? I can only guess at an answer to this question. It is by no means certain, for instance, that an increased willingness by governments to fund graduate student education will in any way be tied to an increased willingness to fund positions for said students upon graduation.

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continued on page 23

EDITORIAL

by Robert Dawson
Saint Mary's University, Halifax

Caveat Calculator

As you probably know, it takes time to prepare the *Notes* for press; and I am writing this editorial in October. Hopefully by the time you read this, things will have calmed down, but on many mornings recently the financial news has not lent much savour to the morning coffee. To add insult to injury, the occasional writer has suggested that a large chunk of the blame should be laid at the desks of "the math graduates", the inside men at the financial skonk works who study the various exotic financial instruments that seem to have been behind so much of the trouble.

Now, I have no idea precisely what these people do; I have known a couple of them and they were extremely quiet about the details of their work. This is, of course, an unusual trait among mathematicians! However, I understand that in many cases it has something to do with the Black-Scholes equation, Itô integrals, and various other ways of quantifying uncertainty.

Now, the Black-Scholes equation is a rather elegant little piece of stochastic calculus. Its underlying assumptions are rather unrealistic; in particular, if the assumptions dealing with market efficiency were truly valid, every stock would trade at its correct price and there would be no bad investments (or good ones). And the shine of the Nobel Prize in economics that Merton and Scholes were awarded for it (Black, by then dead, was ineligible) was perhaps slightly dimmed when they managed to lose a hatful of other peoples' money trying to put the theories into practice. Nonetheless, it doesn't seem fair to blame the equation.

I turn now to my favorite reference on such matters, Charles Mackay's 1841 masterpiece on "*Extraordinary Popular Delusions and the Madness of Crowds*." My copy is the 1932 edition, with a foreword by Bernard Baruch in which he recommends the study of its contents to ward off financial disasters such as that which had just occurred in 1929. (Mackay's book is available online in various places, for instance http://www.gutenberg.org/etext/24518)

Surely enough, we read about the French "Mississippi Scheme" and English "*South-Sea Bubble*" of the early eighteenth century; and indeed of the Dutch tulip mania of 1634, when a single bulb might change hands for a small fortune (until the market crashed). Clearly, speculators have always been able to blind themselves to the realities of markets and persuade themselves that just this once what goes up won't come down again. It may be that financial mathematics made the process a little easier this time, by hiding the uncertainties and risks more deeply than would otherwise have been the case. But it is surely not the root of the problem. In his "*Miscellany*", the late J. E. Littlewood misquotes St Paul: "Perfect greed casteth out fear." All too true, whether the investment is subprime mortgages or tulips.

Internally, pure mathematics appears to be consistent; what is proved in one fragment will not (we believe) be disproved in another. Applied mathematics is not; more or less anything can be proved by the selective application of mathematics. The problem creeps in at the modelling stage; there is no algorithm for finding a model well-enough defined that subjective biases cannot be satisfied. And if the world wishes to be deceived, most scientifically deceived the world will be. Caveat Calculator.

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ÉDITORIAL

par Robert Dawson
Saint Mary's University, Halifax

Caveat Calculator

Comme vous le savez sans doute, la préparation des *Notes* pour impression nécessite un certain temps. Je rédige donc cet éditorial en octobre. J'espère que les choses se seront calmées au moment où vous lirez ces lignes, mais, à plus d'une reprise, dernièrement, les nouvelles financières au bulletin radio du matin donnaient un goût amer au café matinal. Certains rédacteurs vont même jusqu'à insinuer qu'une bonne partie du blâme devrait porter sur les « diplômés en mathématiques », ces experts de la finance qui travaillent dans l'ombre et presque en secret à l'étude des divers instruments financiers « exotiques » que l'on soupçonne d'être les grands responsables de la crise actuelle.

En fait, je ne sais pas exactement ce que font ces personnes. J'en ai connu quelques-unes, qui étaient extrêmement avares de commentaires sur la nature de leur travail. Ce qui, bien sûr, est tout à fait inhabituel pour des mathématiciens, n'est-ce pas? Je crois cependant comprendre que, dans bien des cas, il y a un lien à faire avec l'équation de Black-Scholes, les intégrales d'Itô et les diverses autres façons de quantifier l'incertitude.

Or, l'équation de Black-Scholes est une illustration plutôt élégante de calcul stochastique. Ses hypothèses sous-jacentes sont assez irréalistes. En particulier, si les hypothèses relatives à l'efficacité des marchés étaient vraiment valides, toutes les actions s'échangeraient à leur prix correct, et il n'y aurait pas de mauvais (ni de bons) investissements. L'éclat du prix Nobel d'économie qu'ont reçu Merton et Scholes pour cette équation (Black, décédé à ce moment-là, n'était plus admissible) a sans doute été légèrement terni en raison des pertes qu'ils ont essuyées en testant leurs théories avec l'argent des autres. Il semble toutefois injuste de jeter le blâme sur l'équation.

Je me tourne maintenant vers ma référence préférée pour fouiller de tels sujets, soit le chef-d'œuvre de Charles Mackay intitulé *Extraordinary Popular Delusions and the Madness of Crowds* (1841). L'édition que je possède, datée de 1932, contient un avant-propos de Bernard Baruch, qui recommande l'étude de cet ouvrage pour parer les désastres financiers comme celui qui venait de se produire en 1929. (L'ouvrage de Mackay est publié sur le Web à divers endroits, notamment au http://www.gutenberg.org/etext/24518)

Bien sûr, nous avons déjà entendu parler du complot du Mississippi, en France, et de la *South-Sea Bubble*, en Angleterre, au début du XVIII^{e} siècle; et aussi probablement de la folie des tulipes hollandaises de 1634, année où les bulbes se vendaient une petite fortune (jusqu'à ce que le marché s'effondre). De toute évidence, les spéculateurs sont toujours aveuglés par les réalités des marchés et parviennent à se persuader que pour une seule fois, ce qui monte ne redescendra plus. Peut-être que les mathématiques financières ont légèrement facilité le processus cette fois-ci, en cachant plus profondément les incertitudes et les risques qu'il n'aurait fallu. Mais elles ne sont certainement pas la cause du problème. Dans son ouvrage *Miscellany*, le regretté J. E. Littlewood écrit, en déformant les propos de saint Paul, que « l'avarice parfaite bannit la crainte ». Voilà qui est trop vrai, qu'il s'agisse de prêts hypothécaires à risque ou de bulbes de tulipes.

De l'intérieur, les mathématiques pures semblent constantes. Une preuve faite à un endroit (ainsi le croyons-nous) ne sera pas réfutée ailleurs. Ce n'est pas le cas des mathématiques appliquées; il est possible de prouver à peu près n'importe quoi par des applications mathématiques sélectives. Le problème se dessine à l'étape de la conception, car aucun algorithme ne permet de trouver un modèle assez bien défini pour éliminer toute subjectivité. Si le monde veut être déçu, il le sera assurément d'un point de vue scientifique. Caveat Calculator.

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.

The Riemann Hypothesis: A Resource for the Afficianado and Virtuoso Alike

by Peter Borwein, Stephen Choi, Brendan Rooney, and Andrea Weirathmueller
CMS Books in Mathematics, Springer, New York, 2008
533 pp. $93.59 CDN
ISBN: 978-0-387-72125-5, e-ISBN 978-0-387-72126-2

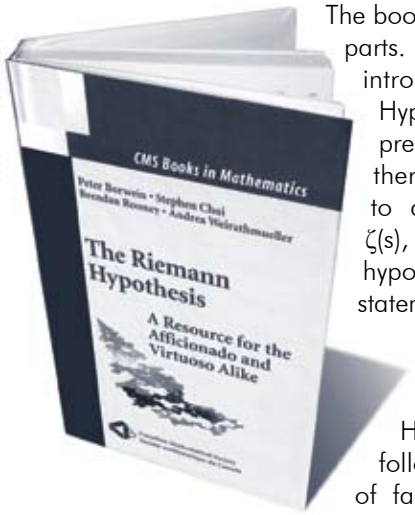
Reviewed by Jeff Hooper,
Department of Mathematics, Acadia University
Sackville, New Brunswick.

The Riemann Hypothesis is viewed by many as the Holy Grail of mathematics. Of the seven Millennium Prize problems, it is the only one which also appeared on Hilbert's list of 23 problems a century earlier. Hilbert is in fact supposed to have said that if he were to awaken after having slept for a thousand years, his first question would be: "Has the Riemann Hypothesis been proven?"

The announcement of the Millennium Prizes a few years ago thrust the Riemann Hypothesis into the public consciousness. During the last several years a number of "popular" books have appeared on the topic of the Riemann Hypothesis: Derbyshire's *Prime Obsession: Bernhard Riemann and the Greatest Unsolved Problem in Mathematics*, du Sautoy's *The Music of the Primes: Searching to Solve the Greatest Mystery in Mathematics*, Rockmore's *Stalking the Riemann Hypothesis*, and Sabbagh's two books, *Dr Riemann's zeros* and *The Riemann Hypothesis: The Greatest Unsolved Problem of Mathematics*. While it's a delight to see mathematics promoted more widely, the depth of the mathematical content in these books is, as one would expect, fairly limited. For a professional mathematician or graduate student who wishes to take on a more serious study of the mathematics surrounding the Riemann Hypothesis, these popular texts can at best only scratch the surface or provide a cultural backdrop.

So where should someone turn for a more thorough mathematical treatment? There are several excellent books available on the Riemann zeta function, including Titchmarsh's classic *The Theory of the Riemann Zeta Function*, Edwards's *Riemann's Zeta Function*, Patterson's *An introduction to the Theory of the Riemann Zeta Function*, and Ivíc's comprehensive *The Riemann Zeta Function*. However, in each of these the Riemann zeta function itself is the focus and the Riemann Hypothesis, though pervasive, is only brought into the foreground when appropriate.

The book under review here gives a new alternative: its focus is squarely on being an advanced introduction to the circle of ideas surrounding the Riemann Hypothesis. As such, it fills an important niche in the literature. It is mainly a source book, and the majority of its content consists of reprints of original papers and expository articles. The emphasis of the book is made clear by the authors at the outset: their choice of papers is informed by the intimate connections between the Riemann Hypothesis and the Prime Number Theorem.



The book is divided into three main parts. The first is an extensive introduction to the Riemann Hypothesis. After some analytic prerequisites are considered, there are chapters devoted to algorithms for calculating $\zeta(s)$, empirical evidence for the hypothesis, and a number of statements which are equivalent to it. Also included are discussions of various extensions of the Riemann Hypothesis, of results which follow on from its validity, and of failed attempts at a proof. The introduction concludes with a section of formulas involving zeta values, as well as a timeline of highlights in the development of the theory through 2004. The importance of this first part should not be underestimated: there is a wealth of material here, much of which either does not appear in the texts mentioned above or can be difficult to find.

Part two consists of four 'Expert Witness' accounts of the Riemann Hypothesis: these are reprints of four recent surveys of the topic, including Bombieri's Millennium Prize Problem Description, Sarnak's 2004 elaboration, the excellent 2003 AMS Notices article by Conrey, and a 2003 article by Ivíc, in which he provides and analyzes arguments which cast doubt on the validity of the Riemann Hypothesis.

The third and final part of the book is a collection of original papers on various aspects related to the Riemann Hypothesis. Each paper is preceded by a discussion to help place its results in context. The collection of papers of course includes Riemann's original 1859 paper, both in digitized form and in a translation by D.R. Wilkins, as well as Weil's 1941 paper in which he proves the Riemann Hypothesis for function fields. Each of the remaining papers either involves direct connections with the Riemann Hypothesis, or is connected to related analytic aspects, especially the Prime Number Theorem. Indeed, the papers of Hadamard and de la Vallée Poussin are both here, as is the earlier important contribution of Chebyshev. As we might expect, we also find contributions by Hardy and Littlewood: the 1914 paper in which Hardy first proves that there are infinitely many zeros of $\zeta(s)$ on the critical line, a 1915 Hardy expository article on the Prime Number Theorem, and the 1915 Hardy-Littlewood paper in which they offer new approaches to proving PNT.

Among the remaining papers are several which offer various elementary approaches to the Prime Number Theorem: the pair of independent 1949 papers by Selberg and Erdös, along with the three approaches given in the papers of Newman (1980), Daboussi (1984), and Hildebrand (1986). We also find important contributions of Turán and Skewes, as well as the disproof of Polya's Conjecture by Haselgrove. Two further

continued page 18

BOOK REVIEW A delight to read

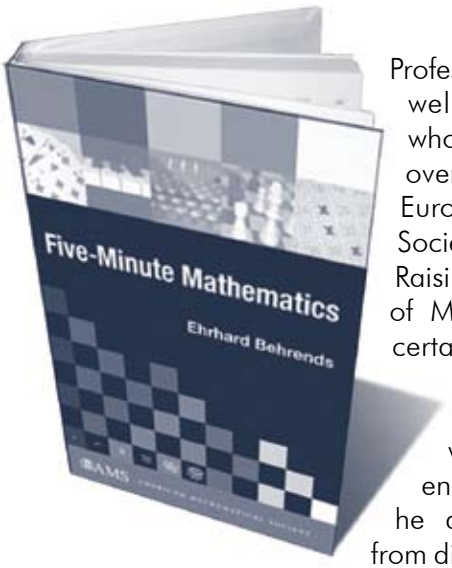
Five-Minute Mathematics

by Ehrhard Behrends
American Mathematical Society, 2008,
380 pp, $35.00 US , ISBN 978-0-82-184348-2.

Review by Robin Wilson, Open University Milton Keynes, UK

Five-Minute Mathematics started life as a series of one hundred weekly columns entitled *Fünf Minuten Mathematik*, published throughout 2003 and 2004 in *Die Welt* and the *Berliner Morgenpost*. The author's hope was "to convince readers who were traumatized by school mathematics that the subject is not the boring, dry-as-dust subject that they remember, but a wellspring of fascination and excitement". The columns generated considerable interest when they first appeared, and the author decided to collect them all together in book form, first in a German edition, and now in an English edition published by the American Mathematical Society and Oxford University Press. The columns have been carefully revised and extra material has been added when this seemed appropriate.

The columns are a delight to read. They range very widely through mathematics, both ancient and modern, from Euclid's proof that there are infinitely many primes to the '*P* = *NP*?' Conjecture, from straightedge-and-compass constructions to the Monty Hall problem in probability, and from the mathematics of music to Andrew Wiles's proof of Fermat's last theorem.



Professor Behrends is a well-known expositor who will shortly be taking over as Chair of the European Mathematical Society's committee on Raising Public Awareness of Mathematics. He has certainly raised public awareness with these fine columns, which are clearly and engagingly written, and he does not shy away from difficult topics when he can find a way to explain them at an appropriate level – even the Riemann hypothesis and the work of Perelman find a place within these pages. The publishers have also done an excellent job; the print is clear and there are a large number of full-colour pictures, all printed on high-quality paper. The book is a delight to dip into, and can be highly recommended as a stocking present for yourself or someone else this Christmas.

(Reprinted by permission from the October issue of the newsletter of the London Mathematical Society.)

CALL FOR PROPOSALS

Call for Proposals for the Jim Totten Special Issue of CRUX

A special issue of Crux Mathematicorum with Mathematical Mayhem will be published in 2009, dedicated to the memory of Jim Totten. This is a further call for problem proposals, articles, solutions to open problems, contests, and special projects.

The deadline for articles is December 1, 2008 and the deadline for problem proposals is January 1, 2009. Note that material is also solicited (at the appropriate level) for the Mathematical Mayhem section as well. For special projects please send an email to crux-editors@cms.math.ca and consult with the editors as soon as possible.

Vàclav (Vazz) Linek
Editor-in-Chief,
CRUX with MAYHEM

Appel de propositions pour le numéro spécial de Crux en l'honneur de Jim Totten

Un numéro spécial de Crux Mathematicorum with Mathematical Mayhem consacré à la mémoire de Jim Totten sera publié en 2009. C'est un autre appel pour proposer des problèmes, des articles, des solutions aux problèmes non résolus, des concours, et des projets spéciaux.

La date limite pour soumettre des articles est le 1er décembre 2008 et la date limite pour des propositions de problèmes est le 1er janvier 2009. Notez que nous sollicitons également des propositions (au niveau approprié) pour la section Mathematical Mayhem. Pour des projets spéciaux veuillez envoyer un courrier électronique à crux-editors@cms.math.ca et consulter avec les rédacteurs aussitôt que possible.

Vàclav (Vazz) Linek
Rédacteur en chef,
CRUX with MAYHEM

BRIEF BOOK REVIEWS

by S. Swaminathan
Dalhousie University, Halifax

High-Dimensional Partial Differential Equations in Science and Engineering

Edited by André Bandrauk, Michel C. Delfour and Claude Le Bris
CRM Proceedings & Lecture Notes, Volume 41
xiv + 194pp. AMS 2007, ISBN-13: 978-0-8218-3853-2

High-dimensional spatio-temporal partial differential equations present major challenges to scientific computing of the future. Recent developments in numerical techniques, appropriate computer implementations, and the use of computers with parallel and even massively parallel architectures have made progress possible opening up new perspectives in many fields of applications. Examples of equations that can now be handled include kinetic plasma equations, many body Schrödinger equation, Dirac and Maxwell equations for molecular electronic structure and nuclear dynamic computations, options pricing equations in mathematical finance, and Fokker-Planck and fluid dynamics equations in complex fields. A conference on High-Dimensional Partial Differential Equations in Science and Engineering was held at CRM, Université de Montréal in August 2005. This volume brings together the contributions by experts of international stature who participated at the conference.

Probability and Mathematical Physics, A Volume in Honor of Stanislav Molchanov

Edited by Donald A. Dawson, Vojkan Jakšić and Boris Vainberg
CRM Proceedings & Lecture Notes, Volume 42
x + 475pp. AMS 2007, ISBN 978-0-8218-4089-4

Stanislov Molchanov has been a professor at Moscow State University for 25 years before arriving in the U. S. in 1991. He has published more than 250 papers on stochastic differential equations, spectral theory for deterministic and random operators, localization and intermittency, mathematical physics, optics and other topics. He had more than 40 doctoral students and a much wider circle of people who learned from him and appreciated the chance to work with him.

This volume is based on talks given at a conference celebrating his 65th birthday, held at CRM, Université de Montréal in June 2005. It contains 24 papers covering a broad range of topics in stochastic differential equations, asymptotics of Poincaré functions, Schrödinger operators, spectral problems, scattering of solitons, Jacobi matrices, Gibbs fields, periodic elliptic equations, Green's functions of generalised Laplacians and orthogonal polynomials.

Universality and Renomalization

Edited by Ilia Binder and Dirk Kreimer
Fields Institute Communications 50,
v + 404pp. AMS 2007, ISBN 978-0-8218-4273-7

The Fields Institute organized a thematic program on "Renormalization and Universality in Mathematics and Mathematical Physics" in the fall of 2005. Part of the program were two workshops: "Percolation, SLE and related topics" (September 2005) and "Renormalization and Universality in Mathematical Physics" (October 2005). This volume contains the proceedings of the two workshops. These workshops demonstrated that self-similarity and the study of scaling behaviour and its anomalous breaking away from a fixpoint of the renormalization group are phenomena which permeate the natural sciences everywhere. The sixteen papers in this volume cover mathematical aspects as well as detailed physical applications touching areas of mathematical specialization as diverse as number theory, infinite dimensional Lie and Hopf algebras, noncommutative geometry, algebraic geometry, differential equations, nonlinear dynamics, complex analysis and probability theory. The physics discussed range from the microscopic ranges of high energy physics and quantum fields to the macroscopic areas of matter in its various phases and to large scales of gravity. Both the history of the subject and current developments are well represented.

Pseudo-Differential Operators: Partial Differential Equations and Time-Frequency Analysis

Edited by Luigi Rodino, Bert-Wolfgang Schulze and M. W. Wong
Fields Institute Communications 52
vii + 414pp. AMS 2008

This volume is based on the lectures given at the workshop on "Pseudo-differential Operators" held at the Fields Institute in December 2006. The two main themes of the workshop were partial differential equations and time-frequency analysis. Five papers relate to the mini-courses given by Peter Greiner, Charles Epstein, Karlheinz Gröchenig, Luigi Rodino and Bert-Wolfgang Schulze. The remaining fifteen papers are on related topics. Together these papers present topics on partial differential equations, geometric analysis, Fourier integral operators, localization operators Gabor transforms, wavelet transforms, Rihaczek transforms and time-frequency analysis.

EDUCATION NOTES

by Edward Barbeau
University of Toronto, Toronto

Mathematical devices

One of the experiments in my first year physics class was to approximate the area of a plane region using a hatchet planimeter, a simple metal device dragged around the periphery that exploited Stokes' theorem. In many of our experiments, the calculations we needed to make were executed on a slide rule. These are but two of the devices that mathematicians had recourse to in the precomputer era for making computations, measurements and diagrams. A few years ago, I had the pleasure of visiting the Laboratory of Mathematical Machines in Modena (*www.unimore.it*) where working replicas of dozens of mathematical instruments used over the past centuries were not only on display but available for use in hands-on workshops with teachers and students. In this way, they were able to have an intimate and direct experience with mathematics.

Now, as part of the *MAA Notes* series, the Mathematical Association of America has produced a book in which a number of North American teachers, mainly at the college level, describe devices used with their classes.

Hands on History: a resource for teaching mathematics
edited by *Amy Shell-Gellasch*
MAA Notes #72, Mathematical Association of America, 2007 (NTE 72). ix+177 pages
ISBN 978-0-88385-182-1 US$44.95 (members US$39.95)

Noting that "numerous studies have shown that doing (as opposed to simply listening or reading) is the best way to learn", the editor has brought together a "resource guide to help high school and collegiate educators incorporate history into their classrooms". Generously supplied with photographs, diagrams and instructions for constructing your own devices, a typical chapter sets the scene, describes the artifact and makes suggestions for classroom activities.

Three chapters are due to the editor herself, who discusses the tower of Hanoi, string models of solid figures (with B. Acheson), and a hands-on approach to completing the square and cube. Other topics treated are labyrinths (H. McCague, York University), Napier's bones (J. Peeples), rectangular protractors (A. Ackerberg-Hastings), ancient constructive Greek and Chinese demonstrations of the Pythagoras theorem (D. Zitarelli), the French curve (B.J. Lunday), the planimeter (R.L. Foote & Ed Sandifer), mechanisms for drawing curves (D. Taimina), ancient Roman land surveying (H. McCague), ancient Greek astronomy (J. Evans), sundials (J.L. Berggren, Simon Fraser University), the cycloid pendulum of Huygens (K.Inouye Lau & K. Plofker) and the brachistochrone (V.F. Rickey). A concluding essay by P. A. Kidwell & A. Ackerberg-Hastings is directed to those who would like to set up their own departmental displays of historical objects.

This book reminded me of a British one published earlier:
Mathematics Galore! masterclasses, workshops, and team projects in mathematics and its applications
by *C.J. Budd & C.J. Sangwin*
ISBN 0-19-850769 (hard)/0-19-850770 (paper)

This book builds on projects for 13-14-year-olds in masterclasses held across the United Kingdom under the auspices of the Royal Institution. Along with chapters on mazes and sundials, there is a discussion of logarithms and slide rules. But the focus is more on human activities than devices: dancing, bell-ringing, performing magic, laying out and defending a fort, ciphering and computing through the ages. In each case, there is a wealth of detail so that teachers and catalysts are able to run their own workshops on these topics.

Clarifying through history

From Calculus to Computers: using the last 200 years of mathematics history in the classroom
edited by *Amy Shell-Gellasch & Dick Jardine*
MAA Notes #68, Mathematical Association of America, 2005. xii+255 pages
ISBN 0-88385-178-4 US$39.50

This is a collection of essays on how history can be used to make mathematics come alive in the classroom. They vary considerably in topic and length, but the best of them are very well done and quite informative for the general mathematical reader.

The book has four sections. Section I is predicated on the belief that having recourse to original sources will deepen our understanding of modern mathematics. David Pengelley reproduces and analyzes an excerpt from Cayley's original paper on group theory; Robert Rogers examines the differential perspective for calculus and provides examples, such as the curve of a suspension cable and the brachistochrone, for classroom use; Matt Lunsford goes back to Galois himself for when an equation can be solved by radicals. A full and interesting article by Lawrence d'Antonio on elliptic curves starts with Newton's classification of cubics, works through papers of Lucas, Sylvester and Mordell, to conclude with treatments of the Beha Eddn Problem (solve rationally the simultaneous diophantine system $x^2 + x + 2 = y^2$, $x^2 - x - 2 = z^2$) and Noam Elkies' treatment of the diophantine equation $a^4 + b^4 + c^4 = d^4$. Finally, Holly Hirst looks at the Lotka-Volterra predator-prey model and how dynamical systems can be handled in liberal arts and introductory mathematical modelling courses.

Section II consists of three essays on geometry, the middle of which, Euler on cevians, by Eisso Atzema and Homer White, is centred on the problem of constructing a triangle whose cevians are given line segments with a common point. In 1780, Euler proved that if AU, BV and CW are cevians of triangle ABC intersecting in O, then $OU/AU+OV/BV + OW/CW = 1$, an observation that the author feels has had very little consideration. He considers ramifications of this result and how it might be extended to space. Diana Taimina and David Henderson consider how to use history to clarify common confusions in geometry and conclude with a discussion of linkages for drawing straight lines. A brief

essay by Jeff Johannes begins with pessimistic prognoses of late eighteenth century mathematicians that the well of mathematical discovery has run dry, and shows how advances in geometry in the last two centuries falsify this.

Section III gets us into more contemporary territory with its essays on discrete mathematics, computer science, numerical methods, logic and statistics. Its seven contributions treat the use of history in a combinatorics and graph theory class (L.E. McGuire), coding and public key cryptography (S. Simonson), introducing logic by Turing machines (J.M. Lodder), logic and computing (W. Calhoun), automated theorem proving (F.F. Abeles), numerical methods (D. Jardine) and foundations of statistics in American textbooks (P.W. Hunter).

The fourth section is a mixed bag that picks up on a number of themes, some political. Sarah J. Greenwald highlights in a class the achievements of women and minority mathematicians, while Amy Shell-Gellasch, who taught at the US Military Academy at West Point, taught a history course from the perspective of West Point, the first US engineering school. Peggy Aldrich Kidwell traces the tortured fortunes of the metric system in the US. David Lindsay Roberts discusses mathematics as part of a history of science course, and Amy Ackerberg-Hastings examines how protractors were used in US classrooms in the past. Peter Ross tells how a mathematical history course can be enlivened, while John Prather shows how a history class can be built around problems.

Innovation in undergraduate mathematics.

Those participating in meetings of the CMS and MAA will have had ample exposure to the number of ways lecturers can make their courses interesting and productive for students. The common goal of all the practitioners is to make the students actively involved in doing mathematics. Such incursions into uncharted territory involve difficulties of designing a syllabus, trying new pedagogical techniques and assessing students, so that it is useful to learn how others have fared. At the 2001 MAA *MathFest*, there was a session on *Innovative Methods in Courses beyond Calculus*; papers presented there form the basis of the following compilation in the *MAA Notes* series:

Innovative approaches to undergraduate mathematics courses beyond calculus
edited by *Richard J. Maher*
MAA Notes #67, Mathematical Association of America, 2005 (NTE 67), xiii+171 pages
ISBN 0-88385-177-6 US$48.95 (members US$39.50)

The contributors describe how their courses were designed along with difficulties they encountered and how they were handled. Examples of exercises, problems and projects are given, and the mode of assessing student performance described.

The first of the three chapters contains five essays that discuss techniques common to innovative courses, such as having students make written and oral presentations, research the literature, investigate, prepare projects, and formulate and write up proofs. Michael Huber and Joseph Myers of the United States Military Academy talk about Interdisciplinary Lively Application Projects (ILAPs), student group projects that are jointly authored with a mathematics faculty member along with one in an applied area.

Five papers make up the second chapter that discuss specific courses: finite groups, analysis (situations requiring the precision of epsilonics), introductory topology, geometry, abstract algebra (modules). Samuel Smith's "basic goal . . . to maximize the extent to which students discover the ideas . . . for themselves" is typical of the approach of all of the essayists.

The final quintet of papers is gathered into a third chapter on special topics: projects in applied statistics courses, second-year mathematical biology for a mixed audience, a geometric approach to voting theory, the Shapley-Shubik Power Index (political science) and post-calculus classical applied mathematics. The last course described uses a computer algebra system as an essential tool.

We have reviewed a number of volumes in the *MAA Notes* series over the past few years. These have been accumulating since 1982 and their uniformly high quality makes them an indispensible addition to your mathematics departmental library.

It is ironic that, when mathematics is remarkably productive in both research and teaching, enrolments in mathematics at the tertiary level are flagging. There is hardly a field of human endeavour, whether it be in arts, science or technology, where there is not a role for mathematics. Furthermore, there is quite a bit of recent mathematics that is not only accessible to undergraduates, but provide for them the opportunities of original work. This is a strong lesson provided by books such as the ones under review. In the United States, quite a few reform efforts are supported by grants from the National Science Foundation, and the sheer diversity of institutions of higher learning provide settings that are conducive to experimentation in teaching methods. We are not so fortunate in Canada, but there is still a great deal happening which I would like to bring to the attention of the readers of these *Notes*.

NEWS FROM DEPARTMENTS: CORRECTION

In the section entilted, Nouvelles de department, on page 5 of the October 2008 CMS NOTES the news is from Université de Sherbrooke, Sherbrooke, Québec rather than the University of Ottawa, Ottawa, Ontario.

The title in French should also read Nouvelles de Département rather than Nouvelles du Department.

We regret this oversight.

Tenure-Stream Position in Statistical Science
Department of Statistics, University of Toronto

Position/Title Rank:	Assistant Professor
Division:	Faculty of Arts & Science
Department:	Department of Statistics
Deadline/Closing Date:	January 9, 2009

The Department of Statistics, University of Toronto, invites applications for a tenure-stream appointment in the field of statistical science. The appointment will be at the rank of Assistant Professor and will begin on July 1, 2009.

We are seeking candidates with: expertise in statistical science; demonstrated excellence in scholarly research; and a commitment to excellence in graduate and undergraduate teaching in statistical science. Applicants with expertise in major areas, including biostatistics, environmental statistics, computational statistics, data mining, genetics/genomics, image analysis, industrial statistics, machine learning, are especially encouraged to apply. The successful candidate should hold a Ph.D. or equivalent degree in statistics or a related discipline.

The ideal candidate must be an independent researcher with the capability of developing a research program and undertake graduate supervision. Salary will be commensurate with qualifications and experience.

DEPARTMENT OF STATISTICS

The Department has an international reputation in the areas of statistical theory and statistical computing. The prestigious COPSS Award, the highest international research honour in statistics, has only been awarded to resident Canadians three times; and all of these were at the University of Toronto. The University of Toronto is the leading research-intensive university in Canada and offers a range of support to early career faculty. It is located in the heart of downtown Toronto, a vibrant city of over 2 million inhabitants.

The Department of Statistics has an outstanding complement of 22 faculty members and is one of six institutional sponsors of the National Institute for Complex Data Structures — an organization that builds interdisciplinary research teams with statistical leadership. It is also involved with the Fields Institute for Mathematical Sciences and has a close relationship with Biostatistics in the School of Public Health on campus. We offer courses in actuarial science, probability theory, applied statistics, statistical computation and theoretical statistics at both the undergraduate and graduate level. The department serves as a focal point for statistical teaching, research and consulting at the university.

For more information on the Department of Statistics at the University of Toronto, visit the department's web site at http://www.utstat.utoronto.ca

TO APPLY

Candidates should submit a curriculum vitae, a covering letter outlining current and future research interests, examples of publications and a teaching statement. Applicants should also arrange for three letters of reference to be submitted directly to:

Faculty Search Committee
Department of Statistics
University of Toronto
100 St. George Street, 6th Floor
Toronto, Ontario M5S 3G3 CANADA

We encourage you to submit your application online
Please visit: http://www.jobs.utoronto.ca/faculty
Reference Job # 0801176

If you are unable to apply online (or alternatively have large documents to send), please submit your application and other materials to the above address. To ensure full consideration in the search, all application materials, including the recommendation letters, must be received by January 9, 2009.

The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, members of sexual minority groups, and others who may contribute to the further diversification of ideas. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

CMS/CSHPM Summer Meeting 2009
Réunion d'été 2009 de la SMC et de la SCHPM
June 6-8 juin 2009
Host: Memorial University of Newfoundland
Hôte : Université Memorial de Terre-Neuve

Plenary Speakers / Conférenciers pléniers :
Elizabeth Billington (Queensland)
Michael Mackey (McGill)
Susan Montgomery (USC)
Michael Sigal (Toronto)
Gaoyong Zhang (Polytechnic Univ. New York)
CSHPM - Jeremy Gray (Open Univ.;Warwick, UK)

SESSIONS

Algebraic Combinatorics
Combinatoire algébrique
Org: Karen Meagher, Steve Kirkland (Regina)

Algebraic Geometry and Topology (Canada/Korea)
Géometrie algèbrique et topologie (Canada/Corée)
Org: Alejandro Adem (UBC), Jong Hae Keum (KIAS)

Algebraic Group Actions and Invariant Theory
Actions algébriques des groupes et théorie des invariants
Org: Eddy Campbell (Memorial), Jianjun Chuai (Memorial), David Wehlau (RMC; Queen's)

Combinatorial Designs and Related Topics
Designs combinatoires et sujets connexes
Org: Václav Linek (Winnipeg), Nabil Shalaby (Memorial)

Financial Mathematics
Mathématiques financières
Org: Rogemar Mamon (Western), Cody Hyndman (Concordia)

Geometric Harmonic Analysis and Partial Differential Equations
Analyse harmonique géométrique et équations aux dérivées partielles
Org: Jie Xiao (Memorial)

Graph Searching
Graph Searching
Org: Anthony Bonato (Laurier), Danny Dyer (Memorial), Gary MacGillivray (Victoria)

Groups and Hopf Algebras
Groupes et algèbres de Hopf
Org: Yuri Bahturin, Mikhail Kotchetov (Memorial), David Radford (Illinois), Earl Taft (Rutgers)

History and Philosophy of Mathematics (CSHPM)
Histoire et philosophie des mathématiques
Org: Tom Drucker (Wisconsin-Whitewater)

History of the Relationship Between Mathematics and the Physical Sciences (CSHPM)
Liens historiques entre les mathématiques et les sciences physiques
Org: Tom Archibald (SFU)

Interactions between Algebraic Geometry and Ring Theory
Interactions entre la géométrie algébrique et la théorie des anneaux
Org: Jason Bell (SFU), Colin Ingalls (UNB)

Mathematical Physics
Physique mathématique
Org: Marco Merkli, Chris Radford (Memorial)

Mathemactics Education
Éducation mathématique
Org: Sherry Mantyka (Memorial)

Nielsen Theory and its Applications
Théorie de Nielsen et ses applications
Org: Philip Heath (Memorial), Evelyn Hart (Colgate Univ.), Edward C. Keppelmann (Nevada-Reno)

Nonlinear Dynamics and Applications
Dynamique non linéaire et ses applications
Org: Gail Wolkowicz (McMaster), Yuan Yuan, Xiaoqiang Zhao (Memorial)

Numerical Analysis and Scientific Computing
Analyse numérique et computations scientifiques
Org: Jahrul Alam (Memorial), Wenyuan Liao (Calgary)

Reaction-Diffusion Systems and Their Applications
Les systèmes de réaction-diffusion et leurs applications
Org: David Iron, Theodore Kolokolnikov (Dalhousie), Chunhua Ou (Memorial)

Topological Algebra, Topology, and Functional Analysis
Algèbre topologique, topologie et analyse fonctionnelle
Org: Alex Karassev (Nipissing), Gábor Lukács (Manitoba), Paul Szeptycki (York)

Contributed Papers
Communications libres
Org: to be determined

CMS-SMM-2009 / SMC-SMM-2009
UBC, Vancouver
August 13-15 août
Host / Hôte : Pacific Institute for the Mathematical Sciences (PIMS)

Scientific Committee / Comité scientifique:
Canada: Alejandro Adem (UBC), Walter Craig (McMaster), Andrew Granville (Montréal)
Mexico: Fernando Brambila (SMM; UNAM), Isidoro Gitler (CINVESTAV), Jose Seade (UNAM)

Plenary Speakers / Conférenciers pléniers :
James Arthur (Toronto)
Xavier Gomez-Mont (CIMAT)
Onesimo Hernandez-Lerma (CINVESTAV)
Niky Kamran (McGill)
Rachel Kuske (UBC)
Alberto Verjovsky (UNAM-Cuernavaca)

SESSIONS

Algebra
Algèbre
Org: Christoff Geiss (UNAM), Arturo Pianzola (Alberta)

Analysis
Analyse
Org: Salvador Perez Esteva (UNAM), Malabika Pramanik (UBC)

Combinatorics and Graph Theory
Combinatoire et théorie des graphes
Org: Hortensia Galeana (UNAM), Luis Goddyn (SFU), Miguel Pizaña (UAM)

Partial Differential Equations
Equations aux dérivées partielles
Org: Monica Clapp (UNAM), Nassif Ghoussoub (UBC), Pablo Padilla (UNAM)

Differential Geometry
Géométie differentielle
Org: Niky Kamran (McGill), Oscar Palmas (UNAM), Adolfo Sanchez Valenzuela (CIMAT)

Algebraic Geometry and Singularity Theory
Géométrie algébrique et théorie des singularités
Org: Ed Bierstone (Toronto), Leticia Brambila (CIMAT), Jacques Hurtubise (McGill), Jose Seade (UNAM)

Optimization
Optimisation
Org: Michael Friedlander (UBC), Pedro Gonzalez Casanova (UNAM), Luis Verde (UAM)

Probability
Probabilité
Org: Ana Meda (UNAM), Edwin Perkins (UBC)

Dynamical Systems
Systèmes dynamiques
Org: Florin Diacu (Victoria), Renato Iturriaga (CIMAT), Ernesto Perez Chavela (UAM)

Topology
Topologie
Org: Ian Hambleton (McMaster), Jose Luis Cisneros (UNAM), Miguel Xicotencatl (CINVESTAV)

Canadian Mathematics Education Forum 2009
Host: Pacific Institute for the Mathematics Sciences (PIMS)
April 30 - May 3, 2009, Vancouver, British Columbia

CMS/CSHPM Summer 2009 Meeting
Host: Memorial University of Newfoundland
June 6-8, 2009, St. John's, Newfoundland

Second CMS/SMM Meeting 2009
Host: Pacific Institute for the Mathematics Sciences (PIMS)
August 13-15, 2009, Vancouver, British Columbia

CMS Winter Meeting 2009
Host: University of Windsor
December 5-7, 2009, Windsor, Ontario

CMS Summer Meeting 2010
Host: University of New Brunswick - Fredericton
June 4 - 6, 2010, Fredericton, New Brunswick

CMS Winter Meeting 2010
Host: University of British Columbia
December, 2010, Vancouver, British Columbia

Forum canadien sur l'enseignement des mathématiques 2009
Hôte : Pacific Institute for the Mathematics Sciences (PIMS)
30 avril - 3 mai 2009, Vancouver (Colombie-Britannique)

Réunion d'été 2009 de la SMC et de la SCHPM
Hôte : Université Memorial
6 - 8 juin 2009, St. John's (Terre-Neuve)

Deuxième réunion conjointe de la SMC/SMM 2009
Hôte : Pacific Institute for the Mathematics Sciences (PIMS)
13 - 15 août 2009, Vancouver (Colombie-Britannique)

Réunion d'hiver 2009 de la SMC
Hôte : Université Windsor
5 - 7 décembre 2009, Windsor (Ontario)

Réunion d'été 2010 de la SMC
Hôte : Université de Nouveau-Brunswick
4 - 6 juin 2010, Fredericton (Nouveau-Brunswick)

Réunion d'hiver 2010 de la SMC
Hôte : Université de Colombie-Britannique (UBC)
décembre 2010, Vancouver (Colombie-Britannique)

THURSDAY/JEUDI December 4 décembre	SATURDAY/SAMEDI December 6 décembre	SUNDAY/DIMANCHE December 7 décembre	MONDAY/LUNDI December 8 décembre
18:00-22:00 Executive Committee Meeting Réunion du Comité exécutif	8:00 – 16:30 **Registration/Inscription** 9:30 – 16:30 **Exhibits/Expositions**	8:00 – 16:30 **Registration/Inscription** 9:30 – 16:30 **Exhibits/Expositions**	8:00 – 16:00 **Registration/Inscription**
	8:30 – 9:00 **Opening/Ouverture**	8:00 – 10:00 **Scientific Sessions**	8:00 – 10:00 **Scientific Sessions**
	9:00 – 9:45 **Fan Chung**		
FRIDAY/VENDREDI December 5 décembre	10:00 – 10:30 Break / Pause		
11:00 AM – 13:00 Development Group Luncheon Lunch du groupe de développement 13:30 – 18:30 Board of Directors Meeting Réunion du conseil d'administration	10:30 – 12:00 **Scientific Sessions**	10:30 – 11:15 **Gilles Godefroy**	10:30 – 11:15 **Laurent Saloff-Coste**
	12:00 – 12:30 **Harley Weston** **A. Pouliot Prize Lecture**	11:30 – 12:15 **Ravi Vakil** **Coxeter-James Prize Lecture**	11:30 – 12:15 **Matthew Greenberg** **Doctoral Prize Lecture**
	12:30 – 14:00 Lunch Break		
	14:00-15:00 **Scientific Sessions**	14:00-15:00 **Scientific Sessions**	14:00-15:00 **Scientific Sessions**
	15:00 – 15:45 **Sorin Popa**	15:00 – 15:45 **Mark Sapir**	15:00 – 15:45 **David Acheson**
	16:00 – 16:15 Break/Pause		
	16:15 – 17:15 **Scientific Sessions**	16:15 – 17:45 **Scientific Sessions**	16:15 – 17:15 **Scientific Sessions**
19:00 –20:00 **Patrick Hayden** **Public Lecture**	18:00 – 19:00 **Reception (cash bar)** **Réception (bar payant)**	18:00 –19:00 **Keith Taylor**	
20:00-21:30 **Welcome Reception** **Réception d'accueil**	19:00 – 22:00 **Banquet**		

(as of October 31, 2008)

CALL FOR SESSIONS

CALL FOR SESSIONS – CMS WINTER MEETING 2009
APPEL DE SESSIONS – RÉUNION D'HIVER 2009 DE LA SMC

Les sessions autonomes jouent un rôle important dans le succès de nos réunions. Nous vous invitons à proposer des sessions autonomes pour la réunion qui se tiendra à Windsor (Ontario), du 5 au 7 décembre 2009. Votre proposition doit inclure une brève description de l'orientation et des objectifs de la session, le nombre de communications prévues et leur durée, ainsi que le nom, l'adresse complète, le numéro de téléphone, l'adresse courriel et les autres coordonnées de l'organisateur. 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 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.

Date limite : 31 mars 2009

Directeur de la Réunion :
Dr. Daniel Britten
Mathematics & Statistics
Lambton Tower, 10th Floor
Windsor, ON N9B 3P4
Tel: (519) 253-3000 Ext. 3013
britten@uwindsor.ca

Les sessions suivantes ont été confirmées :

Algèbres de Banach et analyse harmonique abstraite
Org: Zhiguo Hu, Mehdi Monfared (Windsor)

Analyse convexe et variationnelle
Org: Heinz Bauschke, Shawn Wang (UBC Kelowna)

Algèbres de Lie et théorie des représentations
Org: Nicolas Guay (Alberta), Michael Lau (Windsor)

Groupes de Lie et formes automorphiques
Org: Hadi Salmasian, Wai Ling Yee (Windsor)

Modèles mathématiques en sciences environnementales
Org: Rick Caron (Windsor)

Statistiques mathématiques
Org: Chi Song Wong (Windsor)

Théorie matricielle et les statistiques
Org: Ejaz Ahmed, Abdul Hussein (Windsor)

Mesure, probabilité et processus stochastique
Org: Severien Nkurunziza, Tim Traynor (Windsor)

Théorie de contrôle non-linéaire
Org: Andrew Lewis, Abdol-Reza Mansouri (Queen's)

Algèbres d'opérateurs
Org: Mitja Mastnak (Saint Mary's), Dilian Yang (Windsor)

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 5-7, 2009) in Windsor, 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. All sessions will be advertised in the CMS Notes, on the web site and, if possible, in the Notices of the AMS and in publications of other societies. Speakers will be requested to submit abstracts, which will be published on the web site and in the meeting program. Those wishing to organize a session should send a proposal to the Meeting Director by the deadline below.

Deadline: March 31, 2009

Meeting Director:
Dr. Daniel Britten
Mathematics & Statistics
Lambton Tower, 10th Floor
Windsor, ON N9B 3P4
Tel: (519) 253-3000 Ext. 3013
britten@uwindsor.ca

The following sessions have been confirmed for this conference:

Banach Algebras and Abstract Harmonic Analysis
Org: Zhiguo Hu, Mehdi Monfared (Windsor)

Convex and Variational Analysis
Org: Heinz Bauschke, Shawn Wang (UBC Kelowna)

Lie Algebras and Representation Theory
Org: Nicolas Guay (Alberta), Michael Lau (Windsor)

Lie Groups and Automorphic Forms
Org: Hadi Salmasian, Wai Ling Yee (Windsor)

Mathematical Models in Environmental Sciences
Org: Rick Caron (Windsor)

Mathematical Statistics
Org: Chi Song Wong (Windsor)

Matrix Theory and Statistics
Org: Ejaz Ahmed, Abdul Hussein (Windsor)

Measure, Probability, and Stochastic Processes
Org: Severien Nkurunziza, Tim Traynor (Windsor)

Non-Linear Control Theory
Org: Andrew Lewis, Abdol-Reza Mansouri (Queen's)

Operator Algebras
Org: Mitja Mastnak (Saint Mary's), Dilian Yang (Windsor)

AIDEZ NOUS PAR CONTRIBUER À LA COMMUNAUTÉ SMC

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

Formulaire d'adhésion
INDIVIDUEL 2009

RENSEIGNEMENTS SUR LE MEMBRE

***CHAMPS OBLIGATOIRES**

*Nom:	SMC N°#:
*Adresse:	
*Ville:	*Province/État::
*Pays:	*Code Postal/Code Zip:
*Téléphone:	*Télécopieur:
*Courrier électronique:	Page Web:
* Employeur:	* Poste:
* Plus haut diplôme obtenu: / *Année :	* Établissement :
Ne publiez pas mon nom dans le répertoire des membres: ☐	Langue de correspondance Anglais ☐ Français ☐

J'aimerais recevoir les *Notes de la SMC* en format électronique SEULEMENT: ☐
(Tous les membres de la SMC reçoivent les Notes en format papier à moins d'avis contraire et ils ont accès à la version électronique.)

ADHÉSION

PÉRIODE D'ADHÉSION: 1ER JANVIER AU 31 DÉCEMBRE 2009 CONDITIONS ET RÉGLES : www.cms.math.ca/docs/conditions

BASÉS SUR LE REVENU D'EMPLOI PROFESSIONEL ANNUEL	TARIF RÉGULIER	SOCIÉTÉ RÉCIPROCITAIRE	MAA
90,000$ ET PLUS	224$ ☐	112$ ☐	190$ ☐
70,000$ - 90,000$	182$ ☐	91$ ☐	155$ ☐
40,000$ - 70,000$	118$ ☐	59$ ☐	100$ ☐
RETRAITÉS	48$ ☐	23$ ☐	40$ ☐

NOTER: LE SPÉCIALE 2 POUR 1 N'EST PAS DISPONIBLE AUX ÉTUDIANTS ET LES PROFESSEURS PRÉ-UNIVERSITAIRE

MEMBRE À VIE	
MOINS DE 35 ANS	3 000 $
DE 36 - 44 ANS	2 750 $
DE 45 - 54 ANS	2 500 $
DE 55 -64 ANS	2 250 $
65 ANS ET PLUS	1 500 $

QUATRE VERSEMENTS EGALE ACCEPTES

TARIFS OFFERTS AUX MEMBRES DE LA MAA OU D'UNE SOCIÉTÉ RÉCIPROCITAIRE RÉSIDANT HORS DU CANADA SEULEMENT.

VEUILLEZ INDIQUER VOTRE NUMÉRO D'IDENTIFICATION :_____.

JOIGNEZ MAINTENANT ET ÉCONOMISEZ! OUI, J'AIMERAIS JOINDRE LA SMC ADHÉSION SPÉCIALE 2 POUR 1 (l'année 2009 et 2010) : **$_____**

RENOUVELLEMENT AUTOMATIQUE **Voulez-vous renouveler automatiquement en 2010? Les renouvellements se feront en novembre 2009 pour l'année 2010.**

OUI ☐ NON ☐ CARTE DE CRÉDIT ☐ INDIQUEZ VOS INITIALE(S) : _____

MODE DE PAIEMENT

MODE DE PAIEMENT :	Carte de crédit: Visa ☐ MasterCard ☐ Chèque n° _____
N° de carte de crédit:	_____/_____/_____/_____ Expiration _____/_____
Nom figurant sur la carte :	
Signature :	

HELP 2009 CMS MEMBERSHIP RENEWALS

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

2009 INDIVIDUAL Membership Application

MEMBER INFORMATION

* MANDATORY FIELDS (IF AVAILABLE)

*Name:	CMS ID#:
*Address:	
*City:	*Province/State:
*Country:	*Postal Code/Zip:
*Phone:	*Fax:
*Email:	Home Page:
*Employer Name:	*Position:
*Highest degree obtained: / *Year:	*Granting institute:

Do not list my name in the Member's Directory: ☐ | Language Preference ENGLISH ☐ FRENCH ☐ | Gender Male ☐ Female ☐

I wish to receive the CMS Notes Electronically ONLY: ☐
(Please note all CMS Members receive the CMS Notes in paper format unless indicated. All CMS Members have electronic access to the CMS Notes).

MEMBERSHIP

MEMBERSHIP PERIOD: JANUARY 1 TO DECEMBER 31, 2009 TERMS AND CONDITIONS : www.cms.math.ca/docs/terms

ALL RATES BASED ON PROFESSIONAL ANNUAL INCOME	REGULAR MEMBER RATE
ABOVE - $90,000	$224 ☐
$70,000 TO $90,000	$182 ☐
$40,000 TO $70,000	$118 ☐
RETIRED + UNEMPLOYED	$ 48 ☐

NOTE: THIS 2 FOR 1 SPECIAL IS NOT AVAILABLE TO STUDENTS AND PRE-UNIVERSITY TEACHERS.

LIFETIME MEMBER RATE	
AGE UNDER 35	$ 3, 000.00
AGE 36 - 45	$ 2, 750.00
AGE 46 - 54	$ 2, 500.00
AGE 55 - 64	$ 2, 250.00
AGE 65 & OVER	$ 1, 500.00

PAYMENTS MAY BE MADE OVER 4 EQUAL INSTALLMENTS

	RECIPROCAL SOCIETY RATE	MAA RATE
ABOVE - $90,000	$ 112 ☐	$190 ☐
$70,000 TO $90,000	$ 91 ☐	$155 ☐
$40,000 TO $70,000	$ 59 ☐	$100 ☐
RETIRED + UNEMPLOYED	$ 23 ☐	$ 40 ☐

NOTE: THIS 2 FOR 1 SPECIAL IS NOT AVAILABLE TO STUDENTS AND PRE-UNIVERSITY TEACHERS.

RECIPROCAL SOCIETY AND MAA RATES ARE APPLICABLE ONLY TO MEMBERS RESIDING OUTSIDE CANADA.

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IMO 2008 REPORT: HIGH SCHOOL MATHLETES WIN MEDALS FOR CANADA

By: Lindsey Shorser – 2008 Deputy Leader Observer

As the 2008 competition season comes to a close, the future of Canadian mathematics continues to rest in good hands. Six high school students from across the country represented Canada at the 49th International Mathematical Olympiad in Madrid, Spain this summer. Each returned with a medal, placing Canada 22nd out of the 97 countries and 535 students who competed. The contest was written on Wednesday, July 16 and Thursday, July 17 with four and a half hours given on each day to complete two sets of three questions each.

The team consisted of Yan (Cynthia) Li of Dr. Norman Bethune Collegiate Institute, Scarborough (Ontario); Alexander Remorov of William Lyon Mackenzie Collegiate Institute, North York (Ontario); Jonathan Schneider of University of Toronto Schools, Toronto (Ontario); XiaoLin (Danny) Shi of Sir Winston Churchill High School, Calgary (Alberta); Chen Sun of A.B. Lucas Secondary School, London (Ontario); and Chengyue (Jarno) Sun of Western Canada High School, Calgary (Alberta). They were selected from among 200,000 students in grades 7 to 12 and CEGEP who participated in local, provincial and national mathematics contests.

While the six students have been honing their skills for many years, their training as a team began on Friday, June 27th, 2008 at Wilfrid Laurier University (WLU). Felix Recio (2008 Team Leader) and Yufei Zhao (past participant and 2008 Deputy Team Leader) organized an exciting and challenging mathematical program for the students. Meanwhile, Dr. Edward Wang (Wilfrid Laurier University) organized the logistics and the non-mathematical aspects of the camp seamlessly. The two-week camp allowed the students to gel as a team, be exposed to further strategies, and practice writing mock contests. Among the activities were inspiring and informative talks and working sessions led by Christopher Small (University of Waterloo), Ed Wang, Felix Recio (University of Toronto), Yufei Zhao (M.I.T), Jacob Tsimerman (Princeton), Adrian Tang (University of Calgary), David Rhee (University of Waterloo), Ed Barbeau (University of Toronto), and myself (University of Toronto).

Some past Canadian IMO team members or Winter Camp participants also interacted with the students, making their stay at WLU even more memorable. These included Jenny Park, Ralph Furmaniak, David Rhee, David Pritchard and Michael Lipnowski, all studying at the University of Waterloo. The past IMO team members who stayed overnight with the students, helping to run the training camp, included Adrian Tang, Jacob Tsimerman and Yufei Zhao. These three, Felix Recio and I spent much time working on debriefing the students after mock Olympiads, and marking the exams. Felix Recio and I also stayed with the students. Christopher Small also played an instrumental role in making sure that the camp ran smoothly. For the first few days, six local students were given the opportunity to learn alongside the IMO team members.

After two weeks of training at WLU, the team traveled to Madrid, where they met and trained with the Swedish IMO team. Both teams benefited from one another's particular expertise and enjoyed the cross-cultural interaction. The week of lectures, mock contests and working sessions culminated in a tour of downtown Madrid, sampling the local cuisine, and a trip to the Prado museum.

With their training complete, the team moved on to the IMO, which began with a circus-themed opening ceremony. Immediately after, at a lunch-on-the-lawn, one of the members of the Canadian team reunited with a childhood friend and classmate who, years later, now represented New Zealand at the IMO. The two friends quickly became celebrated symbols of the community aspect of mathematics. The Canadian team also became known as the caretakers of the great CanMoo, a small stuffed moose that served as our team mascot. As has been the case with CanMoo since 2005, when it first made its appearance at the IMO, it was the centre of much attention and multiple kidnapping plots by other teams.

From the time of their arrival in Spain, the team leaders were sequestered. This allowed them the opportunity to discuss and finally vote on which questions would make up this year's Olympiad. After the second day of writing, the Leaders and Deputy Leaders reunited in order to read through their students' solutions and to judge how many marks each warranted. Then, according to an elaborate schedule, the representatives from each team met with judges for each question. Many of our team's solutions followed methods that appeared on the official marking scheme. However, there were a few even more creative solutions that required a more careful presentation and more than one visit to the judges' table.

When the marks were finalized, two of our students received Silver Medals and four received Bronze. As representatives of the Canadian team, we were pleased to receive all of the marks we had expected and two extra that had been debatable.

A team with all students winning medals was a fairly uncommon occurrence at the 2008 IMO. Since no Canadian team member was upset about their results, the Canadian team quickly

became one of the most visibly pleased while still maintaining modesty and respect for the other teams. By the end of the IMO our team was both respectful and respected.

The students stayed in a University of Madrid residence with many other teams, with whom they spent much time socializing, discussing mathematics and, at various times, playing card games and soccer. Specific activities were planned during the days of mark coordination including a mathematically-themed games day in El Restiro Park, Museum visits, a trip to Toledo and an evening of dinner and Flamenco performances, the last of which also reunited the students with the leaders and deputy leaders. The closing ceremonies involved many speeches including one from the Prince of Asturias and a presentation from next year's host: Germany.

The closing banquet was truly a celebratory experience for our deserving team as they danced the night away with their new friends to the tunes of a troupe of Spanish musicians. For two of our team members, this year's IMO was the crowning achievement of their high school career as they move on to university. The rest of the team eagerly anticipates next year's round of competitions both at home and, hopefully, abroad.

The participation of the Canadian team at the 2008 IMO would not have been possible without the support of all the sponsors and all those that volunteered their time to ensure the Canadian team achieved their potential. In addition to the Canadian Mathematical Society, sponsors of the 2008 Canadian IMO team include: the Imperial Oil Foundation; Sun Life Financial; NSERC PromoScience; the Samuel Beatty Fund; Maplesoft; the Ontario Ministry of Education; Alberta Learning; Manitoba Education, Citizenship and Youth; Nova Scotia Department of Education; the Newfoundland and Labrador Ministry of Education; the Northwest Territories Ministry of Education; the Saskatchewan Ministry of Education; Centre de recherches mathématiques; the Fields Institute; the Pacific Institute for the Mathematical Sciences; the Department of Mathematics and Statistics, University of Calgary; the Department of Mathematics and Statistics, University of New Brunswick at Fredericton; the Department of Mathematics and Statistics, University of Ottawa; the Department of Mathematics, University of Toronto; the Centre for Education in Mathematics and Computing, University of Waterloo; the Department of Mathematics, Wilfrid Laurier University; and the Department of Mathematics and Statistics, York University.

EMPLOYMENT OPPORTUNITY

BRANDON UNIVERSITY: DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

Applications are invited for a tenure track appointment, subject to budget, in the Department of Mathematics & Computer Science at Brandon University, in the area of Mathematics. Ph.D. in mathematics preferred, however, ABD candidates will also be considered. The successful applicant will be expected to teach undergraduate courses, maintain a research program, and have the potential to supervise Master's students.

Application Deadline: December 7, 2008, or until the position is filled.
Date of Appointment: August 1, 2009
Rank and Salary: Commensurate with qualifications and experience

Applications should include curriculum vitae, a letter of application, citizenship or Canadian immigration status, and e-mail contact information for three referees. If applying via e-mail, submissions should be in a single file of a reasonable size.

Dr. Austin Gulliver
Dean of Science
Brandon University
Brandon, Manitoba
R7A 6A9
TEL: (204) 727-9625
FAX: (204) 728-7346
e-mail: **gulliver@brandonu.ca**

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. Short-listed candidates will be expected to provide copies of credentials at time of interview.

papers of Montgomery (one co-authored with Goldston) examining differences between imaginary parts of zeros of $\zeta(s)$ provide an early connection with random matrices. The recent paper of Agrawal, Katyal, and Saxena is also included, in which the authors present their deterministic polynomial-time algorithm for determining primes.

My only real complaint with the book is the authors' focus on the purely analytic number theoretic connections with the Riemann Hypothesis, and their decision to essentially ignore other approaches. The Riemann Hypothesis remains wide open, and at present it isn't at all clear from which direction a potential proof might come. In their defence, widening the scope of the book to include other approaches and points-of-view would have demanded the inclusion of numerous papers, along with a number of their precursors, and almost certainly would have seen the book's length become unwieldy. But I would have preferred to see, say, a compromise: a final section including major papers exploring alternative connections with the Riemann Hypothesis, such as for instance Connes' 1999 paper in which he describes connections between noncommutative geometry and the zeros of $\zeta(s)$, or the more recent paper by Conrey, Farmer, Keating, Rubinstein, and Snaith on integral moments of L-functions.

My quibbling aside, this is an excellent book, and I highly recommend it. It could be used for a graduate course or a seminar, alone or as a complement to one of the texts mentioned earlier. I hope that more books of this sort will appear in the future.

NEWS FROM DEPARTMENTS / NOUVELLES DE DÉPARTMENTS

McGill University, Montreal, QC

Promotions: D. Jakobson (Full Professor, June 1, 2008); Nilima Nigam (Associate Professor, June 1, 2008); Adrian Vetta (Associate Professor, June 1, 2008).
Appointments: Tibor Szabo (Associate Professor, August 21, 2008, Discrete Mathematics Continuous Optimization).
Retirements (rank, date): Georg Schmidt (Professor, July 31, 2008).
Resignations: Thomas Wihler (Assistant Professor, June 30, 2008).
Death: Arwel Evans (Associate Professor (post retirement), August 17, 2008).
Awards/Distinctions: Dmitry Jakobson (CMS 2008 G. de B. Robinson Award); Pengfei Guan (Royal Society of Canada Fellow, 2008); Henri Darmon (2008 John L. Synge Prize by the Royal Society of Canada); Mathew Greenberg (CMS 2008 Doctoral Prize).

University of British Columbia, Vancouver, BC

Promotions: Jimmy Feng (Professor, July 1, 2008); Ian Frigaard (Professor, July 1, 2008); Nike Vatsal (Professor, July 1, 2008).
Appointments: Omer Angel (Assistant Professor, July 1, 2008, Probability); Christoph Hauert (Assistant Professor, July 1, 2008, Mathematical Biology); Mahta Khosravi (Assistant Professor, July 1, 2008, Analysis); Young-Heon Kim (Assistant Professor, July 1, 2008, Partial Differential Equations); Akos Magyar (Assistant Professor, July 1, 2008, Analysis).
Resignations: Antoine Mellet; Ulrich Horst.
Awards/Distinctions: Ivar Ekeland (elected to the Royal Society of Canada, 2008); Martin Barlow, Michael Doebeli and Leah Keshet (have been appointed as Distinguished Scholars in Residence for 2009 at UBC's Peter Wall Institute for Advance Study); Stephanie Van Willigenburg (Humboldt Research Fellowship for 2008-2009).

University of Saskatchewan, Saskatoon, SK

Appointments: Alexei Cheviakov (Assistant Professor, July 1, 2008, Applied Mathematics); Juxin Liu, (Assistant Professor, July 1, 2008, Statistics); Ebrahim Samei (Assistant Professor, July 1, 2008, Functional Analysis, Harmonic Analysis).
Visitors: Maxime Fevrier (France, Probability-random matrix, September 20/08 to November 20/08); Fereidoun Gharamani (Canada, Mathematics-Functional Analysis, Banach Algebras, September 22/08 to October 3/08); Igor Klep (University of California - San Diego, Real Algebra, October 7-21, 2008); Michael Matusinki, France, Differential Algebra, March 17/08 to September 17/08); Katazyna Osiak (Poland, Real Algebra, August 26/08 to October 7/08); Marina Tvalavadze (Canada, Nonassociative Algebra, September 1, 2008 to May 1, 2009); Victor Vinnikov (Israel, Analysis, Sept 23/08 to Nov 15/08); Guichang Zhang (China, Mathematics - Queue Theory, Nov 1/07 to March 31/09)
Other News: On July 1, 2008, the University of Saskatchewan officially became a full member of PIMS (Pacific Institute for the Mathematical Sciences).

Wilfrid Laurier University, Waterloo, ON

Promotions: Yongzeng (George) Lai (Associate Professor, July 1, 2008)
Appointments: Anne-Marie Allison (Assistant Professor, Applied Mathematics, July 1, 2008); Amal Amleh (Assistant Professor, Applied Mathematics, July 1, 2008).
Resignations: Anthony Bonato (July 1, 2008).

The University of Western Ontario, London, ON

Promotions: Graham Denham (Associate Professor with Tenure, July 1, 2008); Nicole Lemire (Associate Professor with Tenure, July 1, 2008).
Appointments: Matthias Franz (Assistant Professor, July 1, 2008, Toric Topology); Martin Pinsonnault (Assistant Professor, July 1, 2008, Sympletic Topology).
Awards/Distinctions: Richard Kane (Distinguished University Professor, July 1, 2008)

CALL FOR NOMINATIONS

CALL FOR NOMINATIONS - 2009 DOCTORAL PRIZE
APPEL DE MISES EN CANDIDATURE - PRIX DE DOCTORAT 2009

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 2009**.

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, 2009**.

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

Michael Bennett
Université de Colombie-Britannique

Questions probantes, réponses moins évidentes

Il y a longtemps, avant de choisir la vocation d'apôtre dit « édifiant » auprès de jeunes professeurs, j'ai été – oui, moi aussi – un étudiant diplômé. Il en va probablement de même pour bon nombre des membres de la Société mathématique du Canada (SMC). Pour la plupart, je suppose, l'expérience évoque à la fois défis et récompenses, perfectionnement scolaire et croissance personnelle. De plus, nous sommes nombreux à croire probablement que les études supérieures aujourd'hui ressemblent en gros à ce que nous avons connu. Qui sait, nous avons peut-être raison.

Ce moment d'introspection fini, je me pose la question : qu'en est-il au juste de l'avenir des études supérieures au Canada?

Dans maintes universités du Canada, les inscriptions en mathématiques explosent. Et si le financement et les occasions complémentaires semblent battre au rythme de cette croissance, le marché de travail traditionnel, lui, pourra-t-il soutenir pareille expansion – ou faut-il maintenant explorer d'autres voies, d'autres débouchés? Comme collectivité, est-il sage pour nous de faire comme si de rien n'était? Questions encore plus probantes : Comment la SMC peut-elle offrir son appui à ce niveau? Quelles ressources pouvons-nous mettre à la disposition des programmes de 2^{e} et 3^{e} cycle et, surtout, aux étudiants qui y évoluent?

Pendant mes études de premier cycle, il y a 25 ans, je suis passé de l'histoire aux mathématiques en raison – au moins partiellement – des perspectives d'emploi très prometteuses à l'époque. À l'époque, les données de l'American Mathematical Society (AMS) révélaient un taux de chômage de 0 % pour les nouveaux titulaires d'un Ph.D. en mathématiques; de plus, on se plaisait à dire que la retraite prochaine des *baby-boomers* ouvrirait encore plus grand les portes de l'emploi. Or, en raison d'un ralentissement de l'économie (ça vous dit quelque chose?), de la fin de la Guerre Froide (et la disponibilité soudaine d'éminents universitaires de l'est de l'Europe) et d'autres facteurs, quand j'ai enfin décroché mon doctorat quelques années plus tard, le taux de chômage dans nos rangs avait atteint un sommet record, soit 10,7 %. Notons aussi que l'AMS ne présente pas nécessairement la pleine ampleur du chômage puisqu'elle exclut les groupes « inconnu » et « temps partiel » de la catégorie « sans emploi ».

La morale? Dans le secteur universitaire comme ailleurs, il est extrêmement difficile de prévoir un an d'avance et, encore plus, cinq ou dix ans d'avance ce qui nous attend sur le marché du travail. Pourtant, c'est un peu ce que nous faisons en laissant nos programmes d'études supérieures prendre ainsi de l'ampleur; d'ailleurs, les études montrent assez souvent que les inscriptions aux 2^{e} et 3^{e} cycles en mathématiques (et en sciences plus généralement) sont à la hausse.

À l'Université de la Colombie-Britannique (UBC), au milieu des années 80, nous comptions moins de 30 étudiants diplômés en mathématiques, mais environ le même nombre de professeurs qu'aujourd'hui. Nous avons maintenant 98 étudiants, soit environ 20 % de plus qu'il y a à peine cinq ans. À l'Université de l'Alberta, le nombre actuel est de 127 (y compris le groupe en statistiques), alors qu'à l'Université de Toronto, d'après mes calculs, la cohorte atteint 148 étudiants. Notre capacité de maintenir ces programmes découle en partie de meilleures sources de financement et d'initiatives chez les gouvernements provinciaux et fédéral. Mais faut-il associer « inscriptions croissantes » à « meilleures perspectives »? Je ne saurais répondre d'un trait : par exemple, si le gouvernement est plus disposé à financer des études supérieures de nos jours, rien ne nous dit qu'il sera tout aussi prêt à subventionner des postes pour ces étudiants une fois leur grade en mains.

Pas évident, non plus, d'établir la corrélation entre le nombre croissant de docteurs en mathématiques et le taux de chômage. À la lumière des données de l'AMS (qui se limitent, de nos jours tout au moins, aux universités américaines, mais qui pourraient bien miroiter la situation au Canada), on constate que les universités ont formé entre 960 et 1311 Ph.D. chaque année entre 1992 et 2006. La période de chômage la plus intense, soit 8,1 % par année entre 1993 et 1996, ne concorde pas avec les taux de diplomation particulièrement élevés qu'on y a connus (1034 à 1157 nouveaux docteurs par année).

En effet, dans cette période de 15 ans, les taux de diplomation les plus forts sont aussi les plus récents; les données complètes pour 2007 n'étaient pas disponibles avant que nous mettions sous presse. C'est en 2006 qu'on en observe le plus important, soit 1311 nouveaux docteurs. Par contre, les taux de chômage annoncés, qui sont restés entre 2,9 % et 5 % depuis dix ans, n'ont pas augmenté – ce qui nous porterait à croire que les occasions d'emploi, elles, se sont multipliées. Phénomène curieux : les nouveaux débouchés ne semblent pas se trouver dans l'industrie ou au gouvernement – le pourcentage de nouveaux docteurs optant pour les postes dans l'industrie en 2006 (25 %) est en fait inférieur à celui pour l'an 2000 (31 %); c'est plutôt le secteur universitaire qui vient absorber les nouveaux docteurs. Aujourd'hui, tel qu'on le voit depuis au moins 30 ans, environ 66 % des titulaires d'un doctorat occupent des postes universitaires (qui, selon l'AMS comprennent les instituts de recherche et les sociétés à but non lucratif).

Bon, d'accord. Ces données visent les diplômés d'universités *américaines*. Faut-il y dissocier à ce point la situation au Canada, compte tenu, évidemment, du marché beaucoup plus limité ici? À l'heure actuelle, les possibilités d'emploi au gouvernement sont quelque peu moins nombreuses ici, puisque la NSF aux États-Unis embauche un bon nombre d'agents de programme à temps plein, et la NSA (entre autres) engage un nombre important de mathématiciens. Au fil des ans, par contre, l'écart rétrécira fort probablement grâce aux débouchés pour les titulaires d'un postdoctorat et pour d'autres du domaine au Communications Security Establishment et au tout

nouveau Cryptologic Research Institute. Autre facteur beaucoup plus important ici qu'aux États-Unis : le rôle de nos instituts de mathématiques; de fait, l'Association pour l'avancement de la recherche mathématique en Atlantique (AARMA), la Station de recherche internationale de Banff, le Centre de recherches mathématiques, l'Institut Fields et l'Institut du Pacifique pour les sciences mathématiques (PIMS) influent tous énormément sur les études supérieures dans les universités affiliées et dans d'autres établissements, notamment par voie des « universités d'été », des cours spéciaux, des conférences et – de façon plus directe – par l'appui financier et l'offre de bureaux. Les instituts favorisent en outre l'interaction entre universités, au grand profit des étudiants, bien sûr.

Alors, quel rôle peut ou devrait revenir à la SMC au niveau des études supérieures? À l'heure actuelle, les attributions du Comité étudiant de la SMC sont très générales, soit de promouvoir l'interaction entre les étudiants du postsecondaire au Canada et d'explorer d'autres questions qui pourraient intéresser ou préoccuper les étudiants en mathématiques. Au niveau des études supérieures, le Comité étudiant appuie une gamme d'activités d'intérêt. Au cours des cinq dernières années, par exemple, le comité a financé des activités sociales pour étudiants diplômés à des congrès canadiens, offert un soutien aux « universités d'été » et aux ateliers animés par l'AARMA, l'Institut Fields et le PIMS. Quelles autres ressources pouvons-nous offrir? De son côté, l'AMS fait un travail exceptionnel à ce chapitre. Par exemple, son site Web présente des liens aux sources de financement et de bourses de recherche, ainsi qu'une mine de renseignements sur les carrières et le perfectionnement professionnel (avec des offres de poste); son congrès d'hiver comprend une foire de l'emploi en mathématiques, où l'on tente de jumeler candidats et employeurs – en 2008, d'ailleurs, on y trouvait 120 employeurs (surtout du secteur universitaire) et 568 candidats (2,2 entrevues par personne).

Faut-il songer à faire de même pour la communauté mathématique canadienne, peut-être à l'occasion de notre Réunion d'hiver annuelle? La SMC doit-elle rassembler et diffuser, elle aussi, des données sur les programmes d'études supérieures et sur les possibilités d'emploi, ou serait-ce tout simplement un dédoublement de ce que l'AMS offre déjà?

Si vous avez des avis sur cette question ou sur des questions connexes, n'hésitez pas à les partager avec moi ou avec un membre de l'exécutif de la SMC.

EMPLOYMENT OPPORTUNITY

香港城市大學
City University of Hong Kong

City University of Hong Kong is one of eight tertiary institutions funded by the Government of the Hong Kong Special Administrative Region through the University Grants Committee of Hong Kong. A young and dynamic institution, the University aspires to be internationally recognized as a leading university in the Asia-Pacific region through excellence in professional education and applied research. It has a growing international reputation, as evidenced by its surge up the rankings of the world's top 200 universities according to the Times Higher Education Supplement. The mission of the University is to nurture and develop the talents of students and to create applicable knowledge in order to support social and economic advancement. Currently, approximately 26,000 students are enrolled in over 180 programmes ranging from associate degrees to PhD. The medium of instruction is English.

The University invites applications for the following posts. Candidates with applied research achievements will receive very positive consideration. Relevant experience in business and industry will be a definite asset.

Associate Professor/Assistant Professor (2 posts) *[Ref. A/539/49]*
Department of Mathematics

Duties : Teach undergraduate and postgraduate courses, supervise research students, conduct research in areas of Applied Mathematics, and perform any other duties as assigned.

Requirements : A PhD in Mathematics/Applied Mathematics/Statistics with an excellent research record.

Salary and Conditions of Service
Salary offered will be highly competitive and commensurate with qualifications and experience. Appointment will be on a fixed-term gratuity-bearing contract. Fringe benefits include annual leave, medical and dental schemes, and housing benefits where applicable.

Application and Information
Further information about the posts and the University is available at http://www.cityu.edu.hk, or from the Human Resources Office, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong [Fax : (852) 2788 1154 or (852) 2788 9334/email: hrojob@cityu.edu.hk.] Please send an application letter enclosing a current curriculum vitae to the Human Resources Office by **16 January 2009**. Please quote the reference of the post applied for in the application and on the envelope.

The University reserves the right to consider late applications and nominations, and to fill or not to fill the positions. Personal data provided by applicants will be used for recruitment and other employment-related purposes.

The correlation between increased production of Ph.D.s in mathematics and unemployment is difficult to establish. If we study the AMS's data (which is, nowadays at least, restricted to American universities; we might presume the Canadian situation is similar), we find that there were between 960 and 1311 Ph.D.s produced annually from 1992 and 2006. The period 1993–1996 of highest unemployment (in excess of 8.1% each year) does not correspond to unusually high rates of graduation, with between 1034 and 1157 new Ph.D.s per annum. Indeed the highest graduation rates in this 15 year period are the two most recent; the full data for 2007 was not available at the time of writing. The highest single rate (1311 new Ph.D.s) is for 2006. But the stated unemployment rates (which have remained consistently between 2.9 and 5% over the past decade) have not grown, leading one to conclude that increased employment opportunities have arisen. Interestingly, these new opportunities do not appear to be primarily in industry or government, as the percentage of new Ph.D.s taking industrial jobs (25% in 2006) is actually lower now than it was around 2000 (when it reached 31%). The data instead suggests the number of academic jobs has actually kept pace with the production of Ph.D.s. Nowadays, as has been the case for at least the past 30 years, roughly two thirds of Ph.D.s are employed in academic positions (which the AMS takes to include research institutes and nonprofit societies).

All of this data is for graduates from institutions in the United States. Are factors that much different in Canada, other than that the market is much smaller? Currently, employment opportunities in government are probably somewhat more restricted here, as, in the U.S., the NSF employs a number of full-time program officers, and the NSA (and affiliated acronyms) hires a significant number of mathematicians. In the future, however, this employment gap will likely close due to new possibilities for postdoctoral and other positions connected to the Communications Security Establishment (CSE) and the newly established Cryptologic Research Institute (CRI). Another factor that is much more significant in Canada than correspondingly in the U.S. is the role of our mathematical institutes. Each of the Atlantic Association for Research in the Mathematical Sciences (AARMS), the Banff International Research Station for Mathematical Innovation and Discovery (BIRS), the Centre de Recherches Mathématiques (CRM), the Fields Institute and the Pacific Institute for the Mathematical Sciences (PIMS) is a major force for graduate education at affiliated universities and beyond, through summer graduate schools, special courses, conferences, and directly through funding and provision of office space. The institutes also facilitate increased interaction between universities, with obvious benefits to students.

So what role can and should the CMS play in graduate education? Currently, our CMS Student Committee has extremely broad terms of reference, those being "to promote interaction between Canadian post-secondary students and to consider other matters of interest and concern to post-secondary mathematics students in Canada". For graduate students, the Student Committee supports a variety of activities of interest. Over the past five years or so, these have included funding numerous social events for graduate students at Canadian conferences, as well as providing partial support for summer schools and workshops run by AARMS, Fields and PIMS. What additional resources can we provide? The AMS currently does an outstanding job in this regard. Their website has links to fellowship and funding opportunities, as well as to comprehensive career and professional development information, including job listings. At their annual winter meeting, the AMS runs the Mathematical Sciences Employment Center, matching job seekers with prospective employers – In 2008, this featured 120 employers (mostly academic) and 568 applicants, averaging 2.2 interviews per person. Is there a need for something similar in the Canadian community, perhaps taking place during our annual winter meeting? Should the CMS strive to collect and make available data on graduate programs and subsequent employment as the AMS has done, or would such activities be redundant in light of what the AMS makes available? If any of you have thoughts on these or related questions you'd like to share, please feel free to contact me, or any of the CMS Executive.

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Keith Johnson
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CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

DECEMBER 2008 DECEMBRE

4-5 **CWiMAC 2008 - Connecting Women in Mathematics Across Canada (University of Ottawa, ON)**
www.cms.math.ca

5-8 International Conference on Partial Differential Equations and Applications in honour of Professor Philippe G. Ciarlet's 70th birthday (City University of Hong Kong, Kowloon, Hong Kong)
www6.cityu.edu.hk/rcms/ICPDEA2008/

6-8 **CMS Winter 2008 Meeting**
www.cms.math.ca/Events

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

JANUARY 2009 JANVIER

5-8 Joint Mathematics Meetings (Washington, D.C.)
www.ams.org/amsmtgs/national.html

12-16 Quantitative and Computational Aspects of Metric Geometry (IPAM, UCLA, CA)
www.ipam.ucla.edu/programs/mg2009

17 The N+4th Southern California Topology Conference (California Institute of Technology,Pasedena, CA)
www.its.caltech.edu/~dannyc/sctc/sctc2009.html

22-24 Connections for women: Algebraic Geometry and related fields (MSRI, Berkeley, CA)
www.msri.org/calendar/workshops/workshopInfo/471/show_workshop

FEBRUARY 2009 FEVRIER

23-27 Modern Moduli Theory (MSRI, Berkeley, CA)
www.msri.org/calendar/workshops/workshopInfo/472/show_workshop

MARCH 2009 MARS

7-11 The Spring Topology and Dynamics Conference and the Ulam Centennial Conference (University of Florida, Gainesville)
www.math.ufl.edu/stdculam/

APRIL 2009 AVRIL

30-May 3 Canadian Mathematics Education Forum 2009 (Vancouver, BC)
www.cms.math.ca

MAY 2009 MAI

10-15 ICMI (International Commission on Math Instruction) Study Conference on 'Proof and Proving in Mathematics Education' (Taipei, Taiwan)
www.icmi19.com

18-29 Georgia International Topology Conference (University of Georgia,Athens, GA)
www.math.uga.edu/~topology/

JUNE 2009 JUIN

3-15 Interactions between Hyberbolic Geometry, Quantum Topology and Number Theory Workshop (Columbia University, New York)
www.math.columbia.edu/~volconf09/

6-8 **CMS/CSHPM Summer Meeting 2009 (St. John's, NL)**
www.cms.math.ca

8-13 Workshop on Disordered Systems: Spin Glasses (CRM, Montreal, QC)
www.crm.math.ca/Mathphys2008

15-18 3rd International Conference On Maths and Stats (Athens, Greece)
www.atiner.gr/

14-20 47th International Symposium on Functional Equations (Gargnano, Italy)
GianLuigi.Forti@mat.unimi.it

29-July 4 International Conference in Category Theory (CT2009) (University of Cape Town (South Africa). Conference dedicated to Saunders Mac Lane, who would be 100 years old on 4 August 2009.
Website preparation in progress.

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

JULY 2009 JUILLET

14-17 Summer Conference on Topology and its applications (Brno University of Technology (VUT Brno), Czech Republic)
www.vutbr.cz/SUMTOPO2009

14-24 International Conference on Banach Algebras (Bedlewo, Poland)
www.siue.edu/MATH/BA2009/

AUGUST 2009 AOÛT

2-7 22nd International Conference on Automated Deduction (McGill University, Montreal, QC)
http://complogic.cs.mcgill.ca/cade22/

13-15 CMS/SMM Meeting 2009
www.cms.math.ca/Events/CMS-SMM-2009/

OCTOBER 2009 OCTOBRE

12-16 Algebra, Geometry, and Mathematical Physics 5th Baltic-Nordic Workshop (Bedlewo, Poland)
www.agmf.astralgo.eu/bdl09/

CMS Executive Office Holiday Schedule / Horaire des fêtes du bureau de la SMC

The CMS Executive Office will be closing for the holidays on December 22, 2008 at 4:00 pm and will reopen on January 5, 2009 at 8:00 am. The CMS staff wish you a very happy and safe holiday.

Le bureau de la SMC sera fermé pour les congés de fête débutant le 22 décembre 2008 à 16:00h et ouvrira le 5 janvier 2009 à 8:00h. Les employés de la SMC vous souhaitent des belles vacances saines et sauves.

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May / mai	March 15 / le 15 mars
September / septembre	July 15 / le 15 juillet
October / octobre	August 15 / le 15 août
November / novembre	September 15 / le 15 septembre
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