



CMS NOTES de la SMC

FROM THE VICE-PRESIDENT'S DESK

V. Kumar Murty, *University of Toronto*

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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 scale changes taking place all around us. Consider, for example, the student population. It is much more heterogeneous in terms of composition, culture and goals. Students are showing greater mobility and willingness to attend schools away from home. We have a good mix of both domestic and international students with diverse backgrounds. In some centers, the diversity is seen even amongst domestic students. Culturally, we have a student population that is increasingly comfortable with new technology such as social networking, hand-held devices and electronic games. And students, both undergraduate and graduate, are seeking careers in a wide variety of areas, including academic, industrial, entrepreneurial and government environments.

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.

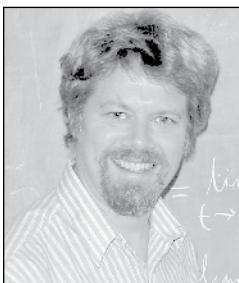
There are also changes arising in the research environment. We see an increasing number of multi-author papers, something that was unusual in mathematics though quite common in other sciences. Leading mathematicians such as Fields medalist Timothy Gowers are openly discussing the possibility of 'massive 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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Spring Cleaning

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 books to discard. *Sic transit gloria fenestrarum.*

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.

Le grand ménage du printemps

Cet éditorial vous parvient d'une salle de travail d'équipe logée au fin fond du pavillon Loyola. L'Université Saint Mary's rénove le pavillon où se trouve notre département, ce qui nous a obligés à déménager temporairement. Outre le bruit (le vacarme avait commencé avant que les travaux ne soient rendus à notre étage), ce sont les travaux d'élimination de l'amiante qui nous ont forcés à changer d'endroit. Il est probablement plus judicieux de ne pas être dans les parages pendant ce brouhaha de toute façon.

Le plus difficile aura été de faire mes boîtes. Les collègues qui ont déjà visité mon bureau auront compris que j'ai tendance à accumuler. Ce n'est toutefois qu'en commençant à ranger la somme de vingt années de livres et d'articles dans mes cartons que j'en ai saisi la démesure. Après avoir rempli une quarantaine de boîtes, j'avais compris.

Eh oui! j'en ai jeté des choses! J'aurais eu dix ou quinze boîtes de plus sinon. Des collègues, dont le bureau me semblait pourtant moins encombré que le mien, mais qui n'ont rien jeté, pourront vous le confirmer (je respecterai leur anonymat!). L'une de mes grandes contributions à la boîte de recyclage fut les notes de travail de divers projets réalisés il y a longtemps, et très peu susceptibles de servir à nouveau. J'ai conservé quelques dossiers, mais je me suis défait de la plupart. J'ai aussi été surpris du nombre d'exams de cours terminés depuis longtemps que j'avais conservés. Ils ont pris le chemin du recyclage eux aussi.

Les livres? À l'exception de quelques guides de l'enseignant qu'il était « interdit de donner ou de vendre à un étudiant », ils se sont retrouvés sur une table de livres à donner à l'autre bout du couloir. Le fait que la plupart des livres de mathématiques, neufs ou vieux de 50 ans, ont trouvé preneur rapidement en dit long; ceux qui sont restés sont les manuels d'utilisation de vieilles versions de logiciels. J'ajouterais que les informaticiens sont ceux qui avaient le plus de livres à jeter, et de loin. *Sic transit gloria fenestrarum.*

J'ai conservé les livres que j'utilisais en ce moment, ceux que je pensais réutiliser, les classiques, les livres que je voudrais peut-être prêter un jour à quelqu'un, et deux boîtes de manuels anciens. Je l'admet, j'ai beaucoup de difficulté à me départir de mes livres. J'ai conservé beaucoup de revues, plusieurs boîtes de tirés à part, des lettres d'anciens étudiants et d'autres documents si hétéroclites que je ne tenterai même pas de les énumérer ici. J'ai gardé certains des cadres accrochés à l'extérieur de mon bureau, d'autres non.

Dans mon bureau temporaire, il y a une seule tablette (sur laquelle ne reposent qu'une douzaine de livres sortis des boîtes), deux tables et un ordinateur. À ma grande surprise, je fonctionne normalement sans mes pénates. Mais je serai heureux de les retrouver.

EMPLOYMENT OPPORTUNITY



École 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.



**ÉCOLE
POLYTECHNIQUE
MONTRÉAL**

Polytechnique Montréal is 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.

Only candidates selected for interviews will receive a written response. In accordance with Canadian immigration requirements, Canadians and permanent residents will be given priority.

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 discrétilisés, 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 vitæ, 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.

Seuls les candidats retenus recevront une réponse écrite.

Conformément aux exigences prescrites en matière d'immigration au Canada, ces offres s'adressent de préférence aux citoyens canadiens et aux résidents permanents.

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.

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

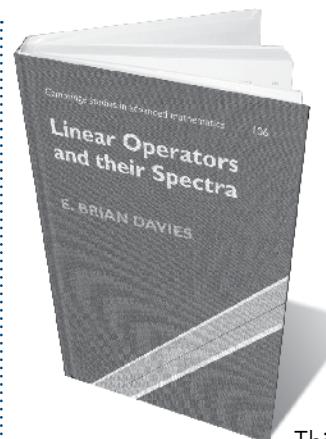
As the author aptly states in the preface, this Volume "is halfway between being a textbook and a monograph." It can certainly be used as a textbook by covering the first five chapters first, and then picking and choosing from among the remaining two-thirds of the book according to taste or requirements.

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 Schrodinger 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

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CMS NOTES

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Crocheting Adventures with Hyperbolic Planes

by Daina Taimi  a

A.K. Peters, Ltd, 2009, 148 pp, £25.50, US\$35.00

ISBN 978-1-56881-452-0

Reviewed by Hinke Osinga, University of Bristol

Taimi  a'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, Taimi  a 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 Taimi  a 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 Taimi  a'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 Taimi  a'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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2010 CMS MEMBERSHIP RENEWALS RENOUVELLEMENTS 2010 À LA SMC

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/

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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.

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. Renormal-

ization 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

Skew-Orthogonal Polynomials and Random Matrix Theory

By Saugata Ghosh
CRM Monograph Series, Volume 28, AMS 2008, vii + 127pp

Skew-orthogonal polynomials are defined by using canonical antisymmetric matrices formed by 2×2 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.

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^p 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*. 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,

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 hosted 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 *Sharing Mathematics* event held in 2009 in Kamloops. That particular event at Thompson Rivers University honoured Jim Totten. There a decision was made at the concluding session to encourage future BCCUPMS hosts to consider adding a one-day *Sharing Mathematics* event immediately following the annual meeting.

In contrast, *Changing the Culture* has a lengthy history at SFU with Małgorzata Dubiel having organized the one-day conference since its inception in 1998. The description in 1998 states:

The conference will continue the work initiated by the 1995 BC Miniforum on Education in Mathematics, bringing together mathematicians, mathematics educators and school teachers from all levels to work together towards changing the culture of school mathematics, to allow students to experience what DOING mathematics means.

The conference continues to build upon this tradition of bringing the various mathematical communities together. The event is sponsored by PIMS and is free to attend. For more information, contact Małgorzata Dubiel (dubiel@math.sfu.ca) or visit the website: see www.pims.math.ca/education/changing-culture

Usually *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: <http://publish.edu.uwo.ca/cmesg/>.

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 oeuvrant 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.

The *Canadian Mathematics Society's Summer Meeting* will be held at UNB Fredericton from June 4 – 6, 2010, preceded by Jason Brown's public lecture on mathematics and music in the evening of June 3. Details of the Education Session will be available on the conference website (www.cms.math.ca/Events/summer10). Alyssa Sankey, the organizer of the Education Session, previously circulated this advance notice: "The themes for the Mathematics Education session are: Interdisciplinary approaches to first year science and/or engineering programmes; and use of online assignment and assessment packages (such as WebAssign or MathXL) in first year courses. If you have found innovative ways to work with students in their first year, or perhaps have tried new approaches that don't work, we invite you to submit a proposal for a short talk." Contact Alyssa Sankey via email (asankey@unb.ca) for more information.

Closing Comments

Details on the various conference websites are being updated as conferences approach. The BCCUPMS calendar of events has links for all of the aforementioned events at http://bccupms.ca/conference_calendar.shtml. Jennifer Hyndman and John Grant McLoughlin can also be contacted for further information about these events via email (hyndman@unbc.ca or johngm@unb.ca).

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.

Canadian Mathematics Society's Summer Meeting

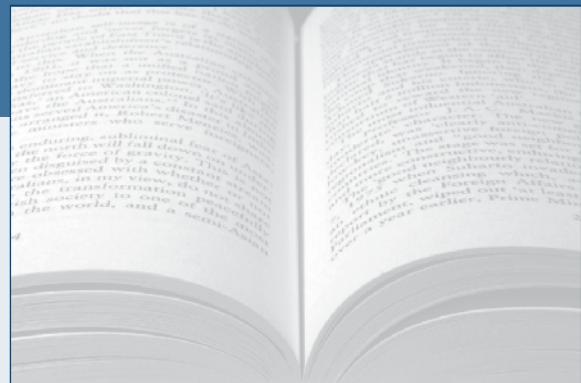
WANTED: Books for Review RECHERCHÉS : Livres pour critiques littéraires

Have you written a book lately?

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

Vous avez récemment écrit un livre?

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



Keith Johnson
Department of Mathematics and Statistics
Dalhousie University
Halifax NS B3H 3J5

CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE

Prix Coxeter-James Prize Lectureship

2011

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.

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

Cette personne doit être membre de la communauté mathématique canadienne. Les candidats sont admissibles jusqu'à dix ans après l'obtention de leur doctorat : ceux qui ont obtenu leur doctorat en 2000 ou après seront admissibles en 2010 pour le prix Coxeter-James 2011. Toute mise en candidature est modifiable et demeurera active l'année suivante, à moins que la mise en candidature originale ait été faite la dixième année suivant l'obtention du doctorat.

La date limite des mises en candidature est **le 30 juin 2010**. Veuillez faire parvenir les mises en candidature et lettres de référence par voie électronique, de préférence en format PDF, avant la date limite à : prixcj@smc.math.ca.

Les proposants doivent faire parvenir trois lettres de référence à la SMC (prixcj@smc.math.ca) au plus tard le 30 septembre 2010. Nous vous incitons fortement à fournir des références indépendantes. Le dossier de candidature doit comprendre le nom des personnes données à titre de référence ainsi qu'un curriculum vitae récent du candidat ou de la candidate, dans la mesure du possible.

FROM THE VICE-PRESIDENT'S DESK *continued*

There are changes in the job applicant pool. Many openings are centrally posted on sites such as MathJobs (a service maintained by the American Mathematical Society). Applications routinely arrive from all over the world and every position tends to get a large number of applications, with the number growing every year.

Thus, in so many aspects of our enterprise, we see significant changes happening. A big challenge for us is to recognize that these changes are taking place around us and think about how these changes affect the formulation and articulation of our goals.

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.

Continued page 14

RÉUNION D'ÉTÉ SMC 2010 CMS SUMMER MEETING

June 4 - 6, 2010

University of New Brunswick - Fredericton
www.cms.math.ca

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!

Du 4 au 6 juin 2010

Université du Nouveau-Brunswick à Fredericton
www.smc.math.ca

La Société mathématique du Canada (SMC) et l'Université du Nouveau-Brunswick invitent la communauté mathématique à la **Réunion d'été 2010 de la SMC**. Au programme du vendredi à dimanche : dix conférences (plénières, publique et de lauréats) ainsi qu'une grande diversité de sessions.

La conférence publique et la réception d'accueil offerte par Nelson le jeudi soir se tiendront au pavillon de l'association étudiante (Student Union Building) sur le campus. Toutes les conférences, le salon des exposants et le kiosque d'inscription (de vendredi à dimanche) seront au pavillon Head aussi sur campus.

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

Le Symposium canadien sur les algèbres d'opérateurs se tiendra à Fredericton du 7 au 11 juin, tout de suite après la Réunion d'été de la SMC. Les organisateurs sont Dan Kucerovsky (Fredericton) et Andrew Dean (Lakehead).

Préinscription – Date limite : 31 mars

Pour avoir droit au tarif réduit de préinscription, le formulaire d'inscription accompagné du paiement doivent nous parvenir au plus tard à la date limite.

Hébergement – Date limite : 7 mai

Nous avons négocié des chambres à tarif réduit aux hôtels Delta et Ramada; il se peut que le tarif réduit ne soit plus offert après la date limite.

Aide financière - Nous encourageons la participation des étudiants à la Réunion. Nous offrons donc de l'aide financière, sous forme de remboursement des frais de voyage et d'hébergement aux étudiants de cycles supérieurs et aux chercheurs postdoctoraux.

Au plaisir de vous accueillir à Fredericton!

Prizes and Awards / Prix

Coxeter-James Prize - Bálint Virág (Toronto)

Jeffery-Williams Prize - Mikhail Lyubich (Stony Brook)

Excellence in Teaching Award Jennifer Hyndman (UNBC)

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)

Public Lecture / Conférence publique

Jason Brown (Dalhousie)

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:

AARMS

CRM

Fields Institute

MITACS

PIMS

RÉUNION D'ÉTÉ SMC 2010 CMS SUMMER MEETING

Wednesday Mercredi June 2 juin	Friday Vendredi June 4 juin	Saturday Samedi June 5 juin	Sunday Dimanche June 6 juin
18:30-22:00 Executive Committee Meeting (Carleton Room, Delta Hotel)	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 – 9:30 Scientific Sessions
	8:30 – 9:15 Plenary Lecture	8:00 – 10:00 Scientific Sessions	9:30 – 10:15 Plenary Lecture
	9:30 – 10:00 Break	10:00 – 10:30 Break	10:15 – 10:30 Break
Thursday Jeudi June 3 juin	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 (Neil McGill Room, McConnell Hall, UNB)	11:30 – 12:15 Bálint Virág Coxeter James-Prize Lecture	11:30 – 12:15 Mikhail Lyubich Jeffery-Williams-Prize Lecture	11:30 – 12:15 Jennifer Hyndman Excellence in Teaching A. Lecture
13:30 – 18:30 Board of Directors Meeting (Neil McGill Room, McConnell Hall, UNB)	12:30 – 14:00 Break Student Panel (Hiring Process)	12:30 – 14:00 Break CMS AGM	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 – 17:30 Scientific Sessions	
18:00-19:00 Jason Brown and Band Public Lecture (Student Union Building, UNB)	18:30 - 19:00 Reception (cash bar)		
19:00-20:30 Nelson Education Reception (Student Union Building, UNB)	19:00 – 22:00 Banquet (Student Union Building, UNB)	Student Social	(updated March 4, 2010)

FROM THE VICE-PRESIDENT'S DESK *continued*

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.



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.

CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE

Prix Adrien-Pouliot Award

2010

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.

Nous sollicitons la candidature de personne ou de groupe de personnes ayant contribué d'une façon importante et soutenue à des activités mathématiques éducatives au Canada. Le terme « contributions » s'emploie ici au sens large; les candidats pourront être associés à une activité de sensibilisation, un nouveau programme adapté au milieu scolaire ou à l'industrie, des activités promotionnelles de vulgarisation des mathématiques, des initiatives, spéciales, des conférences ou des concours à l'intention des étudiants, etc.

Les mises en candidature doivent parvenir au bureau de la SMC avant le **30 avril 2010**.

Veuillez faire parvenir votre mise en candidature par voie électronique, de préférence en format PDF, à prixap@smc.math.ca.

Conditions de candidature

- Inclure les coordonnées du/des candidat(s) 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.

CALL FOR NOMINATIONS CJM/CMB - Associate Editors

APPEL DE MISES EN CANDIDATURE JCM/BCM - Rédacteurs associés

The Publications Committee of the CMS solicits nominations for Associate Editors for the Canadian Journal of Mathematics (CJM) and the Canadian Mathematical Bulletin (CMB). The appointment will be for five years beginning January 1, 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.

Le comité des publications de la SMC sollicite des mises en candidatures pour des rédacteurs associés du Journal canadien de mathématiques (JCM) et Bulletin canadien de mathématiques (BCM). Le mandat sera de cinq ans et débutera le 1 janvier 2010. La liste des éditeurs qui sont en cours de mandat se trouve ci-dessous.

L'échéance pour proposer des candidats est le **15 avril 2010**.

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

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

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

Nantel Bergeron (York) 12/2010; Jianhong Wu (York)
12/2010.

Associate Editors / Rédacteurs associés

K. Bezdek (Calgary) 12/2011; J. Colliander 12/2011;
Alan Dow (York) 12/2010; George Elliott (Toronto)
12/2010; K. Hare (Waterloo) 12/2011; Stephen Kudla
(Toronto) 12/2013; Vladimir Pestov (Ottawa) 12/2013;
Gordon Slade (UBC) 12/2013; Roland Speicher
(Queen's) 12/2013; Vinayak Vatsal (UBC) 12/2013; Jie
Xiao (Memorial) 12/2013.

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 2010, 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 2010, 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

CALL FOR MANUSCRIPTS ATOM - A Taste of Mathematics

DEMANDE DE MANUSCRITS ATOM - Aime-T-On les Mathématiques

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.

So far, ten volumes have been published – Vol. I, Problems from the Olympiad Correspondence Program; Vol. II, Algebra - Intermediate Methods; Vol. III, Problems for Mathematics Leagues; Vol. IV, Inequalities; Vol. V, Combinatorial Explorations; Vol. VI, Problems for Mathematics Leagues II; Vol. VII, Problems of the Week; Vol. VIII, Problems for Mathematics Leagues III; Vol. IX, The CAUT Problems, and Vol. X, Modular Arithmetic.

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

Les Livrets de la collection ATOM sont destinés au perfectionnement des étudiants du secondaire qui manifestent un intérêt et des aptitudes pour les mathématiques. Certains livrets de la collection ATOM servent également de matériel de préparation aux concours de mathématiques sur l'échiquier national et international.

À ce jour, dix tomes ont été publiés - tome I, Problems from the Olympiad Correspondence Program; tome II, Algebra - Intermediate Methods; tome III, Problems for Mathematics Leagues; tome IV, Inequalities; tome V, Combinatorial Explorations; tome VI, Problems for Mathematics Leagues, II; tome VII, Problems of the Week; tome VIII, Problems for Mathematics Leagues III; tome IX, The CAUT Problems, et tome X, Modular Arithmetic.

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

Faites parvenir vos propositions ou manuscrits au

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

Department of Mathematics
Memorial University of Newfoundland
St. John's, NF
Canada A1C 5S7
atom-editors@cms.math.ca



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NEWS FROM INSTITUTES

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)
- 12-16 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)

NEWS FROM THE FIELDS INSTITUTE

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/

CALL FOR NOMINATIONS / APPEL DE MISES EN CANDIDATURE

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

2010

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 gaward@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.

DU BUREAU DU VICE-PRÉSIDENT

LES MATHÉMATIQUES DANS UN MONDE EN CHANGEMENT

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 présenter ces changements et soulever quelques questions à propos des répercussions de ces changements sur l'enseignement des mathématiques et la recherche mathématique.

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 transforment 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 prétilages 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'attaquent 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 prétilages circulent électroniquement, par courriel ou par un service d'archives de prétilages. 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 accroître le nombre d'étudiants aux cycles supérieurs et favoriser les transferts technologiques. On parle constamment de commercialisation de la recherche et du financement accru accordé aux produits de recherche commercialisables.

D'autres changements encore modifient la composition du bassin de recrutement de mathématiciens. De nombreuses offres d'emploi 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 misons 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

les heures de contact direct enseignant-étudiants qu'en donnant un cours magistral? Serait-il temps aussi de revoir notre habitude de faire acheter aux étudiants des manuels coûteux traitant de concepts qui ont peu changé au cours des derniers siècles?

Le temps serait-il venu de réfléchir à la pertinence de faire tous le même travail chacun de son côté? Serait-il possible de partager des cours de base? Pourrions-nous créer un répertoire centralisé de matériel pédagogique pour les cours de base, ou même pour les cours avancés? Pourrions-nous faire cela de manière à voir une amélioration mesurable de la qualité de l'enseignement et des résultats des étudiants? Pouvons-nous, en tant que communauté, devenir des chefs de file à ce chapitre? Après tout, si nous pouvons concevoir un modèle qui améliore la qualité de l'enseignement des mathématiques et les résultats des étudiants, le modèle pourrait être repris dans bien d'autres domaines.

Puisque les organismes subventionnaires insistent de plus en plus sur la formation, pouvons-nous faire participer plus d'étudiants à nos recherches, y compris des étudiants de 1^{er} cycle? Nous devrons pour cela revoir notre définition de « recherche ». Il faut comprendre que bien d'autres disciplines confondent « faire de la recherche » (research) et « chercher » (search). Ces termes

ne sont pas synonymes, de toute évidence, mais peut-être que l'on pourrait commencer par faire chercher nos étudiants de premier cycle ou même nos étudiants qui viennent de passer au cycle supérieur.

Les mathématiques jouissent d'un avantage certain sur les autres disciplines en raison de leur nature ubiquitaire. Des concepts mathématiques ont influencé directement ou indirectement l'évolution des sciences physiques et des sciences sociales. On constate en outre un certain engouement en ce moment pour découvrir le rôle des mathématiques dans les sciences de la vie. Les mathématiques jouent aussi un rôle culturel dans la société. Que ce soit justifié ou non, certains considèrent que seuls les domaines de la connaissance qui s'expriment de façon mathématique sont jugés scientifiques.

La communauté mathématique reconnaît certainement cet avantage, mais il est possible d'en faire tellement plus, et il en reste tellement à faire. Même si nous devrions continuer de bâtir sur nos forces actuelles, nous devons aussi nous garder de nous cantonner dans une définition trop étroite. Le monde change, et il offre des possibilités incroyables pour les mathématiques.

CALL FOR PROPOSALS 2010 Endowment Grants Competition

APPEL DE PROJETS Concours de bourses du fonds de dotation 2010

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.

Les projets doivent parvenir à la Société au plus tard le 30 septembre 2010. Les projets retenus seront annoncés en décembre 2010, et les bourses distribuées en janvier 2011.

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/

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	
8-12	Workshop on Graphs and Arithmetic (CRM, Montreal, QC) www.crm.umontreal.ca		
22-26	Computer Methods for L-functions and Automorphic Forms (CRM, Montreal, QC) www.crm.umontreal.ca		
27-29	Boise Extravaganza in Set Theory (Boise, Idaho) http://diamond.boisestate.edu/~best/		
APRIL	2010	AVRIL	
16	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) www.fields.utoronto.ca/programs/scientific/keyfitz_lectures/merton.html		
19-23	Counting Points: Theory, Algorithms and Practice, (CRM, Montreal, QC) www.crm.umontreal.ca		
MAY	2010	MAI	
3-7	Second International Workshop on Zeta Functions in Algebra and Geometry (Universitat de les Illes Balears, Palma de Mallorca, Spain) www.singacom.uva.es/oldsite/seminarios/cartel/jpg		
5-8	23rd International Workshop on Description Logics (DL2010) (Fields Institute event at the University of Waterloo)		
7-10	Connections in Geometry and Physics 2010 (Perimeter Institute for Theoretical Physics, Waterloo, ON) www.math.uwaterloo.ca/~gap		
31-Jun 4	Harmonic Analysis Retrospective Meeting (Fields Institute)		
JUNE	2010	JUIN	
2-5	Eighth Joint International Meeting of the AMS and the Sociedad Matemática Mexicana, Berkeley, California www.ams.org/amsmtgs/2172_program.html		
3-5	Chico Topology Conference (Chico, CA) www.csuchico.edu/~tmattman/CTC.html		
4-6	2010 CMS Summer Meeting University of New Brunswick, Fredericton, NB www.cms.math.ca/Events/summer10/		
8-9	Clay Research Conference (IHP, Paris, France) www.claymath.org		
10-12	Geometric and Probabilistic aspects of General Relativity (University of Strasbourg, France) franchi@math.u-strasbg.fr		
13-18	48th International Symposium on Functional Equations (Batz-sur-Mer, France) nicole.bellouot@ec-nantes.fr		
14-17	2010		
14-17	Fourth Annual International Conference on Mathematics & Statistics (Athens, Greece) www.atiner.gr/docs/Mathematics.htm		
17-19	14th International Congress on Insurance: Mathematics and Economics (Fields Institute at the University of Toronto)		
20-25	Analysis, Topology and Applications 2010 (Vrnjacka Banja, Serbia) www.tfc.kg.ac.rs/ata2010		
28-July 2	The Józef Marcinkiewicz Centenary Conference (Poznan, Poland) www.jm100.amu.edu.pl		
JULY	2010	JUILLET	
5-9	Iwasawa 2010 Conference (Fields Institute) www.fields.utoronto.ca/programs/scientific/10-11/iwasawa		
7-10	Eleventh International Conference on p-adic Functional Analysis (Université Blaise Pascal, Les Cezeaux, Aubière, France) Alain.escassut@math.univ-bpclermont.fr		
26-Aug 16	Topics in Noncommutative Geometry (Universidad Buenos Aires, Argentina) http://cms.dm.uba.ar/Members/gcorti/workgroup.GNC/3EIL		
AUGUST	2010	AOÛT	
9-13	Workshop on Fluid Motion Driven by Immersed Structures (Fields Institute) www.fields.utoronto.ca/programs/scientific/10-11/fluid_motion/		
15-19	Geometric, Asymptotic, Combinatorial Group Theory with Applications (CRM, Montreal, QC) www.crm.umontreal.ca		
23-27	Topics in Algorithmic and Geometric Group and Semigroup Theory (CRM, Montreal, QC) www.crm.umontreal.ca		
30-Sept 3	Complexity and Group-based Cryptography (CRM, Montreal, QC) www.crm.umontreal.ca		
SEPTEMBER	2010	SEPTEMBRE	
7-10	Seventh Italian-Spanish Conference on General Topology and its Applications (Badajoz, Spain) http://ites2010.unex.es		
13-17	Conference on Asymptotic Geometric Analysis and Convexity (Fields Institute) www.fields.utoronto.ca/programs/scientific/10-11/asymptotic/		
OCTOBER	2010	OCTOBRE	
4-9	Group Actions and Dynamics (CRM, Montreal, QC) www.crm.umontreal.ca		
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Programme Math à Moscou

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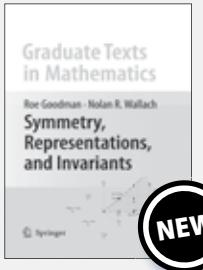
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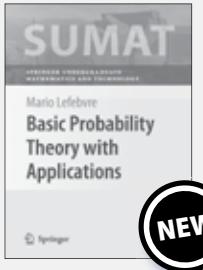
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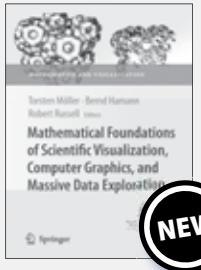
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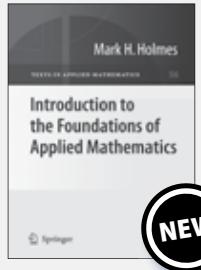
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