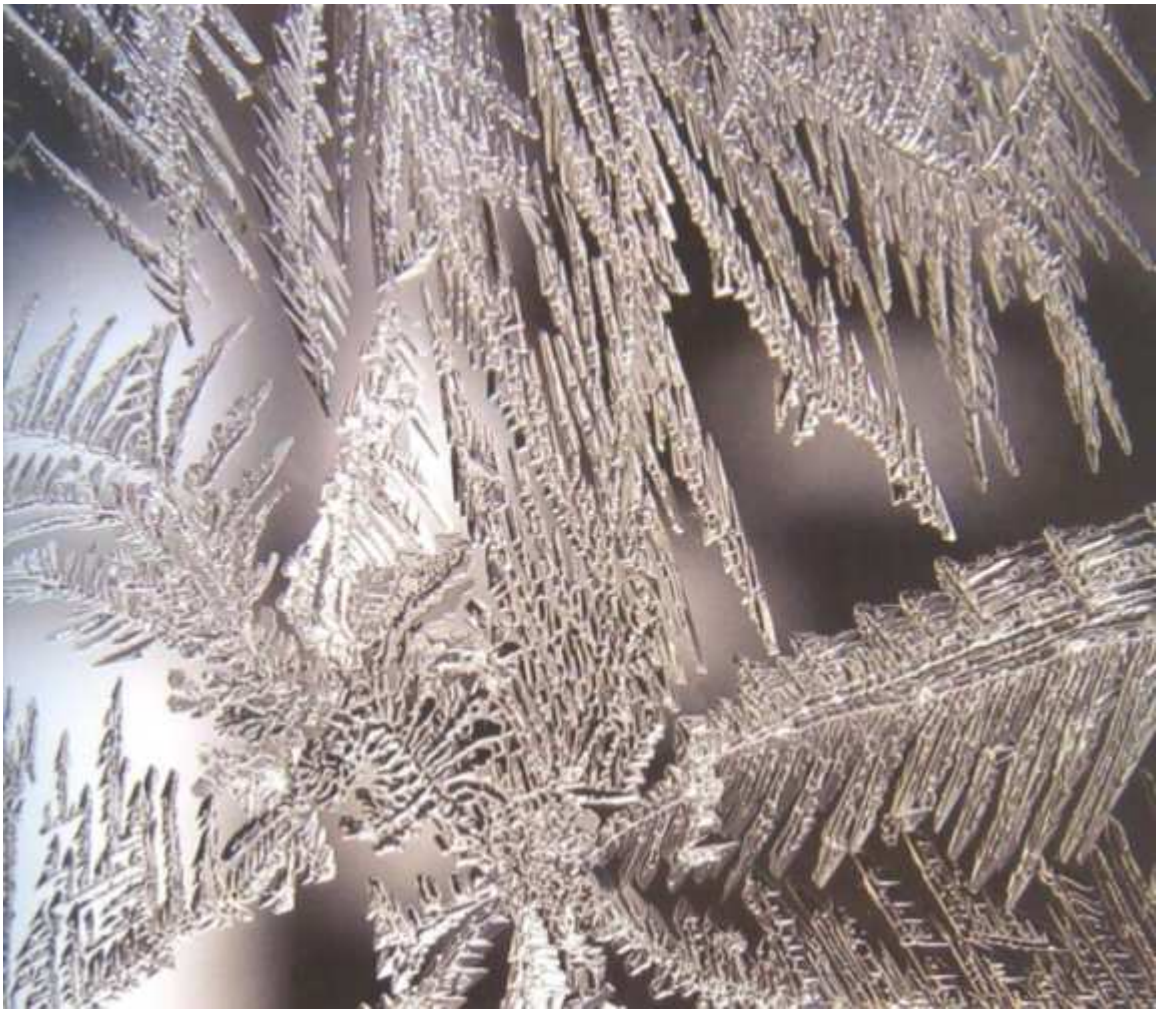
Dalhousie University
*Inspiring Minds*

# CHASE REPORT

**NEWSLETTER OF THE DEPARTMENT OF MATHEMATICS AND STATISTICS**

***Faculty of Science*** **MAY 2008**



**Frost on a Window**
**By**
**Richard J. Nowakowski**

# CONGRATULATIONS

## AWARDS WINNERS

**Sir William Young Gold Medal in Mathematics**
*Carol Ross*

**Ralph & Frances Lewis Jeffery Scholarship**
*Carol Ross and Charlotte Haley*

**Barry Ward Fawcett Memorial Prize**
*Emma Whitney*

**Ken Dunn Memorial Prize**
*Nathan Singer*

**Katherine M. Buttenshaw Prize**
*Peter Crooks*

**Waverly Prize**
*Jean Flemming*

**Emil and Stella Blum Award in Mathematics**
*Matthew Lobban*

**Ellen McCaughin McFarlane Prize**
*Patrick Hughes*

**Lorne O. L. Titus Award**
*Peter Crooks*

**Department of Mathematics & Statistics Bursary**
*Kristina Silmarie*

**Professor Michael Edelstein Memorial Graduate Prize**
*Caroline Adlam*

**Heller-Smith Foundation Graduate Scholarship in Mathematics & Statistics**
*Amanda Halladay*

## NSERC AWARD WINNERS

**PGS-D** *Caroline Adlam*

**CGS-M** *Carol Ross*

**USRA** *Adam Alcolado* (Kolokolnikov)

*Peter Crooks* (Milson)

*Mark Pavlovski* (Johnson)

*Tom Potter* (Fraser)

*Nathan Singer* (Brown)

**NEW KILLAMS** *Caroline Adlam*

**KILLAM RENEWALS**

*Andrew Hoefel*

*Rob Noble*

*Neil McKay*

*Meghan Allen*

*Wade Blanchard*

## HONOURS STUDENTS

**Honours - Mathematics**

*Charlotte Haley*

*Carol Ross*

*David Clair*

*David James*

**Honours - Statistics**

*Sylvia Churcher*

*Yingfei Ma*

*Shuai Gao*

**May 2008 Convocation:**

**Mathematics**

*Richard Hoshino* (PhD)

*Matt Lewis* (MSc)

*Dave McNutt* (MSc)

**Statistics**

*Amanda Halladay* (MSc)

*Mei Chen* (MSc)

*Jin Yue* (MSc)

*Elizabete Almeida* (MSc)

## GRADUATE STUDENTS

**October 2007 Convocation:**

**Mathematics**

*Karyn McLellan* (MSc)

*Sable McKeil* (MSc)

*Travis Squires* (MSc)

*Alexander MacLeod* (MSc)

*Neil McKay* (MSc)

## CHAIR'S REPORT

by Dr. Karl Dilcher

Another academic year has ended, and as I write this, the Spring session has just started. Some of our graduate students embark on the teaching part of their career by teaching their very first university-level course.

Indeed, matters concerning teaching and learning had been the most important part of my duties as Chair, with a great deal of the detailed work done, of course, by the two Directors and the various advisors. Many important changes related to this aspect have occurred during the past year, and are about to occur.

Meanwhile, my second year as Chair is coming to an end. Although there have been a few challenges these past 12 months, it has once again been an enjoyable and fulfilling year. This would not have been so without the good humour and friendliness, and the support and advice at all levels, from colleagues, graduate students, Council, the Department Office, and the Dean's Office. In fact, when a kind graduate student sometimes asked how I was doing, it made me wonder whether everything was really alright, or whether it was just my imagination.

There have been a number of changes to the Department Council and to the Dean's Office, with more changes to come. On July 1, 2007, David Hamilton took over from Bruce Smith as Director of Statistics, and this coming July 1 Jeannette Janssen's 3-year term will have come to an end. It has been a pleasure working with her on Council and numerous other matters, and I look forward to working with Jason Brown as the new Director of the Mathematics Division.

Highlights of the past year were the tenure and promotion of an unusually large number of department members (and not to forget one reappointment), and the awarding of the Adrien Pouliot Award to Richard Nowakowski. All this will be reported elsewhere in this edition. It has also been a busy year for the department as far as workshops, conferences, a Summer school, and outreach activities are concerned.

Another valued colleague, Dr. K.K. Tan, is about to retire, and several of our postdoctoral fellows are going to leave this Summer, or have already left. We look forward to having Dr. Tan's continued affiliation with this Department, and lasting connections have been created with our postdoctoral fellows who are about to embark on successful careers of their own.

All this, and many more, can be found in this year's Chase Report. Enjoy reading this edition, and if you have anything to report, please let us know.

## THE CHASE FAMILY

Last year in this space I reported six weddings and two babies in the Chase Family; this record will be hard to break any time soon. However, I am happy to report that our mathematicians continue to multiply.

A baby girl, Sophie, was born to **Sara Faridi** and **Peter Selinger** on May 28, 2007. Sophie is often seen in the department, where she has her own play pen (with a supply of play paper, no doubt).

**Angela Siegel** and her husband Eric had a baby boy, Dorian, brother to Anneka.

A baby girl, Julia, was born October 14, 2007 to **Paweł Prałat** and his wife Anna, a sister to Piotr and Adam.

A baby boy, Sasha, was born on April 22 to **Theodore Kolokolnikov** and his wife Shannon. Sasha's brother Sebastian will turn two in July.

**Angela Bruhm**, our cleaner of several years, got married on May 17 in Dartmouth.

Finally, word has it that at least one more Chase baby is on its way. Best wishes to all! *–kd*

## TENURE AND PROMOTIONS

The awarding of tenure is probably the most important step in the professional life of an academic, and the promotion to Full Professor indicates that a high and internationally competitive level of achievement in research, teaching, and service has been reached. Both are awarded only after a rigorous process including

peer review by several outside specialists in a candidate's research area, and several levels of

committees as well as reviews by the Dean and VP Academic.

This year we had a very strong group of candidates, both in numbers and in excellence. Tenure was awarded to Joe Bielawski (joint appointment with Biology), Mike Dowd, Sara Faridi, and Roman Smirnov; they will also be promoted to the rank of Associate Professor. Jeannette Janssen and Ed Susko have been promoted to the rank of Full Professor. Finally, Joanna Flemming was reappointed in her tenure-track Assistant Professor position. All these steps are effective this coming July 1.

During a recent ceremony all successful tenure and promotion candidates in the Faculty of Science were honoured by the Dean, VP-Academic, President, and a representative of the Board of Governors, with our department providing almost half all those honoured. The room was also teeming (if not crawling) with children, among them Sophie and Rustam-Jan representing our department. *-kd*

## CHANGES IN THE DEAN'S OFFICE

Almost every department member has regular dealings with the Office of the Dean of Science; in fact, two mathematicians have important positions in that office, with Keith Taylor as Dean and S. Swaminathan as Secretary of the Faculty.

This July 30th, the Dean's Office will see quite substantial changes. Keith Taylor's five-year term as Dean of Science will have ended, and he will assume his new responsibilities as Associate VP Academic for Outreach and International Relations, a position for which he is eminently qualified. Indeed, already as Dean he has been very active in these areas. The Associate Dean, Patrick Ryall (Earth Sciences), will also step down at the end of June; he will be replaced by two Associate Deans with different areas of responsibility; their names are yet to be made public. Finally, Dr. Beth Retallack, the Assistant Dean for Student Affairs, will retire at the end of June; a successor has not yet been named. *-kd*

## A MEETING OF HEADS AND SOULS

Every year in November there is a national meeting of heads and chairs of Canadian Mathematics (or Mathmematics & Statistics) departments. While this originated as an initiative of the Canadian Mathematical Society, it is now formally an independent series of event, organized by a rotating group of three chairs.

The ninth meeting in this series took place on November 9th and 10th here at Dalhousie, and about 20 chairs descended on the Chase Building (and ascended to the Colloquium Room). They came from 9 of the 10 provinces, with the universities ranging geographically from CBU to UBC. The program included items of common interest to mathematical sciences departments and their chairs. As every year, one large and one small department were presented by their chairs, this time the University of Saskatchewan (Raj Srinivasan) and Mount Allison University (Kathy Baker). Invited guests included two program officers from NSERC; recent changes to NSERC policies were of particular interest, and particularly troubling, to the smaller departments, around the country, and in particular in the Maritimes.

The chairs were duly impressed by the Chase Building and by Halifax seafood; one discerning diner from a bigger city sent his special compliments after the meeting. The next meeting will take place in November 2008 at the Université de Montréal. *-kd*

## A NEW GRADUATE AWARD

I am very pleased to report that a new award for graduate students has been established, namely the Heller-Smith Foundation Graduate Scholarship for Mathematics and Statistics. This annual award was made possible through a generous donation by the Heller-Smith Foundation, and was established to provide support and recognition to a graduate student.

The inaugural recipient is Amanda Halladay who is about to receive her M.Sc. degree in Statistics. We are happy that Matt Heller, who received his honours B.Sc. in Mathematics with us in 2001, has agreed to hand out this first award which is named after his family.

This new award joins the Lett Bursary and the Edelstein Prize, which were established only last year, in providing recognition and financial support to our graduate students who, after all, are an essential part of our department. *-kd*

## REPORT FROM THE MATHEMATICS DIVISION

With the outgoing Director, Jeannette Janssen, on her well-deserved vacation, this report will be provided by the Chair who herewith accepts responsibility for any problems with this report, the Department, and all the rest.

This past year saw a number of important changes in the Division's course offerings, with more changes to come this September. Of course, not all changes are necessarily welcome, and so it is good news indeed that John Barger will continue on a 10-month instructor position, thus providing stability and continuity as course coordinator and instructor of MATH 1000/1010 and one other course each term. It has been reported that John is known among some groups of students as the Wizard, or sometimes as Dumbledore.

The mathematics Division continues with its diversification of the first-year Calculus offerings. MATH 1215, Life Science Calculus, has run for two years now, and after an increased effort to educate students and advisors about the purpose of this course, two sections have been opened for this coming year.

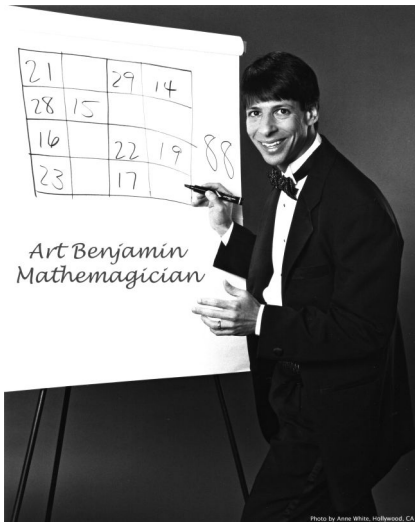
In collaboration with two members from the Faculty of Engineering, the course MATH 1280/1290 (Calculus of Engineers) was revived last September and 40 randomly chosen Engineering students were urged to take this course on a trial basis. This experiment offered a highly structured learning experience, and was done in collaboration with the Mathematics Division and was continuously observed by Jeannette. It was considered so successful that the decision was made to offer three sections next year, two of them taught by Engineering faculty (with strong mathematical backgrounds) and one by a member of our Mathematics Division. All Engineering students will be required to take MATH 1280/1290 instead of 1000/1010.

Another new course, MATH 1500, simply called The Calculus, was first offered this past year. Variously described as “calculus with delta and epsilon” or “honours calculus”, it offered a very strong foundation especially for future Mathematics or Physics honours students, but it was also successfully attended by a couple of Engineering students. This course will again be offered this coming year.

Yet another component in the ongoing redesign of our first-year offerings is the new course MATH 1600: Spectrum of Mathematics. This course will be first taught by Dorette Pronk this coming Fall, and the main purpose is to provide a first-year Mathematics course to those students who come with advanced placement or other transfer credits (such as the International Baccalaureate) and would otherwise not have a mathematics course at all in their first term of university. Students who will take MATH 1500 (or 1000) concurrently would also be accepted with the instructor's permission. The course is intended to give an overview of modern mathematics and its applications and differs substantially from Mathematics for Liberal Arts in that it is mathematically rigorous and is intended for students who want to do degrees in mathematics or the physical sciences.

Finally, the sections of a number of service courses (such as Discrete Math or Mathematics for Commerce) have been consolidated, in consultation with the faculties concerned, and the course description of a number of courses have been revisited and brought up to date.

The Department thanks Jeannette Janssen for her tremendous work on these and other matters. *-kd*




## MATHEMAGICS

This year's public lecture in our department's Distinguished Speaker series was actually more a performance than a lecture. In the evening of May 12, Dr. Arthur Benjamin of Harvey Mudd College (Claremont, California) gave a version of his highly acclaimed “Mathemagics” show before a large audience in a packed auditorium at King's College. Art Benjamin managed to both entertain and educate everybody from young children to mathematics professors. Earlier that day he had appeared on the CBC Radio noon-hour show, and in the afternoon he gave a Colloquium talk on “Combinatorial Trigonometry: A Method to DIE for”.

The audience of the Colloquium talk learned that not even a magician can prevent luggage from getting lost by an airline, and so Art Benjamin wore a shirt borrowed from his friend (and sabbatical visitor) David Wolfe; he then called himself a mathematician in Wolfe's clothes.

This year's Distinguished Speaker's visit, and all the publicity surrounding it, was once again organized by Dr. R.P. Gupta. *-kd*

## VISITORS

Our department continues to attract sabbatical visitors. **Dr. David Wolfe** of Gustavus Adolphus College in Minnesota has been with us since the Summer of 2007 as Richard Nowakowski's visitor. **Dr. Paul Muir**'s home institution, St. Mary's University, is a little closer, but he is currently spending his sabbatical leave with us as Pat Keast's visitor. **Dr. Julie Horrocks** of the University of Guelph will be visiting David Hamilton for the following academic year and will also teach a statistics course. Finally, **Dr. Grace Chiu** of the University of Waterloo is going to visit the department for the Fall term as Mike Dowd's guest. We wish all visitors a pleasant stay, and productive collaborations here at Dalhousie. *-kd*

## A FORMER COLLEAGUE HONOURED

A large conference at a high scientific level was organized at Simon Fraser University in honour of our former colleague **Dr. Peter Borwein** on the occasion of his 55th birthday.

The 5-day conference (May 12-16) had approximately 100 participants and almost 60 talks. Speakers with Dalhousie connections were Heinz Bauschke (Ph.D. student around 1990), Jonathan Borwein, Karl Dilcher, Tamas Erdelyi (PDF, early '90s), Frank Garvan (PDF, late '80s), Colin Ingalls (honours B.Sc., 1992), and Songping Zhou (Ph.D., 1993). The M.C. of the conference banquet was Mike Bennett (honours B.Sc., 1987), and Mark MacLean (M.Sc., 1989) chaired a session. Karl Dilcher expressed this department's greetings at the banquet and presented a birthday card signed by many faculty and staff. Peter Borwein was a member of our department from 1980 until 1993, during which time he rose quickly through the ranks from Assistant to Full Professor. *-kd*

## A NATIONAL AWARD

**Richard Nowakowski** was last year's recipient of the Adrien Pouliot Award, a national award from the Canadian Mathematical Society, "for individuals, or teams of individuals, who have made significant and sustained contributions to mathematics education in Canada".

To quote from the citation: "The award is an acknowledgment of Dr. Nowakowski's outstanding contributions to mathematics education locally, regionally, and nationally. Key among his contributions to mathematics in Canada has been his long-term involvement with and leadership of the Canadian Mathematical Olympiad (CMO) and the International Mathematical Olympiad (IMO). In 1986, Richard became Chair of the CMO Committee and served in this capacity for three years. In 1988 he became involved with the IMO, first as the Deputy Team Leader, and then as Team Leader in 1989 and 1990 and then again from 1994 to 1996. During these years he was Chair or a member of related CMS committees." (For the full citation, please see http://www.cms.math.ca/MediaReleases/2007/ap_prize.html).

Richard received the award on December 9, 2007, during the CMS Winter Meeting in London, Ontario. He also gave a prize lecture, entitled “Can you repeat that, sir?”

Congratulations to Richard on this well-deserved recognition. *-kd*

## POSTDOCTORAL FELLOWS

Our department has always enjoyed the energy, youthfulness, and additional research strength brought by postdoctoral fellows. These past two years we were particularly fortunate to have perhaps more postdoctoral fellows than ever before. Unfortunately, some of them have already left, and some others will leave us during the Summer. Our best wishes to all those who have left, or are about to leave our department.

**Dr. Johan Brannlund** received his Ph.D. at Stockholm University in 2003, after which he was a postdoctoral fellow at UBC. He came to Dalhousie in November, 2006, and has been working with Dr. Alan Coley. He will remain with us for at least the next year.

**Dr. O-Yeat Chan** received his Ph.D. at the University of Illinois in 2006, just before coming to Dalhousie. His fields of interest are classical, additive, and computational number theory, and he works with Drs. Jonathan Borwein and Karl Dilcher. Last year Dr. Chan was awarded an NSERC postdoctoral fellowship and will be with us for another year.

**Dr. Sigbjørn Hervik** received his Ph.D. at Cambridge University in 2004, after which he came to Dalhousie as a Killam Postdoctoral Fellow. For the past two years he was an AARMS PDF. His fields of interest are general relativity and cosmology, and he has been working with Dr. Alan Coley. Dr. Hervik left Dalhousie in mid-April to take up a professorship at the University of Stavanger in Norway.

**Dr. Georg Hofmann** has been with us since 2005, first as a sessional instructor, and this past year as a postdoctoral fellow, working with Dr. Keith Taylor. He received his doctoral degree in Darmstadt, Germany, in 2004. His research interests include infinite-dimensional Lie algebras and the geometry of reflection groups. Georg has just left Dalhousie to take up a position here in Halifax as a mathematician with an international reinsurance company.

**Dr. Toby Kenney** received his Ph.D. at Cambridge University in 2006, and came to Dalhousie in September of that year as an AARMS postdoctoral fellow. His research interests are in category theory and topos theory, and he has been working with Drs. Bob Paré and Richard Wood. In August of this year he will leave us to take up a three-year research position at the Matej Bel University in Banská Bystrica.

**Dr. Dante Manna** received his Ph.D. at Tulane University in 2006, and joined this department soon afterwards on an AARMS Director's Postdoctoral Fellowship. His fields of interest are classical analysis and number theory, and he works with Drs. Jonathan Borwein and Karl Dilcher. Later this Summer Dante will leave us for a tenure track assistant professor position at Virginia Wesleyan College in Norfolk, VA.

**Dr. Georgios Papadopoulos** joined us as a Killam Postdoctoral Fellow in August of 2007. He received his Ph.D. at the University of Athens in 2005 and held a postdoctoral fellowship there until he came to Dalhousie. His field of interest is general relativity, and in particular mathematical and quantum cosmology. He is working with Dr. Alan Coley.

**Dr. Nicos Pelavas** received his Ph.D. at Queen's University in 2002, and he has been in this department since the Fall of that year as a postdoctoral fellow and instructor of numerous courses. His fields of interest are general relativity and cosmology, and he works with Dr. Alan Coley.

**Dr. Paweł Prałat** received his Ph.D. at Adam Mickiewicz University in Poznań, Poland, in 2004, after which he was a postdoctoral fellow at the University of Waterloo and Wilfrid Laurier University. Since September, 2006, he has been a PDF in this department, partly funded through MITACS. His research area is modelling and mining of network information systems, and he has been working with Dr. Jeannette Janssen. Pavel will be with us for at least another year.

**Dr. Huaichun Wang**, who has been at Dalhousie since December, 2004, received his Ph.D. in Biology at the University of Ottawa in 2005. His research interests include Molecular Evolution and Bioinformatics, and he has worked with Dr. Ed Susko and his co-investigators on statistical modelling of protein sequence evolution.

Again this year our department has been able to attract a successful Killam PDF applicant. Unfortunately the candidate turned down the offer, but he has good contacts with the department, and it is hoped that he will join us on a different program at some later date. *-kd*

## THE STATISTICS DIVISION

by Dr. David Hamilton

One of the more interesting innovations in the Statistics Division this year was the creation of an online version of our introductory course Statistics 1060. This course was offered to students at the Michener Institute for Applied Health Sciences in Toronto, who accessed videotaped lectures, submitted assignments and got help over the internet. The architect for this course was Professor Ron Hilburn, who mastered the new technologies required to make this possible. Congratulations and thank you Ron!

Another interesting development this year was the approval of our undergraduate program by the Statistical Society of Canada for accreditation purposes. This means that graduates of this program will be able to apply more easily for the A.Stat, or Associate Statistician, designation. Many thanks to Bruce Smith for putting together our successful application. The A.Stat designation is 'intended to indicate to the broader statistical and non-statistical communities that the holder has achieved a certain level of professional competence in the understanding and application of statistical methods, and maintains a level of ethical practice.' (www.ssc.ca/accreditation/index_e.html) Graduates who obtain the A.Stat accreditation should be more competitive for jobs involving statistical science.

## RETIREMENT

After 38 years as a full-time member of this department, **Dr. Kok-Keong (K.K.) Tan** will be officially retiring on June 30, 2008. Dr. Tan was born in Shanghai, China. He received his B.Sc. in 1966 at Nanyang University in Singapore, after which he went to the University of British Columbia. After finishing his Ph.D. there in 1970, Dr. Tan came to Dalhousie, and has remained here ever since, becoming a Full Professor in 1983.

Dr. Tan has been a very active researcher; he travelled widely and held numerous visiting positions, mainly in East and Southeast Asia. He supervised four M.Sc. and four Ph.D. students, as well as three postdoctoral fellows. While Dr. Tan taught many different undergraduate and graduate courses, in recent years he has been specializing in our large second-year courses.

On Wednesday, June 18 (3 p.m.), there will be a retirement party for Dr. Tan in the Pub of the Dalhousie University Club. The Department is invited, and so are all others who have known Dr. Tan. Members of Dr. Tan's family will also be present. *-kd*

## A NEW SPACE FOR STUDENTS

Work has recently begun on what are probably the most extensive changes to the Chase Building since it has become the home of our department in 1985. For more than 22 years now the most prominent and perhaps the most pleasant space in the building has been occupied by the department library. This was only reasonable because for mathematicians (and statisticians to a lesser extent) the library played a similar role as do labs for the other sciences.

However, this has drastically changed in recent years, with almost all new and recent publications being available on line. At the same time there is an increased need to provide the best possible space to undergraduate students.

Therefore it was decided last Fall that the Mathematics and Statistics Learning Centre would move upstairs into the larger and much more pleasant space occupied by the departmental library, and that the library would move downstairs. For this purpose the Department and the Faculty of Science applied for, and received, sufficient funds from the University's Alterations and Renovations Budget. This was supplemented by a generous donation from Mrs. Alberta Boswall of Montreal, a Dalhousie alumna. This donation will be used to purchase modern furniture to create a pleasant seating area, with display spaces for mathematical games and puzzles, etc. Preparations and planning were done by a department committee chaired by Jason Brown.

As department members know, work has now begun, with the first stage, the renovations of faculty offices and the move of Joanne Flemming and Pierre Stevens, already completed. Keith Taylor's office, located next to Pierre's, has also been renovated. Meanwhile, for the Summer months the Learning Centre is temporarily located in the Seminar Room on the second floor.

So far everything is on schedule, and we expect completion by August 1. We look forward to a grand opening in September. - *kd*

## LIBRARY NEWS

As reported above, the departmental library is undergoing the most drastic changes since the department moved into the Chase Building. A fairly large number of journals that are of no current or foreseen use, and that are duplicated electronically and/or in the Sexton (Engineering) Library, have been moved into storage. This was done after consultation with department members.

The remaining journals will be moved into the basement space currently occupied by the Learning Centre. This space is smaller, and therefore the aisles will be a little narrower than upstairs. Still, the library will remain an important and central resource located in a functional space (though not nearly as pleasant as before), and will continue to be easy to use. A photocopier will be located in Pierre Stevens' old office; this office will also contain shelves with current and unbound journals.

On a different note, the department continues to have a large number of quality books in mathematics and related sciences that are for sale, with proceeds going to the library collection. These books are catalogued and can be found at
http://www.mathstat.dal.ca/~dilcher/oldbooks.html
Prices are particularly low for students, alumni, and friends of the department. -*kd*

## LEARNING CENTRES

by Pierre Stevens

The Mathematics and Statistics Learning Centre is an undergraduate support centre for students who are taking first and second year courses offered by our department. However, the services offered by the Centre are broader and effects four different groups:

- Students
- Departmental faculty
- University community
- The Mathematical Education community at large

**Student services**

One of the resources available to first and second year students are the Mathematics and Statistics Learning Centres. The department operates two learning centres, one in the Chase building and one in the Killam Library. This will be the last year that the centre has operated during the week days from Room 009 in the Chase building (Monday-Friday 8.30 am- 5.00 pm.) It's wonderful news that the centre will reopen in September 2008 on the first floor in the Agnes Baxter Reading Room location. The Reading Room will be renovated during the summer months to accommodate the Centre. The new centre will be, in contrast to the basement location, a bright, welcoming place where students can feel valued within the department. This move has been made possible thanks to the efforts of the Chair, Karl Dilcher, the Dean, Keith Taylor, and the Vice President Student Well Being …… The daily management and supervision of the project is in the capable hands of our Administrator, Gretchen Smith. I am sure that I speak on behalf of all students and TA's in expressing my thanks for this initiative in improving our services.

In the evening (Monday to Thursday 7.00-10.00 pm), the center operates out of Room G40M (the annex) in the Learning Commons in the Killam library

The staff for these tutorials consists of the director and Teaching Assistants (TA's). In the course of the day, staff changes at regular intervals. The Learning Centre TA's are comprised of graduate (PhD and MSc) students and honors graduate students.

This year we have enjoyed the valuable services of Melanie Abeysundera, Elizabete Almeida, Catriona Campbell, Sylvia Church, Danielle Cox, Geoffrey Crutwell, Isabel Gao, Vaneeta Grover, Andrew Hoefel, Matthew Hurshman, Neil McKay, Karyn McLellan, Robert Noble, Mark Pavlovski, Goldis Radjabalipour, Caroline Urquhart, Rebecca White, Scott Wile , Rory Wilson, Jin Yue, Jihua Wu and Liwen Zou. Thank you very much, all of you, for your dedication and contributions to a successful year.

The Centre provides an additional service by coordinating hourly course related group tutorial services for Math 1000 and Math 1010.

Other student services include the display of assignments, their solutions and other relevant resources. In addition the Director provides diagnostic testing services and informally advises students with regard to course selections based on their Mathematical and Statistical skills.

**Departmental Faculty**

The Centre provides a departmental service by coordinating the timely posting of relevant course materials in collaboration with the different course coordinators and by the creation of appropriate distribution procedures of course materials to students. Where in the past most of this was done through display windows and binders with printed materials, this service is now more and more provided through Blackboard Learning Systems. This way students enjoy access to Learning Resources on a 24 hour basis. The director of the Centre has also played a major role in the development and administration of on-line assignments for Math 1000 and 1010, In addition the Centre assists in the management of BLS sites for a variety of courses.

Informal student advising with regard to appropriate course selection is another resource benefiting the departmental faculty.

**University Community**

University oriented services include the administration of diagnostic testing as requested by students or as required by the department or Registrar's Office.

In addition the director may advise the College of Continuing Education regarding the delivery of remedial mathematics programs.

**The Mathematical Education community at large**

Part of the director's mandate includes a professional responsibility towards the enhancement of Mathematical Educational and Instructional development. During the academic year 2007-08 we have managed to create and test a question data base for Math 1010 as part of the First Year Calculus Learning Enhancement Project.

The director maintains a list of private tutors. Although the creation of the list is just a small effort, it is much appreciated and often accessed by high school student, parents, university Students and Adult Learners

**Summary**

The centre continues to provide needed services on a drop-in basis to students at the first, second and sometimes third year level. A future challenge will be to make our new resource space a student friendly environment and increase the awareness of all students about this services and encourage their participation.

## A ROOM WITH A VIEW

Another change to the Chase Building, though not as drastic as the move of the Learning Centre and the library, was the construction of a new seminar room on the third floor, Room 305. This room was created out of two adjacent faculty offices, and since last Fall it has been a much used and very pleasant space for research collaboration, meetings, and talks with small audiences. There are now concrete plans to install high-end communications equipment similar to the D-Drive facility in Computer Science. An application for funding has been submitted to ACEnet (the Atlantic Computational Excellence Network), with some funding from AARMS already committed. If this is successful, as is expected, then the equipment and the room will be shared by the Department, by AARMS, and by ACEnet. The equipment will be cart-mounted and can therefore also be used for larger audiences in the Colloquium Room. - *kd*

## PICTURE THIS!

One fine day at the very end of March, our valued colleague Emeritus Chris Field came into the office to report the theft of his photograph from his office door. While this alone would be serious enough to merit a mention in this publication, it is truly puzzling that the thief left behind the (at least!) equally attractive picture of Chris's office mate, Professor Dick Sutherland. Whether it was due to this snub, or rather the Nova Scotia weather, Dick spent the following weeks in Arizona. Meanwhile, office staff are reportedly monitoring e-Bay on a regular basis to see whether Chris' portrait appears for sale, and more interestingly, what the going price will be.

## PICTURE THIS II

Speaking of photographs: A hot item on this end of the Dalhousie campus is the annual Science Calendar, with a beautiful science picture for each month, and several smaller pictures in the front and end matter. Early in the year, alumni, faculty, students and staff are invited to submit their two best pictures. Then, usually in March, after a pre-selection by Faculty of Science staff, the pictures are exhibited, for everybody to vote for their favourite photographs. The next year's calendar is then put together as a result of this.

The big winner for the current, 2008, calendar was Richard Nowakowski. Not only did he have the April picture (with two curious racoons), but more importantly, he made the cover! We have reproduced it also on the cover of this Chase Report.

For further information, and on how to submit pictures for future calendars, see http://science.dal.ca/NEWS_AND_EVENTS/ *-kd*

## PUBLIC HANGING

In the afternoon of April 23, the Chair received the following ominous message from Gretchen:

"Dr. Gupta was hung this morning, In attendance were Paula, Bob Paré and Gretchen (Chris Field left before we hung him). We did a fine job."

Upon investigation, it turned out that a very nice, and very official, portrait of Dr. R.P. Gupta had been placed on the Department's Wall of Fame in the Conference Room. The second of our last two retirees, Dr. Pat Keast, has so far escaped capture. *-kd*

## PI-DAY FRIDAY

Like every year for the past few years, the Graduate Student Society has put on a Pi-Day celebration on March 14 (3.14 in the American way of numbering days). Through personal connections, Graduate

Student Society President Andrew Hoefel managed to procure a good number of excellent and perfectly round pies. The event, which obviously began at 1:59, was very well attended, with an honours student (Isabel Gao) doing the honours. The Department Chair, who only a day earlier had publicly expressed his doubts about the pedagocial value of trivializing and americanizing the most important number in mathematics, was seen (and photographed) enjoying more than one piece of pie.

The event drew even larger circles: The day before, a CKDU radio journalist interviewed some graduate students concerning Pi-Day, and recorded one graduate student (who shall remain nameless) reciting from memory the first 100 decimal digits of Pi. *-kd*

## NSERC GRANTS

Once again this year, our Department has been very successful in attracting NSERC funding. Four Department members had applied for renewal of their Discovery Grants, and all four received funding at the same, or in some cases significantly higher, levels. Since this information is in the public domain, I will give the figures:

| | |
|---|---|
| Jason Brown | $ 24,000 |
| Alan Coley | $ 53,991 |
| Dorette Pronk | $ 15,000 |
| Ed Susko | $ 21,500 |

Another notable fact is that the funding came through four different Grant Selection Committees, namely Pure & Applied Math B, Space & Astronomy, Pure & Applied Math A, and Statistical Sciences, respectively. A strong indication of the wide range of research done in this Department. Congratulations to all. *-kd*

## A MOVING STORY

It was reported that the Department Chair was proud of at last being a mover and shaker, if only for 15 minutes. During the early stages of renovations to create the new student space, several file cabinets needed to be moved. However, safety regulations did not allow the two burly movers to do the job. So, two scrawny academics had to jump in and remove the very heavy drawers so that the empty cabinets could then be moved professionally
and completely legally. After this moving experience the Chair, who had been joined by Alan Surovell, returned to his office still shaking from the exertion, but happy and duly praised by Gretchen Smith. *-kd*

## AWARDS DAY SPEAKER

This year's Awards Day Speaker is one of our own, **Dr. Peter Fillmore**. His connection with this Department is probably closer than that of any other speaker before him. Peter is not only a Dalhousie graduate, but he was also an active member of this department for 25 years and has been Professor Emeritus for the past 10 years. It was he who started the tradition of Awards Day and Awards Day Speakers during his time as Department Chair (1987-91), so we are happy that it is his turn to address this year's graduates and their families.

Peter Fillmore graduated from Dalhousie University in 1957 with an Engineering diploma, an honours degree in Mathematics and the Sir William Young Gold Medal. He then received his M.A. in 1960 and Ph.D. in 1962 at the University of Minnesota. He was at Indiana University in Bloomington from 1964 to 1972, and progressed from Assistant to Full Professor in those eight years.

In 1972 Peter and his young family returned to Nova Scotia, where he was appointed Killam Research Professor in this department. Peter is best known for his work in C*-algebras, and he is the author of several books in the area. He also supervised several graduate students, some of whom now have very successful academic careers. In recognition of his achievements Peter was elected to the Royal Society of Canada.

In addition to his service as Department Chair, Peter has served the Canadian mathematical community in numerous ways, including terms as Vice President and President of the Canadian Mathematical Society (CMS) and as a member of numerous important committees nationally and internationally. Until earlier this year Peter served as Book Reviews Editor for the CMS.

Currently Peter's main interests lie in music, and he is actively involved in the local opera community, an

interest he shares with his wife Ann-Ellen. Peter also sings in several high-level choirs. *-kd*

## DALHOUSIE UNDERGRADUATE MATHEMATICS AND STATISTICS SOCIETY

2008-2009 Council
President : Mark Pavlovski
Vice-President : Victor Bomers
Treasurer: Jacqueline Suh
Secretary: Zu Chen
Communications Rep: Maggie Jones
DSS Reps: Kristina Silmarie, Mica Das Gupta
Member-at-Large: Jessica Vandorp

This summer DUMASS is hoping to send a number of students to the Canadian Undergraduate Math Conference in Toronto.

Dumass would like to congratulate all the graduating math students and wish them luck with their future.

Council Sept 2007- April 2008

President: David Clair
President: Charlotte Haley
Treasurer: Marc-Andre Chavy-Macdonald
Secretary: Isabel Gao
Communications Rep: Victor Bomers
DSS Rep: Kaitlin MacMillan, Jacqueline Suh
Member at large: Carol Ross, Andy Reddin

Facebook Group:
http://www.facebook.com/group.php?gid=2313006875&ref=ts
Website: http://dumass.wordpress.com
Email: mass@mathstat.dal.ca

Objective:

Our main goal is to increase student participation in society events and connect students to each other.

Main events:

| | |
|---|---|
| September 17, 07 | BBQ |
| September 24, 07 | Trivia Night in T-Room on Sexton Campus |
| October 31, 07 | Trick or Eat |
| November 8, 07 | Trivia at Grawood |
| November 17, 07 | Parade of Light on Spring Garden, donation of toys for children |
| December 19, 07 | Christmas Party |
| January 18, 08 | Pool Night at the Locas Bar on Barrington Street |
| January 25, 08 | Wino & Dino |
| January 25, 08 | Life Science Social Pub Crawl |
| January 31, 08 | Wine and Cheese |
| February 14, 08 | Valentines' day cookies |
| February 15, 08 | Games Night @ Grad House |
| March 7, 08 | Bowling Event @ Halifax Shopping Centre |
| March 14, 08 | Pi Day |
| March 14, 08 | Mini Golf @ Bayer's Lake |
| March 28, 08 | Pool Night at the Locas Bar |
| April 1, 08 | Society Hoodies |
| April 2, 08 | Annual General Meeting |
| July 9-12, 08 | CUMC at Toronto |

- We've obtained liquor licenses online; our bartenders have been Victor and Charlotte
- We've organized two tutorials in each semester for first year math and stat courses
- Book buy back events from and to students at beginning and end of each semester
- We've held society sweatshirt design competition. Andy Reddin was the winner and won a free hoody

Honours Presentations:

David Clair: The $P_\omega$ model of the Lambda Calculus

ABSTRACT: Introduced in the 1930's by Alonzo Church, the lambda calculus is a formal system which was created for the purpose of examining the applications of functions along with recursion. The lambda calculus has, since it's introduction, been a very powerful tool in the domains of logic and computer science. The intent of this talk is to first and foremost give a detailed description of the P_omega model of the lambda calculus. The talk will also give a brief introduction to the basic concepts of the lambda calculus and to the rules that the model follows.

Charlotte Haley: Wilson's Theorem: A universal Corollary?

ABSTRACT: Wilson's Theorem is one of the most prominent results of elementary number theory, stating that (p-1)! = -1 (mod p) iff p is prime. As will follow from theorems from number theory, group theory and combinatorics, Wilson's theorem will emerge as a common corollary of three unrelated sources.

Carol Ross: An Introduction to Metric Geometry and Length Structures

ABSTRACT: Metric geometry attempts to provide an intuitive means of understanding the geometry of a space. In this talk, I will present the notions of a length structure and its derived metric. This metric is 'intuitive' in the sense that it arises from a previously defined class of admissible paths in the space. For example, when measuring distance in mountainous terrain, a possible measure of distance is 'as the crow flies'. However, this distance is meaningless for anyone wishing to travel from one peak to another; instead, we can restrict our attention only to paths along the surface of the earth to get a metric that reflects the difficulty of traveling in mountains. This presentation will explore introductory metric geometry by means of similar examples.

## GRADUATE STUDENT SOCIETY

by Andrew Hoefel

The Dalhousie Math & Stats Graduate Society has had another great year. We continue to add to the progress made in previous years to build a strong sense of community among the graduate students and also in the department at large.

Our first social event of the year was the ever-popular martini party. This semi-formal event proved to be a great way to welcome the new graduate students and start the academic year. In the Fall, we also held our annual Halloween bash and a games night which was held jointly with the undergraduate society. The winter social events included an experimental bowling night, which was well received, and our celebration of pi-day on March 14th. The latter event was held together with the undergraduates and drew swarms of students and professors – presumably some of them were from our department. Our antics on this unusual holiday were reported on the local CKDU radio station.

Our cooperation with the undergraduate society extended to fundraising efforts as well. At the ends of the two academic terms we held tutorials to help students in Math 1000, Math 1010 and Stat 1060 with their exam preparation. We are proud of the efforts made by our volunteers to provide students with resources of the highest quality and to ensure that these events will continue to be successful in the years to come. We are also grateful to the undergraduate society and their volunteers for their pains taken in organizing these events.

On behalf of the Math & Stats Graduate Society executive, I would like to thank our members for a successful year and wish everyone a happy summer.

Andrew Hoefel (President)
Rob Noble (Vice President)
Melanie Abeysundera (Treasurer)
Catriona Campbell (Departmental Liaison)
Neil McKay (DAGS Representative)
Margaret-Ellen Messinger (Computer Resources Representative)

## GRADUATE STUDENT SEMINAR

by Rob Noble
Chair, Graduate Student Seminar
Vice President, Graduate Student Society

The purpose of the Graduate Student Seminar is to host a series of talks that are both of interest to and at a level suitable to the graduate student community. These talks include ones given by graduate students themselves where they are provided the opportunity to gain the invaluable experience of preparing and presenting their research and other academic interests as well as ones given by faculty in the department that serve to introduce the graduate community to current day research in the areas of mathematics and statistics. The Graduate Student Seminar has also provided the Graduate Student Society the opportunity to gain experience in organizing such events. A detailed record of the activities of the seminar can be found on the seminar webpage:
http://www.mathstat.dal.ca/~msgrads/seminar

The Graduate Student Society would like to thank all those who attended and/or participated in the seminar this year. Below is a detailed list of the speakers together with the titles of their talks who participated in the seminar this academic year:

**Fall 2007**

Benoit Valiron, *When Are Two Subgroups Of The Rationals Isomorphic?*, September 18, 2007.

Margaret-Ellen Messinger, *The Firefighter Problem: modeling the spread and containment of fire on graphs*, September 25, 2007.

Matt Lewis, *Rolling Manifolds Without Slipping or Twisting*, October 2, 2007.

Josh MacArthur, *Intro to the Mackey Machine for Calculating Irreducibles*, October 16, 2007.

Johan Brannlund, *Projective Geometry*, October 30, 2007.

Melanie Abeysundera, *Classification trees applied to protein structure classification*, November 13, 2007.

**Winter 2008**

Neil McKay, *Surreal Numbers*, January 15, 2008.

Huaichun Wang, *Evolutionary bioinformatics: from modelling protein evolution to the study of genome adaptation*, March 11, 2008.

Karl Dilcher, *Divisibility properties of some classes of binomial sums*, March 25, 2008.

## GRADUATE REPORT – STATISTICS

by Dr. E. Susko

This year we welcomed two new MSc students into our graduate program, He Gao and Sonja Pritchett. Melanie Abeysundera, a graduate of our MSc program, entered the PhD program. Currently we have five continuing MSc and four PhD students in statistics. We have admitted two new graduate students for 2008/2009. Five MSc students have completed programme requirements since the last Chase Report:

| | |
|---|---|
| Elizabete Almeida | (Drs. Dowd and Flemming) |
| Mei Chen | (Drs. Field and Gu) |
| Amanda Haliday | (Drs. Field and Mills) |
| Scott Wile | (Dr. Dowd) |
| Jin Yue | (Dr. Smith) |

## GRADUATE REPORT – MATHEMATICS

by Dr. Keith Johnson

In September 2007 the Mathematics division welcomed four new MSc students - Catriona Campbell, Danielle Cox Matthew Hurshman and Rory Wilson - and two new PhD students - Neil McKay and Karyn McLellan. At the October convocation five students – Alex MacLeod, Neil McKay, Sable McKeil, Karyn McLellan and Travis Squires - received their MSc degrees. Two MSc students - Matthew Lewis and David McNutt- and one PhD student -Richard Hoshino- will receive their degrees at the May convocation. Caroline Adlam was awarded an NSERC doctoral postgraduate scholarship and a Killam scholarship. The mathematics division has admitted five new MSc and three new PhD students for the 2008/2009 academic year. On July 1

Professor Richard Nowakowski will take over as graduate coordinator for Mathematics.

## NOVA SCOTIA MATH LEAGUE

by Dr. R.J. Nowakowski

The Nova Scotia High School Math League (NSML) is an initiative run by the Dalhousie University Mathematics and Statistics Department designed to stimulate and challenge high school students across the province. The NSML is based on the very successful Newfoundland Math League which has been running since 1987. The first game was run in Halifax in 2002 by Richard Hoshino and Sarah McCurdy. Since then there has been no looking back. At the end of the 2006/2007 season we had approximately 320 participants across six regions. In 2007/2008, this expanded to 408 participants, with 102 teams from 38 High Schools.

This year, the League Coordinator and was Meghan Allen (PhD student) who also led the Problems committee, essentially she is the problems committee. This is the third year Meghan has been involved and will be her last. Meghan is due a lot of thanks for all her hard work and for helping grow the competition to its present size and distribution across the Province. Thanks should also go to the other members of the team all of whom are PhD students in the Mathematics Division Geoff Crutwell, Neil McKay and Angela Siegel. Dr John Irving (Saint Mary's University) also deserves thanks. He will be the Coordinator for the coming year.

This year the Provincial Final was held May 10 at Acadia University. Twenty teams were invited, unfortunately, one had to withdraw at the last minute. The top three teams were awarded Gold medals, the next five received silver and all others received Bronze- this to recognize the tremendous achievement and dedication of the students. The top three teams this year are:

1: Halifax West;
2: King's Edgehill;
3: Halifax Grammar.

More details can be found at http://www.mathstat.dal.ca/~mathleague/standings.html.

The NSML is an excellent venue for students to compete in a friendly manner and learn some mathematics in the process.

How does it work?

Currently, there are six centres which run the NSML games - Antigonish, Bridgewater, Halifax, Sydney, Truro, and Wolfville. On three separate days during the season, schools send teams of four students to participate in a three-hour mathematics problem solving competition. Throughout the competition, 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. The top teams at the end of the season are invited to a provincial championship held in the Spring.

## STUDENT COMPETITIONS

by Dr. O-Yeat Chan

It was a pleasure to coach our math competition team this year. We sent one team of two students, Ashley Kelly and Fredrik Sy, to the Atlantic Provinces Council on the Sciences (APICS) mathematics competition at its annual conference in Mathematics, Statistics, and Computer Science, which was held at the University of New Brunswick in Fredericton this past October. They also participated in the very challenging Putnam competition in December. In particular, Fredrik did quite well, ranking at 661 out of a total of 3753 participants throughout North America.

## EULER SYMPOSIUM AT DAL

Leonhard Euler (1707-1783) was without doubt the most prolific and most influential mathematician of all time, with his work covering most areas of pure and applied mathematics and a great deal of physics.

In celebration of the 300th anniversary of Euler's birth there was an Euler Symposium in this department on October 26 and 27, sponsored by AARMS. It was the aim of the symposium to use local expertise to cover a wide range of different areas of Euler's work through

one-hour expository talks. In addition, a prominent historian of mathematics and Euler specialist, Craig Fraser of the University of Toronto, was invited to speak at this event. The speakers (in alphabetical order) and titles of their talks were as follows:

Karl Dilcher: *Some Number Theoretical Results due to Euler*

Craig Fraser: *Leonhard Euler and Divergent Series*

Jeannette Janssen: *Euler's Way of Counting*

Keith Johnson: *Euler and Elliptic Integrals*

Jürgen Kreuzer: *Euler's Legacy to Physics*

Renzo Piccinini: *The Euler Characteristic and the Classification of Closed Surfaces*

Roman Smirnov: *Mathematical Representation of Motion*

S.Swaminathan: *Euler and the Zeta Functions*

Keith Taylor: *Logarithms and the Unit Circle*

During the 1 1/2 days of the symposium an average of 30 people, in addition to the group of speakers, attended the event. All four Atlantic Provinces, and almost all Atlantic universities, were represented by the audience.

The symposium was organized by Karl Dilcher, Roman Smirnov, and S. Swaminathan. Further information can be found at http://www.mathstat.dal.ca/~smirnov/euler300.html *-kd*


## NUMERICAL ANALYSIS DAY

by Dr. Pat Keast

The Eighth Annual Bluenose Numerical Analysis Day was held in Saint Mary's University on Friday, July 27, 2007. This meeting was supported by a grant from the Atlantic Association for Research in the Mathematical Sciences (AARMS). The organisers were: Ronald Haynes (Acadia University), Pat Keast (Dalhousie University) and Paul Muir (Saint Mary's University). Saint Mary's University provided the venue and AV assistance, and the Faculty of Science at Saint Mary's sponsored the refreshment breaks and a reception at the end of the day.

About thirty people attended the meeting, from Acadia, Dalhousie, Saint Mary's, and the University of New Brunswick. The keynote speaker was Dr. Martin J. Gander (http://www.unige.ch/~gander) of the University of Geneva. There were ten contributed talks with thirteen speakers from undergraduate and graduate students, faculty and from industry and governmental laboratories. Several of the speakers were summer NSERC students. The programme was a good mix of theory and applications. The ninth meeting in the series will take place at Dalhousie on June 13.

## GROUPS OF SELF-HOMOTOPY EQUIVALENCES AND RELATED TOPICS

by Dr. Renzo Piccinini

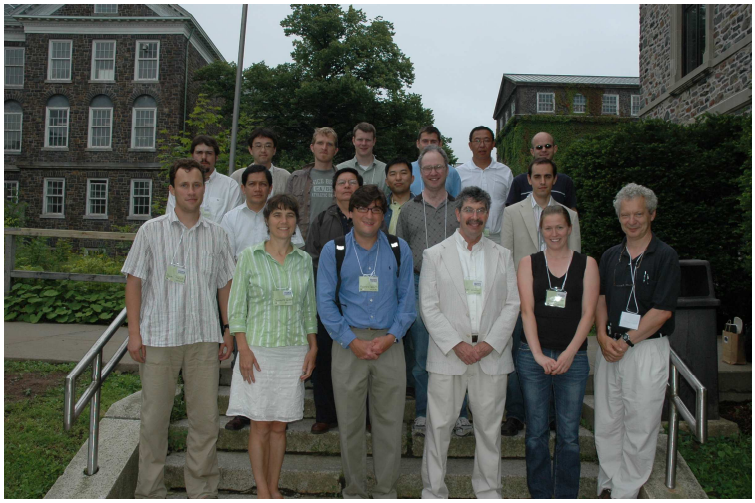
This conference, to be held at the Department of Mathematics and Statistics at Dalhousie University, from June 29 to July 5, 2008 is the third of its kind: the first was held at the Centre de Recherches Mathematiques (Montreal) in 1988 and the second, at Palazzo Feltrinelli (University of Milan) in Gargnano (Garda Lake, Italy), in 1999. Proceedings of these two conferences were published by Springer-Verlag and the American Mathematical Society.

The present edition is organized by Martino Arkowitz (Dartmouth College), Keith Johnson (Dalhousie), Ken-ichi Maruyama (Chiba University) and Renzo Piccinini (Dalhousie University). The Conference is being supported in part by a small grant from AARMS.

We are interpeting the "related topics" in the title in a very large sense, and thus we expect several interesting

talks in several areas of Algebraic Topology. Confirmed attendees are coming from Brazil, Canada, Italy, Japan, Poland, Slovenia and the United States. There will be a Colloquium talk on the main subject of the conference open to a mathematical audience given by Martino Arkowitz; all members of the department are cordially invited.

A list of talks will be posted later on, together with other information pertinent to the conference.



**CAAN 2007**
by Jeannette Janssen and Pawel Pralat

The Internet, because of its size, decentralized nature, and loosely controlled architecture, provides a hotbed of challenges that are amenable to mathematical analysis and algorithmic techniques. The Fourth Workshop on Combinatorial and Algorithmic Aspects of Networking (CAAN 2007) held in our department in August 2007 brought together mathematicians, theoretical computer scientists and network specialists in a fast growing area that is an intriguing intersection of Computer Science, Graph Theory, Game Theory, and Networks.

Peter Winkler (Dartmouth College) and Alejandro Lopez-Ortiz (University of Waterloo) gave invited talks. The 10 revised full papers that were presented during the workshop, together with two invited lectures presented, were published in a post-conference proceedings (Lecture Notes in Computer Science Series, Vol. 4852).

More information available at
http://www.mathstat.dal.ca/~caan2007/

**CHEBUCTO COMMUNITY NET**
by Andrew Wright

2008 marks the fourteenth anniversary of the Chebucto Community Net, the longest running independent Internet Service Provider east of Ottawa. Here before Sympatico, before Eastlink, and a federally registered charitable organization since 1999, the Chebucto Community Net has helped provide thousands of people and hundreds of community groups and non-profit organizations with an equal access to the tools of communication.

Well, that's what we used to do. It's not our fault, we've done amazing things with the barest of resources but technology has marched on. Nowadays if you have $50 a month you can have equal access to the tools of communication and if you don't, well, too bad. The irony is that this was the situation that brought about the creation of the Chebucto Community Net in the first place and it is now the situation that threatens to close us down.

You see, we provide a free text-based dialup access to the Internet and for a $100 membership, we provide a full unlimited PPP dialup connection. Our service works very well and a core of dedicated volunteers has poured a lot of time and energy to keeping it that way but dialup Internet access is no longer enough.

Our members with money have moved to highspeed and poorer people frequently do not have landline phone lines. This unequal access is referred to as the Digital Divide. It sounds almost laughable until you think: which child will do better, the one with home Internet access or the child who has to wait for time at a public terminal? Which grandmother will get to enjoy the photos of her family? Which person's job search will go better?

If you've ever looked at our website, http://chebucto.ca/ you'll notice a lot of information. We provide a free bi-weekly column on computer issues to the local papers,

an RSS newsfeed with timely computer security news that often scoops the major international news outlets, a bulletin board for community announcements, hundreds of community organization websites and other information resources and a cool world map updated daily showing where people accessing our website are coming from.

You may have walked past our office and noticed us working on some senior citizen's computer (which we do for free) to help get them online. Many of Metro's senior population would have no home Internet access at all without us.

We receive no government funding of any kind. We pay our bills from membership fees and from donations.

This year will mark more than our fourteenth anniversary of providing service to the community, it also marks the year we either turn our fortunes around, or start planning to close our doors.
We aim to bring highspeed wireless connectivity to Metro through home-based wireless mesh networking for a $100 a year membership. We will be providing completely free access to local websites and government websites. After almost three years of development we will be unveiling this service over the next two months.

Innovative new technology developed right here in the Chase Building. It won't be the first time for that either. We were the source of Canada's original community networking software back in 1994. Already we have had expressions of interest in our wireless node software from community groups across the country.

Our challenge will be to get this new service out the door and operating in the real world without advertising or financial backing and with less operating money than we have ever had before.

Whether we can do it or not will be the big story for 2008. We think that Metro would be a much poorer place with no community Internet, just two large, impersonal commercial providers. We don't think that the public interest is well-served by $50 a month highspeed access, even if the current provincial government does think that is fine. Time will tell if enough people agree with us.

We would like to express our gratitude for the support we receive from the Department of Mathematics and Statistics without whom we would simply not exist and we hope in our small way that we help bring credit to you all.

## CHASE COMPUTING UPDATE

by Balagopal Pillai

The Department NSERC equipment grant application was successful this past year. With this new grant, computing equipment was purchased in late 2007 and is now fully operational. The department computing cluster was upgraded with 5 new computing nodes, an 8 terabyte storage server and a new rack. This cluster equipment and storage is available to all faculty, graduate students and visitors in the department. All servers and the machine room infrastructure have been working without any major problems the past year.

## CMS MATH CAMP
## DALHOUSIE UNIVERSITY
## JULY 16-20, 2007

by
Chelluri C.A. Sastri
Suraj Sikka

The camp was held by the Department of Mathematics and Statistics, Dalhousie University, under the auspices of the Canadian Mathematical Society (CMS) and Dalhousie University, with financial support from various sources, including Dalhousie, ESSO, and NSERC/PromoScience. This was the eighth in a series of annual camps that began in 2000. The organizers, as before, were Chelluri C.A. Sastri and Suraj Sikka.

The format of the camp was essentially the same as in previous years. The instructors were David Hamilton, Bruce Smith, David Iron, Keith Taylor, O-Yeat Chan all from Dalhousie University, and Robert Dawson, John Irving, and Wendy Finbow-Singh from St. Mary's University. Nobody, among the instructors, organizers or helpers, of whom there were many, received any payment for services rendered.

The students arrived, and registered, on Sunday, July

15, between 1:30 and 2:30 pm. The organizers and the two chaperones, Sunita Gupta, and Dave McNutt, received them. Dave is a graduate student in our department, and Sunita a high school mathematics teacher. The students and the chaperones all stayed at Howe Hall, a student residence. 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 and geometry. 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 great.

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).

We thank Ron Fitzgerald of MathResources Inc. for donating packages of their Math Dictionary. The students were pleased to get them.

There were several extra-curricular activities—bowling, chess, pizza party, etc. One evening, there was a presentation by Travis Squires, an honors student of mathematics in our department, concerning the transition from high school to university. This year, the Atlantic Jazz Festival fortuitously took place in the same week as the math camp, and the chaperones took the students to a concert in the festival. 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 barbecue lunch after the closing ceremonies on Friday the 20th.

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 fifteenth mathematics camp for black students was held the second week of July 2007. 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, & computer science so these students can pursue further studies in these subjects.

The students are generally of grade six and seven and are brought to the Dalhousie campus. While here they stay in Howe Hall.

Mornings and early afternoons are devoted to lectures in mathematical, statistical and computer activities, while late afternoon and evenings are devoted to extra curricular activities where they can apply the talents they have learned in the classes.

They are taken to Dalplex for one hour each afternoon where they participate in swimming and play other games such as basketball, tennis, etc.

They also visited the Nova Scotia museum of history and science and the Discovery Centre. Students of the Camp also spent an evening at the Black Cultural Centre in Dartmouth where they were told about the mathematicians and scientists of black origin and also saw a film.

The students were taught and cared for by seven instructors (three university professors and four school teachers) and four chaperons. The Camp was organized under the directorship of Professor R.P.Gupta of Dalhousie University and Mr.Gerry Clarke of the Black Educators Association. It was financially supported by an NSERC Promo Science Grant, Dalhousie University and the BEA.

## AARMS SUMMER SCHOOL 2007

by Dr. Pat Keast

The 2007 AARMS Summer School was held in the Department of Mathematics and Statistics, Dalhousie University, Halifax, Nova Scotia, from July 16 to August 10. The Director of this year's School was Pat Keast, with assistance from Renzo Piccinini. There were 27 students attending classes. These came from Alberta, Brazil, China, Germany, Italy, Newfoundland and Labrador, New Brunswick, Nova Scotia, Ontario, Romania, and Spain. Several students were attending their second Summer School, and one has attended all three Dalhousie Schools. Also, one third of the students were women.

The classes taught were Polynomials (Instructor: Ed Barbeau, University of Toronto); Statistical Numerical Integration (Instructor: Alan Genz, Washington State University); Mathematical Models in Ecology and Evolution (Instructor: Frithjof Lutscher, University of Ottawa); and Introductions to Number Theory (Instructor: Alf van der Poorten, Sydney, Australia). The students, as in previous years, were very gregarious and the atmosphere at meal times, in the dining hall of Howe Hall residence, was always wonderful. (Except for a few days when one student was mis-diagnosed as having mumps, leaving the other students a little bit nervous until the all clear was given!)

As in previous Summer Schools, students had to find their own way to Halifax, where accommodation and meals were provided by the School. There were two social events. On the first Monday, the Graduate Student Society hosted a dinner-time barbecue, which was a great success. This was held on the balcony of the Chase Building, easily the best asset of the building, especially when the weather cooperates. Then, on Saturday July 28, there was an outing to Peggy's Cove, followed by dinner at the Sou'Wester restaurant there. Despite the fact that visibility was reduced to less than a kilometer by fog, the students seemed to enjoy the experience. To underline the cosmopolitan nature of the group, when a call was made by one of the students to sing happy birthday to the Brazilian student, on the ride home, birthday wishes were sung in English, Romanian, French, Spanish and Mandarin.

This was a very successful event, and a fitting conclusion to Dalhousie's term as host. The next School will be held in Fredericton, New Brunswick, at the University of New Brunswick.

## AARMS-CRM WORKSHOP

by Dr. Pat Keast

A workshop on Recent Advances in Functional and Delay Differential Equations was held November 1-5, 2007, at Dalhousie. This was jointly sponsored by the Atlantic Association for Research in the Mathematical Sciences (AARMS) and the Centre de Recherches Mathematiques (CRM). The organizers were J. Appleby (Dublin City), H. Brunner (Memorial), A.R. Humphries (McGill), D.E. Pelinovsky (McMaster). The local organizers were Pat Keast (Dalhousie) and Paul Muir (St Mary's). The conference, held in the Student Union Building at Dalhousie, attracted about 60 people from Europe, Australia, North America and Asia. Everything ran smoothly until the morning of November 4, after a night of near hurricane winds and torrential rain from tropical storm Noel. All power was cut to Dalhousie and the only option seemed to be to cancel the day's events. But with the help of very organized people at the Lord Nelson Hotel, the venue was transferred to the hotel within thirty minutes, and the workshop began on time. Those visitors who were staying at the Lord Nelson were treated to an extreme view of Halifax weather.

## AARMS in 2007/2008

by Dr. Richard Wood
Acting Scientific Director of AARMS

The academic year began with difficulty for AARMS. Jon Borwein resigned as Scientific Director for personal reasons and then our plans for making an autonomous NSERC MRS application in the fall of 2007 had to be put off for a year as we awaited greater clarity from our stakeholders. However, in other respects it was another successful year for the programs of AARMS. Many thanks are due to Evan Kipnis, Chair of the AARMS Board, and David Langstroth, the AARMS Administrator.

The acclaimed AARMS Summer School has spun off an AARMS/AMS book series and the first volume, ‘A

course on the web graph' by Anthony Bonato, is now in print. Three more volumes, arising from AARMS Summer School classes, are now in preparation.

Dalhousie bids farewell to two AARMS postdocs this summer. Toby Kenney will take up a position in Slovakia and Dante Manna one in the US. Dansheng Yu will leave SFX, while Rebecca Hammond will continue her postdoc with Holger Teismann at Acadia. Daniel Horsley will take up an AARMS PDF at MUN under the supervision of David Pike. There may be other AARMS PDF's awarded in the next few months.

AARMS continues to support many small conferences and workshops but is currently a victim of its own success. All available conference funding for this calendar year has already been allocated to the events that are listed on our web page

http://www.aarms.math.ca/

It is hoped that a successful NSERC MRS application this fall will provide AARMS with a much needed budget increase.

Finally, it should be noted that plans for the Access Grid room in the Chase Building are again moving along nicely, in part due to AARMS, and AARMS hopes to use it to good effect in the near future.

## MARINE PREDICTION AND ENVIRONMENTAL STATISTICS

by Michael Dowd, Joanna Mills Flemming and Keith Thompson

Marine Prediction continues to be a research topic of great interest to statisticians at Dalhousie. Keith Thompson is co-leading a new national network entitled "Prediction and Predictability of the Global Ocean and Atmosphere System on Time Scales of Days to Decades". The Canadian Foundation for Climate and Atmospheric Sciences is providing funding of almost $3M for 17 researchers from 7 institutions to help develop the next generation of coupled atmosphere ocean models. One of the major research challenges is to blend information from the models with the vast amount of data presently being collected by satellite-borne sensors and a global array of over 3000 autonomous profilers of the upper km of the world's oceans. This challenge was the main motivation for organizing an international, five-day workshop entitled "Mathematical Advancement in Geophysical Data Assimilation" held at the Banff International Research Station in Alberta, Canada in February, 2008. (BIRS is a joint Canada-US-Mexico initiative to promote the exchange of ideas and methods within the Mathematical Sciences.) Details on the workshop, and the presentations, can be found at http://www.birs.ca.

The Environmental Statistics program is now well established here at Dalhousie and concerned with the development and application of statistical methods for the environmental sciences, with the purpose of addressing pressing environmental problems facing society. At the May convocation our first two MSc students will be graduating from this program: Amanda Halladay has developed some innovative state space methods for handling tracking data being collected on endangered leatherback turtles while Elizabete Almeida has proposed using cyclical state spaces models to extract key information from biogeochemical time series data. Scott Wile is also completing a MSc in Statistics. Mike Dowd and Joanna Mills Flemming have been successful at developing projects linked to the National Program on Complex Data Structures as well as the Ocean Tracking Network (OTN). The OTN is conducting the world's most comprehensive and revolutionary examination of marine life and ocean conditions, and how they are changing with global warming.

## STATISTICS COLLOQUIA

by Dr. Michael Dowd

During the last academic year a large number of talks were given in the seminar series of the Statistics Division (Thursday afternoons at 3:30). This year's speakers included researchers and students from the Mathematics & Statistics department, as well as other university departments. We also had guest speakers from other Canadian universities and government labs. A number of Statistics MSc thesis presentations and defences also took place as part the Statistics seminar series. A special highlight in November was the series of a week long short course and seminars on particle filtering methods that was given by Dr. Arnaud Doucet of UBC.

**MATHEMATICS COLLOQUIUM IN THE ACADEMIC YEAR 2007/08**

by Dr. Roman Smirnov

2007 was the last year of my three-years (2005, 2006, 2007) appointment as the Mathematics Colloquium Chair. During this time 55 Colloquia had been organised and a Mathematics Colloquium website designed, launched and updated. The following is a list of speakers, their affiliations and the title of their talks given in the year 2007. Local hosts/organizers are given in parenthesis. (Refer to http://www.mathstat.dal.ca/~smirnov/colloquium07.html for more details.)

February 12, Karen Chandler (Illinois)
*Multiple conjectures and multiple theorems on multiple points*. (Karl Dilcher)

March 5, Neil Calkin (Clemson University)
*Clemson's Research Experience for Undergraduates (REU)* (Jon Borwein/Karl Dilcher)

March 12, Dan Goldston (San Jose State University)
*Are there infinitely many twin primes?*
(Alan Coley/Karl Dilcher)

March 26, Mikhail Kotchetov (Memorial University of Newfoundland) *Group gradings on simple Lie algebras*. (Roman Smirnov)

April 2, Aaron Lauve (UQAM)
*Questions concerning sums and products of matrices (with answers!)*. (Kia Dalili/Sara Faridi)

April 16, Karl Dilcher (Dalhousie)
*Euler, the master of us all*. (S. Swaminathan)

May 14, John Cosgrave (St. Patrick's College, Dublin)
*Gauss-4 primes: a (beautiful) new sequence of primes*. (Karl Dilcher)

May 22, Erik D. Demaine (MIT)
*Origami, Linkages, and Polyhedra: Folding with Algorithms*. (Karl Dilcher)

August 13, Peter Winkler (Dartmouth)
*Where statistical physics meets graph theory*. (Jeannette Janssen)

August 27, 2007, Silvia Heubach (CSULA)
*Avoidance of partially ordered patterns in compositions*. (Roman Smirnov)

September 13, Ross M. Richardson (Yianilos Labs and UCSD)
*Sharp Concentration of Random Polytopes*. (Jeannette Janssen)

September 17, Dorette Pronk (Dalhousie)
*Orbifold Bredon Cohomology*. (Roman Smirnov)

November 5, Martin Mathieu (Queen's University at Belfast)
*Spectral characterizations of Jordan homomorphisms*. (Karl Dilcher)

November 19, Amal Amleh (St. Mary's)
*On Second Order Rational Difference Equations*. (Karl Dilcher/ Roman Smirnov)

November 26, Pawel Pralat (Dalhousie)
*Cleaning d-regular graphs with brushes*. (Roman Smirnov)

January 14, Gary Walsh, (CSE and the University of Ottawa)
*The Cryptologic Research Institute*

March 3, Jonathan Barzilai, (Department of Industrial Engineering)
*Game Theory Foundational Errors and the Mathematical Foundations of the Sciences*

March 17, John Barnstead, (Department of Russian Studies)
*Poetry and Mathematics: Pushkin, Kolmogorov, and Language Entropy*

April 21, Brian Coolen, (St. Francis Xavier University)
*Catalecticant Ideals*

May 12, Arthur Benjamin, (Harvey Mudd College)
*Combinatorial Trigonometry: A Method to DIE For*

Mary 13, Dirk Theis, (l'Université Libre de Bruxelles)
*The Cops and Robber game on graphs with forbidden (induced) subgraphs*

Upcoming talks:

May 29, Maurice Cox, (National Physical Laboratory, Teddington, UK)
*Calculating the area under a curve given by a general set of points*

Early July:
Martin Arkowitz, (Dartmouth College)
*A survey of the group of homotopy classes of homotopy self equivalences of a space*

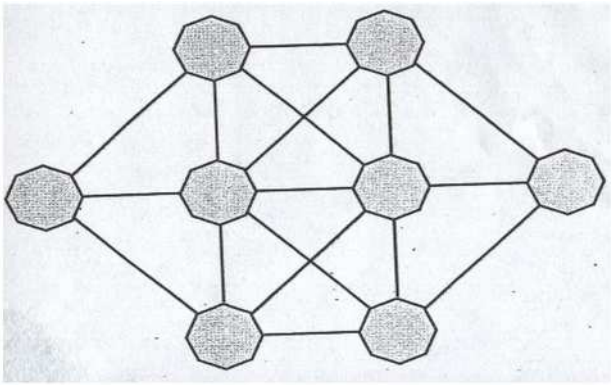
**Pi Day 2008**

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

## BRAIN TEASERS

Edited by
Dr. S. Swaminathan

1. Place the numbers 1 to 8 in the cells of the diagram so that no adjacent numbers are joined by a line. For example, a line can join 5 and 8, because they are not adjacent, but numbers 3 and 4 must not be connected by a line.



2. 'Crispy Chips' company announces a special offer on their potato chips packets. Shops would give a free fresh packet in exchange for 8 empty packets. Jaime Lesfrites wasted no time and went into action right away. She collected 71 empty packets somehow and went to the shop. How many free fresh packets did she get?

3. Two numbers have the same two digits in the opposite order. Their difference is 63. What are the numbers?

4. A party of students went to a Chinese meal. Every two of them shared a dish of rice, every three shared a dish of soup, every four shared a dish of chicken. If 65 dishes were eaten altogether, how many students were there in the party?

**CHASE REPORT**

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We welcome your suggestions and comments for future issues.

**Editor**: Gretchen Smith, Administrator
gretchen@mscs.dal.ca
Phone: (902) 494-2572
Fax: (902) 494-5130

**Department of Mathematics and Statistics**
Karl Dilcher, Chair
David Hamilton, Statistics Director
Jeannette Janssen, Mathematics Director
Keith Johnson, Mathematics Graduate Coordinator
Ed Susko, Statistics Graduate Coordinator