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FROM THE VICE-PRESIDENT’S DESK
V. Kumar Murty, University of Toronto

MATHEMATICS IN A CHANGING WORLD

1. Introduction
Mathematics Departments across the country face very similar problems: recruitment of excellent undergraduate and graduate students, recruitment of excellent faculty, ensuring that the work environment for teaching and research is of high quality, and that there is adequate short-term and long-term funding for all of these initiatives. We certainly stand to gain as a community by sharing our experiences and comparing notes on how we deal with these issues. However, we should also be asking bigger questions about long term goals, fundamental challenges and how and what we can do together that we can’t do separately. And these questions should be asked with the recognition that the world is changing. To operate under the view that the future will just be more of the present would be a lost opportunity. Momentous changes are taking place all around us. In this brief article, I would like to discuss what these changes are and raise some questions about what implications they may have for mathematics teaching and research.

2. An Ocean of Change
There are large changes in the publication environment. Libraries are inexorably moving towards electronic collections, at least partially motivated by financial considerations. Open source journals are proliferating and challenging the business models of commercial journals. Preprint archives are gaining ground over regular journals and the issue is being raised of whether posting to the web constitutes a publication.

There are also changes arising in the research environment. We see an increasing number of multi-author papers, something that was unusual in mathematics though quite common in other sciences. Leading mathematicians such as Fields medalist Timothy Gowers are openly discussing the possibility of ‘massive collaboration’ to advance the subject. Organizations such as the American Institute of Mathematics have a mission of advancing the subject through focused week-long meetings of experts aimed at solving a particular problem. We are also seeing an increase in the use of computers and computation in proofs.

There are changes in the way we communicate. Twenty years ago, email was still a novelty. Today, institutions come to a standstill if email goes down. Preprints are now circulated electronically, either through email or through a preprint archive. Some journals now only give electronic reprints. The entire process of communicating a paper is becoming paperless.

There are changes to our funding environment. NSERC is trying to decrease the success rate on Discovery grants. New importance is being given to the training of highly qualified personnel. And governments are tying funding to strategic developments towards a ‘knowledge economy’. Thus we see some provincial incentives for graduate expansion and technology transfer. There is an ongoing discussion about and increased funding opportunities for research that may be commercializable.

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This month’s editorial reaches you from a converted teamwork room somewhere in the depths of the Loyola Building. The Saint Mary’s University is renovating our usual building, and we have had to move out while they do it. Apart from the noise (which was bad even before they reached our floor) there is a little matter of asbestos abatement. It’s probably just as well to be somewhere else while that goes on.

The hard part was packing for the move. Colleagues who have visited my office will realize that I’m something of a pack rat, but it was only once I started to put twenty years’ accumulation of books and papers into cardboard boxes that it became clear just how bad it was. Forty-some boxes later, I knew.

Yes, I did throw some stuff out; I think I would have had ten or fifteen more boxes if I hadn’t, and the box counts of some colleagues whose offices I had always thought comparatively uncluttered compared with mine, but who had packed everything, bore this out. (Anonymity will be preserved!) One main contribution to the blue box was the working notes for various projects, completed long ago and not likely to be revisited. I did save a few folders, but most went. It was also surprising to discover how many stacks of examinations, from courses long ended, turned up. They went too.

Books? With the exception of a couple instructor’s copies “not to be given or sold to students”, those went to a “free books” table at the other end of the hall for redistribution. Revealingly, almost all math books that were put there vanished quickly, whether new or fifty years old; the ones that sat unclaimed were the manuals for older versions of computer software. I think it’s probably also fair to say that the computing scientists were, by and large, finding more computer software. I think it’s probably also fair to say that it became clear just how bad it was. Forty-some boxes later, I knew.

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Books actually in use got packed. So did books that might get used, classics, books that I might want to lend to somebody sometime, and two boxes of antiquarian textbooks. I admit it, I have a hard time getting rid of books. I kept a lot of journals, several boxes of offprints, letters from old students, and some stuff so random I won’t even try to list it. Some of the pictures from the wall outside were kept, some not.

My temporary office has one bookshelf (with only a few dozen books unpacked), two tables, and a computer. Somewhat to my surprise, I can actually function without the usual lares et penates. But I’ll be glad to get back.
Ecole Polytechnique Montréal, one of the largest engineering teaching and research institutions in Canada with a student population of almost 6000 and more than 1000 employees, is seeking candidates to fill the following faculty position:

Mathematics Professor working in optimization and operational research

The successful candidate will perform duties with enthusiasm and creativity in the Department of Mathematics and Industrial Engineering. The individual will teach undergraduate and graduate courses, supervise post-graduate students, initiate and carry out research projects and work with other research teams in their department and the rest of Polytechnique.

The successful candidate must be familiar with large-scale linear and nonlinear numerical optimization and its application in these areas: discretized problems, transportation, personnel scheduling and timetabling, revenue management, production scheduling, multidisciplinary engineering, service engineering, natural resources, modelling of industrial problems, and others.

The ideal candidate will hold a PhD in Applied Mathematics or in Engineering with a strong mathematics component. Experience with real-life problems would be an asset. The ideal candidate must demonstrate superior research and teaching skills along with proficiency in French. Current membership in the Ordre des ingénieurs du Québec or the ability to become a member in the first year of employment is an asset.

Salary

This is a tenure-track position. Salary and benefits are determined by the applicable collective agreement.

To Apply

Interested applicants should forward their curriculum vitae, a statement of their teaching and research goals, proof of diplomas, names of three references, a few examples of work related to this position and reprints of recent contributions. Send to:

Professor Pierre Baptiste, Director
Department of Mathematics and Industrial Engineering
École Polytechnique Montréal
Post Office Box 6079, Station Centre-ville
Montréal (Québec) H3C 3A7
Fax: 514 340-4086
Email: pierre.baptiste@polymtl.ca

Candidate interviews will start as soon as possible and continue until the position is filled.

L’École Polytechnique de Montréal, l’un des plus importants établissements d’enseignement et de recherche en génie au Canada, comptant près de 6 000 étudiants et plus de 1 000 personnes à son emploi, recherche des candidats afin de pourvoir le poste de professeur(e) suivant :

Professeur en mathématiques dans le domaine de l’optimisation et de la recherche opérationnelle

Au sein du département de mathématiques et de génie industriel, la personne recherchée devra exercer avec dynamisme et créativité les fonctions reliées à ce poste. Elle devra participer à l’enseignement de cours au premier cycle et aux cycles supérieurs, diriger et encadrer des étudiants aux études supérieures, initier et réaliser des projets de recherche ainsi que collaborer avec des équipes de recherche du département et de l’École.

Le(la) professeur(e) doit posséder des compétences en optimisation linéaire et non linéaire numérique de grande taille ainsi que dans son application aux domaines suivants : problèmes discrétisés, transports, horaires, gestion du revenu, gestion de la production, ingénierie multidisciplinaire, ingénierie des services, ressources naturelles, modélisation de problèmes industriels, etc.

La personne recherchée doit détenir un doctorat (Ph. D.) en mathématiques appliquées ou en ingénierie avec une importante composante mathématiques. Une expérience avec des problèmes pratiques constitue un atout. Elle doit démontrer d’excellentes aptitudes pour la recherche et l’enseignement ainsi qu’une bonne connaissance de la langue française. Être membre de l’Ordre des ingénieurs du Québec ou le devenir dès la première année d’embauche est un atout.

Rémunération

Ce poste mène à la permanence. Le traitement et les avantages sociaux sont déterminés selon les dispositions de la convention collective en vigueur.

Mises en candidature

Les personnes intéressées par ce poste sont priées de soumettre leur curriculum vitae, un énoncé de leurs objectifs en enseignement et en recherche, une attestation de leurs diplômes, les noms de trois répondants, quelques exemples de travaux reliés au poste visé ainsi que des tirés à part de contributions récentes. Le tout doit être envoyé à :

Professeur Pierre Baptiste, directeur
Département de mathématiques et de génie industriel
École Polytechnique de Montréal
Case postale 6079, succursale Centre-ville
Montréal (Québec) H3C 3A7
Télécopieur : 514 340-4086
Courriel : pierre.baptiste@polymtl.ca

L’examen des candidatures débutera le plus tôt possible et se poursuivra jusqu’à ce que le poste soit pourvu.

Polytechnique Montréal est committed to the principle of equal access to employment and employment equity for women and men, including persons with disabilities, members of visible minorities, and Aboriginal persons.

L’École Polytechnique souscrit à un programme d’accès à l’égalité en emploi et à un programme d’équité en emploi pour les femmes, les membres des minorités visibles et ethniques, les Autochtones et les personnes handicapées.
BOOK REVIEW

Rich in Examples and Recent Research Results

LINEAR OPERATORS AND THEIR SPECTRA
by E. Brian Davies
Cambridge University Press, 2007
464 pp., $99.95 CDN ISBN 978-0521866293

Reviewed by Heydar Radjavi, University of Waterloo

As the author aptly states in the preface, this Volume “is halfway between being a textbook and a monograph.” It can certainly be used as a textbook by covering the first five chapters first, and then picking and choosing from among the remaining two-thirds of the book according to taste or requirements.

The general, first part of the book covers “elementary” and “intermediate” operator theory. Then come special classes of one-parameter semigroups, resolvents and generators, quantitative bounds, perturbation theory, Markov chains and graphs, positive semigroups, and non-self-adjoint Schrödinger operators. Every one of the non-elementary chapters is rich in examples, problems, and very recent research results, enabling a serious student or researcher to explore current unsettled questions in a vast number of specialized areas. Throughout the book results presented as problems to be solved by the reader play an important role.

The whole book has that balanced style between the informal and the no-nonsense, theorem-proof approaches that makes reading pleasant without sacrificing precision. The reader encounters very useful advice and warnings. For example, in the introductory discussion about semigroups and unbounded operators we read: “It might be thought that such questions [related to unboundedness of generators of semigroups] are of little concern to an applied mathematician -- if an evolution equation occurs in a natural context then surely it must have a solution and this solution must define a semigroup. Experience shows that adopting such a relaxed attitude to theory can lead one to serious error.” The reader is also treated to some confessions: “When I wrote One-Parameter Semigroups, I referred to [the Feller-Miyadera-Phillips theorem on generators] as the central result in the study of one-parameter semigroups. Twenty five years later, I am not so sure …” This is of course followed by reasons, explanations, and assessments of other results for degrees of applicability. I don’t know about other readers, but this reader was charmed by the presentation.

Although there are existence proofs in the book, preference is given to constructive ones, which are more suitable for determining exact numerical bounds, e.g., on resolvent norms.

The book contains surprisingly few typographical errors, which I observed with envy, because I keep finding new misprints in my own old writings. In fact, I have found only two in this book, but not counting multiplicity! The first is a trivial one on page 82, where two sets are defined on lines 5 and 6. The second is also trivial but curious; it occurs at least four times in the form “semigroup s” meaning “semigroups” (pp. 168, 178, 192, and 227). Finally, I have only one non-trivial comment, which of course reflects my personal taste: I would have included a proof of the spectral theorem, “undoubtedly the most important result in the subject…” whose statement is on page 143. It would take only a few pages, given the economy of style generally followed by the author, and that wouldn’t add too much to the weight of this 450-page volume.

This book is recommended not just to those interested in the theory of linear operators and its applications to various fields, including probability and quantum theory, but also to those whose interest lies primarily in nonlinearity. In this connection, we conclude with a quotation from the preface of the book:

“It is frequently said that over the last few decades there has been a decisive shift in mathematics from the linear to the nonlinear. Even if this is the case it is easy to justify writing a book on the theory of linear operators. The range of applications of the subject continues to grow rapidly and young researchers need to have an accessible account of its main lines of development, together with references to further sources for more detailed reading.”

NOTES DE LA SMC
Les Notes de la SMC sont publiés par la Société mathématique du Canada (SMC) six fois l’an (février, mars/avril, juin, septembre, octobre/novembre et décembre).

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de la SMC à l’adresse postale ou de courriel ci-dessous.

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exprimées par les auteurs.

NOTES DE LA SMC

CMS NOTES

The CMS Notes is published by the Canadian Mathematical Society (CMS) six times a year (February, March/April, June, September, October/November and December).

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No responsibility for the views expressed by authors is assumed by the CMS Notes, the editors or the CMS.

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ISSN : 1193-9273 (imprimé/electronic)
1496-4295 (électronique/electronic)
Crocheting Adventures with Hyperbolic Planes
by Daina Taimiòa
ISBN 978-1-56881-452-0

Reviewed by Hinke Osinga, University of Bristol

Taimiòa’s book is not only a coffee-table book of the highest quality, but it is also, first and foremost, a book about mathematics. It is refreshing different from coffee-table books about mathematics where the actual mathematics is all too often hidden under a layer of high-quality photographs. Using crocheted hyperbolic planes, Taimiòa explains hyperbolic geometry in a visual and explorative way. In fact, her crocheted pieces have been photographed in natural settings, reminding us that hyperbolic shapes are familiar shapes that appear all around us. I found that Taimiòa has done a wonderful job providing a history of hyperbolic geometry, explaining hyperbolic geometry to a broad audience, and presenting the crocheted hyperbolic planes for tactile explorations, while keeping the book’s length down at the same time.

The first chapter discusses the notions of positive and negative curvature and is representative for the rest of the book: several mathematical concepts are explained both visually and in words, without becoming too technical. Moreover, the reader is introduced to the crochet instructions for making his/her own hyperbolic planes. These crocheted models are used to explain the concepts of perpendicular and parallel straight lines, which is then used to visualize that the sum of the angles of a triangle in hyperbolic geometry actually depends on the lengths of its sides. The educational benefit from the tactile experience is very powerful and should be a standard part of geometry lectures! I thoroughly enjoyed this chapter. In fact, the essence of using crochet to explore otherwise hard to visualize objects is well maintained throughout the entire book.

The real power of the book, however, lies in Taimiòa’s skill to bring hyperbolic geometry in the realm of applied mathematics. She discusses how human experiences in areas as different as art/patterns, buildings/structures, navigation/stargazing and motion/machines influenced the development of geometry. People are still interested in and use hyperbolic geometry and the breadth of applications listed in this book is enlightening; not only do they come from all branches of science, there are also wonderful applications in music and art. For example, Daina Taimiòa’s crocheted hyperbolic planes inspired industrial designer Radu Comsa to design the Rasta Stool (www.raducomsa.ro/furniture/full_rs.html), which is apparently very comfortable.

I highly recommend this book because of its unique combination of a historical account of hyperbolic geometry with the use of crochet as a tool for its understanding. Finally, we have a beautiful coffee-table book that uses visual delight to emphasize rather than hide serious mathematics. Readers with little knowledge of geometry or mathematics in general may find it hard to understand everything, but as Bill Thurston writes in his foreword: “I hope this book gives you pause for thought and changes your way of thinking about mathematics.”

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REMINDER: Your membership reminder notices have been sent. 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 envoyés. Veuillez s’il-vous-plaît renouveler votre adhésion le plus tôt possible. Vous pouvez aussi renouveler au site Web www.cms.math.ca/members.f/
Combinatorics on Words – Christoffel Words and Repetitions in Words
By Jean Berstel, Aaron Lauve, Christophe Reutenauer and Franco Saliola. CRM Monograph Series, Volume 27, AMS 2008, xii + 147pp

The two parts of this book are based on two series of lectures delivered by Jean Berstel and Christophe Reutenauer in March 2007 at the CRM.

Part I presents a comprehensive and self-contained account of the combinatorics of Christoffel Words, named after the German mathematician and physicist Elwin B. Christoffel (1829-1900). Since their first appearance in the literature, arguably as early as 1771 in Jean Bernoulli’s study of continued fractions, many relationships between Christoffel Words and other areas of mathematics were revealed. The text begins with a discussion of the current state of the art in Christoffel Words. The last four chapters recount some of the relationships.

Part II is concerned with some of the recent research in combinatorics on words that deal with repetitions in words. The discipline originated in a series of papers by Axel Thue, whose work inspired most of recent research on numerous combinatorial and algorithmic aspects of repetition-free words. Examples and exercises provided in the book will be helpful to a beginner to the theory of combinatorics.

Skew-Orthogonal Polynomials and Random Matrix Theory
By Saugala Ghosh
CRM Monograph Series, Volume 28, AMS 2008, vii + 127pp

Skew-orthogonal polynomials are defined by using canonical antisymmetric matrices formed by $2 \times 2$ matrices (with +1 and -1 along the cross-diagonal and zeros along the leading diagonal) as blocks along the leading diagonal while the rest of the terms are zero. Orthogonal polynomials satisfy a three-term recursion relation irrespective of the weight function with respect to which they are defined. This leads to a simple formula for the kernel function, known as the Christoffel-Darboux (CD) sum. The availability of asymptotic results of orthogonal polynomials and the simple structure of the CD sum make the study of unitary ensembles of random matrices relatively straightforward.

The book is concerned with the development of the theory of skew-orthogonal polynomials and with recursion relations which, unlike orthogonal polynomials, depend on weight functions. After deriving reduced expressions, called the generalized Christoffel-Darboux (GCD) formulas, universal correlation functions are obtained as also non-universal level densities for a wide class of random matrix ensembles using the GCD formulas.

Holomorphic Dynamics and Renormalization
A Volume in Honour of John Milnor’s 75th Birthday
Edited by Mikhail Lyubich and Michael Yampolsky
Fields Institute Communications 55, AMS 2008, xvii + 395pp

The papers presented in this volume concern some of the directions of research discussed at two workshops at the Fields Institute in March 2006: on ‘Holomorphic dynamics, laminations and hyperbolic geometry’ and on ‘Renormalizations and universality in mathematics and mathematical physics’.

A survey by V. Nekrashevych deals with iterated monodromy groups of rational mappings, a recently developed subject that links geometric group theory to combinatorics of rational maps. This approach facilitates answering many questions related to Thurston’s theory of branched coverings of the sphere.

Renormalization theory occupies a central place in Complex Dynamics. The progress in understanding the structure of the Mandelbrot set, polynomial Julia sets, and Feigenbaum-type universalities stems from renormalization techniques. Renormalization of circle maps and rotation domains, such as Siegel disks, are presented in the context of the classical KAM theory. Corresponding phenomena in higher dimensions are discussed in the survey paper of H. Koch and also in other papers in this volume.

Function Theory: Interpolation and Corona Problems
By Eric T. Sawyer, Fields Institute Monographs 25, AMS, Fields Institute 2009, ix + 203pp

This monograph is a record of the lecture notes for a graduate course on Function Theory at the Fields Institute, Toronto, ON, given during January - March 2008. Assuming a basic knowledge of real and complex analysis, as well as the theory of the Poisson integral in the unit disk, the main topics of the lectures included (i) interpolating sequences for classical function spaces and their multiplier algebras, (ii) corona problems for classical function algebras, (iii) an introduction to theory of Toeplitz and Hankel operators, Fefferman’s duality of $H^1$ and BMO, and the best approximation problem by analytic functions in the uniform norm, and (iv) Hilbert space methods and the Nevanlinna-Pick theory. These four main threads are interwoven in the lecture notes.
The first two follow the development of interpolation and corona theorems respectively in the past half century, beginning with the pioneering works of Lennert Carleson. The third thread develops the use of trees in the analysis of spaces of holomorphic functions. In the disk, trees are related to the well known Haar basis of $L^2(T)$ on the circle $T$. The Nevanlinna-Pick property (NP) discussed in the fourth thread is shared by many classical Hilbert function spaces including the Dirichlet and Drury-Arveson spaces. Its importance is emphasized by the following results: a sequence is interpolating for a Hilbert space with NP property iff it is interpolating for its multiplier algebra; a Hilbert space with the complete NP property has the baby corona property iff its multiplier algebra has no corona. An extensive appendix is provided on background material in functional analysis and function theory on the disk.

**EMPLOYMENT OPPORTUNITY**

UNIVERSITE LAVAL, Québec, Qc
Département de mathématiques et de statistique
http://www.mat.ulaval.ca/

The Department of Mathematics and Statistics invites applications for a tenure-track position. The appointment will normally, but not strictly, be at the rank of Assistant Professor. The anticipated starting date is August 1, 2010.

This invitation extends to candidates holding a PhD in mathematics or to those near completion.

**Responsibilities and selection criteria**

1) The candidate should demonstrate exceptional pedagogical abilities and a strong interest for teaching service courses to large groups of engineering students, as well as teaching specialized courses to mathematics students at all levels.¹

2) The candidate should be able to initiate an autonomous research program for which he or she will be able to obtain NSERC funding. Candidates in applied mathematics, either in partial differential equations or in dynamical systems, will be given priority.

All candidates fulfilling the above criteria are encouraged to apply. However, it should be noted that, according to canadian immigration requirements, Canadians and permanent residents must be given priority. The salary and rank will be determined in accordance to the collective agreement. According to its equal opportunity program, Université Laval reserves half the vacant positions for the appointment of women.

Applications should include a full curriculum vitae, some reprints of a few recent publications and a summary, no longer than two pages, describing the research program. Applicants should also ask three referees to send letters of reference to the address below. The name and address (including phone and fax numbers and e-mail address) of the referees should be listed in the application but the applicants are expected to solicit the referees themselves.

¹ Université Laval is a French-speaking university, thus the non-francophone candidates should be willing to acquire fluency in French in a short period.
The Canadian Mathematics Society’s Excellence in Teaching Award was presented to David Poole at the 2009 Summer Meeting in St. John’s, NL. David Poole has graciously prepared a form of this presentation for the Education Notes column. The piece entitled The Importance of Teaching Mathematics to Those Who Think They Don’t Like the Subject is the core feature of this edition.

An important role of the CMS community is to raise awareness about and support other initiatives pertinent to mathematics education. This May will feature a range of mathematical events in British Columbia including regional and national events. An overview of these events along with links for further information appears following David Poole’s article. Brief information on the upcoming CMS Education Session is also provided.

The Importance of Teaching Mathematics to Those Who Think They Don’t Like the Subject

David G. Poole, Department of Mathematics
Trent University
Peterborough, Ontario

(This note is an abridged version of the 2009 CMS Excellence in Teaching Award Prize Lecture, presented at Memorial University of Newfoundland, June 6, 2009.)

Most university mathematics departments offer service courses for students majoring in other disciplines. Courses with titles such as “calculus for engineering”, “linear algebra for business and economics” and “statistics for the life sciences” are quite common and, while not usually taken by mathematics majors, generally include university-level mathematical content. Some departments also offer mathematics courses aimed at students outside science and engineering – “mathematics for liberal arts” and “mathematics for teacher education”, to name two. This latter type of course is usually thought of as a “soft” service course, without “real” mathematical content. Perhaps this is sometimes true, but I want to argue that it does not need to be so. Further, I want to make the case that teaching methods that are appropriate for teaching mathematics to students from “non-numerical” disciplines are equally appropriate for teaching mathematics majors.

It is true that teaching mathematics to certain groups of students poses some challenges, not the least of which is that they may have an actual fear of mathematics itself. In a course for pre-service elementary school teachers which I began teaching in 1995, one student once asked me, “In my other courses, my instructors allow me to submit work in an alternative form. Is that OK here?” When I asked what he had in mind, he replied, “May I submit my math assignments in the form of interpretive dance?” This is not a request that I had ever heard in a mathematics class before (or since)!

Another year, in the very first class of the same course, a student suddenly got up and ran out of the room. When she returned about twenty minutes later, I quietly asked her if she was feeling okay. She replied, “Yes but I had to go to the washroom to throw up. The thought of being in a math classroom makes me physically ill.” This is not a comment that one tends to get in a class full of math majors!

Clearly to teach mathematics to students such as the ones I have just described and to make them enthusiastic about the subject is going to require a serious examination of one’s teaching methods. “Chalk and talk” and “definition-theorem-proof” are simply not going to work. First and foremost, the course needs to be interesting to the students and consequently a topics-focused, activity-oriented course has the best chance of success. In addition, to help overcome “math phobia”, there needs to be a safe learning environment with lots of support for the students, both in and out of the classroom.

In such a class, students’ learning styles are likely going to be much more heterogeneous than in a class of mathematics majors or engineers. Consequently, it is very important to present material in as many ways as possible. I try to adhere to the “rule of four”: present mathematical ideas symbolically, verbally, numerically, and geometrically/visually. Engaging the students with the material in different ways is important too – every student needs to have an opportunity to “take ownership” of some part of the course. I find that a mix of writing projects (essays, journals), group work, and independent study projects works well. Finally, it is important to have opportunities for ongoing reflection and assessment, to provide both the students and the instructor with feedback related to the objectives of the course.

In class, I try to follow the A.R.T.I.E. model. (See Bill Ralph’s article in CMS Notes 27:4 (May-June, 1995), 16-20.) A.R.T.I.E. stands for Activity, Reflection, Theory, Interpretation, Examples and represents the flow from the beginning to the end of a class or unit. At the beginning, the class works in groups on an activity, leading to discussion (reflection), and then the lecture portion (theory) which draws out and elaborates upon the main theme. This is followed by a reexamination of the activity (interpretation) and then some follow-up examples or exercises to finish.

As mentioned above, the course in which I first deployed these techniques was a course for pre-service elementary school teachers. This course is described in more detail in the Education Notes column of CMS Notes 32:1 (February 2000), 4-6. In designing and teaching this course, I had two epiphanies. First, I realized that, while different approaches are needed with elementary teacher candidates than with mathematics majors, it is still possible to do actual mathematics, including some proofs. Topics such as UPC and ISBN codes (modular arithmetic), patterns and symmetry (kaleidoscopes, tilings, Cayley tables, polyhedra), graphs and networks, magic squares, number theory, and fractals can all be adapted for an audience of non-specialists. Indeed, I
often took great delight in assigning the same question to the pre-service teachers as to a class of mathematics majors and watching the former group outperform the latter!

The second realization was that pedagogical methods that are appropriate in mathematics courses for non-majors are equally appropriate in courses for majors. Attention to learning styles, the A.R.T.I.E. method, group work, projects/ independent study, journals/portfolios, and essays has a place in every classroom, not just those where one has to work harder to communicate the material. My own teaching (and my students’ learning) has benefited immensely from the incorporation of many of the aforementioned strategies into virtually every course I teach.

Thus, the importance of teaching mathematics to those who might normally shun the subject is twofold. It is possible, however modestly, to produce more mathematically literate citizens. At the very least, it is possible to alleviate some popularly held misconceptions about what mathematics is, to help some students get over their fear of the subject and develop an enthusiasm for it. At the same time, the teaching in other mathematics courses can benefit, where appropriate, from the use of the methods described in this note. It is a win-win situation and one that I hope more mathematics departments will try to achieve.

### Upcoming Mathematics Education Activities in British Columbia and New Brunswick

The month of May has several mathematics education activities all to be held at Simon Fraser University’s (SFU) Burnaby Campus — the BCCUPMS Annual Meeting, Sharing Mathematics, Changing the Culture and the Canadian Mathematics Education Study Group (CMESG)/Groupe Canadien d’étude en didactique des mathématiques (GCEDM) Meeting. The month of June sees activities move to New Brunswick for the Canadian Mathematical Society’s Summer Meeting Education Session.

### BCCUPMS

The British Columbia Committee on Undergraduate Programs in Mathematics and Statistics (BCCUPMS) is an articulation committee for post-secondary (principally, first- and second-year) mathematics and statistics in BC. The committee meets annually with its 88th meeting slated for May 18 and 19, 2010 at Simon Fraser University (SFU). The committee discusses curriculum changes at the BC institutions and related articulation issues. A day in advance of this meeting there will be the initial brainstorming session for the 2011 provincial high school mathematics contest. The BCCUPMS supports two other regional events that will be of interest to people teaching mathematics at any level, and to those interested in mathematics education. This year these events, Sharing Mathematics and Changing the Culture, will piggyback on the BCCUPMS Annual Meeting. Details about BCCUPMS and the BC articulation process can be found at http://bccupms.ca/

### Sharing Mathematics will happen on May 20, 2010. This one-day event is intended to build upon the spirit of the initial Changing the Culture has been held in April, though this year the event will be held on May 21, 2010. The timing is intended to draw upon the participation of people planning to attend the CMESG/GCEDM Meeting.

### CMESG/GCEDM

Simon Fraser University is also hosting the CMESG/GCEDM Meeting from the evening of May 21 through May 25, 2010. The following description of this national organization is taken directly from the website: see www.pims.math.ca/education/changing-culture

**CMESG is a group of mathematicians and mathematics educators who meet annually to discuss mathematics education issues at all levels of learning. The aims of the Study Group are the following:**

1. to advance education by organizing and coordinating national conferences and seminars to study and improve the theories of the study of mathematics or any other aspects of mathematics education in Canada at all levels;

2. to undertake research in mathematics education and to disseminate the results of this research.

Le GCEDM est composé de personnes œuvrant en mathématiques et en didactique des mathématiques et qui se réunissent une fois par année pour étudier diverses questions
relatives à l’enseignement des mathématiques à tous les niveaux. Les buts du Groupe sont les suivants:

1. d’avancer l’éducation par l’organisation et la coordination de conférences nationales et de séminaires afin d’étudier et d’améliorer les théories et les pratiques de l’étude des mathématiques ou de n’importe quel autre aspect de l’enseignement des mathématiques au Canada à tous les niveaux,

2. d’entreprendre des recherches en didactique des mathématiques et de diffuser les résultats de cette recherche.

The format of the meeting is unusual in that the focal point is the working groups that meet for the full mornings on Saturday, Sunday, and Monday. Usually there are five working groups meeting on a range of topics. Details on the working groups are provided in the registration information available at the CMESG website. The local contact for information on the conference is Peter Liljedahl (liljedahl@sfu.ca). In addition to the working groups there are plenary speakers and other select presentations. Most striking is the richness of the community interaction as the 100 or so people present typically stay in residence at the host university campus and share meals together along with social gatherings and a local excursion — integral parts of the CMESG experience. The above mentioned website will have conference details and information about the history of the group, as well as copies of the newsletter and the proceedings dating back to 2000.

Canadian Mathematics Society’s Summer Meeting

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

Closing Comments

It is hoped that those interested can attend some of the upcoming events. Indeed feel free to pass along the information to others. Finally, we extend an invitation to send along notices of events or contributions of talks, links, or feedback on these or other happenings that bridge the communities of mathematics and education.

WANTED: Books for Review

RECHERCHÉS : Livres pour critiques littéraires


Keith Johnson
Department of Mathematics and Statistics
Dalhousie University
Halifax NS B3H 3J5
The Coxeter-James Prize Lectureship recognizes young mathematicians who have made outstanding contributions to mathematical research. The selected candidate will deliver the prize lecture at the Winter Meeting.

The recipient shall be a member of the Canadian mathematical community. Nominations may be made up to ten years from the candidate’s Ph.D.: researchers having their PhD degrees conferred in 2000 or later will be eligible for nomination in 2010 for the 2011 Coxeter-James prize. A nomination can be updated and will remain active for a second year unless the original nomination is made in the tenth year from the candidate’s Ph.D.

The deadline for nominations is June 30, 2010. Nominations and reference letters should be submitted electronically, preferably in PDF format, by the appropriate deadline, to cjprize@cms.math.ca.

Nominators should ask at least three referees to submit letters directly to the CMS (cjprize@cms.math.ca) by September 30, 2010. Some arms length referees are strongly encouraged. Nomination letters should list the chosen referees, and should include a recent curriculum vitae for the nominee, if available.

3. Change and Opportunity
Change always offers the possibility of making a significant (rather than an incremental) advance. It also offers the ‘opportunity’ to regress. Whether we advance or regress depends on whether we recognize and acknowledge change and think seriously and strategically about what new opportunities it opens up. These opportunities have, of course, to be in tune with our fundamental goals.

4. What are the opportunities?
While there is general agreement on the changes that are afoot, what this means in terms of opportunities will be seen differently by different groups. I propose several ideas for discussion.

Is it time to rethink the whole concept of lectures? The model of one person speaking to many is certainly not the only way to teach. If our emphasis is on communication, and if we acknowledge that a large part of the learning process in mathematics consists in the doing of mathematics, is there a more effective way of utilizing contact time with the instructor than the lecture format? Is this also a good time to rethink the practice of making our students buy expensive textbooks that cover material that has not substantially changed in the last hundred years?

Is it time to rethink the wisdom of all of us duplicating the same work? Can basic courses be shared? Can we have a common repository of teaching materials for basic courses, or even for more advanced courses? Can we do this in a way that we see a measurable improvement in quality of instruction and student performance? Can we, as a community, become the leaders in this? After all, if we can develop a model that improves the quality and performance in mathematics instruction, it can probably be replicated in many other areas.

Given that granting agencies are putting more emphasis on training, can we involve more of our students in research, including our undergraduates? To do this, we will have to rethink what we mean by research. We should understand that many in other disciplines confuse the word ‘research’ with ‘search’. Obviously, they are different, but perhaps ‘search’ is an entry point for undergraduates and even beginning graduate students.
The Canadian Mathematical Society (CMS) and the University of New Brunswick invite the mathematical community to the 2010 CMS Summer Meeting. The program will run from Friday to Sunday and include ten plenary and prize lectures, and a wide variety of scientific sessions.

The public lecture and the Nelson Welcome Reception on Thursday evening take place in the Student Union Building on the university campus. From Friday to Sunday, all scientific talks, exhibits and registration will be located in Head Hall on campus. Admission to the reception is complimentary for all registered participants.

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

The Canadian Operator Algebra Symposium will take place in Fredericton, June 7-11, right after the CMS Summer Meeting. The organizers are Dan Kucerovsky (Fredericton) and Andrew Dean (Lakehead).

**Early Bird Registration – Deadline: March 31**
To qualify for the discounted Early Bird registration fee, the registration form and payment have to be received by the deadline.

**Accommodation – Deadline: May 7**
We have secured discounted rates at the Delta and Ramada Hotels; the rates may no longer be available after the deadline.

**Student Subsidies** - We encourage the participation of students at the Meeting. Towards this, we are allocating funds to help defray the cost of travel and accommodation for graduate students and post-doctoral fellows.

We look forward to welcoming you in Fredericton!

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**Prizes and Awards / Prix**
Coxeter-James Prize - Bálint Virág (Toronto)
Jeffery-Williams Prize - Mikhail Lyubich (Stony Brook)
Excellence in Teaching Award Jennifer Hyndman (UNBC)

**Public Lecture / Conférence publique**
Jason Brown (Dalhousie)

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**Plenary Speakers / Conférences plénières**
HEA Eddy Campbell (UNB)
Gerda de Vries (Alberta)
Idun Reiten (Norwegian Univ. of Science and Technology)
Gunther Uhlmann (Washington)
Henri Moscovici (Ohio State)
Kristin Schleich (UBC)
SESSIONS

Algebraic Combinatorics
Combinatoire algébrique
Org: Li Li, Alex Yong (Illinois - Urbana-Champaign)

Algebraic Geometry, Non-commutative Algebra and Derived Categories
Géométrie algébrique, algèbre non commutative et catégories dérivées
Org: Colin Ingalls (UNB)

Discrete Geometry
Géométrie discrète
Org: Barry Monson (UNB), Egon Schulte (Northeastern)

Error Control Codes, Information Theory, and Applied Cryptography
Codes de contrôle d’erreurs, théorie de l’information et cryptographie appliquée
Org: Tim Alderson (UNB - Saint John)

Geometric and Combinatorial Aspects of Convex Optimization
Aspects géométriques et combinatoires de l’optimisation convexe
Org: David Bremner (UNB)

Geometric Topology
Topologie géométrique
Org: Ryan Budney (Victoria), Andy Nicas (McMaster)

Graph Theory
Théorie des graphes
Org: Stephen Finbow (St. Francis Xavier), Shannon Fitzpatrick (UPEI)

Group Actions and Their Invariants
Actions de groupes et leurs invariants
Org: H E A Eddy Campbell (UNB), Jianjun Chuai (MUN), David Wehlau (RMC; Queen’s)

Inverse Problems in Partial Differential Equations
Problèmes inverses pour les équations aux dérivées partielles
Org: Adrian Nachman (Toronto)

Mathematical Ecology and Epidemiology
Ecologie mathématique et épidémiologie
Org: Lin Wang, James Watmough (UNB)

Mathematical Perspectives on Quantum Theory and Gravity
Perspectives mathématiques sur la théorie quantique et la gravitation
Org: Jack Gegenberg, Viqar Husain (UNB)

Mathematics Education
Éducation mathématique
Org: John Grant McLoughlin (UNB), Eric Robert (Leo Hayes HS), Alyssa Sankey (UNB) and Maureen Tingley (UNB)

Noncommutative Geometry
Géométrie non commutative
Org: Bahram Rangipour (UNB)

Representation Theory of Algebras
Théorie des représentations des algèbres
Org: Ibrahim Assem (Sherbrooke), Thomas Brüstle (Sherbrooke; Bishop’s), Shiping Liu (Sherbrooke)

Spectral Methods in the Analysis of Differential Equations
Méthodes spectrales en analyse des équations différentielles
Org: Almut Burchard, Marina Chugunova (Toronto)

Stability in Nonlinear Partial Differential Equations
Stabilité pour les équations aux dérivées partielles nonlinéaires
Org: Stephen Gustafson (UBC); Dmitry Pelinovsky (McMaster)

Tensor Categories
Catégories tensorielles
Org: Robert Paré (Dalhousie)

Contributed Papers
Communications libres
Org: Trevor Jones (UNB)

Scientific Directors / Directeurs scientifiques:
Hugh Thomas, Barry Monson (UNB)
Local Arrangements / Logistique locale :
Maureen Tingley (UNB)

Sponsors:
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Fields Institute
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Letters to the Editors
Lettres aux Rédacteurs

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

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

Mathematics enjoys a decided advantage over other disciplines in terms of its ubiquity. There are mathematical concepts that have directly or indirectly influenced the development of both the physical sciences and the social sciences. Today, there is a momentum to discover the role of mathematics in the life sciences. Mathematics also has a cultural hold on society. There is a perception by some, whether justified or not, that no field of inquiry can be considered scientific unless it can express itself mathematically.

The mathematics community has certainly recognized this advantage in the past, but much more is possible and much more remains to be done. While we should continue to build on our core strengths, we should also be careful not to define ourselves too narrowly. The world is changing and it offers enormous opportunities for mathematics.
Nominations of individuals or teams of individuals who have made significant and sustained contributions to mathematics education in Canada are solicited. Such contributions are to be interpreted in the broadest possible sense and might include: community outreach programs, the development of a new program in either an academic or industrial setting, publicizing mathematics so as to make mathematics accessible to the general public, developing mathematics displays, establishing and supporting mathematics conferences and competitions for students, etc.

Nominations must be received by the CMS Office no later than April 30, 2010.

Please submit your nomination electronically, preferably in PDF format, to apaward@cms.math.ca.

Nomination requirements:
- Include contact information for both nominee and nominator.
- Describe the nominated individual’s or team’s sustained contributions to mathematics education. This description should provide some indication of the time period over which these activities have been undertaken and some evidence of the success of these contributions. This information must not exceed four pages.
- Two letters of support from individuals other than the nominator should be included with the nomination.
- Curricula vitae should not be submitted since the information from them relevant to contributions to mathematics education should be included in the nomination form and the other documents mentioned above.
- If nomination was made in the previous year, please indicate this.
- Members of the CMS Education Committee will not be considered for the award during their tenure on the committee.

Renewals
Individuals who made a nomination last year can renew this nomination by simply indicating their wish to do so by the deadline date. In this case, only updating materials need be provided as the original has been retained.

Conditions de candidature
- Inclure les coordonnées du/des candidats ainsi que le(s) présentateur(s).
- Décrire en quoi la personne ou le groupe mise en candidature a contribué de façon soutenue à des activités mathématiques. Donner un aperçu de la période couverte par les activités visées et du succès obtenu. La description ne doit pas être supérieur à quatre pages.
- Le dossier de candidature comportera deux lettres d’appui signées par des personnes autres que le présentateur.
- Il est inutile d’inclure des curriculums vitae, car les renseignements qui s’y trouvent et qui se rapportent aux activités éducatives visées devraient figurer sur le formulaire de mise en candidature et dans les autres documents énumérés ci-dessus.
- Si la mise en candidature a été soumise en l’année précédente, s’il vous plaît indiquez-le.
- Les membres du Comité d’éducation de la SMC ne pourront être mise en candidature pour l’obtention d’un prix pendant la durée de leur mandat au Comité.

Renouveler une mise en candidature
Il est possible de renouveler une mise en candidature présentée l’an dernier, pourvu que l’on en manifeste le désir avant la date limite. Dans ce cas, le présentateur n’a qu’à soumettre des documents de mise à jour puisque le dossier original a été conservé.
The Publications Committee of the CMS solicits nominations for Associate Editors for the Canadian Journal of Mathematics (CJM) and the Canadian Mathematical Bulletin (CMB). The appointment will be for five years beginning January 1, 2010. The continuing members (with their end of term) are below.

The deadline for the submission of nominations is April 15, 2010.

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

CJM Editors-in-Chief / Rédacteurs-en-chef du JCM
H. Kim (Toronto) 12/2011; R. McCann (Toronto) 12/2011.

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

Associate Editors / Rédacteurs associés

Address for nominations / Adresse de mise en candidatures:
Ken Davidson, Chair / Président
CMS Publications Committee / Comité des publications de la SMC
Department of Pure Mathematics
University of Waterloo
200 University Ave. W
Waterloo, ON N2L 3G1
krdavids@uwaterloo.ca

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 2010, the summer meeting sites are confirmed to June 2012.

Vous aimeriez accueillir une Réunion de la SMC?

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


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

All proposals and manuscripts should be sent to

Bruce Shawyer, Editor-in-Chief / Rédacteur en chef
Department of Mathematics
Memorial University of Newfoundland
St. John’s, NF
Canada A1C 5S7
atom-editors@cms.math.ca

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www.smc.math.ca
April 2010
23 Technology Integration in University Mathematics Instruction (Fields Institute)

May 2010
2-4 Workshop on Semigroups and Categories (Fields Institute event at the University of Ottawa)
2-29 First Montreal Spring School in Graph Theory (Fields Institute event at McGill University)
3-4 Workshop on Modeling, Understanding, and Managing River Ecosystems (Fields Institute event at the University of Ottawa)
3-7 Sage Days Workshop (combinatorics and representations of algebras) (Fields Institute)
5-8 23rd International Workshop on Description Logics (DL2010) (Fields Institute event at the University of Waterloo)
6-10 Twenty-sixth Conference on the Mathematical Foundations of Programming Semantics (Fields Institute event at the University of Ottawa)
7 5th Annual SNAP Math Fair Conference (Fields Institute)
7-8 18th Ontario Combinatorics Workshop (Fields Institute event at Brock University)
7-9 Workshop on Connections in Geometry and Physics 2010 (Perimeter Institute, Waterloo)
12-15 CITA@25/Bondfest (Fields Institute)
14-15 Discrete Mathematics Days 2010 (Carleton University)
17-22 Workshop on Recent Advances in Topological and Measure - Theoretic Methods in Dynamical Systems (Nipissing University)
31-Jun 4 Harmonic Analysis: A Retrospective Workshop (Fields Institute)

June 2010
17-19 14 International Congress on Insurance: Mathematics and Economics (University of Toronto)
22-26 6th World Congress of the Bachelier Society (Hilton Hotel, Toronto)

July 2010
4-6 Joint Fields - Perimeter Institute Workshop on Random Matrix Techniques in Quantum Information Theory. (Perimeter Institute, Waterloo) 2010-2011
5-9 Iwasawa 2010 Conference (Fields Institute)
7-10 Summer School
12-15 Workshop: Schubert Calculus Workshop and Summer School (Fields Institute and the University of Toronto)
12-16 Workshop on Groups and Group Actions in Operator Theory (University of Ottawa)
20-23 Fields Institute-Carleton Finite Fields Workshop (Carleton University)
29-31 Workshop on Hybrid Dynamic Systems (University of Waterloo)

August 2010
2-6 Workshop on Discrete and Computational Geometry (Fields Institute event at Carleton University)
9 – 11 Canadian Conference on Computational Geometry (Fields Institute event at the University of Manitoba)
9-13 Workshop on Fluid Motion Driven by Immersed Structures (Fields Institute)
12–13 Selected Areas in Cryptography (SAC) Workshop (Fields Institute event at the University of Waterloo)
18-21 Workshop on Approximations, Asymptotics and Resource Management for Stochastic Networks (Fields Institute event at Carleton University)
12-15 CIAA 2010, 15th International Conference on Implementation and Application of Automata (Fields Institute event at the University of Manitoba)
16-20 Fields-MITACS Industrial Problem-Solving Workshop (FMIPW10) (Fields Institute)
30-Sep 3 Conference on Homotopy Theory and Derived Algebraic Geometry (Fields Institute)

June 2011
20-25 26th Annual IEEE Symposium on Logic in Computer Science (LICS 2011) (Fields Institute and University of Toronto)

July 2011
26-29 Conference in Harmonic Analysis and Partial Differential Equations (in honour of Eric Sawyer) (Fields Institute or University of Toronto)
The annual Nathan and Beatrice Keyfitz Lectures in Mathematics and the Social Sciences will be delivered by Nobel Prize recipient Robert C. Merton of the Harvard Business School, on April 15, 2010. See www.fields.utoronto.ca/programs/scientific/keyfitz_lectures/merton.html for more information.

The subject of the Summer 2010 Thematic Program is the Mathematics of Drug Resistance in Infectious Diseases, July 5 to August 27. The first two weeks, July 5-16, will have as their theme the Emergence and Spread of Drug Resistance, with colloquium speakers Marc Lipsitch and Ram Laxminarayan. Weeks 3-4 (July 19-30) will concentrate on Mathematical Resistance and Immunology and Weeks 5-6 (Aug. 2-Aug. 13) will have as theme Transmission Heterogeneity. The Coxeter Lecture Series will be given by Neil M Ferguson of Imperial College, U.K.

Each topic will feature a short introductory course and involve a one-day workshop of a more applied nature, bringing together public health officials and policy makers with applied mathematicians. More information: www.fields.utoronto.ca/programs/scientific/10-11/drugresistance

Next fall’s thematic program is Asymptotic Geometric Analysis. The Distinguished Lecture Series will be delivered by Avi Wigderson (Institute for Advanced Study) during the week of September 13 and the Coxeter Lecture Series by Shiri Artstein-Avidan (Tel-Aviv University) on a date to be announced. There will be three workshops:

* September 13-17 Asymptotic Geometric Analysis and Convexity
* October 12-16 Concentration Phenomenon, Transformation Groups and Ramsey Theory
* November 1-5 (tentative dates) Geometric Probability and Optimal Transportation

More information: www.fields.utoronto.ca/programs/scientific/10-11/asymptotic

Future thematic programs:
* 2011(Winter/Spring) Dynamics and Transport in Disordered Systems
* 2011(Fall) Discrete Geometry and Applications
* 2012 (Winter/Spring) Galois Representations
* 2012(Fall) Forcing and its Applications

For more information on these and all other Fields activities, go to www.fields.utoronto.ca/programs/scientific/

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**CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE**

**Graham Wright Award for Distinguished Service**

_Prix Graham-Wright pour service méritoire_

In 1995, the Society established this award to recognize individuals who have made sustained and significant contributions to the Canadian mathematical community and, in particular, to the Canadian Mathematical Society. The award was renamed in 2008, in recognition of Graham Wright’s 30 years of service to the Society as the Executive Director and Secretary.

Nominations should include a reasonably detailed rationale and be submitted by March 31, 2010.

All documentation should be submitted electronically, preferably in PDF format, by the appropriate deadline, to gwaward@cms.math.ca.

En 1995, la Société mathématique du Canada a créé un prix pour récompenser les personnes qui contribuent de façon importante et soutenue à la communauté mathématique canadienne et, notamment, à la SMC. Ce prix était renommé à compter de 2008 en hommage de Graham Wright pour ses 30 ans de service comme directeur administratif et secrétaire de la SMC.

Pour les mises en candidature prière de présenter des dossiers avec une argumentation convaincante et de les faire parvenir, le 31 mars 2010 au plus tard.

Veuillez faire parvenir tous les documents par voie électronique, de préférence en format PDF, avant la date limite à prixgw@smc.math.ca.
1. Introduction

Les départements de mathématiques du pays connaissent des difficultés très semblables : recruter d’excellents étudiants à tous les cycles et d’excellents professeurs, procurer un milieu de travail de grande qualité pour l’enseignement et la recherche, et assurer le financement à court et à long terme de toutes ces initiatives. Nous avons tout à gagner, en tant que communauté, à discuter de nos expériences et à comparer nos façons de surmonter ces obstacles. Nous devons toutefois nous poser des questions plus poussées quant à nos objectifs à long terme, aux enjeux fondamentaux et aux gestes que nous pouvons poser ensemble, mais que nous ne pourrions poser chacun de notre côté. Nous devons nous poser ces questions en pensant que le monde évolue constamment. Faire comme si l’avenir sera toujours comme le présent équivaudrait à manquer le bateau. Car des changements importants se produisent autour de nous. Dans ce bref article, j’aimerais vous proposer quelques pistes de réflexion.

2. Des changements tous azimuts

Nous vivons bel et bien une période de grands changements. Prenons la population étudiante : elle est beaucoup plus hétérogène qu’auparavant tant par sa composition, sa culture et ses objectifs. Les étudiants sont plus mobiles et plus disposés à fréquenter un établissement loin de chez eux. Les établissements d’enseignement comptent un bon mélange d’étudiants canadiens et étrangers, d’origines très diversifiées. Dans certains centres, on constate la diversité même au sein de la clientèle canadienne. Culturellement, nous avons une population étudiante de plus en plus à l’aise avec les nouvelles technologies (sites de socialisation, appareils portatifs, jeux électroniques, etc.). De plus, les étudiants de tous cycles cherchent maintenant à poursuivre leur carrière dans une grande variété de domaines, que ce soit dans le secteur universitaire, industriel, entrepreneurial ou gouvernemental.

De grands changements se produisent aussi le milieu de la publication. Les bibliothèques se tournent inexorablement vers les collections électroniques, motivées au moins en partie par des considérations financières. Les revues libres se multiplient et remettent en question les modèles d’affaires des revues commerciales. Les archives de pré tirages gagnent du terrain sur les revues standard, et l’on se demande maintenant si publier un article sur le Web constitue effectivement une publication.

Des changements surviennent également dans le milieu de la recherche. Le nombre d’articles cosignés est en hausse, ce qui était inhabituel en mathématiques, même si c’était courant dans d’autres domaines scientifiques. Les mathématiciens de renom, comme le récipiendaire de la médaille Fields Timothy Gowers, parlent ouvertement de la possibilité d’une « collaboration massive » pour faire avancer le domaine. Des organismes comme l’American Institute of Mathematics ont pour mission de stimuler l’avancement du domaine en réunissant pendant une semaine des spécialistes qui s’attaque ensemble à la résolution d’un problème particulier. Nous constatons en outre un recours accru à l’informatique pour prouver des résultats.

Des changements modifient nos façons de communiquer. Il y a 20 ans, le courriel était encore une nouveauté. Aujourd’hui, tout s’arrête si le service de courriel tombe en panne. Les pré tirages circulent électroniquement, par courriel ou par un service d’archives de pré tirages. Quelques revues ne font désormais que des réimpressions électroniques. C’est tout le processus de la publication d’un article qui passe en mode « sans papier ».

Des changements transforment aussi le contexte du financement de la recherche. Le CRSNG tente de réduire le taux de succès pour l’obtention de subventions à la découverte. On accorde une nouvelle importance à la formation de personnel hautement spécialisé, et les gouvernements associent le financement à des développements stratégiques favorisant l’« économie du savoir ». Ainsi, quelques provinces adoptent des mesures incitatives pour encourager le nombre d’étudiants aux cycles supérieurs et favoriser les transferts technologiques. On parle constamment de commercialisation de la recherche et du financement accordé aux produits de recherche commercialisables.

D’autres changements encore modifient la composition du bassin de recrutement de mathématiciens. De nombreuses offres emplois sont centralisées sur des sites comme MathJobs (service géré par l’American Mathematical Society). Les demandes d’emploi arrivent souvent de toutes les régions du monde, et le nombre moyen de candidats par poste est non seulement plus élevé que jamais, mais il augmente d’une année à l’autre.

De nombreux aspects de notre travail sont ainsi en pleine transformation. La difficulté sera de reconnaître que ces changements se produisent autour de nous et de réfléchir à la façon dont ces changements touchent la formulation et l’expression de nos objectifs.

3. Changements et possibilités

Tout changement s’accompagne d’une possibilité de faire un grand pas vers l’avant (plutôt que plusieurs petits pas progressifs). Il offre aussi la « possibilité » de faire un pas vers l’arrière. Pour progresser au lieu de régresser, il faut reconnaître le changement et en tenir compte, et réfléchir de façon sérieuse et stratégique aux possibilités qui l’accompagnent. Ces possibilités doivent bien sûr correspondre aux objectifs fondamentaux.

4. Quelles possibilités s’offrent à nous?

Bien que l’on s’entende généralement sur les changements en cours, les possibilités ou les occasions rattachées à ces changements varient d’un groupe de personnes à l’autre. Je vous propose ici quelques pistes de réflexion.

Le temps est-il venu de revoir complètement le concept des cours théoriques ? Le modèle traditionnel d’une personne qui s’adresse à un groupe n’est certainement pas le seul modèle d’enseignement qui soit. Si nous misions sur la communication et si nous reconnaissions qu’une bonne partie du processus d’apprentissage en mathématiques consiste à faire des mathématiques, y aurait-il une meilleure façon de rentabiliser.
The Canadian Mathematical Society is pleased to announce the 2010 Endowment Grants Competition to fund projects that contribute to the broader good of the mathematical community. The Endowment Grants Committee (EGC) administers the distribution of the grants and adjudicates proposals for projects. Proposals must address the goal and statement of purpose of the Canadian Mathematical Society: to support the promotion and advancement of the discovery, learning, and application of mathematics.

An applicant may be involved in only one proposal per competition as a principal applicant. Proposals must come from CMS members, or, if joint, at least one principal applicant must be a CMS member.

The EGC will consider funding one-year proposals to a maximum of $2,500. The EGC tends to favour proposals where CMS funds can be leveraged or where applicants have no other natural funding to which they can apply.

Proposals must be received no later than September 30, 2010. Successful applicants will be informed in December 2010 and grants will be awarded in January 2011.

Application forms and further details about the application process are available on the CMS website: www.cms.math.ca/Grants/EGC

Please contact the CMS Executive Director with any questions or comments regarding the Endowment Grants at director@cms.math.ca.

La Société mathématique du Canada (SMC) est heureuse d’annoncer la tenue du Concours de bourses du fonds de dotation 2010, qui finance des activités contribuant à l’essor global de la communauté mathématique. Le Comité d’attribution des bourses du fonds de dotation (CABFD) gère la répartition des bourses et évalue les projets. Les projets doivent répondre aux objectifs et au mandat de la SMC, soit promouvoir et favoriser la découverte et l’apprentissage des mathématiques, et les applications qui en découlent.

Un demandeur ne peut présenter qu’un projet par concours en tant que demandeur principal. Les projets doivent venir de membres de la SMC. S’il s’agit d’un projet conjoint, au moins un des demandeurs principaux doit être membre de la SMC.

Le CABFD évaluera les projets qui s’étalent sur un an et accordera un maximum de 2 500 $. Le CABFD accorde généralement la priorité aux projets pour lesquels le financement de la SMC sera égalé ou pour lesquels la SMC est la seule source de financement naturelle à laquelle le demandeur a accès.


Pour vous procurer un formulaire ou pour de plus amples renseignements sur l’appel de projets, passez sur le site de la SMC au : www.smc.math.ca/Grants/EGC/.f

Pour toute question ou tout commentaire sur les bourses du fonds de dotation, veuillez communiquer par courriel avec le directeur administratif de la SMC à directeur@smc.math.ca.
## CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

### MARCH 2010  / MARS 2010

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Website</th>
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<tbody>
<tr>
<td>8-12</td>
<td>Workshop on Graphs and Arithmetic (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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<tr>
<td>22-26</td>
<td>Computer Methods for L-functions and Automorphic Forms (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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<tr>
<td>27-29</td>
<td>Boise Extravaganza in Set Theory (Boise, Idaho)</td>
<td><a href="http://diamond.boisestate.edu/~best/">http://diamond.boisestate.edu/~best/</a></td>
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### APRIL 2010  / AVRIL 2010

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<tr>
<td>16</td>
<td>The Nathan and Beatrice Keyfitz Lectures in Mathematics and the Social Sciences, Robert C. Merton, Harvard Business School (Fields Institute event at the University of Toronto)</td>
<td><a href="http://www.fields.utoronto.ca/programs/scientific/keyfitz_lectures/merton.html">www.fields.utoronto.ca/programs/scientific/keyfitz_lectures/merton.html</a></td>
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<tr>
<td>19-23</td>
<td>Counting Points: Theory, Algorithms and Practice, (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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### MAY 2010  / MAI 2010

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<th>Date</th>
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<tbody>
<tr>
<td>3-7</td>
<td>Second International Workshop on Zeta Functions in Algebra and Geometry (Universitat de les Illes Balears, Palma de Mallorca, Spain)</td>
<td><a href="http://www.singacom.uva.es/oldsite/seminarios/cartel/jpg">www.singacom.uva.es/oldsite/seminarios/cartel/jpg</a></td>
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<tr>
<td>5-8</td>
<td>23rd International Workshop on Description Logics (DL2010) (Fields Institute event at the University of Waterloo)</td>
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<tr>
<td>7-10</td>
<td>Connections in Geometry and Physics 2010 (Perimeter Institute for Theoretical Physics, Waterloo, ON)</td>
<td><a href="http://www.math.uwaterloo.ca/~gap">www.math.uwaterloo.ca/~gap</a></td>
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<tr>
<td>31-Jun</td>
<td>Harmonic Analysis Retrospective Meeting (Fields Institute)</td>
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### JUNE 2010  / JUIN 2010

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<tr>
<td>2-5</td>
<td>Eighth Joint International Meeting of the AMS and the Sociedad Matemática Mexicana, Berkeley, California</td>
<td><a href="http://www.ams.org/amsmtgp/2172_program.html">www.ams.org/amsmtgp/2172_program.html</a></td>
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<tr>
<td>3-5</td>
<td>Chico Topology Conference (Chico, CA)</td>
<td><a href="http://www.csuchico.edu/~tmattman/CTC.html">www.csuchico.edu/~tmattman/CTC.html</a></td>
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<tr>
<td>4-6</td>
<td>2010 CMS Summer Meeting University of New Brunswick, Fredericton, NB</td>
<td><a href="http://www.cms.math.ca/Events/summer10/">www.cms.math.ca/Events/summer10/</a></td>
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<tr>
<td>8-9</td>
<td>Clay Research Conference (IHP, Paris, France)</td>
<td><a href="http://www.claymath.org">www.claymath.org</a></td>
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<tr>
<td>10-12</td>
<td>Geometric and Probabilistic aspects of General Relativity (University of Strasbourg, France)</td>
<td><a href="mailto:franchi@math.u-strasbg.fr">franchi@math.u-strasbg.fr</a></td>
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<tr>
<td>13-18</td>
<td>48th International Symposium on Functional Equations (Batz-sur-Mer, France)</td>
<td><a href="mailto:nicole.belluot@ec-nantes.fr">nicole.belluot@ec-nantes.fr</a></td>
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### JULY 2010  / JUILLET 2010

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<tr>
<td>5-9</td>
<td>Iwasawa 2010 Conference (Fields Institute)</td>
<td><a href="http://www.fields.utoronto.ca/programs/scientific/10-11/iwasawa">www.fields.utoronto.ca/programs/scientific/10-11/iwasawa</a></td>
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<tr>
<td>7-10</td>
<td>Eleventh International Conference on p-adic Functional Analysis (Université Blaise Pascal, Les Cezeaux, Aubière, France)</td>
<td><a href="mailto:Alain.escassut@math.univ-bpclermont.fr">Alain.escassut@math.univ-bpclermont.fr</a></td>
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<tr>
<td>26-Aug</td>
<td>Topics in Noncommutative Geometry (Universidad Buenos Aires, Argentina)</td>
<td><a href="http://cms.dm.uba.ar/Members/qorti/workgroup/GNC/3EIL">http://cms.dm.uba.ar/Members/qorti/workgroup/GNC/3EIL</a></td>
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### AUGUST 2010  / AOÛT 2010

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<tr>
<td>9-13</td>
<td>Workshop on Fluid Motion Driven by Immersed Structures (Fields Institute)</td>
<td><a href="http://www.fields.utoronto.ca/programs/scientific/10-11/fluid_motion/">www.fields.utoronto.ca/programs/scientific/10-11/fluid_motion/</a></td>
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<tr>
<td>15-19</td>
<td>Geometric, Asymptotic, Combinatorial Group Theory with Applications (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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<tr>
<td>23-27</td>
<td>Topics in Algorithmic and Geometric Group and Semigroup Theory (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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<tr>
<td>30-Sept</td>
<td>Complexity and Group-based Cryptography (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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### SEPTEMBER 2010  / SEPTEMBRE 2010

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<tr>
<td>7-10</td>
<td>Seventh Italian-Spanish Conference on General Topology and its Applications (Badajoz, Spain)</td>
<td><a href="http://ites2010.unex.es">http://ites2010.unex.es</a></td>
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<tr>
<td>13-17</td>
<td>Conference on Asymptotic Geometric Analysis and Convexity (Fields Institute)</td>
<td><a href="http://www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/">www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/</a></td>
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### OCTOBER 2010  / OCTOBRE 2010

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<tr>
<td>4-9</td>
<td>Group Actions and Dynamics (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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<tr>
<td>11-15</td>
<td>Equations and First Order Properties in Groups (CRM, Montreal, QC)</td>
<td><a href="http://www.crm.umontreal.ca">www.crm.umontreal.ca</a></td>
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</table>
The Natural Sciences and Engineering Research Council (NSERC) and the Canadian Mathematical Society (CMS) support scholarships at $9,000 each. Canadian students registered in a mathematics or computer science program are eligible.

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

Math in Moscow Program
www.mccme.ru/mathinmoscow/

Application details
www.cms.math.ca/Scholarships/Moscow

For additional information please see your department or call the CMS at 613-733-2662.

Deadline March 30, 2010 to attend the Fall 2010 semester.

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

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

Programme Math à Moscou
www.mccme.ru/mathinmoscow/

Détails de soumission
www.smc.math.ca/Bourses/Moscou

Pour plus de renseignements veuillez communiquer avec votre département ou la SMC au 613-733-2662.

Date limite le 30 mars 2010 pour le trimestre d’automne 2010.

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**Tarifs et horaire 2010 Rates and deadlines**

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<th>Content deadline / Date limite pour contenu</th>
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<td>December 1 / le 1 décembre</td>
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<td>January 28 / le 28 janvier</td>
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<td>March 30 / le 30 mars</td>
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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.

Surcharges apply for prime locations - contact notes-ads@cms.math.ca. Subscription to the Notes is included with the CMS membership. For non-CMS members, the subscription rate is $80 (CDN) for subscribers with Canadian addresses and $80 (US) for subscribers with non-Canadian addresses.

Pour plus de 4 pages, ou pour l’impression et l’inclusion d’une copie prête à la reproduction, veuillez envoyer un exemple aux Notes de la SMC afin d’obtenir un estimé. Des suppléments sont applicables pour des places de choix - communiquer avec notes-ads@smc.math.ca. L’adhésion 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.
This book presents elementary probability theory with interesting and well-chosen applications that illustrate the theory. An introductory chapter reviews the basic elements of differential calculus which are used in the material to follow.


Functional Equations and Inequalities with Applications
P. Kannappan, University of Waterloo, ON, Canada
The field of functional equations is an ever-growing branch of mathematics with far-reaching applications. This book presents a comprehensive, nearly encyclopedic, study of the classical topic of functional equations and their applications to related topics.


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Risk and Reward
The Science of Casino Blackjack
N. R. Werthamer, New York, NY, USA
Blackjack is hugely popular in casinos worldwide. This book analyzes the game in depth, covering its optimal strategies and its financial performance in terms of expected cash flow and associated risk. It is accessible to readers at all levels of skill.


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