CMS NOTES de la SMC

FROM THE EXECUTIVE DIRECTOR'S DESK
Johan Rudnick, *Canadian Mathematical Society*

HOW CMS HELPS 'DO MATH'

At the CMS summer meeting in Fredericton, the host for one of the sessions was anxious to get the introductory remarks out of the way so that everyone could start to 'do math.' At that meeting and through many other activities, everyone was able to 'do math' because the CMS helped to make it happen. The way that CMS has generally 'helped' was traditionally characterised as administration, research, education, and publishing activities. To more clearly reflect why the CMS does what it does and how that helps the mathematics community 'do math', the CMS Board recently approved a recasting of the activities to strategically focus on promoting the advancement, discovery, learning, and application of mathematics. In 2011, this change will be reflected in CMS planning and budgeting.

ADVANCEMENT OF MATHEMATICS

To promote the advancement of mathematics, the CMS helps to build the mathematics community through membership, outreach, and advocacy activities.

The issues related to these types of activities include: ensuring that the CMS fully engages and supports members, especially students; identifying how best to help and support the various mathematics constituencies; ensuring the CMS properly represents the interests of the community as a whole; and facilitating member and community dialogue. CMS is already at work helping to build the mathematics community through the provision of support to the Statistical Society of Canada and the Canadian Discrete and Algorithmic Mathematics group.

The most important current advancement issue is the development of the long-term (five-year) strategy requested by NSERC. Coincidentally, the CMS President, with the assistance of many members in the community, has been working on a 'state of mathematics in Canada' overview that will provide excellent input to the strategy. Together, these initiatives will help the CMS identify how best to help the mathematics community in the future.

DISCOVERY OF MATHEMATICS

To promote the discovery of mathematics, the CMS helps to broadly share research, and to celebrate research excellence.

Discovery-related activities, by their nature, focus on the promotion of research and how that can best be achieved. The key activities will continue to be journal publishing and semi-annual meetings. With respect to the journals, CMS must ensure that they continue to meet the interests of the mathematics community, can capitalize on digital opportunities, and can be financially sustained. With respect to the meetings, while CMS has an opportunity to build on the success to date, it must do so at a reasonable cost.

As the CMS scholarly journals are a critical source of revenue for the CMS, their continued relevance to the mathematics community is also critical to their success – as is their adaption to a digital environment. Given the international interest in the CMS journals and their reputation, there has even been some suggestion that the CMS should launch complementary scholarly journals. There is some interest in building on the existing partnership with the Royal Society of Canada and developing *Mathematical Reports* into a more comprehensive research overview

EDITORIAL

by Robert Dawson
Saint Mary's University, Halifax
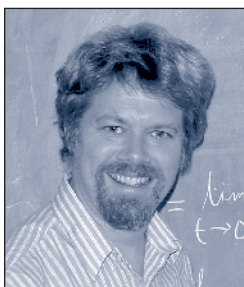
Ave atque Vale

I can remember a few of the early influences that got me interested in mathematics, at an age when mathematics is all too likely to be synonymous with arithmetic exercises. One was Bergamini's excellent *Life Science Library* book *Mathematics*, with its luscious illustrations and tempting descriptions of strange concepts such as quaternions, topology, and calculus. However, while I loved that book, and read it so often that the binding fell apart, it was a bit like taking a tour bus through an exotic foreign land, with the driver never stopping to let the passengers out. I could see that there was something magical happening, but from a distance.

I must have been around five year old, however, when I found a stack of back numbers of a rather obscure American children's magazine called *Humpty Dumpty* in the city library. Much of it was the usual kids' fare. But I remember to this day one article which pointed out the fascinating - and accessible — fact that I could draw any quadrilateral, find the midpoints of the edges, join them, and - hey presto! I would have the corners of a parallellogram.

I realize now that that article was surely written by Martin Gardner, who edited *Humpty Dumpty* in the 1950's. Some years later one of my school teachers introduced me to his "Mathematical Games" column in *Scientific American*. He had been writing the column by then for more than fifteen years, and there was a treasure trove of columns to find and read. And what columns! The Soma cube, Conway's Life, puzzles, games, the tongue-in-cheek numerology of Dr Matrix, Penrose tiles... One particularly memorable column that came out when I was in high school announced several unexpected discoveries, from a proof that chess was a provable win for Black to a counterexample to the four-color theorem. The column was of course an April Fools Day hoax!

One of my first research articles was on Daykin's cube-packing problem — can space be packed with integer cubes, no two the same size? [It cannot.] While I don't think Gardner had ever written on that, he did write in at least one column about closely related results, including the quest for the "squared square" and the impossibility of doing the same with cubes. I was disappointed that he had recently retired from writing his column; if he had still been writing it and had mentioned my result, I (still a student) would have felt that I had truly joined the immortals.

The amazing thing is that Martin Gardner, one of the most influential popularizers of mathematics ever, was not a mathematician by training. He studied philosophy as a student, and thereafter worked as a freelance writer. His column in *Scientific American* began after he submitted a regular article on flexagons there. He was also an expert conjurer and an avid debunker of pseudoscience.

This summer, Martin Gardner left us. So many of us have been influenced by him, even many who (like me) never met him in person. We, and mathematics, are the poorer for his passing; but we are immeasurable richer for his time among us. Martin: hail and farewell.

ÉDITORIAL

par Robert Dawson
Saint Mary's University, Halifax

Ave atque Vale

Je me souviens de quelques-unes des premières influences qui ont suscité mon intérêt pour les mathématiques, à un âge où « mathématiques » était le plus souvent synonyme d'« exercices arithmétiques ». Je mentionnerai d'abord l'excellent *Life Science Library* de Bergamini intitulé *Mathematics*, qui contenait de riches illustrations et des descriptions accrocheuses d'étranges concepts comme les quaternions, la topologie et le calcul intégral et différentiel. Toutefois, malgré mon adoration pour ce livre (lu si souvent que la reliure s'est démolie), je comparerais cette expérience de lecture à un voyage en autobus en pays étranger où le chauffeur ne s'arrête jamais pour laisser sortir ses passagers. Je voyais la magie qui se dégageait de ce livre, mais de loin.

Je devais avoir cinq ans, toutefois, le jour où je suis tombé sur une pile d'anciens numéros d'un curieux magazine américain pour enfants appelé *Humpty Dumpty* à la bibliothèque municipale. Dans l'ensemble, ce magazine s'apparentait à n'importe quelle autre publication pour enfant, mais je me rappelle encore à ce jour un article qui décrivait un fait fascinant (et facile à comprendre) : comment on pouvait dessiner n'importe quel quadrilatère, trouver le point milieu de chacune de ses arêtes et les relier entre eux pour obtenir, à coup sûr, un parallélogramme.

Je me rends compte maintenant que cet article a certainement été écrit par Martin Gardner, qui était rédacteur en chef de *Humpty Dumpty* dans les années 50. Quelques années plus tard, une enseignant m'a fait connaître sa chronique « Mathematical Games » (jeux mathématiques) dans la revue *Scientific American*. À cette époque, cela faisait déjà plus de 15 ans qu'il tenait cette chronique, ce qui m'assurait une mine de trouvailles et de lectures extraordinaires. Et quels articles! Sur le cube Soma, la vie de Conway, des casse-têtes, des jeux, la numérologie ironique du Dr Matrix, le carrelage de Penrose… Je me souviens en particulier d'un article paru quand j'étais au secondaire, qui annonçait plusieurs découvertes surprenantes, dont la possibilité de prouver que les Noirs étaient victorieux aux échecs et un contre-exemple du théorème des quatre couleurs. Bien sûr, il s'agissait d'un poisson d'avril!

L'un de mes premiers articles scientifiques portait sur le problème d'empaquetage de Daykin : est-il possible de remplir un espace avec des cubes entiers, sans utiliser deux cubes de la même taille? [la réponse est non] Je ne crois pas que Gardner ait écrit à ce sujet, mais il a écrit, dans au moins un article, sur des résultats étroitement liés à ce problème, notamment sur la quadrature du carré et l'impossibilité de faire de même avec les cubes. À l'époque, j'ai été déçu d'apprendre qu'il venait de quitter cette chronique : s'il

avait continué d'écrire et s'il avait mentionné mes résultats (j'étais toujours étudiant), j'aurais vraiment eu l'impression de m'être taillé une place chez les immortels.

Ce qui fascine chez Martin Gardner, l'un des plus grands vulgarisateurs mathématiques de tous les temps, c'est qu'il n'a fait pas fait d'études en mathématiques. En effet, il a d'abord étudié la philosophie avant de faire carrière comme rédacteur pigiste. Il a obtenu sa chronique dans *Scientific American* après avoir proposé à la rédaction de la revue un article sur les flexagones. Il était aussi un grand prestidigitateur et il s'empressait de démystifier toute découverte pseudoscientifique.

L'été dernier, Martin Gardner nous a quitté. Son influence a atteint un nombre inouï de personnes qui, bien souvent, ne l'ont jamais rencontré (c'est mon cas). Son départ est une perte pour nous tous et pour les mathématiques; mais son passage nous aura laissés immensément plus riches. Avé Martin, et adieu.

The Abel Prize 2003–2007: The First Five Years

edited by Helge Holden and Ragni Piene, 2010, Springer, 327 pp, £58.99, US$89.95 with DVD, ISBN 978-3-642-01372-0

Reviewed by Anton Cox, City University

The Abel prize was established by the Norwegian government in 2002, the bicentenary of Abel's birth, to recognise outstanding scientific work in the field of mathematics. Since then it has been awarded annually, and this book surveys the first five years.

The volume under review presents the winners of the first five prizes, together with a brief history of the prize and a very short biographical sketch of Selberg, the first, honorary, laureate. There is a short autobiographical piece by each laureate, followed by a more extensive review of their work. Included with the book is a DVD of interviews carried out with the laureates when their prizes were awarded.

The writers of the various overviews of the prizewinners' work have been set a difficult task. Each presents in some detail the main achievements of the respective laureates, while endeavouring to give an overview suitable for a general mathematical audience. In general I think they have been very successful, and the resulting essays provide a rewarding insight into the respective fields.

The first and longest review, by Pilar Bayer, is of the work of Serre. It is also the most ambitious, as it attempts in 55 pages to survey almost all 285 publications. Unfortunately this does mean that in places the material turns into little more than a list of topics, with classic works such as FAC (faisceaux algébriques cohérent) reduced to a few short lines. On the other hand, the reader soon appreciates the range and power of Serre's work across a number of fields.

The second review, by Nigel Hitchin, surveys the background to the Atiyah–Singer index theorem and some of its many applications. This leads the reader gently but rapidly from the definition of an index, through the various geometric ideas needed and then on to various versions of the index theorem in different contexts.

The remaining reviews are shorter, and cover selected highlights of the respective laureates' work. Helge Holden and Peter Sarnak review the contributions of Lax, particularly to partial differential equations, integrable systems, and scattering theory. Tom Körner discusses Carleson's contributions to modern analysis
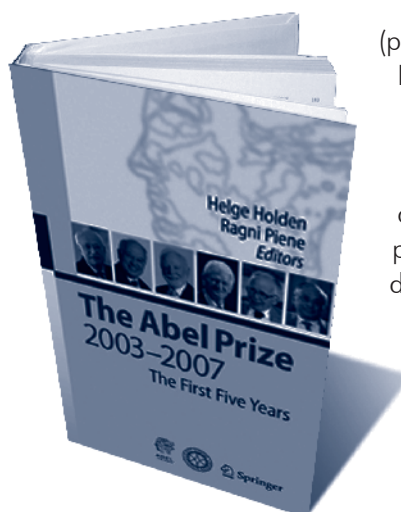
(particularly the proof of Lusin's conjecture), and this essay is noteworthy both for being aimed (in part) at a general audience and also containing some actual proofs! Finally, Terry Lyons discusses Varadhan's work in stochastic analysis. Each of these essays provides the reader with a flavour of the respective disciplines, and of the distinctive contribution of the various laureates.

The short autobiographical pieces by the various laureates are each of interest, but still more rewarding are the lengthy interviews included on the accompanying DVD. The majority of these were shown on Norwegian TV, and the interviewers (both mathematicians) and interviewees do an excellent job at balancing technical precision with the demands of a general audience.

This volume is intended to be the first of a series; if the rest reach the same high standard then they will provide a rich survey of a broad range of modern mathematics.

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Letters to the Editors
Lettres aux Rédacteurs

BOOK REVIEW   A topological tour-de-force

Algebraic methods in unstable homotopy theory
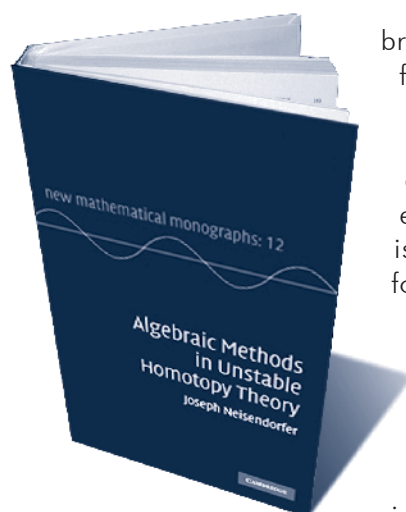
edited by Joseph Neisendorfer
Cambridge University Press, 2010 574 pp., $125.00 (US)
ISBN 978-0512760379

Reviewed by Petar Pavesic, University of Ljubljana

Homotopy theory can be briefly described as the part of mathematics that studies the properties of spaces and maps that are invariant under small deformations called homotopies. In this sense the generic problem of homotopy theory is to determine the set of fundamentally distinct (i.e. non homotopic) maps between two given spaces. It is a remarkable fact that these sets can be usually described algebraically in terms of the so-called homotopy groups. The n-th homotopy group of a space X, denoted $\pi_n(X)$, is defined as the set of homotopy classes of maps from the n-dimensional sphere to the space X, endowed with a natural concatenation operation which makes it into a group (a commutative one, when $n \geq 2$). The computation of homotopy groups can be further reduced to the homotopy groups of spheres, which are in a sense the geometrically simplest non-trivial spaces.

The simplicity of the definition is deceptive as the homotopy groups are tantalizingly difficult to compute. Actually, there is no finite, simply-connected space for which all homotopy groups are known, and this applies in particular to the homotopy groups of spheres. For that reason much effort is devoted to the study of qualitative properties of the homotopy groups. Many important results in homotopy theory fall in this category, for example the celebrated theorems by J.P. Serre that a simply-connected finite complex has infinitely many non-trivial homotopy groups, all of which are finitely generated. Specializing to spheres Serre also proved that their homotopy groups are finite, with only two exceptions: $\pi_n(S^n) \cong \mathbb{Z}$, the infinite cyclic group, while $\pi_{4n-1}(S^{2n}) \cong \mathbb{Z} \oplus$ finite group. Consequently, to compute the homotopy groups of spheres we must only determine certain finite commutative groups, which means that is sufficient to work one prime at a time by considering the p-primary components $\pi_n(S^m)_{(p)}$. Moreover the homotopy groups of even dimensional spheres can be expressed in terms of the homotopy groups of odd-dimensional ones, so it is sufficient to study the properties of the latter. I. James in 1955 proved that 2-primary component of $\pi_*(S^{2m+1})$ is annihilated by 4^m, or in other words, that the exponent of $\pi_*(S^{2m+1})_{(2)}$ is at most 4^m. James' result was extended to odd primes by H. Toda in 1958, who proved that p^{2m} annihilates $\pi_*(S^{2m+1})(p)$. This remained the state-of-the-art for twenty years until P. Selick in 1978 proved that for p an odd prime, the exponent of $\pi_*(S^3)(p)$ is p. This breakthrough was soon followed the theorem of F. Cohen, J. Moore and J. Neisendorfer that for an odd prime p the exponent of $\pi_*(S^{2m+1})(p)$ is pm. Surprisingly, for $p = 2$ the definitive bound has not yet been found.

The exponent theorem of Cohen-Moore-Neisendorfer is justly considered to be one of the deepest results in homotopy theory. Neisendorfer's book brings together mathematical tools and topics which are involved in the proof of that result. The base camp for the ascent is set quite high, as it is assumed that the reader is familiar with homology and homotopy theory at the level of standard textbooks on algebraic topology like those of E. Spanier or A. Hatcher. The prerequisites also include obstruction theory, Postnikov systems, some homological algebra and even the Serre spectral sequences. And then the list of contents also looks formidable, but one should not assume that from the starting point on the author rushes toward the climax, the proof of the main theorem. Far from that, the book is written more in the style of a Russian novel with a host of parallel developments and stories enveloping the main thread. So the reader will learn about homotopy groups with coefficients, general localization theory, variants of Hopf invariants, about the underlying homological algebra and other topics, each of them treated in detailed and fairly self-contained chapters.

There are several ways to use this book. First of all, one can head directly toward the Cohen-Moore-Neisendorfer theorem, leaving aside all the additional material. Or one can take individual chapters as building blocks for an advanced graduate course. It could be also used as a reference source, as one of the great merits of this book is that in it one can find expositions of advanced results that are not easily retrieved in the literature, like those on James-Hopf and Toda-Hopf invariants or on Browder's treatment of torsion in H-spaces and others.

In conclusion, this book is a real tour-de-force that is unlikely to be bettered in the near future. We recommend it both to the specialists in the field and to those, like graduate students, who need a thorough introduction to classical topics and to some of the greatest achievements of unstable homotopy theory.

BRIEF BOOK REVIEWS

by Keith Johnson
Dalhousie University, Halifax

Mathematics and Sports
Joseph A. Gallian (Ed.)
Mathematical Association of America,
Dolciani Math. Exp. #43
ISBN 978-0-88385-349-8

If asked to give a talk about mathematics accessible to a general audience one of the best choices of topic you can make is an application of mathematics in sports. Almost everyone has a favorite sport about which they think they are an expert and telling them something new is certain to hold their attention. This new volume from the MAA in the Dolciani series contains ample source material for many such talks. It is a collection of essays on applications in 8 different sports - baseball, basketball, football, golf, soccer, tennis, track and auto racing. Statistical studies occur frequently (baseball fans are famous for their enthusiasm in this area) and also tournament design and game theory (including the contentious problem of the optimal strategy in the final minute of a basketball game). Of the more unusual essays the one about humidifying baseballs to reduce the number of homeruns stands out (they actually do this at one high altitude ball park).

How to read historical mathematics
Benjamin Wardhaugh
Princeton Univ. Press
Princeton, NJ
ISBN 978-0-691-14014-8

One of the pleasures of being a mathematician is of being part of a subject with a long and rich history. No science and few arts can claim such a long lineage. This sense of continuity with the past has a price however. The actual writings of our mathematical ancestors seem frequently to be full of obscure notation and obtuse exposition and to lack the common cultural subtext which aids understanding of modern writing. Benjamin Wardhaugh has written a useful handbook to help with this problem. What it contains is what you would hope for if, puzzled by some piece of ancient writing, you cornered one of your university's historians and demanded advice. Here is advice on how to tease out the meaning, on how to deduce how the work came to be written, and for whom, and on the physical nature of primary sources and what they reveal about the mathematical content. The book concludes with some comments on what historical sources to read, amplifying Laplace's exhortation "Read Euler, read Euler, he is the master of us all".

Algebra: Applications and Algorithms (2nd Ed.)
Michael Artin
Prentice Hall,
ISBN 978-0-13-241377-0

A course in abstract algebra, offered in the third year, is a feature of almost every honours or specialist undergraduate mathematics program. Given this demand, there is a wide choice of suitable textbooks all covering much the same material (groups, rings, fields) in the same order. Such books are not interchangeable however and the one under review, now in its second edition, has a couple of features which particularly recommend it. The more notable feature is its wide selection of concrete examples from other branches of mathematics to illustrate what is, by its nature, an abstract subject. Cryptography, algebraic geometry, algebraic number theory and differential equations are each treated at some length. The other feature is the prominence of linear algebra, particularly in the section on group theory. This both connects the material with the linear algebra class most students take in the second year of their program and provides the tools for actual computations which are frequently glossed over in this area.

Classical topics in discrete geometry
Karoly Bezdek
CMS books in mathematics,
Springer, NY
ISBN 978-1-4419-0600-7

Discrete geometry is the study of discrete arrangements of geometric objects in Euclidean or non-Euclidean space. While geometry has been part of the core of mathematics for millennia this branch is relatively new and abounds in interesting unsolved problems. This new book by Karoly Bezdek of the University of Calgary gives an introduction to this subject by first surveying some of these unsolved problems and then offering a selection of proofs of relevant results not previously published. Of the problems the best known is that of packing spheres in Euclidean 3-space. This is discussed at length together with packing problems by convex bodies, covering problems with homothetic bodies of planks or cylinders, volume problems for unions of spheres (the Kneser-Poulsen conjecture) and ball-polyhedra.

New Releases from the AMS
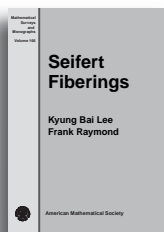
Seifert Fiberings

Kyung Bai Lee, *University of Oklahoma, Norman, OK*, and **Frank Raymond**, *University of Michigan, Ann Arbor, MI*

This is the first book to bring together the scattered literature on singular fiberings in a unified approach. The focus is toward geometric applications, with nearly all illustrations devoted to manifolds or manifolds with singularities. Unlike other texts on the subject, this book treats all dimensions, with a particular focus on higher-dimensional phenomena where the typical fiber is a homogeneous space.

Mathematical Surveys and Monographs, Volume 166; 2010; approximately 411 pages; Hardcover; ISBN: 978-0-8218-5231-6; List US$99; AMS members US$79.20; Order code SURV/166

Nonlocal Diffusion Problems

Applied Mathematics

Fuensanta Andreu-Vaillo, José M. Mazón, *Universitat de València, Spain*, **Julio D. Rossi**, *Universidad de Alicante, Spain*, and **J. Julián Toledo-Melero**, *Universitat de València, Spain*

This book presents recent results on nonlocal evolution equations with various boundary conditions, starting with the linear theory and moving to nonlinear cases. The largely self-containe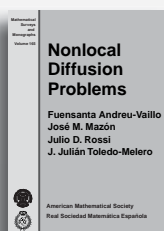d text emphasizes an intuitive understanding and results given with full proofs. The book serves as a relevant reference for mathematicians, engineers, physicists, biologists and others interested in analysis and partial differential equations.

A co-publication of the AMS and Real Sociedad Matemática Española (RSME).

Mathematical Surveys and Monographs, Volume 165; 2010; 256 pages; Hardcover; ISBN: 978-0-8218-5230-9; List US$82; AMS members US$65.60; Order code SURV/165

Mathematical Connections

TEXTBOOK
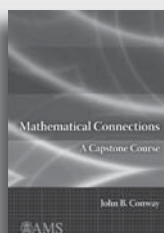
A Capstone Course

John B. Conway, *George Washington University, District of Columbia*

This book illustrates the connections between the topics in the various courses taken by undergraduate mathematics majors. It emphasizes the importance of having a broad view of mathematics, for the instructor and the research mathematician as well as the student. A number of exercises are designed to assist the student in understanding and doing mathematics.

2010; 243 pages; Softcover; ISBN: 978-0-8218-4979-8; List US$55; AMS members US$44; Order code MBK/75

The Intrinsic Nature of Things

The Life and Science of Cornelius Lanczos

Barbara Gellai, *Hungarian Academy of Sciences, Budapest, Hungary*

This rich account of the life and accomplishments of mathematician and physicist Cornelius Lanczos illustrates his deep awareness of the beauty in science and his notion of "science as a kind of art." The book recounts contributions that include an exact solution of the Einstein field equations for gravity and a rediscovery of what is now known as the singular value decomposition. The book traces a life journey that reflects the social upheavals of his time.

2010; 168 pages; Softcover; ISBN: 978-0-8218-5166-1; List US$29; AMS members US$23.20; Order code MBK/76

Glimpses of Soliton Theory

The Algebra and Geometry of Nonlinear PDEs

Alex Kasman, *College of Charleston, SC*

This book adresses some of the hidden mathematical connections in soliton theory which have been revealed over the last half-century. It aims to convince the reader that, like the mirrors and hidden pockets used by magicians, the underlying algebro-geometric structure of soliton equations provides an elegant and surprisingly simple explanation of something seemingly miraculous.

Student Mathematical Library, Volume 54; 2010; approximately 310 pages; Softcover; ISBN: 978-0-8218-5245-3; List US$46; AMS members US$36.80; Order code STML/54
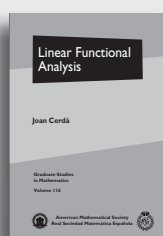
Linear Functional Analysis

TEXTBOOK

Joan Cerdà, *Universitat de Barcelona, Spain*

This introduction to functional analysis avoids the most general results possible in favor of clarity and applications to differential equations, Fourier analysis and quantum mechanics. The approach will help the reader gain an easier understanding of methods, clarifying what is essential in analytic problems. Nearly 230 exercises at the end of chapters are designed to broaden the understanding of the concepts employed.

A co-publication of the AMS and Real Sociedad Matemática Española (RSME).

Graduate Studies in Mathematics, Volume 116; 2010; 330 pages; Hardcover; ISBN: 978-0-8218-5115-9; List US$62; AMS members US$49.60; Order code GSM/116

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www.ams.org/bookstore

AMS
AMERICAN MATHEMATICAL SOCIETY

EDUCATION NOTES

By John Grant McLoughlin *and* **Jennifer Hyndman**
University of New Brunswick   *University of Northern British Columbia*

Building Bridges between Universities and K–12 Schools
Written by Michelle Manes, Department of Mathematics, University of Hawaii at Manoa

Five mathematicians from the Department of Mathematics at the University of Hawaii at Manoa (UH) recently received a five-year grant from the National Science Foundation's (NSF) "Graduate STEM Fellows in K–12 Education" (GK–12) program. Each year, eight of our mathematics graduate students receive generous stipends and tuition support from this grant. Instead of working as a teaching assistant for a calculus class, these GK–12 Fellows spend fifteen hours each week working in local schools. Their roles vary: some work with a single teacher, assisting with all of the math classes; some work in after-school programs, coaching a math team or teaching mathematics through robotics; and some work as school-wide mathematics experts, visiting several classes and even helping the teachers think about curricular issues. In all cases, we encourage the Fellows to give the teachers and students a taste of mathematics research, meaning they share both the content (control theory, reflection groups, lattice theory, dynamical systems, etc.) and the process (being perpetually stuck, making incremental progress, attacking smaller problems, asking "what if" questions, etc.).

The NSF hopes that through interactions with teachers and students, graduate Fellows will improve their communication, teaching, collaboration, and team building skills while enriching learning and instruction in K–12 schools. As Co-Principal Investigator of the UH project, I hope that our Fellows become mathematicians who care about and contribute positively to K–12 mathematics education, that they learn to respect teachers and the difficult job they do, and that they become bridges between the university and the K–12 communities.

As part of our GK–12 program, the graduate Fellows spend a semester studying "Issues in K–12 Mathematics Education." They read and discuss writings from various sources: short histories of mathematics education in the United States; pieces of the National Council of Teachers of Mathematics Standards as well as Hawaii state standards; excerpts from Liping Ma's research into teachers' mathematical content knowledge; position pieces from both sides of the "Math Wars"; theories of learning; descriptions of different teaching styles; essays about cultural differences in the classroom; and even memoirs written by classroom teachers.

Perhaps more importantly, we provide support for the Fellows' initial interactions with teachers and students. The first few times Fellows go into their partner schools, we ask them just to observe. They sketch the classroom. When they share their sketches with each other, we discuss the differences they see and how the physical setup affects what happens in class. Fellows ask for copies of the school calendar, school rules, any mathematics curricular documents, and textbooks used in their classes. They interview the teacher and some of the students. They watch, listen, and learn.

Many of our partner teachers have told us that they were initially ambivalent about the project, wondering "Who do they think they are? Coming into my school and my classroom and telling me how to teach? What do these UH people know about my students?" These are the attitudes built up over years of hearing mathematicians publicly disparage K–12 teachers. When our Fellows showed up asking questions, listening, observing, and presenting themselves as experts in mathematics but as learners in all other realms, the relationships grew strong. The teachers opened up to learning from our Fellows, and our Fellows learned quite a lot as well.

Great Things Can Happen for Students

I asked a few of our Fellows to share stories from the past school year; two of their stories are summarized below.

Hye Jung's story: Hye Jung's fifth grade students were learning about multiplying fractions, using polygons to model the standard algorithm. Some of the students invented an alternate algorithm that seemed to work for all of the examples on the worksheet. They approached Hye Jung — the classroom's math expert — and asked her about it. Rather than telling the students that their method would not work, Hye Jung suggested the students try their algorithm on some carefully chosen examples, ones that she knew would provide counterexamples. Instead of stopping there, however, Hye Jung led the students on a long exploration to describe exactly when their algorithm would and would not work. The class ended with the students' articulating an important insight: the power of the standard algorithms lies in their generality, in the fact that we don't need a special case for each new type of problem. (Hye Jung is writing up a more detailed description of the students' algorithm and their exploration, which she plans to submit to a journal.)

Tristan's story: Tristan's third grade students added play dollars to their bank every day at the start of the math lesson. On the first day of school, they put in one dollar; they added two dollars on the second day, three dollars on the third day, and so on. Each day, they would count the money in the bank, trading ones for tens and tens for hundreds as appropriate. The whole class found this clever exercise in place value very engaging, but some students wanted to know how to check if their total was correct. How could they be sure they hadn't made an error somewhere along the way, either in how much to add or in one of the trades? Tristan showed "Gauss' trick" for summing the first n natural numbers to a small group of the students, and they all figured out that their total could not possibly be correct. Because they knew how much the total was off, they were able to trace back the error and correct it, and the small group of students was very excited to explain what they had learned to the rest of the class.

These two stories are just snapshots. Our Fellows were in classes every week, often every day. Their impact on the students — as young people so excited about math that they

want to do it for a living — cannot be overstated. Moreover, each of these scenes has a teacher in the background, who was learning some mathematics and seeing with fresh eyes what his students can do.

Great Things Can Happen for Teachers

In our evaluation questionnaires, all of the teachers described the incredible experience of having a mathematician in their classroom on a regular basis, and how much they learned from the experience.

There were many commonalities in the feedback from teachers.

- Teachers said that after interacting with the Fellows for a year, they began to see math everywhere, and they brought that perspective to the classroom.

- They talked about thinking "outside the book," looking for hands-on activities, and finding ways to make mathematics fun and relevant to their students.

- They talked about finding ways to challenge their best students.

- Many of them pointed out specific pieces of mathematics that they learned from our Fellows.

Here are just a few quotes from our partner teachers:

"[Our Fellow] demonstrated how rotating objects on the coordinate plane could be done by matrices, and that repeating the matrix operations is like doing more rotations. [He] applied mathematics to many situations that came up in class. He discussed many topics of probability, bringing seemingly impossible problems within range of understanding and solving by the students… I learned a new aspect of math with most every visit… Looking back, I can only wish I had videotaped [his presentations], so that I could study them over and over, as there was always many layers of math going on that I did not see until later."

"I learned that I really was never taught how to think mathematically… Having [the Fellow] provide a helping hand whenever my brain was putting up resistance to breaking the old training / habits I had was such a blessing. This experience has changed my way of thinking and understanding of math, and of course how I approach the teaching of math concepts… I was about to make a big mistake in the beginning of the year because I was going to only teach the tricks and steps on how to solve math problems — this has forever changed my way of teaching math…"

"I learned a lot personally, and we were able to offer our students engaging, real world experiences where critical thinking and problem solving took place."

"[Our Fellow] reminded me of the importance of making math fun. Showing students that math isn't just algorithms… I cannot express how much he opened their eyes to math."

"She was able to coach our math team and introduce them to higher level concepts; something that we don't do very well, unfortunately… I am eternally grateful for what she did for my personal mathematical development as well as helping our school move forward with our math focus."

The main complaint from the teachers was that the Fellows were placed in the classroom for only one year; all of the teachers wanted to have the Fellows return and work with them for a second year. Remember, these are the same teachers who were hesitant at first, wondering about the motives of these university "experts."

Beginning with Respect, Building Trust

Because our Fellows approached their work as a partnership, expecting to learn and not just teach, they were able to effect some very real (though small) changes in local schools. More importantly, these Fellows now have an image of ways in which mathematicians can collaborate with teachers to improve K–12 education.

Certainly, research mathematicians cannot all spend 15 hours per week in local schools, and most universities cannot support their graduate students financially to do this kind of work. But we mathematicians do spend a lot of time and energy complaining to each other (sometimes in a public forum) about the quality of K–12 mathematics education. We rail against "incompetent teachers" and "weak curriculum." We talk about the lack of preparation we see in our undergraduates.

I like to imagine channeling this energy into more positive directions: working with kids in Math Circles, running workshops for teachers, and rethinking the way we prepare the next generation of K–12 teachers. What could we accomplish if we took some time to understand the work that teachers do? If we worked from the assumption that most teachers recognize how important their job is and want to do it well? If we truly believed that even teachers who may be lacking in mathematical content knowledge have some real expertise, and that there may be things that a research mathematician can learn from interactions with teachers (and with students)?

By beginning with respect, building trust, and working together, mathematicians and teachers can accomplish great things. I have seen it happen.

More information about NSF GK–12 programs can be found at www.gk12.org/. Further information about the UH program is available from the author via mmanes@math.hawaii.edu or at www2.math.hawaii.edu/superm/.

The preceding article by Michelle Manes brings to our attention a working example of collaboration between postsecondary and secondary levels of education. Other articles of this type would be welcomed for publication in this column. As we wind down the first year of a five-year term as co-editors, feedback and input on Education Notes is encouraged. Please contact Jennifer (hyndman@unbc.ca) or John (johngm@unb.ca) with your ideas.

December 4 - 6, 2010
Vancouver, British Columbia
www.cms.math.ca

Du 4 au 6 décembre 2010
Vancouver (Colombie-Britannique)
www.smc.math.ca

The Canadian Mathematical Society (CMS) and the University of British Columbia invite the mathematical community to the **2010 CMS Winter Meeting**. The program will run from Saturday to Monday and include ten plenary and prize lectures, and a wide variety of scientific sessions.

All scientific and social events will be taking place at the Coast Plaza Hotel & Suites in Vancouver.

Several events are planned for students: A student social, a panel discussion and a poster session. Details will be available on the website shortly.

Accommodation – Deadline: November 15
We have secured discounted rates at the Coast Plaza Hotel & Suites; the rates may no longer be available after the deadline.

Travel
Air Canada is the Official Canadian Airline for this event, offering special discounts to delegates attending the CMS Winter Meeting for travel to and from Vancouver between November 25 and December 13. The Promotion Code C4PN43M1 has to be entered during the booking.

Student Subsidies
Student Subsidies - We encourage the participation of students at the Meeting. With the support of CRM, the Fields Institute, MITACS, PIMS and the University of Lethbridge (Jiping [Jim] Liu Memorial Travel Fund), grants are available to partially fund the travel and accommodation costs for bona fide graduate students at a Canadian or other university. Preference is given to Canadian students. To apply for this funding, applicants should submit a letter written by their supervisor or departmental graduate advisor, providing the following: name of student, area of study and level, how the student will benefit from the meeting, whether or not the student be speaking, and what support is available from other sources.

We look forward to welcoming you in Vancouver!

La Société mathématique du Canada (SMC) et l'Université du Colombie-Britannique invitent la communauté mathématique à la Réunion d'hiver 2010 de la SMC. Au programme du samedi à lundi : dix conférences (plénières, publique et de lauréats) ainsi qu'une grande diversité de sessions.

La Réunion se tiendra a l'hôtel Coast Plaza Hotel & Suites.

Plusieurs activités sont prévues pour les étudiants : activité sociale, discussion en groupe, et séance de présentation par affiche. Les détails suivront sur le site web sous peu.

Hébergement – Date limite : 15 novembre
Nous avons négocié des chambres à tarif réduit au hôtel Coast Plaza Hotel & Suites; il se peut que le tarif réduit ne soit plus offert après la date limite.

Déplacement
Air Canada est le transporteur aérien officiel canadien de cette rencontre. Il offre une réduction aux personnes qui assisteront à la Réunion d'hiver de la SMC et voyageront à destination ou en provenance de Vancouver entre le 25 novembre et le 13 décembre. Il faut entrer le Code de promotion C4PN43M1 au moment de la réservation.

Aide financière
Aide financière - Nous encourageons la participation des étudiants à la Réunion. Grâce au soutien financier du CRM, de l'Institut Fields, du Réseau MITACS, du PIMS et de l'Université de Lethbridge (fonds Jiping [Jim] Liu), les étudiants diplômés du Canada ou de l'étranger peuvent se faire rembourser une partie de leurs frais de déplacement et de séjour. La préférence est toutefois accordée aux étudiants canadiens. Toute demande de financement doit être accompagnée d'une lettre du superviseur de l'étudiant ou de la personne responsable des études supérieures de son département, dans laquelle il ou elle indiquera le nom de l'étudiant, son domaine et son niveau d'études, en quoi la Réunion sera profitable à l'étudiant, si l'étudiant présentera une communication et si l'étudiant a accès à d'autres sources de financement.

Au plaisir de vous accueillir à Vancouver!

RÉUNION D'HIVER SMC 2010 CMS WINTER MEETING

Prizes and Awards / Prix

Prix Krieger-Nelson Prize - Lia Bronsard (McMaster)

Doctoral Prize / Prix de doctorat - Benjamin Young (MSRI)

Prix Adrien-Pouliot Award - Miroslav Lovric (McMaster)

Prix G. de B. Robinson Award - to be determined / à venir

Graham Wright Award for Distinguished Service /
Prix Graham-Wright pour service méritoire - Robert Woodrow
(University of Calgary)

David Borwein Distinguished Career Award / Prix David-
Borwein de mathématicien émérite pour l'ensemble d'une
carrière - Nassif Ghoussoub (UBC)

Public Lecture / Conférence publique

Ron Graham (UC-San Diego)

Plenary Speakers / Conférences plénières

David Aldous (UC-Berkeley)
David Donoho (Stanford)
Sujatha Ramdorai (Tata Institute; UBC)

Peter Sarnak (Princeton)
Carl Wieman (UBC)
Tamar Ziegler (Technion)

Scientific Directors / Directeurs scientifiques:

Brian Marcus, Jozsef Solymosi (UBC)

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University of Alberta
University of Victoria

Thursday | Jeudi December 2 décembre	Saturday | Samedi December 4 décembre	Sunday | Dimanche December 5 décembre	Monday | Lundi December 6 décembre
18:00-22:00 **Executive Committee Meeting**	8:00 – 16:00 - **Registration** 9:30 – 16:00 - **Exhibits** 9:30 – 16:00 - **Student Poster Session**	8:00 – 16:00 - **Registration** 9:30 – 16:00 - **Exhibits**	8:00 – 14:00 - **Registration**
	8:15 – 8:30 **Opening/Ouverture**	8:00 – 10:00 **Scientific Sessions**	8:00 – 9:30 **Scientific Sessions**
	8:30 – 9:15 **Plenary Lecture**		9:30 - 10:15 **Plenary Lecture**
	9:30 - 10:00 Break	10:00 - 10:30 Break	10:15 - 10:30 Break
Friday | Vendredi December 3 décembre	10:00 – 11:30 **Scientific Sessions**	10:30 – 11:15 **Plenary Lecture**	10:30 – 11:15 **Plenary Lecture**
11:00 AM – 13:00 **Development Group Luncheon** **13:00 – 18:30** **Board of Directors Meeting**	11:30 – 12:15 **A. Pouliot Award Lecture**	11:30 – 12:15 **Krieger-Nelson Prize Lecture**	11:30 – 12:15 **Doctoral Prize Lecture**
	12:30 – 14:00 - Break **Student Panel (TBD)**	12:30 – 14:00 Break **CMS Town Hall Meeting**	12:30 – 14:00 Break
	14:00-15:00 **Scientific Sessions**	14:00-15:00 **Scientific Sessions**	14:00-16:30 **Scientific Sessions**
	15:00 – 15:45 **Plenary Lecture**	15:00 – 15:45 **Plenary Lecture**	
	15:45 – 16:00 Break		
	16:00– 17:30 **Scientific Sessions**	16:00 – 17:00 **Scientific Sessions**	
	17:30 – 18:30 NSERC Longterm Strategy Panel (TBD)	17:00 – 18:00 **NSERC Research Funding Focus Group**	
18:00-19:30 **Welcome Reception**	20:00 – 21:00 **Ron Graham** **Public Lecture** **Student Social**	18:30 - 19:00 **Reception (cash bar)** 19:00 – 22:00 **Banquet**	(updated July 26, 2010)

IMO 2010 CMS REPORT

Report on the 51st International Mathematical Olympiad, in Astana, Kazakhstan
by Victoria Krakovna, Alexander Remorov and Adrian Tang

The Canadian IMO team has recently returned from an exciting Olympiad in Kazakhstan, bringing back unique memories, a strong team bond, and an incredible 13th place out of 96 countries, one of the best results ever in Canadian history. This year's team consisted of Robin Cheng, Pinetree Secondary School (Coquitlam, BC); Alex Song, Detroit Country Day School (Detroit, MI); Hunter Spink, Western Canada High School (Calgary, AB); Chen Sun, A.B. Lucas Secondary School (London, ON); Yuqi Zhu, University Hill Secondary School (Vancouver, BC); and Jonathan Zung, University of Toronto Schools (Toronto, ON). Accompanying them were team leader Adrian Tang and deputy leaders Victoria Krakovna and Alexander Remorov. It was a privilege for the three of us to share the IMO experience with these amazing students, supporting them during the challenging training and competition, and enjoying great times together.

Training camp
The team spent a week training at Wilfrid Laurier University in Waterloo, and a fair amount of training had also been done online before the training camp started. On a typical training day there was a mock olympiad in the morning, a lecture in the afternoon, and a problem-solving session in the evening. Each of the three leaders gave two lectures over the five days of the camp, and one of the days actually contained two lectures (by the Pigeonhole Principle), so the training was fairly intense. Even so, the students continued doing problems during meals, and worked in the classroom long after the problem-solving session officially ended. No worries, there was time for relaxation as well - every evening there was a card game of Mafia, and the camp ended on a recreational note with a movie night.

While we were doing the training, Dr. Christopher Small (University of Waterloo) and Dr. Edward Wang (Wilfrid Laurier University) were around to help with the organizational part of the camp and to give the team valuable advice and encouragement. Two IMO alumni came by to have fun with the team and enjoy the problems - Elyot Grant and David Rhee, who now study mathematics at the University of Waterloo. One day Dr. Small brought a very pleasant surprise - a replacement for the team mascot Canmoo, who was lost on the way back from the 2009 IMO. The new Canmoo is a cute miniature moose, who shows his Canadian pride by wearing a red sweater that says "Canada", and, more subtly, with a small Canadian flag tattooed on his foot. By the end of the camp, the team had all the ingredients for an excellent performance at the IMO - strong students, a great week of training, and a new mascot.

Vienna
On their way to Kazakhstan, the team had a 12-hour layover in Vienna. Though many of the students did not get a good sleep on the flight, they were eager to explore the city.

Getting to and around downtown Vienna was easy, thanks to the generally good navigability of the place and some instructions from Gertrud Jeewanjee of the CMS, a native Austrian. After spending some time in a souvenir shop (the students were particularly excited by the rich variety of music boxes), the team went to the central square, the site of the majestic St. Stephen's Cathedral. They arrived there during a mass and had a chance to enjoy the excellent acoustics of the cathedral.

The group continued walking around the beautiful downtown, making several stops for refreshments due to the hot weather and tiredness (carrying around their hand luggage did not help). When they walked into a pleasant air-conditioned museum, the students just sat down on the floor near the entrance, putting their bags all over the place. They were so relaxed that it took ten minutes to get them out of there, and head for a more appropriate location. That in fact existed nearby, and in an unexpected place too - the garden next to the Hofburg Imperial Palace, which looked funny with crowds of people sunbathing everywhere. In front of the Palace there was a statue of Mozart, which allowed Chen to show his statue-mimicking skills. The last stop was the Parliament building - the team did not go inside, but had a good time hanging out on the front steps in the company of great philosophers. When it was time to head back to the airport, everyone was quite tired but pleased with the excursion.

Problem selection in Almaty, Kazakhstan
Adrian left the training camp a few days early to attend jury meetings on problem selection, and arrived in Almaty at midnight local time. The team leaders were immediately greeted warmly by local Kazakh organizers. Most did not speak much English beyond "Welcome to Kazakhstan", but their warm smiles assured the leaders that they will make their stay enjoyable. Exhausted, Adrian checked into his comfortable room, showered and promptly fell asleep.

As an interlude, here are some simple Kazakh phrases:

> Salem - Hello (informal)
>
> Saubol - Good-bye (informal)
>
> Rahmet - Thank you
>
> Menin atym - My name is

Salem, our dear CMS Notes readers. You now know just as much Kazakh as the Canadian team.

Upon waking up, Adrian discovered that the hotel was in fact a relaxation and wellness centre, with mineral water baths. The hotel was surrounded by a beautiful park in which people could ride bikes, paddle boats and exercise. His balcony overlooked a driving range surrounded by beautiful greenery, with a scenic mountain backdrop. It was a great sight to wake up to in the morning.

The team leaders received the shortlist problems, from which six problems were to be chosen for the competition. Their job was to judge the beauty and difficulty of as many problems as they could over the following two days. Adrian gathered with fellow leaders to solve and discuss the problems, and promptly solved the easy problems. He noted two nice and easy problems, a functional equation and a geometry problem. The Canadians had a thorough session on functional equations and were overall quite strong in geometry. Hence, Adrian's choices for the favourites were clear.

The leaders had an afternoon excursion to Medeo, the site of the future Asian Winter Games in 2011. Although still under construction, the skating rink facilities appeared to be at a world class level and the mountains were glorious. The group hiked up the steps to the top of the mountain and soaked in the picturesque views from the top.

A jury meeting was scheduled for that evening at 8pm. However, the German leader spoke up and reminded the jury that the Germany vs Argentina World Cup game was at 8pm that evening and proposed to shift the meeting. This was met with thunderous applause from everyone. Even the jury chair jokingly apologized for his "scheduling over this important event". The priorities became World Cup > IMO Shortlist. The game was projected onto the big screen in the jury meeting room and roughly 100 leaders and observers gathered to watch the game. Watching with an international crowd was a very unique experience and definitely made the game far more exciting than usual.

The shortlist problems were of very high quality. Consequently, the jury had many choices for the medium and difficult problems. Adrian was particularly enamoured with the following combinatorics problem:

Problem 5. In each of 6 boxes B1, B2, B3, B4, B5, B6 there is initially one coin. There are two types of operations allowed:

Type 1: Choose a non-empty Box B_j with $1 <= j <= 5$. Remove one coin from B_j and add two coins to B_{j+1}.

Type 2: Choose a non-empty Box B_k with $1 <= k <= 4$. Remove one coin from B_k and exchange the contents of B_{k+1} and B_{k+2}.

Determine whether there is a finite sequence of such operations that results in boxes B1, B2, B3, B4, B5 being empty and box B6 containing exactly $2010^{2010^{2010}}$ coins.

We ask you, the reader, to play around with this fun problem. Go ahead. Come back in an hour after you've played with it.

Okay, you are back. Do not read this paragraph if you do not want spoilers. Would you believe that the answer is yes? Would you believe that you can obtain far more coins than what is asked in the problem? Let $P_1 = 2$ and $P_{n+1} = 2^{P_n}$ for all positive integers n, i.e. P_n is the value of a tower of exponents containing n twos. Would you believe that you can obtain $2 \times P_{14}$ coins? How about $2 \times P_{P_{14}}$ coins? The answer to all of the above is yes. This result is absolutely mind-blowing. We strongly recommend you to share this problem with your students in your math clubs, math circles or math classes. We promise you it will be worthwhile.

This problem narrowly won over another combinatorics problem. Adrian was happy that all six chosen problems were amongst his favourites. The final stage was formulating the wording of the problems in English and the subsequent translations into over 50 languages, which traditionally is a big hassle. Thankfully this year, the English version required only minor tweaks in five of the problems and the creation of a cleaner scenario in the aforementioned coins problem to complete the English translation. It is amazing that certain English words cannot be translated easily into some languages. For example, a certain language apparently did not have a word for "stack". After the translations of all languages were completed and approved, there were other orders of business for the leaders, including the election of a new chairman and two new members. Nazar Agakhanov, the Russian leader, was elected chairman. Past chairman József Pelikán's efforts will not be forgotten, as the success of the

IMO 2010 CMS REPORT

IMO today is primarily due to his vision and hard work. We all owe József a lot of gratitude.

Now it was time to head to Astana, the capital of Kazakhstan, for the opening ceremony and coordination. To Adrian's recollection, this was the first time the leaders were flown from the leaders site to the coordination site. The leaders said goodbye to Almaty, and boarded their 3am flight...

Opening ceremony and contest days

When the team landed in the Astana airport, some were concerned that they would be taken to the contest location (a children's summer camp) right away, meaning a 4-hour bus ride right after the tiring flight. Fortunately, this was not the case - the newly arrived teams were taken to a luxurious hotel in Astana, and a whole day of relaxation was ahead. The hotel was packed pretty much to maximum capacity - it was amusing to see fancy rooms lined with little wooden beds that were obviously put there just to accommodate the sheer numbers of students.

Astana (literally meaning "capital" in Kazakh) was a very modern city, built only in the past 12 years since the capital was moved there from Almaty. The opening ceremony took place at the Palace of Independence, and coincided with the anniversary of Astana being the capital and the President's birthday. The IMO participants were given a grandiose welcome by lovely Kazakh musicians in national costumes. The team leaders were already at the Palace - Adrian was admiring the murals of the Astana 2030 project, a plan by President Nursultan Nazarbayev to transform Astana into a futuristic looking metropolis by 2030. The team leaders were, of course, separated from the students and deputy leaders during the ceremony, but Adrian and his team still exchanged waves of hellos from a distance.

The opening ceremony began with children coming on stage wearing t-shirts with math symbols on them. It was an adorable sight that melted the audience to go "awwwwwww...". The organizers went all out to provide lively musical and dance performances for everyone to enjoy. During the introduction of countries, the Canadian team walked across the stage proudly, waving the maple leaf flag and holding on to Canmoo, the moose that gives them strength, loved by all and stolen by many.


After the opening ceremony, the deputy leaders and students departed to the contest site at the Baldauren camp, and the leaders returned to their hotel in Astana, in preparation for the meeting to approve the marking schemes for the problems. Here is a tip for everyone: never create and discuss marking schemes when you are sleep deprived. The team leaders' day began at 3am and it was decided to continue the jury meeting on the following day after everyone had slept. However, this did not deter many of them from watching the Netherlands vs Uruguay World Cup semi-final game that night at 12:30am.

The next day began with the Question and Answer period. Students' questions are faxed to the leaders' room, and each student's leader proposes an answer to return to the student. Leaders braced themselves that no embarrassing questions come from their own students. Gems from past years (not from Canadian students) included "What is a grasshopper?" and "I cannot draw the diagram (described in the problem). Can you do it for me?" This year's questions were fairly straightforward and uneventful, to the relief of everyone.

The leaders went on an excursion to downtown, the site of the Baiterek Tower, the symbol of Astana. Downtown Astana encapsulated a futuristic look, with gold-coloured buildings and modern architecture that rose to the sky, some in the shape of a parabola. At the base of Baiterek was a square with an impressive display of bear statues, one for each country in the world. The bears symbolized love and unity amongst nations. The bear representing Canada was disappointing - it was blue-and-white and pixelated. Adrian could not fathom why this represented Canada. Other bears were more colourful and symbolic of their representing countries. At the top of the tower was a small podium with the handprint of the President of Kazakhstan. Visitors were encouraged to place their hand in the handprint and make a wish. Adrian did, and wished that the Canadian team would have a wonderful time in Kazakhstan.

Meanwhile, the deputies and students were enjoying the beautiful Kazakh countryside. The Baldauren camp, well-known in Kazakhstan as the Island of Children's Dreams, was a very nice facility that gave the students an opportunity to play sports, go boating on the lake, and enjoy nature. Unfortunately, the deputies were staying at a different place, a resort a half-hour drive away, which was also a very picturesque place, but without easy access to the students. Thankfully, they were taken to Baldauren after each half of the contest to spend time with the students and discuss how they did. The deputies enjoyed a great excursion to the Burabai National Park and an exciting sing-and-dance party called the "Night of Surprises", and then it was time to return to Astana for coordination. Meanwhile, with the contest worries behind them, the students stayed at Baldauren for three more fun-filled days.
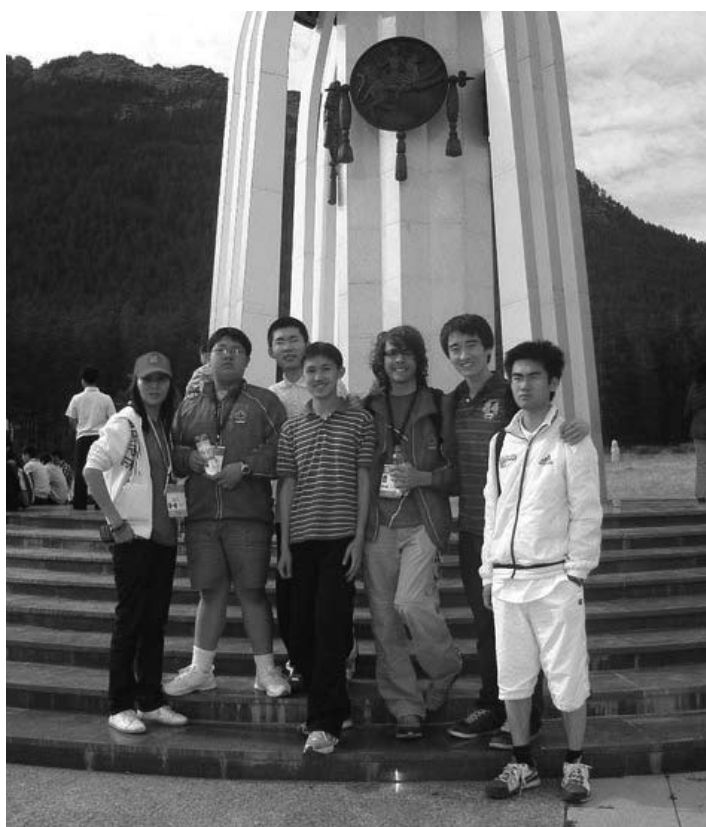
Canadian team in Burabai National Park with their guide Zauresh

Coordination

After Day 1, many members of the Canadian team showed their usual modesty proclaiming "they failed" on the first day. Leaders often have to remind students that their performance is always relative to other countries and to trust the leaders in their job of obtaining as many marks for each student as possible. Adrian received the Day 1 solutions and was delighted to know that Robin seemed to have a perfect Day 1. On Problem 1, Canada had three perfect solutions, one solution with a minor flaw, and two incomplete solutions which were still worth five (out of seven) points. On Problem 2, Canada had two perfect solutions, but a plethora of part

marks amongst the other four solutions. The problem was a tricky geometry problem, and hence, the Canadian leaders were content with this result. Canada had one perfect solution to Problem 3, a difficult number theory problem disguised as a functional equation, and also three solutions with partial progress, which eventually yielded Canada part marks. Hooray for partial marks!

Adrian received the Day 2 solutions the day after, and was happily reunited with Victoria and Alex. Woohoo! We scoured the Day 2 solutions and were further delighted that Hunter seemed to have a perfect Day 2. Canada had five perfect solutions to Problem 4, two to Problem 5 and one to Problem 6. Unfortunately several students on the team thought the answer to problem 5 was no and spent most of their time on Day 2 trying to prove a false claim. However, this misfortune fell not only upon Canada, but on every other country, so all was not lost for Canada. Two of our students received full marks and two obtained partial marks on Problem 5. More hoorays for partial marks!

Coordination went very smoothly with the exception of one problem, namely Problem 1, where the coordinators insisted on going through every line for five of our students' solutions. This is a warning to future team members: the coordinators wanted to deduct marks for minor things such as typos and bad notation on Problem 1. Hence, please write solutions to easy problems with extreme care. Canada narrowly escaped punishment this year, but some other countries were said not to be as lucky. It was very beneficial at this problem coordination to speak Russian - while the coordinators did have good English, they were more comfortable with Russian, and spoke it among themselves. The assertiveness and Russian skills of Alex and Victoria were pivotal in preventing the coordinators from deducting marks in places not deserving such mistreatment. For the remaining five problems, we agreed on the scores with little to no conflict. There was one mishap where a student used the word "obvious" in his solution, which caused some minor headaches since his claim was anything but obvious. Oh, the dreaded "o" word. Thankfully, this issue was resolved when Alex spent 20 minutes explaining (in Russian) why the student's claim was indeed obvious.

After coordination, Canada's score was 129 out of 252 and we looked to be ranked among the top 20 countries. This itself would be a great success for Canada already. Robin and Hunter seemingly had gold medals secured with scores of 35 and 32, respectively, and Yuqi had his bronze medal secured with a score of 19. Jonathan received an honourable mention, with a performance worthy of recognition. Chen's score of 21 and Alex's score of 15 were dancing on the edge of the silver and bronze cutoffs, respectively. In each of the past three years, Canada had at least one student who was one mark short of a cutoff. Oh please let the universe balance and give Chen and Alex the desired medals! The jury meeting began and the medal gods responded - the gold, silver and bronze cutoffs were

determined to be 27, 21, 15, respectively. Hi-five! Silver for Chen and bronze for Alex! It is worth noting that Alex is only 13 years old, which makes his bronze medal achievement even more astounding. This resulted in a total of 2 golds, 1 silver, 2 bronzes and an honourable mention for Canada. More exciting news arrived, as we discovered that Canada was ranked 13th! Thinking 20th and receiving 13th set off all sorts of fireworks in our heads. Percentile-wise, this is Canada's best performance ever! We could not handle any more news, until we realized that individually, Robin and Hunter ranked 7th and 11th, respectively, out of all 517 contestants. Wow Wow Wee Wow! Smiles and hugs were shared as we celebrated, laughed and giggled throughout the night. We emailed the results to the students and to interested parties back in Canada and could only imagine the elation and glee from everyone.

The last days and farewell

After the coordination, it was time for the leaders to sit back and have some fun. We enjoyed the bowling and go-carting facilities at the hotel, and several excursions - to the Cultural Centre of Astana, the President's Museum, and the "Miniature Kazakhstan" complex. Finally, the big day arrived when we were reunited with the students, who returned to Astana from Baldauren. Together, we went to see an amazing equestrian show of Kazakh national sports. The performers did all sorts of incredible acrobatics on horses - riding two horses at once, swinging off the horse at full gallop to pick up a handkerchief from the ground, wrestling each other off their horses, and so forth. There was also an adorable game where a guy chases a girl on his horse, in the attempt to hug and kiss her while in full gallop. If he fails, then on the way back she chases and whips him!

Afterwards, the students spent a day enjoying excursions around Astana, and then it was time to return to the Palace of Independence for the closing ceremony. The students were given the red carpet treatment, literally, as they marched on a red carpet into the Palace to a majestic fanfare performed by Kazakh musicians. The leaders followed soon after and the closing ceremony began. We cheered on as the Canadians proudly went up on stage and received their medals. The gold medalists were further rewarded with laptops, courtesy of the main sponsor of this IMO, ExxonMobil.

After the ceremony, we celebrated our glory and achievement this year. We bussed back to the leaders' hotel for the farewell dinner, and were joined at our table by the Canadian guide, Zauresh. She did an amazing job taking care of our team. The Canadians loved her, and she loved the Canadians. We proudly signed our names onto a Canadian flag and presented the flag to her as a gift. Zauresh's eyes lit up in happiness. The dinner consisted an assortment of Kazakh cuisine, which we feasted on to our hearts' delight.

We were only hours away from departing from Kazakhstan. An event is only as wonderful as the people who were there to share the experience with. We said farewell to our friends and colleagues, who filled our experience in Kazakhstan with happiness, laughter and life-long friendships. We will certainly see them again at a future IMO or through other endeavours. The Kazakhs were wonderful hosts, who made the strongest effort to please out of all the hosts we have ever encountered. Rahmet Kazakhstan, for a lovely IMO 2010.
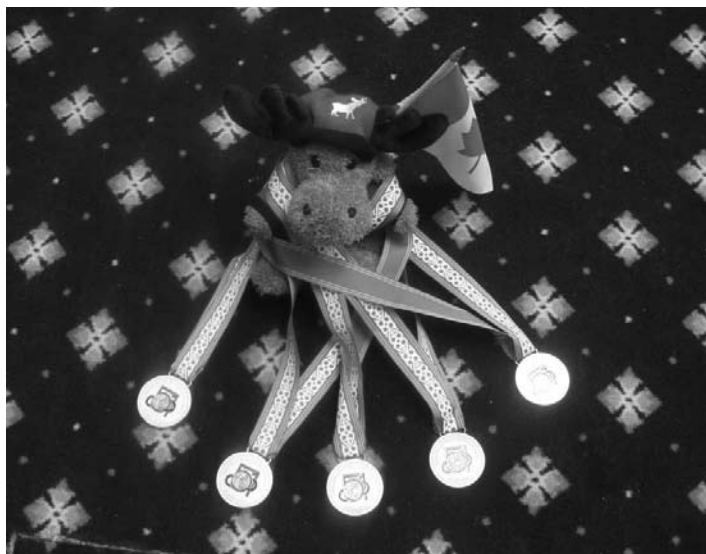
WE'RE MOVING!
CHANGEMENT DU LOCAL DU BUREAU ADMINISTRATIF DE LA SMC!

The CMS is moving to a new location in Ottawa on **September 30th, 2010**. Our street address is changing, but the phone and fax numbers remain unchanged.

Le bureau administratif de la SMC déménage dans un nouveau local. Le déménagement aura lieu **le 30 septembre**. Notre adresse est en mutation, mais les numéros de téléphone et de télécopieur demeurent inchangés.

! Please note: The office will be closed for the move from September 28 to October 1. We ask for your patience and understanding during this transition.

! Veuillez noter : Le Bureau sera fermez pour le déménagement entre le 28 septembre et le 1 octobre. Nous vous remercions de votre patience et de votre compréhension pendant cette période de transition.

From October 1st
Canadian Mathematical Society
209-1725 St. Laurent Blvd
Ottawa, ON K1G 3V4
Canada

JOB POSTING
Mathematics Department
University of British Columbia

The Mathematics Department at the University of British Columbia is seeking outstanding candidates for at least one position, subject to funding, at the tenure-track Assistant Professor level, with a starting date of July 1, 2011. Exceptional candidates at the Associate Professor or Full Professor level may be considered. Postdoctoral experience is normally expected and a PhD is required. Priority research areas are Partial Differential Equations and Probability. More detail on hiring priorities will be posted by September 1, 2010 at **www.math.ubc.ca/Dept/Jobs/priorities**. In any event, exceptional candidates in any area of mathematics may be considered. Joint positions with other departments may also be possible.

The successful applicant is expected to work in an area of interest to current faculty, to interact with related groups in the Department and to have demonstrated interest and ability in teaching. The salary will be commensurate with experience and research record.

Applicants are strongly encouraged to apply on-line; submissions can be made at MathJobs.Org

Alternatively, applicants may send a current CV including a list of publications, statement of research and teaching interests, a teaching dossier or similar record of teaching experience, and should arrange for three letters of recommendation to be sent directly to:

> **Chair, Departmental Committee on Appointments**
> Department of Mathematics, #121-1984 Mathematics Road
> University of British Columbia
> Vancouver, B.C., Canada, V6T 1Z2

In order to ensure full consideration, applications should be received by **November 15, 2010**.

The Department has strong connections with other mathematical institutes, such as the Pacific Institute for the Mathematical Sciences (PIMS), Mathematics of Information Technology and Complex Systems (MITACS), Banff International Research Station (BIRS), and the UBC Institute of Applied Mathematics (IAM). For more information see **www.math.ubc.ca**.

The University of British Columbia hires on the basis of merit and is committed to employment equity. We encourage all qualified persons to apply; however Canadian citizens and permanent residents will be given priority. We strongly encourage candidates from under-represented groups to apply, including women, visible minorities, people of aboriginal origin, and people with disabilities.

DU BUREAU DU
DIRECTEUR ADMINISTRATIF

Johan Rudnick
Société mathématique du Canada

EN QUOI LA SMC CONTRIBUE-T-ELLE À « FAIRE DES MATHÉMATIQUES »?

Au cours de la rencontre d'été de la SMC, à Fredericton, l'hôte d'une des séances avait bien hâte que le mot d'ouverture soit terminé pour que tous les membres puissent commencer à « faire des mathématiques ». Au cours de cette réunion et pendant de nombreuses autres activités, chacun a pu « faire des mathématiques » parce que la SMC a contribué à rendre le tout possible. L'aide qu'a toujours fourni la SMC était caractérisée comme de l'administration, de la recherche, de l'éducation et des activités liées à la publication. Pour mieux refléter les motifs incitant la SMC à faire ce qu'elle fait et les moyens qu'elle prend pour aider la communauté des mathématiques à « faire des mathématiques », le conseil de la SMC a récemment approuvé une recentrage stratégique des activités afin d'accorder la priorité à la promotion de l'avancement, de la découverte, de l'apprentissage et de l'application des mathématiques. En 2011, les plans et le budget de la SMC tiendront compte de ce changement.

AVANCEMENT DES MATHÉMATIQUES

Pour promouvoir l'avancement des mathématiques, la SMC contribue à renforcer la communauté des mathématiques grâce à ses activités liées aux membres et de sensibilisation et de promotion de la discipline.

On compte parmi les enjeux de ces types d'activités : veiller à ce que la SMC assure l'engagement à part entière de ses membres et appuie ces derniers, surtout les étudiants; trouver les meilleurs moyens d'aider et d'appuyer les divers intervenants du milieu des mathématiques; veiller à ce que la SMC représente convenablement les intérêts de la communauté dans son ensemble; et faciliter le dialogue entre les membres et la communauté. La SMC contribue déjà à édifier la communauté des mathématiques en offrant son appui à la Société statistique du Canada et au groupe canadien des mathématiques discrètes et algorithmiques.

L'enjeu dominant à l'heure actuelle en matière d'avancement des mathématiques est la formulation de la stratégie à long terme (de cinq ans) exigée par le CRSNG. Comme coïncidence, le président de la SMC, avec l'appui de nombreux membres de la communauté, prépare actuellement un survol de l'« état des mathématiques au Canada », projet qui éclairera bien la stratégie. Ensemble, ces initiatives aideront la SMC à cerner les meilleurs moyens à prendre pour aider la communauté des mathématiques dans les années à venir.

DÉCOUVERTE DES MATHÉMATIQUES

Pour favoriser la découverte des mathématiques, la SMC aide à partager de manière générale les résultats de la recherche et à célébrer l'excellence en recherche.

Les activités se rapportant à la découverte, par leur nature même, sont axées sur la promotion de la recherche et les meilleurs moyens d'y parvenir. Les activités principales sont toujours la publication de revues et les rencontres bi-annuelles. En ce qui concerne les revues, la SMC doit s'assurer que celles-ci répondent toujours aux intérêts de la communauté mathématique, peuvent profiter pleinement des occasions numériques et sont viables d'un point de vue financier. En ce qui concerne les rencontres, bien que la SMC ait l'occasion de s'inspirer des réussites à ce jour, elle doit le faire à des frais raisonnables.

Puisque les revues savantes de la SMC constituent une source de revenus critique pour la SMC, leur pertinence continue pour la communauté des mathématiques est également un élément critique de leur réussite – tout comme leur adaptation au monde du numérique. Vu l'intérêt international porté aux revues de la SMC et la réputation de celles-ci, certains ont même suggéré que la SMC lance des revues savantes complémentaires. Un intérêt se manifeste aussi pour une expansion du partenariat actuel avec la Société royale du Canada et la transformation des Rapports mathématiques en une publication offrant un survol plus complet de la recherche. Aussi, à l'autre extrémité, certains proposent de préparer une publication où l'on offrirait un examen plus approfondi de la recherche. Grâce aux occasions qui se présentent en matière de publication numérique, on peut plus facilement donner suite à ces types d'intérêts.

APPRENTISSAGE DES MATHÉMATIQUES

La SMC contribue à l'apprentissage des mathématiques en offrant aux étudiants des occasions extracurriculaires de poursuivre leur intérêt à l'égard des mathématiques, en soulignant l'excellence en éducation et en soutenant les activités de partenaires à travers le Canada.

Les activités liées à l'apprentissage de la SMC varient énormément et vont de la publication de revues à l'organisation de concours et de camps de mathématiques au financement de colloques étudiants où l'on remet des prix pour l'excellence en enseignement. Parmi les dossiers qui font actuellement l'objet d'un examen, citons le projet qui vise à établir la viabilité de la revue de la SMC où l'on solutionne des problèmes, la définition de la nature et de la portée de la participation de la SMC dans les camps de mathématiques et une analyse pour comprendre en quoi la SMC peut appuyer le mieux possible les foires de mathématiques et les concours provinciaux. Qui plus est, la SMC est en passe de revoir l'organisation du concours de mathématique national ouvert pour permettre à des institutions mathématiques partenaires d'à travers le Canada d'y participer. On a suggéré aussi que la SMC apporte une contribution importante en lançant une publication de recherche en éducation.

DU BUREAU DU DIRECTEUR ADMINISTRATIF *suite*

La participation des étudiants aux camps et aux concours de la SMC n'a pas cessé d'augmenter au fil des années, et on s'attend à ce que cette croissance se maintienne. On constate à chaque année que ces activités sont réussies, notamment par le rendement de l'équipe d'étudiants qui représente le Canada à l'Olympiade internationale de mathématiques (OIM).

APPLICATION DES MATHÉMATIQUES

Pour favoriser l'application des mathématiques, la SMC doit collaborer avec les instituts et les organisations de mathématiques appliquées afin de cerner les meilleurs moyens à préconiser pour soutenir ce volet de la communauté mathématique.

Vu que les activités de la SMC ont toujours été axées sur la recherche, on n'a organisé qu'un nombre limité d'activités pratiques. Cependant, avec l'appui de la communauté, on pourrait en faire plus à ce chapitre à l'avenir. Entre temps, on s'intéresse à la possibilité d'offrir un soutien au nombre infini d'applications pluridisciplaires des mathématiques, notamment les mathématiques et la chimie, les mathématiques et les affaires, etc. On s'intéresse aussi à la possibilité de rajeunir les initiatives antérieures « les mathématiques au travail » de la SMC. Les nouveaux modules statistiques et actuarielles au sein du programme des camps de mathématiques devraient offrir une excellente mesure des mathématiques appliquées.

EN QUOI LA SMC AIDE-T-ELLE

Recentrer les activités de la SMC aidera à mieux mettre l'accent sur ce qui reste à accomplir et moins sur ce qui se fait actuellement. Par exemple, alors que les activités de la SMC liées à la publication aient toujours été perçues comme étant de moyens suffisants en soi, la SMC publie les ouvrages non pas parce qu'elle a été créée pour émuler une maison d'édition, mais bien parce que la publication fait progresser la recherche, l'éducation et les objectifs de la communauté.

Le recentrage, en 2011, des activités de la SMC devrait accroître son efficacité par rapport à la promotion des intérêts de toute la communauté des mathématiques et, plus important encore, par rapport à la façon dont la SMC aide à « faire des mathématiques ».

FROM THE EXECUTIVE DIRECTOR'S DESK *continued*

publication. At the same time, at the other end of the spectrum, there is interest in developing a publication for more extensive treatment of research. The opportunities in digital publishing make these types of interests easier to address.

LEARNING OF MATHEMATICS

To promote the learning of mathematics, the CMS helps through the provision of extra-curricular opportunities for students to pursue math interests, the celebration of education excellence, and support for partner activities across Canada.

CMS learning-related activities are quite varied and range from magazine publishing to staging math competitions and camps to funding student colloquium to presenting awards for teaching excellence. Current issues under consideration include determining the viability of the CMS problem-solving magazine; defining the nature and scope of CMS involvement in math camps; and understanding how CMS can best support math fairs and provincial competitions. Furthermore, the CMS is in the midst of revamping the staging of the national open math competition to include partner math institutions across Canada. And, there has been a suggestion that CMS could make a significant contribution by launching an education research publication.

Student participation in CMS camps and competitions has steadily grown over the years and that growth is expected to continue. The ultimate success of these activities can be seen each year in the performance by the team of students that represent Canada at the International Mathematical Olympiad (IMO).

APPLICATION OF MATHEMATICS

To promote the application of mathematics, CMS needs to work with the applied mathematics institutes and organizations to identify how it can best support this part of the mathematics community.

Given the historic research nature of the CMS, there has been limited applied activity; however, working with the community, more can be done in the future. In the interim, there is interest in developing support for the plethora of multi-disciplinary applications of mathematics, such as math and chemistry, math and business, etc. There is also interest in rejuvenating past CMS 'math in the workplace' initiatives. And the introduction of statistical and actuarial modules to the math camp program should provide an excellent measure of applied math.

HOW CMS HELPS

Recasting CMS activities will help focus more on what is to be achieved and less on what is being done. For example, while CMS publication activities have traditionally been viewed as a means unto themselves, CMS publishes not because it was created to be a publisher, but rather because publishing advances research, education and community goals and objectives.

The 2011 re-alignment of CMS activities should improve how effectively CMS activities work together to meet the interests of the entire mathematics community, and more importantly, how CMS helps 'do math.'

Christiane Rousseau
elected Vice-President of IMU / élue vice-présidente de l'IMU

At the 2010 meeting of its General Assembly, Christiane Rousseau was elected a Vice President of the International Mathematical Union (IMU) for the period 2011-2014. Christiane is the first Canadian to hold this office.

Christiane Rousseau is an internationally recognized researcher in dynamical systems. She obtained her PhD at the Université de Montréal in 1977, where she is now Professor of Mathematics and served as Chair of the Department of Mathematics and Statistics from 1993 to 1997. She was a vice-president the Canadian Mathematical Society (CMS) from 1995 to 1997 and president from 2002 to 2004.

Christiane served as director of the Centre de Recherches Mathématiques in 2008-2009. At present, she chairs an international committee that coordinates the activities of a widening list of mathematics institutes the world for a year *Mathematics for Planet Earth* 2013.

In recognition of her outstanding contributions to mathematics in Canada Christiane was awarded the CMS Graham Wright Award for Distinguished Service in 2009.

Christiane Rousseau a été élue vice-présidente de l'Union mathématique internationale (UMI) pour la période de 2011 à 2014 lors de l'assemblée générale 2010 de l'UMI. C'est la première fois qu'un chercheur du Canada occupe ce poste.

Christiane Rousseau est une chercheuse mondialement reconnue dans le domaine des systèmes dynamiques. En 1977, elle a obtenu son doctorat de l'Université de Montréal, où elle est professeure de mathématiques. Elle a assumé la direction de son département de 1993 à 1997. Elle fut vice-présidente de la Société mathématique du Canada (SMC) de 1995 à 1997, puis présidente de 2002 à 2004.

Christiane a assumé la direction du Centre de recherches mathématiques en 2008-2009. Elle préside présentement un comité international qui coordonne les activités d'une liste grandissante d'instituts mathématiques à travers le monde pour une année *Mathématiques de la planète terre* 2013.

Finalement, en guise de reconnaissance pour ses contributions importantes et soutenues à la communauté mathématique canadienne, la SMC lui a remis en 2009 le Prix Graham Wright pour service méritoire.

2011 CMS MEMBERSHIP RENEWALS
RENOUVELLEMENTS 2011 À LA SMC

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

✦ ✦ ✦

RAPPEL : Les avis de renouvellements ont été postés. Veuillez s-il-vous-plaît renouveler votre adhésion le plus tôt possible. Vous pouvez aussi renouveler au site Web
`www.smc.math.ca/members.f/`

CANADIAN RECEPTION AT ICM 2010

The International Congress of Mathematicians was held during August 19-27 in Hyderabad, India. During the meetings, many countries took the opportunity to host receptions for various sections of the mathematical community. By tradition, Canada held a reception in honour of the IMU prize winners. This is particularly appropriate given Canada's special connection to the Fields Medals. The medals, named after Professor J. C. Fields of the University of Toronto, are struck at the Royal Canadian Mint in Ottawa and transported to the site of the Congress.

The Canadian reception, which was organized by the CMS in partnership with the Centre de Recherches Mathematiques, the Fields Institute and the Pacific Institute for Mathematical Sciences and the Canadian High Commission in India, was held on Saturday, August 21. The reception was well attended with more than 80 mathematicians and other friends present. Amongst the prize winners present were Fields Medallists Elon Lindenstrauss, Stanislav Smirnov and Cedric Villani, Gauss Prize winner Yves Meyer, Nevanlinna Prize winner Daniel Spielman and the winner of the first Chern Prize, Louis Nirenberg.

Kumar Murty

Canadian Trade Commissioner Vikram Jain welcomed the group. Kumar Murty, Vice President of the CMS, and Christiane Rousseau, the incoming Vice President of the IMU, gave short addresses. Finally, the Acting High Commissioner, Jim Nickel spoke about cooperation between Canada and India in the area of education.

Canadian representation on the academic program was particularly strong at this ICM. In particular, Jim Arthur (University of Toronto) spoke on the work of Fields Medalist Ngo Bao Chau, while David Brydges (University of British Columbia), Larry Guth (University of Toronto), Alexander Nabutovsky (University of Toronto), Jeremy Quastel (University of Toronto), Zinovy Reichstein (University of British Columbia), Alexander Schnirelman (Concordia University) all gave special session talks. Moreover, Christiane Rousseau (Université de Montréal) participated in a panel discussion on Mathematics Education. All of them were acknowledged at the reception.

CALL FOR SITES
DEMANDES DE PROPOSITIONS D'EMPLACEMENTS

Interested in hosting a CMS Meeting?
The CMS Research Committee invites proposals from heads of departments interested in hosting a CMS Meeting. The winter meeting sites are confirmed to December 2011, the summer meeting sites are confirmed to June 2012.

Vous aimeriez accueillir une Réunion de la SMC?
Le Comité de la recherche de la SMC lance un appel de propositions aux chefs de départements intéressés à accueillir une Réunion de la SMC. Les hôtes des Réunions d'hiver sont confirmés jusqu'en décembre 2011, et ceux des Réunions d'été, jusqu'en juin 2012.

Dr. David Brydges, Chair
CMS Research Committee / Comité de recherches de la SMC
Department of Mathematics, University of British Columbia
121-1984 Mathematics Rd
Vancouver, British Columbia V6T 1Z2

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

OCTOBER	2010	OCTOBRE

4-9 Group Actions and Dynamics (CRM, Montreal, QC)
www.crm.umontreal.ca

8-10 Symposium on Geometry and Low-Dimensional Topolgy
(University of Minnesota, Minneapolis, MN
http://www.math.umn.edu/yamabe

11-15 Equations and First Order Properties in Groups (CRM, Montreal, QC)
www.crm.umontreal.ca

18-22 Algebraic systems with only real solutions (AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/
realsolutions.html

27-30 Differential Algebra and Related Topics
(Chinese Academy of Sciences, Beijing)
http://mmrc.iss.ac.cn/~dart4/index.html

NOVEMBER	2010	NOVEMBRE

1-5 Workshop on Geometric Probability and Optimal Transportation
(Fields Institute)
www.fields.utoronto.ca/programs/
scientific/10-11/asymptotic/

12-15 Toric Geometry Seminar (Combinatorial Commutative Algebra,
Optimization & Statistics) (Càceres, Spain)
http://matematicas.unex.es/~ojedamc/jarandilla/

23-27 International Conference on Mathematical Sciences dedicated to
Professor Hari M. Srivastava on his 70th birthday
(Izzet Baysal Kampüsü, Bolu, Turkey)
http://www.conference.math.sci.ibu.edu.tr/

28-Dec3 International Conference on Applied Mathematics and Informatics
(San Andres Island, Columbia)
http://mathematicas.univalle.edu.co/icami/

DECEMBER	2010	DECEMBRE

4-6 **2010 CMS Winter Meeting**
University of British Columbia, BC
www.cms.math.ca/Events/winter10/

6-10 Waves and Multiscale Processes
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/
multiscale.html

13-17 Conference on Mathematical Education Research
(Malaca, Malaysia)
http://einspem.upm.edu.my/icmer2010

15-16 Random Matrices
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/
randommatrices.html

15-18 Joint International meeting between the AMS and the Sociedad de
Matematica de Chile (Puc n, Chile)
www.ams.org/amsmtgs/internmtgs.html

JANUARY	2011	JANVIER

3-5 Conference on Mathematical Sciences (A.M.Mathai)
(St.Thomas Coll.Kottayam, India)
http://www.cmsintl.org/

12-14 Statistical Methods for Meteorology and Climate Change
(CRM, Montreal, QC)
www.crm.umontreal.ca/Stat2011/en/
www.crm.umontreal.ca/Meteoll/index_e.php/

17-21 Deformation theory, patching, quadratic forms and Brauer group
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/
deformbrauer.html

FEBRUARY	2011	FÉVRIER

7 – 12 Complex Geometry – Extremal Metrics: Evolution equations and stability
(CIRM, Marseille, France)
www.latp.univ-provence.fr/geom2011/
index.php/welcome/week2

14 – 19 Workshop on Mathematical Methods in Quantum Mechanics
(University of Padova, Bressanone, Italy)
www.mmqum.unimore.it

MARCH	2011	MARS

14 – 19 International Conference on Operations Research
(Kowloon, Hong Kong)
www.iaeng.org/IMECS2011/ICOR2011.html

21 – 25 AIM Workshop: Hypergraph Turan Problem
(AIM, Palo Alto,CA)
http://aimath.org/ARCC/workshops/
hypergraphturan.html

APRIL	2011	AVRIL

18 – 22 Computational Statistical Methods for Genomics and Systems Biology
(CRM, Montreal, QC)
www.crm.umontreal.ca/Stat2011/

MAY	2011	MAI

2 – 4 Statistical Issues in Forest Management, (Laval, QC)
(CRM, Montreal, QC)
www.crm.umontreal.ca/Forest11/index-e.php

JUNE	2011	JUIN

22 – 25 26th Annual IEEE Symposium on Logic in Computer Science
(Fields Institute event at the University of Toronto)
www.fields.utoronto.ca/programs/
scientific/10-11/lics11

19 – 25 49th International Symposium on Functional Equations
(Graz, Austria)
jens.schwaiger@uni-graz.at

JULY	2011	JUILLET

26-29 Harmonic Analysis and PDE (Eric Sawyer)
(Fields Inst., Toronto, ON)
www.fields.utoronto.ca/programs/
scientific/11-12/PDE/

UNIVERSITÉ YORK UNIVERSITY

Department of Mathematics and Statistics
Faculty of Science and Engineering
APPLIED MATHEMATICAL BIOLOGY

Applications are invited for one tenure-track appointment at the Assistant Professor level in the Department of Mathematics and Statistics, Faculty of Science and Engineering, to commence July 1, 2011. Applicants in all areas of Mathematical and Computational Biology and Ecology will be considered, including Non-linear Dynamics of Disease Mechanism, Biological Invasion, Population Dynamics, Epidemiological and Ecological Modeling, BioInformatics and Health Informatics, Protein, Cellular and Physiological Modeling and Stochastic Biological Modeling.

The successful candidate must have a Ph.D. in Mathematics or a related field and a proven record of independent and collaborative interdisciplinary research. The successful candidate must have a potential for research excellence and demonstrated excellence or promise of excellence in teaching. Superior teaching will be an asset. Preference will be given to candidates who can strengthen existing areas of present and ongoing research activity in the department and in biological and life sciences across the university. The successful candidate should be suitable for prompt appointment to the Faculty of Graduate Studies. All positions at York are subject to budgetary approval.

Applications must be received by **December 15, 2010**. Applicants should send a curriculum vitae, an outline of their research plan and a description of teaching interests, and arrange for three letters of recommendation (one of which should address teaching) to be sent directly to:

Applied Mathematics Search Committee
Department of Mathematics and Statistics
N520 Ross, York University
4700 Keele Street
Toronto, Ontario
M3J 1P3 Canada
applmath@mathstat.yorku.ca
Web-address: www.math.yorku.ca/Hiring

York University is an Affirmative Action Employer. The Affirmative Action Program can be found on York's website at **www.yorku.ca/acadjobs** or a copy can be obtained by calling the affirmative action office at 416-736-5713. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority.

Tarifs et horaire 2010 Rates and deadlines

Deadlines for receipt of material are as follows / Les dates limites pour la réception des annonces sont les suivantes

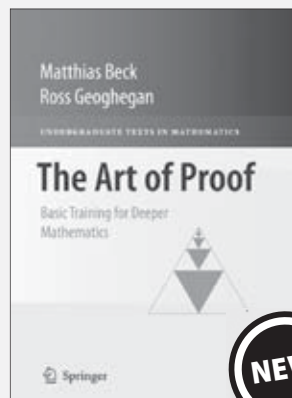| Issue date/ date de parution		Content deadline / Date limite pour contenu	
February / février March/April / mars/avril June / juin September / septembre October/November / octobre/novembre December / décembre		December 1 / le 1 décembre January 28 / le 28 janvier March 30 / le 30 mars June 30 / le 30 juin August 30 / le 30 août September 29 / le 29 septembre	
Net rates / tarifs nets	Institutional Members / Library Membres institutionnels / Bibliothèques	Corporate Members Membres Organisationels	Others/Autres
Full page / page complète	260.00	485.00	645.00
3/4 page	240.00	445.00	595.00
1/2 page	160.00	295.00	395.00
1/4 page	95.00	175.00	235.00
Back cover	325.00	615.00	815.00
Inserts	195.00	375.00	495.00

For more than 4 pages, or for the printing and inserting of camera ready material, please send a sample to the CMS Notes for a quote.
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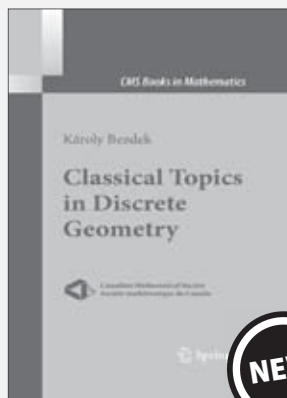Des suppléments sont applicables pour des places de choix - communiquer avec notes-ads@smc.math.ca. L'adhesion à la SMC comprend l'abonnement aux Notes de la SMC. Le tarif d'abonnement pour les non-membres est de 80 $ CDN si l'adresse de l'abonné est au Canada et de 80 $ US si l'adresse est à l'étranger.
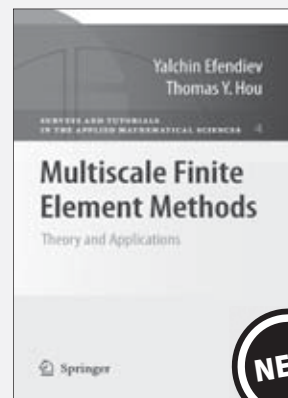
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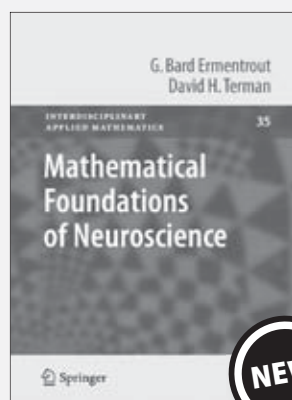ISBN 978-1-4419-7022-0 ▶ **approx. $39.95**

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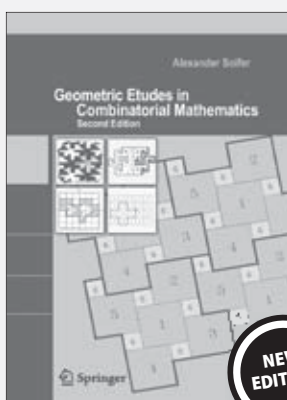**Multiscale Finite Element Methods**

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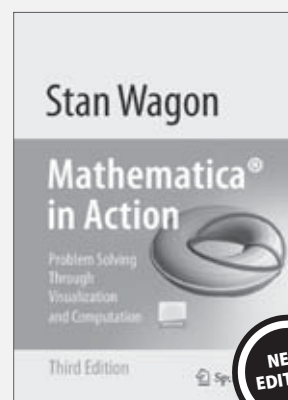**G. Bard Ermentrout**
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