APPLIED MATHEMATICS in the RENAISSANCE: Central perspective in Italian painting

The Annunciation, Fra Angelico, c. 1435

Professor Karl Heinrich Hofmann
Technical University, Darmstadt and Tulane University, New Orleans

CONGRATULATIONS

AWARDS WINNERS

Sir William Young Gold Medal in Math
Micah McCurdy

University Medal in Statistics
Liang Wu

Ralph & Frances Lewis Jeffery Scholarship
Micah McCurdy

Barry Ward Fawcett Memorial Prize
Tomas M. Hofmann

Ken Dunn Memorial Prize
Alex H. MacLeod

Katherine M. Buttenshaw Prize
Theresa R. Mader

Bernoulli Prize
Jennifer MacDonald

Waverly Prize
Peter Crooks

Emil and Stella Blum Award in Mathematics
Stephen G. Newman

Ellen McCaughin McFarlane Prize
Marc-Andre Chavy-MacDonald

Lorne O.L. Titus Award
Micah McCurdy, awarded Jan. 2006

Department of Mathematics & Statistics Bursary
Rachael Sarah Manion, awarded Jan. 2006

NSERC AWARD WINNERS

NSERC CGS-M: *Amanda Halladay*
(Starting MSc Stat. Sept. 2006)

USRA: *Jillian Falkenberg*
Theresa Mader

GRADUATING HONOURS STUDENTS

Honours - Mathematics

Sarah Chisholm	First Class Honours Math
Stephen Chisholm	Honours Math
Amanda Halladay	First Class Honours Math, Stat
Matt Lewis	First Class Honours Math
Rachael Manion	Honours Math
Micah McCurdy	First Class Honours Math, Phyc
David McNutt	Honours Math

Honours - Statistics

Elizabete Almeida	First Class Honours Stat, Math
Samuel Stewart	First Class Honours Stat, CSCI
Liang Wu	First Class Honours Stat, Econ
Dut A. Deng	Honours Econ, Stat

GRADUATE STUDENTS

October 2005 Convocation:

Mathematics	**Statistics**
Ryan Lukeman , MSc	*Krista Collins , MSc*
Geoff Cruttwell , MSc	*Le Bao, MSc*
Angela Siegel , MSc	*Liwen Zou, MSc*
Tara Taylor , PhD	*Connie Stewart, PhD*
Jin Yue, PhD	

May 2006 Convocation:

Mathematics	Statistics

Yanjing He, PhD
Jeff Praught, MSc
Josh MacArthur, MSc
Caroline Adlam, MSc

Talia Beech, MSc
Chris Jones, MSc
Shuyan Li, MSc
Michele Millar, PhD
Sean Smith, MSc
Cathy Wamboldt, MSc

KILLAM SCHOLARSHIP

Benoit Valiron (starting PhD Math Sept. 2006)

Angela and baby daughter Anneka at the October 2006 Convocation

CHAIR'S REPORT
by Dr. Patrick Keast

It is said that time passes quickly when you are having fun. Whether that means that time drags when you aren't, I do not know, but I will say that the last three years have gone by incredibly quickly. My term as chair ends on June 30, when Dr. Karl Dilcher takes over. There have been tremendous changes over the past three years in the Department of Mathematics and Statistics. Two new faculty arrived just as my term began, Dr. Michael Dowd (Statistics) and Dr. Roman Smirnov (Mathematics). During my term five new appointments were made, Dr. Joanna Flemming (Statistics), and Drs. David Iron, Sara Faridi, Peter Selinger and Theodore Kolokolnikov (all Mathematics). Unfortunately, Dr. Ray Spiteri took a leave of absence in my second year as chair, and is currently at the University of Saskatchewan. We can hope that he will return, but that is looking unlikely. In addition, Dr. Shigui Ruan resigned in 2004, and is now at the University of Miami. Countering the in-flow of new people, during my term we have had seven retirements, Dr. Luzius Grünenfelder (2004), Drs. Chris Field, Kevin Moriarty and Dick Sutherland (2005) and Drs. Kit Bowen, John Clements and Chelluri Sastri (2006). These long-serving faculty members make up a combined 209 years of commitment to the Department and take away a collective memory of a Department whose face has changed vastly since the longest serving of them arrived in 1970.

Items of note for the past year, each documented later in the Report, include a conference to celebrate Chris Field's retirement (Aug. 15, 2005); the establishment of a lecture at the APICS annual conference named after Chris; the Distinguished Lecture by Dr. Karl Hofmann; the Atlantic Association for Research in the Mathematical Sciences Summer School, organized by Tony Thompson with the assistance of Renzo Piccinini which attracted young mathematicians from 7 countries and 6 Canadian provinces.

Our Honours programmes continue to grow. Especially gratifying is the increase in enrolment in the Statistics Honours programme, which is at the highest it has ever been. The Graduate programmes are also growing, and we are attracting a number of excellent students in both Mathematics and Statistics. Our Outreach Programmes report describes a very good year of activities by the Outreach team, involving high school students and teachers. All in all, I think that the Department has had a wonderfully successful year, and I have had an enjoyable term as chair. I shall miss being in the centre of all the activity.

I have had a good three years, made so by the hard work of the members of the Department, efforts that it is easy to take for granted because nobody complains! I would like to thank everyone for their help, advice and understanding, and for the willingness to take on tasks uncomplainingly, and for carrying them out efficiently. I think few chairs are so lucky as I have been.

ALUMNI AND FACULTY NEWS

Todd Grimm (MSc, 1999) is now happily married, living in Moncton, NB. He has been working as a mathematician for SPIELO (a GTech Company) since July 2004. One of his co-workers is Mark MacIsaac (MSc, 2002).

MATHEMATICS CAN TAKE YOU ANYWHERE; EVEN TO THE OLYMPIC GAMES
by Dr. Patricia Benoit

While at Dalhousie, Patricia Chafe (née Benoit), Ph.D. '99, divided her time between the Chase building and the local skating club; seven years later, her love of mathematics and figure skating have completely merged.

Patricia began skating as a young woman growing up in Nova Scotia and continued while she was doing graduate work in mathematics with Alan Coley at Dalhousie. She became a coach, an official, and then a volunteer director on the Board of Skate Canada, the national governing body for figure skating. Following graduation in 1999, Patricia was pursuing a traditional career as a mathematician: first as a professor and then as an analyst for the department of National Defence. That is, until February 2002, when the sporting world watched as figure skating collapsed in controversy.

At that point, Patricia's career took a new turn. She accepted a "once in a lifetime" challenge and shifted her career to become an analyst in the world of sport. Since that time Patricia has collaborated with international colleagues to assist in the development of a new scoring system for figure skating. The revolutionary system is now used at all figure skating competitions in Canada and internationally. In fact, it was used at the Olympic Winter Games in Turin, Italy in February, 2006. Patricia has also used her mathematical skills to develop a low-technology option for the new scoring system to be used in skating clubs in Canada and worldwide.

Today, Patricia has taken the combined experience of traditional mathematics and working in the international sport industry to become the president of *Jump Beyond Inc.*, a strategic analysis firm focusing on Canada's sport industry. Her work involves client consultation, systems and risk analysis, optimization and research to develop new and innovative techniques for the sports industry, with a specialization in figure skating.

In short: Patricia takes her computer and math algorithms to the rink, puts on her skates, and for the past two years has been providing a mathematical competitive edge to the Canadian Olympic Figure Skating Team - a great and unique application of mathematics!

CFI AWARD SUMMARY
by Dr. Joe Bielawski

Dr. Joseph P. Bielawski was awarded a Canadian Foundation for Innovation (CFI) infrastructure project grant to establish a cluster-computing platform at Dalhousie University with capabilities sufficient for modelling and analysis of genome data. In addition to allowing the purchase of an 80 core-cpu computer cluster from Sun Microsystems, this award funded significant upgrades to the computer equipment facility located in the Chase building, where this platform will be located. This new infrastructure provides a genomics research capability otherwise unavailable in the Department of Mathematics & Statistics at Dalhousie. The project was made possible by significant matching funds from SUN Microsystems, the Nova Scotia Research and

Innovation Trust, and a start-up fund from the Faculty of Science awarded to Dr. Bielawski.

This computer infrastructure will support a research program dedicated to studying the process of adaptive evolution in the genomes of pathogenic bacteria. The program is unique in two respects. First, sophisticated statistical methods will be developed and used to scan genomes for the signals of adaptive evolution. Second, the program will focus on comparison of genomes from pathogenic bacteria and their non-pathogenic relatives. Practical results of the research include: (i) discovery of adaptive trait genes; (ii) identification of genetic markers useful for population analysis; and (iii) a greater understanding of the genomic context in which adaptive bacterial diversification occurs. Such results will be of value in the effort to understand the genetic basis of pathogenicity, particularly because pathogenic micro-organisms remain the single most important health threat worldwide. Of immediate interest are the genes exhibiting a strong signal for adaptive evolution, as they can be promising targets for drug therapy.

DEPARTMENT NEWS

Dr. Alan Coley is the Chair of the Space and Astronomy Grant Selection Committee of NSERC for 2006-2007.

Dr. Richard Nowakowski has accepted an appointment to the NSERC Pure and Applied Math B Grant Selection Committee.

In August 2006, Dr. Chris Field was elected as a Fellow of the American Statistical Association. Also, in October, at the annual meeting of the Mathematics, Statistics and Computer Science section of APICS (Atlantic Provinces Council on the Sciences) an annual lecture, the Field Lecture, was named after him.

In September 2006 Joe Bielawski was appointed as an associate in the Canadian Institute of Advanced Research (CIAR) program in Evolutionary Biology.

Vaneeta Grover presented: "My Experiences Working as a Biostatistician" at APICS 2005: Workshop on

Robust and Computationally Intensive Statistical Models at Acadia University, October 21-23, 2005.

Dr. Jin Yue: "The invariant theory of Killing tensors and Drach potentials", Oct 22, 2005, APICS 29th Annual Conferences, Faculty Contributed Session, Acadia University, Wolfville, Nova Scotia.

Mar 1st - 3rd, 2006, Dr. Jin Yue was invited for a visit to the Department of Mathematics, University of South Florida, Tampa, Florida and gave a Colloquium entitled "The Hamiltonian Approach to Solving Differential Equations".

Vaneeta Grover attended the First Canadian Genetic Epidemiology and Statistical Genetics Workshop from March 30-31, 2006, held at the Field's Institute, in Toronto.

Roman Smirnov, *Hamilton-Jacobi theory of orthogonal separation of variables in the framework of Cartan's geometry* Mathematical Physics Seminar, CRM, Montreal, January 24, 2006.

Roman Smirnov, *Geometric invariant theory on Killing tensors,* 2005 Fall Central Section Meeting organized by the AMS, Special Session on Geometry of Differential Equations, Nebraska, Lincoln, USA, October 21-23, 2005.

Roman Smirnov, *Superintegrability of the Calogero-Moser model via invariant theory and symbolic analysis,* Foundations of Computation Mathematics Conference, Workshop on Symbolic Analysis, Santander, Spain, July 4-6, 2005.

Roman Smirnov, *Superintegrability of the Calogero-Moser model and invariant theory,* The Second International Conference on Superintegrable Systems in Classical and Quantum Mechanics, Bogolyubov Laboratory of Theoretical Physics of the Joint Institute of Nuclear Research, Dubna, Russia, June 27 - July 1, 2005.

Roman Smirnov, *Generalized Killing tensors: At the confluence of differential geometry, invariant theory, mathematical physics and representation theory,* Symmetry in Nonlinear Mathematical Physics Conference, Institute of Mathematics, Kyiv, Ukraine, June 20-26, 2005.

Roman Smirnov, *On bridging the gap between invariant theory and the study of Hamiltonian systems,* Formal Geometry of PDEs and Integrability Workshop, Brock University, June 7-8, 2005.

NEWS FROM THE DEPARTMENTAL LIBRARY
by Dr. Karl Dilcher

Over the years we have had regular book sales aimed at students, where we sold out-of print and mainly elementary textbooks for a few dollars. The proceeds, hundreds of dollars each time, were used to supplement the mathematics and statistics library budget, mainly through the unbureaucratic purchase of books on special sales, thus getting more book for the buck.

Through the generosity of retired faculty members and other faculty and graduate students we also have a growing collection of high-quality upper-level textbooks and research monographs for sale. Those are books of which we already have copies in the library.

We are now offering these books, the number of which has grown to a few hundred, through an on-line catalogue. While the "market value" of many of these volumes is often quite high, I would like to offer them to all members, alumni, or friends of the department for a standard price of $10 for a hardcover, or $5 for a paperback, and less for very small or worn-out books. Our aim is to find good homes for these volumes, while getting more funds for purchasing new books.

So, please visit

http://www.mathstat.dal.ca/~dilcher/oldbooks.txt
Permanent Booksale

Of course, further donations of any mathematics, statistics, or related books of any kind or vintage are always welcome.

Karl Dilcher (dilcher@mathstat.dal.ca)
Department Library Representative

NEW MATHEMATICS AND STATISTICS DEPARTMENT WEBSITE LAUNCHED – AUGUST 2005
by Dr. Roman Smirnov

After several months of planning and design, the new Mathematics and Statistics Department website was successfully released shortly before the start of the Academic Year 2005-06. The site was developed by Rachel Su, a Dalhousie co-op student, with input from the supervisory committee (Pat Keast, Dorette Pronk and Roman Smirnov) and the rest of the department. In particular, Gretchen Smith provided Rachel with a number of interesting documents pertinent to the history of the department, while Jin Yue generously donated for the project a substantial number of photographs of the Chase Building. The development of the new website was aimed to help more effectively disseminate information about the department on the WWW, as well as to make sure that the website functions as an important departmental resource. The design of the new website is compatible with the official Dalhousie Web site design, showing at the same time a number of unique features that enhance the image of the department within the Dalhousie community. Thus, for example, every time someone visits the website, it randomly generates a different image of the Chase Building and a Mathematical or Statistical quotation. The website is an ongoing project, - feedback on the new site is strongly encouraged as are thoughts on how to develop the site in the future. Starting in June 2006, Pat Keast will handle the maintenance of the site including additions, troubleshooting, and alterations.

Visit http://www.mathstat.dal.ca/ .

THE APPLIED MATHEMATICS/HUMAN PHYSIOLOGY RESEARCH GROUP
by Dr. John Clements

This research program is supported by NSERC (Natural Sciences and Engineering Research Council of Canada) and CIHR (Canadian Institutes of Health Research) via the following grants: John C. Clements, NSERC Discovery Grant, "*Isolated Heart Model*" (2004-09), John C. Clements, NSERC-Collaborative Health Research Project (CHRP) Grant, "*Physiologically Accurate Simulation of the Human Heart's Electrical Activity Under Arrhythmogenic Conditions*" (2003-07) and John C. Clements with B.M. Horacek, CIHR Grant, "*Spatiotemporal Dynamics of Ventricular Tachycardia and Ventricular Fibrillation in a Three-Dimensional Anisotropic Heart Model*" (2004-07).

Heart disease remains the leading cause (39%) of death in developed countries. The majority of these deaths occur suddenly due to ventricular tachycardia (VT) that deteriorates into ventricular fibrillation (VF). Mathematical modeling and computer simulations play an important role in understanding and treating the fundamental mechanisms of these events. The main objective of our research is the development of anatomically and physiologically accurate models of the human heart to simulate and characterize such events. Our model simulations---which include normal and ectopic activation, reentrant activation, and afterdepolarizations --- provide insight into the mechanisms of VT/VF, and into the effects of therapeutic interventions (by means of catheter ablation and antiarrhythmic drugs) in patients suffering from ventricular tachyarrhythmias. One of our specific aims is to develop a clinical procedure, assisted by body-surface potential mapping (BSPMs) for guiding catheter ablation in patients with life-threatening arrhythmias.

John Fitz-Clarke (MD, PhD) models cardiac dynamics and heart arrhythmias including fibrillation. **Jeffery Praught** has just completed the requirements for an M.Sc. in Mathematics. In his thesis "*A hybrid model for propagation of activation in human cardiac tissue*", Jeff describes in detail the microscopic and macroscopic level modeling of cardiac activation in the Dalhousie propagation (hybrid) model and shows how it can applied to the problem of calibrating heart pacemaker resynchronization after surgical implantation. **Garrett MacLean** and **Rebecca White** are graduate students working on a very important problem in electrophysiolocal imaging; which is that of identifying and localizing from BSPMs the sources of monomorphic and polymorphic VT in patients prior to ablation surgery. The topic areas related to our groups' research include mathematical modeling, analysis (wavelet theory), dynamical systems, ordinary and partial differential equations and numerical analysis.

THE MATHEMATICS & STATISTICS COOP PROGRAM
by Dr. John Clements

Co-operative Education is a program that combines academic studies with career related work experience. Students alternate 3 work terms with their normal academic study and graduate with a Bachelor of Science, Co-op. Students must apply before the start of their second year of studies and must have achieved at least a 3.0 GPA. Currently there are two students in our Co-op program: **Jennifer MacDonald** and **Erin MacIntosh. Jennifer** completed her third work term (with **Statistics Canada**) in December and will be graduating this May having also completed all of the requirements for the **Certificate in Actuarial and Financial Mathematics. Erin MacIntosh** completed her third work term (with **MathResources Inc.** here in Halifax) and will be graduating in October of this year. We have been fortunate to have exceptional students in this program and look forward to expanding the numbers in the future.

STATISTICS DIVISION
by Dr. Bruce Smith

The Statistics Division was pleased to welcome new faculty member Joanna Mills-Flemming in July, 2005. Joanna's appointment adds to a growing research group in Environmental Statistics, which together with Statistical Genetics, represent major areas of research focus for the division.

Chris Field took early retirement beginning July, 2006. This is retirement in name only, as Chris remains very active in research and graduate supervision. Chris was elected as a Fellow of the American Statistical Association at the Joint Statistical Meetings in August, 2005. Congratulations, Chris.

Kit Bowen will be retiring July 1, 2006. Kit's superb and dedicated teaching has benefitted many a Dalhousie student, and she will be sorely missed. We wish you the best in retirement, Kit.

Wade Blanchard, who served ably as our statistical consultant for over 10 years, has left the Statistical Consulting Service to pursue Ph.D. studies full time. Good luck with your studies Wade, and many thanks

for a job well done.

Vaneeta Grover, a current Ph.D. student, is working part time as our statistical consultant. Her experience as a Biostatistical Consultant at the University of Saskatchewan is an asset.

MATHEMATICS DIVISION
by Dr. Jeannette Janssen

This was a fine year for the Mathematics division, with new faces, new initiatives and new ideas. The rejuvenation of the division continued, with three new faculty members starting in the past year. The division has record numbers of new graduate students and post doctoral fellows, many of them working with the newer faculty. In the two-and-a-half years before I started my directorship I was away from the Chase building a lot because of sabbatical and maternity leave. When I came back last September, energy levels were at a height not seen (my colleagues tell me) since the mid-eighties.

Our undergraduate program is also undergoing a renewal. Five new courses will be starting next September. A new Calculus course for Life and Social Sciences will differentiate our first year courses, and offer more choice for students in different disciplines. Four new Math electives at third year level or higher enrich the course offerings for our students, and reflect the interest of new faculty members.

Mathematics seems to be increasing in popularity among students, and also in society at large. In my advising hours, I see many students from other disciplines that are contemplating a minor, shared major, or even a switch to a major in Math. The interest in Math Circles and the Math League keeps growing. Jason Brown, writing in the CMS NOTES as Vice-President Atlantic Region, gives some more examples that indicate a higher profile of Mathematics in society: movies such as *A Beautiful Mind* and *Proof*, the television show NUMB3RS, the JUMP program pioneered by Governor General's award winning playright, and mathematician, John Mighton, and even the Sudoku craze. Jason's conclusion is that mathematics and mathematicians have become "cool". Whether this is a passing fad or a genuine

trend remains to be seen, but whatever the case, these are good times for Mathematics at Dalhousie. I am looking forward to another good year.

MITACS PROJECT
by Dr. Jeannette Janssen

The project Modelling and Mining of Networked Information Spaces (MoMiNIS) saw a doubling of its funding from MITACS this year. The project is led by Jeannette Janssen and Evangelos Milios (CS), and supports nine researchers and fourteen students in five universities across Canada. In our department, MoMiNIS supports graduate students Bob Garrish and Changping Wang, and involves Emma Connon, who worked as a research assistant for Dr. Janssen, and Theresa Mader, an undergraduate summer research student. MoMiNIS will also fund a post-doctoral fellow starting September 2006, Pawel Pralat. The external sponsors of MoMiNIS are the Canadian Security Establishment and TARA, a conglomerate of telecommunications companies.

The goal of MoMiNIS is to study complex networks. These networks can be real, such as the Internet, or virtual, such as the World Wide Web, a network of email exchanges, or a network representing the interactions of proteins in a cell. The main focus of MoMiNIS research in our department is the development and analysis of stochastic models for such networks.

NEW NSERC GRANTS

Dilcher, K.H.	$15, 000
Fraser, A.J.	$6, 000
Gu, H.	$15, 000
Selinger, P.	$30, 600
Taylor, K.F.	$16, 000

Most faculty members hold continuing NSERC grants.

RETIREMENTS
by Dr. Patrick Keast

Dr. Kit Bowen joined the faculty in July 1985. She received her PhD degree, in Marine Biology, from the Scripps Institution of Oceanography in San Diego. Much of her teaching over the past 21 years has been in classes where most of the students were majoring in something other than mathematics or statistics. She has consistently done an excellent job for us. In addition, she has contributed to the supervision of many MSc students, especially in Health Professions. She will be sorely missed by us, and by many other Departments. We are losing a colleague who has contributed far beyond her job description. Replacing her is going to be a challenge.

Dr. John Clements came to Dalhousie in July 1970, after completing his PhD at the University of Toronto. He has been involved in every aspect of the Department over the years, as teacher of many different classes at all levels, as Cooperative Education Director, as Director of the Mathematics Division, and as supervisor of a long list of MSc and PhD students. Despite the administrative and teaching load he assumed, he has always had an on-going solid research programme. One of his passions is glider flying, and one of his research interests is optimal control as it applies to efficiently navigating aircraft. Not many of us get to do research into our hobbies. His retirement will be from teaching and administration only; his research programmes and student supervision will continue.

Dr. Chelluri Sastri (or simply, Sastri as everyone calls him) has been in the Department since July 1979. He completed his PhD at the prestigious Courant Institute in 1973, and held visiting research positions at Courant, Waterloo and the University of Saskatchewan before coming to Dalhousie. During his 27 years in the Department he has taught an unusual variety of classes, reflecting his interests in two distinct areas, applied probability and symmetries of differential equations. He has held the position of Director of Mathematics, and has for several years organized a Canadian Mathematics Society summer camp for high school students. Sastri will retire from teaching and administration only. His research programmes will continue both here and with colleagues in Italy.

PROMOTIONS AND TENURE

Dorette Pronk was awarded tenure and promotion to Associate Professor.

Bruce Smith was promoted to Professor.

Chelluri Sastri was promoted to Professor.

NEW FACULTY

Two new faculty members have joined us since May 2005. Dr. Joanna Mills Flemming started in July 2005 and Dr. Theodore Kolokolnikov in January 2006. Joanna completed her PhD, under the supervision of Dr. Christopher Field, in 2000. Before returning to Dalhousie to take up a position as an Environmental Statistician, Joanna worked as an actuary, and then held a postdoctoral position in the University of Geneva.

Dr. Kolokolnikov completed his PhD at the University of British Columbia in 2004, and then held an NSERC postdoctoral fellowship at Ghent University in Belgium. He works in the area of partial differential equations and was supervised by Dr. Michael Ward, who was also the supervisor of Dr. David Iron who joined us in 2004.

These new faculty members, and the others who have joined the Department, truly have raised the level of energy and activity around us. We hope that they will be able to continue in the tradition of long service provided by the retiring faculty.

DALHOUSIE UNIVERSITY MATH AND STAT SOCIETY

In an effort to stay out of trouble, the Undergraduate Society (DUMASS) tried to keep busy this past year with regular events. We had a handful of Aftermaths throughout the year, at the Grad House and Dooly's and at Freeman's. The fall semester saw the first of what we hope will become an annual series of Charity Games Nights: we organized tables of board games and donated the proceeds to the Metro Food Bank. The Night was a great success and DUMASS matched the funds raised during the evening for a total of $125,

which the Food Bank greatly appreciated. We tried to alleviate some of the February blues by planning a movie night in the Colloquium Room and the Annual Wine and Cheese during that busy month. Although we did not pop any popcorn, we gorged ourselves sufficiently on goodies while watching some clever (and, sadly, not so clever) movies. On February 10, 2006, we saw the Colloquium Room, where we have spent so many lectures staring at the assorted math decorating the black board, transformed by candles, hors d'oeuvres, and a whole cartload of wine. As the hours waxed on and the level of wine waned, we all forgot about our collective stress level and enjoyed the company of friends. This March, DUMASS planned a Ski Trip, open to Math and Stats students and their friends, which was a success despite the unreliable weather. We also offered tutorials for the December 2005 Exams, as is the tradition. In collaboration with the Math and Stats Graduate Students' Society, we celebrated Hallowe'en in style and continued offering the tutorials in April 2006. This summer also promises more events planned by both societies and it has been great to see our communities grow closer together. We are currently organizing a trip to Montréal to attend the 2006 Canadian Undergraduate Mathematics Conference at McGill University and are very excited about it!

We had an awesome year and we wish the DUMASS Council 2006-2007 great luck for the upcoming year:

Lindy DeCoste - President
Dave Claire – Vice President
Theresa Mader - Treasurer
Jill Falkenberg – Secretary
Jim Parks – DSS Representative

 By: Rachael Manion, Dave McNutt, Sarah Chisolm, Amanda Halladay, Micah McCurdy, Jill Falkenberg and Steve Chisolm.

GRADUATE STUDIES REPORT – MATHEMATICS
by Dr. Keith Johnson

There were 10 PhD and 15 MSc students enrolled in mathematics during the 2005/2006 academic year. At the October convocation, Tara Taylor and Jin Yue each received the PhD (supervised by Dorette Pronk

and Roman Smirnov respectively) and Ryan Lukeman, Geoff Cruttwell and Angela Siegel each received their MSc. At the May convocation, Yanjing He will receive her PhD (written under the supervision of Alan Coley) and Caroline Adlam, Josh MacArthur and Jeffery Praught will receive each their MSc. The division has so far admitted 5 new PhD students and 9 new MSc students for the 2006/2007 academic term.

GRADUATE STUDIES REPORT – STATISTICS
by Dr. E. Susko

This year we welcomed six new students to our graduate programme in Statistics. Melanie Abbeysundera, Sipi Garg, Li Li and Laura MacKenzie entered into the MSc program. Wade Blanchard and Vaneeta Grover entered the PhD program. Currently we have 10 continuing MSc and 6 PhD students in Statistics. We have admitted four new graduate students and hope to admit another two for 2006/07.

Michele Millar successfully defended her PhD Thesis in November. She is currently an Assistant Professor at Mount St. Vincent. Eight MSc students completed programme requirements this academic year:

Talia Beech (Drs. Dowd and Hatcher)
Le Bao (Drs. Bielawski and Gu)
Chris Jones (Dr. Dowd)
Shuyan Li (Drs. Gu and Smith)
Sean Smith (Drs. Dowd and Smith)
Cathy Wamboldt (Dr. Hamilton)
Jihua Wu (Dr. Susko)
Liwen Zou (Drs. Field and Susko)

GRADUATE STUDENT SOCIETY
by Caroline Adlam

The Graduate Student Society kicked off the 2005 year with a potluck dinner to acquaint everyone with new members of our society. With a few checkered tableclothes and some fancy table organization, the Colloquium room was transformed into a buffet style dining hall. Needless to say the food was great and the night a success.

In the spirit of Halloween, a spooktacular costume party was organized in collaboration with DUMASS at the end of October. To create the perfect ambiance, we outfitted the Colloquium room in cobwebs, jack-o-lantern lighting and an eerie spider web silhouette that was projected onto the back wall. Many students, disguised in creative costume, came to celebrate the event.

In November, Matt Heller hosted the ever popular swanky Martini party at his downtown apartment. Dressed in formal attire, graduate students sipped exotic cocktails and mingled with each other into the wee hours of the night.

As 2005 turned into 2006, events such as the annual Pi day celebration and Chinese dinner were held. This year the somewhat belated Chinese New Year celebration was hosted at the Great Wall and was a tremendous success.

In the past, DUMASS has traditionally organized tutorials at the end of each semester to help first-year Math and Stats students prepare for their final exams. This year the Graduate Student Society has taken the initiative to play a more active role in these tutorials. In particular, both organizing and running the exam tutorials is now a joint effort shared by the Graduate and Undergraduate Societies. In the past, these tutorials have been a valuable resource for both the students and the society. This joint effort is an attempt to preserve and improve this resource. We would like to thank everyone who has assisted in making the first co-organized exam tutorials such a success.

As the academic year winds down and some serious thesis writing gets underway, the Graduate Student Society has some stress relieving party plans already in the works. Given the tremendous success of last year's summer BBQ fiesta, members of our society can look forward to a spring BBQ fiesta in the very near future.

2006 MATHEMATICAL CONTEST IN MODELING
by Dr. Dorette Pronk

Harry Xu, Lylia Mogosumova, and Daniel Sutow represented our department in the 22nd annual

Mathematical Contest in Modeling (MCM), organized by COMAP. This year, 748 teams representing institutions from 9 countries participated in this contest.

This year's contest ran from Thursday, February 2 to Monday, February 6, 2006. During that time, our team researched, modeled and described a solution to the problem of determining a water irrigation schedule for a field of fixed dimensions subject to various hydrodynamical and practical requirements. Our team received the designation of "Successful Participants" for their work.

This competition is a great way for students to practice applying their knowledge to a real life problem and to work on problem solving as a team (containing both math and engineering students). They also get a chance to experience more of the social aspects of working on a project that needs to be finished within a weekend, and with the department's funding to celebrate their work with a nice dinner on Saturday evening.

Students who would be interested in participating in this contest in the future are encouraged to check out some of the practice problems on the COMAP website mathmodels.org.

THE APICS AND PUTNAM COMPETITIONS
by Dr. Dorette Pronk

The APICS and Putnam competitions require problem solving skills for problems that have a particular mathematical beauty to them, but are not necessarily useful for any kind of practical applications. Some of these problems can appear very difficult unless you approach them from just the right angle.

Our department runs a special training session during the fall semester for students who are interested in participating in these competitions. During the training we present the students with various techniques that may be useful in solving the problems on the competitions, and we just practice on solving a lot of different kinds of problems. This year, the training was organized by Steven Noble, who also taught the Problem Solving class, Dorette Pronk, and Kia Dalili, who is in our department as an AARMS

postdoctoral fellow. As a high school student, Kia participated in the training of the Iranian International Math Olympiad team. The Iranian team has frequently been among the top ten teams in the world, and it was certainly a pleasure to have him work with our students. The students enjoyed the training and saw this as an opportunity to further enrich their education with challenging new material without the risk of a low course grade.

The APICS competition was at Acadia University this year, together with the APICS conference, and we sent several teams, and the competition problems were perceived as particularly tough by most of our students. They were just not the kind of problems they liked. Although we didn't win any prizes this year, our students did stay for the conference and attended the talks given by older students who had done summer research in mathematics. This is a good way to spark their interest in doing research in mathematics.

Four of our students, Fredrik Sy (first-year mathematics), Lylia Mogosumova (third-year engineering), Andy Reddin (second-year physics), Ashley Kelly (second-year mathematics), and Jim Parks (third-year mathematics) participated in the Putnam Competition on December 3, 2005. This competition is written individually, but over lunch and after the competition was over we had a delightful discussion on how the students had solved the various problems. This is a particularly difficult competition for university and college students across North America. It is considered a significant achievement when one solves a complete problem for 7 points. Our top student this year was Fredrik Sy with 9 points. We congratulate Fredrik with this achievement and look forward to his results in the coming years.

One of the reasons why it is hard to get points on the Putnam is that it is not sufficient to have ideas on how to solve a problem. Those ideas also need to be worked out in a mathematically correct way. This is especially difficult for students from other disciplines. So during the winter semester Kia Dalili continued to do the problem solving training and focused on the writing of proper solutions. Kia, thank you for all your hard work in this!

NOVA SCOTIA MATHEMATICS LEAGUE
by Dr. Richard Nowakowski

On three separate Saturday mornings during the season, schools send teams of four students, accompanied by a parent or teacher, to participate in a three-hour mathematics problem solving competition. Throughout the morning, the students work as a team to answer ten different problems and have an opportunity to take them up afterward. They also participate in two math relays in which the team members get their own individual questions and race against the other teams to solve them all. Team members receive a certificate of participation. The top teams at the end of the season participated in the provincial championship held in Truro, May 6. A more detailed description of the event is available at http://www.mathstat.dal.ca/~mathleague/index.html.

Currently, three centers run the Nova Scotia Mathematics League games - Halifax, Sydney and Truro. Bridgewater participated in the last two rounds this year and will participate fully next year. There has also been interest shown in the Wolfville area but there are no definite plans yet.

This was the fourth year of operation and was our biggest yet. Forty-five teams, from the Halifax Regional, Truro Regional and Sydney Regional school boards, competed in three rounds. One of the Halifax region teams is a Home School team. Eight teams from the South Shore also took part in the last two rounds.

Dates and Locations for the 2005-2006 Season

	Halifax	Sydney	Truro	Bridgewater
Game 1:	November 5 Dalhousie University	November 5 C.B.U.	November 3 N.S.C.C.	
Game 2:	February 11 King's College Alumni Hall	February 11 C.B.U.	February 9 N.S.C.C.	February 9 N.S.C.C.
Game 3:	March 25 St. Mary's University	March 25 C.B.U.	March 25 C.E.C.	March 25th N.S.C.C.

Regional Winners:
Halifax: Queen Elizabeth Team A, Halifax Grammar Team A, Sackville High Team A
Sydney: Sydney Academy Team A, Sydney Academy Team B, Glace Bay High Team A
Truro: CEC Team A, CEC Team B, Hants East Team A.

Wild Card Qualifiers: Halifax Grammar Team B, Millwood High Team A, Halifax Grammar Team C, Queen Elizabeth Team B, King's Edgehill Team A, Halifax West Team A.

The Problems and the Central Organizing Committee consists of Paul Ottaway, Meghan Allen, Richard Nowakowski and Angela Siegel. Thanks also go out to those former Math League competitors who submitted and helped vet questions. Our thanks go to the Dean of Science who underwrote the events held at Dalhousie—it costs about $600 for the snacks and drinks for each event, and to the Department of Mathematics, which underwrote the prizes as well as giving time to the committee members to run the events.

Our thanks also go to NSERC and the Canadian Mathematical Society who provided prizes for the Provincial Final.

The Provincial Final held on May 6, 2006 was a closely contested affair. The top 15 teams in the province took part and there were only three points separating Gold and Silver. The teams, by rank, but in alphabetical order in each rank, are:

Halifax Grammar Team A	Gold Medalist
Halifax Grammar Team B	Gold Medalist
King's Edgehill Team A	Gold Medalist
CEC Team A	Silver Medalist
Halifax Grammar Team C	Silver Medalist
Hants East Team A	Silver Medalist
Queen Elizabeth Team A	Silver Medalist
Sackville High Team A	Silver Medalist
CEC Team B	Bronze Medalist
Glace Bay High Team A	Bronze Medalist
Halifax West Team A	Bronze Medalist
Millwood High Team A	Bronze Medalist

Queen Elizabeth Team B	Bronze Medalist
Sydney Academy Team A	Bronze Medalist
Sydney Academy Team B	Bronze Medalist

Congratulations to all who took part.

GAMES-AT-DAL 4 WORKSHOP
AUGUST 21-25, 2006
by Dr. Richard Nowakowski

This event is held every second year, participation is by invitation only and is limited. Experts and graduate students from around the world are invited to mix with the local graduate students. There are no lectures. The topic is combinatorial games, such as Chess, Checkers and Go. We agree on three problems in advance and the group works on whichever they find the most appealing after everyone arrives.

Eighteen months ago, Thane Plambeck and then Aaron Siegel and Thane had major breakthroughs in evaluating impartial, misere games. Certainly, one topic will be an attempt to extend these techniques to partisan misere games.

Participants:
Meghan Allen (Dal), JP Grossman (NY), Alan Hill (Dal), Richard Nowakowski (Dal), Paul Ottaway (Dal), Thane Plambeck (Calif.) Aaron Siegel (Princeton), Angela Siegel (Dal), Fraser Stewart (Dal), David Wolf (Gus. Adolp. Coll.), and possibly Elwyn Berlekamp (Berkeley). Regrets: Michael Albert (NZ).

Highlights from the past: Games-At-Dal 3 resulted in two groundbreaking papers. One by JP Grossman and Aaron Siegel, Reduced Canonical Form, showed a concept postulated in 1993 was, in fact, well defined and they gave an evaluation procedure. The other paper Spittles by G. A. Mesdal, a non-de-plume for the 12 participants, made headway on a game introduced in the 19 century. The game of Clobber was invented during Games-At-Dal 2, two papers resulted and a world championship was held at an International Conference at Dagstuhl the following year. Games-At-Dal 1 also resulted in two papers and gave thesis topics to two MSc students.

SPATIAL/TEMPORAL MODELING FOR
MARINE ECOLOGICAL SYSTEMS
by Dr. Joanna Mills Flemming

A workshop entitled "Spatial/temporal modeling for marine ecological systems" was held August 17-19, 2005 here at Dalhousie University. This workshop was sponsored by the National Program on Complex Data Structures (NPCDS) and was a first step towards a full proposal to NPCDS for funding to continue research on the workshop theme. In January of 2006, organizers Michael Dowd, Joanna Mills Flemming, Chris Field and Rick Routledge (SFU) were informed that this proposal had been successful. Financial support for graduate students and postdoctoral researchers is now in place for the next three years.

The workshop brought together researchers in statistics and marine ecology interested in the development of models for the analysis of complex temporal/spatial data. These data include, for example, animal tracking data as well as time series of biological variables from ocean observing systems. Keynote speakers included David Brillinger (University of California, Berkeley), Yvette Spitz (Oregon State University), Arnaud Doucet (UBC), Hans Ruedi Kuensch (ETH, Zurich), Pierre Lermusiaux (Harvard University) and Ransom Myers (Dalhousie University). There were over 70 attendees.

"MATH CIRCLES" AT DALHOUSIE
UNIVERSITY
by Dr. Richard Nowakowski

The purpose of the Math Circles program is to foster interest in mathematics among talented high school students and expose them to mathematics beyond the high school curriculum. The sessions took place in the Fall term on Tuesday evenings from 5:30 to 8:00 pm with a break in the middle for pizza. These sessions are intended to have lots of interaction between the presenters and the audience.

This was our third year and our thanks go to Angela Siegel (and Anneke) who organized the sessions and to the many people who volunteered their time to help organize the events, most especially to the presenters who had the most work but maybe the most fun. Also,

thanks goes to the Dean of Science and to the Department who made the pizza possible.

The presentations were

October 4: Richard Hoshino and Angela Siegel, *Fifteen & Frogs: Mathematical Games*.

October 18, Steve Noble & Sable McKeil, *Counting and Infinity*.

November 1, Sipi Garg & Vaneeta Grover, *Probable Fun - a Look at Probability*.

November 15, Jon Borwein and Dorette Pronk, *Mathematical Explorations*.

Part II.
November 29, Sara Faridi & Peter Selinger, *Graphs and Lazy Counting*.

CATCH-THE-BAD-GUY WORKSHOP
MAY 17 2005
by Dr. Richard Nowakowski

Cyber attacks have become increasingly severe, and current network security solutions offer only local protection from known cyber attacks. Graphs are an abstraction for a wide range of physical systems such as networks and searching graphs is a basic problem. Researchers have suggested and investigated several models. The important three considerations have are:

1: the amount of information---in the Cops-and-Robber model, which is characterized by perfect information, the Cops try to apprehend a Robber and everyone knows everybody's position at all times;

2: the speed of the protagonists---in the Searching model, which allows the intruder to have infinite speed, the searchers try to decontaminate a network after a biological or chemical spill;

3: whether the intruders multiply---in the Firefighting model, the fire or virus is observed to breakout and then propagates at finite speed, the object is to quarantine the outbreak.

The Workshop will be in two sessions, Cops-and Robber models in the morning and Searching and Firefighting in the afternoon. The 15 min talks will consist of a review of a topic---the important definitions, main models and typical questions, results and any conjectures. Presenting proofs is not required and actively discouraged unless there is a good reason. Brainstorming will follow the reviews. As the presentations continue, the idea is to obtain more linkages and cross-fertilization between the models.

Session 1: Cops and Robber models

11am: Sable McKeil, Cops and Robber on graphs with unreliable edges.

11:15: Alan Hill, Cops and Robbers with differential speeds.

11:30: Nancy Clarke, Technology, cops and robbers.

11:45: General Discussions

12:30: Lunch

Session 2: Other models

1pm: Margaret-Ellen Messinger: firefighting.

1:15: Richard Nowakowski, Cleaning as a model for searching.

1:30: Richard Nowakowski, Watchman problems.

1:45: Discussions

THE 2005 ANNUAL BLUENOSE NUMERICAL
ANALYSIS DAY
by Dr. Patrick Keast

The Sixth Annual Bluenose Numerical Analysis Day was held at Cape Breton University on June 10, 2005. The event was organized by Shaohua Chen (Cape Breton University), Richard Karsten (Acadia), Paul Muir (Saint Mary's) and Pat Keast (Dalhousie). The day brought together 35 researchers from Dalhousie, Saint Mary's, Acadia, St. Francis Xavier, Cape Breton University, and the University of New Brunswick, (St. John), 11 of whom gave presentations. The principal

speaker was Steve Ruuth, from Simon Fraser University, British Columbia. This annual meeting, started by a former member of our Department, Ray Spiteri, continues to grow and will be held in June, 2006, at St. Francis Xavier, for the first time.

COMPUTING RESOURCES COMMITTEE
by B. Pillai

We have weathered a tough year, with a new set of charges to the Department for network connections. Our teaching operations now rely on the internet to such an extent that we found ourselves in a very awkward situation. With the help of the Faculty of Science Dean's office we tided over the brief financial storm, but are still struggling with the added costs to our external grants. Most of what follows is a report on changes in the past year.

The 10 node linux compute cluster was upgraded in 2005 with 6 additional dual opteron 2.4 GHz compute nodes with 4 GB ram per node, bringing the total to 16 compute nodes and a master node in the department compute cluster. A cluster file system replaced nfs to improve input/output performance under heavy load.

The main server chase.mathstat.dal.ca is scheduled to be replaced soon with a new 5U dual xeon 3.4 GHz server with a 2.4 TB scsi raid array. The new server provides redundancy for the operating system and data in case of disk drive failure and provides big improvements in input/output throughput and performance compared to the current Sun e450 servers. This server is expected to provide an increase in disk quotas for user accounts with daily tape backup, a larger temporary storage space with no tape backup and also improved performance of current services including email and web services. Once retired from its current duties, the Sun enterprise servers would consolidate the services provided by several old servers like web services, software license services, CDE sessions to XClients and hosting of Solaris only applications. The UPS of the server chase.mathstat.dal.ca is also scheduled to be replaced with a new 3U rackmount 3000 VA unit and 3 battery packs to extend the run time in case of power failure from the 5 minutes provided by the current ups to 2 hours. All new servers would be rack mountable, increasing the efficiency in space utilization of the machine room and would be housed on ventilated 42U APC netshelter racks with side panels and lockable doors.

The solaris compute server sigma.mathstat.dal.ca   is scheduled to be replaced with a sun fire 3800 that has 4 x 900 MHz ultrasparc 3 cpu and 8 GB ram in mid 2006. This server would supplement the linux cluster, providing computing facilities to faculty, graduate students, visitors, researchers and honours students in the department.

The air conditioning service in chase machine room was upgraded from 3 tons to 8 tons in 2005. It has been further upgraded with another new 5 ton unit in April 2006 to accommodate research equipment from a Canadian Fund for Innovation grant. Dr. Joe Bielawski, who is a member of the Statistics Division, is one of the holders of this grant. A new water feed for the air conditioning units and an additional power line were also installed in April 2006.

Several old graduate student computers were replaced in 2005 with new ones. Also we acquired a site license for all Microsoft products (Microsoft office not included) for computers owned by the department through MSDN academic alliance program in 2005.

THE DISTINGUISHED SPEAKER LECTURE SERIES
by Dr. Patrick Keast

The second speaker in the Distinguished Speaker Series of the Department was Dr. Karl Heinrich Hofmann of the Technical University, Darmstadt, and Tulane University, New Orleans. The public talk took place on March 15, 2006, with the title *Applied Mathematics in the Renaissance: Central Perspective in Italian Painting*, and was very well attended. Dr. Hofmann also gave a Colloquium talk on March 13. In addition to these two formal talks, Dr. Hofmann gave a very informative first hand presentation on the devastation in New Orleans caused by hurricane Katrina. He and his wife have a home in New Orleans, and were there during the hurricane and its aftermath in the late summer of 2005.   Their home was spared major damage, despite being within a block of the flooded areas.

The Distinguished Speaker Lecture Series was a project of Dr. Rajendra Gupta, a former Chair of the Department. His fund-raising efforts have resulted in an endowment which can sustain a Distinguished Speaker Lecture each year, alternating between a Statistician and a Mathematician.

CHRIS FIELD RETIREMENT SYMPOSIUM
by Dr. Joanna Mills Flemming

Chris Field, now Professor Emeritus, retired from our department in July of 2005 and a Symposium in his honour was held on August 15, 2005 here at Dalhousie University. Invited talks were given by Elvezio Ronchetti (University of Geneva), Alan Welsh (Australian National University), Micheal Newton (University of Wisconsin, Madison), Debbie Dupuis (HEC Montreal), Marc Genton (Texas A & M University) and Andrew Roger (Dalhousie University), all of whom are collaborators or former students of Chris. The talks spanned his research interests (robustness, genetics, etc.) while at the same time highlighted his love of hiking, bird watching and great passion for life. There were over 50 attendees. Following the symposium, a dinner was held at St. Mary's Boat Club. Chris's mother, Mrs. Alexander, said a few words. It was a very special day indeed.

GENOMICS
by Dr. Ed Susko

Ed Susko, Chris Field and Hong Gu are part of large collaborative group of statisticians, genomicists and bioinformaticians working on issues in molecular evolution. The group includes faculty members from the Departments of Biochemistry and Molecular Biology (Andrew Roger and W. Ford Doolittle), Biology (Joe Bielawski) and the Faculty of Computer Science (Christian Blouin). A wide variety of projects are being pursued in the general areas of modeling genome and proteome evolution at the most ancient levels of divergence (i.e. at the prokaryotic/eukaryotic split). Specific interests include developing phylogenetic methods and software tools that incorporate lateral gene transfer as a process, more accurate models of protein evolution that account for covarion, rate-shift and 3D structural effects and site-specific amino acid frequencies, developing methods

for phylogenetic inference from multiple gene sets and developing methods for estimating confidence regions for phylogenies.

In the past year the group has benefitted from the involvement of MSc students Le Bao, Wenyi Jiang, Jihua Wu and Liwen Zou. Jihua and Liwen have continued on to PhD studies as part of the project. Also part of the group were Postdoctoral Fellows Huaichun Wang and Matthew Spencer. Huaichun continues work on covarion models of sequence evolution as well as obtaining better understanding GC content variation in genomes. Matthew Spencer has obtained a position in Quantitative Biology at the University of Liverpool.

An outgrowth of the collaboration has been a new MSc program in Bioinformatics and Computational Biology that will start accepting students in the coming year. The program will allow interested students to obtain the multi-disciplinary training that has become increasingly important in this area of research.

LEARNING CENTRES
by Dr. Nicos Pelavas

The Math & Stats Learning Centres provide help to students enrolled in core Mathematics and Statistics courses. The daytime location is in room 009 of the Chase building, Monday-Friday 8:30am-5:00pm, and in the evenings the Learning Centre is located in room G40M of the Killam Library, Monday-Thursday 7:00pm-10:00pm. The Centres are staffed by senior undergraduate and graduate students who are knowledgeable and eager to help. Many thanks to all of the students who have worked in the Math Learning Centres this year; Melanie Abeysundera, Meghan Allen, Timothy Caley, Geoff Cruttwell, Katie Gardner, Sipi Garg, Vaneeta Grover, Yanjing He, Alan Hill, Andrew Hoefel, Wenyi Jiang, Ashkan Kharwzi, Li Li, Laura MacKenzie, Garrett MacLean, Sable McKeil, Karyn McLellan, Margaret-Ellen Messinger, Ozy Naghibi, Paul Sheridan, Changping Wang, Jihua Wu, Jin Yue. Your time and effort has made possible this valuable resource to our undergraduate students.

CATEGORY THEORY 2006
by Dr. Dorette Pronk

One of the research areas in which our department specializes is Category Theory. This summer Robert Dawson, Dorette Pronk, and Peter Selinger are organizing the international category theory conference CT 2006. The conference will have about 90 participants, and will be held from June 25 to July 1, 2006, at the White Point Beach Resort, on Nova Scotia's South Shore.

The conference will be partly sponsored by AARMS, Dalhousie University, and Saint Mary's University. Aside from funding invited speakers in some key areas of category theory, most of the funding will be used to help graduate students attend this conference. The organizers are delighted to see a large number of active young researchers who are expanding the applications of category theory with significant original contributions.

CT 2006 will be an active research-oriented conference. The seaside setting will offer more opportunities for informal discussion and collaboration in the evenings than might be the case in an urban setting.

This meeting is part of a series that has included meetings in Halifax, Montreal, Vancouver, Como, Coimbra, Tours, and Sussex. Topics of interest include higher dimensional categories, categorical logic, and various applications of categories in and outside of mathematics. A special session in memory of Samuel Eilenberg and Saunders MacLane, the "founding fathers" of category theory, will be held on the Monday morning.

THE SOUND OF STONES
by Dr. Theodore Kolokolnikov

Each week a group of us meet to play "go" in the lunch room. It is especially nice to see beginners joining in, discovering the hidden pleasures of this ancient game. It remains to be seen as to whether the game theorists can hold up to the onslaught of the statisticians, categorists, applied mathematicians, and pregnant women. To this day, the answer is a categorical no.

Please join us each Thursday at 12:00, in the lunch room (207), for an afternoon of "go". An extended welcome to absolute beginners to learn this beautiful game.

CHEBUCTO COMMUNITY NET
by Andrew Wright

The Chebucto Community Net is now celebrating its twelfth year of existence, an accomplishment that could be considered something of a miracle. Many other community nets, so hopefully begun in the early 1990's have fallen by the wayside, their community resources websites gone and the old domains now driving traffic to mortgage ads and online pharmacies.

Yet here we are, Canada's second oldest community net (after Ottawa), attesting to the will of the community to keep us alive and also to the generosity of the Department of Mathematics and Statistics, which provides the foundation for all else we do.

The past year has posed many challenges for Chebucto but has also marked a number of impressive advances.

The Chebucto Community Net website is ranked in the top 40,000 on the Internet by web resource *Alexa*. We have added an array of new services: updated webmail, encrypted file management and email access, improved spam and scam filters, secured credit card membership renewals and many more features. We have also undertaken a top to bottom retooling of our whole email system a major part of which will shortly produce an increased mailbox size from 4 MB to 1000 MB (one GigaByte).

In the past year we have sustained and increased our community involvement. We continue to be the chosen website for the Nova Scotia branch of the Canadian Volunteer Initiative as well as Envision Halifax, which seeks to foster and develop community leadership in the growth of the Halifax Regional Municipality. And we have added the website of the embryonic Federation of Community Organizations of Halifax.

In January, we suffered a sad loss with the death of Norman De Forest, a longtime volunteer who had helped with user support and technical development

since 1995. Scarcely had we posted the news of Norman's death on our website when tributes began to pour in from all over the world, sent by those who had never met Norman other than on the Internet but had been especially touched by his willingness to share his vast stores of technical knowledge and his concern for the needs of the disabled.

One telling communication was from Spamhaus, a major Internet anti-spam information resource which acknowledged Norman's contributions to the field of spam fighting by donating an anti-spam service to Chebucto in perpetuity in Norman's memory.

Another acknowledgment also came in January in the form of an invitation to Chebucto to submit an application to the Donner Canadian Foundation 9th annual awards for Excellence in the Delivery of Social Services. We were deeply honoured to have been invited to participate in this most prestigious awards event.

Despite the proliferation of Internet providers which has occurred during Chebucto's lifetime, major barriers still exist to the full participation of potential users. The "digital divide" still prevents many from utilizing the Internet, through lack of knowledge or more commonly lack of means. And one of the best uses of the Internet - to use technology for the betterment of our communities - continues to drive us to better ourselves, year after year.

Following our April Annual General Meeting, a message arrrived from a member. It said, "You folks are doing amazing things..."

We have more innovations in store. And with appropriate planning and perhaps a little bit of luck we plan on continuing to amaze.

SUMMER CAMPS

CANADIAN MATHEMATICAL SOCIETY (CMS) CAMP
by Dr. C.C.A. Sastri and S. Sikka

 The Dalhousie-CMS math camp has now become an annual tradition. It was held for the first time in the summer of 2000 and has been repeated every summer since then. Thus it is in its seventh year now. Last year it was held from the 4th to the 8th of July; this year, the dates are July 17-21. It is held under the auspices of the Canadian Mathematical Society (CMS) and Dalhousie University, with financial support from various sources, including Dalhousie, ESSO, and NSERC/PromoScience. The organizers, from the beginning, have been Chelluri C.A. Sastri and Suraj Sikka.

The camp is aimed at high school students in Nova Scotia. The purpose is to identify, stimulate, and encourage mathematical talent. Accordingly, letters calling for nominations are sent out in early March to all the high schools in the province, both public and private. The stipulation is that a school can make no more than two nominations and that the nominees are to have finished either Grade 10 or Grade 11. Last year, the response from the public schools, while slightly better than the previous year's, was still down from earlier years. It was, however, sufficient to provide a good pool of students from which to make the selection. The response from the private schools was poor, as before. Altogether, there were 31 applicants. We are trying different ways of attracting more good students: For the last few years Dalhousie has been running two outreach programs, "Nova Scotia Math League" and "Math Circles." Richard Hoshino, a graduate student here and a mainstay of the CMS math camp – he was too busy with his thesis last year to participate in the camp – initiated both of them. He put a lot of work into those programs and established good connections with high school students and teachers in the province. Paul Ottaway, a graduate student, and Dr. Richard Nowakowski, are continuing the programs initiated by Richard. We hope and expect that, in the coming years, the work they are doing will generate greater interest in the camp among high school students in Nova Scotia.

In the selection process last year, we encountered a problem we had faced before: One of the criteria we have used for acceptance into the camp is performance on the Cayley/Fermat contests held by the University of Waterloo. However, it is becoming increasingly difficult to do so since many schools are not participating in these contests for financial reasons. This makes the task of selection harder, for the contests provide a uniform measure of excellence.

The other criteria we use, such as grades and letters of reference, are useful but have the disadvantage of considerable variability. Equity of distribution in terms of gender as well as geographical location was also an important consideration. In the end, ten boys and ten girls representing almost all the regions in the province were selected.

The format of the camp was essentially the same as in previous years. All the instructors were faculty members at either Dalhousie or St. Mary's. Nobody, among the instructors, organizers or helpers, of whom there were many, received any payment for services rendered. However, all of them were invited to a thank-you dinner or lunch, depending upon their convenience.

The students arrived, and registered, on Sunday, July 3, between 1:00 and 2:30 pm. The organizers and the two chaperones, Sunita Gupta, and Paul Sheridan, received them. Paul is a graduate student in our department, and Sunita a high school mathematics teacher. Sunita worked as a chaperone before, but it was the first time for Paul. The students and the chaperones all stayed at Howe Hall, a student residence. They got along quite well. The students, in their comments after the camp, described their interaction with the chaperones in very positive terms.

Following registration, a reception was held for the students and their parents.

Computers were an integral part of the camp. The computer lab belonging to the Faculty of Engineering and located in the Dunn Building was placed at our disposal for the entire duration of the camp. For this we are grateful to the Engineering Faculty and, in particular, to Reg Peters, who is in charge of the lab. It was used to teach *Maple*, geometry, and statistical simulation. In addition, one of the instructors, Robert Dawson, taught the students how to print on their T shirts some of the work they had done in class. For this purpose, each of the students was given a T-shirt. They thoroughly enjoyed this activity, and the individualized T-shirts look beautiful.

Each day of the camp was divided into a morning session (9:00 to 12:00, with a twenty-minute snack break) and an afternoon one (1:30 to 3:30, with a ten minute break); please see the enclosed schedule for details. Each session consisted of a lesson. The lessons were not just lectures; there was plenty of interaction, problem solving and hands-on work. Since this format had worked well in previous years, we decided to follow it last year also. The consensus was that the camp went very well.

We are grateful to Ron Fitzgerald of MathResources Inc. for donating packages of their Math Dictionary. We believe the students were pleased to get them.

There were several extra-curricular activities—bowling, chess, a pizza party, etc. However, there were a couple of changes from those announced in the program: We could not schedule a visit to Shakespeare by the Sea as we did in previous years because of a conflict in the timetable; a presentation by an honors student in our department concerning the transition from high school to university had to be cancelled because of some last-minute problems. Also, we took the students to the Metro Center on Wednesday to see the Nova Scotia Tattoo. Since the price of admission ($20 per person) was higher than the amount budgeted ($10 per head) the students paid the difference. (We had asked the students and their parents at registration time whether this would be acceptable, and they all agreed. We were prepared to subsidize any students who couldn't afford to pay the difference, but didn't have to.) Every day, after the academic sessions were over, the students spent about an hour and a half playing sports or working out at Dalplex, the university's athletics and sports complex.

There was a pizza lunch after the closing ceremonies on Friday July 8th. Afterwards, the students were picked up by their parents.

Both Dalhousie and the CMS supported the camp. The CMS, with support from ESSO, NSERC/Promo Science and perhaps other sources, contributed $3000.00. Dalhousie supported the camp in many ways: $3000.00 from the President's Office, $2000.00 from the Office of the Dean of Science; free use of the classrooms and the computer lab; free secretarial help, photocopying and miscellaneous items and services from the department; and free faculty time. We received enthusiastic help and support from our colleagues in organizing the camp and are grateful for it. A registration fee of $50 per student was charged except in cases of financial exigency.

In closing, it is our pleasant duty to thank all the instructors, without whose hard work and dedication the camp would not have been possible. We are also pleased to thank Gretchen Smith, the departmental administrator, and the secretaries, Maria Fe Elder, Paula Flemming, and Jackie Harnish-Grandy, for their unstinting help.

MATH CAMP FOR BLACK STUDENTS
by Dr. R.P. Gupta

The fourteenth mathematics camp for black students was held in the second week of July 2005. The camp was organized by the Department of Mathematics and Statistics and the Black Educators Association of Nova Scotia. Thirty-two students were selected to attend the camp from schools all over Nova Scotia.

The aim of the camp is to generate interest in mathematics, statistics, computers and sciences so these students can pursue further studies with enthusiasm and appreciation of these subjects. The students are generally of grade six and seven, they are brought to the Dalhousie campus and stay in Howe Hall. Mornings and early afternoons are devoted to lectures and mathematical, statistical and computer activities, while late afternoon and evenings are devoted to extra curricular activities where they can apply the talents they have learnt in the classes and practice them.

They are taken to Dalplex for one hour each afternoon where they participate in swimming and play other games like basketball, tennis, etc. They also visited the Nova Scotia museum of history and science as well as the Discovery Centre. Students of the Camp also spent one evening at the Black Cultural Centre in Dartmouth where they were told about the mathematicians and scientists of black origin and a film was shown. The students were taught and cared for by six instructors (three university professors and three school teachers) and five chaperons. The Camp was organized under the direcrorship of Professor R.P.Gupta of Dalhousie University and Mr.Gerry Clarke of the Black Educators Association. It was financially supported by NSERC Promo Science Grant, Dalhousie University and the BEA.

AARMS
by Dr. Richard Wood

As many of you will have heard, the AARMS directorship has returned to Dalhousie after being for a number of years at Memorial under the exceptional leadership of Hermann Brunner. 'AARMS' is the Atlantic Association for Research in the Mathematical Sciences and was founded in March of 1996 at a time when there were a number of changes taking place in the funding of Canadian mathematical research. The name is entirely self explanatory. Amongst other things, AARMS seeks to foster mathematical research in Atlantic Canada by helping to secure financial and organizational support for graduate level Summer Schools, Postdoctoral Fellowships, Conferences, and workshops.

In its early days at Dalhousie, AARMS operated in a rather ad hoc manner, applying on behalf of various Atlantic research groups to the outreach programmes of the national institutes: CRM, Fields, and PIMS. There were early successes to be sure but Hermann's overarching accomplishment has been the establishment of a stable annual funding base so that today AARMS has an annual budget in excess of $200,000 and is a substantial regional institute.

The new Director is Professor Jonathan Borwein, Canada Research Chair. I join again as Associate Director and David Langstroth will be our Administrator. Our unabashed goal is to take AARMS to the next level: a recognized national and international Mathematics institute. Our first steps have been to improve communications via our website,
   http://www.aarms.math.ca/

our newsletter, and the establishment of support groups of five at each of MUN, UNB and Dalhousie. Each of these groups contains a Statistician, a Computer Scientist and people interested in Educational and Industrial Outreach. Over the next year or two we also hope to begin to use technology more fully to allow collaboration and interaction across Atlantic Canada.

In just the past four months AARMS has already undergone significant growth, both in its base funding

levels and list of sustaining universities. We have already held the 'Atlantic Analysis Days' January 20-21 and 'The East Coast Combinatorics Conference' April 01-02. If you would like to be involved, please contact us by way of the directions at our website.

AARMS SUMMER SCHOOL
by Drs. Tony Thompson, Renzo Piccinini,
Summer School Directors.

The fourth Atlantic Association for the Mathematical Sciences (AARMS) summer school took place at Dalhousie University from Sunday, July 17 to Saturday August 13, 2005. As usual, four courses were offered. These were:

Convexity and Fixed Point Algorithms in Hilbert Space. This was taught by Heinz Bauschke of the University of Guelph (he has since moved to the University of British Columbia at Kelowna).

Integral Geometry of Convex Bodies and Polyhedra. This was taught by Daniel Klain of the University of Massachusetts at Lowell.

The Mathematics of Finance. This was taught by Wolfgang Runggaldier of the University of Padova, Italy.

Mathematical Statistics. This was taught by Bruce Smith of Dalhousie University.

The students came from a wide variety of places and, consequently, had a wide variety of backgrounds. In total there were 39 students from outside Dalhousie and 4 of our own students. Eight different countries were represented by the student body.

There were a number of social activities in connection with the summer school. There was a reception on the first Sunday evening at which we all (students, instructors and directors) met for the first time. We were glad to have the Director of AARMS and the Vice-President Academic of Dalhousie also at that reception. The next day there was a pizza lunch partially funded by the Canadian Math Society Undergraduate Student Committee. In the middle of the programme there was an organized bus trip to

Lunenburg with a dinner that was partially funded by Clearwater Fine Foods.

Judging from the reactions of students and instructors, the summer school was successful and an enjoyable experience for everyone. Certainly, I found it extremely stimulating to have such a keen and active group of students on campus for the month.

Following that successful programme we are quite excited about the line-up of courses and instructors for this coming summer.

As usual, there will be four, beginning-graduate-level courses. These are: *Elliptic Curve Cryptography* given by Mark Bauer of the University of Calgary; *Massive Networks and Internet Mathematics* given by Anthony Bonato from Wilfrid Laurier University; *Introduction to Algebraic Geometry* given by Rick Miranda from Colorado State University; and *Introduction to Wavelet Theory and Numerical Applications* given by Anita Tabacco from Politecnico di Torino.

Most of the students have now been selected and, again, it looks like a very interesting and exciting group of international students.

D-DRIVE HAD A BUSY YEAR

The Dalhousie Distributed Research Institute and Virtual Environment (D-Drive), under the direction of Jonathan Borwein, has had a busy year. We have hosted numerous activities which involved distributed collaboration where colleagues and partners were located in distant locations; we have been consulted by the Canadian Forces on this technology in order that they may implement a similar communications facility in Kandahar; we have sponsored research into mathematical and technological questions and we have ordered a large computer cluster for mathematical computation which will fulfill part of Dalhousie's

obligations as a member of ACEnet. Here are a few highlights:

One of the highlights has been our bi-weekly "Coast to Coast" Seminar Series which has included some very high quality presentations in Mathematics and Computer Science from both sides of Canada. A day long mini-conference on Mathematical Computation is planned for August 5th, 2006. http://projects.cs.dal.ca/ddrive/seminars/index.shtml

In January, as part of the AARMS Atlantic Analysis Days, D-Drive enabled three of the presentations to be given from distant locations. Peter Borwein spoke from BC and Jim Zhu and Gabor Pataki delivered their talks from Western Michigan and UNC Chapel Hill.

On the research front we completed a successful MITACS internship with MathResources Inc as our industrial partner. Peter Dobcsanyi and Lingyun Ye developed protocols for communication between handheld devices which will enable math teachers to co-ordinate individual and group work for their pupils. The success of the first internship has led to a second internship which is in progress at the moment.

A third highlight of our year is the ongoing project to evaluate and write a report on the usability of the prototype *Online Digital Library of Mathematical Functions*. This is the digital version of the bestselling mathematical reference book and is the creation of the National Institute of Standards and Technology in the United States http://dlmf.nist.gov/ .

One final highlight of our year was our work on the MediaLightPaths Project, a CANARIE sponsored endeavour between six universities to implement a system for dedicating optical fibre pathways between endpoints. The result of this is the unprecedented ability to guarantee a given amount of bandwidth from point to point across the internet, regardless of other traffic, for the delivery of scientific applications which have high bandwidth requirements.

D-Drive continues to grow and develop. Our doors are always open to visitors or colleagues who might have a use for our technology or expertise. Visit our website, or drop by sometime to see what we can do for you. www.cs.dal.ca/ddrive

GRADUATE STUDENT SEMINAR
Joshua MacArthur
Chair, Graduate Student Seminar
Vice President, Graduate Student Society

The Graduate Student Seminar has continued to give both mathematics and statistics graduate students the opportunity to share their research and academic interests with the department. The seminar has proved to be an excellent avenue for the students to gain vital experience in giving the seminars; as well for the society to gain experience in organizing these events.

However, the seminars are not exclusively for graduate students. The experience and expertise provided by participating faculty members, post-doctoral fellows and the occasional visitor has been much appreciated in this ongoing series.

In a final note, the Graduate Society continues to maintain a website initiated by Jin Yue last year. The website keeps a record of the names of those who have given talks in the Graduate Seminars as well as their titles and abstracts. The site is located at:

http://www.mathstat.dal.ca/~msgrads/seminar

The Graduate Student Society would like to thank everyone that has participated in the seminars. Please find a list of the speakers and the title of their talks for the 2005-2006 academic year below:

Fall 2005
John Rumsey, *An Eigenvalue Problem*, October 19, 2005.

Eva Curry, *Uncertainty Principles*, November 2, 2005.

Matthew Spencer, *Reconstructing Evolutionary History from Presence and Absence of Genes*, November 16, 2005.

Margaret-Ellen Messinger, *The Firefighting Problem*, November 30, 2005.

Winter 2006

Peter Selinger, *Combinators and fixpoints*, January 16, 2006.

Herre Wiersma, *Asplund Decompositions of Monotone Operators*, January 20, 2006.

Keith Johnson, *Integer Valued Polynomials*, February 13, 2006.

Andrew Hoefel, *Betti numbers of edge ideals,* March 6, 2006.

Rebecca White, *LaTeX*, March 13, 2006.

Mehrangiz (Ozy) Naghibi, *Spike Pinning for the Gierer-Meinhardt Model*, March 20, 2006.

Vaneeta Grover, *Some applications of Statistical Methodology to real life data*, March 27, 2006.

APPLIED & COMPUTATIONAL MATHEMATICS SEMINAR
by Dr. John Clements

2005

Sept. 30/05: *Problems with von Neumann's Theory*: Modelling Empirical Systems and the Reconstruction of the Mathematical Foundations of the Social Sciences, Jonathan Barzilai, Industrial Engineering, Dalhousie University.

Oct. 14/05: *Radial Basis Functions in Approximate Dynamic Program*ming, Eldon Industrial Engineering, Dalhousie University.

Oct. 28/05: *Computational Mathematical Lists and Challenges*, Jonathan M. Borwein, FRSC Canada Research Chair in IT, Faculty of Computer Science, Dalhousie.

Nov. 18/05: *Applicable differential geometry: differential invariants and image recognition*, Roman Smirnov, Dalhousie University.

Dec. 2/05: *A Convex Analysis Approach to Limits of Performance in Control*, Andrew Eberhard, RMIT University. Melbourne, Australia.

2006

Jan. 13/06: *Wavelet Denoising Weak Biosignals*, Josh MacArthur, Dalhousie.

Jan. 27/05: *A 2-Morphogen Model with Activation and Cross Inhibition*, David Iron, Dalhousie University.

Feb. 10/06: *Self-replication of mesa-type patterns in reaction-diffusion systems*, Theodore Kolokolnikov, Dalhousie University.

Mar. 17/06: *Algorithms for Computing Bi-diagonal Representations of Matrix-Exponential Distributions*, Qi-Ming HE, Industrial Engineering, Dalhousie

Mar. 31/06: *A hybrid model for propagation of activation in human cardiac tissue*, Jeff Praught, Dalhousie University

April 7/06: *Statistical Estimation for Nonlinear Stochastic Dynamic Systems*, Michael Dowd, Dalhousie University

HONOURS SEMINARS
by Dr. Robert Paré

Bob Pare: *Reflections on Duality*

John Clements: *A look at some of the basic tools required by mathematicians when solving real world problems: a specific application of mathematics to medicine*

Keith Johnson: *What algebra is good for*

Francisco Marmolejo: *A subjective view of objective number theory*

Tony Thompson: *Mahler's inequality/conjecture*

Gillman Payette: *Compactness and Modal Logic*

Karl Dilcher: *Some small talk on large primes*

Jeff Egger: *Lying about Lie theory*

David Iron: *Pattern formation in biology and differential equations*

Roman Smirnov: *Felix Klein: the legacy of the Erlangen program*

Rob Milson*: Equations and symmetry*

S Swaminathan: *The Fundamental Theorem of Algebra*

C.C.A. Sastri: *How Many Words did Shakespeare Know?*

Pat Keast: *A Tale of Two Transformations*

Micah McCurdy: *Taking Monoids Seriously*

Rachael Manion: *The Singular Story of Orbifolds: An Introduction to 2-orbifolds*

Dave McNutt: *Points on Elliptic Curves - Counting and Group Structure*

Travis Squires: *Is there a set with -3 elements?*

Matt Lewis: *Geometry ``a la Cartan" and its applications*

Sanga Han: *Undecidability - Godel's Theorem and its Implications*

Stephen Chisholm: *Chromatic Polynomials: An Investagation of Critical Points*

Sarah Chisholm: *What's your PIN? Confessions of a Crypto-cryptographer*

MATHEMATICS COLLOQUIUM
by Dr. Roman Smirnov

The Mathematics Colloquium series offers a dynamic forum for research and scholarly discussion in the field of mathematics. One of its goals is to strengthen the synergy between different research groups in the department. The Mathematics Colloquium program was especially active in Academic Year 2005-06, consisting of 23 talks given by outside invited speakers as well as Dalhousie Faculty. Among the invited speakers were such distinguished scholars of highest international reputation as Karl Hofmann

(Tulane University and Darmstadt Technical University) and Pavel Winternitz (University of Montreal and CRM), former graduates of the department, Colin Ingalls (UNB) and Rong Wang (Saskatchewan). The new Faculty, Sara Faridi, David Iron, Theodore Kolokolnikov and Peter Selinger who joined the department in the course of the last two years also contributed strongly to the success of the Mathematics Colloquium by giving talks in their respective areas of research. The following is a list of speakers, their affiliations and the titles of their talks. Local hosts are given in parenthesis.

September 12, 2005, Jung-Jo Lee (Smirnov), Queen's University: *Dirichlet Series and Hyperelliptic Curves.*

September 26, 2005, Jim MacDougall (Dilcher), University of Newcastle, Australia: *Rational and Heron Tetrahedra.*

October 3, 2005, Will Traves (Faridi), US Naval Academy and University of Maryland: *Counting Conics.*

October 17, 2005, Arnold Mitniski (Taylor), Dalhousie University: *Human Aging: Phenomenology and the Prospects for Mathematical Modeling.*

October 20, 2005, David Gomez-Ullate (Milson), Universitat Polytecnica de Catalunya: *An integrable dynamical system with sensitive dependence on initial conditions.*

October 24, 2005, Massimo Caboara (Faridi), University of Pisa: *Linear System Over $k[x_1,\ldots, x_n]$.*

October 31, 2005, Pavel Winternitz (Milson), University of Montreal and CRM: *Symmetries of Linear and Nonlinear Difference Systems.*

November 7, 2005, Gavin Seal (Pare), McGill: *A Categorical Introduction to Convergence Theory.*

November 14, 2005, Rong Wang (Keast), University of Saskatchewan: *Linear Stability Analysis for Explicit Runge-Kutta Time Integration with Finite Difference Spatial Discretization.*

November 21, 2005, Alexander Ioffe (Borwein), Technion: *Variational Problems with Finite Dimensional Duals*.

November 28, 2005, Lorenzo Fatibene (Smirnov), University of Turin: *Gauge Theories vs Differential Geometry.*

December 5, 2005, Andrew Eberhard (Borwein), RMIT University: *Applications of Nonsmooth Analysis to the Derivations of Comparison Principles*.

January 30, 2006, Pawel Pralat (Janssen), University of Waterloo: *Probabilistic Models for the Web Graph*.

February 9, 2006, Theodore Kolokolnikov (Smirnov), Dalhousie: *Coarsening and Self-Replication of Patterns in Reaction-Diffusion Systems*.

February 13, 2006, Nataliya Ivanova (Smirnov), UBC: *Symmetry Methods of Nonlinear Differential Equations.*

February 27, 2006, David Iron (Smirnov), Dalhousie: *Spike Dynamics for a Nonlocal Partial Differential Equatio in n Dimensions*.

March 2, 2006, Grzegorz Sojka (Pronk): *Selected Subjects in Geometric Tomography.*

March 6, 2006, Sergey Sadov (Smirnov), Memorial University: *Is Elementary Geometry Trivial for Mathematicians*?

March 9, 2006, Colin Ingalls (Wood), UNB: *Classifying Noncommutative Surfaces*.

March 13, 2006, Karl Hofmann (Taylor), Tulane University and Darmstadt Technical University: *The Lie Theory of Pro-Lie Groups.*

March 20, 2006, Richard Laugesen (Taylor), University of Illinois at Urbana-Champaign: *Wavelets, and Related Affine Systems.*

April 3, 2006, Peter Selinger (Smirnov), Dalhousie: *Mathematical Models of Quantum Computing.*

April 10, 2006, Sara Faridi (Smirnov), Dalhousie: *On Conjugacy Classes of Nilpotent Matrices.*

THE STATISTICS COLLOQUIUM
by Dr. Hong Gu

In the past year, the statistics colloquium has continued to perform as an important stimulation to the research within the statistics division although a smaller number of talks have been scheduled. A list of the talks from May. 2005 to Apr. 2006 in the statistics colloquia is given below. A Statistics Colloquium website can be accessed via the following link: http://www.mathstat.dal.ca/seminars.html

Aug. 4, 2005, Eva Cantoni, Department of Econometrics, University of Geneva. *Variable selection techniques for marginal longitudinal models.*

Aug. 11, 2005, Olivier Renaud, Methodology and Data Analysis, Section of Psychology, University of Geneva. *Simultaneous tests in the Time-Frequency Plane for Electroencephalogram signals.*

Oct. 6, 2005, Arnold Mitnitski, Faculties of Medicine & Computer Science, Dalhousie University, *How many variables should be included in multivariable models*?

Oct. 23,2005, Michele Millar,Dept. of Math. & Stat., Dalhousie University, *Breeding Value Estimation and Biodiversity Considerations in Forest Genetics*

Nov. 3, 2005, David Hamilton, Dept. of Math. & Stat., Dalhousie University. *Inferences for a standardized composite measure of linkage disequilibrium.*

Nov. 17, 2005, Jonathan Taylor, Stanford University. *Tail strength of a dataset*.

Feb. 2, 2006, *Christopher Field*, Dalhousie University, Halifax, Canada. *Wandering and Outlying Birds: A Statistical Analysis.*

Apr. 6, 2006, *Ian D. Jonsen*, Department of Biology, Dalhousie University, Halifax, Nova Scotia, Canada. *Robust state-space modeling of Leatherback turtle movement*.

BRAIN TEASERS
Edited by
Dr. S. Swaminathan

A. Think Of A Number

"Think of a two-digit number."

"Right."

"Call it AB for the moment. Now think of a one-digit number (not 0)."

"Right."

"Call it C. Does AB + C make a two-digit number?"

"Yes, it does."

"Call that one DE. Now write down the five-digit number ABCDE and divide it by 581. What do you get?"

"Well, AB was 45, C was 6 and so DE was 51. So my answer is 78.573149 or thereabouts."

"Bad luck! If it had come out as a whole number, I would have paid for the drinks."

What whole number would have done the trick?

B. Puzzles

1. How is your visualization of the continents? Put these four cities in order, South to North: Halifax (N.S.), Tokyo (Japan), Venice (Italy), Algiers (Algeria).

2. An odd number of soldiers are stationed in a field, in such a way that all the pairwise distances are distinct. Each soldier is told to keep an eye on the nearest other soldier.

Show that at least one soldier is not being watched.

C. A Cross Number

(There are no 0's)

Across   1. Each digit is odd and is greater than the one before.

           4. The digits are all different and this is a multiple of the number which is 3 greater than 1 down. Even when reversed.

           5. A perfect cube.

Down   1. 17 goes into this.

           2. A multiple of 1 down.

           3. Each digit is odd and is less than the one before.

One clue is incorrect. With which digit should each square be filled?

ANSWERS TO THE BRAIN TEASERS will be posted on the department website:
www.mathstat.dal.ca.

RETIREMENT PARTY FOR
DRS. KIT BOWEN, JOHN CLEMENTS AND CHELLURI SASTRI