



CHASE REPORT

NEWSLETTER OF THE DEPARTMENT OF MATHEMATICS AND STATISTICS

May 2003

DALHOUSIE UNIVERSITY

HALIFAX, N.S.

CONGRATULATIONS TO ALL OUR GRADUATES

AWARD WINNERS

Sir William Young Gold Medal in Math

Adam Clay

University Medal in Statistics

Krista Collins

Ralph & Frances Lewis Jeffery Scholarship

*Joshua Knauer
Adam Clay
Paul Sheridan*

Barry Ward Fawcett Memorial Prize

Jessica Rusak

Ken Dunn Memorial Prize

Jenna Archibald

Katherine M. Buttenshaw Prize

Adam Clay

Bernoulli Prize

Darren Swan

Waverly Prize

Matthew Himmelman

Emil and Stella Blum Award in Mathematics

Gregory Rockwell

Ellen McCaughin McFarlane Prize

Shannon Ezzart

Congratulations to *Adam Clay* who is this year's winner of the Kings College Silver Medal. This is presented to the student with the highest standing of all the graduates in Arts and Science at Kings College.

KILLAM AWARD WINNER

Mathematics

Yanjing He

NSERC AWARD WINNERS

NSERC PGS-A awards: *Adam Clay
Sarah McCurdy*

NSERC PGS-B award: *Richard Hoshino*

GRADUATING HONOURS STUDENTS

October 2002 Convocation:

Honours - Mathematics

<i>Victoria Best</i>	Honours
<i>John Klapstein</i>	First Class Honours
<i>Sarah McCurdy</i>	First Class Honours

Honours - Statistics:

Melissa Song	Honours
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May 2003 Convocation:

Honours - Mathematics:

<i>Michael Lockett</i>	Honours
<i>Michael Klaas</i>	Honours
<i>Sarah MacKinnon-Cormier</i>	Honours
<i>Katherine Woodside</i>	Honours
<i>Adam Clay</i>	First Class Honours
<i>Amy Goldlist</i>	First Class Honours
<i>Joshua Knauer</i>	First Class Honours
<i>Paul Sheridan</i>	First Class Honours

Honours - Statistics

<i>Talia Beech</i>	Honours
<i>Christa Collins</i>	First Class Honours

STUDENTS RECEIVING HIGHER DEGREES

October 2002 Convocation:

Mathematics

Nancy Clarke, PhD

Statistics

Takayoshi Ikeda, MSc

Rebecca Culshaw, PhD
Mitja Mastnak, PhD
Rong Wang, PhD
Reza Yahaghi, PhD
Richard Hoshino, MSc

May 2003 Convocation:

Mathematics

Jacky Li, MSc.

Statistics

Wei Xu, MSc

WELCOME TO OUR UNDERGRADUATE SUMMER RESEARCH STUDENTS

NSERC Undergraduate Student Research Awards:

Jana Archibald (supervisor: R. Milson)
Ehab Eshaya (supervisor: R. Spiteri)
Katie Gardner (supervisor: J. Clements)
Marc Humber (supervisor: K. Dilcher)
Shannon Ezzat (supervisor: R. Paré)

Liang Undergraduate Student Research Award:

Jesse Rusak (supervisor: R. Spiteri)

Faculty Summer Research Students:

Kathryn Duffy (supervisor: D. Pronk)
Pin-Hung Kao (supervisor: D. Pronk)
Adam Clay (supervisor: R. Wood / R. Paré)
Gillman Payette (supervisor: R. Wood)

Co-op Summer Research Students:

Kelly Nauss (J. Clements)
Garrett MacLean (J. Clements)

ALUMNI NEWS

Nigel Higson will be the department head at Penn State University for the period 2003-2006.

Rebecca Culshaw took a teaching position at Clarke College in Iowa in September 2002.

Nancy Clarke took a teaching position at Acadia University in Wolfville in September 2002.

Joanna Flemming (Mills) is currently working at the University of Geneva as a maître-assistante with Elvezio Ronchetti looking at issues in model selection and analysis for longitudinal data.

FACULTY NEWS

Ed Susko was promoted to Associate Professor and awarded tenure.

Jeannette Janssen was promoted to Associate Professor and awarded tenure.

Richard Nowakowski will be stepping down as Chair as of July 1, 2003. *Patrick N. Keast* will be replacing him as Chair of the Department.

Keith Thompson was awarded a Canadian Research Chair in Ocean Studies.

Shigui Ruan was named to a MITACS SARS task force.

The project "Modelling and Mining of Networked Information Spaces", with project leaders *Jeannette Janssen* and *Evangelos Miliotis*, was awarded a seed grant from MITACS for the amount of \$58,000. The project is supported by IT Interactive Solutions, a local software company. The money awarded has been used to support PhD student *Changping Wang* and Post-doctoral fellow *J.P. Grossman*, as well as a number of graduate students in the CS department here and at the University of Toronto.

Just in: The MITACS seed projects of *Jeannette Janssen*, Modelling and Mining of Networked Information Spaces, and of *Richard Nowakowski*, Searching Networks, were funded as full MITACS projects.

Jeannette Janssen had a baby boy in March 2003.

Kassiem Jacobs is taking a Leave of Absence as of July 1, 2003. He is pursuing a PhD degree in Oceanography here at Dalhousie.

REPORT ON ICM 2002

The ICM 2002: a personal account.

If participants at the first ICM in Zurich in 1897 could have been present in Beijing at this 24th such gathering they would have been astonished at the changes in mathematics in the intervening years.

First of all, mathematics and mathematicians have rarely (ever?) been accorded the recognition and official stamp of approval that they were given in Beijing. The Opening Ceremony took place in the Great Hall of the People on

Tiananmen Square (China's closest analogy to the Houses of Parliament). It was attended by the President of China, Zhang Zemin, one of the Vice Premiers and the Mayor of Beijing (a city with a population nearly half that of Canada). To transfer the delegates from Conference Centre on the 4th ring road to the city centre a fleet of about 90 buses was used. These were given a police escort and whisked through the traffic non-stop in the middle of the day. Taxi drivers were not happy. The Congress was given prominent display in the daily papers for at least a week. Ordinary citizens – shopkeepers, taxi drivers, train conductors – that I met in rural Hunan the following week were aware of the conference and of the reported "not-quite-top-level" performance of Chinese mathematicians. The newsworthiness was enhanced by some celebrities: Stephen Hawking gave a public lecture on the Sunday before the Congress and John Nash Jr. gave one on the Wednesday evening. Secondly, there were the prizes. Since the first Nobel prizes were not awarded until 1901, our time travellers might be surprised to see the conferring of three prestigious awards (two Fields medals and one Nevanlinna prize). These went to Laurent Lafforgue, Vladimir Voevodsky and Madhu Sudan. The areas of the first two would not surprise the visitors. Lafforgue was honoured for his major advance in the Langlands programme providing new connections between number theory and analysis; Voevodsky for his work in algebraic geometry and number theory. Sudan's work on a wide variety of topics within theoretical computer science contributes to the ever expanding domain of mathematics. One might insert here that prizes always generate controversy. Why only two Fields medals at this congress? If, as rumour suggests, it is lack of adequate endowment for the prizes, then the Federal Government is missing a wonderful opportunity. We need to do more lobbying. Why both prizes in such traditional (and somewhat related) fields?

Next is the breadth of the programme. The 20 plenary talks ranged from Lafforgue explaining very clearly what Mumford described as one of the "tremendous Himalayan peaks of arithmetic algebraic geometry" to the new applications of mathematics exemplified by Shafi Goldwasser's beautiful presentation (using Powerpoint) of: "The mathematical foundations of modern cryptography, a complexity perspective". Incidentally, Lafforgue was the only presenter I saw to provide a Chinese translation – to assuage his dislike of presenting his talk in English. There were 19 parallel sessions of Invited and Contributed talks. These roughly followed the order of subjects in Math Reviews and went from Logic to Applications of Mathematics in the Sciences, Mathematics Education and Popularization, and History of Mathematics. The Short Communications offered a bewildering range of topics. Here are a few titles from the programme: Relativization in non-standard set theory; 2×2 matrices as sums of cubes; affinely convex ovals; polynomial knots; Toeplitz operators on semisimple Lie groups; graph polynomials for the game of Go; Geometric Fourier analysis and image processing; the fractal dimension and predictions of a chaotic time series from Shanghai stock market; the poetry of mathematics; logical reasoning in ancient Chinese mathematics.

My own intake of talks was very mixed. "The poetry of mathematics" turned out to be a delightful 15 minutes listening to Anne Hughes read poems (mostly her own) on mathematics and mathematicians. I spent an interesting

afternoon in the History section listening to a series of talks on medieval Islamic mathematics. The two short talks that seemed closest to my own interests were both disappointing; one did not show up and the other was a strong candidate for the worst presentation I have ever been at. The most productive time was spent at plenary and invited talks. In addition to the two mentioned above, David Mumford gave a brilliant talk on the mathematics of perception once more stressing the stochastic nature of the problem. By concentrating on the particular example of the Monge-Ampère equation, Luis Caffarelli made non-linear elliptic equations seem accessible (even to me). For the first time I saw a structure to the problems. Douglas Arnold unified a broad range of mathematics in a very surprising way by linking exact sequences to numerical analysis. On Saturday afternoon, I spent an interesting time listening to combinatorics. Günter Ziegler, talking about face numbers of 3-spheres and 4-polytopes, gave the impression of being close to characterizing these f -vectors. This was followed by Gerard Cornuejols outlining a proof of the perfect graph conjecture. Many of the invited talks presented very new results; here so new that he admitted not all the proofs had been written out.

The conference was brilliantly organized and ran smoothly. The only glitches had to do with computers. There was always a wait to get access to the machines handling e-mails and very few of the Powerpoint presentations ran without interruption. Particularly troublesome in this respect was the hold up in the expositions of the work of the medallists. Nevertheless, Mao may have turned in his mausoleum to see such abstract mathematics publicly displayed in the Great Hall. Particularly noteworthy to the organization was the band of volunteers (about 200) from Beijing University (mostly math undergraduates) who were always on hand to answer questions and help. They first made their presence felt by making the transition from airport to hotel particularly easy. Registration was fast and easy. No-one I spoke to had any complaints about the organization.

The main complaint was of the air quality in Beijing. It was unpleasant to wake up every morning to a yellowish brown haze limiting visibility. It was made more difficult to bear by the sticky heat outside and the dust from a great deal of construction going on for the Olympics.

The conference was truly global in its scope. There were participants from well over 100 countries, naturally a large contingent from China and more than 50% from Asia. During the Congress there was a two day Juvenile Mathematics Forum for school children from China. Some of these appeared briefly in the Convention centre and appeared to be both extremely bright and very keen to practice English skills.

While in Beijing, many of us enjoyed the exquisite landscaping and buildings of the old Summer Palace. It was shortly after the first ICM that this park was looted and destroyed by a consortium of western powers. Much has changed. Will the world and the world of mathematics change as much before the first ICM of the next century? The most likely answer is "yes". Certainly one has a lot of faith in the bright young mathematicians at this Congress who are likely to advance our subject in unforeseen ways before then.

A.C. Thompson
Professor of Mathematics

SOLUTIONS TO THE PUZZLES.

- I. Since the statements contradict one another, at most one of them can be true, in which case the nine other statements will be false, which is what the statement number nine asserts. Hence statement nine is the only true statement.
- II. Each symbol is one of the digits 1 to 9 with its reflection in a vertical mirror. The symbols are arranged in a 3 x 3 magic square. So the empty cell must contain the number 8 with its reflection, i. e., 88.

Sabbatical Leave

C.C.A. Sastri is spending 4 months of his sabbatical leave in Milan, Italy.

The following professors will be on sabbatical leave during the terms mentioned below:

<i>K. Bowen</i>	July 1, 2003 - June 30, 2004
<i>E. Cameron</i>	January 1, 2004 - June 30, 2004
<i>K.J.M. Moriarty</i>	July 1, 2003 - June 30, 2004
<i>R.P. Gupta</i>	July 1, 2003 - June 30, 2004
<i>R.J. Nowakowski</i>	July 1, 2003 - December 31, 2003

OTHER NEWS

The APICS meeting at Mt. Allison

The mathematics competition, which was to be attended by a record number of 5 teams (10 students) from our department, was overshadowed by a very serious car accident which involved three students. Fortunately, two of them were not (or only slightly) injured, but one student, *Sable McKeil*, had to be airlifted to hospital. She has now fully recovered, but had to remain in the QEII for a few days.

On the positive side, one of our teams, consisting of *Adam Clay* and *Micah McCurdy*, came in third among the 17 teams from across the region who wrote the competition; they missed second place by just an "epsilon". The other teams, consisting of *Josh Knauer* and *Marc Humber*, *Jana Archibald* and *Chris Kao*, and *Steve Howie* (who had to write by himself, due to the circumstances) all did a respectable job.

Another student from our department (joint with CS) was successful: *Sarah McKinnon-Cormier* won the prize for best student paper in CS in her session; her supervisor was *Ray Spiteri*.

Please join me in congratulating *Adam*, *Micah*, and *Sarah* for their successes.

I would also like to mention that this year, for the first time, almost everything (housing, transportation, registration, etc.) was organized by the undergraduate students themselves, and most of the work was done by *Josh Knauer*, president of the MASS. He did a great job, and he, and all the other students, certainly deserved a more positive experience than what it turned out to be. In fact, the seven students decided to return on Friday night, to be closer to their injured friends.

Competition training had been done jointly by *Richard Hoshino* and myself, but Richard did all of the organizational work. He was also a member of the APICS competition committee, and was responsible for a very good and well-balanced exam paper.

Special Session on Ring Theory

At the 2002 Atlantic Provinces Council on the Sciences meeting, at Mount Allison University, October 19-20, 2002, a special session on Ring Theory was held in memory of Patrick N. Stewart. The session was sponsored by the Atlantic Association for Research in the Mathematical Sciences. Until his death in April 2001, at the age of 57, Pat Stewart was an active researcher with 50 papers, the last published in 1999. Most of Professor Stewart's professional life was spent at Dalhousie University. He was a respected colleague, active in the Canadian Mathematical Society and regional organizations, and widely recognized as an excellent teacher. He is remembered for his generosity of spirit and for his eagerness to discuss mathematics with colleagues and students.

Karl Dilcher,
Professor of Mathematics

Mathematical Modeling Competition

Three of our students, *Adam Clay*, *Josh Knauer*, and *Chris Kao*, formed the Dalhousie team in Comap's Mathematical Modeling Competition. They worked hard on their project from the evening of Thursday, February 6, until the evening of Monday, February 10. Their project is entitled "A Solution to the Gamma Knife Targeting Problem".

For their work they received the designation "meritorious". Please join me in congratulating our team.

Dorette Pronk
Professor of Mathematics

Numerical Analysis Days, 2002, 2003

On May 31, 2002 the third annual numerical analysis day, organized by *Paul Muir* (an adjunct faculty member whose principal appointment is in Saint Mary's university), *Ray Spiteri* and *Pat Keast* of this department, was held in the Chase building. The previous two NA Days were held in Saint Mary's and Acadia. The keynote speaker was *Dr. Larry Shampine* from the Mathematics Department of Southern Methodist University in Dallas, Texas. In addition, there were 7 talks given by faculty from other universities and both undergraduate and graduate students from Dalhousie. More than 30 people took part, including *Alf Gerisch* from the Fields Institute, *Jim Diamond* from Acadia, and *John Stockie* from UNB. We intend to continue this successful event, with NA Day 2003 planned to take place at Saint Mary's on June 6.

Numerical Analysis and Scientific Computation

At the APICS (Atlantic Provinces Council on the Sciences) 2002 Fall meeting a special session was held on Numerical Analysis, Scientific Computing and Computational Applied Mathematics. This was organized by *Paul Muir*, *Ray Spiteri* and *Pat Keast*. The session was funded by AARMS (the Atlantic Association for Research in the Mathematical Sciences). The invited main speakers were Graeme Fairweather, Department of Mathematical and Computer Sciences, Colorado School of Mines, Uri Ascher, Department of Computer Science, University of British Columbia and Gerda de Vries, Department of Mathematical and Statistical Sciences, University of Alberta. Talks were also given by graduate students from Dalhousie, Saint Mary's, UNB and UCCB. This was the third special session on numerical analysis and scientific computation organized by our group in conjunction with the APICS Fall meeting, the previous two having been held at Dalhousie and St. Francis Xavier. The talks included a discussion of a computational model of the heart, by *Mary Maclachlan*, of the School of Biomedical Engineering, Dalhousie, a paper by *John Mason*, of the Faculty of Computer Science, Dalhousie, on realistic computer simulation, and a description of a model of epidemic solutions and endemic catastrophes by James Watmough of UNB.

MITACS Atlantic Interchange

MITACS (the Mathematics of Information Technology and Complex Systems) held the first Atlantic Interchange conference in Dalhousie University on March 24, 2003. This attracted 300 people, faculty, students and industry representatives, and also 150 high school students who attended a talk given by *Nick Cercone*, the Dean of Computer Science. The local representatives for MITACS were *Jeannette Janssen* from Mathematics, *Evangelos Milios* of the Faculty of Computer Science and *Paul Muir* of Saint Mary's. *Jacky Li* (whose MSc in Mathematics was supervised by *John Clements*) and *Rong Wang* (a post doctoral fellow in Mathematics whose PhD supervisors were *Pat Keast* and *Paul Muir*) won joint 3rd place in the student poster competition. *John Mason* of the Faculty of Computer Science (one of whose supervisors is *Ray Spiteri* of this department) also won a third place prize. All three will be attending the MITACS annual conference in Ottawa in May, with all expenses being paid by MITACS.

GRADUATE STUDENT SOCIETY NEWS

GRAD Events 2002/2003

The Math/Stat Graduate Student Society has had a wonderful year. We have continued to offer social events for graduate students and the whole department, and we have also initiated other types of events, such as presentations and seminars.

We began the fall term with a potluck dinner for graduate students. This provided an opportunity for new and returning graduate students to get to know one another. In October, a two-part presentation on LaTeX was given by *Clyde Clements*. Most graduate students will use LaTeX to write their theses, so this was extremely beneficial. On the social side, there was a martini party at *Richard Hoshino's*. We ended October with a Halloween pizza party for the

department, which was well-attended as usual. The first "Terminal Pool Tournament" took place in November, with *Paul Ottaway* declared the Champion of the Universe. This event raised money for the United Way. We finished the term with a Christmas pizza lunch party for the department. The desserts were potluck, and there were far too many to choose from! *Richard Hoshino* organized the Secret Santa again this year, to the delight of the participants.

The winter term kicked off with another potluck dinner. January also saw the first "Graduate Student Seminar". We introduced these seminars as a forum for graduate students and others to present either their own work or something that interests them, at a level that is understandable to most graduate students. Graduate students, faculty members and undergraduate students are all welcome to attend these seminars. The first seminar was "An Introduction to the Axiom of Choice" by *Tara Taylor*. Valentine's day was celebrated with coffee and sweets for everyone, and a second graduate student seminar. This was "The Conley Index and Some Applications" by Jin Yue. The highlight of March was Pi Day, celebrated March 14 at 1:59. We served pie, of course, and *Richard Hoshino* presented the third graduate student seminar, "The Life of Pi". The second terminal pool tournament took place in March, and again the winner was *Paul Ottaway*, who was declared Master of Space and Time. Also of note, *Richard Hoshino* won the M.A.S.S. "Motivator of the Year" award, and we congratulate him on this well-deserved recognition.

The main goal of the Math/Stat Graduate Student Society is to promote the interests of the graduate students and to act as a social institution. We have endeavoured to achieve this over the past year. We try to bring the graduate students together as a community, and as part of the larger departmental community of students and faculty. As the winter term is ending, we look forward to planning more events and we wish everyone a wonderful summer.

Tara Taylor (president) *Alan Hill* (vice president) *Sarah McCurdy* (secretary/treasurer) *Richard Hoshino* (department liaison).

Tara Taylor
Math Graduate Student

UNDERGRADUATE STUDENT SOCIETY NEWS

MASS Executive Committee 2002/2003

The Undergraduate Society executive for this year are:

<i>Joshua Knauer</i>	President
<i>Joshua MacDonald</i>	Vice-President
<i>Johnny Metlej</i>	Treasurer
<i>Garret Maclean</i>	Secretary

Report from the Undergraduate Society

2002-2003 has been an eventful year for MASS. We started off this year's string of Friday afternoon "Aftermaths" with a BBQ in September. Despite Josh and Sable inexplicably

getting lost somewhere between the Chase building and Quinpool road with the fuel tank for the grill, the event went very well. Gillman showed that years of part-time job experience in burger flipping does pay off as he ran the show as master chef. Johnny's catcalls paid off as well and many students who were just passing by decided to come and join us on the Chase building balcony. The semi-weekly socials were well attended all year long.

We had our departmental Wine and Cheese party in conjunction with the Grad Society. The event was held in November. Co-organizers Sara McCurdy and Josh MacDonald did an incredible job. The colloquium room was transformed for the candle-lit soiree with decorations and music. All enjoyed the scrumptious selection of hors d'oeuvres, including of course many interesting and flavourful cheeses. Amy and Katie provided the entertainment highlight of the evening when they took Adam's wallet hostage in a contrived attempt to get him to go on a date with their roommate.

This year we started what we hope will be a regular event with our "Math and Movie" afternoons. Unfortunately our showings of the Arnold Schwarzenegger classics "Conan the Barbarian" and "Commando" were sparsely (though enthusiastically!) attended. Maybe next year someone other than Josh, Josh and Mitja should pick the films :)

Our three pub-crawls were all great successes this year. On each occasion well over fifty students came along on a tour of our favourite bars downtown. We started at 7pm at the Halifax Alehouse or Dooley's and ended at 1am at Bearly's, with some combination of the Seahorse, Planet Pool and Pacifico in the middle. We were particularly proud of Gillman on the last pub-crawl, he made it all the way to Bearly's without getting kicked out of any bars along the way. Our pub-crawl T-shirts were a big hit as well. With the slogan "Talk Nerdy To Me" or "Do It With Rigor" on the front and "DUMASS" (short for Dalhousie University Math And Stats Society) on the back, the shirts were hot sellers. They were so popular in fact that Alan had groups of women trying to buy the shirt right off his back at the Alehouse. Really though, we think they just wanted him to "talk nerdy" to them.

We ended the season like we began it, with a big giant BBQ! The steaks were bigger than the plates and the plastic cutlery was horribly inadequate, but a MASSive number of people came out and enjoyed our final event. A well-deserved shout out goes to Ehab for finding a butcher that would sell us the steaks at such a great price! During the BBQ we presented our Motivator of the Year award. This year's honouree was Richard Hoshino. In only a couple of years Richard has made a real impact on the quality of undergraduate life at Dalhousie. His tireless volunteer work and dynamic teaching style have made him a popular figure in the department. We were very happy to recognise him.

We'd like to thank everyone for a great year and wish good luck to next year's MASS council: Gillman Payette (President), Garrett MacLean (Vice-president), Sable McKeil (Secretary) and Megan Kennedy (Treasurer).

Over the past several years, there has been a great deal of strife between universities and high schools. Each side has made strong criticisms of the other, and plenty of unnecessary divisions have been created. To help bridge these gaps, members of our department have started various outreach initiatives, for both high school teachers and their students. Here we describe three such initiatives.

High School Math League

The Nova Scotia High School Math League was formed by two graduate students, *Sarah McCurdy* and *Richard Hoshino*. This league is based on a highly successful one that has been running in Newfoundland for the past fifteen years.

The purpose of this league is to provide a fun environment for students to engage in cooperative problem-solving, and to get them excited about mathematics. The problems are recreational yet challenging, and so students are engaged throughout the event, and learn a great deal of new mathematics from participating.

Each league game takes place on a Saturday morning, and runs from 9 a.m. to noon. We ran three math league games this year, at Dalhousie in November, at Saint Mary's in February, and Mount St. Vincent in March. We had 52 students from eight high schools attend our last league game at MSVU. We have received extremely positive feedback about the math league, from both teachers and students.

With the help of various math educators across the province, we have decided to expand this league to other areas of Nova Scotia next year. If you are interested in being a part of this math league (e.g. making up questions, attending the math league games, etc.), would you please e-mail Sarah (smccurdy@mscs.dal.ca) or Richard (hoshino@mscs.dal.ca)

For more information on the high school math league, please see

<http://www.mscs.dal.ca/~hoshino/mathleague.html>

In-Service Workshops for High School Teachers

John Grant McLoughlin (Faculty of Education, UNB) and *Richard Hoshino* have received a \$5,000 grant from the Canadian Mathematical Society to run a series of in-service combinatorics workshops for high school teachers across Atlantic Canada.

These institutes are intended for high school teachers, as combinatorics is one of the areas that is now receiving greater attention with the APEF curriculum. In each workshop, participants engage in problem-solving activities and discussion intended to develop the mathematical understanding of these topics. Also, these events serve as a forum to bring university faculty and high school teachers together, to work together in an equal, informal, non-threatening environment.

The material for these workshops is taken from the book "Combinatorial Explorations", by *Richard Hoshino* and *John*

OUTREACH INITIATIVES

Grant McLoughlin. This book will be published by the Canadian Mathematical Society.

In 2003, we plan to run at least five institutes, with at least one in each province. On April 3rd, we ran an institute here at Dalhousie, which was attended by 24 teachers across Nova Scotia, some coming from as far away as Wolfville from Truro. A free dinner at the University Club was arranged for all participants, prior to the combinatorics discussion.

For more information on this in-service combinatorics institute, please see

<http://www.mscs.dal.ca/~hoshino/institute.html>

High School Outreach Program

In addition to the math league and the inservice institute, the Mathematics Department has also begun a direct outreach program, where members of our department visit local high schools.

In March, a visit was made to J.L. Ilesley High School, and we plan to visit other high schools in April.

In late April, several members of our department have been invited to give talks at the Sacred Heart School of Halifax, for a 1-day "afternoon of mathematics" conference.

Richard Hoshino
Math Graduate Student

An Education Study Group

In December of 2001, I attended the Canadian Mathematical Society's winter meeting in Toronto. At this conference, I participated in a special session on mathematics education, coordinated by *Pat Rogers* (Windsor) and *Walter Whiteley* (York). During this session, one of the speakers encouraged all of us to start a study group within our own departments, to discuss and share teaching ideas. In addition, such a study group would provide a forum for celebrating teaching, and recognize its importance. Inspired by the conference, I asked my colleagues in the Department of Mathematics and Statistics if we could start a study group at Dalhousie. The response was tremendous, and many faculty members and graduate students were interested in participating.

Since January of 2002, the Dalhousie Math and Stats Education Study Group have met once every two weeks. The meetings last for one hour, and usually consist of a 15 minute presentation followed by a 45 minute open-ended discussion. We have approximately ten people per meeting, although this number has been as high as twenty. We have discussed a wide variety of topics in mathematics education, including effective use of technology in the classroom, active learning, alternative assessment techniques, non-traditional teaching practices, dealing with large classes, problems-based learning, and gender issues. In addition to the meetings, participants are regularly given journal articles on mathematics pedagogy, which they are encouraged to read prior to study group meetings. Several members of the study group have presented at local, provincial, and national conferences, including the Canadian Mathematics Education Study Group, the Society for Learning and Teaching in Higher Education, and the

Dalhousie Conference on University Teaching and Learning. Handouts from these conference presentations have been duplicated for the study group participants.

Mathematics research is often very collaborative, as is research in other disciplines. However, teaching is often non-collaborative. Faculty members are rarely found discussing teaching ideas over lunch, or debating pedagogy during coffee break. Too often, we teach as we have been taught, and are not aware of other models and practices in undergraduate education. The majority of new instructors (especially graduate students) are inadequately prepared to teach a class of fifty students, and there is no support network in place for them. Our study group attempts to correct these problems, by providing a safe, cooperative forum where teaching issues can be discussed. Our diversity enriches our thought-provoking discussions: we have faculty members with over thirty years teaching experience, and graduate students with no formal experience. Regardless of our background, all contributions are equally valued and respected.

Our study group is informal, with no set agenda or plan. We seek to provide a forum where we can explore and debate our views on teaching, as well as share resources and practices. We seek to build a community where teaching excellence is celebrated, and thus, our discussions are not specific to mathematics or statistics. Thus, the study group has attracted colleagues from other departments, such as computer science, history, physics, and biology. We have welcomed and valued their contributions, and learned from their experiences. We also have participants from other universities, namely Saint Mary's, Mount Saint Vincent, and Acadia. They have added a new perspective to our discussions, and we hope that the study group is working to improve undergraduate mathematics education in Nova Scotia.

The feedback from the study group has been extremely positive. Personally, I have gained so much from the study group meetings. I have learned many innovative ideas from colleagues with far more experience, and have used their methods in my own teaching practices. I have learned (i.e., stolen) many other resources from conferences I have attended, and have had the privilege of sharing them with colleagues who have benefited from them. Other study group members have enjoyed similar experiences. Due to the success of the Math/Stats Education Study Group, we encourage faculty members and graduate students from all departments, to form their own study group. We hope that these groups will help maintain and improve the high standard of education at Dalhousie University.

If you are interested in being a part of our study group, or would like access to the handouts that are shared in our meetings, would you please contact *Richard Hoshino* at hoshino@mscs.dal.ca

Richard Hoshino
Math Graduate Student

CONFERENCES

Ray Spiteri attended the SIAM Conference on Computational Science and Engineering, San Diego, February 13, 2003. He will also attend SciCADE 2003, the International Conference on Scientific Computation and Differential Equations, at

Trondheim, Norway, June 30 - July 4, 2003, where he is organizing a workshop.

C.C.A. Sastri who is on sabbatical leave in Milano, Italy has been asked to speak in the Milan Mathematics Seminar, Monday, May 12, 2003. This is organized jointly by the three main universities in Milan – the University of Milano, the University of Milano-Bicocca, and the Milan Polytechnic. (This is what we would call a joint colloquium in North America.) It is an honor to be invited to speak in these seminars. A paper based on the talk will be published by the Milan Journal of Mathematics, published by Birkhauser. Many of the previous speakers are quite famous, so he was a little nervous about it. You can find out all about the seminar at the website www.mate.polimi.it/smf.

Swami (S.Swaminathan) visited Bangkok on invitation by Universities in Thailand to conduct workshops on Fixed Point Theory and Geometry of Banach Spaces at the Rangsit campus of Thammasat University and deliver lectures on special topics in metric spaces and topology during September and October 2002.

Keith Johnson was on sabbatical leave from July 1, 2002 to June 30, 2003. In December 2002, he visited Cambridge University and gave an invited lecture at the Newton Institute workshop on Elliptic Cohomology and Chromatic Phenomena and, in March 2003, visited and gave invited lectures at the University of Wales and the University of Milan.

Tony Thompson has had a very active year as far as mathematical travels are concerned. At the beginning of July he was in Vancouver for a conference on Convexity organized by PIMS, in August he went to Beijing for the International Congress of Mathematicians and in October he had a trip to Boston for a regional meeting of the American Math. Society at which there was a special session on Convexity. He spent the first two weeks of January at the German Mathematical Research Institute in Oberwolfach doing "Research in Pairs". His collaborator was Juan Carlos Alvarez Paiva from Polytechnic University in New York and the project was a chapter in a book on Finsler Geometry. Finally, in April he was invited to the University of Rochester to give a colloquium talk.

Rong Wang will attend the SciCade conference, and will also attend the 20th Dundee Biennial Conference on Numerical Analysis, June 24-27, 2003, where he will present a paper. *Pat Keast* will also attend the Dundee conference.

CMS-DALHOUSIE Math Camp

The Math camp will be held from July 13 – 18, 2003. This will be our fourth camp and like every year, it is sponsored by the Canadian Mathematical Society, Dalhousie University, and the cooperation of Math/Stats professors from Dal/SMU. Twenty top Math students (boys and girls) from N.S. High

schools will be invited to attend this week long Math camp. Their intellect will be challenged and inspired by a variety of workshops/lectures from Dal/SMU Math Professors. They will also enjoy Dalplex facilities and other extra-curricular activities in the evening. For a nominal fee of \$50.00 they will enjoy free meals and stay in one of the residences. Each year the students have a wonderful experience and a great time.

STATISTICS SEMINARS 2002/2003

DATE	TITLE AND SPEAKER
12.09.02	<i>George Gabor</i> , Dalhousie. Can the Lady tell?
19.9.2	<i>David Hamilton</i> , Dalhousie. A tale of two textbooks.
10.10.02	<i>Ed Susko</i> , Dalhousie. Inconsistency of Distance Methods for Phylogenetic Estimation with Model Misspecification.
24.10.2	<i>Bruce Smith</i> , Dalhousie. An Introduction to Spectral Estimation.
21.11.02	<i>Jonathon R. Stone</i> , Dalhousie, Biology. Information Obtained in Cladistic Analysis.
16.01.03	<i>C.C.A. Sastri</i> , Dalhousie. A Function Arising in the Estimation of Unobserved Probability.
13.2.3	<i>Leonard MacLean</i> , Dalhousie, School of Business. Bayesian analysis of stock portfolios.
27.02.03	<i>Christopher Herbinger</i> , Dalhousie, Biology & MS. Pedigree reconstruction and quantitative genetic parameter estimation.
6.3.3	<i>Jianan Peng</i> , Acadia. Statistical Inference for Treatments with Control.
13.3.3	<i>Dan Kehler</i> , Dalhousie, Biology. On the decrease of shark population.
20.3.3	<i>Hong Gu</i> , Dalhousie. Detecting Change in Visual Field Dat.
03.04.03	<i>Tony Almudevar</i> , Acadia. A time loss prediction model in a work injury compensation environment.

MATHEMATICS SEMINARS 2002/2003

DATE	TITLE AND SPEAKER
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- 12.08.02 *Laurent Marcoux*, University of Waterloo. Spans of Projections in Certain Algebras.
- 09.09.02 *Philip Gerrish*, Instituto Mexicano del Petroleo. Statistical Mechanics of Adaptation in Asexuals.
- 30.09.02 *Ross Street*, Macquarie University. Roots of Unity as a Lie Algebra.
- 07.10.02 *Steve Lack*, University of Sydney, Australia. Distributive and Extensive Categories.
- 21.10.02 *Richard Wiegandt*, Hungarian Academy of Sciences. Structure theorems for rings with involution.
- 24.10.02 *Tara Nicholson*, Simon Fraser University. Towards a Modal Logical Formulation of the Four Colour Theorem Using Forbidden Minor Subgraphs
- 05.11.02 *Barry Gardner*, University of Tasmania, Australia. The Kuratowski 14 Theorem and Some Variants. How Many Sets Can Be Produced By Closure and Complementation?
- 26.11.02 *Tadashi Tokieda*, University of Montreal. The Purr of a Pirouetting Penny.
- 17.01.03 *David Iron*, University of Amsterdam. Spikes and Fronts, Localized Structures in Reaction-Diffusion Equations
- 21.01.03 *Keith Taylor*, University of Saskatchewan. Fine Structure of Spectra: Toeplitz Matrices and Hydrocarbons.
- 24.01.03 *Eddy Campbell*, Queen's University. Modular Invariant Theory.
- 27.01.03 *Dennis Pollney*, Max Planck Institute. Techniques for evolving black hole spacetimes in numerical relativity.
- 30.01.03 *Roman Smirnov*, University of Paderborn. An extension of the classical theory of algebraic invariants to pseudo-Riemannian geometry and Hamiltonian mechanics.
- 24.02.03 *Janez Bernik*, Dalhousie University. A generalization of Brauer's theorem on splitting fields to semigroups.
- 03.03.03 *Vladimir G. Troitsky*, University of Alberta, Edmonton. Invariant subspaces problem: some recent advances.
- 17.03.03 *Juan Carlos Alvarez Paiva*, Polytechnic University, Brooklyn, NY. A hundred years of Hilbert's fourth problem.
- 31.03.03 *Robb Fry*, St Francis Xavier University. A Short Survey of Extension Theorems.
- 11.04.03 *Mair Zamir*, University of Western Ontario. Fractal Patterns in Vascular Branching: Fact or Fiction?
- 14.04.03 *Georg Hofmann*, Technical University, Darmstadt. Coxeter Groups – Groups Generated by Reflections.
- 17.04.03 *Michele Titcombe*, McGill University. A Method to Treat Strongly Localized Singular Perturbation Problems in 2D.
- 08.05.03 *Mark Fels*, Utah State University. Applications of Group Theory to Differential Equations
- 15.05.03 *David Gomez-Ullate*, CRM, Montreal. Many-body problems in the plane with lots of periodic solutions

OBITUARY

MICHAEL EDELSTEIN

By Leah Keshet

Mathematician, husband, father, grandfather. Born March 21, 1917, in Mlawa, Poland. Died January 27, 2003 in Vancouver, B.C., of natural causes, aged 85.

Michael Edelstein was born to a respected, well-to-do, traditional Jewish family: His grandfather, *Zisha Zilberberg*, owned a large brick tenement building and a grocery store; his father, Baruch, prospered in the leather trade.

As a young child, *Michael* received a Jewish education. During his impressionable teen years, *Michael* discovered a copy of Darwin's Origin of Species abandoned in his grandfather's attic by a fleeing soldier. The discovery led him toward a life of science, and away from religion. As an adolescent, he excelled in mathematics and physics. He was an avid reader, astute in current events, and a scholar of history, who retained detailed knowledge of turbulent events of the two centuries spanned by his life.

Rising anti-Semitism in Poland of the 1920s and 1930s blocked higher education for Jews (via "Numerus Clausus" – the quota system). His sister *Sarenka* persuaded *Michael* to study abroad at the fledgling Hebrew University of Jerusalem (in then-Palestine). He arrived alone in that bewildering land in 1937. There he struggled with the language and culture, and was beset by loneliness and homesickness. Ultimately, this dislocation spared his life. The firestorm that erupted over Europe in 1939 was to consume his family in the Holocaust.

On the Mt. Scopus campus of Hebrew U., conditions were rough, stipends meagre, and hunger and deprivation were rampant. War interrupted his studies: With the onset of the Second World War, *Michael* enlisted in the British Army, serving in Italy and Egypt. He later fought in the Israeli War of Independence in 1948, and participated in defense research.

The 1950s were years of happiness and rejuvenation. He was reunited, in Israel, with his sister, the single family member who had survived Auschwitz. In 1951, *Michael* married a warm, caring, beautiful native bride, *Tikvah Segal*; two years later, their only daughter was born. The couple struggled to make ends meet while completing higher degrees, *Michael* a mathematics DSc and *Tikvah* a botany PhD.

In 1962, the family undertook a journey, through Ithaca, N.Y., and Michigan, which eventually led them, in 1964, to a new home in Canada. *Michael* was recruited as a mathematics professor at Dalhousie University in Halifax, where he became a founder of the mathematics graduate and research program. He inspired colleagues, trained students, carried out research, and taught there for more than two decades before his retirement and relocation to British Columbia.

Michael saw his own life as a series of personal losses: of his beloved mother *Ester-Leah* (when he was 6), of his young wife (at age 51), his sister in later life, and many others. By age 85, he had outlived an entire generation of in. He struggled with internal demons in personal interactions, often leaving friends and loved ones grieving over sudden, inexplicable estrangements. A miraculous reunion in recent years, with his once-estranged daughter who had followed his footsteps to become a mathematician, led to a close bond. It remained unbroken until his dying day, Jan. 27, 2003, in Vancouver.

Michael was an exceptional chess player (gaining the title of International Master in Correspondence Chess in the 1990s), but mathematics was his first love and lifelong passion; he never tired of transmitting that passion to students and even to casual acquaintances. While infirm with Parkinson's disease at an advanced age, he took pleasure in his mathematics books, and braved some of the most notoriously challenging problems in mathematics.

Leah Keshet is *Michael's* daughter.

PUZZLE CORNER

Edited by
S. Swaminathan

I. Here are ten numbered statements. Find how many of them are true.

1. Exactly one of these statements is false.
2. Exactly two of these statements are false.
3. Exactly three of these statements are false.
4. Exactly four of these statements are false.
5. Exactly five of these statements are false.
6. Exactly six of these statements are false.
7. Exactly seven of these statements are false.
8. Exactly eight of these statements are false.
9. Exactly nine of these statements are false.
10. Exactly ten of these statements are false.

II. The following square has occult properties. For example, carefully studying it will reveal the missing symbol which should go into the empty cell. What is the missing symbol?

The picture goes here.

Breaking News: Congratulations to *Richard Hoshino* for winning an Action Canada Fellowship. He was awarded \$20,000 for one year.

Action Canada is an investment, by the federal government and the private sector working in partnership, in the young men and women who aspire to lead our country.

Action Canada will create and maintain a network of outstanding young Canadians building their skills and experience for leadership in the public and private sector.

Each year twenty of Canada's best and brightest young emerging leaders—the Action Canada Fellows—will join together in a program of leadership development and public policy study.

Action Canada will be an ongoing resource of new leaders and new ideas to meet the challenges of the new century.

CHASE REPORT

Is published for alumni and friends of the Department of Mathematics & Statistics, Dalhousie University.

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We welcome your suggestions and comments for future issues.

OTHER STATISTICS SEMINARS
2002/2003

DATE	TITLE AND SPEAKER
22.08.02	<i>Joseph Bielawski</i> , A maximum likelihood method for detecting sites subject to functional divergence following gene duplication.
9.9.2	<i>Philip Gerrish</i> , Statistical mechanics of adaptation in asexuals.
23.09.02	<i>Christian Blouin</i> , Interfacing protein biophysics and evolution.
06.01.03	<i>Michael Dowd</i> , Data Assimilation Methods and Oceanographic Applications.
09.01.03	<i>Andrew Irwin</i> , Global Ocean Models.
13.01.03	<i>Nicholas Barrowman</i> , Meta Analysis for Proportions.
28.02.03	<i>Tal Pupko</i> , Maximum likelihood estimation of evolutionary rates with applications in phylogeny and biochemistry

Professor **MICHAEL EDELSTEIN**
(1917-2003)