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In this issue / Dans ce numéro

John Napier 1550-1617

by John Fauvel, The Open University

This article originally appeared in the December 2000 issue of the European Mathematical Society Newsletter.

Scotland has produced many creative and influential mathematicians — one thinks of James Gregorie, James Stirling, Colin Maclaurin and their many successors — but arguably the greatest and most original of all was the first Scottish mathematician of international renown, John Napier, who was born 450 years ago. Napier was indeed the first Scottish mathematician that we know about, and it is extraordinary that he created mathematics of the highest quality from within a country with no other mathematicians, with no mathematical tradition, and plunged into religious, political and social feuding. As his descendant Mark Napier wrote in 1834:

"As for Scotland, until Napier arose, it was only famed for mists that science could not penetrate, and for the Douglas wars, whose baronial leaders knew little of the denary system beyond their ten fingers."

Born in 1550, Napier was the eldest son in a wealthy and well-connected family who had been playing an increasingly important part in Scottish court and civic life over the hundred years leading up to his birth. His parents, Sir Archibald Napier and his wife Janet Bothwell, were both barely 16 when their son was born, and from the start John Napier was living in an atmosphere of political and religious disputation and intrigue: the Scottish Reformation was in full spate and Sir Archibald was strongly on the Protestant side, as his son was to be. This wasn't merely a theological but also a political-cum constitutional position, given the swirl of intrigue surrounding the Catholic Queen Mary, James V's daughter, and her Protestant-inclining son James VI (as he became).

At the age of thirteen, young John was sent to the University of St Andrews, where he lodged with the principal, John Rutherfurd, and where he tells us he developed his theological interests and strongly anti-Papist views. There is no record of Napier graduating from St Andrews, and it is supposed that he probably went to study abroad, as was fashionable among young Scots of his generation and class. He may well have studied in Paris, where he would have had an opportunity to develop his mathematical knowledge, and perhaps in Geneva too, where he could have learned Greek in a fiercely Protestant environment.

His being out of the country during the latter 1560s meant that he missed the excitements at the Scottish court such as the murder of Queen Mary's secretary David Rizzio, the murder of the Queen's husband Lord Darnley, the

(see NAPIER–page 5)

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NOTES DE LA SMC

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EDITORIAL

Peter Fillmore

A belated welcome to Ian Putnam, who has taken over the *Research Notes* column from Noriko Yui and James Lewis. The job requires an active researcher, one with the broadest possible range of interests, who is willing to take the necessary time away from research. Ian is one of Canada's leading research mathematicians, and we feel fortunate to have "bagged" a collaborator of his stature (as we did with Noriko and James before him). Please send him your ideas and comments about our research coverage.

The recent appearance in the **Notices of the AMS** 2000 Survey of Math and Stats New Doctoral Recipients reminded us again that such a survey is no longer conducted for Canada. In the US there were (in round numbers) 1100 new PhDs, 69% working in academia at a median starting salary of 41K, and 31% in government and industy at median starting salaries of 60K (government) and 72K (industry). What are the corresponding figures here? Unfortunately we just don't know. Perhaps the AMS could be contracted to find out.

In this issue we are pleased to reprint an interesting article about John Napier, which appeared originally in the December 2000 issue of the **EMS Newsletter**. This excellent publication of the European Mathematical Society is but one of its many impressive achievements since its founding in 1990. The Society has (as institutional members) the mathematical societies of Europe, as well as about 2000 individual members. It organizes the quadrennial European Congress of Mathematics (the next will be in Stockholm in 2004), oversees the European Mathematics Prizes, and publishes (since 1999) JEMS, the Journal of the EMS. For more about these and many other activities, see the EMIS website www.emis.de.

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C'est un peu en retard que je souhaite la bienvenue à Ian Putnam, qui a repris la chronique *Research Notes* dont s'occupaient Noriko Yui et James Lewis. Le rédacteur de cette chronique doit être un chercheur actif qui possède un très vaste champ d'intérêts et qui est prêt à sacrifier un peu de son temps de recherche pour se consacrer à la rédaction. Ian est l'un des plus grands mathématiciens canadiens, et nous sommes très fiers d'avoir «mis la main» sur un collaborateur de son envergure (tout comme l'étaient Noriko et James avant lui). N'hésitez pas à lui faire part de vos idées et de vos commentaires concernant cette chronique.

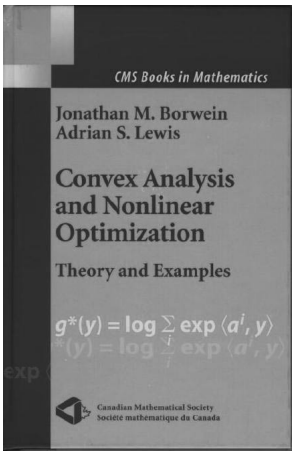
Dernièrement, la parution du «2000 Survey of Math and Stats New Doctoral Recipients» dans **Notices of the AMS** nous a rappelé qu'il n'existait plus de telle enquête au Canada. Aux États-Unis, on comptait en 2000 (chiffres arrondis) 1 100 nouveaux titulaires de doctorats, dont 69 % travaillaient dans les universités et touchaient un salaire médian à l'embauche de 41 000 $, et 31 % occupaient des postes dans l'administration publique ou l'industrie et touchaient un salaire médian à l'embauche de 60 000 $ (gouvernement) ou de 72 000 $ (industrie). Quels sont les chiffres correspondants ici? Malheureusement, personne ne le sait. On devrait peut-être demander à l'AMS de faire enquête...

Dans le présent numéro, nous reprenons avec plaisir un article intéressant de John Napier, paru à l'origine en décembre 2000 dans **le bulletin de la Société Mathématique Européenne** (SME). Cette excellente publication de la SME est l'une des nombreuses grandes réalisations de la Société depuis sa fondation, en 1990. La SME se compose des sociétés mathématiques d'Europe et compte en plus quelque 2 000 membres à titre individuel. C'est elle qui organise le Congrès Européen de Mathématiques, tenu aux quatre ans (le prochain aura lieu à Stockholm en 2004), qui remet les prix de mathématiques européens et qui publie (depuis 1999) le Journal of the European Mathematical Society (JEMS). Pour de plus amples renseignements sur la SME et une foule d'autres activités, rendez-vous au www.emis.de.

The Miraculous Properties of Convex Sets and Functions

Book review by Jean-Paul Penot, Université de Pau

Convex Analysis and Nonlinear Optimization. Theory and Examples
by Jonathan M. Borwein and Adrian S. Lewis,
CMS Books in Mathematics,
Springer-Verlag New York, 2000
xii+223 pp.



Convexity is one of the most ancient fields of study in mathematics: the Greeks devoted much attention to special convex polytopes, and in fact, the names these beautiful solids bear were given by Greek mathematicians. At the same time, convexity plays a major role in modern mathematics, in particular through optimization problems. Why is this so?

A first explanation stems from the simplicity of the notion. Convex cones are the subsets of a vector space which retain most of the linear structure, next to vector subspaces: they are stable under addition and homotheties. When intersected with affine subspaces, they give rise to convex subsets (and there is a reverse construction, called homogenization).

A second reason lies in the fact that convex sets and convex functions enjoy some miraculous properties. Continuity of a convex function propagates all over the interior of its domain and it holds as soon as the function is locally bounded above. Directional derivatives exist at each point of the interior of the domain of the function. Closed convex sets (or functions) are also weakly closed, so that existence results in reflexive spaces are easily available under a coercivity condition. Finally, for convex functions, necessary optimality conditions are also sufficient.

A third insight into the reasons of the success of convexity can be obtained by the observation that one has access to a calculus apparatus within convexity which is rich and powerful. It even has some superiority over ordinary differential calculus, since rules for functions obtained as infima and suprema are available. Moreover, an alluring duality theory enables one to transform a function into a conjugate function and a convex minimization problem into a dual one which may help in solving the primary problem. Furthermore, the passage from an analytical viewpoint to a geometrical approach and the reverse passage are easy and fruitful. It consists in associating to a function its epigraph (i.e. the set of points above the graph of the function), which is a convex set whenever the function is convex; in the reverse direction, to any convex set C one can associate its indicator function ι_C which assigns 0 to any point of the set and the value $+\infty$ to any point outside the set. In a normed vector space, one can also use the distance function.

The features just described are also characteristic of the fields known as nonsmooth analysis and nonsmooth optimization. These topics are also treated in the book, in a way which makes it appear as a natural extension of convex analysis and convex optimization. Another opinion claims that convex analysis and convex optimization are parts of the field of nonsmooth analysis; it does not differ much from the preceding view: convex analysis is the root of nonsmooth analysis and its model. In both cases the substitute for the derivative of a function f at some point x is a set $\partial f(x)$ called the subdifferential. In both cases the analysis is one-sided and inequalities are more prevalent than equalities. This fact indicates that both theories are able to treat problems of the real world in which inequalities and constraints are so prevalent.

In remarkably concise form (about 220 pages), the authors expound the basic facts of convex analysis and constrained optimization. But they offer much more: the reader gets the flavour of the most active themes of the field. This is achieved through a wealth of exercises and commentaries which supplement the text. Part of this material has not appeared in book form. Still, the exposition is gentle and intuitive, and the grading of the exercises makes them usable for teaching purposes. Although this book is not applications oriented, it contains a number of applicable topics (complexity, entropy, fixed point theory, spectral analysis of matrices, variational inequalities...) which make it suitable for courses in applied mathematics as well as in pure mathematics. In view of its emphasis on questions of optimization (optimality conditions of first and second order, duality, theorem of alternative...) it can be recommended for a course on optimization.

Among the most original subjects treated in the book are the ones dealt with in chapter 5: functions of eigenvalues of symmetric matrices, duality for semidefinite programming, convex process duality. This material can be considered as an appealing excursion out of the realm of classical linear algebra. The reader will be able to get

a general view of the results considered in the book by looking at one of the two lists which end the book. Let us extract from this 13 page-long list the following items: Fan's inequality, log-barrier functions, Rayleigh quotients, nearest points, BFGS updates, Ville's theorem, Schur-convexity, minimum volume ellipsoid, log-convexity, maximum entropy, Duffin duality gap, analytic center, Pareto minimization, tangency conditions, Fischer information function, condition number, KKM principle, cuscos... This short selection shows how lively are the topics illustrating the main results. It also shows that this list can prove to be useful in supplementing the index and the bibliography.

It may be surprising, to those who know them as leading researchers using the tools of functional analysis, that the authors almost entirely limit their treatment to the finite dimensional case. They explain their choice in the preface: for reasons of space and accessibility. In chapter 9, presented as a postscript, they indicate how finite dimensionality has played a critical role in the preceding chapters. They also point out the difficulties of extending the results displayed in the finite dimensional case by proposing a number of exercises and counterexamples. When infinite dimensional versions are possible, the adopted method of proof will enable the reader familiar with functional analysis to perform the extensions. Otherwise, the reader will find an infinite dimensional framework in the two recent references [A] and [Z] which may complete the present book and the classical monographs [R], [H], [L] and [H-U/L].

This book represents a tour de force for introducing so many topics of current interest in such a small space and with such clarity and elegance. It deserves to "make converts", a challenge the authors are about to win.

[A] D. Azé, *Analyse Convexe et Variationnelle*, Ellipses, Editions Marketing, Paris, 1997.

[H-U/L] J.-B. Hiriart-Urruty and C. Lemaréchal, *Convex Analysis and Minimization Algorithms*, Springer-Verlag, Berlin, 1993.

[H] R.B. Holmes, *Geometric Functional Analysis and its Applications*, Springer Verlag, New York, 1975.

[L] D.G. Luenberger, *Optimization by Vector Spaces Methods*, Addison Wesley, New York, 1969.

[R] R.T. Rockafellar, *Convex Analysis*, Princeton University Press, Princeton, N.J. 1970.

[Z] C. Zalinescu, *Convex Analysis in General Vector Spaces*, (expanded version of the Romanian book, *Mathematical programming in infinite dimensional normed spaces*, Editura Academiei Romane, Bucharest, 1998) (submitted).

FROM THE INSTITUTES

Workshop on Numerical Linear Algebra in Scientific and Engineering Applications

The Fields Institute for Research in Mathematical Sciences (http://www.fields.utoronto.ca) in Toronto, Ontario, Canada, will host a special program entitled "Numerical and Computational Challenges in Science and Engineering" (http://www.fields.utoronto.ca/programs/scientific/01-02/numerical/) from August 2001 to August 2002. One of the research areas emphasized in the Fall of 2001 will be numerical linear algebra, and this period will include a Workshop on Numerical Linear Algebra in Scientific and Engineering Applications

(http://www.fields.utoronto.ca/programs/scientific/01-02/numerical/linear_al gebra/).

The goal of the week-long workshop is to bring together computational scientists and researchers in numerical linear algebra to foster interaction and collaboration between the two communities. The workshop will highlight not only numerical linear algebra problems arising from computational science problems, but it will also present recent developments in the area of numerical linear algebra. The computational science areas will include, but are not limited to, biocomputing, computational chemistry, computational finance, computational physics, image and signal processing, and information retrieval.

The workshop will include both invited presentations and contributed papers. It will also feature one of the Fields Institute Coxeter Lecture Series, which will consist of three lectures to be delivered by Professor Gene H. Golub of Stanford University.

Organizers:
Gene H. Golub, Stanford University
Esmond G. Ng, Lawrence Berkeley National Laboratory

Advisory Committee:
Zhaojun Bai, University of California, Davis
Tony Chan, University of California, Los Angeles
Alan Edelman, MIT
Sabine Van Huffel, Katholieke Universiteit Leuven, Belgium
James Varah, University of British Columbia

Invited Presentations:
A tentative list of invited speakers include
Mark Baertschy, University of Colorado, Boulder
Peter Forsyth, University of Waterloo
Francois Gygi, Lawrence Livermore National Laboratory
Eldad Hebber, University of British Columbia

Marko Huhtanen, Stanford University
Lieven De Lathauwer, Universite de Cergy-Pontoise, France
Philippe Lemmerling, Katholieke Universiteit Leuven, Belgium
Jim Nagy, Emory University
Olavi Nevanlinna, Helsinki University of Technology, Finland
Haesun Park, University of Minnesota
John Reid, Rutherford Appleton Laboratory, UK
Jianbo Shi, Carnegie Mellon University
Baba Vermuri, University of Florida
Jacob White, MIT
Chao Yang, Lawrence Berkeley National Laboratory

Shor Delivers Fields Institute Distinguished Lectures on Quantum Computing

Reprinted from the September Fields Institute Newsletter

Peter Shor is a mathematician at AT&T Labs. His research interests include quantum computing, algorithmic geometry, and combinatorics and is recognized worldwide – perhaps most notably for his work in the theory of quantum computing.

Peter Shor

Quantum computation is the study of information processing in a quantum mechanical framework. Since information is stored in a physical medium and manipulated by physical processes, it is impossible to separate any meaningful theory of computing from the laws of physics which govern computers or other information processors. For most practical applications of computing, the classical approximation to the laws of physics has sufficed, and will probably continue to suffice. However, early in the twentieth century, it was realized that classical physics is wrong and a new framework for expressing physical theory was developed: quantum mechanics. But it wasn't until nearly the end of that century that scientists began to understand the non-trivial impact that quantum physics, as a more precise approximation to the laws of physics, has on the theory of computation.

A major breakthrough in understanding the power of quantum computing came in 1994, when Shor showed how one can factor large numbers with a quantum computer, using a sequence of computational steps comparable in number to the number of steps needed to multiply two numbers. In other words, if we allow quantum computational steps, we can factor efficiently.

Many public-key encryption systems in use today depend on the fact that factoring large numbers using current technology is exponentially harder than multiplying. That is, they assume that encoding the information is roughly as easy as multiplying, but cracking the code is exponentially harder and thus infeasible.

Another widely used class of public-key encryption systems assumes that finding discrete logarithms in various mathematical groups is hard. Shor also came up with an efficient algorithm for finding discrete logarithms. This algorithm can easily be generalized in order to crack any of the discrete logarithm based cryptographic systems.

Shor won the 1999 Godel prize for this work. His factoring algorithm was the topic of his first lecture on Thursday, May 17, at the Fields Institute.

The discovery of these algorithms forced scientists to take more seriously the question of whether or not quantum computers could really be built or if there is some fundamental reason why large-scale quantum computations cannot be done efficiently. We can never hope to manipulate quantum systems perfectly, so we need to know if there is a reasonable way of coping with some degree of inaccuracy. Shor again provided a major breakthrough on this front, pioneering the field of fault-tolerant quantum error correction.

Some of his more recent work includes an elegant new proof (with Preskill) of the security of quantum key distribution. He has also studied the capacity of various kinds of quantum channels for transmitting both classical and quantum information; this was the topic of his second Fields lecture on May 18.

His pioneering work in quantum computing earned him the 1998 Nevalinna Award, the 1998 International Quantum Communication Award, and a 1999 MacArthur Fellowship.

Mike Mosca (Waterloo)

AWARDS / PRIX

LMS Honours Morawetz

Cathleen Morawetz, shown at the CMS 50th Anniversary meeting with President Peter Fillmore. Photo courtesy of Paul Milnes.

Cathleen Synge Morawetz has been elected to Honorary Membership of the London Mathematical Society. In announcing her election the Society cited Professor Morawetz as "one of the most distinguished applied mathematicians in the United States and indeed worldwide." During the decade before the 1960s Cathleen Morawetz produced extremely ambitious and important results on transonic flow (flow near to the speed of sound), results that completely transformed theoretical and practical research in airfoil design. For such mixed hyperbolic/elliptic problems, she proved that "almost all" shapes of airfoil produce shock waves and an associated wave drag, and showed that any possible perturbation of a shock-free airfoil would develop shock waves. Her analytic and computational work was confirmed experimentally. Even so, careful transonic aerodynamic design can result in airfoils having very low wave drag at certain speeds. This knowledge follows from Cathleen Morwawetz's work, followed by that of Paul Garabedian.

In her later work, Professor Morawetz has produced important results on wave scattering, involving studies of hyperbolic equations and associated energy identities. She is a member of the United States National Academy of Sciences and in 1998 was a recipient of the United States National Medal of Science.

Prime Minister Honours Teachers

In May, Prime Minister Jean Chrétien announced the 2000-2001 recipients of the Prime Minister's Awards for Teaching Excellence (PMA) at a gala event on Parliament Hill in honour of national level winners. Fifteen teachers from across Canada received national recognition from Prime Minister Chrétien.

This year's recipients teach many different subjects, ranging from science to Spanish and music to mathematics, to children of different grades and differing ability levels. However, all share an innovative spirit in their teaching philosophies and methods which enrich their students learning experience, greatly increases class attendance and improve student performance. Many of the winners are also leaders in integrating information and communications technologies into their curricula.

A total of 65 awards were announced at the ceremony (15 national and 50 local). Awards are worth $5,000 at the national level and $1,000 at the local level. Funds are given to winning teachers' schools to be spent under the recipients' direction.

Among the national winners were mathematics teachers David Pilmer of Hants East Rural High School, Milford NS, and Connie Buchanan of White City School, White City SK. The local winners were Joanne Sparks of Mount Pearl Senior High School, Mount Pearl NF, Gail Wallace of East Kildonan Collegiate, Winnipeg MN, Vasile Bratu of Stratford Academic High School, Edmonton AB, Trevor Kolkes of Central Middle School, Dawson Creek BC, and Brian Kerr of King George Secondary School, Vancouver BC.

More details are available at the PMA web site www.schoolnet.ca/pma

(NAPIER–continued from page 1)

Queen's marriage to the Earl of Bothwell (the wedding ceremony being performed by Napier's uncle, the Bishop of Orkney), the forced abdication of Mary not long afterwards, and the coronation of her son James VI which helped mark the Protestantisation of Scotland. The next we hear of Napier himself is in the early 1570s. His father remarried in 1570 (Napier's own mother had died shortly after he went to St Andrews), and Napier himself married Elizabeth Stirling in 1573, receiving the Merchiston estate from his father as part of the wedding settlement.

There are five books in Napier's textual corpus, which were all first printed in Edinburgh:

Napier's first and indeed best selling book in its day was *A plaine discovery of the whole Revelation of St John,* published in 1593. This anti-papist tract made his reputation as a leading theologian, and went into numerous editions in many languages.

His next book, which did not appear for another twenty-one years, was on a quite different subject. *Mirifici logarith-*

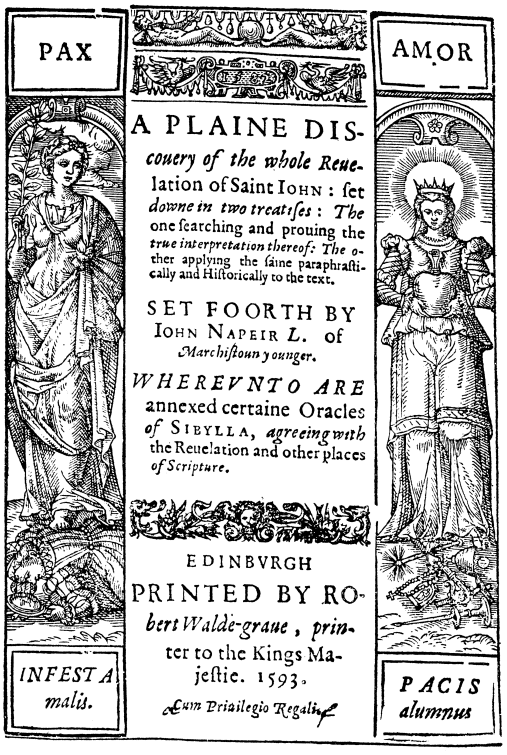
morum canonis descriptio, of 1614, 'Descriptio' for short, was the book that introduced logarithms to the world and established his reputation among mathematicians across Europe.

His next book, in 1617, the year he died, was called *Rabdologiae*. This was not about logarithms but about other devices and means of calculation.

Two years after Napier's death, in 1619, his son Robert brought out from his manuscripts a companion work, as it were, to the 1614 *Descriptio*, called *Mirifici logarithmorum canonis constructio,* 'Constructio' for short, which explained how logarithm tables were constructed.

Finally, 220 years later, another descendant, Mark Napier, edited more of his papers under the name of *De arte logistica* (1839).

First editions of the Descriptio, Rabdologiae and De arte logistica, as well as early editions of the other two, were in the Turner Collection at Keele University, UK, before that university secretly sold off the collection to a second-hand book dealer for a mess of pottage (see EMS Newsletter 31, pp.10-12, and 32, pp.14-15.)



Napier's fame in his own day was as the author of *A plaine discovery of the whole Revelation of St John.* This remarkable best-seller explains such pressing issues as just why the Pope is the Antichrist and how we know that judgement day will fall between 1688 and 1700. It is worth more attention from historians of mathematics than it has received, if less for its conclusions then for the process by which he reaches and explains those conclusions.

Given the assumption that the text of the book of Revelation contains predictions about the subsequent course of human history – which is not an unfair inference from the opening words: The revelacion of Jesus Christe, which God gave unto him, for to shewe unto his servauntes thynges which must shortly come to passe . . . Happy is he that redith, and they that heare the wordes of the prophesy . . . [Revelation Chapter 1, Tyndale translation] – and given that in the succeeding 1500 or so years some of the predicted events must have happened, then this gives clues about how to match up the language of prediction with the historic record. So what Napier was seeking to establish was a function, if you like, between two continua: the historic time-line from the time of Christ onwards, and the narrative time-line of St John's vision as presented in the Apocalypse which is being mapped onto it. To evaluate the functional correlation, he had to make considered judgements about what trumpets are, what seals are, what candlesticks are, and so on, the conclusions of which he presented in a series of 36 numbered propositions. Once the function is established, from the information about the past which you have, you are then in a position to use the correlation to work out the things you don't know - in particular, the date of the last judgement.

I've described Napier's procedure in his Plaine discovery in this functional way in order to point up the similarities with what he was later doing in constructing logarithms. Napier constructed logarithms through considering two moving points, P and L, say, moving along a finite and an infinite line respectively, in such a way that while L is moving at constant speed, in arithmetical progression, P is moving geometrically, its speed being proportional to the distance it still has to go. Then he defined the logarithm of the distance P had still to go as the distance the other point L has travelled. The idea that multiplication of terms in a geometric progression correspond to addition of terms in an arithmetical progression had long been familiar, from Greek times if not earlier. The fresh insight that Napier brought was to situate this in two continuous movements – he even uses the word 'fluxion' at one point – so that he could make inferences about one from what happened on the other.

So in very broad terms, both the Plaine discovery and Napier's construction of logarithms involve functional relationships between two continua, using information from one to make deductions about the other. It might be ill advised to push this parallel too far, but both are examples of Napier's overwhelming characteristic, his lateral thought in the service of making calculations easier. In some ways he was a computationalist, a calculator, even more strongly and more pervasively than he was the inventor of logarithms.

Part of his subsequent success and fame echoing down the ages is due to luck. It was amazing good fortune, which he

could not have anticipated, that logarithms turned out in the course of the century after his death to be not only a calculating device for astronomers and navigators – doubling the life of astronomers, as Laplace remarked – but also central to the development of mathematics itself. Already by the 1650s and 1660s it was becoming clear that logarithms were much deeper mathematical objects than their initial motivation might suggest, relating to the area measure of hyperbolas, and thus a vital tool for the integral calculus, as well as being thought of as an infinite series, which opened up another great swath of mathematical analysis. The fact that we still teach the logarithm function to young people who wouldn't have a clue how to use logarithm tables or even what they are for, indicates how Napier's invention has transcended its original use and purpose.

Napier's genius was fundamentally that of an amazingly gifted and innovative calculator. His all-pervading interest in calculating showed itself especially strongly in his remarkable little book *Rabdologiae* which appeared in 1617, the year of his death. This described three inventions for aiding calculations, the so-called Napier's rods, the promptuary, and a chessboard abacus.

Napier's rods, or Napier's bones, are a physical realisation of an old method of multiplying numbers, known since the middle ages in Europe and maybe in India long before that. Thus the concept was old but its physical realisation was new, demonstrating Napier's lateral technological thinking. Rabdologiae explains how to construct the rods as well as how to use them for multiplication and division, taking square roots and cube roots, and doing the rule of three. These became very popular and there are still many sets of rods, generally in wood or ivory, in our museums.

The promptuary was a more complicated and more powerful modification of the rods, enabling ready handling of much larger numbers. It uses flat cards rather than rods, but with rather similar markings and factorings. It is sufficiently sophisticated that it has been called 'the first calculating machine', though it's not quite a machine as we usually understand the term, its operation depending on quite a lot of manual manipulation. The only known example of a promptuary from the time of Napier is in the Archeological Museum in Madrid, and was only recognised for what it is in the last twenty years.

The third of Napier's calculational devices, his chessboard abacus, is the most innovative and of greatest conceptual interest, even though he described it as 'more of a lark than a labour'. The fundamental insight is that multiplication of binary numbers is more straightforward than multiplication in base 10, which of course computers got around to realising 350 years later. So in Napier's procedure decimal numbers are converted into binary, the operation is carried out (multiplication, division or whatever) and then the result is converted back into a decimal number. Notice two things. One is that this transformation of base is really quite radical and innovative – no one else had done this kind of thing before. The other thing you might notice is that the process of converting into different numbers, carrying out your operation and then coming back, is structurally the same as the logarithmic procedure; and indeed, one might argue, of his theological procedures.

Why do we remember John Napier? His deep significance may be that, along with others of his time, Napier was a central figure in the transformation of the mediaeval into the modern world-view, in a very specific way arising from his deep concern for computation and calculating effectiveness. We know the immediate context of logarithms and why they were taken up so widely and so rapidly: the need for ways of doing mathematical calculations was becoming evident to the navigators and others who were beginning to lay the foundations for the British imperial adventure. For some years, a century or more, it was increasingly clear that European expansion, geographically, in military engineering, in terms of trade and business practices, was predicated upon better mathematical skills. Napier happened to be working at a time when the idea of quantification was settling deep into the mindset of the movers and shakers of Renaissance Europe, and supplied a number of justifications for considering that how you handle and compute with numbers is a really important issue. In some ways there was nothing else like this conceptual revolution in the applicability of mathematics to the world until the statisticisation of inquiries in the 19th century.

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John Fauvel, who died earlier this year, was Senior Lecturer in Mathematics at the Open University, UK. This article is based on a lecture to commemorate the 450th anniversary of John Napier's birth, given at Napier University, Edinburgh, on 1 December 2000. The event was organised jointly by Napier University and the International Centre for Mathematical Sciences, Edinburgh.

EDUCATION NOTES

Ed Barbeau and Harry White, Column Editors

International Olympiad success

At the forty-second International Mathematical Olympiad held during the first two weeks of July in Washington, DC, Canada made a fine showing of placing 24th and gaining five medals and an honourable mention.

The six members of the 2001 Canadian IMO team were: Daniel Brox, Sentinel Secondary School, West Vancouver, British Columbia; Paul Cheng, West Vancouver Secondary School, West Vancouver, British Columbia; Liang Hong, University of Toronto Schools, Toronto, Ontario; Nima Kamoosi, West Vancouver Secondary School, West Vancouver, British Columbia; Roger Mong, Don Mills Collegiate Institute, Toronto, Ontario; and Shu Niu, Port Moody Secondary School, Port Moody, British Columbia. The Canadian team members, who must be less than 20 years old when they write the IMO, competed against 473 of the world's best students. The 2001 IMO contest was set by an international jury of mathematicians, one from each country, and was written on Sunday, July 8 and Monday, July 9, 2001. On each day of the contest, there are three questions to be solved with a time limit of four and one-half hours.

The 2001 Team Leader was Christopher Small (University of Waterloo) and the Deputy Team Leader was Dorette Pronk (Dalhousie University). Edward Wang (Wilfrid Laurier University) was the Leader Observer and Richard Hoshino (a Canadian IMO Silver Medalist in 1996) was the Deputy Leader Observer.

"This year's competition was one of the hardest IMOs in recent years. There were four problems among the six which were gold medal questions in the sense that they were challenging to the top students in the world," said Dr. Small, "Canada should be very proud of our six students and their performance at this year's IMO."

At the Awards Ceremony on July 13th, 2001 in Washington, a Gold Medal was awarded to **Daniel Brox** and Bronze Medals to **Paul Cheng**, **Liang Hong**, **Nima Kamoosi**, **Roger Mong**.

Although students compete individually, country rankings are obtained by adding the team's scores. The maximum score for each student is 42 and for a team of six students the maximum is 252. The Canadian team placed 24th out of 83 competing countries with a score of 100, placing ahead of Australia and the United Kingdom, and just behind Hungary.

The top 10 teams and their scores are: China (225), United States (196), Russia (196), Republic of Korea (185), Bulgaria (185), Kazakstan (168), India (148), Ukraine (143), Taiwan (141) and Vietnam(139).

Since 1981, Canadian students have received a total of 11 gold, 24 silver, and 48 bronze medals. The six members of the Canadian IMO team were selected from among more than 200,000 students who participated in local, provincial and national mathematics contests. Prior to leaving for the 42nd IMO, the team trained at the University of New Brunswick from June 17th to July 1st. The Society is grateful to Daryl and Maureen Tingley, Barry Monson and Roman Mureika who organized the session and assisted the four coaches in the training.

Sponsors of the 2001 Canadian IMO team included: the Ontario Ministry of Education; the Newfoundland and Labrador Ministry of Education; the Quebec Ministry of Education; the North West Territories Ministry of Education; Alberta Learning; the Saskatchewan Ministry of Education; the Canadian Mathematical Society; Sun Life Financial; the Samuel Beatty Fund; Maple Software Inc; Centre de recherches mathématiques; the Fields Institute for Research in the Mathematical Sciences; the Pacific Institute for the Mathematical Sciences; the Department of Mathematics and Statistics, University of New Brunswick at Fredericton; the Department of Mathematics and Statistics, University of Calgary; the Department of Mathematics, Simon Fraser University; the Department of Mathematics, University of Toronto; the Department of Mathematics and Statistics, University of Ottawa; and the Centre for Education in Mathematics and Computing, University of Waterloo.

The 43rd International Mathematical Olympiad will take place in Scotland in July 2002.

Breaking the Cycle of Ignorance

by John Mighton

John Mighton, who took his doctorate in knot theory last year at the University of Toronto, is not only a mathematician, but also a poet and a playwright. He was an advisor in the film Good Will Hunting, *in which he himself played a part as the graduate student assistant to Professor Lambeau. Of the five plays that he has written, one,* Possible Worlds, *received the Governor General's Award for drama in 1992.*

However, these distinctions are not the occasion for this article. Having taken a serious interest in mathematics only in his thirties, he has strong views about its accessibility to a broad public and how it should be taught. These induced him to found a tutorial program called JUMP. It is predicated on the hypothesis, as recent research is beginning to show, that with very few exceptions, children are born capable of learning anything, but that the system is markedly failing the many children who do not realize their potentials and lose interest and confidence in themselves. In the following statement of philosophy, John describes his beliefs and his goals.

John Mighton was the subject of an article written by Karen Shenfeld in the November 18, 2000 issue of Satur-

day Night; this is available in the archives on the website `www.saturdaynight.ca`.]

Imagine a school where the following ritual is observed: at the end of the year, after several days of coaching and preparation, the children are led to a cafeteria where tables have been set with plates of food, one for each child. A government official has inspected the plates; for a given grade, each plate holds exactly the same foods, in the same proportions at the same temperature. To encourage a feeling of fair play and sportsmanship, the children have been instructed not to touch a knife or fork until everyone is comfortably seated. At a signal from the teacher the children begin eating madly, trying to stuff as much food into their mouths as they can before a buzzer signals that the meal is over. Afterwards, the children are given a battery of tests to determine how well they are digesting their food.

Now imagine that only those children judged to be superior eaters are allowed to eat a full and balanced diet at school the following year. The teachers at the school, though well meaning, believe that only a few children are born with the capacity to digest their food properly; the rest, depending on what kind of stomach they inherit, can eat only one or two kinds of food, and even then, only in small quantities. When challenged to defend this belief, the teachers point to the vast number of weak and unhealthy students at the school: even those singled out for special attention continue to complain of stomach disorders when placed on restricted diets.

Now call to mind a typical public school in any developed country in the 21st century. Exams are offered rather than plates of food, but in what other ways do the two models of education differ? Why, in the parable, is the principle of the inequity of digestion so ill-conceived, while in our world the inequity of intellectual ability is the foundation of all education? Why, in the parable, are restricted diets and artificial tests so obviously means of perpetuating inequity, while in our world they are tolerated as a prudent response to the economic burden imposed by children?

Though we live in an age of scientific advancement, there is still a dangerous inertia in human thought, particularly when it pertains to humans. Only fifty years ago women and people with dark skins were universally held to be intellectually inferior to males with white skin. Having spent the last ten years working with young children in the public school system, I have become convinced that this kind of unexamined prejudice still underlies most of our thinking about intellectual (and even artistic) ability. Among animals of the same species, biologists tend to attribute differences in behaviour to differences in material condition; they test their hypotheses rigorously by varying these conditions. But ask any biologist if they are gifted in a subject like mathematics and they will almost certainly reply, “I don’t have that kind of brain”. (If one is speaking to an artist they’ll say, “I’m more of a right brain person”.) Twelve or thirteen years in oversized classes, in a system predicated on the idea that only a few students will excel: these factors are immaterial. Failure in this system stands as irrefutable evidence, even for the person failing, that one is not born to succeed.

JUMP (*Junior Undiscovered Math Prodigies*) is a tutoring program that was founded two years ago by eight volunteers and myself. Children, beginning in grade four or five, receive one hour of free private tutoring in mathematics once a week from October to May. The tutoring is guaranteed for the child up to grade twelve. Tutors teach from manuals in which the steps in every explanation are made as simple and as mechanical as possible; quite often a step is as simple as "Which of these two numbers is larger?" Students are constantly praised and encouraged to see themselves as brilliant; gradually they are led to guess the steps of the explanations themselves. One of the goals of this program is to demonstrate that children given this kind of tutoring can excel at math, even if they are failing or have been placed in remedial classes. At present, we have fifty volunteers working at three schools; within five years we hope to establish the program in schools across Toronto and, possibly, in the Third World.

It might seem that by reducing explanations to trivial steps one can only add tiny increments to a student’s knowledge; the slower children will become a little better at math, but only by parroting what they have learned by rote. At JUMP however, we have seen a great deal of evidence to the contrary. Scientists of all fields (except perhaps psychology) have begun to recognize that most natural systems exhibit chaotic or nonlinear behaviour. The system may be stable in most cases, but some tiny change of condition can have dramatic and often unpredictable results. If one adds reagent, one drop at a time, to a chemical solution, nothing may happen until, with the addition of a single drop, the whole mixture changes colour. I have seen similar nonlinear leaps in intelligence. My first student at JUMP was in a remedial grade five class; last year he graduated from grade seven with over 90% in math (and his teacher told his mother he was the smartest kid in the class). My second student couldn’t count to ten by 2’s even though she was in grade six; she is now in a regular class and in several areas is ahead of her grade level. The other tutors at JUMP have also observed many remarkable changes.

After seeing how children flourish with even a modest amount of attention, I have come to believe that when a child fails a test it should be regarded as a failure of our system of education. And when millions of children, year after year, fail tests they could easily pass, it should be regarded as the failure of an entire society to care for its young. If children are born with any natural proclivity it is surely to absorb knowledge, but we coerce them to learn by playing on their worst instincts, the fear of failure or jealousy (isn’t the reward we hold out for those who succeed the chance to be better than

(see EDUCATION–page 13)

RESEARCH NOTES

Ian Putnam, Column Editor

Canada Research Chairs Program

The Government of Canada recently developed the Canada Research Chairs program. It is an ambitious idea aimed at improving research in Canada, especially at universities. More information can be obtained from www.gc.chairs.ca .

Here are the chairs which have been appointed to date in Pure Mathematics, along with a brief description of their research. In a subsequent issue, we will describe the chairs appointed in Applied Mathematics.

Nantel Bergeron
York University

Nantel Bergeron has established an impressive track record in the development of new findings in combinatorics, geometry and algebra. As Canada Research Chair in Algebraic Combinatoric Structures, Dr. Bergeron will expand his work in solving algebraic problems using combinatorial tools.

The problems that he considers frequently come from areas such as geometry, topology, mathematical physics and computer science.

Nantel Bergeron

One of Bergeron's approaches is to experiment using computer software that performs symbolic exploration of combinatorial constructs. This experimental process suggests ideas for proofs or new conjectures.

Web page: www.math.yorku.ca/Who/-Faculty/Bergeron

David Brydges
University of British Columbia

David Brydges is moving from the University of Virginia to UBC. His work involves applications of probability and statistical mechanics to complex systems, including those used in computer science.

David Brydges

He has developed improved descriptions of complex physical phenomena in polymer physics, phase transitions and Coulomb systems and algorithms for computer simulations.

Microsoft recently launched a Theory Group headed by two mathematical physicists that follows these mathematical developments and considers their implications for increasingly sophisticated computer systems. David Brydges is expected to forge stronger ties with Microsoft's Theory Group.
Web page: www.math.virginia.edu/-b̃d5d

Walter Craig
McMaster University

Walter Craig is coming to McMaster University after teaching at the California Institute of Technology, Stanford University, and Brown University. He specializes in PDEs and their applications to a broad range of questions in fields as diverse as hydrodynamics and astrophysics. During the course of this work, he has also cultivated strong interdisciplinary links, particularly in theoretical physics and physical chemistry.

Walter Craig

Web page: www.math.mcmaster.ca/-craig/index

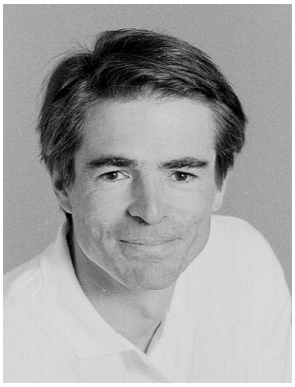
George Elliott
University of Toronto

George Elliot

George Elliott studies algebras of operators in Hilbert space. This overlaps such other areas of mathematics as geometry, topology and number theory. In particular, he is following up on the surprising discovery that virtually all naturally arising "norm-closed" algebras of operators in Hilbert space can be described completely in terms of very simple data. This is called the K-theory invariant, although in some circles it is

already being called the Elliott invariant. The importance of this simple description of what are called amenable C*-algebras - a very large class of objects with very complex structure - is that these objects arise in many areas of mathematics, and also in physics (in solid state physics, and string theory, for instance).

François Lalonde
Université de Montréal

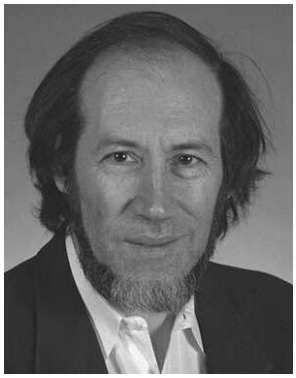


François Lalonde

François Lalonde is moving to Université de Montréal from UQAM. His work has helped to describe the mathematical behaviour of symplectic manifolds, classifying them as well as drawing basic conclusions about the stability and rigidity of their features. This research has been relevant both to mathematicians and mathematical physicists.

Web page: www.DMS.UMontreal.CA/-Professeurs/lalonde

François Soumis
École Polytechnique de Montréal



François Soumis

The work of Fran{ccois Soumis deals with optimization of large transportation systems. He develops optimization software to manage personnel and vehicles in systems such as aircraft, trains and buses.

Dr. Soumis discovered that organizational problems among players in the transportation industry have a mathematical structure. Very few researchers can bridge the gap between theory and practice so skillfully. His programs are now in use around the world, and because they improve operational efficiency, they were responsible for a 5% reduction in the wage bill of the air transport industry and a 6.2% reduction in Air France's wage bill for flight attendants. Dozens of capital cities like Tokyo, Vienna and Singapore now use Professor Soumis' programs to manage their urban transit services.

Professor Soumis' publications are authoritative in the field, both for their scientific value and for his incontrovertible demonstration that his theories work.

Web page: www.polymtl.ca/p270

Nicole Tomczak-Jaegermann
University of Alberta

Tomczak-Jaegermann works in an area of mathematics called Geometric Functional Analysis. It is the study of the geometry of infinite dimensional linear spaces, especially Banach spaces.

Nicole Tomczak-Jaegermann

(EDUCATION–continued from page 10)

everyone else, or to earn more money?). At JUMP students write tests, but without time restrictions and only when their tutors judge that they are prepared. As a result, they complete the test quickly and very few fail to achieve a passing grade of 80% on their first try.

Mathematicians often describe mathematics as a spiritual activity. This, of course, is surprising to most people. But mathematics, after all, is simply a different way of perceiving nature. It is a way of seeing symmetries and hidden connections that transcend the human imagination, a way of entering worlds that are so elegant and surprising they inspire a sense of awe. At JUMP we hope to encourage children to appreciate nature with all their faculties, allowing them to develop a deeper respect for the interconnectedness of all living things. At an early age they will be introduced, through games and enriched units, to the mathematics that underlies contemporary science: topology, group theory, graph theory and chaos theory, as well as to new mathematics stemming from chemistry, biology and computer science. Logic, argument analysis and even the mathematics of the environment (how our actions add up) will be taught. Eventually we hope to develop lessons in philosophy and the arts.

There is no scarcity in the world of ideas; when someone understands an idea its beauty is not consumed or used up. But everything in our present system of education seems designed to make real knowledge scarce, to keep the deepest ideas out of the hands of all but a few. A student graduating

from high school will likely believe (if they are lucky) that they have one or two talents, and that the majority of subjects offered at school are either uninteresting or beyond their grasp. In this sense our schools are quite efficient; twelve years is a relatively short time in which to close many doors forever.

Though the developed countires of the world presently have the resources to feed and educate everyone on earth, more than half the world's children still live in abject poverty. In affluent countries, violence, overconsumption and the destruction of the environment continue at the same pace. JUMP was founded in reaction to the institutionalized apathy and ignorance that underlie these problems. If children grow up frustrated and insecure, meeting only a fraction of their potential, unable to reason clearly or weight the consequences of their actions, and having witnessed few models of effective charity, they will easily be exploited and misled by corporations and politicians seeking gain. Until educated people devote themselves to breaking this cycle of ignorance, no amount of political action is likely to improve our condition. The profound love parents feel for their children, the money and time they lavish on their families, have not, to this day, been sufficient to change the world. Until we reach beyond our families, to children in need, we will continue to neglect the needs of the children closest to us, by passing on a world that is unfit for them to inherit.

CMS TRACTS IN MATHEMATICS
TRAITÉS DE MATHÉMATIQUES DE LA SMC

The Canadian Mathematical Society is pleased to announce the launch of a *new* series of short monographs and lecture notes:

La Société mathématique du Canada est fière d'annoncer le lancement de sa nouvelle collection de courtes monographies et de notes de cours :

Editors / Directeurs de collection :
K.R. Davidson and / et C.L. Stewart
Department of Pure Mathematics
University of Waterloo
Waterloo, ON N2L 3G1
tracts-editors@cms.math.ca

The CMS Tracts in Mathematics will consist of original monographs of about 150 to 200 pages giving an exposition of a research topic of current interest, or lecture notes for an advanced graduate level course.

The Editors encourage potential authors to contact them at an early stage. Final manuscripts should be submitted to the Editors for consideration. Authors of accepted manuscripts will be expected to provide a LaTeX file using the series style file, available from the CMS TeX Office (tex-editor@cms.math.ca).

The series is a joint publication with the American Mathematical Society. Volumes will be paperbound. The final TeX files will be produced by the CMS, and the books will be printed and distributed by the AMS.

Les Traités de mathématiques de la SMC seront des ouvrages originaux de 150 à 200 pages portant sur des domaines de recherche d'intérêt actuel, ou encore des notes de cours pour le deuxième ou le troisième cycle.

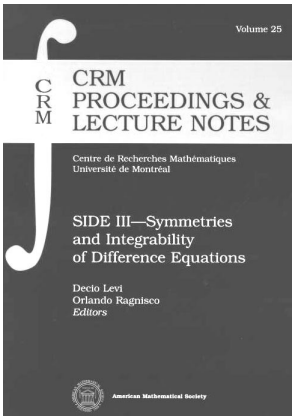
Les directeurs de la collection encouragent les auteurs potentiels à communiquer avec eux le plus tôt possible. Les directeurs procéderont à l'examen des textes finaux qui leur seront soumis. Les auteurs de textes acceptés devront remettre leur document en format LaTeX, composé à l'aide du fichier de style de la collection, qu'ils pourront se procurer au bureau de rédaction TeX de la SMC (tex-editor@smc.math.ca).

Les ouvrages de la collection, publiée en collaboration avec l'American Mathematical Society (AMS), seront des volumes brochés (à couverture souple). La SMC se chargera de préparer les fichiers TeX définitifs, et l'AMS, de l'impression et de la distribution des livres.

Symmetries and Integrability of Difference Equations

Book Review by Mourad E. H. Ismail, University of South Florida

SIDE III–Symmetries and Integrability of Difference Equations
CRM Proceedings and Lecture Notes, volume 25
American Mathematical Society, Providence 2000



This book contains the proceedings of the third conference/workshop on difference equations organized by a very active group of difference equations and integrable systems enthusiasts. I had the good fortune of attending SIDE III and SIDE IV and I was very impressed by the breadth and depth of the mathematics presented and by the diversity of the topics covered under the umbrella of Symmetry and Integrability of Difference Equations (= SIDE).

The techniques used in studying the subject fall in three categories: algebraic, analytic, and geometric. Many papers use combinations of these tools. One area which always seem to be well-presented at SIDE meetings in the area of discrete Painlevé equations, their classification, and their continuum limits. Of course, Toda lattices, the Hirota equation, and discrete integrable systems are at center stage. The study of singularities of discrete systems and the asymptotics of solutions of such systems is also a very active area. I look forward to seeing a clearly written book on singularity confinement and its applications, and I hope I will not have too long to wait.

In the 1970's, Geza Freud started studying what has become known as Freud polynomials, that is polynomials orthogonal with respect to $e^{-v(x)}$, v being a polynomial. He correctly conjectured the asymptotic form of the recursion coefficients of Freud polynomials and solved the case $v = x^4 4$. The general case was proved in the 1980's. In the 1970's it was also realized that recursion coefficients of polynomials orthogonal with respect to a measure $(\sum b_j x^j)du(x))$, solve the semi-infinite Toda equations in the times t_1, t_2, ..., when μ is independent of the time parameters. This brought orthogonal polynomials in general and Freud polynomials in particular to the subject of integrable systems and their discrete analogues. The organizers of the SIDE meetings attempted to attract speakers on orthogonal polynomials. They also recognized the potential applications of q-special functions and orthogonal polynomials to the analysis of difference equations, so the SIDE meetings normally have q-special functions experts who attend and/or lecture on related topics. I hope to see more of us (special functions types) attend the future SIDE meetings.

There is another group of researchers in difference equations which holds annual meetings and frequently special sessions at American Mathematical Society Annual Meetings. The SIDE group seems to have the advantage of attracting very powerful mathematicians like Calogero, Hirota, Kruskal, Miwa, Satsuma and Toda to their meetings. There is room for two groups in this area.

The book under review contains original research contributions as well as some review articles. I enjoyed reading the review articles which overlap with my research interests. I was also able to understand some of the technical research articles. I strongly recommend this volume to all libraries of research institutions and to mathematicians with interest in difference equations.

I noticed that "q-Spectral Functions", should be"q-Special Function" in the title of the paper by Atakishiyev. The paper by Dattoli deals with exponential generating functions of the form $\sum_1^m a_j t^j$, yet no reference or mention of the exponential formula for combinatorial enumeration. The exponential formula provides a combinatorial interpretation of sequences whose exponential generating function is $\sum_1^m a_j t^j$. For example the exponential formula explains what the author refers to as the Bell extension of the ordinary Hermite polynomials, (13), page 85.

CORRECTION ...

The incorrect email address for CMS Winter 2002 Meeting Director, Daniel Daigle was published in the September Call for Sessions. The correct address is ddaigle@uottawa.ca

L'adresse électronique du directeur de la Réunion d'hiver 2002 de la SMC, Daniel Daigle, publiée dans l'appel à communications de septembre était erronée. La bonne adresse est : ddaigle@uottawa.ca.

CEIC Update

Jonathan Borwein (Simon Fraser University)

As I've previously noted, I sit as Deputy Chair on the IMU's only standing committee: *Committee on Electronic Information and Communication.* The CEIC, (`www.math.ceic.ca`) founded in 1998 continues to make slow, but hopefully steady, progress on its charter, on issues of digital publishing, metadata, copyright and intellectual property. All are designed to offer the world mathematical community the greatest possible access to its own intellectual fruit. We met in Princeton, May 12-13. The CMS cosponsored a previous meeting in Berkeley in December 1999. The next meeting will take place in Vancouver, February 15-17, 2002 and it is intended to organize a meeting at which Canadians interested in such issues may also participate. The membership is Peter Michor (Austria, Chair), Jonathan Borwein (Canada), John Ewing (USA), Jonas Gomes (Brazil), Martin Groetschel (Germany), Wilfrid Hodges (UK), David Morrison (USA), Kapil Paranjape (India), Alf van der Poorten (Australia), Alexei Zhizhchenko (Russia), Qing Zhou (China).

In addition to writing a detailed report for the IMU Executive in Beijing, a principal goal is the development of a world-wide *MathNet* that allows one to obtain information about mathematicians and mathematics. The two primary steps are the installation of "secondary home pages" (institutional, departmental, and individual) and the integration of preprint services. The German prototype is flourishing at `www.math-net.de/`.

We are now looking for about 40 North American "beta-testers" and the CMS and the Vice Presidents' Departments have agreed to participate by installing these secondary homepages. In principle this is easy. I have also asked the three Institutes, to begin to prepare their preprints with the necessary metadata to have them easily found by the system. My own secondary pages can be seen at `www.cecm.sfu.ca/althome.html` and `www.cecm.sfu.ca/jalthome.html`. Interested individuals are invited to install similar pages. A web interface for the purpose lives at `www.math-net.de/project/-tools/pagecreator/index.en.html`

Copyright One of the substantial consequences of our last meeting was the following statement, written and recommended by the Committee on Electronic Information and Communication (CEIC) and endorsed by the Executive Committee of the IMU in its 68th's session in Princeton, NJ, May 14-15, 2001).

What do you want from your publisher? Executive summary for authors of research papers in journals.

"The number of mathematical papers that are stored or circulated as electronic files is increasing steadily. It is important that copyright agreements should keep in step with this development, and not inhibit mathematical authors or their publishers from making best use of the electronic medium together with more traditional media. While most mathematicians have no desire to learn the subtleties of copyright law, there are some general principles that they should keep in mind when discussing copyright for research papers with their publishers."

1. A copyright agreement with your publisher is a bargain struck between his interests and yours. You are entitled to look out for your interests. Most journal publishers have a standard copyright form, and may be unwilling to vary it for individual authors. But nothing prevents you from asking, if you see room for improvement. Pressure from authors may lead publishers to change their standard contracts.

2. Three groups of people have an interest in your paper:

   a. Yourself and your employer (who may in some countries be automatically the original copyright holder and hence a party to the copyright agreement);

   b. The journal publisher;

   c. Users of paper who are not parties to the copyright agreement, including readers and libraries. One of the main purposes of your copyright agreement is to control how your publisher or you make the paper available to this third group. Publishers will hardly allow individual authors to dictate agreements with libraries. But if you know that a certain journal publisher makes life hard for libraries, you can take this into account when choosing where to submit your paper.

3. There is no ideal copyright agreement for all situations. But in general your agreement should contain the following features:

   a. You allow your publisher to publish the paper, including all required attachments if it is an electronic paper.

   b. You give your publisher rights to authorize other people or institutions to copy your paper under reasonable conditions, and to abstract and archive your paper.

   c. Your publisher allows you to make reprints of the paper electronically available in a form that makes it clear where the paper is published.

   d. You promise your publisher that you have taken all reasonable steps to ensure that your paper contains nothing that is libellous or infringes copyright.

e.Your publisher will authorize reprinting of your paper in collections and will take all reasonable steps to inform you when he does this.

4. Should you grant full copyright to the publisher? In some jurisdictions it is impossible to transfer full copyright from author to publisher; instead the author gives the publisher an exclusive right to do the things that publishers need to do, and these things need to be spelt out in the agreement. This way of proceeding is possible in all jurisdictions, and it has the merit of being clear and honest about what is allowed or required.

A more complete copyright checklist was written by Wilfrid Hodges. It was approved and is recommended by the Committee on Electronic Information and Communication of the International Mathematical Union (IMU). A final version is lodged at `www.maths.qmw.ac.uk/personal/-wilfrid/copyright.html`. It will be posted in the near future.

The entire document may be viewed as a modest 'shot across the bows' of the publishers.

Opera Uniqua We also addressed the need to keep as much of our (older) literature available as possible. This was also endorsed by the Executive Committee of the IMU in Princeton.

Call to All Mathematicians

"*Open access to the mathematical literature is an important goal. Each of us can contribute to that goal by making available electronically as much of our own work as feasible. Our recent work is likely already in computer readable form and should be made available variously in TeX source, dvi, pdf (Adobe Acrobat), or PostScript form. Publications from the pre-TeX era can be scanned and/or digitally photographed. Retyping in TeX is not as unthinkable as first appears. Our action will have greatly enlarged the reservoir of freely available primary mathematical material, particularly helping scientists working without adequate library access.*"

Guidelines aimed at making such activity reasonably painless will also be circulated soon.

Pubmed: a warning Lest we think that these are only academic issues, I recently read the editorial in the Proceedings of the NAS by Nobelist Richard Roberts on PubMed/NIH which aims to have the bio-medical literature freely available within six months of publication .[1] I've been watching NIH's PubMed and similar initiatives develop and so the article was more interesting for its colour than detail. Roberts writes:

"*What is a reasonable delay? I would argue that 6 months seems a reasonable time for a journal to monopolize the content. Most of us would not dream of scanning the contents of a journal published 6 months ago unless we were searching for a specific article. Thus it seems unlikely that a large number of subscriptions would be lost if 6-month-old issues were made freely available. I think rather few worthwhile journals would be adversely affected if they were to institute such a policy.*"

While it is hard to oppose 'open access', his assertions are clearly not true of mathematics and any such successful venture would come close to destroying mathematical publishers like the CMS or the AMS. Without vigorous activity such as the IMU/CEIC are promoting, we are hostage to both the large academic publishers and the myopic views of our medical colleagues.

LETTER TO THE EDITORS

Prof Radjavi's letter in the September issue reminds me the time when, in the 70's, the U.K. changed into metric. Some people took it seriously. In a Physics Experiments book, there was a phrase "keep the burner an inch or two away ...". The new metric edition had corrected this to "keep the burner between 2.54cm and 5.08cm away ...".

I am still not worried too much about the need people seem to have to digitalise fractional notation indiscriminately. I hope they will realise their stupidity sooner or later. But then I just had a nightmare that the date to-day is not 4/11 (North American notation) nor 11/4 (Continental notation) but 0.363636 (respectively 2.75). That gets me!

Regards from the other side of the world. That is, 1/4 (sorry, 0.25) of the way around.

Michael Lambrou (University of Crete)

[1] Richard J. Roberts "PubMed Central: The GenBank of the published literature", Proc. Natl. Acad. Sci. USA, Vol. 98, Issue 2, 381–382, January 16, 2001 http://www.pnas.org/cgi/content/full/041601398v1

CALL FOR NOMINATIONS / APPEL DE CANDIDATURES

2002 Canadian Mathematical Society Doctoral Prize
Le Prix de doctorat 2002 de la Société mathématique du Canada

The CMS Doctoral Prize recognizes outstanding performance by a doctoral student. The prize is awarded to the person who received a Ph.D. from a Canadian university in the preceding 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.

Individuals who made a nomination last year can renew this nomination by simply indicating their wish to do so by the deadline date. Only materials updating the 2000 nomination need be provided as the original has been retained.

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, 2002**.

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.

Il est possible de renouveler une mise en candidature présentée l'an dernier, pourvu que l'on en manifeste le désir avant la date limite. Dans ce cas, le présentateur n'a qu'à soumettre des documents de mise à jour puisque le dossier original a été conservé.

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 2002**.

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

Editor-in-Chief - CRUX with MAYHEM / Rédacteur-en-chef - CRUX avec MAYHEM

The term of office of the present Editor-in-Chief of the Crux Mathematicorum with Mathematical Mayhem will end December 31, 2002.

The Publications Committee of the CMS now invites nominations for the next Editor-in-Chief to serve a five year term.

Applications should consist of a formal letter of application and include the following:

- A curriculum vitae
- An expression of views of the publication indicating if any changes in direction or policy are contemplated
- Since editorial responsabilities often necessitate a lessening of responsabilities in an individual's normal work, applicants should indicate that they have the support of their university department and, in particular of their head of department.

The Publications Committee will communicate its recommendation to the Executive Committee of the CMS in April 2002. Any input from the mathematical community concerning this important selection process is welcome.

Applications (with supporting material) and/or comments should be sent to the address below:

The deadline for the receipt of applications is **November 15, 2001**.

Le mandat des rédacteur-en-chef actuels du Crux Mathematicorum with Mathematical Mayhem prendra fin le 31 décembre 2002.

Le Comité des publications de la SMC sollicite des mises en candidatures pour les prochains rédacteur-en-chef pour un mandat de cinq ans.

Les mises en candidature doivent inclure une lettre formelle et les éléments suivants:

- Un curriculum vitae
- L'expression de votre opinion sur la publication indiquant si des changements de directions ou de politiques sont envisagés
- Puisque les responsabilités de rédaction nécessitent souvent une réduction dans la charge normale de travail, les candidats devraient indiquer qu'ils(elles) ont l'appui de leur département et en particulier, de leur chef de département.

Le Comité des publications transmettra ses recommandations au Comité exécutif de la SMC en avril 2002. Les commentaires de la communauté mathématique au sujet de cette importante sélection sont bienvenus.

Les mises en candiatures (avec matérial à l'appui) et/ou commentaires devraient être acheminés à l'adresse qui suivent:

L'échéance pour la réception des mises en candidature est le **15 novembre 2001.**

Editors-in-Chief - CMS Notes / Rédacteurs-en-chef - Notes de la SMC

The term of office of the present Editors-in-Chief of the *CMS Notes*, P.A. Fillmore and S. Swaminathan will end December 31, 2002. The Publication Committee of the CMS invites applications for the next Editor(s)-in-Chief to serve for a five year term. Applications should consist of a formal letter of application and a curriculum vitae. The Publication Committee will communicate its recommendation to the Executive Committee of the CMS in April 2002.

Applications and/or comments should be sent, by **November 15**, 2001 to the address below:

Le mandat du rédacteurs-en-chef actuels des *Notes de la SMC*, P. A. Fillmore et S. Swaminathan, prendra fin le 31 décembre 2002. Le Comité des publications de la SMC sollicite les mises en candidature pour le prochain rédacteurs-en-chef pour un mandat de cinq ans. Les mises en candidature doivent inclure une lettre formelle et un curriculum vitae. Le Comité des publications transmettra ses recommendation au Comité exécutif de la SMC en avril 2002.

Les candidatures et/ou commentaires devraient être acheminés, avant **le 15 Novembre 2001** à:

Address for Nominations / Addresse de mise en candidatures:
Keith Taylor, Chair / Président
CMS Publications Committee / Comité des publications de la SMC
Department of Mathematics and Statistics
University of Saskatchewan, McLean Hall, 106 Wiggins Road
Saskatoon, Saskatchewan S7N 5E6
chair-pubc@cms.math.ca

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 for two tenure-track positions starting July 1, 2002. One position will be for a recent Ph.D. at the Assistant Professor level. For the second position, the rank and salary will be commensurate with qualifications and experience. Applications in all areas of mathematics and statistics will be considered.

Applicants should send a curriculum vitae, a research plan, and arrange for four confidential letters of recommendations, with one addressing teaching, to be sent to :

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

Applicants are also encouraged to include up to three copies of their most significant publications. The evaluation of files will start October 15, 2001, but applications will be accepted until the positions have been filled.

Conditions of employment are set by a collective agreement. Employment equity is University policy and the University strongly encourages applications from women. Canadian citizens and permanent residents will be considered first for these positions.

Information about the department can be found at *http://www.science.uottawa.ca/mathstat.*

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Le Département de mathématiques et de statistique de l'Université d'Ottawa met en concours deux postes de professeur menant à la permanence. Entrée en fonction: le 1er juillet 2002. Un des postes, de niveau professeur assistant, s'adresse à des candidats ayant obtenu récemment leur doctorat. En ce qui concerne le second, le niveau ainsi que le salaire dépendront des qualifications et de l'expérience. Toute demande, dans quelque domaine que ce soit en mathématiques ou en statistiques, sera prise en considération.

Les candidat(e)s doivent faire parvenir leur dossier de candidature au directeur du département, Erhard Neher, Département de mathématiques et de statistique,

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

Les dossiers commenceront à être évalués à compter du 15 octobre 2001; on continuera toutefois d'accepter des demandes jusqu'à ce que les postes soient comblés. Les dossiers doivent comprendre le curriculum vitae, le plan de recherche, quatre lettres de recommandation confidentielles dont une sur l'enseignement ainsi qu'au plus trois tirés à part des contributions récentes les plus importantes du candidat(e).

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. On étudiera d'abord les demandes des citoyens canadiens et des résidents permanents.

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 invites applications for an anticipated tenure-track position starting July 1, 2002. The Department is particularly interested in candidates with research interests in algebra, number theory, geometry or topology, though outstanding 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 for applications is December 1, 2001.** 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, Canadian citizens and permanent residents will be given first consideration for this position. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native people, 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/

QUEEN'S UNIVERSITY – KINGSTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS

The Department of Mathematics and Statistics invites applications for a renewable (tenure-track) appointment in statistics at the Assistant Professor level to begin July 2002. The successful applicant will be expected to demonstrate potential for outstanding scholarship and research and show evidence of a commitment to excellence in teaching. Salary will be commensurate with qualifications and experience.
Interests of the present statistics faculty include: design of experiments, non-parametric statistics, time series, image analysis, statistical problems in biomechanics, queuing methodology, Bayesian data analysis and the teaching of statistical consulting. Opportunities exist for collaboration with research groups in the University in a variety of disciplines including clinical trials, statistical process control and ergonomics.
The Department offers a full range of graduate and undergraduate degrees in statistics including a Ph.D. program. Candidates should have a Ph. D. in statistics or a related area and will have begun an active research program. Candidates with some teaching experience are preferred.
Interested candidates should arrange for a curriculum vitae, a description of research interests, up to five publications or preprints, a statement on teaching or a teaching dossier, and at least three letters of reference, one of which should comment on the candidate's teaching, to be sent to the address below **by December 31, 2001.** Applications will be considered until the position is filled.

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

Canadian citizens and permanent residents will be considered first for this position.
Queen's University is committed to employment equity and welcomes applications from all qualified women and men, including visible minorities, aboriginal people, persons with disabilities, gay men and lesbians.

QUEEN'S UNIVERSITY – KINGSTON, ONTARIO
DEPARTMENT OF MATHEMATICS & STATISTICS

The Department of Mathematics and Statistics will be making at least one renewable (tenure-track) appointment in Mathematics and Engineering at the Assistant Professor level to begin July 2002. **Members of the Mathematics and Engineering group are currently active in the areas of communications and information theory, control, and dynamics and mechanics. The Department also has an interest in expanding into other areas including partial or applied differential equations, large scale scientific computation and statistical data analysis.**

Candidates must have a Ph.D. in applied mathematics, electrical, mechanical or chemical engineering, computer science, statistics or a closely related field. Membership or eligibility for membership in a Canadian professional engineering association is required. Normally, this requires an undergraduate engineering degree. Candidates are expected to have a strong research record, develop an independent research programme, and offer evidence of a strong ability and interest in teaching a range of applied mathematics/statistics courses and in supervising graduate students. Salary will be commensurate with qualifications and experience.

Interested candidates should arrange that a curriculum vitae, descriptions of teaching and research interests, at least three letters of recommendation, and copies of their three most significant publications be sent to the address below, preferably **before December 31, 2001.** Applications will be considered until the position is filled. At least one letter should comment on the candidate's teaching.

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

Canadian citizens and permanent residents will be considered first for this position. Queen's University is committed to employment equity and welcomes applications from all qualified women and men, including visible minorities, aboriginal people, persons with disabilities, gay men and lesbians.

UNIVERSITY OF WATERLOO – WATERLOO, ONTARIO
DEPARTMENT OF COMBINATORICS AND OPTIMIZATION

Applications are being invited for one or more tenure-track faculty positions, in any area of combinatorics and optimization, but especially in cryptography or quantum computing. While the intention is to make appointments at the rank of Assistant Professor, applications for positions at other ranks will be considered. A Ph.D. and significant evidence of ability in research and the potential for effective teaching are required. Responsibilities will include the supervision of graduate students, as well as teaching at the undergraduate and graduate levels. Successful candidates in cryptography or quantum computing will participate in the Centre for Applied Cryptographic Research or a proposed Institute for Quantum Computation at the University of Waterloo. Salary will depend on the candidate's qualifications. Effective date of appointment: July 1, 2002. These appointments are subject to the availability of funds. Canadians and permanent residents will be considered first for these positions. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples, and persons with disabilities.

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

Prof. W.H. Cunningham, Chair
Department of Combinatorics and Optimization
Faculty of Mathematics, University of Waterloo
Waterloo, Ontario, Canada N2L 3G1
e-mail: combopt@math.uwaterloo.ca
phone: (519) 888-4567 x3482 fax: (519) 725-5441
http://www.math.uwaterloo.ca/CandO_Dept/homepage.html

Closing date for receipt of applications is **December 15, 2001.**

UNIVERSITÉ DE MONTRÉAL – MONTRÉAL, QUEBEC
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES
Poste en mathématiques fondamentales

Le Département de mathématiques et de statistique de la Faculté des arts et des sciences de l'Université de Montréal recherche une professeure ou un professeur adjoint(e) à plein temps en mathématiques fondamentales. Le Département collabore étroitement aux activités du Centre de recherches mathématiques (CRM). Le poste est ouvert sous réserve d'approbation budgétaire. Pour toute information sur le Département ou le CRM, veuillez visiter www.dms.umontreal.ca/ et http://www.crm.umontreal.ca/.

Fonctions : Enseignement aux trois cycles, encadrement d'étudiants aux cycles supérieurs, activités de recherche.

Exigences : Détenir un doctorat en mathématiques. La préférence sera accordée aux candidates et candidats possédant une expertise dans l'un des domaines suivants : équations différentielles, équations aux dérivées partielles, analyse spectrale, analyse fonctionnelle géométrique, géométrie arithmétique, mais toute candidature de haut niveau en mathématiques fondamentales sera considérée. La qualité du dossier en recherche est primordiale. La candidate ou le candidat doit démontrer une excellente aptitude en enseignement.

Traitement : L'Université de Montréal offre un salaire concurrentiel jumelé à une gamme complète d'avantages sociaux.

Date d'entrée en fonction : Le 1er juin 2002.

Les personnes intéressées doivent faire parvenir un curriculum vitae complet incluant une courte description des intérêts de recherche, au moins trois lettres de recommandation et au maximum trois tirés à part des plus importantes contributions à la recherche, et ce **avant le 15 novembre 2001** (ou jusqu'à ce que le poste soit comblé), à :

Conformément aux exigences prescrites en matière d'immigration au Canada, cette annonce s'adresse en priorité aux citoyens canadiens et aux résidents permanents. L'Université de Montréal souscrit à un programme d'accès à l'égalité en emploi pour les femmes et au principe d'équité en matière d'emploi.

UNIVERSITÉ DE MONTRÉAL – MONTRÉAL, QUEBEC
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES
Position in Pure Mathematics

The Department of Mathematics and Statistics of the Faculty of Arts and Sciences of the Université de Montréal invites applications for a tenure-track position in pure mathematics at the assistant professor level. The Department collaborates to the activities of the Centre de recherches mathématiques (CRM). The position is subject to budgetary approval. For more information on the Department or the CRM, visit www.dms.umontreal.ca/ and www.crm.umontreal.ca/ .

Duties: Undergraduate and graduate teaching, upervision of graduate students, and research.

Requirements: To hold a Ph.D. in Mathematics. A preference will be given to candidates in one of the following areas: differential equations, partial differential equations, spectral analysis, geometric functional analysis, arithmetic geometry, but every outstanding candidate in pure mathematics will be considered. The research record is of prime importance. The candidate must possess excellent teaching skills. Courses are taught in French. Candidates who do not speak French must acquire an adequate knowledge of it within a reasonable period of time after the appointment.

Salary: The Université de Montréal offers competitive salaries and a complete package of social benefits.

Starting Date: June 1, 2002.

The interested candidates must submit a curriculum vitae including a concise statement of their research interests, at least three letters of reference, and copies of at most three of their most important research publications **before November 15, 2001** (or until the position is filled), to:

In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. The Université de Montréal subscribes to an affirmative action program for women and to employment equity.

Directeur
Département de mathématiques et de statistique
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal QC
H3C 3J7
Téléphone : (514) 343-6743
Télécopieur : (514) 343-5700
Courriel : mathstat@dms.umontreal.ca

Chair
Département de mathématiques et de statistique
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal QC
H3C 3J7
Phone: (514) 343-6743
FAX: (514) 343-5700
email: mathstat@dms.umontreal.ca

UNIVERSITÉ DE MONTRÉAL – MONTRÉAL, QUEBEC
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES
Poste en mathématiques ou statistique pour un boursier ou une boursère du programme APU du CRSNG

Le Département de mathématiques et de statistique de la Faculté des arts et des sciences de l'Université de Montréal sollicite des candidatures féminines ou autochtones dans tous les domaines des mathématiques et de la statistique pour le Programme d'appui aux professeurs universitaires (APU) du CRSNG. La ou le titulaire de la bourse sera nommé(e) professeure ou professeur au rang d'adjoint. Une candidature exceptionnelle au niveau récemment agrégé pourrait être considérée. Le Département collabore étroitement aux activités du Centre de recherches mathématiques (CRM). Le poste est ouvert sous réserve d'approbation budgétaire. Pour toute information sur le Département ou le CRM, veuillez visiter www.dms.umontreal.ca/ et http://www.crm.umontreal.ca/.

Fonctions : Enseignement aux trois cycles, encadrement d'étudiants aux cycles supérieurs, activités de recherche.

Exigences : Détenir un doctorat en mathématiques ou statistique. Être citoyen canadien ou résident permanent du Canada. Pour toute information sur le programme APU du CRSNG, veuillez visiter www.nserc.ca/programs/schol4_f.htm . La qualité du dossier en recherche est primordiale. La candidate ou le candidat doit posséder une excellente aptitude pour l'enseignement.

Traitement : L'Université de Montréal offre un salaire concurrentiel jumelé à une gamme complète d'avantages sociaux.

Date d'entrée en fonction : Le 1er juin 2002.

Les personnes intéressées doivent faire parvenir un curriculum vitae complet incluant une courte description des intérêts de recherche, au moins trois lettres de recommandation et au maximum trois tirés à part des plus importantes contributions à la recherche, et ce **avant le 1er octobre 2001,** à l'adresse ci-dessous:

Directeur
Département de mathématiques et de statistique
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal QC H3C 3J7
Téléphone : (514) 343-6743 Télécopieur : (514) 343-5700
Courriel : mathstat@dms.umontreal.ca

UNIVERSITÉ DE MONTRÉAL – MONTRÉAL, QUEBEC
DÉPARTEMENT DE MATHÉMATIQUES ET DE STATISTIQUES
Position in Mathematics or Statisitics for a NSERC's University Faculty Awaard Holder

The Department of Mathematics and Statistics of the Faculty of Arts and Sciences of the Université de Montréal invites applications from talented females or Aboriginal researchers in all areas of mathematics and statistics for the University Faculty Awards (UFA) program of NSERC. The holder will be appointed at the assistant professor level. Exceptionally, an outstanding candidate at the associate professor level could be considered. The Department collaborates to the activities of the Centre de recherches mathématiques (CRM). The position is subject to budgetary approval. For more information on the Department or the CRM, visit www.dms.umontreal.ca/ and www.crm.umontreal.ca/ .

Duties: Undergraduate and graduate teaching, supervision of graduate students, and research.

Requirements: To hold a Ph.D. in Mathematics or Statistics. To be Canadian citizen or permanent resident of Canada. For more information on NSERC's UFA program, visit www.nserc.ca/programs/schol4_e.htm .The research record is of prime importance. The candidate must possess excellent teaching skills. Courses are taught in French. Candidates who do not speak French must acquire an adequate knowledge of it within a reasonable period of time after the appointment.

Salary: The Université de Montréal offers competitive salaries and a complete package of social benefits.

Starting Date : June 1, 2002.

The interested candidates must submit a curriculum vitae including a concise statement of their research interests, at least three letters of reference, and copies of at most three of their most important research publications **before October 1, 2001** (or until the position is filled), to:

Chair
Département de mathématiques et de statistique
Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal QC H3C 3J7
Phone: (514) 343-6743
FAX: (514) 343-5700
email: mathstat@dms.umontreal.ca

UNIVERSITY OF TORONTO – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS

The Department invites applications for one or more limited term Assistant Professorships which may, subject to budgetary approval, become available on either the St. George (downtown), Scarborough or Erindale campus, for a period of one to three years, beginning July 1, 2002. Duties consist of teaching and research, and candidates must demonstrate clear strength in both. Preference will be given to candidates with recent doctoral degrees. Salaries commensurate with qualifications.
Applicants should send their complete C.V. including a list of publications, a short statement describing their research programme, and all appropriate material about their teaching. They should also arrange to have at least three letters of reference sent directly to

Search Committee, Department of Mathematics
University of Toronto
100 St. George Street, Room 4072
Toronto, Canada M5S 3G3

In addition, it is recommended that applicants submit the electronic application form which is available on our WWW Employment Opportunities page: http://www.math.toronto.edu/jobs/. The position code is CLTA.
To ensure full consideration, all information should be received **by December 1, 2001.**
The University of Toronto is strongly committed to diversity within its community. The University especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.
Any inquiries about the application should be sent to ida@math.toronto.edu

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UNIVERSITY OF TORONTO – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS

The University of Toronto solicits applications for four tenure-stream appointments in the Department of Mathematics. The areas of research interest are partial differential equations and geometry, geometric analysis, gauge theory or symplectic topology, and algebra or number theory.
It is intended that the successful applicants will be nominated for a Canadian Research Chair, at either a junior or senior level. Accordingly, candidates are expected to be outstanding mathematicians, whose research and teaching will make major contributions to the quality and stature of the department.
The appointments will be made at the rank of either Assistant, Associate or Full Professor, to begin July 1, 2002. Salary commensurate with experience.
Applicants should send a complete C.V., a short statement about their research programme, and appropriate material about their teaching. They should also submit the names of four mathematicians who could be consulted about their work.
The application should be sent directly to

Search Committee, Department of Mathematics
University of Toronto
100 St. George Street, Room 4072
Toronto, Canada M5S 3G3

In addition, it is recommended that applicants submit the electronic application form which is available from our WWW Employment Opportunities page: www.math.toronto.edu/jobs. The position code is CRC.
To ensure full consideration, the application should be received **by December 1, 2001.** Applications after this date will be considered until the positions have been filled.
The University of Toronto offers the opportunity to teach, conduct research and live in one of the most diverse cities in the world, and is strongly committed to diversity within its community. The University especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.
Any inquiries about the application should be sent to ida@math.toronto.edu

UNIVERSITY OF TORONTO – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS

The University of Toronto solicits applications for a tenure-stream appointment in Mathematics. Preference will be given to researchers in the areas of partial differential equations, stochastic differential equations or modelling.
The appointment is at the downtown (St. George) campus at open rank, to begin July 1, 2002. Salary commensurate with experience. Candidates are expected to have demonstrated excellence in both teaching and research after the Ph.D.; in particular, a candidate's research record should show clearly the ability to make significant original and independent contributions to mathematics.
Applicants should send their complete C.V. including a list of publications, a short statement describing their research programme, and all appropriate material about their teaching. They should also arrange to have at least four letters of reference sent directly to

Search Committee, Department of Mathematics
University of Toronto
100 St. George Street, Room 4072
Toronto, Canada M5S 3G3

At least one letter should be primarily concerned with the candidate's teaching.
In addition, it is recommended that applicants submit the electronic application form which is available from our WWW Employment Opportunities page: www.math.toronto.edu/jobs. The position code is DE.
To ensure full consideration, this information should be received **by December 1, 2001.** Applications after this date will be considered until the position has been filled. Any inquiries about the application should be sent to ida@math.toronto.edu.
The University of Toronto offers the opportunity to teach, conduct research and live in one of the most diverse cities in the world, and is strongly committed to diversity within its community. The University especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.

UNIVERSITY OF TORONTO – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS

The University of Toronto solicits applications for a tenure-stream appointment in Mathematics. Preference will be given to researchers in the areas of low-dimensional, geometric or symplectic topology.
The appointment is at the downtown (St. George) campus at the rank of assistant professor, to begin July 1, 2002. Salary commensurate with experience. Candidates are expected to have demonstrated excellence in both teaching and research after the Ph.D.; in particular, a candidate's research record should show clearly the ability to make significant original and independent contributions to Mathematics.
Applicants should send their complete C.V. including a list of publications, a short statement describing their research programme, and all appropriate material about their teaching. They should also arrange to have at least four letters of reference sent directly to

Search Committee, Department of Mathematics
University of Toronto
100 St. George Street, Room 4072
Toronto, Canada M5S 3G3

At least one letter should be primarily concerned with the candidate's teaching.
In addition, it is recommended that applicants submit the electronic application form which is available from our WWW Employment Opportunties page: www.math.toronto.edu/jobs. The position code is TOP.
To ensure full consideration, this information should be received **by December 1, 2001.** Applications after this date will be considered until the position has been filled. Any inquiries about the application should be sent to ida@math.toronto.edu.
The University of Toronto offers the opportunity to teach, conduct research and live in one of the most diverse cities in the world, and is strongly committed to diversity within its community. The University especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.

UNIVERSITY OF TORONTO – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS

The University of Toronto solicits applications for a tenure-stream appointment in any area of Pure or Applied Mathematics, with preference given to the areas of Algebra and Geometry.
The appointment is at the University of Toronto at Mississauga, Erindale College, at open rank, to begin July 1, 2002. Salary commensurate with experience. Candidates are expected to have demonstrated excellence in both teaching and research after the Ph.D.; in particular, a candidate's research record should show clearly the ability to make significant original and independent contributions to Mathematics.
Applicants should send their complete C.V. including a list of publications, a short statement describing their research programme, and all appropriate material about their teaching. They should also arrange to have at least four letters of reference sent directly to

Search Committee, Department of Mathematics
University of Toronto
100 St. George Street, Room 4072
Toronto, Canada M5S 3G3

At least one letter should be primarily concerned with the candidate's teaching.
In addition, it is recommended that applicants submit the electronic application form which is available on our WWW Employment Opportunities page: www.math.toronto.edu/jobs. The position code is MAG.
To ensure full consideration, this information should be received **by December 1, 2001.** Applications after this date will be considered until the positions have been filled.
The University of Toronto offers the opportunity to teach, conduct research and live in one of the most diverse cities in the world, and is strongly committed to diversity within its community. The University especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.
Any inquiries about the application should be sent to ida@math.toronto.edu

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UNIVERSITY OF TORONTO – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS

The University of Toronto solicits applications for two tenure-stream appointments in Mathematics. Preference will be given to researchers in the areas: (i) Algebra, Number Theory and Cryptography, and (ii) Applied PDE's such as Mathematical Modelling, Mathematical Finance or Pattern Recognition.
The appointments are at the University of Toronto at Mississauga, Erindale College, at the rank of Assistant Professor, to begin July 1, 2002. Salary commensurate with experience. Candidates are expected to have demonstrated excellence in both teaching and research after the Ph.D.; in particular, a candidate's research record should show clearly the ability to make significant original and independent contributions to Mathematics.
Applicants should send their complete C.V. including a list of publications, a short statement describing their research programme, and all appropriate material about their teaching. They should also arrange to have at least four letters of reference sent directly to

Search Committee, Department of Mathematics
University of Toronto
100 St. George Street, Room 4072
Toronto, Canada M5S 3G3

At least one letter should be primarily concerned with the candidate's teaching.
In addition, it is recommended that applicants submit the electronic application form which is available on our WWW Employment Opportunities page: www.math.toronto.edu/jobs. The position codes are, respectively, (i) MANTC and (ii) MAPDE.
To ensure full consideration, this information should be received **by December 1, 2001.** Applications after this date will be considered until the positions have been filled.

The University of Toronto offers the opportunity to teach, conduct research and live in one of the most diverse cities in the world, and is strongly committed to diversity within its community. The University especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.
Any inquiries about the application should be sent to ida@math.toronto.edu

YORK UNIVERSITY – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS AND STATISTICS
Applied Mathematics

Applications are invited for a tenure-track appointment at the Assistant Professor level in the Department of Mathematics and Statistics to commence July 1, 2002. Applications in the areas of Operations Research or Applied Discrete Mathematics will be considered. The successful candidate must have a PhD and is expected to have a proven record of research and superior teaching ability. Candidates will be expected to provide leadership to the undergrad OR program, and to make a solid contribution to the mathematics graduate programme. **The selection process will begin on January 7, 2002.** Applicants should send resumes and arrange for three letters of recommendation (one of which should address teaching) to be sent directly to:

Applied Mathematics Search Committeee
Department of Mathematics and Statistics
York University
4700 Keele Street
Toronto, Ontario, Canada M3J 1P3
Fax: (416) 736-5757
E-mail: appld.recruit@mathstat.yorku.ca, www.math.yorku.ca/Hiring/

In accordance with Canadian immigration requirements, Canadian citizens and permanent residents will be considered first for this position. All positions at York are subject to budgetary approval. For many years, York University has had a policy of employment equity including affirmative action for women faculty and librarians. Recently, York has included racial/visible minorities, persons with disabilities and aboriginal peoples in its affirmative action program. Persons who are members of one or more of these three groups are encouraged to self identify during the selection process. Please note that candidates from these three groups will be considered within the priorities of the affirmative action program only if they self identify. The Department of Mathematics and Statistics welcomes applications from women, racial/visible minorities, persons with disabilities and aboriginal peoples. The affirmative action program can be found on York's website at www.yorku.ca or a copy can be obtained by calling the affirmative action office at 416-736-5713.

YORK UNIVERSITY – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS AND STATISTICS
Mathematics

Applications are invited for a tenure-track appointment at the Assistant Professor level in the Department of Mathematics and Statistics to commence July 1, 2002. Applications in Algebra, Logic, or related areas will be considered. The successful candidate must have a PhD and is expected to have a proven record of research and superior teaching ability. Preference will be given to candidates who can strengthen existing areas of present and ongoing research activity. The selection process will begin on January 7, 2002. Applicants should send resumes and arrange for three letters of recommendation (one of which should address teaching) to be sent directly to:

Pure Mathematics Search Committeee
Department of Mathematics and Statistics
York University
4700 Keele Street
Toronto, Ontario, Canada M3J 1P3
Fax: (416) 736-5757
E-mail: pure.recruit@mathstat.yorku.ca, www.math.yorku.ca/Hiring/

In accordance with Canadian immigration requirements, Canadian citizens and permanent residents will be considered first for this position. All positions at York are subject to budgetary approval. For many years, York University has had a policy of employment equity including affirmative action for women faculty and librarians. Recently, York has included racial/visible minorities, persons with disabilities and aboriginal peoples in its affirmative action program. Persons who are members of one or more of these three groups are encouraged to self identify during the selection process. Please note that candidates from these

three groups will be considered within the priorities of the affirmative action program only if they self identify. The Department of Mathematics and Statistics welcomes applications from women, racial/visible minorities, persons with disabilities and aboriginal peoples. The affirmative action program can be found on York's website at www.yorku.ca or a copy can be obtained by calling the affirmative action office at 416-736-5713.

YORK UNIVERSITY – TORONTO, ONTARIO
DEPARTMENT OF MATHEMATICS AND STATISTICS
Applied Mathematics

Applications are invited for a tenure-track appointment at the Assistant Professor level in the Department of Mathematics and Statistics, in the area of Infinite Dimensional dynamical systems, with applications to population biology, neural networks, or data mining. The successful candidate must have a PhD and is expected to have a proven record of research and superior teaching ability. Preference will be given to candidates who can make solid contributions to an undergraduate programme in Computational Mathematics and to the graduate programme, and who can strengthen existing areas of present and ongoing research activity. The position commences July 1, 2002 and **the selection process will begin on January 7, 2002.** Applicants should send resumes and arrange for three letters of recommendation (one of which should address teaching) to be sent directly to:

Dynamics Search Committeee
Department of Mathematics and Statistics
York University
4700 Keele Street
Toronto, Ontario, Canada M3J 1P3
Fax: (416) 736-5757
E-mail: dynamics.recruit@mathstat.yorku.ca, www.math.yorku.ca/Hiring/

In accordance with Canadian immigration requirements, Canadian citizens and permanent residents will be considered first for this position. All positions at York are subject to budgetary approval. For many years, York University has had a policy of employment equity including affirmative action for women faculty and librarians. Recently, York has included racial/visible minorities, persons with disabilities and aboriginal peoples in its affirmative action program. Persons who are members of one or more of these three groups are encouraged to self identify during the selection process. Please note that candidates from these three groups will be considered within the priorities of the affirmative action program only if they self identify. The Department of Mathematics and Statistics welcomes applications from women, racial/visible minorities, persons with disabilities and aboriginal peoples. The affirmative action program can be found on York's website at www.yorku.ca or a copy can be obtained by calling the affirmative action office at 416-736-5713.

NEWS FROM DEPARTMENTS

University of Toronto, Toronto ON

Appointments: James Colliander (Assistant Professor, pde, harmonic analysis, July 2001), George Elliott (CRC Professor, operator algebras, K-theory, non-commutative geometry, topology, July 2001), Henry Kim (Associate Professor, algebra, geometry and number theory, automorphic L-functions, Langlands program, July 2001), Adrian Nachman (Professor, joint with dept of elec.and comp.engg, inverse problems, pde, medical imaging, July 2001), Mary Pugh (Associate Professor, computational science, pde, fluid dynamics, July 2001).

Promotion: Jeremy Quastel (Professor, July 2001).

Deaths: Rod Ross (January 15, 2001), George Duff (March 2, 2001), Ray Vanstone (April 9, 2001).

University of Victoria, Victoria, BC

Promotions: Min Tsao (Associate Professor, July 2001), Julie Zhou (Associate Professor, July 2001).

Appointment: Marcelo Laca, (Assistant Professor, Operator Algebras/Noncommutative Geometry, July 2001).

Retirement: William R. Gordon.

Visitor: Luis Verde-Star (Mexico, Differential Equations, September 2000 to August 2001).

Other News: An extremely thorough External Review of the Department was carried out by Professors John Chaddam (Pittsburgh), Charmaine Dean (SFU), and Jim Morrow

(Seattle) in October of 2000.

University of Western Ontario, London, ON
Appointments: Graham Denham (Assistant Professor, Algebraic Combinatorics, January 2002), Nicole Lemire (Assistant Professor, Algebraic Groups and Invariant Theory, July 2001), Behrang Noohi (Imperial Oil Postdoctoral Fellow, Algebraic Geometry, July 2001).
Retirement: Richard Biggs (June 2001).

CALENDAR OF EVENTS / CALENDRIER DES ÉVÉNEMENTS

OCTOBER 2001 **OCTOBRE 2001**

13–14 Ontario Topology Seminar, Fall 2001 (University of Western Ontario, London ON)
http:// www.math.uwo.ca/ots.html

25–28 Annapolis Algebraic Geometry Conference in memory of Ruth Michler (US Naval Academy, Annapolis, Maryland)
http://mathweb.msathsci.usna.edu/Faculty/Conferences/-AlbGeom2001/aagc.html

NOVEMBER 2001 **NOVEMBRE 2001**

2–6 Workshop on the Geometry of Infinite Dimensional Lie Groups (CRM, Université de Montreal, Montreal)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

DECEMBER 2001 **DÉCEMBRE 2001**

3–8 NIPS 2001, Neural Information Processing Systems: Natural and Synthetic (Vancouver, BC)
nipsinfo@salk.edu, http://www.cs.cmu.edu/Web/Groups/NIPS/

8–10 CMS Winter Meeting / Réunion d'hiver de la SMC (Toronto Colony Hotel, Toronto, Ontario)
http://www.cms.math.ca/CMS/Events/winter01

10–14 ICMI Study Conference on the Future of Teaching and Learning of Algebra (University of Melbourne, Australia)
http://www.edfac.unimelb.edu.au/DSME/icmi-algebra/

JANUARY 2002 **JANVIER 2002**

6–9 Joint Mathematics Meetings, San Diego, CA
http://www.ams.math.org/meetings/

21–28 Winter School on Computations in Coxeter Groups (CRM, Université de Montreal, Montreal)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

FEBRUARY 2002 **FÉVRIER 2002**

2–3 9th Southern California Geometric Analysis Seminar (UC at Irvine,CA)
http://www.math.uci.edu/ scgas

27–March 3 Group Actions on Rational Varieties (CRM, Université de Montreal, Montreal)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

MARCH 2002 **MARS 2002**

26–April 4 Instructional Conference on Combinatorial Aspects of Mathematical Analysis (ICMS, Edinburgh, UK)
http://www.ma.hw.ac.uk/icma/current/

APRIL 2002 **AVRIL 2002**

8–19 Invariant Theory (Queen's University, Kingston, ON)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

30–May 17 Concentration Period on the Langlands Programme for Function Fields (CRM, Université de Montreal, Montreal)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

MAY 2002 **MAI 2002**

3–5 AMS Eastern Section Meeting (CRM, Université de Montréal)
http://www.ams.math.org/meetings/

27–June 10 Computational Lie Theory (CRM, Université de Montreal, Montreal)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

JUNE 2002 **JUIN 2002**

6–8 CAIMS 2002 (University of Calgary)
Samuel Shen: shen@maildrop.srv.ualberta.ca

10–15 Algebraic Transformation Groups (CRM, Université de Montreal, Montreal)
activites@crm.umontreal.ca,
http:/www.CRM.UMontreal.CA/geometry/

15– 17 CMS Summer Meeting / Réunion d'été de la SMC (Université Laval, Québec, Québec)
Monique Bouchard: meetings@cms.math.ca

17–21 Seventh International Conference on p-adic Functional Analysis, (University of Nijmegen, The Netherlands)
http://www.sci.kun.nl/math/p-adic2002/

24–28 Special Activity in Analytic Number Theory (Max Planck Institute, Bonn) *moroz@mpim-bonn.mpg.de*

JULY 2002 **JUILLET 2002**

22–30 44rd International Mathematical Olympiad (University of Strathclyde, Glasgow, UK)

AUGUST 2002 **AOÛT 2002**

3–10 Logic Colloquium 2002, ASL European Summer Meeting (WestfWilhelms-Universitẗat, Münich, Germany) *http://www.math.uni-muester.da/LC2002*

20–28 International Congress of Mathematicians (Beijing, China) *http://icm2002.org.cn/*

DECEMBER 2002 **DÉCEMBRE 2002**

8–10 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 **DÉCEMBRE 2003**

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

SPRING 2004 **PRINTEMPS 2004**

CMS Summer Meeting / Réunion d'été de la SMC (Dalhousie University, Halifax, Nova Scotia)
Monique Bouchard: meetings@cms.math.ca

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SPRINGER FOR MATHEMATICS

ROBIN WILSON, The Open University, Milton Keynes, UK

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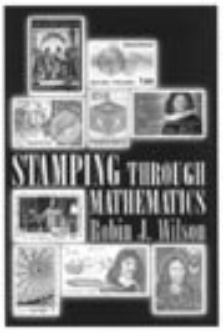

Postage stamps are an attractive vehicle for presenting mathematics and its development. For many years the author has presented illustrated lectures entitled *Stamping through Mathematics* to school and college groups and to mathematical clubs and societies, and has written a regular "Stamps Corner" for a mathematical journal. The book contains almost four hundred postage stamps relating to mathematics, ranging from the earliest forms of counting to the modern computer age. The stamps appear enlarged and in full color with full historical commentary, and are listed at the end of the book.

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PAULO RIBENBOIM, Queen's University, Kingston, Ontario, Canada

CLASSICAL THEORY OF ALGEBRAIC NUMBERS

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JÖRG ARNDT, Bayreuth, Germany and **CHRISTOPH HAENEL,** Eichenau, Germany

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MARIAN FABIAN, Czech Academy of Sciences, **PETR HABALA,** Czech Technical University, **PETR HÁJEK,** Czech Academy of Sciences, Prague, Czech Republic, and **VICENTE MONTESINOS SANTALUCIA,** Polytechnic University of Valencia, Spain; **JAN PELANT** and **VACLAV ZIZLER,** both Czech Academy of Sciences, Prague, Czech Republic

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