

CMS

NOTES

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FROM THE PRESIDENT'S DESK



Richard Kane

(voir la page 7 pour la version française)

The CMS Winter meeting will be taking place during December 13-15 at Kingston, hosted by Queen's University and the Royal Military College. The meeting possesses an excellent program involving sixteen sessions (Algebraic Geometry, Discrete Geometry, Education (two sessions), Extremal Combinatorics, Mathematics on the Internet, Number Theory, Operator Algebras, Probability Theory, Topology (four sessions), Universal Algebra and Multi-Valued Logic, Graduate Student Session, and Contributed Papers Session). As a means of expanding participation in our semi-annual meetings, the CMS has been actively encouraging meeting organizers to present as broad and diversified a program as possible. The program for the Kingston meeting has certainly achieved this goal. Our

semi-annual meetings are now consistently attracting well over 200 registrants. At Kingston the above sessions alone will involve nearly 180 speakers. Kingston is a very attractive site for a meeting. I hope to see you there in December.

One small experiment will be tried at Kingston. We have developed a tradition of holding a General Meeting during an afternoon of each CMS meeting. Because of the growing number of events at our meetings and the need for no conflicting activities to take place at the same time, this has created some scheduling pressures. This pressure is particularly acute at the Kingston meeting. After discussing this matter, the Board decided in Saint John that the organizers of the Kingston meeting should be allowed to experiment by holding an evening General Meeting. The bylaws of the CMS require at least one General Meeting per year and there was also some discussion of the advisability of moving to one General Meeting per year at the summer meeting. The final decision of the Kingston organizers has been to hold the General Meeting in the early evening beginning at 5:30 pm, which is not a major change from standard practice. But changes are, at least, under consideration.

Over the course of this academic year, I will be reporting on a number of CMS initiatives. One current area of activity is planning for the year 2000. I hasten to say that this is not a CMS effort to defeat the millennium bug and

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CMS NOTES
NOTES DE LA SMC

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EDITORIAL



S. Swaminathan

The four Fields medalists of 1998 received the highest recognition for mathematicians for achievements in algebra, geometry, theoretical physics, knot theory, Banach space theory, chaos theory, Julia sets and Mandelbrot sets (see Oct. 98 issue of the *NOTES*). It is a formidable task to explain their work even to anyone with a modest mathematical background. One can say generally that they all solved important problems. Discussing criteria for a good mathematical problem, David Hilbert in his famous 1900 address says, "An old French mathematician said: A mathematical theory is not to be considered complete until you have made it so clear that you can explain it to the first man whom you meet on the street. Moreover a mathematical problem should be difficult in order to entice us, yet not completely inaccessible, lest it mock at our efforts. It should be to us a guide post on the mazy paths to hidden truths, and ultimately a reminder of our pleasure in the successful solution." Sometimes, as in the case of Fermat's Last Theorem, just the history of the problem is enough to arouse interest in a lay person.

Thus there is need for good expository accounts accessible to advanced undergraduate students. Of course, there are popular accounts of past work of mathematicians written by competent professors like Ross Honsberger

and Ian Stewart, but here I am talking about mathematical articles which explain the problem, its history and outline the salient features of the solution pointing out how a breakthrough occurred which made the solution possible. Such articles would persuade young and bright students to aim at attempting outstanding problems themselves. I would urge mathematicians working in the areas mentioned above to spend some of their valuable time towards this effort.

Les quatre récipiendaires de médailles Fields 1998 ont reçu la plus haute distinction pour des réalisations mathématiques dans les domaines de l'algèbre, de la géométrie, de la physique théorique, de la théorie des noeuds, de la théorie de l'espace de Banach, de la théorie du chaos, des ensembles de Julia et des ensembles de Mandelbrot (*NOTES*, oct. 98). Tenter d'expliquer leur travail à des personnes aux connaissances mathématiques limitées relève de l'exploit. De façon générale, on peut s'en sortir en disant qu'ils ont tous résolu d'importants problèmes. En parlant des caractéristiques d'un bon problème mathématique, David Hilbert, dans un célèbre discours prononcé en 1900, tenait ces propos : "Comme le disait un mathématicien français des temps passés: une théorie mathématique ne doit être regardée comme parfaite que si elle a été rendue tellement claire qu'on puisse la faire comprendre au premier individu rencontré dans la rue. Pour avoir de l'attrait, un problème mathématique doit être difficile, mais non pas inabordable, sinon il se rit de nos efforts; il doit au contraire être un véritable fil conducteur à travers les dédales du labyrinthe vers les vérités cachées, et nous récompenser de nos efforts par la joie que nous procure la découverte de la solution." Parfois, comme dans le cas du dernier théorème de Fermat, l'historique du problème suffit à stimuler l'intérêt des non-initiés.

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PRIME MINISTER HONOURS OUTSTANDING TEACHERS

Prime Minister Jean Chrétien has announced the recipients of the 1997 Prime Minister's Awards for Teaching Excellence. These awards are given every year to recognize the achievements of elementary and secondary school teachers who are leading the way in preparing their students for the new, knowledge-based economy.

"As we approach a new millennium, technology and globalization are rapidly changing our world. And Canadian students must be ready," said the Prime Minister. "The teachers we honour today are helping young people across Canada equip themselves with the skills that will help them build strong futures for themselves in the new economy, no matter what career path they choose."

The Prime Minister was joined at the awards ceremony by Ron Duhamel, Secretary of State (Science, Research and Development and Western Economic Diversification), as well as representatives of the program's corporate partners: Bell Canada, G.E. Canada, Kraft Canada, Merck Frosst and The Royal Bank Financial Group

"It is crucial that our children have their shot at success in the knowledge-based economy," said the Secretary of State. "This places a high premium on the leadership and creativity of Canadian teachers. This year's award winners are fine examples of these indispensable qualities."

The Prime Minister's Awards have evolved from their original focus on science, technology and mathematics to recognize the contribution of teachers in all disciplines. Recipients were recognized for a variety of achievements in areas including computer animation, community and peer outreach, cultural and language development and environmental assessment.

A total of 72 teachers (17 Certificates of Excellence and 55 Certificates of Achievement) were selected from almost 300 nominations. Certificates of

Excellence are presented by the Prime Minister. All recipients are recognized in an Exemplary Practices publication, which appeared in September. It is designed to share the proven teaching methods of Award recipients with educators across Canada and throughout the world via the Internet.

Six mathematics teachers were awarded Certificates of Achievement.

Mathematics and sciences were never strong points for Agnes L. Mathers Elementary Junior Secondary School in Sandspit, British Columbia, but that changed with the arrival of **Peter Gadja**. He quickly put in place a program that combines learning at the students' pace with higher performance standards, and students responded enthusiastically. His students today can do mathematics at their own pace but they know they have to master 80 per cent of the subject matter. Mr. Gadja transformed the school's computer lab, making more and better computers available to students. He did this without an increase in budget, often upgrading computers and wiring networks himself. In response, his students are doing better in mathematics and reaching levels in science fairs that are unprecedented for the school.

Among his peers at West Vancouver Secondary School in West Vancouver, British Columbia, **John Klassen** is considered to have been a major force in bringing about much-needed change to the school's mathematics program. This includes a 20 per cent increase in participation in Math 12 between 1991 and 1997, and a steadily decreasing rate of failing grades. Among other things, Mr. Klassen designed and introduced a highly successful remedial learning program for incoming Math 10 and Math 11 students who have previously had difficulty in math courses. With typical determination, he also has

been a leader in the use of graphical calculators in mathematics departments, an effort finally rewarded by British Columbia's decision to integrate this technology into a new senior-level curriculum beginning in September 1998.

Joseph Wood's students distinguish themselves with impressive performance in mathematics. Whether it is provincial exams, on which they regularly outperform other schools, or the Pascal, Cayley and Fermat mathematics competitions, in which they place in the top levels, the students at Killarney Secondary School in Vancouver, British Columbia, are a force to reckon with. They get that way by completing a wide variety of learning activities. Some of Mr. Wood's techniques are tried and true and others use new technology such as graphical calculators. These approaches have helped students at all levels succeed. He makes his classroom equally welcoming to boys and girls; the latter comprise half of his classes.

As Head of the Mathematics and Computer Science Department of Sisler High School in Winnipeg, Manitoba, **William Korytowski's** dedication to student development is apparent inside and outside the classroom. He integrates concepts from business, engineering and computer science into his lessons to make them interesting and relevant. He draws on each student's existing skills and strengths when teaching, challenges his advanced students for the national mathematics contest, gives after-hour tutorial sessions, initiated a partnership with the University of Manitoba enabling Grade 12 students to take university-level calculus for credit, created and funded the Sisler High School Math Award, and wrote, co-authored or reviewed numerous textbooks and curricula.

John Bradley is the Mathematics Department Head at St. Matthew High

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TWO TASTY SERVINGS OF PI

Book Review by Roger Webster, University of Sheffield

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Pi: A Source Book

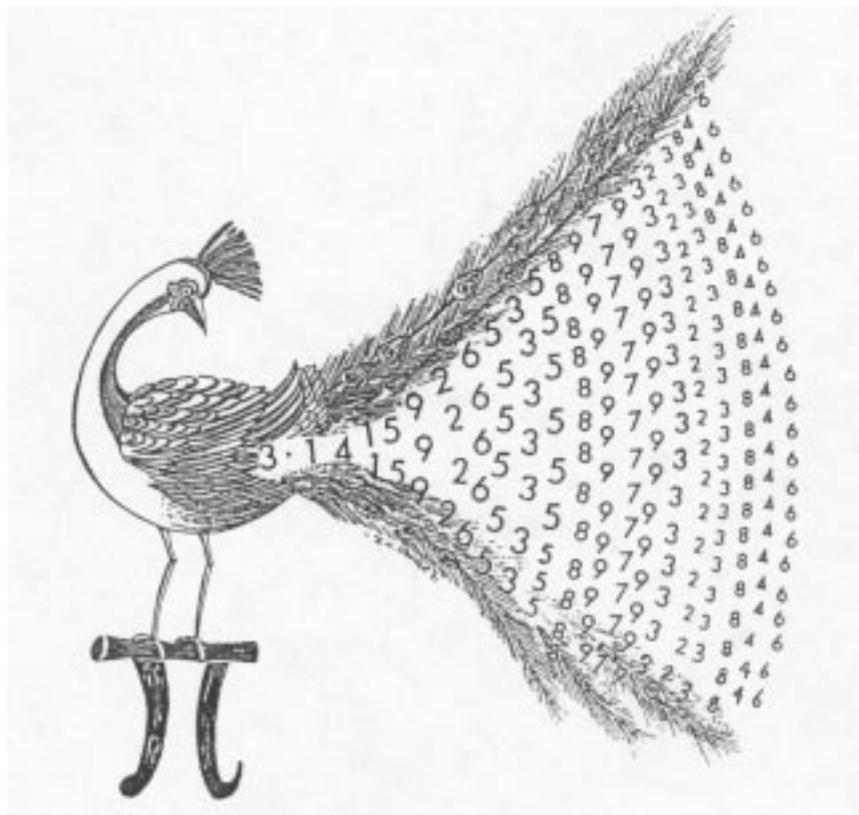
by Lennart Berggren, Jonathan Borwein and Peter Borwein. Springer, 1997, 716pp, \$37.50.

The Joy of π

by David Blatner. Allen Lane, The Penguin Press, 1997, 130pp, \$12.99.

Perhaps no concept has captured the mathematical imagination more than the circle ratio π , while no mathematical symbol has evoked more mystery, romanticism and popular appeal than π itself. Why this fascination with mathematics' most famous number? For the professional mathematician, π has long presented a challenge, being taciturn by nature and yielding up its splendours only grudgingly. When they are teased out, however, the effort expended is often handsomely repaid. Among reasons drawing the amateur to π are: its habit of turning up everywhere, often in unexpected places; the highly publicized search for its decimal digits, with world records tumbling almost annually in today's age of the supercomputer; and its long, colourful history filled with incident, drama, humour, genius and eccentricity. Continued interest in π over four millennia has resulted in the accumulation of a vast π -archive. What, then, do the two books under review here contribute to this collection?

Pi: A Source Book, the first source book on π ever to be published, documents, mainly through original writings, the history of π from the dawn of mathematical time to the present day. One only has to glance at the Contents to appreciate the pre-eminent role played by π in the history of mathematics, the seminal ideas to which it has given birth, and the number of illustrious mathematicians who have fallen under its spell. Furthermore, the list of titles supports the authors' claim that



the computation of π is the one topic from the most ancient stratum of mathematics that continues to be vigorously researched today, and that to trace its development is to follow a thread which winds through geometry, analysis and special functions, numerical analysis, algebra and number theory. One beauty of the anthology is the inclusion of so much contemporary, yet still accessible, mathematics - more than half of the collected articles are from the latter half of this century, the most recent published in 1996, the year of the book's completion!

The compilation itself comprises seventy articles (mostly research papers, but also a few historical studies and items of a more light-hearted nature) arranged chronologically and presented in their original form (photocopies, in fact) without accompanying comment, although each is accorded

an illuminating one sentence description in the Contents. The introduction provides an overview of the whole collection, which serves to place individual articles into historical context, and there are three short appendices: *On the Early History of Pi*, *A Computational Chronology of Pi* (out of date even before publication) and *Selected Formulae for Pi*. A striking multicoloured design adorns the front cover, while more than 10,000 digits of π 's decimal expansion decorate it on the inside.

The authors divide their material into three periods: before Newton, Newton to Hilbert, and the Twentieth Century. The earliest of these, containing fifteen papers from Egyptian, Chinese, Arabic, Indian and European sources, commences with a problem from the Rhind Papyrus (1650 BC) showing that the ancient Egyptians assumed an implicit value for π

of 256/81, and concludes with the debut of π to denote the circle ratio, in William Jones' *A New Introduction to the Mathematics* (1706). Incidentally, the Jones' extract can also boast the first calculation of π to 100 decimal places, *computed by the accurate and Ready Pen of the Truly Ingenious Mr John Machin*, but no mention is made of this. Archimedes' *On the Measurement of the Circle*, which dominated the subject in the pre-calculus era, is well represented, as are the original derivations of the first infinite expressions for π , those linked with the names of Viète (1593) and Wallis (1655). Another gem is Ranjan Roy's paper on the independent discovery of the power series for $\tan^{-1} x$ by Gregory (1671), Leibniz (1673) and a lesser known Indian mathematician, Nilakantha (1450).

What the period from Newton to Hilbert lacks in quantity, with only nine representative papers, it certainly compensates for in quality. Euler's dazzling mastery of formal algebraic manipulation, combined with innate good judgement, is exhibited in a chapter from his *Introduction to Analysis of the Infinite* (1748), which includes derivations of his celebrated series for powers of π . Then follow the first proofs of the transcendence of e , by Hermite (1873), and of π , by Lindemann (1882). Lindemann's paper, a landmark in the history of mathematics, showed once and for all that *the circle could not be squared*. Simpler proofs of the transcendence of π by Weierstrass (1885) and Hilbert (1893) are also given.

The twentieth century selections are divided between analytical and computational studies. Opening the former is Ramanujan's seminal paper *Modular Equations and Approximations to π* (1914), which exhibits some remarkable series for $1/\pi$. Watson's *The Marquis and the Land Agent: A Tale of the Eighteenth Century* (1933) is a delightful exposition of the early de-

velopment of elliptic functions, which play a role in some modern computations of π . Other highlights include: Niven's one page proof of the irrationality of π , influential papers by Kurt Mahler and Alan Baker, and two articles on Apéry's controversial proof (1978) of the irrationality of $\zeta(3)$. The computational selection covers the first electronic computation (ENAI) of π in 1949, the independent discovery of arithmetic-geometric mean based algorithms for the computation of π by Salamin and Brent in 1976, and papers by Kanada, the Borwein brothers and the Chudnovsky brothers, today's leading exponents on the computation of π . A recent (1996) paper by David Bailey, Peter Borwein and Simon Plouffe serves as a worthy climax to this wonderful treasury and points the way to future developments. It describes a fast algorithm for determining *individual* digits of π in certain bases and illustrates its effectiveness by showing that the ten billionth hexadecimal digit of π is a 2!

Few mathematics books serve a wider potential readership than does a source book and this particular one is admirably designed to cater for a broad spectrum of tastes: professional mathematicians with research interest in related subjects, historians of mathematics, teachers at all levels searching out material for individual talks and student projects, and amateurs who will find much to amuse and inform them in this leafy tome. The authors are to be congratulated on their good taste in preparing such a rich and varied banquet with which to celebrate π .

The Joy of π is a highly entertaining, lavishly designed book, which more than fulfils the expectation generated by its title and striking dust jacket blazoning an incandescent π shining forth from a star-studded jet sky. It is unashamedly popular in its approach, clearly aimed at the mass mar-

ket, somewhat along the lines of the bestselling *Longitude* by Dava Sobel and the books on *Fermat's Last Theorem* by Aczel and Singh, but less substantial. In a lively and engaging style, the author tells the tale of π and man's fascination with it, sprinkling his narrative with rich helpings of π trivia: tidbits about π -eccentrics, π 's own idiosyncrasies, multilingual mnemonics for π , and π -inspired quotations, poems, limericks, anecdotes, jokes and cartoon. In addition to more familiar stories, such as Indiana's notorious attempt to legislate a legal value of π in 1897, there are others that are brand new, like a transcript from the OJ Simpson trial in which an FBI agent and the learned Judge express differing opinions on the value of π , the former believing it to be 2.12, the latter 3.1214! Each page is individually and attractively, if occasionally over fussily, laid out with imaginative use of two-colour (black and green) artwork, although it is surely a misjudgement to squander space by strewing a million illegible decimal digits of π across the pages of the book, when most of them are infuriatingly unnumbered. Readers who still have not had their fill of π are exhorted to start Web-surfing at <http://www.joyofpi.com>.

One item appearing in both books, and for the first time in print, is Michael Keith's *π Mnemonics and the Art of Constrained Writing*. This has for its showpiece a rewriting of Edgar Allen Poe's poem, *The Raven*, in such a way as to preserve as far as possible the story, tone and rhyming scheme of the original, while simultaneously creating a 740 word mnemonic poem for π . In the *Source Book* the mnemonic begins as intended: *Poe E, Near a Raven . . .*, but in *The Joy of π* it commences *Pie E, Near a Raven . . .*, under the circumstances, a most forgivable Freudian slip!

(continued from page 1)

ensure that our computers will be working in the next century. Rather this concerns planning connected with the fact that the year 2000 represents an exceptional occasion to make mathematics visible throughout Canada. The International Mathematical Union (IMU) has declared the year 2000 as World Mathematical Year and UNESCO is one of the major sponsors of WMY 2000. The IMU declaration set three goals. First there should be an effort to look to the future and formulate the great challenges of the 21st century. Secondly, there should be an effort to raise the level of mathematical activity and support in less developed countries to that of the current 50 IMU members. Thirdly, there should be a systematic effort to highlight the accomplishments of mathematics and its impact on today's "Information Society".

Last year, the CMS created a WMY 2000 committee, chaired by Bernard Hodgson, which was given the mandate of formulating projects which might occur under the sponsorship of the CMS during the year 2000. The committee submitted its report in October and the Executive is currently dealing with the implementation of their report. The focus of the committee's report is very much centred on the last goal of the WMY 2000 declaration, that of improving the public awareness of mathematics, its achievements, and its impact on society.

Independently of the CMS, a number of Canadian WMY 2000 projects are already underway. Notably, planning of activities within Quebec are clearly in advance of the rest of the country. A wide range of Quebec based activities (e.g. poster campaigns, symposiums, special publications, popular articles, museum displays) are either being discussed or are being prepared.

The CMS also began actively planning one major WMY 2000 activity this fall. The CMS Summer Meeting for the year 2000 has been absorbed into a joint meeting involving the Canadian Applied and Industrial Mathematics Society (CAIMS) and the Canadian Symposium on Fluid Dynamics (CSFD). This joint meeting will take place on the McMaster campus during June 10-13 of the year 2000. Organizational discussions between the three groups have been taking place since September and are still at a very preliminary stage.

The past four years have clearly been a period of both appraisal and change within the Canadian mathematical community. The community has participated, during that period, in two NSERC Reallocation exercises as well as in an NSERC Review of Canadian Mathematics. With the approval by the Board of a planning document at our recent Saint John Sum-

mer meeting, the CMS has now initiated its own appraisal exercise. One aspect of this exercise will be the examination of the relationship between the CMS and our evolving mathematics community. One of our planning Task Forces will be devoted to this very question. Notably, the evolution of the Mathematical Institutes into a significant national presence has been particularly striking in the past few years. With the evolution of the Institutes and their growing impact on Canadian mathematical activity the CMS needs to re-examine its relationship to the Institutes. The Institutes represent both a challenge and an opportunity. The dynamism of the Institutes, not only in research but in education and training as well, presents a clear challenge to the CMS with respect to maintaining leadership in these areas. On the other hand, these are also areas where a strengthening of CMS activity could occur via collaboration. In September, I wrote a letter to the committee which was evaluating the three Institutes and recommending funding levels for the period 1999-2002. I conclude this article with part of that letter:

"Regarding future growth, the CMS is very supportive of the desire of the Institutes to evolve in the direction of providing a national infrastructure for mathematical research in Canada. This requires a configuration of three viable Institutes co-ordinating their activities and operating in the context of a 'national vision'. This goal was supported by the Review of Canadian Mathematics. It was also articulated in the Mathematics Reallocation submission and expressly supported by the Reallocation Committee. In particular, the CMS strongly supports the declared goal of the Institutes to adequately support mathematical activity from all regions of Canada.

The CMS anticipates developing stronger links with the networked Institutes. The CMS is currently undergoing a strategic planning process and the examination of links between the CMS and the Institutes will be one aspect of that review. At the moment the primary interaction has come via the financial support provided, by the various Institutes, for research sessions occurring at CMS semi-annual meetings. This support is crucial and we welcome a more coherent conference funding format, as proposed by the Institutes.

Besides research, there are other areas where we share common interests, notably education and training. In particular, the growth of outreach activity will increasingly affect graduate training and this is an area in which the CMS and the Institutes might co-operate. The exposure of graduate students to research problems from business and industry, as well as the promoting of actual contacts between mathematical students and prospective employers from the private sector, is one area where such co-operation could clearly take place."

DU BUREAU DU PRÉSIDENT

(see page 1 for the English version)

La Réunion d'hiver de la SMC aura lieu du 13 au 15 décembre à Kingston, à l'invitation de l'Université Queen's et du collège militaire royal. Les participants auront droit à un excellent programme comprenant seize séances (géométrie algébrique, géométrie discrète, éducation (deux séances), combinatoire extrémale, les mathématiques dans l'Internet, théorie des nombres, algèbre des opérateurs, théorie des probabilités, topologie (quatre séances), algèbre universelle et logique multivaluée, séance pour étudiants diplômés et communications libres). Dans le but d'accroître la participation à ses Réunions semestrielles, la SMC encourage vivement les organisateurs à offrir le programme le plus vaste et diversifié possible. Celui de la Réunion de Kingston correspond certainement à ces critères. Depuis quelque temps, chaque Réunion semestrielle attire bien au-delà de 200 participants. À Kingston, les séances décrites ci-dessus mettront en scène près de 180 conférenciers à elles seules. Kingston est un superbe endroit où tenir une Réunion. J'espère avoir le plaisir de vous y rencontrer en décembre.

Cette fois-ci, nous tenterons une petite expérience. Nous avons pris l'habitude de tenir une assemblée générale en après-midi, à chacune de nos Réunions semestrielles. En raison du nombre toujours croissant d'activités à nos Réunions et parce que nous devons éviter les conflits d'horaires, il est de plus en plus difficile d'établir les programmes. La difficulté est particulièrement grande cette fois-ci. Après discussions, le Conseil a décidé, à Saint John, que les organisateurs de la Réunion de Kingston pourraient tenir, à titre d'essai, l'assemblée générale en soirée. Selon les règlements généraux, la SMC doit organiser au moins une assemblée générale par année. La possibilité de passer à une seule assemblée générale par année, à la Réunion d'été, a aussi fait l'objet de discussions. Les organisateurs de la Réunion de Kingston ont finalement décidé de tenir l'assemblée générale tôt en soirée (17 h 30), ce qui, somme toute, ne diffère pas tellement de l'ordinaire. Chose certaine, des changements sont à l'étude.

Au cours de l'année universitaire, je vous ferai part de certaines initiatives de la SMC. Ces temps-ci, nous planifions notamment en vue de l'an 2000. Je m'empresse de préciser qu'il ne s'agit pas d'une lutte contre le bogue de l'an 2000 pour assurer le fonctionnement de nos ordinateurs au début du prochain millénaire. Nous planifions plutôt des activités pour l'an 2000, car nous croyons que cette année constituera une occasion exceptionnelle d'accroître la visibilité des mathématiques au Canada. En effet, l'Union mathématique internationale (UMI) a déclaré l'an 2000 année internationale des mathématiques, et l'UNESCO est l'un des

principaux commanditaires de l'événement. La déclaration de l'UMI comporte trois objectifs. Premièrement, il faut s'efforcer de regarder vers l'avenir et de définir quels seront les grands défis du 21^e siècle. Deuxièmement, il faut s'efforcer d'élever le niveau d'activité mathématique dans les pays moins développés au niveau des 50 pays membres de l'UMI, et d'accroître le soutien à ces pays. Troisièmement, il faut toujours s'efforcer de faire valoir les réalisations mathématiques et leur influence sur la "société de l'information" actuelle.

L'an dernier, la SMC a créé le Comité spécial des activités pour l'an 2000, année internationale des mathématiques, dont Bernard Hodgson assume la présidence. On a donné à ce comité le mandat de proposer des projets qui pourraient être réalisés sous l'égide de la SMC en l'an 2000. Le comité a présenté son rapport en octobre, et le Comité exécutif se consacre actuellement à sa mise en oeuvre. Le rapport est très axé sur le dernier objectif de la déclaration de l'UMI, soit sensibiliser davantage le public aux mathématiques, à ses réalisations et au rôle qu'elles jouent dans la société.

En dehors de la SMC, bon nombre de projets canadiens dans le cadre de l'année internationale des mathématiques ont vu le jour. En particulier, les organisateurs du Québec ont une bonne longueur d'avance sur ceux du reste du pays. Dans cette province, une vaste gamme d'activités (campagnes d'affichage, symposiums, publications spéciales, articles de vulgarisation, expositions dans les musées, etc.) font l'objet de discussions ou sont en cours de réalisation.

Cet automne, la SMC a commencé la planification active d'une activité d'envergure pour l'an 2000. Cette année-là, la Réunion d'été de la SMC sera intégrée à un événement organisé et tenu de concert avec la Société canadienne de mathématiques appliquées et industrielles (SCMAI) et le symposium canadien sur la dynamique des fluides (SCDF), sur le campus de l'Université McMaster, du 10 au 13 juin. Les discussions concernant l'organisation de l'activité ont commencé en septembre et sont encore au stade embryonnaire.

Les quatre dernières années ont été marquées par l'évaluation et le changement dans la communauté mathématique canadienne. Pendant cette période, la communauté a participé à deux exercices de réaffectation des fonds du CRSNG et à l'Examen des mathématiques au Canada, tenu par le mme organisme. L'approbation par le Conseil d'un document de planification, à la Réunion d'été tenue dernièrement à Saint John, marque le début d'un exercice d'évaluation au sein mme de la SMC. Nous profiterons notamment de cet exercice pour étudier le lien qui existe entre la SMC et notre communauté mathématique en constante évolution. L'un de nos groupes de travail se penchera particulièrement sur cette question. Nous remarquons entre autres que les instituts mathématiques jouent un rôle accru sur la scène nationale

depuis quelques années. Cette évolution des instituts et leur incidence grandissante sur l'activité mathématique au Canada forcent la SMC à réévaluer le rapport qu'elle entretient avec les instituts. Pour nous, ces derniers sont à la fois source de difficultés et de bonnes occasions. Compte tenu du dynamisme des instituts, non seulement dans le domaine de la recherche, mais aussi dans ceux de l'éducation et de la formation, la SMC aura visiblement fort à faire pour demeurer le chef de file dans ces domaines. Par contre, la Société pourrait renforcer ses activités dans d'autres secteurs, grâce à une collaboration avec les instituts. En septembre dernier, j'ai écrit une lettre au comité chargé du dossier des instituts, dans laquelle je recommandais le financement souhaité pour la période de 1999 à 2002. Pour terminer, je vous livre un extrait de cette lettre :

"En ce qui a concerné la croissance envisagée, la SMC appuie entièrement la volonté des instituts, qui consiste à procurer une infrastructure nationale à la recherche mathématique au Canada. Pour ce faire, les trois instituts viables devront coordonner leurs activités et fonctionner dans le contexte d'une 'vision nationale'. Cet objectif a été défendu pendant l'Examen des mathématiques au Canada; il a de plus été formulé dans le cadre de l'exercice de réaffectation des fonds du CRSNG et a reçu l'appui formel du comité de réaffectation. La SMC appuie tout particulièrement l'objectif avoué des

instituts, qui consiste à procurer un soutien adéquat aux mathématiques dans toutes les régions du pays.

La SMC a l'intention de créer des liens solides avec les trois instituts regroupés. Nous procédons actuellement à un exercice de planification stratégique, dans le cadre duquel nous examinerons notamment nos relations avec les instituts. Jusqu'à présent, nos rapports se limitaient surtout à la participation financière des divers instituts aux séances scientifiques des Réunions semestrielles de la SMC. Ce soutien nous est indispensable, et nous accueillerons avec plaisir une formule de financement plus cohérente, telle que proposée par les instituts.

La recherche n'est pas le seul domaine pour lequel nous partageons des intérêts. Je pense notamment à l'éducation et à la formation. Plus particulièrement, l'importance accordée aux activités de sensibilisation aura une incidence de plus en plus grande sur la formation des étudiants des 2e et 3e cycles; nous croyons qu'une collaboration entre la SMC et les instituts serait possible dans ce domaine. De même, la présentation aux étudiants diplômés de problèmes de recherche posés par les milieux des affaires et de l'industrie, ainsi que la promotion des rapports entre les étudiants en mathématiques et les employeurs potentiels du secteur privé, se prêterait certainement bien à une collaboration."

(continued from page 2)

Il y a donc place à de bons exposés descriptifs à l'intention des étudiants avancés de premier cycle. Il existe bien des relations populaires des travaux de mathématiciens écrits par des professeurs compétents comme

Ross Honsberger et Ian Stewart, mais je parle plutôt ici d'articles mathématiques où l'on explique le problème, trace son historique et décrit les étapes marquantes de la solution, en faisant ressortir les percées décisives qui ont mené à la solution. De tels articles persuaderaient de jeunes et bril-

lants étudiants à tenter de résoudre de grands problèmes eux-mêmes. C'est pourquoi j'encourage vivement les mathématiciens spécialisés dans les domaines mentionnés précédemment à consacrer une partie de leur précieux temps à cette cause.

S. Swaminathan

(continued from page 3)

School in Orleans, Ontario. The school is known locally as St. Math's, largely because of Mr. Bradley. Using a personal touch to get students involved, he coaches several of the math teams, preparing them for provincial and national competitions. The importance of math is highlighted throughout the school. Student achievements are honoured, math is promoted as a key discipline for overall learning, "math anxiety" in students and parents is ad-

dressé, and the enrichment that extracurricular math activities offer is advertised. Mr. Bradley obviously loves math and math teaching. He guides and encourages the other teachers in his department, has created seven board-wide exams and co-authored a marking document that has improved student performance and confidence.

Judith Crompton, from Sir Winston Churchill Secondary School in St. Catharines, Ontario, believes in second chances. Any student can understand math and those who already do can per-

form better. One of the ways she shows this is by letting students opt for follow-up courses and by giving them a second shot at exams and assignments. Even students who are firmly convinced that mathematics is not for them respond to her teaching, and requests from students for timetable changes so they can get into her class are a regular event. Ms. Crompton has also promoted improvements to the curriculum and mathematics competitions and has recently implemented a tutoring program at her school.

**Winter Meeting
Queen's University and
Royal Military College
Kingston, Ontario
December 13-15, 1998**

Fourth Announcement

Please refer to the Second Announcement in the September issue of the *CMS Notes* for more complete information on the scientific, education and social programmes. This announcement features a preliminary timetable and any changes to the programmes previously announced. The most up-to-date information concerning the programmes, including scheduling, is available at the following world wide web address:

<http://www.camel.math.ca/CMS/Events/winter98/>

Meeting registration forms and abstract forms for contributed papers may be found in the September issue of the *CMS Notes*.

Acknowledgements

The CMS wishes to thank the Centre de recherches mathématiques, the Fields Institute and the Pacific Institute for Mathematics Science for their financial support of scientific sessions at this meeting.

Thanks are also extended to the Royal Bank – MSTE Group and the Queen's University Instructional Development Centre for their support of the expanded programme of education activities.

The CMS wishes to acknowledge the contribution of the Meeting Committee in presenting exciting scientific, educational and social programmes. Thanks are also extended to

members of the host departments who have taken time from their regular duties to help out.

Meeting Committee

Meeting Directors: Tony Geramita (Queen's) and David Wehlau (RMC), *Local Arrangements Committee:* Fady Alajaji (Queen's) and Leo Jonker (Queen's), *Algebraic Geometry:* P. Milman (Toronto), *Discrete Geometry:* Robert Erdahl (Queen's), Marjorie Senechal (Smith College), Walter Whiteley (York), *Education:* William Higginson, Morris Orzech and Grace Orzech (Queen's), *Extremal Combinatorics:* D. de Caen (Queen's), *Mathematics on the Internet:* June Lester, Malgorzata Dubiel and Nathalie Sinclair (Queen's), *Number Theory:* Ram Murty and Noriku Yui (Queen's), *Operator Algebras:* James Mingo (Queen's), *Probability Theory:* Miklos Csörge (Carleton), *Topology:* Eddy Campbell (Queen's), Muang Min-Oo and McKenzie Wang (McMaster), Lisa Langsetmo (Ottawa), Jim Shank (Queen's), Juris Steprans (York), Steve Watson (York), Steve Boyer (UQAM), Jacques Hurtubise (McGill, CRM) and François Lalonde (UQAM, CRM), *Universal Algebra and Multiple-Valued Logic and Contributed Papers:* L. Haddad (RMC), *Graduate Student Session:* David Gregory (Queen's), *Other members:* Monique Bouchard (CMS) – Ex-officio, Jean Fugere (RMC), Graham Wright (CMS) – Ex-officio.

Items also published with this announcement

Updated list of speakers and titles of talks
Timetable - schedule

In the next issue of the *CMS Notes*

Fifth Announcement
Updated Timetable - block schedule

CMS 50th Anniversary Books

Delegates to the 1998 Winter Meeting can purchase the 50th Anniversary Books at a special price of \$30 per book or \$75 for the set of three. Ordering details are on the Registration form.

Livres du 50e anniversaire de la SMC

Les délégués au Réunion d'hiver de la SMC de 1998 peuvent acheter les livres du 50e anniversaire de la SMC pour un prix spécial de 30\$ pour un livre ou 75\$ pour tous les trois. Pour plus de détails voir la formulaire d'inscription.

CMS WINTER MEETING 1998 RÉUNION D'HIVER DE LA SMC
SCHEDULE - HORAIRE
QUEEN'S UNIVERSITY and ROYAL MILITARY COLLEGE - UNIVERSITÉ QUEEN'S et COLLEGE MILITAIRE ROYALE
CONFÉRENCES PRINCIPALES: Ballroom, Holiday Inn Waterfront
KINGSTON, ONTARIO

Time Heure	Friday / vendredi December 11 décembre	Saturday / samedi December 12 décembre	Sunday / dimanche December 13 décembre	Monday / lundi December 14 décembre	Tuesday / mardi December 15 décembre
8:00			12:00 to 17:00 Exhibits - Expositions	8:00 to 17:00 Exhibits / Expositions	
8:30			8:30 - 9:00 Opening Remarks Mots de bienvenue		
9:00	9:00 - 15:00 Executive Committee Meeting Réunion du Comité exécutif Cataragui Suite Holiday Inn		9:00 - 10:00 Z. FUREDI	9:00 - 10:00 MIKLOS CSORGO	9:00 - 10:00 DOCTORAL PRIZE YURI BEREST
10:00			COFFEE AVAILABLE / CAFÉ DISPONIBLE 10:00 - 12:00		
11:00		11:00 - 13:00 CMS Development Group Groupe de développement Sir John A. MacDonald Room Holiday Inn	10:00 - 12:00 SESSIONS DG, EC, HT, NT, PT, ST	10:00 - 12:00 SESSIONS DG, DT, MI, NT, PT, ST	10:00 - 12:00 SESSIONS AG, DG, DT, GS, OA, PT, ST, UA
12:00			12:00 - 13:30 DELEGATES LUNCHEON	12:00 - 13:30 LUNCH / DÉJEUNER	12:00 - 13:30 LUNCH / DÉJEUNER
12:30			LUNCH DES PARTICIPANTS Ballroom Howard Johnson		
13:00			11:30 - 13:30 DEPARTMENT HEADS' LUNCH		
13:30		13:30 - 18:30 Board of Directors Meeting Réunion du Conseil d'administration Bellevue North Holiday Inn	13:30 - 14:30 DONAL O'SHEA	13:30 - 14:30 COXETER-JAMES LECTURE HENRI DARMON	13:30 - 14:30 W. GOLDMAN
14:00					

Time Heure	Friday / vendredi December 11 décembre	Saturday / samedi December 12 décembre	Sunday / dimanche December 13 décembre	Monday / lundi December 14 décembre	Tuesday / mardi December 15 décembre
14:30	9:00 - 15:00 Executive Committee Meeting Réunion du Comité exécutif Catarraqui Suite Holiday Inn	13:30 - 18:30 Board of Directors Meeting Réunion du Conseil d'administration Bellevue North Holiday Inn	14:30 - 17:30 SESSIONS DG, ED, EC, HT, NT, PT, ST	14:30 - 18:00 SESSIONS AG, DG, HT, MI, NT, OA, PT, UA	14:30 - 18:00 SESSIONS AG, DG, DT, GS, PT, ST
15:00	COFFEE AVAILABLE / CAFE DISPONIBLE				
15:30			17:30 - 19:30 General Meeting Assemblée Générale	14:30 - 18:00 SESSIONS AG, DG, HT, MI, NT, OA, PT, SL, UA	14:30 - 18:00 SESSIONS AG, DG, DT, GS, PT, ST
16:00					
17:00					
17:30					
18:00					
Evening		18:00 - 20:00 Reception Cash-bar and Evening Registration Réception (bar payant) et inscription Holidome Holiday Inn		18:30 - 19:30 Reception (Cash bar) 19:30 - 22:00 Banquet Royal Military College	
		20:00 - 21:00 PUBLIC LECTURE H.S.M. COXETER Kingston City Hall			

Session	Title / Titre	Session	Title / Titre
AG	Algebraic Geometry / Géométrie algébrique	DT	Topology:
DG	Discrete Geometry / Géométrie discrète	HT	Differential Topology / Topologie différentielle
ED	Education / Éducation	ST	Homotopy Theory / Théorie de l'homotopie
GS	Graduate Student Session / Séance pour étudiants diplômés	ST	Set Theoretic / Topologie des ensembles
MI	Math on the Internet / Mathématiques sur Internet	SL	Symplectic/Low Dimensional / Symplectique et en basse dimensions
NT	Number Theory / Théorie des nombres		
OA	Operator Algebras / Algèbre des opérateurs		
PT	Probability / Probabilités		
UA	Universal Algebra / Algèbre universelle		

**Réunion d'hiver
Université Queen's et
Collège militaire royal
Kingston (Ontario)
du 13 au 15 décembre 1998**

Quatrième annonce

Veillez consulter la deuxième annonce dans le numéro de septembre des *Notes de la SMC* pour obtenir de l'information détaillée sur les programmes scientifique et pédagogique, et les activités sociales. La présente annonce contient l'horaire et tous les changements aux programmes annoncés précédemment. Vous trouverez l'information la plus récente sur les programmes, y compris les horaires, à l'adresse Web suivante:

<http://www.camel.math.ca/CMS/Events/winter98/>

Un formulaire d'inscription et un formulaire de résumé pour communications libres étaient inclus dans le numéro de septembre des *Notes de la SMC*.

Remerciements

La SMC désire remercier le Centre de recherches mathématiques et l'Institut Fields d'avoir contribué financièrement aux séances scientifiques de la Réunion.

Nous remercions également la Banque Royale (groupe MSTE) et le Instructional Development Centre de l'Université Queen's pour leur soutien au programme élargi d'activités sur l'éducation.

La SMC tient à remercier le Comité des Réunions, qui a contribué à l'organisation des activités scientifiques et sur l'éducation, ainsi que des activités sociales. Merci également à toutes les personnes des départements hôtes qui ont empiété sur leurs heures de travail habituelles pour nous venir en aide.

Comité des Réunions

Directeurs de la Réunion : Tony Geramita (Queen's) et David Wehlau (CMR), *Président du Comité local* : Fady Alajaji (Queen's) et Leo Jonker (Queen's), *Géométrie algébrique* : P. Milman (Toronto), *Géométrie discrète* : Robert Erdahl (Queen's), Marjorie Senechal (Smith College), Walter Whiteley (York), *Éducation*: William Higginson, Morris Orzech et Grace Orzech (Queen's), *Combinatoire extrémale* : D. de Caen (Queen's), *Mathématiques sur Internet*: June Lester, Malgorzata Dubiel et Nathalie Sinclair (Queen's), *Théorie des nombres* : Ram Murty et Noriku Yui (Queen's), *Algèbre des opérateurs* : James Mingo (Queen's), *Théorie des probabilités* : Miklos Csörge (Carleton), *Topologie* : Eddy Campbell (Queen's), Muang Min-Oo (McMaster), McKenzie Wang (McMaster), Lisa Langsetmo (Ottawa), Jim Shank (Queen's), Juris Steprans (York), Steve Watson (York), Steve Boyer (UQAM), Jacques Hurtubise (McGill, CRM) et François Lalonde (UQAM, CRM), *Algèbre universelle et logique multivaluée et Communications libres* : L. Haddad (CMR), *Étudiants diplômés* : David Gregory (Queen's), *Autres membres* : Monique Bouchard (SMC) – d'office, Jean Fugere (CMR), Graham Wright (SMC) – d'office.

Documents publiés avec cette annonce

Liste des conférenciers et titres des conférences
Horaire et programme

Dans le prochain numéro des *Notes de la SMC* :

Cinquième annonce du congrès
Horaire et programme à jour

Letters to the Editors/Lettre 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 CMS Executive Office.

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

SCHEDULED SPEAKERS / CONFÉRENCIERS PRÉVUS

Here is a list of the scheduled speakers, along with the titles of their talks where available. Abstracts for all talks may be found at the following world wide web page after November 1:

<http://www.camel.math.ca/CMS/Events/winter98/>

Voici les conférenciers prévus, ainsi que les titres de leurs conférences. Les résumés pour tous les conférences seront disponibles à l'adresse Web suivante après le 1er novembre :

<http://www.camel.math.ca/CMS/Events/winter98/>

COXETER-JAMES LECTURE CONFÉRENCE COXETER-JAMES

Henri Darmon (McGill University) *Recent progress in the theory of elliptic curves*

DOCTORAL PRIZE LECTURE CONFÉRENCE DU PRIX DOCTORAL

Yuri Berest (University of California, Berkeley) *Lacunae for hyperbolic differential operators with variable coefficients*

PUBLIC LECTURE CONFÉRENCE PUBLIQUE

H.S.M. Coxeter (University of Toronto) *The Descartes circle theorem and Fibonacci numbers*

PLENARY SPEAKERS CONFÉRENCIERS PRINCIPAUX

Miklos Csörge (Carleton University) *Random walking around financial mathematics*

Z. Füredi (University of Illinois at Urbana / Inst. Hungarian Acad. Sci.) *Lotto, football pool and other covering radius problems*

W. Goldman (University of Maryland) *Topology and dynamics of moduli spaces of geometric structures on surfaces*

Donal O'Shea (Mt. Holyoke College) *The glory and perversity of us*

SPECIAL SESSIONS / SÉANCES SPÉCIALES

Algebraic Geometry / Géométrie algébrique (Org: P. Milman)

Fedya Bogomolov (NYU Courant Institute) *On the fundamental groups and universal coverings of complex projective surfaces and symplectic fourfolds*

Lisa Jeffrey (University of Toronto) *The Verlinde formula for moduli spaces of parabolic bundles*

Boris Khesin (University of Toronto) *Defining absolute and relative linking numbers of complex submanifolds in a Calabi-Yau or Fano manifold*

Askold Khovansky (University of Toronto) *Algebraic Geometry and Geometry of convex polyhedra*

Donal O'Shea (Mt. Holyoke College) *Limits of tangent spaces to real surfaces*

Evgenii Shustin (Tel-Aviv University) *Asymptotically proper bounds in the geometry of equisingular families of curves*

Yosef Yomdin (Weizmann Institute) *A tractable problem of the way (hopefully) to counting limit cycles of polynomial vector fields*

Discrete Geometry / Géométrie discrète (Org: Robert Erdahl, Marjorie Senechal, Walter Whiteley)

V. Alexandrov (University of Moscow) *Sufficient conditions for the extendibility of an N -th order flex of polyhedra*

Valery Alexeev (University of Georgia) *Families of algebraic varieties associated with cell decompositions*

Pau Atela (Smith College) *Periodicity in geometric dynamical models in Phyllotaxis*

Lynn Batten (University of Manitoba) *Blocking sets and security*

Margaret Bayer (University of Kansas) *Eulerian partially ordered sets*

András Bezdek (Auburn University) *A Sylvester type theorem on circles*

Karoly Bezdek (University of Budapest) *On a stronger form of Rogers' lemma and the minimum surface area of Varoni cells in unit ball packings*

T. Bisztriczky (University of Calgary) *A signature theorem for uniform oriented matroids*

Jin-Yi Cai (University of Buffalo) *A new transference theorem in geometry of numbers with applications to Ajtai's connection factor*

R. Connelly (Cornell University) *Holes in a membrane: tension percolation*

H.S.M. Coxeter (University of Toronto) *Whence does an ellipse look like a circle?*

Balazs Csikos (Eötvös University, Budapest) *Some results around the Hadwiger-Kneser-Poulsen conjecture*

Ludwig Danzer and Gerrit van Ophuysen (University of Dortmund) *A species of planar triangular tilings with inflation factor $\sqrt{-\tau}$*

Robert Dawson (Saint Mary's University) *What Shape is a Loaded Die?*

Michel Deza and Mikhail Shtogrin (Ecole Normale Sup., Paris) *Embedding of regular tilings and star-honeycombs*

Robert Erdahl (Queen's University) *Voronoi's hypothesis on perfect domains*

Ferenc Fodor (Auburn University) *Large polygons in convex sets and polygons with large perimeter*

Deborah Franzblau (CUNY/College of Staten Island) *Generic rigidity of molecular graphs*

Christopher Gold (Laval University) *Voronoi methods in geometry – the importance of the spatial model*

Chaim Goodman-Strauss (University of Arkansas) *Addressing and substitution tilings*

Timothy Havel (Harvard University) *The role of tensegrity in distance geometry*

Donald Jacobs (Michigan State University) *Graph rigidity: Applications of material science and proteins*

Gábor Kertész (Eötvös Loránd University) *Dido problem on planes of constant curvature*

Włodzimierz Kuperberg (Auburn University) *Covering the cube with equal balls*

Barry Monson (University of New Brunswick) *Realizations of regular abstract polytypes*

Konstantin Rybnikov (Queen's University) *On traces of d -stresses in the skeletons of lower dimensions of homology manifolds*

Idzhad Sabitov (Moscow State University) *Solution of polyhedra*

Peter Schmitt (Universität Wien) *The versatility of (small) sets of prototiles*

I. Talata (University of Budapest) *On translative coverings of a convex body with its homothetic copies of given total volume*

Anke Walz (Cornell University) *The Bellows Conjecture in dimension four*

Walter Whiteley (York University) *Constraining a spherical polyhedron with dihedral angles*

**EDUCATION I/ ÉDUCATION I
IDENTIFYING AND OVERCOMING BARRIERS TO
TEACHING AND LEARNING MATHEMATICS AT
UNIVERSITY/
IDENTIFIER ET VAINCRE LES OBSTACLES À
L'ENSEIGNEMENT ET L'APPRENTISSAGE DES
MATHÉMATIQUES
À L'UNIVERSITÉ**
(Org: Morris Orzech and Grace Orzech)

Ed Barbeau (University of Toronto) *The teacher as coach*

William Byers (Concordia University) *Revealing the inner mathematician*

Morris Orzech (Queen's University) *Addressing student difficulties specific to linear algebra*

Tom Rishel (Cornell University) *Teaching and job initiatives for graduate programs in mathematics*

Martha Siegel (Towson University)

Keith Taylor (University of Saskatchewan) *The math readiness project at the University of Saskatchewan*

**EDUCATION II/ ÉDUCATION II
TEACHING MATHEMATICS – WHY WE DO WHAT
WE DO IN THE CLASSROOM?/
L'ENSEIGNEMENT DES MATHÉMATIQUES –
POURQUOI FAIT-ON CE QU'ON FAIT EN CLASSE?**
(Org: William Higginson, Morris Orzech and Grace Orzech)

George Gadanidis (Durham Board of Education)

William Higginson (Queen's University) *Having, knowing, and being: some fundamental questions about mathematics teaching*

Lynn McAlpine and Cynthia Weston (McGill University) *How six outstanding math professors use reflection to improve their teaching*

Pat Rogers (York University) *The importance of why: encouraging students to reflect*

Nathalie Sinclair (Queen's University) *Romancing powerful mathematical ideas*

Extremal Combinatorics / Combinatoire extrémale

(Org: D. de Caen)

Richard Anstee (University of British Columbia) *Small forbidden configurations*

Jason Brown (Dalhousie University) *The inducibility of complete bipartite graphs*

Ralph Faudree (University of Memphis) *Anti-Ramsey Colorings in several rounds*

David Fisher (University of Colorado) *The minimum number of triangles in a graph*

Jerrold Griggs (University of South Carolina) *Extremal graphs with bounded densities of small subgraphs*

Penny Haxell (University of Waterloo) *Integer and fractional packings in dense graphs*

Felix Lazebnik (University of Delaware) *On a class of algebraically defined graphs*

Laszlo Székely (University of South Carolina) *Some new Erdős-Ko-Rado type problems*

Bing Zhou (Trent University) *Extremal graphs related to star chromatic number and fractional chromatic number*

GRADUATE STUDENT SESSION SÉANCE POUR ÉTUDIANTS DIPLÔMÉS

(Org: David Gregory)

Leo Butler (Queen's University) *A new class of homogenous manifolds with Liouville-integrable geodesic flows*

Leo Creedon (University of Alberta) *Constructing free groups in modular group algebras*

Mark DeFazio (York University) *The behaviour of the complex zeros of the Laguerre polynomials*

Jody Esmonde (McGill University) *Parametric solutions to the generalized Fermat equation*

Shaun Fallet (William and Mary University) *Multiplicative principal minor inequalities for totally nonnegative matrices*

Andrei Gagarin (University of Manitoba) *Characterizations of (α, β) -polar graphs by forbidden induced subgraphs*

Malcolm Harper (McGill University) *A family of Euclidean rings containing $Z[\sqrt{14}]$*

Yu-Ru Lui (Harvard University) *The Turán sieve and probabilistic Galois theory*

David McKinnon (University of California, Berkeley) *An arithmetic Bézout theorem*

Satya Mohit (Queen's University) *The ABS-Conjecture and bounds for the order of the Tate-Shafarevich group*

Daniel Piché (University of Waterloo) *Wavelet compression on fractal tilings*

Philip Saidak (Queen's University) *On zero-free regions of the zeta function*

Gregory Smith (University of California, Berkeley) *Computing global extension modules*

Sarah Sumner (Queen's University) *Investigating transcendence in the field of p -adic numbers*

Drew Vandeth (McQuarrie university, Australia) *Transcendence of the values of generalized Mahler function*

MATHEMATICS ON THE INTERNET MATHÉMATIQUES SUR INTERNET

(Org: June Lester, Nathalie Sinclair and Malgorzata Dubiel)

Bill Casselman (University of British Columbia) *Colour, animation, interaction – the next generation of electronic articles*

Stan Devitt (Waterloo Maple) *MathML support for defining notation – an essential step towards live math on the web*

Chris Howlett (Web Pearls)

Nick Jackiw (KCP Technologies) *JavaSketchpad: Taking Dynamic Geometry on-line*

Loki Jörgenson (CECM) *The CMS journals on-line: A study in digital publishing*

Robert Miner (WebEQ) *Putting math on the Web*

Number Theory/ Théorie des nombres

(Org: Ram Murty, Noriko Yui)

Amir Akbary (Concordia University) *On the distribution values of symmetric square L-functions in the half plane $Re(s) > \frac{3}{2}$*

Henri Darmon (McGill University) *Modularity of hypergeometric abelian varieties*

Chantal David (Concordia University)

Jacek Fabrykowski (University of Manitoba)

G. Frei (Laval University)

Eyal Goren (Concordia & McGill University, CICMA) *Stratifications of moduli spaces and modular forms*

C. Greither (University of Laval) *On Brumer's Conjecture*

James Huard (Canisius College, Carleton University) *An arithmetic reciprocity relation of Liouville type and applications*

Hershky Kisilevsky (Concordia University) *Henri Darmon's Coxeter-James prize*

Manfred Kolster (McMaster University) *Higher relative class number formulas*

Arne Ledet (Queen's University) *Some small 2-groups as Galois groups*

Claude Levesque (University of Laval) *Explicit solutions of a family of Thue diophantine equations*

Kumar Murty (University of Toronto) *Zeros of Dedekind zeta functions in towers of fields*

Werner Nowak (University of Austria) *Large convex domains sometimes contain more lattice points than we would expect*

Yiannis Petridis (McGill University) *Zeros of the Riemann Zeta function and central values of the L-series of holomorphic cusp forms*

Damien Roy (University of Ottawa) *Criteria of algebraic independence and approximation by hypersurfaces*

Gary Walsh (University of Ottawa) *Solving families of quartic equations*

Hugh Williams (University of Manitoba) *Computer verification of the Ankeny-Artin-Chowla conjecture for all $p < 5 \cdot 10^{10}$*

Kenneth Williams (Carleton University) *Values of the Dedekind eta function at quadratic irrationalities*

Operator Algebras/ Algèbre d'opérateurs

(Org: James Mingo)

Berndt Brenken (University of Calgary) *Endomorphisms of finite direct sums of I_∞ factors*

Ken Davidson (University of Waterloo) *Principal bimodules of nest algebras*

George Elliot (University of Toronto) *An abstract Brown-Douglas-Fillmore absorption theorem, II*

Thierry Giordano (University of Ottawa)

Daniel Kucerovsky (Fields Institute, University of Toronto) *An abstract Brown-Douglas-Fillmore absorption theorem, I*

Michael Lamoureux (University of Calgary) *Crossed product algebra constructions*

A. Nica (University of Waterloo) *Some minimization problems for the free analogue of the Fisher information*

John Phillips (University of Victoria) *Spectral flow and index in bounded and unbounded θ -summable Fredholm modules*

Jack Spielberg (Arizona State University) *A new look at C^* -algebras of infinite graphs*

Sam Walters (University of Northern British Columbia) *K-theory on non commutative spheres arising from the Fourier automorphism*

Probability Theory/ Théorie des probabilités

(Org: Miklos Csörge)

Siva Athreya (Fields Institute) *Existence of positive solutions satisfying the boundary Harnack principle for a semi-linear Dirichlet problem*

M. Claude Belisle (Université Laval) *The hit-and-run sampler*

David Brillinger (University of California, Berkeley) *Some aspects of the motion of particles described by stochastic differential equations*

Murray D. Burke (University of Calgary) *Model checking and estimation: A large sample approach*

Colleen D. Cutler (University of Waterloo) *Scaling structures, chaos, and determinism in time series*

Andre R. Dabrowski (University of Ottawa) *A unified approach to fast teller queues and ATM*

Eric Derbez (McMaster University) *Generating functions and integrated super Brownian excursion (ISE)*

Shui Feng (McMaster University) *The behaviour of some degenerate diffusions near boundary under large deviations*

Rene Ferland (Université du Québec à Montréal) *Propagation of chaos: from Physics to Finance*

Antonia Foldes (The College of Staten Island, CUNY) *About the local time of random walk and Brownian motion*

Genevieve Gauthier (École des Hautes Études Commerciales) *Service de l'enseignement des méthodes quantitatives de gestion*

Edit Gombay (University of Alberta) *Correcting some limit theorems about the likelihood ratio*

Lajos Horvath (University of Utah) *Best approximations for bootstrapped processes with applications*

Gail Ivanoff (University of Ottawa) *Set-Indexed Martingales*

Mike Kouritzin (University of Alberta) *Parabolic equations with random coefficients*

Reg Kulperger (University of Western Ontario) *Empirical processes and tests of independence*

Brenda MacGibbon (Université du Québec à Montréal) *On statistical minimax estimation and principal Eigenfunctions of the Laplacian*

Neal Madras (York University) *In search of faster simulations*

Don L. McLeish (University of Waterloo) *Estimating parameters of financial time series using highs and lows*

Majid Mojirsheibani (Carleton University) *Combined estimation and probabilistic classification*

Bruno Remillard (Université du Québec à Trois-Rivières)

Pál Révész (Math. Inst. Hung. Acad. Sci.) *Critical branching Wiener process*

Jeffrey S. Rosenthal (University of Toronto) *The mathematics of Markov chain Monte Carlo algorithms*

Tom Salisbury (York University) *The complement of the planar Brownian path*

Byron Schmuland (University of Alberta) *Rademacher's theorem on configuration space*

Qi-Man Shao (University of Oregon) *Gaussian correlation conjecture and small ball probabilities*

Zhan Shi (Université Paris VI) *The maximum of the uniform empirical process*

Gordon Slade (McMaster University) *The scaling limit of the incipient infinite cluster in high-dimensional percolation*

Christopher G. Small (University of Waterloo) *The analysis of random shapes*

Barbara Szyszkowicz (Carleton University) *An Interplay of weighted approximations and change-point analysis*

Keith Worsley (McGill University) *The geometry of random fields, with applications to astrophysics and human brain mapping*

Hao Yu (University of Western Ontario) *Weighted Kolmogorov-Smirnov test of stock return distributions*

Ricardas Zitikis (Carleton University) *The Vervaat, Lorenz and some other related processes of probability and mathematical statistics in weighted metrics*

Topology - 4 Sub-sessions/ Topologie - 4 sous-sessions
(Org: Eddy Campbell)

1) Differential Geometry and Global Analysis
Géométrie différentielle et analyse globale
(Org: Muang Min-Oo, McKenzie Wang)

Igor Belagradek (McMaster University)

Christoph Böhm (McMaster University) *Inhomogeneous Einstein metrics on spheres*

Jeffrey Boland (McMaster University) *Magnetic fields on negatively curved manifolds*

Virginie Charette (University of Maryland) *Properly discontinuous actions of free groups on Minkowski space*

Jingyi Chen (University of British Columbia) *Triholomorphic curves and complex ASD connections*

Ailana Fraser (Stanford University) *On the free boundary variational problem for minimal disks*

Mike Gage (University of Rochester) *Remarks on B. Süßman's proof of the Banchoff-Pohl inequality*

Miroslav Lovric (McMaster University)

Mohan Ramachandran (SUNY)

Patrick Ryan (McMaster University) *Real hypersurfaces in complex space forms*

Patrice Sawyer (Laurentian University) *Ghostly symmetric spaces*

Alina Stancu (Courant Institute) *Asymptotic behaviour of a crystalline evolution*

John Toth (McGill University)

2) Homotopy Theory/Théorie de l'homotopie

(Org: Lisa Langsetmo, Jim Shank)

Dan Christensen (Johns Hopkins University) *Phantom maps: all or nothing*

Fred Cohen (University of Rochester) *On stunted projective spaces*

Gustavo Granja (MIT) *On self maps of HP^n*

Steve Halperin (University of Toronto) *The homotopy Lie algebra of a finite complex*

Barry Jessup (University of Ottawa) *Estimating the rational of LS-category of elliptic spaces*

Brenda Johnson (Union College) *Constructing and characterizing degree n functors*

Keith Johnson (Dalhousie University) *Elliptic homology co-operations*

Kathryn Lesh (University of Toledo) *Progress toward a partial splitting of E_2 in the UASS for SO*

Gaunce Lewis (Syracuse University) *Recent results on Mackey functors for a compact Lie group*

John Martino and Stewart Priddy (University of Western Michigan) *A Minami-Webb formula for compact Lie groups*

Joe Neisendorfer (Rochester University) *James-Hopf invariants, Anick's spaces, and decompositions of the double loops on a Moore space*

Paul Selick (University of Toronto) *Natural decompositions of loop suspensions and tensor algebras*

Stephen Theriault (MIT) *Homotopy exponents for certain mod-2(r) Moore Spaces*

3) Set Theoretic Topology/Topologie des ensembles

(Org: Juris Steprans, Steve Watson)

Murray Bell (University of Manitoba) *Cardinal functions of centered spaces*

Maxim Burke (University of Prince Edward Island) *Continuous functions which take a somewhere dense set of values on every open set*

Krzysztof Cielieński (West Virginia University) *Each Polish space is cocompactly quasimetrizable*

Wistar Comfort (Wesleyan University) *Continuous cross sections on Abelian groups equipped with a Bohr Topology*

Ilijas Farah (York University) *$Exp(N^*)$ need not be an N^* -image*

Douglas Grant (University College of Cape Breton) *Alternative universes: the role of set theory in topological algebra*

Gary Gruenhage (Auburn University)

Melvin Henriksen (Harvey Mudd College) *Embedding a ring of continuous functions in a regular ring; preliminary report*

Valery Miskin (Kemerovo State University) *Set ideals everywhere*

Justin Moore (University of Toronto) *A linearly fibered Souslinean space under Martin's axiom*

Eduardo Santillan (UNAM - Mexico)

Alexander Shibakov (Tennessee Technological University) *Controlling sequential order in topological vector spaces*

Slawomir Solecki (Indiana University) *Polish group actions and measures*

Paul Szeptycki (Ohio University) *Normality and property (a)*

Andrzej Szymanski (Slippery Rock University of Pennsylvania) *On a class of special Namioka spaces*

Franklin Tall (University of Toronto) *The topology of elementary submodels*

Murat Tuncali (Nipissing University) *On Generalizations of the Hahn-Mazurkiewicz Theorem*

Ed Tymchatyn (University of Saskatchewan) *Measures and topological dynamics on Menger manifolds*

Grant Woods (University of Manitoba) *Recent Developments in Rings of Continuous Functions*

Eduardo Zeron (York University, Cinvestav, Mexico) *Topological properties of removable singularities for analytic functions*

4) Symplectic/Low Dimensional Topology Topologie en basses dimension/ Topologie symplectique

(Org: Steve Boyer, Jacques Hurtubise, François Lalonde)

Steve Boyer (Université de Québec à Montréal) *Norm duality and hyperbolic 3-manifolds*

Jacques Hurtubise (McGill University, CRM)

François Lalonde (Université de Québec à Montréal, CRM) *Applications of Quantum cohomology to some fundamental problems of dynamics*

Yuriy Shkolnikov (University of Calgary) *A generalisation of Whitney's trick in dimension 4, borromeanism and related questions*

Jennifer Slimowitz (Université de Québec à Montréal) *Length minimizing geodesics in the group of hamiltonian diffeomorphisms*

Xingriu Zhang (SUNY Buffalo) *On simple points of the character variety of a cusped hyperbolic 3-manifold*

Universal Algebra and Multiple-Valued Logic
Algèbre universelle et logique multiple valeurs
(Org: L. Haddad)

Clifford Bergman (Iowa State University) *Complexity of some Problems in Universal Algebra*

Jie Fang (Simon Fraser University) *Ockham algebras with pseudocomplementation*

Ibrahim Garro (University of Toronto) *An application of non-wellfounded sets to infinite valued infinitary propositional calculus*

George Grätzer (University of Manitoba) *Independence Theorems for automorphism groups and congruence lattices of lattices*

Jennifer Hyndman (University of Northern British Columbia) *Dualizable is not the same as fully dualizable*

Benoit Larose (Concordia University) *Projective graphs and Hedetniemi's conjecture*

Jonathan Leech (Westmount College) *Noncommutative lattices: foundational issues and recent results*

Vaughan Pratt (Stanford University)

Robert Quackenbush (University of Manitoba) *Varieties of binary linear codes*

Ivo Rosenberg (Université de Montréal) *Completeness for uniformly delayed circuits*

Ross Willard (University of Waterloo) *Independence of the linear commutator*

CONTRIBUTED PAPERS
COMMUNICATIONS LIBRES
(Org: L. Haddad)

Igor Nikolaev (Université de Montréal) *3-manifolds, foliations and $K_0(C(X) \rtimes Z)$*

Dieter Ruoff (University of Regina) *Solution of a Non-Euclidean convexity problem*

Andrew Toms (Fields Institute, University of Toronto) *Perforated K_0 -groups of C^* -algebras*

**CANADIAN MATHEMATICAL
SOCIETY
SOCIÉTÉ MATHÉMATIQUE DU
CANADA
MINUTES OF THE ANNUAL
GENERAL MEETING**

Room 104, Oland Hall,
University of New Brunswick - Saint John
June 14, 1998

Draft pending approval.

The meeting opened at 3:30 p.m. with 35 members in attendance.

1. Adoption of the agenda

The agenda was adopted as circulated, with the addition of a report from the CUMC under Reports from Committees.

2. Minutes of the previous meeting

G-98-1 MOTION (Sherk/Rosebrugh)

That the minutes of the previous General Meeting, held June 8, 1997 at the University of Manitoba, Winnipeg, Manitoba, be accepted. *Carried Unanimously*

There were no matters arising.

3. President's Report

- Heinrich has written to Lloyd Axworthy regarding Canada's support of the NATO science program. Currently, Canada has not withdrawn support but the level of funding has been reduced, as has funding from other countries. More information is available on the NATO web page.
- CAIMS has voted to hold their meeting jointly with us in Hamilton in Summer 2000. IIMS in Manitoba, the CUMC and CORS (Canadian Operations Research Society) have expressed preliminary interest in joining with us for this meeting.
- There was no Distinguish Service Award given this year. The terms of reference have been modified and members are encouraged to submit nominations. De-

tails will be found in the upcoming December and February issues of the *CMS Notes*

- Barry Adams and his colleagues at Laurentian University selected the winners of five prizes for Math at the recent Canada Wide Science Fair.
- We have established nine Task Forces. Members will be appointed by October and those interested in participating are encouraged to contact any member of the Executive. Two Task Forces have completed their work. The Task Force on Geographic Distribution of the Board recommended that no changes be made to the current membership structure of the Board and the Executive. This recommendation has been accepted. A review will be done in ten years.

The Task Force on Budget Policy has also completed its work. Many of its recommendations are administrative and the Executive Director will be addressing them.

The Task Force on the Endowment Fund has prepared a draft report and expects that the first competition will be held next winter.

Reports and draft reports will be posted on Camel as they become available.

- The Board has reappointed Graham Wright as Executive Director for the period July 1, 1999 to June 30, 2002. During that time, we will be looking into the future of the position of the Executive Director, with the expectation that it will become a full-time position.

4. Audited Statement and Treasurer's Report

Sherk presented the report for the special six-month financial period. He noted that we had planned for a deficit at December 31, which fortunately did not happen. The Audited Statement now also includes a statement of capital assets.

G-98-2 MOTION (Board of Directors)

That the Audited Statement for the financial period ended December 31, 1997 be accepted. *Carried Unanimously*

G-98-3 MOTION (Board of Directors)

That the Treasurer's Report for the financial period ended December 31, 1997 be accepted. *Carried Unanimously*

5. Executive Director and Secretary's Report

- Kane and Wright will alternate reports in the *CMS Notes*. The *Notes* are now published eight times per year.
- Wright outlined the current staff situation at the Ottawa Office.
- Wright announced that the Executive Office will be closed for two weeks in August.

- Our meetings are attracting more and more sessions. A call for sites as of June 2001 will appear in the *CMS Notes*. David Leeming from Victoria and the Chair at Memorial have both expressed a desire to host future meetings, and we are looking forward to official applications.
- Comments are sought on the possibility of holding only one annual general meeting per year.

6. Reports from Committees

- **Education Committee:** Orzech reported that the organizers of the education sessions in Winter 1998 and Summer 1999 are in place and have chosen themes. The Education Committee has supported three public lectures in the past year. The MAA Mathfest in Toronto will feature a panel jointly organized with the CMS. Orzech invited members to contact him with their views on the work of the Education Committee. He thanked Katherine Heinrich for her work in Education.

The Education Committee has selected Bernard Hodgson for the 1998 Adrien Pouliot Award.

- **Electronic Services Committee:** Online versions of the CMS research journals are available. Members were asked to encourage their libraries to take advantage of the very good rates for electronic access. The *CMS Notes* is almost ready for on-line access.

Camel has been in place almost five years. A review is being done of the CMS electronic services and Camel. Alan Kelm will be taking on more responsibility for the eastern hump of Camel. Loki Jørgenson is invaluable, especially since he works on a volunteer basis. The cost of Camel is very low for the service delivered.

- **Finance Committee:** The investments have done very well and benchmarks have been set.
- **Fund Raising Committee:** The Committee feels that the best strategy for attracting students to the CMS is to support the CUCM. The Committee is now contacting corporate people. The appeals to government departments, which included information on their students' participation and success in CMS mathematics competitions, proved successful. Eight of the 12 provincial and territorial governments are now sponsors of the CMS. Membership donations are up and the strategy of encouraging members donate to specific projects appears to be working.

Partnerships are growing with provincial associations. We now have more to offer teachers, including ATOM, Crux and educational resources on Camel.

- **Government Policy Committee:** The 1996 Survey Report appeared recently in the *CMS Notes* and the 1997 Survey is in departments now. Departments are encouraged to complete it. The 1998 Survey will be out in the fall of 1998, and will invite comments on questions we may not be addressing or things we should be doing differently.

The Society continues to work with PAGSE and the National Consortium.

- **Human Rights Committee** David Poole has recently taken on the role Chair. The Committee had nothing to report at this time.
- **International Affairs Committee:** Kane reported on the delegation going to ICM'98 and a reception being planned to honour the Canadian speakers at the Canadian Embassy in Berlin.

The NATO science programme is still being funded but at a lower rate The Committee was pleased that NRC had accepted the invitation for Canada to join IMU at Level 5. Thanks were extended to Jim Timourian for all his efforts.

- **Mathematical Olympiads Committee:** Sands reported on the six students chosen for this year's IMO team. Four are returning students. The training camp starts June 29 in Calgary and the team will leave for Taiwan on June 12. On June 29, there will be an IMO team sendoff, sponsored by the CMS, the Bank of Montreal and Upper Canada College, and held at Upper Canada College. It is hoped that all team members will obtain the proper travel documents.

The CMO was written on April 1 and the awards banquet will be held in Waterloo on June 16.

The COMC faced labor problems (i.e. teachers' strikes) yet again this year, but there was an increase of 22% in participation. We are close to breaking even but not quite. As in previous years, the loss was shared by both the CMS and the Centre for Education in Mathematics and Computing in Waterloo.

- **Nominating Committee:** The Committee continues to look for people interested in participating on committees. Wright, Kane or Heinrich should receive names for the Task Forces.
- **Publications Committee:** Carrell and Ghoussoub have been reappointed for another five years as Editors-in-Chief of the CJM. The search for new Editors-in-Chief for the CMB will begin in the next six months.

The ATOM Series will soon have a newly structured editorial board. There are nine volumes under devel-

opment. Any ATOM series proposals should go to Richard Nowakowski.

The contract with Wiley has not been renewed. Proposals were sought from the AMS, Birkhauser and Springer-Verlag. The Publications Committee and the Board of Directors has accepted a contract with Springer-Verlag. The average price for each volume will be approximately \$59.00, much less expensive than at present. At the same time, the percentage of our royalties is significantly higher.

- **Research Committee:** The winner of the second CMS Doctoral Prize has been selected. The deadline for the next competition is January 31, 1999. The schedule of meetings is set until Winter 2000. The Committee will be considering applications for future sites at its Winter 1998 meeting.
- **Committee on Women in Mathematics:** The Web Page project continues and there are now approximately 45 web pages. An email discussion list has been set up. The Celebration of Women in Mathematics Conference was very successful and a report will appear in the AWM and CMS Notes. Requests continue to be received through the Camel page for information about women in mathematics.
- **Task Force #3 on the Endowment Fund:** The Task Force was charged with identifying a mechanism for application and selection of projects to be funded with the income from the Endowment Fund. The Task Force will report by the end of the year.
- **Canadian Undergraduate Math Conference:** The 5th CUMC will take place at UBC, July 9-12. Charbonneau encouraged every department to send at least one student. Information is available at www.cumc.math.ca and Email may be sent to cumc@cumc.math.ca

It is hoped that students will go to the conference and apply to host the next conference at their home university. This is a good investment for the department and some funds are available to support students. There are approximately 40 registrations but it is hoped this will increase to 100. The Department which hosts the event does not have to do much organizing, as the conference is organized by the students themselves.

There will be a recommendation on the formation of a new CMS committee which would help stabilize the CUMC. It is hoped that the 7th CUMC will take place in Hamilton in 2000.

Julien Marcil and Daniel Piché are members of the CMS Board and Benoit Charbonneau is the alternate.

In closing, Heinrich commented on how valuable she had found her term as President and how exiting it is to see the organization grow and develop and become more professional. This is possible only because of the commitment of so many people, staff and volunteers.

Heinrich introduced Richard Kane, the new President, and outlined the work done by him over the last few years, most recently as the convener of the Math Review and the lead role he took in the submission for the NSERC reallocation exercise.

Kane responded by thanking Heinrich for the work she

had done in the last two years. Her strong leadership has laid a strong foundation for constructive change and he will work to bring it to fruition.

The meeting congratulated and thanked her on her two years as President.

7. Other Business

There was no other business.

8. Adjournment

The meeting adjourned at 5:00 p.m.

CALL FOR NOMINATIONS / APPEL DE CANDIDATURES

CMS Distinguished Service Award / Prix de la SMC pour service méritoire

In 1995, the Society established this award to recognize individuals who have made sustained and significant contributions to the Canadian mathematical community and, in particular, to the Canadian Mathematical Society.

The first awards were presented at the 1995 Winter Meeting in Vancouver. The second awards were presented at the 1996 Winter Meeting in London, Ontario. The next awards will be presented at the 1999 Summer Meeting in St. John's, Newfoundland.

Nominations should include a reasonably detailed rationale and be submitted by **March 31, 1999**, to the address below.

En 1995, la Société mathématique du Canada a créé un nouveau prix pour récompenser les personnes qui contribuent de façon importante et soutenue à la communauté mathématique canadienne et, notamment, à la SMC.

Les premiers lauréats furent honorés lors de la réunion d'hiver 1995 à Vancouver. Les deuxièmes lauréats furent honorés lors de la réunion d'hiver 1996 à London, Ontario. Les prochains lauréats seront honorés lors de la réunion d'été 1999 à St. John's, Terre-Neuve.

La période de mises en candidature est en cours; prière de présenter des dossiers suffisamment détaillés et de les faire parvenir, le **31 mars 1999** au plus tard, à l'adresse ci-dessous.

Selection Committee / Comité de sélection
Distinguished Service Award
Prix pour service méritoire
577 King Edward, Suite 109
C.P./P.O. 450, Succursale / Station A
Ottawa, Ontario K1N 6N5 Canada

1998 Canadian Mathematical Society Doctoral Prize Le Prix de doctorat 1998 de la Société mathématique du Canada

The CMS Doctoral Prize has been inaugurated to recognize outstanding performance by a doctoral student. The prize is awarded to the person who received a Ph.D. from a Canadian university in the preceeding year (January 1st to December 31st) and whose overall performance in graduate school is judged to be the most outstanding. Although the dissertation will be the most important criterion (the impact of the results, the creativity of the work, the quality of exposition,

etc.) it will not be the only one. Other publications, activities in support of students and other accomplishments will also be considered.

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

Nominations

Candidates must be nominated by their university and the nominator is responsible for preparing the documentation described below, and submitting the nomination to the address below.

No university may nominate more than one candidate and the deadline for the receipt of nominations is **January 31, 1999**.

The documentation shall consist of:

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

La SMC a créé ce Prix de doctorat pour récompenser le travail exceptionnel d'un étudiant au doctorat. Le prix sera décerné à une personne qui aura reçu son diplôme de troisième cycle d'une université canadienne l'année précédente (entre le 1^{er} janvier et le 31 décembre) et dont les résultats pour l'ensemble des études supérieures seront jugés les meilleurs. La dissertation constituera le principal critère de sélection (impact

des résultats, créativité, qualité de l'exposition, etc.), mais ne sera pas le seul aspect évalué. On tiendra également compte des publications de l'étudiant, de son engagement dans la vie étudiante et de ses autres réalisations.

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

Candidatures

Les candidats doivent être nommés par leur université; la personne qui propose un candidat doit se charger de regrouper les documents décrits aux paragraphes suivants et de faire parvenir la candidature à l'adresse ci-dessous.

Aucune université ne peut nommer plus d'un candidat. Les candidatures doivent parvenir à la SMC au plus tard **le 31 janvier 1999**.

Le dossier sera constitué des documents suivants :

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

Chair/Président

Doctoral Prize Selection Committee/Comité de sélection du Prix de doctorat
 CMS Executive Office/Bureau administratif de la SMC
 577 King Edward, Suite 109
 P.O. Box 450, Station A/C.P. 450, Succursale A
 Ottawa, Ontario Canada
 K1N 6N5

NEWS FROM DEPARTMENTS

Bishop's University, Lennoxville, PQ:

Appointments: One-year (non-tenure-track) appointment to Nacera Mellal, and a five-month full-time contract to Francois Huard. Brad Williams is the new Chair of the Department replacing Andrew Dean, who has been promoted to the position of Dean of the Division of Natural Sciences and Mathematics.

Concordia University, Montreal, PQ:

Appointments: Angelo Canty (Statistics) and V.Goulet (Actuarial Mathematics).

Promotion: Anna Sierpinska to Full Professor.

Death: M.Bobetic, who retired in August 1998.

Trent University, Peterborough, Ont:

Appointment: Reem Yasawi (Assistant Professor, two-year term).

Promotions: Stefan Bilaniuk to Associate Professor and David Poole to Full Professor.

Université Laval, Quebec, PQ:

New Chair of Department of Mathematics and Statistics: J.-P.Carmichael (from July 1998).

Retirement: W.Hengartner (August 1998).

**UNIVERSITY OF WATERLOO
DEPARTMENT OF COMBINATORICS AND OPTIMIZATION
FACULTY POSITION**

Applications are being invited for a tenure-track faculty position at the rank of Assistant Professor, in any area of combinatorics and optimization, but especially in graph theory. A Ph.D. and proven ability, or the potential, for excellent research and effective teaching are required. Responsibilities will include the supervision of graduate students, as well as teaching at the undergraduate and graduate levels. Salary will depend on the candidate's qualifications. Effective date of appointment: July 1, 1999. This appointment is subject to the availability of funds. In accordance with Canadian Immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples, and persons with disabilities.

Interested individuals should send curriculum vitae, selected reprints/preprints and the names of three references to:

Prof. W.H. Cunningham, Chair
Department of Combinatorics and Optimization
Faculty of Mathematics
University of Waterloo
Waterloo, Ontario, Canada N2L 3G1

email: combopt@math.uwaterloo.ca
phone: (519) 888-4567 x3482
fax: (519) 725-5441
<http://math.uwaterloo.ca/CandO Dept/homepage.html>

Closing date for receipt of applications is **January 15, 1999**.

**MEMORIAL UNIVERSITY OF NEWFOUNDLAND
St. John's, Newfoundland, Canada A1C 5S7
DEPARTMENT OF MATHEMATICS AND STATISTICS**

Applications are invited for a tenure track senior position in **ALGEBRA** effective September 1999, subject to availability of funds.

We are looking for an outstanding researcher in classical associative algebra and preferably in nonassociative algebra too. The successful candidate will be expected to maintain a vigorous and well-funded research program, to attract graduate students and post-doctoral fellows, and generally to enhance the reputation of this department's active algebra group. Excellence as a teacher and the ability to work well with students at both the graduate and undergraduate levels is a requirement. Rank and salary depend upon qualifications and are subject to negotiation.

Applications, marked **REF: MS/SEN-ALG/99**, should include a Curriculum Vitae, and a statement of current and proposed research. They should also include the names and mailing/e-mail addresses of four potential references who, collectively, are likely to provide a wide base of information about the applicant.

MS/SEN-ALG/99
Department of Mathematics and Statistics
Memorial University of Newfoundland
St. John's, Newfoundland, Canada A1C 5S7

The closing date for receipt of applications is **December 31, 1998**.

Memorial University is committed to the principle of equity in employment. In accordance with Canadian Immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

Memorial University is part of a vibrant, local scientific and engineering community which maintains an inventory of available positions for qualified partners. Partners of candidates for these positions are invited to include their resume for possible matching with other job opportunities.

Please note-Correction: Applications to the tenure track position(s) at Memorial University in **Applied Mathematics** should be sent with reference **MS/AMT/99** by November 30, 1998, **NOT MS/ALG/99** as indicated in *October Notes*.

SIMON FRASER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS
FACULTY APPOINTMENT IN STATISTICS

The Department of Mathematics and Statistics of Simon Fraser University invites applications for a tenure track position in Statistics at the rank of Assistant Professor. Applicants are expected to have completed a Ph.D. degree at the time of appointment and to be able to demonstrate strong potential in research. Skill and experience in applications would be an asset. A strong commitment to teaching is essential.

Information on the statistics group in the department can be found on the World Wide Web site, http://www.math.sfu.ca/stats/stat_home.html

The position, which is subject to final budgetary approval, will begin on September 1, 1999 or on a date mutually agreed upon, but not later than September 1, 2000. Interested applicants should, before **31 December 1998**, submit an up-to-date curriculum vitae and descriptive statements on research plans and teaching activities to:

Dr. J. L. Berggren, Chair
Statistics Search Committee
Department of Mathematics and Statistics
Simon Fraser University
Burnaby, BC V5A 1S6
Canada

Please arrange for three letters of reference to be sent, in confidence, from the referees.

Simon Fraser University is committed to the principle of equity in employment and offers equal employment opportunities to all qualified applicants. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada. If a suitable candidate cannot be found from this group, other qualified applicants will be considered.

SIMON FRASER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS
FACULTY APPOINTMENT IN ACTUARIAL SCIENCE

The Department of Mathematics and Statistics of Simon Fraser University invites applications for a tenure track position in Actuarial Science at the Assistant Professor level starting September 1, 1999 or September 1, 2000. Applicants will be expected to have completed a Ph.D. degree at the time of appointment and to have demonstrated a strong teaching and research potential.

Applications, including a curriculum vitae and descriptive statements on research plans and teaching activities, should be sent, by **15 January, 1999**, to:

Dr. J. L. Berggren, Chair
Department of Mathematics and Statistics
Simon Fraser University
Burnaby, BC V5A 1S6
Canada

Please arrange for three letters of reference to be sent, in confidence, from the referees.

Further information on the department and the university can be found on the WWW site http://www.math.sfu.ca/mast_home.html

The position is subject to final budgetary approval.

Simon Fraser University is committed to the principle of equity in employment and offers equal employment opportunities to all qualified applicants. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada.

SIMON FRASER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS
FACULTY APPOINTMENT IN PURE MATHEMATICS

The Department of Mathematics and Statistics of Simon Fraser University invites applications for a tenure track position in Pure Mathematics at the Assistant Professor level starting September 1, 1999 or September 1, 2000. Applicants will be expected to have completed a Ph.D. degree at the time of appointment and to have demonstrated a strong teaching and research potential. The Department is particularly interested in broadly-based, computer-literate applicants with strength in algebra, but also welcomes applicants with strengths in such other areas as algebraic geometry, discrete mathematics, nonlinear analysis or number theory.

Applications, including a curriculum vitae and descriptive statements on research plans and teaching activities, should be sent, **by 31 January, 1999**, to:

Dr. J. L. Berggren, Chair
Department of Mathematics and Statistics
Simon Fraser University
Burnaby, BC V5A 1S6
Canada

Please arrange for three letters of reference to be sent, in confidence, from the referees.

Further information on the department and the university can be found on the WWW site
http://www.math.sfu.ca/mast_home.html

The position is subject to final budgetary approval.

Simon Fraser University is committed to the principle of equity in employment and offers equal employment opportunities to all qualified applicants. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada.

SIMON FRASER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS
POSITION IN APPLIED AND COMPUTATIONAL MATHEMATICS

The Department of Mathematics and Statistics of Simon Fraser University invites applications for a tenure-track position in Applied and Computational Mathematics at the Assistant Professor level starting either September 1, 1999 or September 1, 2000. We are searching for an individual with outstanding background and exceptional promise who will establish a vigorous independent research program and who will have commitment to undergraduate and graduate teaching. We are particularly interested in an individual with expertise in industrial applications and modelling who will complement current strengths in mechanics (fluids and solids) and scientific computing.

The department webpage can be accessed via <http://www.sfu.ca>. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada. Simon Fraser University is an equal opportunity employer and encourages applications from women and minorities.

Applicants should send their curriculum vitae, publication list, a short statement of teaching and research interests and the names of at least three references to:

Dr. J. L. Berggren, Chair
Department of Mathematics and Statistics
Simon Fraser University
Burnaby, BC V5A 1S6
Canada

Deadline: **January 31, 1999**. The position is subject to final budgetary approval.

**SIMON FRASER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS**

NSERC UNIVERSITY FACULTY AWARD

The Department of Mathematics and Statistics of Simon Fraser University invites applications for nomination for the NSERC University Faculty Award 1999-2000 competition. Candidates are required to hold a Ph.D. degree in any area of Statistics or Pure or Applied Mathematics at the time of appointment and be able to demonstrate strong potential in research. A strong commitment to teaching is essential.

The department web page can be accessed via <http://www.sfu.ca>.

A tenure-track appointment will accompany the award, effective on the start date of the award. Candidates must be women and must be Canadian citizens or permanent residents of Canada.

The position, which is subject to final budgetary approval, will begin on a date mutually agreed upon from September 1, 1999. Interested applicants should, before **November 30, 1998**, submit an up-to-date curriculum vitae and descriptive statements on research plans and teaching activities to:

Dr. J. L. Berggren, Chair
University Faculty Award Search Committee
Department of Mathematics and Statistics
Simon Fraser University
Burnaby, BC V5A 1S6
Canada
berggren@sfu.ca

Please arrange for three letters of reference to be sent, in confidence, from the referees.

Further information on the award can be obtained from the department or directly from NSERC. (Also see the NSERC web site <http://www.nserc.ca/programs/sf/UFA.e.htm>).

Simon Fraser University is committed to the principle of equity in employment.

**YORK UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS**

FACULTY POSITION IN MATHEMATICS – ALGEBRA

Subject to budgetary approval, applications are invited for a tenure-track appointment at the Assistant Professor level in the Department of Mathematics and Statistics, to commence July 1, 1999. Applicants must have a completed Ph.D. and proven teaching abilities. The successful candidate will be expected to have an established record of research excellence with a demonstrated ability to make significant, original and independent contributions to a contemporary area of Algebra or closely related areas such as Algebraic Geometry or Algebraic Number Theory. The salary will be commensurate with experience and will be in the normal range for the Assistant Professor rank.

Applicants should send resumes and arrange for at least three letters of recommendation to be sent so that they arrive before **January 15, 1999**, directly to:

Alan Dow, Chair,
Department of Mathematics and Statistics,
York University, 4700 Keele Street,
Toronto, Ontario
M3J 1P3
FAX: (416) 736-5757.
E-Mail: chair@mathstat.yorku.ca
WWW: <http://www.math.yorku.ca/Hiring/>

York University is implementing a policy of employment equity, including affirmative action for women faculty. The Department encourages applications from women, underrepresented minorities, First Nations, and persons with disabilities. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents.

UNIVERSITY OF OTTAWA / UNIVERSITÉ D'OTTAWA
Department of Mathematics and Statistics/Département de mathématiques et de statistique

The Department of Mathematics and Statistics of the University of Ottawa invites applications from recent Ph.D.'s for one tenure-track position at the assistant professor level beginning July 1, 1999. Applications in all areas of mathematics and statistics are invited. The department's priorities are modern applied mathematics and statistics. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. Applicants should send a curriculum vitae and have three letters of recommendation sent to Wulf Rossmann, Chairman, Department of Mathematics and Statistics, University of Ottawa, Ottawa, ON Canada, K1N 6N5 by **January 15, 1999**. Conditions of employment are set by a collective agreement. Employment equity is University policy and the University strongly encourages applications from women.

The University of Ottawa has a student population of over 25,000. It has a full range of academic and professional programs, several research institutes, and is near the federal government with all its agencies and laboratories. The region is home to Canada's biggest concentration of high-tech companies.

The Department of Mathematics and Statistics has 28 full-time faculty members, more than 80% of whom hold national research grants. Shared computing facilities (Sun, RS/6000) with mathematical and statistical software are available for the successful applicant. New tenure-track appointees begin with reduced teaching and administrative loads and usually receive a start-up grant. Please consult <http://www.uottawa.ca/science/mathstat/> for further information.

Le Département de mathématiques et de statistique de l'Université d'Ottawa met au concours un poste menant à la permanence au niveau de professeur adjoint. Entrée en fonction: le 1er juillet 1999. Pour poser sa candidature, il faut avoir reçu, récemment, un doctorat en mathématiques ou en statistique. Les candidates et candidats de tout domaine de mathématiques ou de la statistique seront considérés. La priorité du département se situe en mathématiques appliquées modernes et en statistique. Conformément aux exigences prescrites en matière d'immigration au Canada, cette annonce s'adresse aux citoyens canadiens et aux résidents permanents. Envoyer son c.v. ainsi que trois lettres de recommandation à Wulf Rossmann, Directeur, Département de mathématiques et de statistique, Université d'Ottawa, Ottawa, ON, Canada, K1N 6N5. La date limite pour la réception des candidatures est le **15 janvier 1999**. Les conditions d'emploi suivent les dispositions d'une convention collective. L'Université a une politique d'égalité en matière d'emploi et encourage fortement les demandes de la part des femmes.

L'Université d'Ottawa offre à plus de 25,000 étudiants une gamme complète de programmes d'études tant académiques que professionnels. En plus du gouvernement fédéral, de ses agences et de ses laboratoires, la région abrite la plus grande concentration d'entreprises de haute technologie au pays.

Le département de mathématiques et de statistique est composé de 28 professeurs dont plus de 80% reçoivent des fonds de recherche d'organismes nationaux. Des ordinateurs (Sun, RS/6000) munis de logiciels de mathématiques et de statistique sont disponibles. De plus, les nouveaux titulaires de poste menant à la permanence reçoivent un octroi de démarrage ainsi qu'une charge administrative et d'enseignement réduite. Pour plus de renseignement voir <http://www.uottawa.ca/science/mathstat/>.

McMASTER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS

ANALYSIS

The Department of Mathematics & Statistics, McMaster University, invites applications for a tenure track Assistant Professorship starting July 1, 1999.

Candidates should have a Ph.D. and a research record of high quality in a major area of Analysis, as well as demonstrated interest and ability in teaching. The salary and rank will be based on qualifications and experience.

McMaster is committed to Employment Equity and encourages applications from all qualified candidates, including aboriginal peoples, persons with disabilities, members of visible minorities and women.

Applications, including curriculum vitae and three letters of reference, should be received before **December 1, 1998** by:

I. Hambleton, Chair
 Mathematics & Statistics
 McMaster University
 Hamilton, Ontario
 Canada, L8S 4K1

**McMASTER UNIVERSITY
DEPARTMENT OF MATHEMATICS AND STATISTICS**

THE DR. F. RONALD AND HELEN E. BRITTON CHAIR IN MATHEMATICS

The Department of Mathematics & Statistics, McMaster University, invites applications for the Britton Chair in Mathematics, with anticipated starting date July 1, 1999.

The Chair will be a tenured appointment in the Department of Mathematics & Statistics. The successful candidate for the Chair should be internationally recognized for his or her fundamental contributions to research in a major area of mathematics, and be actively engaged in significant research projects. The successful candidate should have attracted substantial research grant support and demonstrated leadership in organizing research efforts through the supervision of graduate students and post-doctoral fellows.

Two post-doctoral positions, the Britton Postdoctoral Fellowships, support the research activities of the Chair. They are appointed by the Department on the recommendation of the Britton Professor of Mathematics.

The salary will be based on qualifications and experience.

McMaster is committed to Employment Equity and encourages applications from all qualified candidates, including aboriginal peoples, persons with disabilities, members of visible minorities and women.

In accordance with Canadian Immigration requirements, this advertisement is directed to Canadian citizens and permanent residents.

Applications, including curriculum vitae and three letters of reference, should be received before **December 1, 1998** by:

I. Hambleton, Chair
Mathematics & Statistics
McMaster University
Hamilton, Ontario
Canada, L8S 4K1

**McGILL UNIVERSITY/UNIVERSITÉ MCGILL
DEPARTMENT OF MATHEMATICS AND STATISTICS
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES**

The Department of Mathematics and Statistics of McGill University is inviting applications for the following tenure track positions, at the assistant professor level:

1. A position in number theory:

Preference will be given to applicants with research interests in the area of analytic number theory or arithmetic geometry, but other areas of number theory will also be considered.

2. A position in statistics:

Preference will be given to applicants with a strong theoretical background in statistics, whose work is driven by applications.

3. A position in statistics, analysis or infinite group theory:

In **statistics** our preferences would be as described in 2.

In **analysis**, preference would be given to candidates working in geometric analysis, partial differential equations, harmonic analysis or wavelets.

In **infinite group theory** we would expect interaction with geometry and topology, logic or combinatorics.

The appointments are to begin July 1, 1999.

Applicants should preferably have postdoctoral experi-

ence and are expected to have demonstrated the capacity for independent research of excellent quality. Selection criteria include research accomplishments, as well as potential contributions to the research interests of the Department and to its educational programs at both the undergraduate and graduate levels.

Applications, with a curriculum vitae, a list of publications, a research proposal, an account of teaching experience and the names, phone numbers and e-mail addresses of at least four references (with one addressing the teaching record) should be sent to:

Professor Georg Schmidt, Chair
Department of Mathematics and Statistics
McGill University
805 Sherbrooke Street West
Montreal, Quebec, Canada H3A 2K6

Candidates must arrange to have the letters of recommendation sent directly to the above address. Candidates are also encouraged to include copies of up to 3 selected publications

with their application.

To ensure full consideration, applications must be received by **December 31, 1998**, although the search will continue until all the positions are filled.

McGill University is committed to equity in employment and in accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

Le département de mathématiques et de statistique de l'Université McGill cherche à pourvoir les postes suivants au niveau de professeur adjoint, menant à la permanence.

1. Un poste en théorie des nombres:

La préférence sera accordée aux candidats travaillant en théorie analytique des nombres ou en géométrie arithmétique, mais d'autres domaines de la théorie des nombres seront également pris en considération.

2. Un poste en statistiques:

La préférence sera accordée aux candidats ayant une forte formation théorique en statistiques et dont les travaux sont motivés par des applications.

3. Un poste en statistiques, en analyse ou en théorie des groupes infinis:

Pour le poste en **statistiques**, la préférence est telle que décrite au point 2.

Pour le poste en **analyse**, la préférence sera accordée aux candidats travaillant en analyse géométrique, en équations aux dérivées partielles, en analyse harmonique ou en théorie des ondelettes.

Pour le poste en **théorie des groupes infinis**, la préférence sera accordée aux candidats dont les recherches ont des rapports avec la géométrie et la topologie, la logique ou la combinatoire.

La date d'entrée en fonctions sera le premier juillet 1999.

Les candidats devront de préférence avoir acquis de l'expérience au niveau post-doctoral et avoir démontré leur capacité de mener à bien leurs recherches de manière indépendante et à un haut niveau. Parmi les critères de sélection des candidats, figurent leurs réalisations de recherches, ainsi que le potentiel qu'ils auront de contribuer aux intérêts de recherches du département et à ses programmes d'enseignement, ce tant au niveaux sous-gradu, que gradué.

Les demandes, comprenant un curriculum vitae, une liste de publications, un aperçu des projets de recherches, une description de l'expérience acquise en enseignement et les noms, numéros de téléphone et adresses électroniques d'au moins quatre répondants (dont un pourra commenter les qualités d'enseignant du candidat) doivent être envoyés à :

Professeur Georg Schmidt, Directeur
Département de mathématiques et statistique
Université McGill
805, rue Sherbrooke ouest
Montréal (Québec) Canada H3A 2K6

Les candidats doivent faire envoyer les lettres de recommandation directement à l'adresse ci-dessus. Ils sont également invités à inclure en annexe de leur demande des copies de jusqu'à trois de leurs publications.

Pour être prises pleinement en considération, les demandes devront être reçues **le 31 décembre 1998** au plus tard. Les recherches se poursuivront jusqu'à ce que le poste soit rempli.

L'Université McGill souscrit à l'équité en matière d'emploi et, conformément à la législation canadienne en matière d'immigration, la priorité est accordée aux citoyens canadiens et aux résidents permanents du Canada.

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

DECEMBER 1998

8–12 International Commission on Mathematical Instruction (ICMI) Study Conference (Singapore)

<http://elib.zib.de/IMU/ICMI/bulletin/43/Study.html>

13–15 CMS Winter Meeting / Réunion d'hiver de la SMC (Queen's University, Kingston)

Monique Bouchard: meetings@cms.math.ca

JANUARY 1999

13–16 Joint Mathematics Meetings (San Antonio, Texas)

A.H. Daly: AMS,meet@math.ams.org

MAY 1999

18–21 Vision Interface (VI'99)/Quality Control By Artificial

DÉCEMBRE 1998

Vision (QCAV'99) (Hotel Delata, Trois-Rivieres, Quebec)

<http://www.dmi.usherb.ca/conferences/>

29–31 CMS Summer Meeting / Réunion d'été de la SMC (Memorial University of Newfoundland, St. John's)

Monique Bouchard: meetings@cms.math.ca

29–June 4 Moonshine in '99 (Montreal, Quebec)

mckay@vax2.concordia.ca

JANVIER 1999

JUNE 1999

4–8 CMESG Meeting (Brock University, St. Catherine's)

6–9 Annual Meeting of the Statistical Society of Canada (Regina, Saskatchewan)

14–19 14th Householder Symposium on Numerical Linear Algebra (Whistler, British Columbia) varah@cs.ubc.ca; <http://roadmap.ubc.ca/hholder/>

JUIN 1999

20–24 The Sixth Conference of the Canadian Number Theory Association (CNTA'99) (University of Manitoba, Winnipeg)
P.N. Shivakumar: insmath@cc.umanitoba.ca
<http://www.iims.umanitoba.ca>

JULY 1999

JUILLET 1999

5–9 4th International Congress on Industrial and Applied Mathematics (Edinburgh, Scotland)
geninfo.iciam@meetingmakers.co.uk;
<http://www/atjs/ed/ac/uk/conferences.icicam99/>

10–22 40th International Mathematical Olympiad (Romania)

AUGUST 1999

AOÛT 1999

International Conference on Valuation Theory and its Applications, Conf. dedicated to Paulo Ribenboim (University of Saskatchewan)
fvk@usask.ca; http://math.usask.ca/fvk/Valth.html

DECEMBER 1999

DÉCEMBRE 1999

11–13 CMS Winter Meeting / Réunion d'hiver de la SMC (Université de Montréal)
Monique Bouchard: meetings@cms.math.ca

JUNE 2000

JUIN 2000

9–13 CMS Summer Meeting / Réunion d'été de la SMC (McMaster University)
Monique Bouchard: meetings@cms.math.ca

4–7 Annual Meeting of the Statistical Society of Canada (Ottawa, Ontario) *adrsg@uottawa.ca*

12–15 Integral Methods in Science and Engineering (Banff, Alberta) *Peter.Schiavone@ualberta.ca*

JULY 2000

JUILLET 2000

11–24 41st International Mathematical Olympiad (Korea)

SEPTEMBER 2000

SEPTEMBRE 2000

22–24 American Mathematical Society Central Section meetings (University of Toronto)
<http://www.ams.org/meetings/>

DECEMBER 2000

DÉCEMBRE 2000

CMS Winter Meeting / Réunion d'hiver de la SMC (University of British Columbia)
Monique Bouchard: meetings@cms.math.ca

RATES AND DEADLINES / TARIFS ET DATES LIMITEES

*If requested the rates indicated include electronic availability.
 S'il y a lieu, les tarifs indiqués valent aussi pour la disponibilité électronique*

Deadlines for receipt of material are as follows: Les dates limites pour la réception des annonces sont les suivantes :		RATES / TARIFS		
		Advertisement size Grandeur de l'annonce	Educational Institutionnelle	Commercial Commerciale
Feb / fév	15 décembre / December 15	bus. card / carte d'aff.	\$40.00	\$65.00
March / mars	15 janvier / January 15	1/4-page	\$60.00	\$90.00
April / avril	15 février / February 15	1/2-page	\$110.00	\$165.00
May / mai	15 mars / March 15	3/4-page	\$160.00	\$240.00
September / septembre	15 juillet / July 15	1-page	\$200.00	\$300.00
October / octobre	15 août / August 15	Surcharges apply for prime locations / des sur-charges sont applicables pour les places de choix.		
November / novembre	15 septembre / September 15			
December / décembre	15 octobre / October 15			
Subscription to the <i>CMS Notes</i> is included with the CMS membership. For non-CMS members, the subscription rate is \$40 (CDN) for subscribers with Canadian addresses and \$40 (US) for subscribers with non-Canadian addresses. L'adhésion à la SMC comprend l'abonnement aux <i>Notes de la SMC</i> . Le tarif d'abonnement pour les non-membres est de 40 \$ CAN si l'adresse de l'abonné est au Canada et de 40 \$ US si l'adresse est à l'étranger.				

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Conference Proceedings, Canadian Mathematical Society



This series is published for the Canadian Mathematical Society by the AMS. It consists of the proceedings of internationally attended conferences on pure and applied mathematics sponsored by the CMS. CMS members may order at the AMS member prices. (ISSN 0731-1036) Softcover.

Geometric Control and Non-holonomic Mechanics

V. Jurdjevic and R. W. Sharpe, *University of Toronto, ON, Canada*, Editors

Control theory, a synthesis of geometric theory of differential equations enriched with variational principles and the associated symplectic geometry, emerges as a new mathematical subject of interest to engineers, mathematicians, and physicists. This collection focuses on several distinctive research directions having origins in mechanics and differential geometry, but driven by modern control theory.

The first of these directions deals with the singularities of small balls for problems of sub-Riemannian geometry and provides a generic classification of singularities for two-dimensional distributions of contact type in a three-dimensional ambient space.

The second direction deals with invariant optimal problems on Lie groups exemplified through the problem of Dublins extended to symmetric spaces, the elastic problem of Kirchhoff and its relation to the heavy top. The results described in the book are explicit and demonstrate convincingly the power of geometric formalism.

The remaining directions deal with the geometric nature of feedback analyzed through the language of fiber bundles, and the connections of geometric control to non-holonomic problems in mechanics, as exemplified through the motions of a sphere on surfaces of revolution.

This book provides quick access to new research directions and also demonstrates the effectiveness of new insights and methods that control theory brings to mechanics and geometry.

Conference Proceedings, Canadian Mathematical Society, Volume 25; 1998; 239 pages; Softcover; ISBN 0-8218-0795-1; List \$49; Individual member \$29; Order code CMSAMS/25CMS98

Algebras and Modules II

Idun Reiten, Sverre O. Smalø, and Øyvind Solberg, *Norwegian University of Science and Technology, Trondheim*, Editors

This volume contains 43 research papers based on results presented at the Eighth International Conference on Representations of Algebras (ICRA VIII) held in Geiranger, Norway. The papers, written by experts in the field, cover the most recent developments in the representation theory of artin algebras and related topics.

Features:

- a unique source for the developments in the representation theory of finite dimensional and artin algebras and related topics
- a wide variety of important papers by leading researchers in the field, with references to earlier developments in the field

Volume 24; 1998; 569 pages; Softcover; ISBN 0-8218-1076-6; List \$99; Individual member \$59; Order code CMSAMS/24CMS98

Algebras and Modules I

Idun Reiten, Sverre O. Smalø, and Øyvind Solberg, *Norwegian University of Science and Technology, Trondheim*, Editors

This volume contains recent results on geometric aspects of representations of algebras, a thorough treatment of the theory of quantized algebras, new developments on infinite dimensional representations of finite dimensional algebras, a bridge between representation of algebraic groups and representation theory of finite dimensional algebras, and recent discoveries on modular representation theory. In addition, the volume contains two papers devoted to some of Maurice Auslander's many contributions both in the representation theory of finite dimensional algebras and in commutative ring theory.

A general background in noncommutative algebra including rings, modules and homological algebra is required. Given that, parts of this volume would be suitable as a textbook for an advanced graduate course in algebra.

Volume 23; 1998; 198 pages; Softcover; ISBN 0-8218-0851-8; List \$39; Individual member \$23; Order code CMSAMS/23CMS98

Trends in Ring Theory

Vlastimil Dlab, *Carleton University, Ottawa, ON*, and László Márki, *Hungarian Academy of Sciences, Budapest*, Editors

The Ring Theory Conference (University of Miskolc, Hungary) successfully accomplished its two goals: 1) to reflect contemporary trends in the subject area and 2) to offer a meeting place for a large number of Eastern European algebraists and their colleagues from around the world. Particular emphasis was placed on recent developments in the following four areas: representation theory, group algebras, PI algebras, and general ring theory. This book presents 13 of the invited lectures.

Volume 22; 1998; 239 pages; Softcover; ISBN 0-8218-0849-4; List \$49; Individual member \$29; Order code CMSAMS/22CMS98

Harmonic Analysis and Number Theory

Papers in Honour of Carl S. Herz

S. W. Drury, *McGill University, Montreal, PQ*, and M. Ram Murty, *Queen's University, Kingston, ON*, Editors

This volume presents the proceedings of a conference held at McGill University (Montreal). The papers are dedicated to the memory of Carl Herz, who had deep interests in both harmonic analysis and number theory. These two disciplines have a symbiotic relationship that is reflected in the papers in this book.

Volume 21; 1997; 227 pages; Softcover; ISBN 0-8218-0794-3; List \$49; Individual member \$29; Order code CMSAMS/21CMS98

All prices subject to change. Charges for delivery are \$3.00 per order. For optional air delivery outside of the continental U. S., please include \$6.50 per item. Prepayment required. Order from: American Mathematical Society, P. O. Box 5904, Boston, MA 02206-5904, USA. For credit card orders, fax 1-401-455-4046 or call toll free 1-800-321-4AMS (4267) in the U. S. and Canada, 1-401-455-4000 worldwide. Or place your order through the AMS bookstore at www.ams.org/bookstore. Residents of Canada, please include 7% GST.



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