CMS NOTES de la SMC

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FROM THE PRESIDENT'S DESK

Richard Kane

(voir la page 6 pour la version française)

Our next CMS meeting, the 1999 Winter Meeting, will be taking place during December 11-13 in Montreal, hosted by Université de Montréal. The extensive scientific program comprises eleven sessions: Algebraic and Geometric Methods in Differential Equations; Applied Logic; Combinatorial Algebra, Group Representations and Macdonald Polynomials; Computing and Mathematical Modelling; History of Mathematics; Mathematical Genetics and Genomics; Mathematical Physics; Orders, Lattices and Universal Algebra; Teaching of Linear Algebra; Graduate Students Seminar; Contributed Papers Session. As well, there will be two satellite events associated with the meeting. On the day preceding the meeting (December 10) the Centre de Recherches mathématiques (CRM) will hold a one day symposium marking its 30th anniversary and its many achievements, notably in the past decade. On the day following the meeting (December 14) the first CMS Job Fair will take place, sponsored by the CMS, CRM, the Institut des sciences mathématiques (ISM) and two industrial liaison networks, NCM2 and MITACS, in which the CRM is a partner. So a great deal of activity is compressed into an extended weekend. And Montreal is, of course, a wonderful city to visit. I look forward to seeing you there.

Job fairs are an innovation which we are hoping to establish as a regular event at CMS meetings. There is a consensus in the mathematical community that such forums for graduate and senior undergraduate students, focusing on outreach and careers, business and industry, are important. Job fairs represent another area in which the CMS and the three Canadian Mathematical Institutes are collaborating. A format has evolved in which the Institutes (via MITACS) and the CMS will jointly sponsor these job fairs. A job fair is being planned for next summer's McMaster meeting, with the Fields Institute as the main partner.

The development of resources and infrastructure to support mathematical training at all levels from secondary to graduate school is clearly one of the major current trends within the CMS. In his article appearing in the October

(see PRESIDENT–page 5)

CMS NOTES
NOTES DE LA SMC

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EDITORIAL

S. Swaminathan

When this issue appears we will be just less than two months away from the second millenium. It will, indeed, be quite exciting to witness the transition from one millenium to another.

The widespread concern, known as the Y2K problem, whether the various software in our computers would make the transition smoothly has overshadowed the attention of scientists and the media in assessing the achievements of the sciences during the waning century and in delineating future directions in various disciplines.

A search on the Web reveals no articles nor books written on the mathematical counterpart of this problem. A journal called *History Today* devoted its November 1996 issue to a series of interesting articles, of which one is about astronomy and another one on energy. A recent issue of the *Mathematical Intelligencer* has a humorous article on how theorems would be discovered and proved by computers some fifty years hence. There is a report in the Bulletin of the IMU, June 1998 issue, that the IMU is publishing a book, *Mathematics Tomorrow*, edited by V. Arnold (chair), M. Atiyah, P. Lax and B. Mazur, to celebrate the turn of the century, with articles from prominent mathematicians on how they see the present state of mathematics, its main problems and prospects for the coming century.

I request our readers to send us their thoughts on such matters.

Lorsque vous lirez ce numéro, nous serons à moins de deux mois du second millénaire. C'est drôlement excitant d'avoir l'occasion d'assister à ce moment mémorable qu'est le passage à un nouveau millénaire.

La grande préoccupation de l'heure, le célèbre bogue de l'an 2000, à savoir si les différents logiciels de nos ordinateurs vont réussir à franchir le pas, a accaparé l'attention de tous et a éclipsé le travail des savants et des médias à évaluer les exploits de la science au tournant du siècle et à définir des directions d'avenir en ce qui a trait à diverses disciplines.

Une recherche du Web n'a révélé aucun article ni livre sur la contrepartie mathématique de ce problème. Un périodique intitulé *History Today* consacre son numéro de novembre 1996 à ce sujet et présente une série d'articles intéressants dont l'un porte sur l'astronomie et un autre, sur l'énergie. Un numéro récent de *Mathematical Intelligencer* comporte un article humoristique sur la façon dont on découvrira et fera la démonstration de nouveaux théorèmes par ordinateur dans cinquante ans. On fait également mention dans le numéro de juin 1998 du Bulletin de l'UMI de la parution prochaine du livre *Mathematics Tomorrow*, sous la direction de V. Arnold (président), M. Atiyah, P. Lax et B. Mazur. pour célébrer le tournant du siècle. Ce livre rassemble des articles d'éminents mathématiciens sur la façon dont ils voient l'état actuel des mathématiques, ses principaux problèmes et ses perspectives d'avenir au siècle prochain.

J'attends avec plaisir tout commentaire et toute réflexion à ces propos.

A Canadian "Mathematics and Careers" Resource?

Morris Orzech, Queen's University

During my tenure as chair of the CMS Education Committee, I have had conversations and correspondence with about twenty people concerning advising students who ask us how to include career considerations in deciding whether to study mathematics, or in choosing which mathematics courses to take. About a year ago I posted a message on the CMATH-L list in which I mentioned a book that we at Queen's often lend to students who approach us with such questions. The book, *101 Careers in Mathematics*, is edited by Andrew Sterret, and published by the MAA. Several people responded, either asking for additional information or mentioning that they were pleased to know about the existence this resource.

In my CMATH-L posting I stated that the book "....presents photographs and profiles of people in a wide variety of occupations, who along the way studied a mathematical science. It lacks a Canadian perspective that students sometimes look for, but they seem to enjoy perusing the book despite this."

Consideration of a Canadian perspective is the driver for this note. Several CMS members have told me that our community needs a careers information or careers advice resource that reflects our Canadian environment. I tend to agree, but I am not certain what elements would provide such a perspective, and student comments on the issue are too diffuse to provide an answer. I don't know whether these elements should suffuse a careers resource "from the ground up" or could be provided as add-ons to existing resources. It has been suggested to me that the CMS Education Committee should provide a careers resource, or at least instigate its development. After thinking about this suggestion, and discussing it within the Education Committee and outside, I conclude that a more broadly-based dialogue is needed to clarify what is available, whether more needs to be done, and if so, how to bring ideas and relevant work already done or in progress to fruition.

101 Careers in Mathematics could itself conceivably provide "Canadian content" our students could relate to their situation. Andrew Sterret tells me that in revising the book he is willing to include profiles of appropriate Canadians, and will gladly receive suggestions for individuals he should consider contacting. He needs the profiles by January 1, 2000. He can be contacted through the MAA (e.g., by e-mail to asterret@maa.org).

To what other resources can we guide students who want information about careers that use mathematics? There is a web site associated to the U.S. National Academy of Sciences, and sponsored by the Sloan Foundation, called the Career Planning Center for Beginning Scientists and Engineers. It bills itself as "the 'one stop shopping' location for job openings and the guidance and information needed to make decisions about education and career choices." It works through a (no-charge) registration system. The self-description on the site reads:

"Registrants come to the site: Out of general interest; Seeking Employees; Seeking Employment/ Postdoctorals/ internships; or Seeking Guidance.

The discipline areas from which registrants come include 'Physical and Sciences and Mathematics.' The site's URL is http://www2.nas.edu/cpc/ ."

The Sloan Foundation also provides partial funding for a site sponsored jointly by the AMS, the MAA and SIAM, at http://www.ams.org/careers/home.html. This is a quote from that site:

"The AMS-SIAM Mathematics Careers Bulletin Board is an interactive service that informs students about nonacademic career choices in the mathematical sciences. Periodically AMS and SIAM feature the profiles of individuals who have pursued a variety of careers. You are invited to read their profiles to learn why they made a particular career choice, what they enjoy about their position, and how their careers have developed over time. Many include tips on what nonacademic employers are looking for in a job candidate. You are also invited to submit questions to a forum made up of the mathematicians currently featured. Current profiles were posted April 1999.

"You can search the archives by key word, employment sector or degree and access the profiles, forums and applications of all mathematicians currently or previously profiled in the Mathematical Careers Bulletin Board."

Career Information in the Mathematical Sciences: A Resource Guide is a booklet published under auspices of the Conference Board of the Mathematical Sciences. It provides a list of publications that might be of interest to students and parents. This free booklet is available from the MAA, and a web-based, shortened version of the resource list is provided by Mary Washington College at http://departments.mwc.edu/math/www/cpubl.htm.

At http://www.yorku.ca/admin/ careers/index.shtml, York University Career Services provides a combination of campus-based and publicly-available links and references that are not discipline-specific, but that do connect with Canadian resources, such as Canadian government sites.

When students ask us about careers and mathematics they may not be yet considering graduate work, but it doesn't hurt for them (and for us) to know that undergraduate work in mathematics can be excellent preparation for a wide range of professional graduate work. In recent years organizations

such as the AMS, MER and SIAM have tried to promote development of professional Master's degree programmes in mathematics. An account of a November 1998 workshop highlighting such programs can be found at http://www.math.uic.edu/MER/news.html and links from there lead to information about specific professional programs open to students whose mathematics backgrounds range from moderate to substantial.

It is difficult to judge the significance of the advice we give students who ask about connecting their undergraduate mathematics choices to career plans or aspirations. My impression is that I meet more students now than I did ten or twenty years ago who are worried about how their academic work will mesh with a job or career, even when they are uncertain about what job or career they are aiming for. Besides simply wanting to help students who ask, I have other rationales for taking their questions seriously. There is some evidence that vocational relevance is among the factors that lead to students learning better, and to their reflecting positively on their academic experience. And of course, it is good for the health of our courses if we can provide honest information that supports students' interest in taking mathematics courses provided they are not thereby doing themselves a career disservice.

I hope people will have things to say on the issues raised in this article. I would be happy to receive comments directly, or to see them posted on the new Camel area for mathematics education discussion.

Problem Solving – A Definitive Strategy Book

Book Review by Edward J. Barbeau, University of Toronto

Paul Zeitz, The art and craft of problem solving
John Wiley and Sons, Inc., 1999
xii + 334 pages

Mathematical progress in the twentieth century has been measured by the creation of sophisticated fields and techniques that have deepened significantly our understanding of mathematical structure. However, less conspicuously, many of our colleagues have been creating or discovering mathematical gems, elegant problems with the sole purpose of puzzling and delighting the student or amateur. While the tradition of mathematicians posing challenges to one another goes back half a millennium, the past two centuries have seen the appearance of problems in journals and questions on examinations, such as the *Tripos*, specifically designed to test the mettle of putative mathematicians.

In the North America, for much of the century, the *American Mathematical Monthly* along with certain university and public examinations, such as the Ontario Problems Paper, have carried most of the burden. More recently, these have been augmented or supplanted by problems sections in several journals, including our own *Crux Mathematicorum with Mathematical Mayhem*, and by competitions such as the *Putnam* (1938), *American High School Mathematics Examination* (1950), Waterloo *Descartes Competition* (1968) and the *Canadian Mathematical Olympiad* (1969). The *International Mathematical Olympiad* (1959) continued a well-established tradition in Eastern Europe; it now involves over 80 countries and has inspired an explosion of national olympiads across the globe.

This has created a "market" for new problems and for student preparation books. Until forty years ago, problems books were scarce (see, for example, [3]). There was [8] for university students in the original German edition, and the groundbreaking book *How to solve it* [7]. Then appeared collections of problems from various competitions along with solutions, and eventually the first (and so far only) volume in an ambitious project to collect in one place problems appearing in prominent journals [9]. Ross Honsberger, in a series of Mathematical Association of America books, presented problems and solutions that were particularly elegant. But except for Polya's early book, there was little guidance in print for students who needed to learn the tricks of the trade and develop systematically their natural ingenuity. One early attempt was the Tool Chest in the CMS series *1001 Problems in High School Mathematics*, now published as [i]; this was followed by an expanded Australian Tool Chest [6]. Anthony Gardiner [4] in the UK and Alexander Soifer [11] in the US moved beyond merely cataloguing problems and solutions towards a coaching role.

Paul Zeitz has now provided a definitive strategy book for students preparing for competitions. Unlike its predecessors, it gives both a comprehensive coverage of necessary mathematical background and systematic practical advice on finding and writing up solutions to problems. The author "had a problem solver's education" at Stuyvesant High School in New York City, was a member of the first USA team in the International Mathematical Olympiad, has coached several recent USA teams in the IMO and is currently a professor at the University of San Francisco. While this book is written for college students preparing for the Putnam competition, it is equally

valuable for high school students operting at the olympiad level and can be used profitably by fans of problem sections in journals.

A student successful in competitions needs not only natural talent and insight, but an appropriate psychological demeanour, a solid mathematical background and an ability and willingness to rework ideas and make them intelligible to a reader. All of these can be enhanced by training, and this book neglects none of them. The first half of the book deals with the broader issues of getting into a problem and deciding what stategies and tactics to employ. Zeitz discusses different forms of arguments, ways of reformulating problems, and the exploitation of symmetry, extreme cases, pigeonholes and invariants. The second part focuses on background material in algebra, combinatorics, number theory and calculus.

Worked examples pervade the book. Sometimes the author walks the reader through initial investigations (p. 35, 267). Sometimes he shows how vague evocative ideas can be hammered into a solid argument (p. 112). Often, alternative approaches are compared (p. 215). Sometimes he pauses to ensure that apparently obvious facts are properly grounded (p, 122). Zeitz tries to dissolve the mystery of getting a solution. The problems range from straightforward to intricate, and are often taken from Putnam, IMO, AIME and other competition papers. Many problems are left for the reader; hints are provided for some of them, but there is a web site for further information.

Why should you purchase this book? There is the pleasure of seeing elegant mathematics; some of the problems are ingenious and many solutions are delightful. There is a good cross-section of problems; even if some of them are chestnuts, it is good to have a reference for them and a place where students can discover them without having to rely on informal means of getting into the lore. The author explicitly addresses issues that prevent many students from operating at their peak level - how to approach problems, how to work with ideas, how to look after significant details and how to write up a solution. This book is useful for anyone preparing students for a competition; it can be used as a checklist and ready source of material, or can be given to students themselves to work through.

(The only misprint I found is in the middle of page 277, where $(\frac{p-1}{2})^2$ should be $(\frac{p-1}{2})!^2$.)

References

[1] Edward J. Barbeau, Murray S. Klamkin & William O.J. Moser, *Five Hundred Mathematical Challenges.* Mathematical Association of America, 1995

[2] Arthur Engel, *Problem-solving strategies.* Springer, 1998

[3] Howard Eves & E.P. Starke (*editors*), *The Otto Dunkel Memorial Problem Book.* Mathematical Association of America, 1957

[4] A. Gardiner, *The Mathematical Olympiad Handbook.* Oxford, 1997

[5] Loren C. Larson, *Problem-solving Through Problems.* Springer, 1983

[6] A.W. Plank & N.H. Williams (*editors*), *Mathematical Toolchest.* Australian Mathematics Trust, 1996

[7] G. Pólya, *How to solve it.* Princeton, 1945; Doubleday, 1957

[8] G. Pólya & G. Szegö, *Problems and theorems in analysis.* (2 volumes) Springer, 1972

[9] Stanley Rabinowitz (*editor*), *Index to Mathematical Problems 1980-1984.* MathPro Press, Westford, MA, 1992

[10] Stanley Rabinowitz (*editor*), *Problems and Solutions from the Mathematical Visitor 1887-1986* MathPro Press, Westford, MA

[11] Alexander Soifer, *Mathematics as Problem Solving.* Center for Excellence in Mathematics Education, Colorado Springs, CO

[12] Gábor J. Székely (*editor*), *Contests in Higher Mathematics.* Springer, 1996

(PRESIDENT–continued from page 1)

Notes, Graham Wright gave an extensive discussion of another student related innovation within the CMS, namely our emerging program of Math Camps.

Another development within the mathematical community is the Departmental Chairs meeting which will be hosted by the CRM in Montreal on the weekend of November 20-21. Both I and Graham Wright, our Executive Director, will participate, and there will be a CMS sponsored reception at the meeting. The Departmental Chairs have, for many years, held a working luncheon at each CMS meeting. This meeting is being held at the initiative of George Bluman (UBC) and Herb Gaskill (Memorial). It represents an interesting experiment in expanding the level of interaction betwen departments and the CMS is delighted to support and cooperate with this initiative.

This year's CMS membership drive is now underway. A great deal of discussion has taken place within the CMS, over the past year, about membership renewal. We have roughly 925 members, mainly concentrated in Canadian Mathematics departments. It is a goal of the CMS to broaden this membership so as to include a greater cross section of both academics and non-academics who are involved in the mathematical sciences. We have been working diligently at this, in particular to recruit members from the business community. Also, as part of our efforts to more effectively service students, we

also plan to incorporate graduate students within the CMS by offering them free membership.

We are also, however, concerned with maintaining, and even expanding, our core membership. As the babyboomer demographic wave moves through the academic community in the next decade, the current group of mathematicians will be replaced by another generation. We want this group to be CMS members! We will be offering three years free membership to new faculty in Canadian Mathematics Departments. We also hope to attract a number of Canadian mathematicans who are currently AMS members but not CMS members. The new AMS/CMS reciprocity will allow them to join both the CMS and AMS for the same price as AMS membership costs. The secret is to first join the CMS and then take advantage of the reciprocity agreement to join the AMS

Finally, I might mention yet another innovation: the first Canada-China Congress (CCC) which took place in Beijing on August 23-28. The Congress involved 55 Canadian mathematicians and over 70 Chinese mathematicians and was intended to "jump-start" research relations between the two communities. The CMS was a CCC sponsor although the Canadian funding was provided by NSERC and the three Institutes. The true index of success of the Congress will be the research collaborations which evolve out of it. From all anecdotal evidence, the CCC was very successful in this respect. A second CCC is being considered for Vancouver in summer 2001. The President of NSERC, Tom Brzustowski, attended the entire first day of the Congress including a number of mathematical talks.

The dynamism of Canadian Mathematics over the past few years is clearly still present, and the CMS is part of that pattern.

DU BUREAU DU PRÉSIDENT

(see page 1 for the English version)

Notre prochaine réunion de la SMC, la réunion d'hiver 1999, aura lieu du 11 au 13 décembre, à l'Université de Montréal. Cette réunion nous offre un vaste programme scientifique de onze sessions (Méthodes algébriques et géométriques en équations différentielles; Logique appliquée; Algèbre combinatoire; Représentations des groupes et polynômes de Macdonald; Modélisation informatique et mathématique; Histoire des mathématiques; Génomique et génétique mathématique; Physique mathématique; Ordres, treillis et algèbre universelle; Enseignement de l'algèbre linéaire; Séminaire des étudiants de deuxième et troisième cycles; Articles et travaux). Comme si ce n'était pas assez, il y aura deux événements satellites : la journée précédant la réunion, le 10 décembre, le Centre de recherches mathématiques (CRM) organise un symposium d'un jour pour célébrer son trentième anniversaire et ses nombreuses réalisations, tout particulièrement au cours de la dernière décennie. Le lendemain de la réunion, le 14 décembre, aura lieu le premier salon de l'emploi de la SMC, commandité par la SMC, le CRM, l'Institut des sciences mathématiques (ISM) ainsi que par les deux réseaux de relations avec les entreprises, le RCM2 et le MaTISC. Vous constatez que le week-end sera intensif et fertile en activités, sans oublier l'intérêt touristique de Montréal! J'espère avoir le plaisir de vous y rencontrer tous.

Le salon de l'emploi est une innovation que nous espérons voir devenir une activité courante aux réunions de la SMC. Tous les éléments de la communauté mathématique reconnaissent combien ces forums de diffusion du monde industriel et des affaires sont importants pour les étudiants finissants au premier cycle et les étudiants de deuxième et troisième cycles. Voilà qui représente une autre sphère de collaboration entre la SMC et les trois Instituts mathématiques au Canada. Une nouvelle formule est en cours d'élaboration, où les Instituts (par l'intermédiaire du MaTISC) et la SMC commanditeront conjointement ces salons de l'emploi. Un autre salon est déjà prévu au moment de la réunion d'été à McMaster, avec, cette fois, le Fields Institute comme partenaire principal.

L'élaboration des ressources et de l'infrastructure nécessaire au soutien de la formation mathématique à tous les niveaux, à partir de l'école secondaire au deuxième cycle universitaire, constitue manifestement l'une des principales préoccupations actuelles de la SMC. Dans son article paru dans les NOTES d'octobre, Graham Wright nous a expliqué en détails une autre innovation de la SMC au profit des étudiants, c'est-à- dire notre programme de Camps mathématiques.

Nous pouvons compter comme autre réalisation importante au sein du milieu mathématique, la réunion des directeurs de départements, organisée par le CRM et qui aura lieu à Montréal les 20 et 21 novembre prochains, à l'initiative de George Bluman (UBC) et de Herb Gaskill (Memorial). Nous y participerons tous deux, Graham Wright (notre directeur administratif) et moi-même et il y aura une réception commanditée par la SMC. Les directeurs de départements mathématiques tiennent depuis plusieurs années un déjeuner de travail à chacune des réunions de la SMC. Voilà une façon intéressante d'accroître encore l'interaction entre les divers départements et la SMC est heureuse d'y collaborer.

Le renouvellement de la cotisation à la SMC est maintenant lancé. Bien

des choses ont été dites à la SMC sur ce renouvellement, au cours des dernières années. Nous avons environ 925 membres, provenant principalement des département de mathématiques d'universités canadiennes. La SMC poursuit l'objectif d'élargir ce bassin pour englober tant des établissements d'enseignement que d'autres qui, bien que non reliés à cet aspect, touchent aux sciences mathématiques. Nous y avons travaillé avec diligence, en particulier pour recruter des membres du secteur des affaires. De plus, toujours dans le but de desservir toujours mieux les étudiants, nous prévoyons inclure les étudiants de deuxième et troisième cycles au sein de la SMC, en leur offrant l'adhésion gratuite.

Cet aspect ne nous empêche pas de nous préoccuper de conserver et même d'accroître le nombre de membres reconnus. Au fil de l'évolution de la génération du baby-boom dans le monde de l'enseignement au cours des dix prochaines années, le groupe actuel de mathématiciens cédera la place à la génération montante. Nous voulons que cette dernière se rallie massivement à la SMC. Nous offrirons donc trois ans d'adhésion gratuite aux nouveaux professeurs, dans les divers départements de mathématiques au Canada. Nous espérons également attirer un certain nombre de mathématiciens canadiens actuellement membres de l'AMS, mais non de la SMC. La nouvelle entente de réciprocité entre l'AMS et la SMC leur permettra d'appartenir aux deux sociétés au seul prix de leur cotisation à l'AMS. Le secret, c'est de joindre les rangs de la SMC et ensuite, profiter de l'entente de réciprocité pour adhérer à l'AMS.

Enfin, je voudrais souligner ici une autre innovation : le premier Congrès Canada-Chine (CCC) a eu lieu à Beijing, du 23 au 28 août dernier. Y ont participé 55 mathématiciens canadiens et plus de 70 collègues chinois. Ce congrès servait de rampe de lancement de nouvelles relations dans le domaine de la recherche entre ces deux mondes. La SMC était l'un des commanditaires du CCC, mais le financement canadien provenait du CRSNG et des trois Instituts. Ce n'est qu'à l'aune des collaborations qui en résulteront qu'on pourra véritablement mesurer le succès de ce congrès. De façon purement intuitive, on peut tout de même déjà affirmer que le CCC a remporté un vif succès. On planifie déjà le prochain CCC pour l'été 2001, à Vancouver. Le président du CRSNG, Tom Brzustowski, a passé la première journée au complet à ce congrès et a assisté à plusieurs conférences.

Le dynamisme affiché par les mathématiques canadienne au cours des quelques dernières années ne s'éteint manifestement pas et la SMC s'y intègre parfaitement.

AWARDS / PRIX

G de B Robinson Award

James Mingo (l) and Richard Kane (r) present G de B Robinson Award to Ranee Brylinski

The 3rd G de B Robinson Award was presented in St. John's, Newfoundland at the June meeting of the Society to Ranee Brylinski of Pennsylvania State University. This award is for an outstanding paper in one of the Society's publications and is named in honour of one of the founding editors of the Canadian Journal of Mathematics.

Ranee Brylinski received her A.B. degree from Princeton University in 1977 and her Ph.D. from MIT in 1981. She was awarded two postdoctoral fellowships, from the NSF and NATO, and also a Sloan Foundation Fellowship. She taught at Brown University from 1982-88 and then moved to Penn State University where she is now Professor of Mathematics and Co-director of the Center for Geometry and Mathematical Physics. Her research interests are geometry, representation theory and mathematical physics. She won the award for her article in the Canadian Journal of Mathematics entitled "Quantization of the 4-dimensional nilpotent orbit of SL(3, R)."

Ranee Brylinski a obtenu son diplôme de premier cycle de l'université Princeton en 1977 et son Ph. D. du MIT en 1981. Elle a reçu deux bourses de recherche postdoctorales, l'une de la National Science Foundation, l'autre de l'OTAN, ainsi qu'une bourse de recherche de la Sloan Foundation. Elle a enseigné à l'université Brown de 1982 à 1988, avant de passer à Penn State, où elle est actuellement professeure de mathématiques et codirectrice du Center for Geometry and Mathematical Physics. Ses domaines de recherche sont la géométrie, la théorie des représentations et la physique mathématique. Elle a gagnée pour son article intitulé "Quantization of the 4-dimensional nilpotent orbit of SL(3, R)."

1999 CMS Distinguished Service Awards

The 1999 CMS Distinguished Service Awards were presented in St. John's, Newfoundland at the June

meeting of the Society to Michael Doob of the University of Manitoba and Srinivasa Swaminathan of Dalhousie University.

S. Swaminathan (l) and Michael Doob (r) accept award from CMS Preseident Richard Kane

Srinivasa Swaminathan joined the Canadian Mathematical Society in 1980. In the past two decades he has served in an editorial role for the CMS in numerous capacities. These editorial roles are, of their nature, relatively less visible but extremely important. He was Technical Editor of the Bulletin during 1979-1990. During 1986-90 this role was expanded to include being Technical Editor of the Journal as well. During the period 1991-96 he served as Production Editor of the Bulletin and Journal. Since 1994 he has been an Editor in Chief of the CMS Notes. He also served as one of the organizers for the CMS meetings held at Dalhousie in 1990 and 1981. He has been a mainstay of CMS publications over the past two decades. He is often cited by others for the dedication, and even generosity, with which he has carried out all of the above tasks.

He co-hosted a radio program (1976-1982) and a very successful television program "Panorama" (1982-1990) dealing with cultural aspects of life in the Indian subcontinent. He is a public speaker and often lectures on his "Ten Equations That Changed The World." He also made a video tape of this for APICS.

Srinivasa Swaminathan est devenu membre de la Société mathématique du Canada en 1980. Au cours des deux dernières décennies, il a occupé divers postes de rédaction à la SMC. De par leur nature, ces fonctions ne procurent peut-être pas une très grande visibilité, mais elles sont néanmoins extrêmement importantes. Rédacteur technique du Bulletin de 1979 à 1990, il a occupé simultanément les mêmes fonctions au Journal de 1986 à 1990. De 1991 à 1996, il a été chef de production du Bulletin et du Journal, et il est maintenant rédacteur en chef des Notes de la SMC depuis 1994. Il a également fait partie du comité organisateur des Réunions de la SMC tenues à l'université Dalhousie en 1990 et en 1981. L'un des piliers du secteur des publications de la Société des vingt dernières années, il est reconnu parmi nos membres pour son dévouement et pour la générosité avec laquelle il se consacre à toutes ses tâches.

Au nombre de ses autres réalisations, mentionnons la coanimation d'une émission de radio (1976-1982) et de "Panorama" (1982-1990), une très populaire série télévisée portant sur divers aspects culturels de la vie sur le sous-continent indien. Il donne régulièrement des conférences publiques et parle souvent de ses « dix équations qui ont changé le monde ». Il a de plus réalisé un document vidéo sur le sujet pour le Conseil des provinces atlantiques pour les sciences. La SMC est heureuse de remettre son Prix pour service méritoire au professeur Swaminathan.

Michael Doob has been a member of the Canadian Mathematical Society since 1971. The focus of his activity within the CMS has always been Publications and associated areas. He has sat on both the Publications and Electronic Services Committees and is currently on the ad hoc committee which is reviewing Electronic Services and Camel. Since 1990 he has served as TeX Editor of the Bulletin and Journal. He has made an outstanding contribution to the CMS in this role. He is one of North America's leading experts in TeX. He is known in the mathematical typesetting world for his book *A Gentle Introduction to TeX* and, more recently, he has written *TeX (starting from [1])*. He serves on the Board of the TeX Users' Group (a world-wide organization of TeX users) and has given many workshops on TeX use.

His TeX expertise, along with his strong attention to detail and accuracy, has enabled the CMS to establish, and maintain, cost effective publications of very high quality. It has also enabled the CMS to play a major role in the publication of its journals and thereby reap the financial rewards. His blend of skills have been crucial, and really irreplaceable, in achieving all of this.

Michael Doob est membre de la Société mathématique du Canada depuis 1971. Son travail à la SMC a toujours été lié aux publications et autres domaines connexes. Il a fait partie du Comité des publications et du Comité des services électroniques, et il est actuellement membre du comité spécial chargé d'examiner les services électroniques et Camel. Depuis 1990, il occupe les fonctions de rédacteur TeX du Bulletin et du Journal. À ce titre, sa contribution à la SMC est exceptionnelle. Il est l'un des éminents spécialistes du langage TeX en Amérique du Nord et il est connu, dans le milieu de la typographie mathématique, pour son livre *A Gentle Introduction to TeX*. Plus récemment, il a aussi publié un ouvrage intitulé *TeX (starting from [1])*. Il est membre du conseil d'administration d'une association mondiale d'utilisateurs de TeX et il a donné de nombreux ateliers sur l'utilisation de ce langage.

Sa grande expérience du langage TeX, alliée à son souci du détail et de la précision, ont permis à la SMC de concevoir et de conserver des publications rentables de très grande qualité, ainsi que de jouer un rôle clé dans la publication de ses revues et, par conséquent, d'en récolter les avantages financiers. À cet égard, son bagage de connaissances a toujours été primordial et indispensable pour la Société.

CRM/Fields Institute Prize

Stephen Cook

The 1999 CRM / Fields Institute Prize has been awarded to Stephen A. Cook, of the University of Toronto. The prize recognizes exceptional achievement in the mathematical sciences, the main selection criterion being excellence in research.

Stephen Cook was born in Buffalo, New York. He received his BSc degree from the University of Michigan in 1961 and his SM and PhD degrees from Harvard University in 1962 and 1966 respectively. From 1966 to 1970 he was an Assistant Professor at the University of California, Berkeley. He joined the University of Toronto in 1970 as an Associate Professor and was promoted to a Professor in 1975.

Dr. Cook's principal research area is computational complexity, with excursions into programming language semantics, parallel computation and especially the interaction between login and complexity theory. He has authored over 50 research papers, including his famous 1971 paper, "The Complexity of Theorem Proving Procedures," which introduced the theory of NP completeness. Dr. Cook was the 1982 recipient of the Turing award, and was awarded a Steacie Fellowship in 1977 and a Killam Research Fellowship in 1982. He received computer science teaching awards in 1989 and 1995. He is a fellow of the Royal Society of Canada and was elected to membership in the National Academy of Sciences (United States) and the American Academy of Arts and Sciences.

A Note of Thanks / Une Note de Remerciement

Richard Kane, University of Western Ontario

The success of the CMS is due to many people: dedicated staff, sponsors and donors, and our members. We would like to take this opportunity to thank all of our supporters. First of all, more than one in five of our membership (currently numbering 925) are active volunteers in any given year. There are those who serve on the Board, on committees and editorial boards, and those who organise conferences, educational events and the various competitions for students. The names of these people can be found at the web sites http://www.camel.math.ca/CMS/Docs/commlist.html (committee and board memberships) and
http://www.camel.math.ca/CMS/Events/ (conference organization).

We would also like to thank the many donors and sponsors given below who have provided financial support to the CMS during the period July 1, 1998 to August 31, 1999.

Funding was received both to support the ongoing activities of the Society and to build our endowed funds. The CMS Endowment Fund has now reached its initial goal of 1.5 million dollars and, in 1999, the income from this endowment will fund the first annual competition to provide grants to support a variety of mathematical activities across the country. The Mathematical Olympiads Fund (now at almost $180,000) which supports competitions and activities related to the selection and training of Canada's International Mathematics Olympiad team, continues to grow. As these funds increase, so does our long-term ability to provide much-needed support to mathematics in Canada.

La SMC doit son succès à de nombreuses personnes : son personnel dévoué, ses commanditaires et donateurs, et ses membres. Nous aimerions profiter de l'occasion pour remercier tous ceux et celles qui nous appuient. D'abord, mentionnons que près d'un de nos membres sur cinq (la Société en compte actuellement 925) sont des bénévoles actifs. Certains sont membre du conseil d'administration, de comités de la SMC ou de comités de rédaction, d'autres organisent des Réunions, des activités éducatives ou l'un de nos divers concours mathématiques. On pourra consulter la liste de ces personnes aux pages Web suivantes : http://www.camel.math.ca/CMS/Docs/commlist.html (membres de comités et du conseil) et
http://www.camel.math.ca/CMS/Events/ (organisation des Réunions).

Nous aimerions également remercier les nombreux donateurs et commanditaires qui nous ont appuyé financièrement au cours de la dernière année, soit du 1er juillet 1998 au 31 août 1999.

Nous avons reçu du financement pour les activités courantes de la Société et pour alimenter nos fonds de dotation. Le fonds de dotation de la SMC a maintenant atteint l'objectif initial de 1,5 million de dollars. En 1999, les revenus tirés de ce fonds financeront le premier concours annuel où seront décernées des bourses utilisées dans le cadre de diverses activités mathématiques aux quatre coins du pays. Le fonds pour les olympiades mathématiques (qui atteint presque

les 180 000 $), servant à financer les activités et les concours associés à la sélection et à la formation de l'équipe canadienne à l'OIM, continue à croître lui aussi. Plus ces fonds augmentent, plus nous serons en mesure d'offrir un soutien à long terme et nécessaire à la communauté mathématique canadienne.

Individuals / Individus : Janos Aczel (Waterloo, Ontario), Brian R. Alspach (Burnaby, British Columbia), Edward J. Barbeau (Toronto, Ontario), Howard E. Bell (St. Catharines, Ontario), J.L. Berggren (Burnaby, British Columbia), F. Peter Cass (Richmond, British Columbia), Carl Faith (Princeton, New Jersey), Peter Fillmore (Halifax, Nova Scotia), K.O. Geddes (Waterloo, Ontario), Edgar G. Goodaire (St. John's, Newfoundland), Katherine Heinrich (Burnaby, British Columbia), Richard Hoshino (Marhan, Ontario), Wilfred Kaplan (Ann Arbor, Michigan), Spiros Karigiannis (Cambridge, Massachusetts), Hans Kummer (Kingston, Ontario), Maung Min-Oo (Hamilton, Ontario), Bruce Shawyer (St. John's, Newfoundland), Rafat Nabi Siddiqi (Kuwait), Elmer M.. Tory (Sackville, New Brunswick), E. R. Williams (St John's, Newfoundland), T.W. Alan Wong (Markham, Ontario), Graham P. Wright (Ottawa, Ontario) and 85 other members and donors who chose to remain anonymous.

Corporations, Foundations, Institutes and Governments / Sociétés, fondations, instituts et gouvernements : Bank of Montreal, Becton-Dickinson Canada Inc., Canada Life Insurance Company, Celestica International Inc., Centre de Recherches Mathématiques, the Centre for Education in Mathematics and Computing, Citibank, The Fields Institute, John Wiley & Sons Canada Ltd., Imperial Oil Charitable Foundation, Government of Alberta, Government of New Brunswick, Government of Newfoundland, Government of Nova Scotia, Government of Ontario, Gouvernement de Québec, Government of Saskatchewan, Industry Canada, Nelson Thomson Learning, Bank of Nova Scotia, Pacific Institute for the Mathematical Sciences, Royal Bank of Canada, Samuel Beatty Fund, Springer Verlag, Sun Life Assurance Company of Canada, Waterloo Maple, Waterloo Mathematics Foundation.

Universities and Schools / Universités et écoles : Eric Hamber Secondary School, Upper Canada College, University of British Columbia, University of Calgary, Dalhousie University, University of Manitoba, McMaster University, Memorial University of Newfoundland, University of New Brunswick, University of Ottawa, Simon Fraser University, University of Toronto, University of Waterloo, University of Western Ontario.

FROM THE INSTITUTES

New director for the CRM

The CRM has announced the appointment of Jacques Hurtubise as its new director, following the recent resignation of Luc Vinet.

Hurtubise received his B.A. from the Université de Montréal in 1978, then went to Oxford on a Rhodes scholarship, obtaining his D.Phil. there in 1982, under the supervision of Nigel Hitchin. His first academic appointment was at the Université du Québec à Montréal, where he taught from 1982 to 1987. This was followed by a year at the Institute for Advanced Study in Princeton, after which he took up a position at McGill University. He was a visiting professor at Stanford during the spring of 1992.

His research interests lie at the crossroads of differential geometry, algebraic geometry and mathematical physics, and have covered such topics as magnetic monopoles, instantons and their moduli, integrable systems and algebraic geometry, and moduli of vector bundles. He was the Society's Coxeter-James Lecturer in 1993, and gave one of the plenary lectures at the AMS Annual Meeting in 1994.

He has been an associate member of the CRM since 1984, serving as deputy director in 1998-99. He brings to his position considerable knowledge of the Canadian mathematical community, having amongst other things served on the NSERC grant selection commmittee for mathematics, the NSERC-Mathematics liaison committee, several FCAR grant selection committees, as well as the Steacie prize committee. He has just finished a term as the Society's vice-president for Québec.

Jacques says, "Under the leadership of both Francis Clarke and Luc Vinet, the CRM saw a tremendous growth in the scope of its activities; it is indeed a challenge for me to maintain the pace. One of the advantages of running a national centre, though, is that there is a whole community to support it with its ideas and also its participation. Both are very much welcome. Speaking of welcomes, we are celebrating this fall our 30th anniversary, with a one-day conference on December 10th, just prior to the CMS meeting in Montreal. You are all cordially invited."

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Jacques Hurtubise a obtenu son B.A. à l'Université de Montréal en 1978, et son doctorat à Oxford, où il était boursier Rhodes, en 1982 sous la direction de Nigel Hitchin. Son premier poste académique était à l'Université du Québec à Montréal, où il a enseigné de 1982 à 1987. Ceci

fut suivi d'une année à l'Institute for Advanced Study de Princeton. après laquelle il est devenu professeur à l'Université McGill. Il a été professeur visiteur à Stanford au printemps de 1992.

Ses intérêts de recherche se situent au carrefour de la géométrie différentielle, de la géométrie algébrique, et de la mathématique physique, et ont porté sur des sujets tels que les monopoles magnétiques, les instantons et leurs modules, les systèmes intégrables et la géométrie algébrique, et les espaces de modules de fibrés vectoriels. Il a été le conférencier Coxeter-James de la Société en 1993, et a donné une des conférences plénières à la réunion annuelle de l'AMS en 1994.

Il est membre associé du CRM depuis 1984, et a été directeur adjoint en 1998-99. Il apporte à son poste une connaissance considérable de la communauté mathématique canadienne, ayant été entre autres membre du comité de sélection des subventions du CRSNG en mathématiques, le comité de liaison mathématiques-CRSNG, plusieurs comité de subvention FCAR, ainsi que le jury du prix Steacie. Il vient de terminer un mandat de vice-président de la Société pour le Québec.

Jacques a dit, "Sous la direction de Francis Clarke et de Luc Vinet, le CRM a connu une croissance extraordinaire de la gamme de ses activités, et c'est un grand défi pour moi de maintenir ce rythme. Par contre, il y a un grand avantage à gérer un centre national, qui est celui de pouvoir faire appel à toute une communauté qui l'appuie de ses idées et de sa participation. Les deux seront toujours bienvenus; et puisque l'on parle de bienvenue, le CRM célèbre cet automne son trentième anniversaire avec une conférence d'une journée, le 10 décembre, la veille de la réunion de la SMC à Montréal. Vous y êtes tous cordialement invités."

Report on the First China-Canada Congress of Mathematical Sciences

August 23 - 27, 1999
Tsinghua University
Beijing, China

On August 23 in Beijing, China, Professor Dayong Cai of Tsinghua University declared open the first China-Canada Congress of Mathematical Sciences, thereby initiating four days of intensive meetings and presentations by researchers from the two countries on recent advances in mathematics and its applications. The Canadian delegation of some sixty mathematical scientists was headed by Thomas Brzustowski, President of the Natural Sciences and Engineering Research Council of Canada, and organized through the joint efforts of the President of the Canadian Mathematical Society, Richard Kane, and the Directors of Canada's three mathematics research institutes, Jacques Hurtubise of the Centre de recherches mathematiques, Donald Dawson of the Fields Institute, and Nassif Ghoussoub of the Pacific Institute for the Mathematical Sciences.

A similar number of Chinese mathematicians was led by Professor Zhang Cunhao, President of the National Science Foundation of China and K. C. Chang, President of the Chinese Mathematical Society, with the organization provided by the Directors of the three Mathematics Institutes of the Universities of Nankai, Peking and Tsinghua, Professors Xingwei Zhou, Lizhong Peng, and Dayong Cai. Brzustowski and Ghoussoub spoke on behalf of the Canadian delegation, both emphasizing the importance of a close collaboration between the two countries on the scientific and mathematical levels.

Twelve plenary talks were presented by top researchers from the two countries, followed by over one hundred presentations in twelve scientific sessions in areas of mathematics ranging from applied mathematics, number theory, and probability, to technology-based mathematics. The wide range of talks by outstanding researchers was also an excellent opportunity for scientists from both countries to observe their compatriots expositing on deep results from disparate fields of mathematics. All presentations were in English, with the Chinese researchers impressing their Canadian visitors on their command of the language. In addition to the one hundred and twenty established researchers participating in the congress, a large number of graduate students from several universities in the region were in attendance.

Over the course of the congress, a number of meetings were held between the heads of the Chinese and Canadian mathematics societies and research institutes, concluding with agreements in principle on a range of issues concerning future joint activities in the mathematical sciences, including important understandings on the training of graduate students. Most significantly, the second China-Canada Congress has been announced for the summer of 2001, to be held in Vancouver, Canada. The level of activity demonstrated by the congress has already led to funding successes for the Chinese research institutes.

In addition to the excellent hospitality extended by the local organizers, his Excellency Harold Balloch, Canadian Ambassador to China, along with the President of the Canadian Mathematical Society and the Directors of Canada's three mathematics research institutes, hosted a reception at the Canadian Embassy in honour of Brzustowski and Zhang, Presidents of NSERC of Canada and the NSF of China, respectively.

After four rich, fulfilling days of talks, discussion, and collaboration, Ghoussoub declared the conference closed. The Canadians' voyage concluded with a tour around the Forbidden City at the centre of Beijing, followed by a brisk march up a steep section of the Great Wall of China. The

last ride to the airport was enriched by lively, impromptu lessons by top mathematicians to their cabbies on colloquial English, appropriate for drivers fighting their way through Beijing's dense midday traffic.

A summary of sessions and presentors follows:

PLENARY TALKS:

Arthur, James (University of Toronto) *Harmonic analysis and group representations.*
Dawson, Donald (Fields Institute) *Superprocesses: from building blocks to universal classes.*
Fang Fuquan (Nankai University) *Recent progress.*
Friedlander, John (University of Toronto) *Prime values of polynomials.*
Gang Tian (Peking University) *Self-dual instantons and calibrated submanifolds.*
Han Houde (Tsinghua University) *Artificial boundary condition methods for problems in unbounded domains.*
Hong Jiaxing (Fudan University) *Boundary value problem of isometric embedding.*
Hu Hesheng (Fudan University) *Darboux transformations in differential geometry.*
Lalonde, Francois (UQAM) *Dymanical systems and elliptic methods in topology: towards an L-infinity geometry.*
Ma Zhiming (Academic Sinica) *Some results on path spaces and loop spaces.*
Shi Qingyun (Peking University) *Invertible integer transforms in image processing.*
Tomczak-Jaegermann, Nicole (University of Alberta) *From finite to infinite dimensions in Geometric Functional Analysis.*

SCIENTIFIC SESSIONS:

Special Session on Industrial and Applied Mathematics

Crainic, Teodor (Universite de Montreal) Shanghai Public Transportation Project

Technology-based Mathematics

Laflamme, Claude (University of Calgary), Lamoureux, Michael (University of Calgary), Lin Xiaoyan (Tsinghua University), Scharein, Rob (UBC), Taylor, Keith (University of Saskatchewan).

Number Theory, Algebraic Theory

Cai Maocheng (Academic Sinica), Jia Chaohua (Academic Sinica), Qui Derong (Tsinghua University), Wang Fuzheng (Peking University), Wang Juping (Fudan University), Zhang Xianke (Tsinghua University), Zhao Chunlai (Peking University).

Combinatorical Optimization

Alspach, Brian (SFU), Goddyn, Luis (SFU), Haxell, Penny (Waterloo), Heinrich, Katherine (SFU), Xu Mingqao (Peking University), Wagner, David (Waterloo).

PDEs and Dynamical Systems

Blumen, George (UBC), Campbell, Sue Ann (Waterloo), Gauthier, Paul (Universite de Montreal), Ghoussoub, Nassif (UBC), Gui Chanfeng (UBC), Jian Huaiyu (Tsinghua University), Jiang Meiyue (Peking University), Kamran, Nicky (McGill), Langford, Bill (Fields Institute), Li Chenzhi (Peking University), Li Jiayu (Academic Sinica), Li Tiecheng (Tsighua University,) Liu Peidong (Peking University), Long Yiming (Nankai University), Ma Li (Tsinghua University), Ruan Shigui (Dalhousie), Tang Yun (Tsinghua University).

Differential Geometry and Topology

Bland, John (University of Toronto), Boyer, Steven (UQAM,) Campbell, Eddy (Queen's), Chen, Jungyi (UBC), Dong Yuxi (Zhejiang University), Duan Haibao (Peking University), Hurtubise, Jacques (McGill), Jiang Boju (Peking University), Kane, Richard (UWO), Li Banghe (Academic Sinica), Li Haizhong (Tsinghua University), Ma Renyi (Tsinghua University), Qiu Duanfeng (Jilin University), Rolfsen, Dale (UBC), Ryan, Patrick (McMaster), Shen Yibing (Zhejiang University), Song Hongzao (Henan University), Tang Zizhou (Tsinghua University), Wang Changping (Peking University), Wang Hong (West-North Tech University), Zhang Weiping (Nankai University), Zhang Xingru (SUNY at Buffalo).

Probability Theory

Chen Mufa (Beijing Normal University), Gong Guanglu (Tsinghua University), Liang Zhongxia (Tsinghua University), Quastel, Jeremy (University of Toronto), Salisbury, Tom (York), Schmuland, Byron (University of Alberta), Walsh, John (UBC), Wang Yonjin (Nankai University).

Computational Mathematics

Brunner, Hermann (Memorial University), Cao Zhihao (Fudan University), Feng Shui (McMaster), Fortin, Michel (Laval), He Zhinqing (East China Tech Unversity), Hu Jianwei (Nankai University), Huang Huaxiong (York), Wetton, Brian (UBC).

Representation Theory and Mathematical Physics

Broer, Bram (Universite de Montreal), Carrell, Jim (UBC), Deng Shaoqiang (Nankai University), Gu Cahaohao (Fudan University), Kai Behrend (UBC), Liu Xufeng (Peking University), Liu Zhangju (Peking University), Pianzola, Arturo (University of Alberta), Wang Zhengdong (Peking University), Zeng Yunbo (Tsinghua University), Zhang Hechun (Tsinghua University), Zhao Kaiming (Academic Sinica), Zhou Mai (Nankai University).

Operator Algebras, Operator Theory and Signal Processing

Choi, Man-Duen (University of Toronto), Dean, Andrew (Fields Institute), Ding Ganggui (Nankai University), Elliott, George (University of Toronto), Giordano, Thierry (University of Ottawa), Gong Guihua (Fields Institute), Guo Kunyu (Fudan University), Jiang Chunlan (Hubei University Tech), Khalkhali, Massoud (UWO),

Luo Guiming (Tsinghua University), Mingo, James (Queen's), Peirce, Anthony (UBC), Peng Lizhong (Peking University), Zhou Xingwei (Nankai University).

Computational Mathematics and Numerical Analysis

Ascher, Uri (UBC), Bai Fengshan (Tsinghua University), Bai Zhongzhi (Academic Sinica), Li Zhiping (Peking University), Russell, Bob (SFU), Yang Dinghui (Tsinghua University).

World Mathematical Year 2000: SYMPOSIUM ON THE LEGACY OF JOHN CHARLES FIELDS

The United Nations Educational Scientific and Cultural Organisation and the International Mathematical Union have declared the year 2000 to be World Mathematical Year.

The aim is to promote and raise the public image of mathematics as a key to social and economic development. Countries around the world will be celebrating achievements in the mathematical sciences and looking at mathematical solutions to the challenges of the 21st century. Across Canada, activities are being planned which will integrate these aims. A centerpiece of the Canadian celebration is The Legacy of John Charles Fields symposium set for June 8 and 9, 2000, at the Royal Ontario Museum and organised by the Fields Institute. The project will raise awareness of the Canadian visionary and his exceptional legacy to the world of mathematics. As one of the original research mathematicians in Canada, John Charles Fields established the world's highest award for achievement in mathematics known internationally as the Fields Medal; often referred to as the "Nobel Prize of Mathematics" and is highly revered.

The symposium will include scientific and public lectures by some of the Fields medallists, an historical lecture as well as a documentary on the life and times of John Charles Fields, his legacy and its impact through the work of the Fields medallists. P-L. Lions (Paris), Vaughan Jones (Berkeley), Alain Connes (France), David Mumford (Harvard) and Stephen Smale (Berkeley/Hong Kong) are among the recipients of the Fields Medal. This is the first attempt to bring some of this century's leading thinkers together to explain their medal-winning work and its impact on the world. Sir Michael Atiyah of Oxford University and Edinburgh University, the only person with both a Fields Medal and a knighthood, will give a banquet address. The programme features public lectures of interest to teachers and students of mathematics. Many events will attract leading mathematicians from abroad. Other activities are aimed at young Canadians in hopes of inspiring them to pursue higher studies in mathematics, which will prepare them for rewarding careers in the new millennium.

The symposium is closely coordinated with the Joint Mathematical Societies Meeting, June 10 to 13, 2000 in Hamilton, which will unite the Canadian Mathematical Society, the Canadian Applied and Industrial Mathematics Society, and four other important Canadian conferences in the mathematical sciences.

The Fields medalists will be encouraged to extend their stay in Canada before and after the symposium, to visit and work with leading Canadian researchers. Sponsors are being sought to award visiting fellowships to talented young mathematicians from developing countries so they can join the Canadian celebration, meet and work with Canadian and international mathematicians, and take new insights home with them. The symposium is being coordinated with other Canadian WMY-2000 activities, including classroom projects and museum events across the country.

CMS MEMBERSHIP ...

The 2000 Membership Notices have been mailed. Please renew your membership before December 31st, 1999.

ADHÉSION À LA SMC ...

Les avis d'adhésion 2000 était postés. S'il vous plaît renouveller votre adhésion avant le 31 décembre 1999.

CMS Winter 1999 Meeting
Renaissance - Hôtel du Parc
Montréal, Québec
December 11 - 13, 1999

Fourth Announcement

Please refer to the Second and Third Announcements in the September and October issues of the *CMS Notes* for more complete information on the scientific, education and social programmes. This announcement features an updated timetable and any changes to the programmes previously announced. It also features the most updated listing of confirmed speakers and their titles. 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/

Meeting registration forms, abstract forms, and hotel accommodation forms may be found in the September issue of the *CMS Notes* and at our website.

Programme Updates

The Meeting Committee is pleased to welcome **Abraham Broer** (Montreal) as co-organizer of the Graduate Student Seminar and **Paul Arminjon** (Montreal) as the organizer of the Contributed Papers Session.

Speakers have now been announced for the symposia on *Orders, lattices and universal algebra* and for *Teaching of linear algebra*. Please refer to the updated listing of scheduled speakers and their titles, found below.

Acknowledgements

The support of the following organizations is gratefully acknowledged:
- Centre de recherches mathématiques
- Institut des sciences mathématiques
- Laboratoire de combinatoire et d'informatique mathématique
- Network for Computing and Mathematical Modeling
- The Fields Institute for Research in Mathematical Sciences
- The Pacific Institute for the Mathematical Sciences.

The CMS wishes to acknowledge the contribution of the members of the Meeting Committee for organizing this meeting and presenting these exciting scientific, educational, and social programs.

Meeting Committee

Meeting Director: Michel Delfour (Montréal)
Local Organizing Committee Chair: Véronique Hussin (Montréal).
Paul Arminjon, François Bergeron, Nantel Bergeron, George Bluman, Monique Bouchard (CMS ex-officio), Abraham Broer, Martin Goldstein, Michel Grundland, Lucien Haddad, Pierre Hansen, Alexandra Haedrich (ISM), Joel Hillel, Jacques Hurtubise (CMS ex-officio), Jacqueline Klasa, François Lalonde, Gilbert Laporte, Benoît Larose, Sabin Lessard, Paul Libbrecht, Wendy MacCaull, Thomas Mattman, Angelo Mingarelli, Richard O'Lander, Ivo Rosenberg, Christiane Rousseau, David Sankoff, Phil Scott, Ronald Sklar, Gordon Slade, Graham Wright (CMS ex-officio), Mike Zabrocki.

Items also published with this announcement

Updated Timetable - block schedule
List of Scheduled Speakers and Titles

In the next issue of the *CMS Notes*

Fifth Announcement
Updated Timetable - block schedule
Updated List of Scheduled Speakers and Titles

SPECIAL NOTICE!!

The Centre de recherches mathématiques invites all those attending the 1999 CMS Winter Meeting to join them in celebrating its 30th Birthday Party.
The evening registration will be held during the reception to be held at the University of Montreal on Friday, December 10, 1999, beginning at 6:00 p.m. Come join the celebration and pick up your registration packages for the CMS Winter Meeting 1999 at the same time.
For those who plan to attend this reception, please let us know by filling out a special registration form at www.CRM.UMontreal.CA. Additional information regarding the 30th anniversary programme and the evening's events will also be available at the web site.

Réunion d'hiver de la SMC
Renaissance Hôtel du Parc
Montréal (Québec)
du 11 au 13 décembre, 1999

Quatrième annonce

Veuillez consulter la deuxième et troisième annonce dans les numéros de septembre et octobre 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 révisé et tous les changements aux programmes annoncés précédemment. Vous trouverez ci-dessous la liste des conférenciers prévus et les titres des conférences. 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/

Un formulaire d'inscription, un formulaire de résumé et un formulaire de réservation d'hôtel étaient inclus dans le numéro de septembre des *Notes de la SMC* et au site Web.

Changements au programme

Le comité de coordination est heureux d'accueillir **Abraham Broer** (Montréal) comme co-organisateur du Séminaire des étudiants aux cycles supérieurs et **Paul Arminjon** (Montréal) comme organisateur de la session des communications.

Les conférenciers des symposia intitulés *Ordres, treillis et algèbre universelle* et *l'enseignement de l'algèbre linéaire* sont maintenant annoncés. Consulter la liste des conférenciers et des titres ci-dessous qui a été mise à jour.

Remerciements

Nous remercions les organisations suivantes pour leur soutien financier

- Centre de recherches mathématiques
- Institut des sciences mathématiques
- Réseau de calcul et de modélisation mathématique
- Laboratoire de combinatoire et d'informatique mathématique
- The Fields Institute for Research in Mathematical Sciences
- The Pacific Institute for the Mathematical Sciences

La SMC tient à remercier tous les membres du comité de coordination pour l'organisation de la réunion et des activités scientifiques, éducationelles et sociales.

Comité de Coordination

Président et coordinateur : Michel Delfour (Montréal)
Présidente du Comité local : Véronique Hussin (Montréal).
Paul Arminjon, François Bergeron, Nantel Bergeron, George Bluman, Monique Bouchard (SMC ex-officio), Abraham Broer, Martin Goldstein, Michel Grundland, Lucien Haddad, Alexandra Haedrich (ISM), Pierre Hansen, Joel Hillel, Jacques Hurtubise (SMC ex-officio), Jacqueline Klasa, François Lalonde, Gilbert Laporte, Benoît Larose, Sabin Lessard, Paul Libbrecht, Wendy MacCaull, Thomas Mattman, Angelo Mingarelli, Richard O'Lander, Ivo Rosenberg, Christiane Rousseau, David Sankoff, Phil Scott, Ronald Sklar, Gordon Slade, Graham Wright (SMC ex-officio), Mike Zabrocki.

Documents publiés avec cette annonce

Horaire et programme révisé
Liste des conférenciers prévus

Dans le prochain numéro des *Notes de la SMC*

Cinquième annonce
Horaire et programme à jour
Liste des conférenciers prévus á jour

AVIS SPÉCIALE!!

Le Centre de recherches mathématiques invite tous les participants de la Réunion d'hiver 1999 de la SMC à célébrer le 30e anniversaire du CRM.
L'inscription du vendredi, 10 décembre 1999, aura lieu à l'occasion d'une réception spéciale à l'Université de Montréal, prévue pour 18 h 00. On vous invite à célébrer avec nous et prendre possession de votre trousse d'inscription pour la Réunion d'hiver.
Afin d'avoir un juste aperçu du nombre de participants, nous vous prions de bien vouloir remplir le formulaire d'inscription sur le site web du CRM: www.CRM.UMontreal.CA. Veuillez consulter cette page d'accueil pour de plus amples renseignements sur le programme du 30e anniversaire et de la soirée.

CMS WINTER MEETING 1999 RÉUNION D'HIVER DE LA SMC
RENAISSANCE - HÔTEL DU PARC
3625, Avenue du Parc, Montreal (Québec) Canada

LECTURES : Conference Center — **SCHEDULE - HORAIRE** — **CONFÉRENCES : Centre de Conférence**

Time Heure	Thursday / jeudi December 9 décembre	Friday / vendredi December 10 décembre	Saturday / samedi December 11 décembre	Sunday / dimanche December 12 décembre	Monday / lundi December 13 décembre
8:00			Registration open from 8:00 a.m. to 5:00 p.m. Bureau d'inscription ouvert de 8:00 à 17:00 Coffee will be available in the Exhibit area / Le café sera servi dans l'aire d'exposition		
			12:00 - 17:00 Exhibits - Expositions	8:00 - 17:00 Exhibits / Expositions	
8:30			8:30 - 9:00 Welcome - bienvenue		
9:00			9:00 - 9:50 **ADRIANO GARSIA**	9:00 - 9:50 SESSIONS	9:00 - 9:50 **JIAN SHEN** PRIX DOCTORAT DE LA SMC CMS DOCTORAL PRIZE
10:00	9:00 - 16:00		10:00 - 10:30 **COFFEE BREAK / PAUSE CAFÉ**		
10:30	Executive Committee Meeting Réunion du Comité exécutif		10:30 - 11:20 **PAVEL A. PEVZNER**	10:30 - 11:20 **ZHIHONG XIA**	10:30 - 11:20 **ANDREAS DRESS**
11:00	Salon Jeanne-Mance Conference Center	11:00 - 13:00 CMS Development Group Groupe de développement Salon Laurier Conference Center	11:30 - 14:00 **DELEGATES' LUNCHEON** **LUNCH DES PARTICIPANTS** Renaissance-Hôtel du Parc	11:30 - 12:30 SESSIONS	11:30 - 12:30 SESSIONS
11:30					
12:30				12:30 -14:00 **LUNCH / DÉJEUNER**	12:30 - 14:00 **LUNCH / DÉJEUNER**
13:00		13:30 - 18:30 Board of Directors Meeting Réunion du Conseil d'administration Salon Des Pins Renaissance-Hôtel du Parc			
14:00			14:00 - 15:00 **DAVID C. LAY** PLÉNIERE EN EDUCATION EDUCATION PLENARY	14:00 - 15:00 **MACIEJ ZWORSKI** CONFÉRENCE COXETER-JAMES LECTURE	14:00 - 15:00 **ELLIOTT H. LIEB**

CMS WINTER MEETING 1999 RÉUNION D'HIVER DE LA SMC
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15:30			15:30 - 17:30 SESSIONS	15:30 - 17:30 Assemblée Générale General Meeting	15:30 - 18:30 SESSIONS 17:30 - 19:30 Forum sur l'enseignement de l'algèbre linéaire Forum on the teaching of linear algebra
				17:30 - 18:30 SESSIONS	
Evening		18:00 - 21:00 Reception Evening Registration Réception et inscription 30e anniversaire du CRM 30th Anniversary of the CRM University of Montreal	18:00 - 18:30 Reception (Cash bar) 18:30 - 19:30 **JENNIFER CHAYES** CONFÉRENCE GRAND PUBLIC PUBLIC LECTURE	18:30 - 19:00 Reception (Cash bar) 19:00 - 22:00 Banquet Renaissance-Hôtel du Parc	

SESSIONS WILL BE RUN IN PARALLEL ON ALL THREE DAYS OF THE MEETINGS.
CONTRIBUTED PAPER SESSIONS WILL BE RUN ON THE LAST DAY OF THE MEETING.

TOUTES LES SESSIONS SE DÉROULERONT EN PARALLÈLE PENDANT LES TROIS JOURS DE LA RÉUNION.
LA SESSION CONSACRÉE AUX COMMUNICATIONS EST PRÉVUE POUR LE DERNIER JOUR DE LA RÉUNION.

Centre de recherches mathématiques

30e anniversaire
30th anniversary

Le Centre de recherches mathématiques vous invite à célébrer son 30e anniversaire!

À l'occasion de son trentième anniversaire, le CRM organise, à l'Université de Montréal, un colloque d'une journée, le vendredi, 10 décembre 1999. L'événement précédera la Réunion d'hiver de la SMC qui aura également lieu à Montréal, du 11 au 13 décembre 1999. Six conférences d'une heure seront au programme:

The Centre de Recherches Mathématiques invites you to its 30th Birthday Party !

On Friday December 10th, 1999, a one-day conference will be held at the Université de Montréal to celebrate the CRM's thirtieth anniversary. The conference precedes the CMS Winter meeting, also held in Montreal (December 11th-13th, 1999) There will be six one-hour talks:

Nigel Higson, Penn State, *"Asymptotic Geometry of Groups and Analysis in C* Algebras"*
Ioannis Karatzas, Columbia, *"Probabilistic Aspects of Finance"*
Dusa McDuff, SUNY-Stony Brook, *"Symplectic Topology Today"*
Bill Miller, IMA, *"Mathematics in Industry: The IMA Experience"*
Peter Sarnak, Princeton, *"Equidistribution on arithmetic surfaces"*
Shing-Tung Yau, Harvard

Une réception en soirée clôturera cette journée. Afin d'avoir un juste aperçu du nombre de participants, nous vous prions de bien vouloir remplir le formulaire d'inscription sur le site web du CRM:**www.CRM.UMontreal.CA**

The conference will be followed by a reception, with a buffet, in the evening. You are kindly requested to fill out the registration form posted on the CRM web site: ***www.CRM.UMontreal.CA*** *so that we can get an idea of the number of people attending.*

Pour plus d'information: / *For more details:*
30e@CRM.UMontreal.CA

SCHEDULED SPEAKERS / CONFÉRENCIERS PRÉVUS

Here is a list of the confirmed speakers. Abstracts for all talks may be found at the following world wide web page after October 15:

http://www.camel.math.ca/CMS/Events/

Voici les conférenciers prévus à ce jour. Les résumés pour toutes les conférences seront disponibles à l'adresse Web suivante après le 15 octobre :

http://www.camel.math.ca/CMS/Events/

COXETER-JAMES LECTURE
CONFÉRENCE COXETER-JAMES

Maciej Zworski (Berkeley) *Asymptotic aspects in geometric functional analysis*

DOCTORAL PRIZE LECTURE
CONFÉRENCE PRIX DE DOCTORAT

Jian Shen (Queen's)

PLENARY SPEAKERS
CONFÉRENCIERS PRINCIPAUX

Andreas Dress (Bielefeld) *Virtual crystallography an tiling theory*
Adriano Garcia (USCD)*Update on the n! Conjecture*
David Lay (Maryland) *Recent advances in teaching of linear algebra*
Elliott H. Lieb (Princeton) *Stability of matter: from Schroedinger's equation to quantum electrodynamics*
Pavel Pevzner (USC) *Transforming mice into men*
Zhihong Xia (Northwestern & Georgia Tech) *N body problem, central configuration.....*

SYMPOSIA

ALGEBRAIC GEOMETRIC METHODS IN DIFFERENTIAL EQUATIONS: THE 20thCENTURY IN CELESTIAL MECHANICS AND ONE CENTURY OF WORK ON HILBERT'S 16th PROBLEM (CMS-CRM)
MÉTHODES ALGÉBRIQUES ET GÉOMÉTRIQUES EN ÉQUATIONS DIFFÉRENTIELLES: LA MÉCANIQUE CÉLESTE AU 20è SIÈCLE ET UN SIÈCLE DE TRAVAIL SUR LE 16è PROBLÈME DE HILBERT (SMC-CRM)

(Org: Angelo Mingarelli and Christiane Rousseau)

Jacques Bélair (Montréal)
Sue Campbell (Waterloo)
Florin Diacu (Victoria) *Dynamical systems given by quasi-homogeneous potentials*
F. Dumortier (Belgium)
Jean-Pierre Françoise (Paris)
John Guchenheimer (Cornell)
Ana Guzman (Mexico)
Philip Holmes (Princeton) *Non-holonomic and piecewise-holonomic mechanical systems*
Yulik Il'yashenko (Moscow & Cornell)
Angelo Mingarelli (Carleton) *Hamiltonian dynamical systems*
R. Moechel (Minnesota)
Ernesto Perez (Mexico)
Robert Roussarie (Dijon) *Melnikov functions and Bautin ideal*
Christiane Rousseau (Montréal)
D. Saari (Northwestern)
Dana Schlomiuk (Montréal)
Sergey Yakovenko (Weizmann)

APPLIED LOGIC / LOGIQUE APPLIQUÉE

(Org: Wendy MacCaull, Phil Scott and Prakash Panangaden)

Robin Cockett (Calgary) *Double glueing*
Josée Desharnais (McGill) *A Logical characterization of bisimulation for labelled Markov processes*
ideals
Esfandiar Haghverdi (Ottawa) *Linear logic, geometry of proofs and full completeness*
Peter Caines (McGill) *A logic for systems and control*
Amy Felty (Bell Labs) *A semantic model of types for proof-carrying code*
Franck van Breugel (York) *Towards quantitive verification of systems: A coalgebraic approach*
Marta Bunge (McGill) *Relative stone duality*
Doug Howe (Bell Labs) *Combining functional programming languages and set theory in support*

Alasdair Urquhart (Toronto) *Complexity problems for substructural logics*
François Lamarche (INRIA) *Spaces for linguistic representatives and the semantics of linear logic*
Gonzalo Reyes (Montreal) *Topics in synthetic differential geometry*
Joachim Lambek (McGill) *Bilinear logic in linguistics*
Fahiem Bacchus (Waterloo)
Robert Seely (John Abbott College) *Semantics for noncommutative linear logics*

ALGEBRAIC COMBINATORICS, GROUP REPRESENTATIONS AND MACDONALD POLYNOMIALS (CMS-CRM-LaCIM)
COMBINATOIRE ALGÉBRIQUE, REPRESENTATIONS DES NOMBRES ET POLYNÔMES DE MACDONALD (CRM-LaCIM-SMC)
(Org: François Bergeron, Nantel Bergeron and Mike Zabrocki)

Ed Allen (Wakeforest) *Bitableaux for some Garsia-Haiman modules and other related modules*
Jean-Christophe Aval (Bordeaux)
François Bergeron (UQAM) *Diagonal harmonics and generalizations*
Carol Chang (Northeastern) *Representations of quivers with free modules of covariants*
Tudose Geanina (York) *Littlewood-Richardson rule for a special fusion coefficients*
Victor Ginzburg (Chicago) *Principal Nilpotent pairs in a semisimple lie algebra*
Mark Hainman (UCSD) *The McKay correspondence and the n! conjecture*
Alain Lascoux (Marne da Vallé) *Graphe de Yang-Baxter*
Luc Lapointe (Montréal)
Jennifer Morse (UCSD) *A new basis for Macdonald polynomials.*
Siddharta Sahi (Rutgers)
Luc Vinet (Montréal)
Mike Zabrocki (UQAM-CRM) *Special Cases of Positivity for (formula) Kosta Coefficients*

COMPUTING AND MATHEMATICAL MODELLING (CMS-NCM2)
CALCUL ET MODÉLISATION MATHÉMATIQUE (SMC-NCM2)
(Org: Pierre Hanson and Gilbert Laporte)

TBA

GENERAL HISTORY OF MATHEMATICS
HISTOIRE GÉNÉRALE DES MATHÉMATIQUES
(Org: Richard O'Lander and Ronald Sklar)

Tom Archibald (Acadia) *Mathematics in France, 1870-1890: A view via doctoral theses*
Ed Barbeau (Toronto) *Bringing history close to home: Pell's equation*
Liliane Beaulieu (CRM) *Clips from Bourbakian skits*
Len Berggren (Simon Fraser) *Three geometrical gems from Islamic mathematics*
Jal Choksi (McGill) *A history of the convergence theorems of (Lebesgue) integration*
Suh Chun Chongs (Athabasca) *Historical background for sequences and calculus*
Hardy Grant (York) *Greek mathematics in cultural context*
Bernard Hodgson (Laval) *Histoire des mathématiques et formation des enseignants du secondaire : une expérience d'utilisation de textes originaux*
Norbert Schlomiuk (Montréal) *André Weil (1906-1998), in memoriam*
Ronald Sklar (St-John's) *Computational logic: 1950- 1965*
Viena Stastna (Calgary) *Math caught a wedding bouquet: young years of Sonja Kovalevskaja*
Peter Zvengrowski (Calgary) *Vector analysis and the great 1890's controversy*

GRADUATE STUDENT SEMINAR (CMS-ISM)
SEMINAIRE DES ÉTUDIANTS AUX CYCLES SUPÉRIEURS (SMC-ISM)
(Org: Abraham Broer, Alexandra Haedrich, Paul Libbrecht and Thomas Mattman)

Leo Butler (Queen's) *New examples of integrable geodesic flows*

MATHEMATICAL PHYSICS (CMS-PIms)
PHYSIQUE MATHÉMATIQUE(SMC-PIms)
(Org: George Bluman, Michel Grundland and Gordon Slade)

I. Probability Methods and Applications
Méthodes probabilistes et applications

Christian Borgs (Microsoft)
Almut Burchard (Virginia) *Minimal and random spanning trees in two dimensions*
Neal Madras (York) *Self-avoiding walks with drift*

Jeremy Quastel (Toronto)
Mary Beth Ruskai (Massachussetts) *Pauli exchange errors in quantum computation*
Yvan Saint-Aubin (Montréal) *Boundary states for a free Boson defined on finite geometries*

II. Group Theory Methods and Applications
Méthodes de la théorie des groupes et applications

Stephen Anco (Concordia) *Conservation laws of field equations*
Lyudmila Bantsur (Ternopil State Pedagogical University) *On one approach to the stability analysis of nonlinear systems*
Paul Bracken (Montréal & McGill)
Edgardo Cheb-Terrab (Simon Fraser)
John Harnad (Concordia)
Nicky Kamran (McGill) *Non-existence of time-periodic or quasi-periodic solutions of the Dirac operator in stationary axisymmetric black hole geometries*
A. Koudiavtsev
François Lalonde (Concordia)
Martin Légaré (Alberta)
Jiri Patera (Montréal)
Greg Ried (Okanagan)
Pavel Winternitz (Montréal)

MATHEMATICAL GENETICS AND GENOMICS (CMS-Fields)
GÉNÉTIQUE ET GÉNOMIQUE MATHÉMATIQUES (SMC-Fields)

(Org: Sabin Lessard and David Sankoff)

Kevin Atteson (Yale)
Andreas Dress (Bielefeld) *Cluster analysis and phylogenetic nets*
R.C. Griffiths (Oxford) *Ancestral inference from gene trees*
Tao Jiang (McMaster) *Quartet cleaning: efficient algorithms and simulations*
Ming Li (Waterloo) *Whole genome phylogeny*
Nicolas Shork (CWRU) *The future of genetic case-control studies*
Katy Simonsen (Purdue) *Probability models for genetic factors underlying a binary phenotype*
Simon Tavaré (USC) *The genealogy of branching processes and the reconstruction of tumor histories*
Elisabeth Thompson (Washington)

ORDERS, LATTICES AND UNIVERSAL ALGEBRA
ORDRES, TREILLIS ET ALGÈBRE UNIVERSELLE

(Org: Benoit Larose, Lucien Haddad and Ivo Rosenberg)

Stanley Burris (Waterloo) *Density in abstract number systems*
Isidore Fleischer (CRM, Montréal)
Jennifer Hyndman (UNBC) *Strong duality of finite algebras that generate the same quasivariety*
Hans-Karl Keiser (Wien, Austria)
Benoit Larose (College Champlain)
Hajime Machida (Hitsotsubashi University, Japan)
Bob Quackenbush (Manitoba) *Duality and nonduality theorems for finite groups*
Luigi Santocanale (UQAM) *Free μ-lattices*
William Trotter (Arizona State)
Shelly Wismath (Lethbridge) *Hyperdensities for star-band varieties*
Laszlo Zadori (Szeged) *Finite posets with symmetric idempotent operations*

TEACHING OF LINEAR ALGEBRA (CMS-ISM)
L'ENSEIGNEMENT DE L'ALGÈBRE LINÉAIRE (SMC-ISM)

(Org: Joel Hillel, Véronique Hussin and Jacqueline Klasa)

John Auer (Brock) *Ten years of teaching linear algebra using Maple V at Brock University.*
Jeffrey Boats (Detroit) *On using computer tutorials to tailor linear algebra for secondary teachers*
Bill Byers (Waterloo) *Working with ambiguity in linear algebra*
Bill Casselman (UBC) *Linear algebra with Java-based programmable calculator*
Daniel Norman (Queen's) *Teaching Linear algebra independence via unique representation*
Asuman Oktac (Concordia) *Linear algebra: Is it possible at a distance?*
Morris Orzech (Queen's) *Linear algebra and rigor–mixed messages as an opportunity*
David Poole (Trent) *Does linear algebra need to be "reformed"?*
Anna Sierpinska (Concordia) *Practical, theoretical, synthetic and analytic modes of thinking in linear algebra*
Gilbert Strang (MIT) *Partly random graphs and small world networks*

CONTRIBUTED PAPERS
COMMUNICATIONS LIBRES
(Org: Paul Arminjon)

Paul Gauthier (Montréal) *Les théorèmes Cauchy et Green pour connexite arbitraire*
Omar Kihel (Laval) *Sur un probléme de Diophante*
Konstantin Rybnikov (Queen's) *Loss of tension in an infinite membrane with holes distributed by a Poisson Law*
Peter Lancaster (Calgary) *Numerical ranges of selfadjoint quadratic matrix polynomials*
Claude Levesque (Laval) *Sur les sommes de puissances consécutives*
Wei-Jiu Liu (Dalhousie) *Adaptive control of Burgers' equation with unknown viscosity*
Martin Pergler (Chicago) *Connection preserving actions and observable and epimorphic subgroups*
Dominic Rochon (Montréal) *Dynamique bicomplex*
Dieter Ruoff (Regina) *Proportionality of non-Euclidean plane*
Michael Soltys *Boolean programs and quantified propositional proof systems*
Christina Stoica (Victoria) *The relative two-body problem in quasi-homogenous potentials fields*

COLLOQUE DES SCIENCES MATHÉMATIQUES DU QUÉBEC

May 5–7, 2000, Université Laval, Québec, Canada

Comme on le sait, l'année 2000 à été proclamée Année mondiale des mathématiques par l'UNESCO. Suite a une décision du CQEM (Conseil québecois pour l'enseignement des mathématiques), le Groupe des chercheurs en sciences mathématiques (GCSM) tiendra le Colloque de sciences mathematiques du Québec de mai 2000, conjointement avec

- l'AMQ (Association mathématique du Québec)
- l'APAME (primaire)
- le GRMS (secondaire)
- MOIFEM (Mouvement international pour les femmes et l'enseignement des maths)
- QAMT (Québec association of maths teachers)
- le GDM (Didactique des maths)

les 5,6 et 7 mai 2000 a l'Université Laval.
Le format de notre rencontre sera donc fort different de celui auquel nous sommes habitués. Nous chercherons en effet a tirer pleinement profit de la presence d'enseignants de tous les ordres d'enseignement - nous attendons plus de 1000 congressistes. En particulier, cette rencontre sera MOINS APPROPRIEE POUR DES PRESENTATIONS SPECIALISEES PAR DES ETUDIANTS DES DEUXIEME ET TROISIEME CYCLE, et nous vous invitons donc a prévoir, si cela est possible, que ces présentations aient davantage lieu lors de la rencontre de Sherbrooke de l'automne prochain (communiquer avec Pierre Yves Leduc a pierre.yves.leduc@DMI.USherb.CA) ainsi que lors de celle qui suivra a l'automne 2000.
Etant donné le caractere extraordinaire du Congres Mathématique de l'an 2000, nous sommes evidemment ouverts aux suggestions pour des conférences, ateliers, panels ou autres activités. Charles Cassidy represente le GCSM au sein du comité de programme (charles.cassidy@mat.ulaval.ca), et je suis pour ma part le représentant du GCSM au sein du comité organisateur, Frederic Gourdeau (frederic.gourdeau@mat.ulaval.ca).

Washington, D.C.

Joint Mathematics Meetings
Marriott Wardman Park Hotel and
Omni Shoreham Hotel

January 19–22, 2000

Abbreviated Program listing Invited Addresses, AMS Special Sessions, MAA Minicourses, MAA Contributed Paper Sessions, SIAM Minisymposia

For full program and registration materials, please refer to *Notices* and *Focus*, or see www.ams.org /amsmtgs/ 2026_intro.html.

Invited Addresses

Bruce Alberts, National Academy of Sciences, *Mathematics and science education: Some roles for mathematicians and scientists.* (AMS-MAA-MSEB)

Thomas F. Banchoff, Brown University, *Interactive geometry on the Internet.* (MAA Student Lecture)

Edward B. Burger, Williams College, *The Y2.1K Problem: What can the research and teaching community do to inspire a song other than "Math Suks"?*

Sun-Yung Alice Chang, U. C. L. A., *Title to be announced.*

Wade Ellis, Jr., West Valley College, *Mathematics and modeling.*

Ronald L. Graham, AT&T Labs Lucent Technologies, *Combinatorics at the crossroads: Progress, problems, and prospects.*

Brian Greene, Columbia University, *Title to be announced.* (AMS-MAA-SIAM)

Thomas C. Hales, University of Michigan, Ann Arbor, *The proof of the Kepler conjecture.*

Alexander R. Its, Indiana University-Purdue University, Indianapolis, *The Riemann-Hilbert Problem and integrable systems.*

Arthur M. Jaffe, Harvard University, *Reflections and twists.*(AMS Retiring Presidential Address)

Mikhail Lyubich, State University of New York at Stony Brook, *Dynamics of quadratic polynomials.*

Curtis T. McMullen, Harvard University, *Title to be announced.* (AMS Colloquium Lectures)

Karen H. Parshall, University of Virginia, *Looking back: An historian's perspective on American mathematics.*

George C. Papanicolaou, Stanford University, *Stochastic differential equations in financial mathematics: From Black-Scholes to the present.* (AMS-MAA-SIAM)

Sir Roger Penrose, Oxford University, *Title to be announced.* (AMS Josiah Willard Gibbs Lecture)

Carl Pomerance, Bell Laboratories - Lucent Technologies, *Prime numbers: What we still don't know.*

Floyd Williams, University of Massachusetts at Amherst, *Notes on quantum electrodynamics on a negatively curved surface and the Selberg-Maass trace formula.* (NAM William W. S. Claytor Lecture)

Margaret H. Wright, Lucent Technologies, *The mathematics of optimization.* (AWM Twenty-First Annual Emmy Noether Lecture)

AMS Committee on Science Policy-MAA Science Policy Committee Government Speaker, speaker and title to be announced.

SIAM Speaker, speaker and title to be announced.

Joint Special Sessions

The History of Mathematics, Karen H. Parshall, University of Virginia; and David E. Zitarelli, Temple University.

Innovative Development Programs for Teaching Assistants and Part-Time Instructors, Teri Jo Murphy, University of Oklahoma; Neil Calkin, Clemson University; and Ethel Wheland, University of Akron.

In Memory of Gian-Carlo Rota, Richard P. Stanley, MIT; and Rodica Simion, The George Washington University.

Linear Algebra and Optimization, Dianne P. O'Leary, University of Maryland, College Park, and Margaret H. Wright, Bell Laboratories.

Mathematics and Education Reform, William H. Barker, Bowdoin College; Jerry L. Bona, University of Texas, Austin; Naomi Fisher, University of Illinois, Chicago; and Kenneth C. Millett, University of California, Santa Barbara.

Mathematics in Business, Government, and Industry, Mary Lynn Reed and Navah Langmeyer, National Security Agency.

AMS Special Sessions

Algebraic Geometry and Commutative Algebra, Irena Peeva, Cornell University; and Hema Srinivasan, University of Missouri, Columbia.

Analytic Aspects of Jordan Theory, C. Martin Edwards, Oxford University; Kevin McCrimmon, University of Virginia; Bernard Russo, University of California, Irvine; and Gottfried Ruettiman, University of Bern.

Beautiful Graph Theory, Gary Chartrand, Western Michigan University; and Frank Harary, New Mexico State University.

Complex Hyperbolic Geometry and Conformal Geometry of the Heisenberg Group, William M. Goldman, University of Maryland; Hanna M. Sandler, American University; and Richard Schwartz, University of Maryland.

Control Theory for Partial Differential Equations, Robert Triggiani, University of Virginia.

Difference Equations and Their Applications in Social and Natural Sciences, Hassan Sedaghat, Virginia Commonwealth University; Abdul Aziz Yakubu, Howard University; Gerry Ladas, University of Rhode Island; and Saber Elaydi, Trinity University.

Effective Methods and Commutative Algebra, Anna Guerrieri, Universita Degli Studi dell'Aquila; and Irene Swanson, New Mexico State University.

Ergodic Theory and Topological Dynamics of Z^d and R^d Actions, E. Arthur Robinson, George Washington University; and Ayse A. Şahin, North Dakota State University.

The Feynman Integral and Applications, Michel L. Lapidus, University of California, Riverside; and Gerald W. Johnson, University of Nebraska.

Geometric Analysis, Paul C. Yang, University of Southern California; and Matthew J. Gursky, Indiana University.

The History of Topology *(in honor of Ralph Krause)*, Jack Morava, Johns Hopkins University.

Holomorphic Dynamics and Related Issues, Mikhail Lyubich, State University of New York at Stony Brook; Kevin Pilgrim, University of Missouri; and Michael Yampolsky, Institute des Hautes Études.

Homotopy Theory, W. Stephen Wilson and Jack Morava, Johns Hopkins University.

Integral Equations and Applications, Constantin Corduneanu, University of Texas at Arlington; and Mehran Mahdavi, Bowie State University.

Invariants of Knots and 3-Manifolds, Dubravko Ivansic, George Washington University; Mark E. Kidwell, U.S. Naval Academy; Jozef H. Przytycki and Yongwu Rong, George Washington University; and Ted Stanford, U.S. Naval Academy.

Mathematical Aspects of Consensus Theory, Melvin F. Janowitz, University of Massachusetts, Amherst.

Mistaken Philosophies in Mathematics Education, Seymour Lipschutz, Temple University.

Modular Forms and Elliptic Curves, and Related Topics, Sharon Frechette, Wellesley College; and Tamara Veenstra, University of Northern Iowa.

Nonlinear Eigenvalue Problems and Applications, Alfonso Castro, University of Texas, San Antonio; and Maya Chhetri and Ratnasingham Shivaji, Mississippi State University.

Operator Algebras, May M. Nilsen, University of Nebraska, Lincoln, and Texas A&M University; and David R. Pitts, University of Nebraska, Lincoln.

Operator Theory, Systems Theory, and Interpolation in Several Complex Variables, Joseph A. Ball, Virginia Polytech Institute & State University; and Cora S. Sadosky, Howard University.

Quantum Computation and Information, Samuel J. Lomonaco, Jr., University of Maryland, Baltimore County; and Howard E. Brandt, Army Research Labs.

Recent Advances in Complex and Harmonic Analysis, Carlos A. Berenstein, University of Maryland, College Park; Stephen D. Casey, American University; Bao Qin Li, Florida International University; David F. Walnut, George Mason University; and C. C. Yang, Hong Kong University of Science and Technology.

Research in Mathematics by Undergraduates, Darin R. Stephenson, Hope College; and Leonard A. VanWyk, James Madison University.

Singularities in Algbebraic and Analytic Geometry, Ruth I. Michler, University of North Texas; and Caroline Melles, U.S. Naval Academy.

Sixty Years of Mathematical Reviews, Jane E. Kister, Mathematical Reviews.

MAA Minicourses

Minicourse 1: *Mathematical Finance*

Minicourse 2: *Projects in Pre-Calculus, Calculus, and Differential Equations Using Biology and Chemistry Applications.*

Minicourse 3: *The Curves and Surfaces of the Digital Age.*

Minicourse 4: *Computer Based Modeling with Difference Equations and Matrices.*

Minicourse 5: *Exploring Abstract Algebra Topics through Interactive Labs.*

Minicourse 6: *Teaching with Web-Based Interactive Modular Materials.*

Minicourse 7: *Getting Students Involved in Undergraduate Research.*

Minicourse 8: *Facilitating Active Learning: Concrete Ways to Foster Student Participation.*

Minicourse 9: *Generating Functions: Techniques and Tricks.*

Minicourse 10: *Interdisciplinary Lively Applications Projects*

Minicourse 11. *Discrete Dynamical Systems: Mathematics, Methods, and Models.*

Minicourse 12: *Transforming Anxiety into Hatred: Rethinking This Standard Model of Reaching Liberal Arts Students and the General Public.*

Minicourse 13: *Teaching Contemporary Statistics with Active Learning.*

Minicourse 14: *Modern Physics and the Mathematical World.*

Minicourse 15: *The Fibonacci and Catalan Numbers.*

Minicourse 16: *Construction Projects and the Imagination.*

MAA Contributed Paper Sessions

The Use of History in the Teaching of Mathematics, Florence Fasanelli, College-University Resource Institute; V. Frederick Rickey, U.S. Military Academy; and Victor J. Katz, University of the District of Columbia.

Integrating Mathematics and Other Disciplines. William G. McCallum, University of Arizona; Duff Campbell, U.S. Military Academy; Deborah Hughes Hallett, University of Arizona; David C. Lay, University of Maryland; Nicholas Losito, SUNY Farmingdale; Jim Rolf, U.S. Military Academy; and Yajun Yang, SUNY Farmingdale.

Innovative Uses of the World Wide Web in Teaching Mathematics. Brian E. Smith, McGill University; and Marcelle Bessman, Jacksonville University.

Interdisciplinary Applications for College Algebra, Donald B. Small, U.S. Military Academy; Della D. Bell, Texas Southern University; and Ahmad Kamalvand, Houston-Tillotson College.

Interdisciplinary Collaborations to Improve Service Courses in Mathematics and Statistics, Linda H. Boyd, Georgia Perimeter College; and Thomas L. Moore, Grinnell College.

The Role of Mathematicians in the Development of Mathematics Teachers and Their Students, Diane Spresser, National Science Foundation; John S. Bradley, National Science Foundation; and Alfred B. Manaster, University of California, San Diego.

Looking to Our Future: Recruiting and Preparing the Next Generation of Mathematics Teachers, Jay A. Malmstrom, Oklahoma City Community College; Gary L. Britton, University of Wisconsin Washington County; Marjorie Enneking, Portland State University; James Loats, Metropolitan State College of Denver; and Mary Robinson, University of New Mexico.

Teaching Statistical Reasoning. K. L. D. Gunawardena, University of Wisconsin, Oshkosh; Nkechi M. Agwu, Borough of Manhattan CC; and Mary Sullivan, Rhode Island College.

Innovations in the Use of Technology in Teaching Ordinary and Partial Differential Equations, Timothy J. McDevitt, Millersville University; Elias Y. Deeba, University of Houston–Downtown; Richard J. Marchand, U.S. Military Academy.

Math and Math Sciences in 2010: What Should Graduates Know?, Herbert E. Kasube, Bradley University, and Harriet S. Pollatsek, Mount Holyoke College.

Establishing and Maintaining Undergraduate Research Programs in Mathematics, Emelie Kenney, Siena College; Joseph A. Gallian, University of Minnesota, Duluth; and Daniel J. Schaal, South Dakota State University.

Research on the Use of Hand-Held Technology in Teaching Mathematics, Deborah A. Crocker, Appalachian State University; and Penelope H. Dunham, Muhlenberg College.

Association for Research on Undergraduate Mathematics Education, Julie Clark, Emory and Henry College; M. Kathleen Heid, Pennsylvania State University; and Rina Zazkis, Simon Fraser University.

SIAM Minisymposia

Analysis of Krylov Space Methods in Numerical Linear Algebra, Anne Greenbaum, University of Washington.

3-D Navier-Stokes and Euler Equations, Basil Nicolaenko and Alex Mahalov, Arizona State University.

Title to be announced, Kathleen T. Alligood, George Mason University; and James Yorke, Institute for Physical Sciences and Technology, University of Maryland.

Discrete mathematics in Information Technology, Fan Chung, University of California, San Diego.

Association for Symbolic Logic: Two-day program.

AMS Short Courses

Quantum Computation: The Grand Mathematical Challenge for the Twenty-First Century and the Millennium. Samuel J. Lomonaco, Jr., University of Maryland, Baltimore County.

Environmental Mathematics, V. S. Manoranjan, Washington State University. Both Monday and Tuesday, January 17 and 18.

MAA Short Course

Fuzzy Mathematics, Kiran Bhutani, Catholic University of America, Monday and Tuesday, January 17 and 18.

CALL FOR NOMINATIONS / APPEL DE CANDIDATURES

2000 Canadian Mathematical Society Doctoral Prize
Le Prix de doctorat 2000 de la Société mathématique du Canada

The CMS Doctoral Prize is for recognizing 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, 2000**.

The documentation shall consist of:

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

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 2000**.

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

40th International Mathematical Olympiad (IMO)

by Ed Barbeau - 1999 IMO Team Leader

The "mathletes" and leaders with (back row, right) Mr. Corey Jack, Vice-President of the Bank of Montreal Institute for Learning, get ready for the 1999 IMO

This year marked the fortieth International Mathematical Olympiad, and the nineteenth in which Canada took part. The Canadian team of six students consisted of:

David Arthur, Upper Canada College, Toronto, ON
Jimmy Chui, Earl Haig Secondary School, Toronto, ON
James Lee, Eric Hamber Secondary School, Vancouver, BC
Jessie Yin Lei, Hon. Vincent Massey Secondary School, Windsor, ON
David Nicholson, Fenelon Falls Secondary School, Fenelon Falls, ON
David Pritchard, Woburn Collegiate Institute, Toronto, ON

Jimmy Chui, the team leader and official Samuel Beatty competitor (an Ontario student supported by the Samuel Beatty Fund of the University of Toronto mathematics alumni), had competed in the 1998 International Mathematical Olympiad as had Jessie Lei. The team was accompanied by the Leader, Ed Barbeau, of the University of Toronto; the Deputy Leader, Arthur Baragar, of the University of Nevada in Las Vegas; and Dorette Pronk, of Calvin College in Grand Rapids, Michigan and Dalhousie University in Halifax. Arthur Baragar had actually been a member of the first Canadian team in Washington in 1981.

The selection of the team is the responsibility of the CMS International Mathematical Olympiad Committee under the direction of Bill Sands of the University of Calgary. It is a process that involves many factors. Students are expected to enrol in the Mathematical Olympiads Correpondence Program that exposes them to Olympiad problems, helps them gain experience and background and provides an initial evaluation. Those who show promise write a time-limited examination in November, which, together with results in the Canadian Open Mathematics Competition, provide a basis for invitation to the IMO Winter Training Camp. This year, it was held at York University (January 7-10); the Society is extremely grateful to the Mathematics Department and Bethune College for their hospitality and the provision of accommodation and seminar rooms. In the spring, students write the Canadian Mathematical Olympiad, the Asian Pacific Mathematics Olympiad, and the USA Mathematical Olympiad. The IMO Committee considers high achievement on these contests as an important factor in the selection. Finally, by the middle of May, the team is selected and we have to deal with the practical issues of arranging travel and visas (for which the Romanian government graciously waived the fee of over $50), and scheduling the official Send-off Reception and the Summer IMO Training Camp.

The Ontario Minister of Education, Janet Ecker, presents James Lee with IMO shirt

The Send-off Reception was held at the Bank of Montreal Institute for Learning on Tuesday, June 29. It was a pleas-

ant occasion attended by a number of dignitaries, including Janet Ecker, the Ontario Minister of Education; Corey Jack, Vice-President of the Bank of Montreal Institute for Learning; Radu Gabriel Safta, the Consul-General for Romania in Toronto and Richard Kane, the President of the CMS. Press coverage included a story by Virginia Galt in the *Globe and Mail* of July 2. But it was not quite time to leave! There followed almost two weeks of training at Renison College at the University of Waterloo. Besides those who were accompanying the team, the Society is indebted to Christopher Small and Richard Hoshino (a recent Olympian) from the University of Waterloo and Ed Wang from Wilfrid Laurier University for helping out with the training. We are indebted to Peter Crippin for the arrangements.

The IMO Team take a training break at Niagara Falls

The Leader left for Romania on Friday, July 9 to join the International Jury of all the country leaders at Brasov to make up the paper. We were in a very pleasant hotel in the Carpathian mountains, and our hospitable Romanian hosts treated the delegates to some fine evening meals and samples of Romanian culture at some of the local restaurants. The Deputy Leader, the Observer and team left for Bucharest on July 12, and were housed in the residences of the Polytechnical University close to the centre of the city. On Friday and Saturday, two 4-1/2 hour examinations were written, and then the deputies and observers moved into the Bucharest Hotel with the leaders to mark the papers and bring them before coordinators for confirmation of the marks. The papers were tough; the Romanian problem selection committee chose a slate of difficult problems from which to select the six questions.

The coordination process is a kind of negotiation. Three teams of two coordinators were appointed by the Romanians for each problem. Each leader and deputy brought their students' scripts which they had marked to discuss with the coordinators and to agree on the final mark. Often, accord was quickly reached, but we had some protracted discussions about a couple of our solutions, with some degree of success. However, the coordination was competent, efficient and fair, with coordinators and leaders attempting on the whole to find the maximum grade that could be justified according to what the student had written down.

There was a spare day between the completion of the marking and the Closing Ceremony. For the Romanians, it was a busy time preparing the final tabulation of marks, the certificates, medals and programs; for the rest, it was a time to be tourists and take a trip to Bran and Peles castles near Siniai. These were two contrasting structures. Bran castle, about 600 years old and perched on a height, was an idiosyncratic place with courtyards and occasionally cosy small rooms. Peles Castle, a nineteenth century building, was the soul of formality, a place where the last of Romania's kings could hold formal audiences and conduct affairs of state.

The leaders and deputies also had other outings around Bucharest, most notably to a park where interesting buildings from outlying villages in Romania had been moved to preserve an important part of the cultural heritage of the country. There are, in effect, three Bucharests, the elegant city of the early part of the century which earned it the sobriquet of "Paris of the East", the drab blocks of the Communist era and the coldly formal buildings in the centre of the city built in the declining years of the Ceaucescu dictatorship.

The IMO Team outside the House of the People in Bucharest, Romania with Carmen Toma, the guide (front left)

It was in the most grandiose of these formal buildings that the Opening and Closing Ceremonies were held. Ceaucescu's Palace conspicuously situated on a low hill is now the home of the Romanian parliament; it was a fine site for the festivities. It was here that our team members reaped the rewards of their efforts; there were bronze medals for our top three students, David Arthur, Jimmy Chui and David Pritchard.

The Canadian team ranked 31, tying with the Netherlands. The team worked hard in the training, mastering the background required for the contest, and did some nice work on the papers. Top-ranking teams are listed below. The maximum possible score for a team is 252; the minimum scores for gold, silver and bronze medals were, respectively 28, 19 and 12, out of a possible score of 42.

1.	China	182
1.	Russia	182
3.	Vietnam	177
4.	Romania	173
5.	Bulgaria	170
6.	Belarus	167
7.	Korea	164
8.	Iran	159
9.	Taiwan	153
10.	United States	150

Two members of the Canadian team will be eligible to try out for the team in the year 2000, when the IMO will be held in Korea; David Arthur and David Pritchard. To the rest, we send our best wishes for their university studies. Jimmy Chui and Jessie Lei will be studying engineering science at the University of Toronto; James Lee and David Nicholson will be studying mathematics at the University of Waterloo. However, there are many talented young students in the wings, and we need to bring them along to olympiad level. In particular, our students need lots of practice writing up clear and complete solutions, especially under pressure of time. The Society is fostering an increasingly intensive system of training and competition to identify and help develop these competitors, but is looking for members in all parts of the country who are willing to help out either in the training programs or as mentors to students in their areas.

It also requires a great deal of money for the Society to sponsor a full program of team preparation and participation, and it is very grateful to a number of sponsors for their open-handed generosity in providing funding and awards. The Society is grateful for the support of Industry Canada; Alberta Education; Department of Education, New Brunswick; Department of Education, Newfoundland and Labrador; Department of Education, Northwest Territories; Department of Education, Nova Scotia; Ministry of Education, Ontario; Ministry of Education, Quebec; Department of Education, Saskatchewan; Bank of Montreal; Sun Life Assurance Company of Canada; The Fields Institute; Samuel Beatty Fund; Senator Norman M. Paterson Foundation; Waterloo Maple Inc.; Dalhousie University; University of Calgary; University of Ottawa; University of Toronto and University of Waterloo.

COMMITTEES AT WORK

CMS Women in Mathematics Committee

Shelly Wismath, University of Lethbridge, Committee Chair

One of our projects is the compilation of a Directory of Canadian Women in the Mathematical Sciences. This project is funded by Nancy's Very Own Foundation, which has given us money to set up a directory on CAMEL, the CMS web server. Each directory listing consists of a cover page, showing name, contact address(es), and areas of interest in mathematics; participants may also include links to their own home page or curriculum vitae.

The directory currently contains about 60 entries. In order to increase this number, I'd like to ask readers to alert any women in your department who might be interested in participating. We particularly want to contact new graduate students, post-docs, and junior faculty, and ask your help in making them aware of our project.

You can find our directory, and information about how to join it, on the web at the address:

http://camel.math.ca/Women/WMpages/package

You can also reach us by e-mail at:

dcwms@camel.math.ca.

NEWS FROM DEPARTMENTS

University of British Columbia, Vancouver, BC

Promotion: Kai Behrend to Associate Professor, July 1999.

Carleton University, Ottawa, ON

Appointments: Ayse Alaca (Instructor, 1999-00); Saban Alaca (Instructor, 1999) Wojciech Jaworski (Asst. Professor, 1999-00); Abolfazl Monadi (Asst. Professor, 1999-00); Tariq Qazi (Instructor, 1999-00); Ann Woodside (Instructor, 1999-00); Bin Han (Asst. Professor from July 2000); Konstantin Rybnikov (Asst. Professor from Jan. 2002).

Retirements: Donald A. Dawson, Louis D. Nel.

Awards: A. K. Md. E. Saleh received the award "Best

Researcher from the Organization of Islamic countries." The award was made by the Islamic Educational, Scientific and Cultural Organization and the Islamic Society of Statistical Science.

Visitors: Mirjana Stojanovic (Novi Sad, Yugoslavia, analysis, September 1999); Istvan Agoston (Budapest, algebra, Fall 1999); Erzebet Lukacs (Budapest,algebra, Fall 1999); Blaire S.Spearman (Kelowna, number theory, October 1999); Qihua Wang (Beijing, statistics, May 1999–April 2000).

Université Laval, Québec, QC

Retirements: Prof. Radu Theodorescu (April 1999 after 30 years of service). Prof. Gunther Frei (September 1999 after 29 years of service).

Resignations: Prof. Cornelius Greither (May 1999)

Awards/Distinctions: Prof. Christian Genest received the first CRM-SSC Award at the Statistical Society of Canada annual meeting held in Regina in June 1999.

University of Manitoba, Winnipeg, MB

Appointments: Robert Craigen, Combinatorial Mathematics, July 1999;

Resignation: As of January 1, 2000, Lynn Batten leaves the University of Manitoba to take on a Professorship and personal Chair in Mathematics at Deakin University, Melbourne, Australia.

McMaster University, Hamilton, ON

Appointments: David J. D. Earn (Assistant Professor, October 1999, mathematical biology); Aaron Childs (Assistant Professor, July 1999, statistics)

Postdoctoral Fellowships: A. Cherhabili (January 1999, applied mathematics), D. Delic (July 1999, NSERC PDF, algebra), N. Diamantis (July 1999, number theory), P. Lu (July 1999, algebraic geometry), M. McCooey (July 1999, topology), D. Park (July 1999, gauge theory), E. Yalcin (July 1999, topology).

Memorial University of Newfoundland, St. John's, NF

Appointments: Yuri Bahturin (Professor, September 1999, algebra), Xiaoqiang Zhao (Assistant Professor, July 1999, applied mathematics).

Retirement: Dr. Louise Dionne, August 1999.

University of Ottawa, Ottawa, ON

Promotions: André Dabrowski, Professor,July 1999; Thierry Giordano, Professor, July 1999.

Appointments: Yves Bourgault, Assistant Professor, July 1999; Abdellah Sebbar, CMS Instructorship, July 1999.

Retirements: Chandrakant Deo, Rémi Vaillancourt.

University of Victoria, Victoria, BC

Distinction: Ian Putnam was elected a Fellow of the Royal Society.

Visitors: Junesang Choi, Dongguk University, Kyongju, Korea, (number theory and special functions) from August 1999, to August 2000.

University of Western Ontario, London, ON

Promotions: Masoud Khalkhali, with tenure, to the rank of Associate Professor, July 1999. Finnur Larusson, with tenure, to the rank of Associate Professor, July 1999.

Appointments: Paul Balmer, Postdoctoral Fellow, August 1999, number theory and algebraic K-theory.

Visitors: P. V. Paramonov, Moscow State University, complex analysis, January–February 2000.

Other News: Prof. Jan Minac is visiting MSRI in Berkeley in the fall term of 1999 to participate in the half year program "Galois Groups and Fundamental Groups."

York University, Toronto, ON

Promotion: Kim Maltman, Professor, January 1999

Appointments: Yun Gao, Assistant Professor, pure mathematics, July 1999; Huaxiong Huang, Assistant Professor, applied mathematics, July 1999; Scott MacKenzie, Associate Professor, information technology, July 1999.

Awards/Distinctions: Masoud Asgharian was awarded the 1998 Pierre Robillard Award. This award recognizes the best doctoral thesis in statistics defended at a Canadian university in 1998. Lee Lorch: Doctor of Science (honoris causa) Spelman College, May 16, 1999.

Did you know? ...

The CMS Office is on the University of Ottawa campus. All correspondence from participating Ontario universities can be sent IUTS - **free of charge.**

Saviez-vous que? ...

Le Bureau administratif de la SMC est situé sur le campus de l'Université d'Ottawa. Toute correspondance provenant d'une université ontarienne peut être envoyée **gratuitement** via IUTS.

UNIVERSITÉ McGILL UNIVERSITY – MONTRÉAL, QUÉBEC
DEPARTMENT OF MATHEMATICS AND STATISTICS
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES

The Department of Mathematics and Statistics of McGill University invites applications for a tenure track position in statistics at the assistant professor level.

A Ph.D. degree in statistical science is essential. Preferred areas of specialization are computational statistics, sample surveys and time series analysis, although not exclusively so. Preference will be given to applicants with a strong theoretical background in statistics, whose work is driven by applications.

The appointment is to begin July 1, 2000.

Applicants 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 K. GowriSankaran, 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 **November 30, 1999,** although the search will continue until the position is 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 un poste en statistiques au niveau de professeur adjoint, menant à la permanence.

Un doctorat en statistique est essentiel. Les domaines prioritaires sont l'échantillonnage, la statistique informatique ou l'analyse des séries chronologiques; ces priorités ne sont pas exclusives. La préference sera accordée aux candidats ayant une forte formation théorique en statistiques et dont les travaux sont motivés par des applications.

La date d'entrée en fonction sera le premier juillet 2000.

Les candidats devront avoir démontré leur capacité de mener à bien une recherche indépendante et de haut niveau. Parmi les critères de sélection des candidats figurent leurs réalisations en recherche, ainsi que leurs contributions potentielles aux activités de recherche du département et à ses programmes d'enseignement à tous les cycles.

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 electroniques d'au moins quatre répondants (dont un pourra commenter les qualités d' enseignant du candidat) doivent être envoyées à :

Professeur K. GowriSankaran, Directeur
Département de mathemátiques et statistique
Université McGill
805, rue Sherbrooke ouest
Montréal (Québec) Canada H3A 2K6

Les candidats doivent demander à leurs répondants d'envoyer leurs lettres de recommandation directement á l'adresse ci-dessus. Ils sont également invités á inclure en annexe á leur demande des copies de trois de leurs publications au plus.

Pour être prises pleinement en considération, les demandes devront être reçues **le 30 novembre 1999** au plus tard. Les recherches se poursuivront jusqu'a ce que le poste soit comblé.

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

UNIVERSITÉ McGILL UNIVERSITY – MONTRÉAL, QUÉBEC
SCHOOL OF COMPUTER SCIENCE

Tenure Track Assistant Professor

The School of Computer Science at McGill University wishes to invite applications for four tenure-track positions at the assistant professor level, to begin June 1st, 2000. Applications for more senior positions are also welcome. Areas of priority include, but are not limited to, software engineering, software verification, networks, architecture, real-time systems, machine learning, model-checking, reasoning with uncertainty, speech understanding and computational biology.

Hardcopy applications, including a curriculum vitae, a list of publications with copies of one or two sample reprints, a research proposal and the names and e-mail addresses of three references should be sent to:

The review process will start **November 15, 1999** and the search will continue until the positions are filled. Information about our department can be found at *www.cs.mcgill.ca*.

McGill University is committed to equity in employment and, in accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada.

Head, Search Committee
School of Computer Science
McGill University
McConnell Engineering Building, 318
3480 University Street
Montreal, QC
H3A 2A7

QUEEN'S UNIVERSITY – KINGSTON, ONTARIO
MATHEMATICS AND ENGINEERING

The Department of Mathematics and Statistics expects, pending budgetary approval, to make a renewable (tenure-track) appointment in Mathematics and Engineering at the Assistant Professor level to begin July 2000.
We seek candidates specializing in the areas of computational fluid dynamics, partial differential equations, dynamical systems, scientific computation, or statistical data analysis. Candidates must have an earned Ph.D. in Applied Mathematics, Statistics, or a closely related field.
Membership or eligibility for membership in a Canadian professional engineering association is required. Candidates are expected to have a strong research record, develop an independent research programme, be willing and competent to teach a broad range of applied mathematics/statistics courses, and supervise graduate students.
Interested candidates should arrange that a curriculum vitae, a description of teaching and research interests, at least three letters of recommendation, and copies of their three most significant publications are sent to the address below. At least one letter should comment on the candidate's teaching. Applications will be accepted until **December 17, 1999**, or until the position is filled.

Professor James A. Mingo, Associate Head
Department of Mathematics and Statistics
Queen's University, Kingston
Ontario, K7L 3N6, Canada
fax: (613) 533-2964
e-mail: position@mast.queensu.ca
http://www.mast.queensu.ca

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

UNIVERSITY OF MANITOBA–WINNIPEG, MANITOBA
DEPARTMENT OF MATHEMATICS

Applications are invited for two full-time tenure-track positions, subject to final budgetary approval, at the Assistant Professor level, commencing July 1, 2000, or as soon as possible thereafter. Minimum qualifications are a Ph.D. in mathematics, evidence of strong research potential, and a strong commitment to teaching at the post-secondary level. The area of specialization of primary interest is functional analysis. Other fields of interest are partial differential equations and current areas of geometry. However, a truly outstanding candidate in any area will be considered. Duties will include undergraduate and graduate teaching and supervision, research, and service-related activities. The salary range for the position is $42,524 to $65,040.

The University of Manitoba encourages applications from qualified women and men, including members of visible minorities, aboriginal peoples, and persons with disabilities. This advertisement is directed to Canadian citizens and permanent residents.

Further information concerning this position, the Department and the University may be obtained from our World Wide Web home page:

http://www.umanitoba.ca/faculties/science/mathematics/

Applicants should send a curriculum vitae and the names of three referees (together with e-mail addresses, if possible) to the address below, and they should include statements regarding research plans and teaching philosophy. At least one referee should be prepared to comment on the applicants teaching.

The deadline for applications is **November 30, 1999.** They should be sent to:

Chair of Search Committee
Department of Mathematics
University of Manitoba
Winnipeg, Manitoba R3T 2N2
e-mail: mathematics_dept@umanitoba.ca
telephone: (204) 474-8703
fax: (204) 474-7611

McMASTER UNIVERSITY – HAMILTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS
Algebra & Number Theory

The Department of Mathematics & Statistics, McMaster University, invites applications for a tenure track Assistant or Associate Professorship starting July 1, 2000.
Candidates should have a Ph.D. and a research record of high quality in a major area of Algebra or Number Theory, 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.
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, 1999** by:

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

McMASTER UNIVERSITY – HAMILTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS
Analysis

The Department of Mathematics & Statistics, McMaster University, invites applications for a tenure track Assistant Professorship starting July 1, 2000.
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. Areas of particular interest to the Department are Partial Differential Equations, Geometric Analysis, and Gauge Theory. 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, 1999** by:

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

McMASTER UNIVERSITY – HAMILTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS
Applied Mathematics & Statistics

The Department of Mathematics & Statistics, McMaster University, invites applications for a tenure track Assistant or Associate Professorship starting July 1, 2000.
Candidates should have a Ph.D. and a research record of high quality in a major area of Applied Mathematics or Statistics, 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.
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, 1999** by:

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

McMASTER UNIVERSITY – HAMILTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS
Post-Doctoral Instructorships in Mathematics

Applications are invited for post-doctoral fellowship positions in the Department of Mathematics & Statistics. These fellowships provide an opportunity to spend up to two years engaged in research, with a limited amount of teaching, and are particularly suitable for talented young mathematicians who have recently completed the Ph.D. degree.
The Fellowships are open to candidates of any nationality and selection will be based upon the candidate's research potential.
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.
Starting July 1, 2000, the stipend will be $34,000 plus a $2,000 grant for research expenses.
Applications and three letters of reference should be sent **by January 1, 2000** to:

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

We appreciate all replies to this advertisement, but only those applicants selected for our short list will be contacted.

McMASTER UNIVERSITY – HAMILTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS
Britton Post-Doctoral Fellowship in Mathematics

Applications are invited for the Britton Post-Doctoral Fellowship in Mathematics, named after our former colleague Dr. Ronald F. Britton. This Fellowship is intended for talented research mathematicians with a recent Ph.D. degree.
The Britton Fellowship is open to candidates of any nationality and selection will be based upon the candidate's research potential.
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.
The Britton Fellowship is tenable for a period of two years beginning July 1, 2000 at a salary of $36,000 per year plus a research grant of $4,000. Duties include research and the teaching of one course per year.
Applications, including three letters of reference, should be received **before January 1, 2000** by:

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

We appreciate all replies to this advertisement, but only those applicants selected for our short list will be contacted.

McMASTER UNIVERSITY – HAMILTON, ONTARIO
DEPARTMENT OF MATHEMATICS & 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, 2000.
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, 1999** by:

P.G. Sutherland, Dean
Faculty of Science
McMaster University
Hamilton, Ontario
Canada, L8S 4K1

UNIVERSITY OF OTTAWA / UNIVERSITÉ D'OTTAWA
DEPARTMENT OF MATHEMATICS & STATISTICS
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES

The Department of Mathematics and Statistics of the University of Ottawa invites applications from recent Ph.Ds for one tenure-track position at the assistant professor level beginning July 1, 2000.

Applications in all areas of mathematics and statistics are invited, but the department's priorities are modern applied mathematics, statistics, algebra and analysis. The candidate will be required to teach both in English and in French in the near future. Active bilingualism is a condition for tenure. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. Applicants should send a curriculum vitae, a research plan and arrange for three letters of recommendations to be sent to:

Erhard Neher, Chairman,
Department of Mathematics and Statistics,
University of Ottawa,
Ottawa, ON
Canada, K1N 6N5

by **December 20, 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, 25 of whom hold national research grants. Shared computing facilities (Sun, RS/6000) with mathematical and statistical software are available for the successful applicant. Please consult *http://www.science.uottawa.ca/mathstat* for further information.

Le Département de mathématiques et de statistiques 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 2000. 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, mais les priorités du département sont en mathématiques appliquées modernes, en statistique, en algèbre et en analyse. Dans un avenir rapproché, la candidate ou le candidat devra enseigner en français et en anglais. Le bilinguisme actif est une condition exigée pour la permanence. Conformément aux exigences prescrites en matière d'immigration au Canada, cette annonce s'adresse aux citoyens canadiens et aux résidents permanents. Les dossiers de candidature doivent comprendre un curriculum vitae, un plan de recherche et trois lettres de recommandation. Ils doivent parvenir au directeur du département,

Erhard Neher,
Département de mathématiques et de statistiques,
Université d'Ottawa,
Ottawa ON
Canada, K1N 6N5

au plus tard **le 20 décembre 1999.**

Les conditions d'emploi suivent les dispositions d'une convention collective. L' Université a une politique d'équité en matière d'emploi. Les femmes sont fortement encouragées à poser leur candidature.

L'Université d'Ottawa offre à plus de 25,000 étudiants une gamme complète de programmes d'études. 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 statistiques est composé de 28 professeurs dont 25 reçoivent des fonds de recherche d'organismes nationaux. Des ordinateurs (Sun, RS/6000) munis de logiciels de mathématiques et de statistique sont disponibles. Pour plus de renseignement voir *http://www.science.uottawa.ca/mathstat*

UNIVERSITY OF WATERLOO – WATERLOO, ONTARIO
DEPARTMENT OF PURE MATHEMATICS

The Department of Pure Mathematics at the University of Waterloo expects one or more tenure-track positions starting July 1, 2000. For one position, the Department is particularly interested in candidates whose research interests are related to Algebra or Number Theory, including their computational aspects. However candidates in any area of Pure Mathematics will be considered.

In order to be considered for a position, a Ph.D. is required. Postdoctoral experience is preferred. An appointment will be offered only to someone with very strong research and teaching qualifications. The closing date for receipt of applications is **January 14, 2000.** Applicants should submit their curriculum vitae, together with the names of at least three referees, and should arrange for letters of reference to be sent directly from the referees.

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.

This appointment is subject to the availability of funds. Please send applications to:

Dr. B. Forrest, Chair,
Department of Pure Mathematics,
University of Waterloo,
Waterloo, Ontario, Canada N2L 3G1
The department's Web page is at:
http://math.uwaterloo.ca/PM_Dept/homepage.html/

SIMON FRASER UNIVERSITY – VANCOUVER, BRITISH COLUMBIA
DEPARTMENT OF MATHEMATICS AND STATISTICS
Faculty Appointment in Mathematics

The Department of Mathematics and Statistics of Simon Fraser University has two positions in mathematics to be filled over the next two years. One position will start September 1, 2000, the second a year later. 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 appointments will most likely be made at the level of Assistant Professor although the department is seeking authorization to appoint at higher rank. The department's first priority is discrete mathematics; the second priority is for algebra or number theory. However, specialists in other areas may apply.
Applications, including a curriculum vitae and descriptive statements on research plans and teaching activities, should be sent **by 10 January, 2000** 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
These positions are 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.

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

NOVEMBER 1999 **NOVEMBRE 1999**

14–18 International Conference on Mathematics Education into the 21st Century (Cairo, Egypt)
Dr. A Rogerson: arogers@mgs.vic.edu.au

20–21 Canadian Department Chairs' Meeting, CRM, Montreal *bluman@math.ubc.ca*

29–Dec. 3 Group Theory and Computation (University of Sydney, Australia)
http://math.auckland.ac.nz/conference/groups-11-1999

DECEMBER 1999 **DÉCEMBRE 1999**

2–5 The Future of Mathematical Communication, 1999, MSRI (Berkeley, California)
http://www.msri.org/activities/events/9900/fmc99/

11–13 CMS Winter Meeting / Réunion d'hiver de la SMC (Université de Montréal)
http://cms.math.ca/CMS/Events/

JANUARY 2000 **JANVIER 2000**

7–15 NZMRI Mathematics Workshop (Kaikoura, New Zealand)
Rod Downey: rod.downey@vuw.ac.nz

14–16 Workshop on Operator Theory (University of New Brunswick – Fredericton)
Dan Kucerovsky (dan@math.unb.ca)

19–22 Joint Mathematics Meetings, including the 106th Annual Meeting of the AMS (Washington DC),
a WMY2000 event *www.ams.org/meetings/*

MARCH 2000 **MARS 2000**

6–10 Fourth International Conference on Operations Research (Havana, Cuba) *lorch@mathstat.yorku.ca*

MAY 2000 **MAI 2000**

5–7 Unified Congress of Mathematical Associations and Groups of Quebec (Université Laval), a WMY2000 event
pallascio.richard@uqam.ca

JUNE 2000 **JUIN 2000**

Canadian Mathematics Education Study Group Meeting (UQAM, Montreal) *Dates to be announced*

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

4–8 Canadian Annual Operator Algebra Symposium (Fields Institute, Toronto, Ontario) *elliott@math.utoronto.ca; choi@math.utoronto.ca*

8–9 Symposium on the Legacy of John Charles Fields (The Royal Ontario Museum, Toronto); a WMY2000 event
www.fields.utoronto.ca

10–13 MATH 2000 (McMaster University, Hamilton, Ontario)
Participating Societies include the Canadian Mathematical Society (CMS), the Canadian Applied and Industrial Mathematics Society (CAIMS), the Canadian Operational Research Society (CORS), the Canadian Symposium on Fluid Dynamics (CSFD), the Canadian Society for the History and Philosophy of Mathematics (CSHPM) and the Canadian Undergraduates Mathematics Conference (CUMC). A WMY2000 event
Monique Bouchard: meetings@cms.math.ca

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

JULY 2000 **JUILLET 2000**

10–14 Third European Congress of Mathematics (Barcelona)
3ecm@iec.es; http://www.iec.es/3ecm/info.htm

11–25 41st International Mathematical Olympiad (Korea)

31–Aug 7 International Congress on the Teaching of Mathematics (ICME-9)(Tokyo/Makuhara)
http://www.ma.kagu.sut.ac.jp/ icme9/

AUGUST 2000 **AOÛT 2000**

7–12 AMS Meeting (Los Angeles); a WMY2000 event
www.ams.org/meetings/

SEPTEMBER 2000 **SEPTEMBRE 2000**

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

DECEMBER 2000 **DÉCEMBRE 2000**

10–12 CMS Winter Meeting / Réunion d'hiver de la SMC (University of British Columbia, Vancouver, B. C.)
Monique Bouchard: meetings@cms.math.ca

JUNE 2001 **JUIN 2001**

2–4 CMS Summer Meeting / Réunion d'été de la SMC (University of Saskatchewan, Saskatoon, Saskatchewan)
Monique Bouchard: meetings@cms.math.ca

Canadian Mathematics Education Study Group Meeting (University of Alberta, Edmonton)

Annual Meeting of the Statistical Society of Canada
(Vancouver, British Columbia)

DECEMBER 2001 **DECEMBRE 2001**

CMS Winter Meeting / Réunion d'hiver de la SMC
(York University, Toronto, Ontario)
Monique Bouchard: meetings@cms.math.ca

JUNE 2002 **JUIN 2002**

CMS Summer Meeting / Réunion d'été de la SMC
(Université Laval, Québec, Québec)
Monique Bouchard: meetings@cms.math.ca

AUGUST 2002 **AOÛT 2002**

20–28 International Congress of Mathematicians,
(Beijing, China)
cms@math08.math.ac.cn; http://icm2002.org.cn/

DECEMBER 2002 **DECEMBRE 2002**

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

JUNE 2003 **JUIN 2003**

CMS Summer Meeting / Réunion d'été de la SMC
(University of Alberta, Edmonton, Alberta)
Monique Bouchard: meetings@cms.math.ca

DECEMBER 2003 **DECEMBRE 2003**

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

RATES AND DEADLINES / TARIFS ET ÉCHÉANCES

Net rates/Tarifs nets	**Institutional Members** **Membres institutionels**	**Corporate Members** **Membres organisationnels**	**Others** **Autres**
Full Page	$ 200	$ 375	$ 500
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February/février	December 15 décembre
March/mars	January 15 janvier
April/avril	February 15 février
May/mai	March 15 mars
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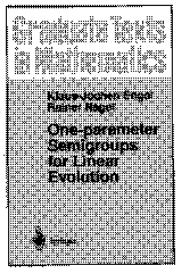
Les Notes de la SMC sont postées la première semaine du mois de parution. L'adhésion à la SMC comprend l'abonnement aux Notes de la SMC. Le tarif d'abonnement pour les non-membres est de 40 $ *CAN si l'adresse de l'abonné est au Canada et de 40* $ *US si l'adresse est à l'étranger.*

SPRINGER FOR MATHEMATICS

KLAUS-JOCHEN ENGEL and **RAINER NAGEL**, both, Universität Tübingen, Germany

ONE-PARAMETER SEMIGROUPS FOR LINEAR EVOLUTION EQUATIONS



This book gives an up-to-date account of the theory of one-parameter semigroups of linear evolution equations. It contains a systematic discussion of the spectral theory and the qualitative behavior of semigroups as well as many applications to partial differential equations, functional differential equations, and Volterra equations. This book is written for students and researchers interested in the theory of strongly continuous semigroups and in the applications of semigroup theory.

Contents: Linear Dynamical Systems • Semigroups, Generators and Resolvents • Perturbation and Approximation of Semigroups • Spectral Theory for Semigroups and Generators • Asymptotics of Semigroups • Semigroups Everywhere • History of the Exponential Function

1999/APP 616 PP/HARDCOVER/$49.95/ISBN 0-387-98463-1
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RICHARD SERFOZO, Georgia Institute of Technology, Atlanta

INTRODUCTION TO STOCHASTIC NETWORKS

This book describes several basic stochastic network processes, beginning with Jackson networks and ending with spatial queueing systems in which units move in a space or region where they are served. *Introduction to Stochastic Networks* is intended for graduate students and researchers in engineering, science, and mathematics interested in the basics of stochastic networks that have been developed over the last twenty years.

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APPLICATIONS OF MATHEMATICS, VOLUME 44

WERNER BALSER, Universität Ulm, Germany

FORMAL POWER SERIES AND LINEAR SYSTEMS OF MEROMORPHIC ODE

In this book the author presents the classical theory of meromorphic systems of ODE in the new light shed upon it by the recent achievements in the theory of summability of formal power series.

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UNIVERSITEXT

SERGE LANG, Yale University, New Haven, CT

SELECTA, VOLUMES I - IV

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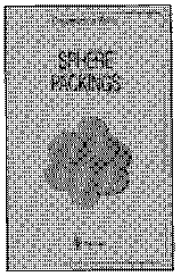
TERJE AVEN, Stavanger University College, Norway and **UWE JENSEN**, University of Ulm, Germany

STOCHASTIC MODELS IN RELIABILITY

1999/280 PP/HARDCOVER/$64.95/ISBN 0-387-98533-2
APPLICATIONS OF MATHEMATICS, VOLUME 41

CHUANMING ZONG, Chinese Academy of Sciences, Beijing, China and **JOHN TALBOT**, University College London, England

SPHERE PACKINGS



Sphere Packings is one of the most fascinating and challenging subjects in mathematics. Almost four centuries ago, Kepler studied the densities of sphere packings and made his famous conjecture. Several decades later, Gregory and Newton discussed the kissing numbers of spheres and proposed the Gregory-Newton problem. Since then, these problems and related ones have attracted the attention of many prominent mathematicians. This tract gives full account of this subject. It deals not only with the classical sphere packing problems, but also the contemporary ones; such as blocking light rays, the holes in sphere packings, and finite sphere packings. Not only are the main results of the subject presented, but also its creative methods from areas such as geometry, number theory, and linear programming are described. In addition, it contains short biographies of several masters of this discipline along with many open problems.

Contents: The Gregory-Newton Problem and Kepler's Conjecture • Positive Definite Quadratic Forms and Lattice Sphere Packings • Lower Bounds for the Packing Densities of Spheres • Lower Bounds for the Blocking Numbers and the Kissing Numbers of Spheres • Sphere Packings Constructed from Codes • Upper Bounds for the Packing Densities and the Kissing Numbers of Spheres I • Upper Bounds for the Packing Densities and the Kissing Numbers of Spheres II • Upper Bounds for the Packing Densities and the Kissing Numbers of Spheres III • The Kissing Numbers of Spheres in Eight and Twenty Four Dimensions • Multiple Sphere Packings • Holes in Sphere Packings • Problems of Blocking Light Rays • Finite Sphere Packings

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