



Greetings from the Chair ATM Lau

I would like to extend a warm welcome to our new graduate students, post-doctoral fellows, staff and visitors.

Dr. Doug Wiens has recently been admitted as a Fellow of the American Statistical Society. Congratulations Doug.

Dr. Dragos Hrimiuc has been awarded the 2005 Department of Mathematical and Statistical Sciences Award for Excellence in Undergraduate Teaching. Congratulations and thank you, Dragos.

On November 23, 2005 the following members of the Department will be honored at a ceremony at the Myer Horowitz Theatre for their services at the University of Alberta: Dr. Walter Allegretto, Dr. Peter Antonelli and Dr. Hans Kunzle for 35 years; Dr. Gerald Cliff for 30 years; Dr. Peter Hooper, Dr. Andy Liu and Dr. Wo-Sang

Young for 25 years. Congratulations and thank you to all of you.

We have been approved to advertise for 5 regular appointments in Statistics, Algebraic Geometry, Algebraic Groups and Applications, Ordinary Differential Equations and Fluid Dynamics. We have also been approved to continue our search for an NSERC University Faculty Award.

I would like to thank the graduate students for organizing the annual B-B-Q held at Hawrelak Park this past September. The B-B-Q was a great success.

This year's Christmas party will be held on Saturday, December 3, 2005 at the Santa Maria Goretti Community Centre. Please join us for an evening of good food and fellowship.



Associate Chair (Research) P. Hooper

Riyaz Sharan joined our office staff this past June. His responsibilities include assisting with NSERC and other grant applications. This October the Research Committee is again providing a peer review of NSERC Grant applications. The Research Awards Committee has also begun its work reviewing upcoming awards and preparing nominations. Please let committee members know if you have suggestions.

MITACS has introduced an internship program to support graduate students working on applied research projects with a sponsoring company for periods of four months. A description of the program as it relates to Alberta can be found at www.stat.ualberta.ca/~hooper/research

Congratulations to Doug Wiens for his election as Fellow of the American Statistical Association.

Math Student to Attend Harvard Law School submitted by S. Shen

Laura McIntyre earned her honors math/econ BSc. Degree with first class honors from our department in May 2004. She was an NSERC USRA student in 2003 and 2004 working with Michael Li and Samuel Shen. With a University of Toronto Fellowship she went to the U of T and earned her MA in economics in May 2005. During this period she was admitted to Harvard Law School, where she will be attending in the fall of 2005.

Laura thinks that law is an excellent way to apply mathematical logic to social/economic problems. She notes that the analytic skills developed through a mathematics education are extremely important for success in law school, and are a great asset while writing the Law School Admissions Tests. "Mathematics students are among the top scorers in both the LSAT and MCAT," she says.

Laura found her honors math classes to be such a large component of her preparation for the logical rigors of law school that she devoted an entire paragraph in her personal statement for Harvard to address the intellectual growth realized during these classes. She wrote: *"I was accustomed to identifying patterns and memorizing material, rather than fully comprehending the implications of the results obtained, and the derivations that led to them. The inadequacy of my approach became apparent in my honors math classes. These courses demanded a strong grasp of the theoretical aspects of each problem, rather than a mechanical adherence to formulas. With the emphasis shifted from the tangible territory*

of the 'answer' to the more elusive realm of 'analysis,' I realized that I would have to train my mind to think and reason in a whole new way. I ceased to simply memorize that A implied B, and began to ask, "Why does A imply B, what would happen if this relationship didn't exist, and would this implication be apparent to me?"

Laura feels that this more comprehensive approach to problem solving honed through her challenging math classes has given her the confidence to thoroughly examine any law issue from start to finish. Even though Laura recognizes that Harvard Law will be excessively challenging she can't help shaking her head and saying, "if I can get through 417 and 411 in the same semester during my third year with geniuses like Andy Hammerlindl in my class, I feel like I can get through anything." She is looking forward to next year and wishes to thank the math department for their overwhelming support in terms of NSERCS, marking and tutoring opportunities, reference letters and amazing advisors such as John Bowman.

Laura is from Edmonton.



Associate Chair of Graduate Studies YS Wong

During the 2005-06 academic year, our Graduate Program completed a second five-year review conducted by FGSR. The members of the external review team consisted of Dr. D. Brillinger (UC Berkeley), Dr. R. Kane (Western Ontario) and Dr. C. Capjack (UofA). They visited our Department for two days in May, 2005 and interviewed many faculty members and graduate students. In their external report submitted to FGSR, they have stated that, "The department is one of the strongest departments in Canada. If one considers the totality of mathematics and statistics at each of the other Canadian universities then only Toronto and UBC clearly rank above Alberta".

According to the NSERC statistics, over the five-year period from 1999 to 2004, our department consistently placed among the top four in research funding in area of mathematical and statistical sciences. The ranking was Waterloo, Toronto, UBC and Alberta. Note that, at Waterloo, the Faculty of Mathematics includes four departments (Applied Mathematics, Combinatorics & Optimization, Pure Mathematics, Statistics and Actuarial Science) and the School of Computer Science.

It is also of interest to note that the data provided by the American Math Society shown that, over the three-year period 2001-04, our Department awarded 24 doctoral degrees, which places Alberta and Toronto in a second place tie after Waterloo (with 33 Ph.D. awarded in the four departments). As pointed out in the external review report, out of the 31 students who graduated in the past 5 years, 29 have academic positions. Such positions are awarded competitively and reflect a consistent positive assessment of the graduate program.

In September 2005, we welcomed 30 new graduate students to begin their graduate programs in our Department. Among them, 15 are in M.Sc. programs, 13 in Ph.D. programs and two in the PGD program. We are pleased to note that among the 16 local students in the degree programs, five were awarded with NSERC scholarships.

The total number of our current graduate students is 101, and 37 are in Applied Math, 26 in Pure Math, 20 in Stats, 4 in Biostats, 11 in Math Finance and 3 in Math Physics.

2005-06 NSERC Scholarships Recipients:

- Darja Kalajdzievska
- Remkes Kooistra
- Joshua Nault
- Alexander Ondrus
- Peter Pivovarov

2005-06 UofA Master Scholarship Recipients:

- Vladislav Krasin
- Cheuk-Kuen Lui

2005-06 UofA Provost Doctoral Entrance Awards Recipients:

- Pak-Keung Chan
- Matthew Emmett
- Serhan Kalayci
- James Munroe
- Alexey Popov
- Ying Qu
- Xiaosheng Zhuang

2005-06 Province of Alberta Scholarship Recipients:

- Benjamin Willson
- Mohammad Ali Yassaei

2005-06 Province of Alberta Graduate Fellowship Recipients:

- Benjamin Wards
- Xiaojian Xu

2005-06 Izaak Walton Killam Memorial Scholarship Recipient:

- Qian Wang

Centre for Mathematical Biology

Contributed by C. Zinchuk, M. Lewis and T. Hillen

The Centre for Mathematical Biology has been operational since January 2002 under the direction of Mark Lewis, Canada Research Chair in Mathematical Biology. The Centre is housed at CAB 545-551. The focus of the Centre is to promote research in mathematical biology at the University of Alberta through interdisciplinary research collaboration, a visitor program, a seminar series, a summer school, and postdoctoral and graduate education. Click on the link to view the Centre's Web page www.math.ualberta.ca/~mathbio/

Christine Zinchuk joined the Centre as Research and Administrative Manager in June 2005, replacing Kym Schreiner who transferred to another department on campus. We extend a warm welcome to Christine and send many thanks for Kym for her work at the Centre. We also welcome Caspar Williams who is the new part-time computer support for the Centre. He, along with Mark Duller, ensures the smooth running of computers at the Centre.

We are very happy to have added Bill Nelson to our research group as a new postdoc at the Centre, coming from the University of Calgary. He is working on the development of special temporal models for mountain pine beetle outbreaks. Congratulations as well to Bill Nelson and Hannah McKenzie for their new Alberta Ingenuity Fund fellowships. The Alberta Ingenuity Fellowship program helps post-secondary research institutions in Alberta expand their science and engineering research capacity by recruiting new researchers to Alberta.

We bid farewell this summer to postdoc Frithjof Lutscher, who is now Assistant Professor in Mathematics at Ottawa and Junior Canada Research Chair nominee. Erik Noonburg, postdoc at the Centre completed his appointment in studies involving elk movement and has moved to New York City to work as an independent consultant. We wish them well in their new endeavors.

Congratulations to Amy Hurford for completing her Master's degree under the supervision of Mark Lewis. Amy progressed with her research project on spatial analysis of wolf territories and produced a paper that uses integrodifference equations to model population spread of wolves in Yellowstone. The second part of her thesis involved analysis of wolf movements in their home ranges in the Ya Ha Tinda region in the foothills of the Rocky Mountains. She has gone on to pursue a PhD in Mathematics at Queen's University.

Kevin Painter, from the Department of Mathematics, Edinburgh, UK visited the Centre on August 20, 2005 for two week's stay. He presented on Chemotaxis during his visit.

Andria Dawson is finishing up her Master of Science degree under the supervision of Thomas Hillen in October 2005. In collaboration with the Cross Cancer Institute, Andr ea developed a model for radiation treatment of cancer and applied the model to prostate cancer data.

We extend a warm welcome to Weide Li who is a visiting scholar from Lanzhou University, China for one year. He will be with us until nearly the end of January 2006.

Welcome as well to Bettina Greese, as a visiting student from University of Geifswald, Germany. She is completing her diploma/thesis on ovarian cancer modeling under the supervision of Gerda de Vries and Thomas Hillen by December 2005.

Welcome to Ozden Yurtseven from Turkey. She is a new grad student working with and co-supervised by Thomas Hillen and Gerda de Vries.

Scientific Highlight:

A paper published by the Centre on transmission dynamics of parasitic sea lice from farm to wild salmon by Ph.D. graduate student Marty Krkosek, Mark Lewis, and John Volpe (University of Victoria) has generated a high level of scientific interest as well as much interest by press, public and industry (see <http://www.math.ualberta.ca/~mlewis/publications/SeaLicePub.htm>). Within this project, we are developing mathematical and statistical models that are complemented by intensive field research being conducted in the Broughton Archipelago, BC. Together with John Volpe at the University of Victoria, these models and data are being brought together to yield new insights into how the farm salmon-wild salmon-sea lice system works and move towards ecologically sustainable solutions.

The 4th Annual PIMS-ASRA Mathematical Biology Summer Workshop ran from May 2-12 at the Centre for a total of eleven days this year. The workshop was attended by 14 students from all over Canada. All students received a scholarship to cover registration, part of the travel expenses and accommodation. The instructors were Thomas Hillen, Mark Lewis, Frithjof Lutscher (PDF), Alex Potapov (Research Associate), and Rebecca Tyson (Assistant Professor, Okanagan University College). The guest lecturer was Michael Mackey (McGill).

The annual summer workshops aim to introduce students to mathematical modeling and analysis applied to real biological systems.

Centre for Mathematical Biology

Continued

Through lectures and exercises, students are introduced to various techniques of mathematical modeling (discrete models, ODEs, PDEs, stochastic models). With a self-guided tutorial, the students learned how to use Maple to simulate mathematical models and relate them to biological data. This year's projects included (project presentations can be found at [www.math.ualberta.ca/~mathbio/summer workshop](http://www.math.ualberta.ca/~mathbio/summer%20workshop)):

- HIV in Cuba 1986-2000
- Cholera in South Africa 2000-01
- Extinction of a Wolf Population in Sweden 1991
- Growth of Cell Populations
- Cell Competition
- Pupil Control, and
- Radiation Treatment of Cancer



Student Photo: PIMS-ASRA Mathematical Biology Summer Workshop



Instructors: Left to Right: Mark Lewis, Rebecca Tyson, Thomas Hillen, Alex Potapov, Frithjof Lutscher

Differential Equations and Dynamics Seminars

Organizer: Michael Li

September 21, 2005: Michael Li, U of A

Global Stability in Epidemic Models with Logistic Growth, I

September 28, 2005: Michael Li, U of A

Global Stability in Epidemic Models with Logistic Growth, II

October 5, 2005: Qian Wang, U of A

Some Results on a Diffusive SIR Epidemic Model

October 12, 2005: James Muldowney, U of A

A Nonlinear Variation of Parameter Formula

November 2, 2005: Haibo Ruan, U of A

Applications of Equivariant Degree Theory to Symmetric Hopf Bifurcation Problems in FDEs

November 9, 2005: Petro Babak, U of A

Nonlocal initial problems for coupled reaction-diffusion systems

News From PIMS

G. Cliff, Site Director

We have three new PIMS postdoctoral fellows starting this academic year. The first to arrive was Iulia Pop, originally from Romania, who got her PhD from the University of Goteborg in Sweden. She works in quantum groups and is supervised by Arturo Pianzola. Arriving last week was Mohammad Akbar, who got his PhD from the University of Cambridge. He works in mathematical physics and is supervised by Eric Woolgar. Arriving in February will be Ying-fen Lin, from the National University of Taiwan. She works in functional analysis and will be supervised by Tony Lau.

PIMS will pay \$20,000 towards a postdoc. An additional \$20,000 must be found from NSERC or other personal grants; some of this can come from teaching one course per year in our department. The application deadline for this year's competition has been moved up to Dec. 15, 2005. If you want your applicant to teach a course, you will need to apply to our department by the third week in November.

Much of PIMS funds are allotted to Collaborative Research Groups, or CRGs. These normally run for two years, and get funds of \$50,000 to \$100,000 per year, shared among collaborators at PIMS sites. A CRG usually gives its organizers preference for postdoctoral applications and BIRS conferences. We will have a new CRG based in our department starting next year, in Geometric Functional Analysis, organized by Tony Lau and Nicole

Tomczak-Jaegermann. There is an ongoing CRG in Algebraic Geometry, Cohomology and Representation Theory, based here and at UBC. U of A organizers of this are Vladimir Chernousov and Arturo Pianzola.

There are two more PIMS CRGs based at the U of A, in their third years, operating at somewhat reduced funding. There is one in Mathematical Ecology, and one in Scientific Computing. The main activity in Scientific Computing will be an international conference to be held at the Banff Centre in May 2006. You can see the poster for this on Yan-Ping Lin's office door.

The deadline for applying new CRGs has passed; think about an application for next fall.

PIMS is involved in funding projects in education, from K-12, through college and university. Currently our main involvement in K-12 is through math fairs, organized by Ted Lewis and Tom Holloway. For college and University education, Jack Macki has been active in organizing Alberta wide mathematics curriculum reviews, currently mostly dealing with calculus. If you have any ideas in these directions, let me know.

There is an ongoing series of lectures, sponsored by Syncrude, run by the Applied Math Institute and PIMS. The most recent lecture, in October, was given by Barbara Keyfitz, the Director of the Fields Institute.

The 26th Midwest-Pacific Differential Equations Conference October 15-17, 2005 - submitted by Michael Li

The department hosted the 26th Midwest-Pacific Differential Equations Conference, from October 15-17, 2005. The conference is held in honor of the retirement of Jack W. Macki and James S. Muldowney from the University. Jack and Jim have made tremendous contributions to mathematics research and education through their research leadership in the area of differential equations, through their teaching of mathematics and supervision of students, and through their services to the department and the university, and to the mathematics community.

The conference had more than 60 participants. Plenary speakers are: Lynn Erbe (Nebraska-Lincoln), John Mallet-Paret (Brown), Michael Li (Alberta), Robert O'Malley, Jr. (Washington), George Sell (Minnesota), Pauline van den Driessche (Victoria),

James Wong (Hongkong), Jianhong Wu (York), Pietro Zecca (Florence). Many of our graduate students have actively participated in the conference: 12 of the contributed talks were given by our graduate students; Hongbin Guo, Masky Ng, Zhisheng Shuai, and Qiang Wang have volunteered their time helping with the organization of the conference. The graduate students association, GAME, provided an excellent catering service for coffee breaks.

Funding for the conference comes from the U of A Conference Fund, PIMS, MITACS, and AMI. Local organizing committee members are: Thomas Hillen, Herb Freedman (Co-Chair), Michael Li (Co-Chair), and Joseph So. The proceedings of the conference will be published in CAMQ.

Applied Mathematics Institute

Michael Li, Director

The AMI has a new logo! The new logo is the product of a three-month long logo competition. The judges (John Bowman, Gerda de Vries, Thomas Hillen, Michael Kouratian, and Michael Li) selected the contribution from artist Janina Kuerschner of Edmonton for the \$200 prize, and then suggested some modifications to get the final version. The logo will become part of the AMI signage. It will be featured on the cover of the AMI preprint series, which publishes preprints of AMI members both on the AMI website at <http://www.math.ualberta.ca/ami/preprint.htm> and in print.

Another important AMI activity in the past year was to coordinate the Syncrude Lectures with PIMS U of A. The 4th Syncrude Lecture, titled "Hyperbolic Conservation Laws: Do We Need Proofs?" was given by Professor Barbara Lee Keyfitz of University of Toronto/University of Houston, on September 23, 2005. Professor Keyfitz is the Director of the Fields Institute and a world leader on hyperbolic conservation laws. The Syncrude Lecture series was sponsored by a grant from Syncrude Canada in 2004. The lectures have a strong focus on mathematical problems related to the fundamental interests of Syncrude: fluid dynamics, fluid dynamics with heat transfer and turbulence, imaging related to assessment of ore bodies, and process control. The previous Syncrude Lecturers are: Professor Dan Joseph of University of Minnesota (May, 2004), Professor Roland Glowinski of the University of Houston (October, 2004), Professor Bruno Eckhardt of Philipps-Universität Marburg, Germany (January, 2005). Syncrude Canada has renewed its commitment to sponsor the lecture series in the coming year.

The AMI seminar series continue to thrive. The following is a list of recent AMI speakers.

AMI Speakers in 2004

January 16, 2004, Professor Mary Pugh, University of Toronto

"A finite locus effect diffusion model for the evolution of a quantitative trait"

January 27, 2004, Professor Clayton Deutsch, University of Alberta

"What is Geostatistics"

February 25, 2004, C.P. Caulfield, University of California

"Rigorous bounds on mixing in stratified shear flows"

April 6, 2004, Professor Chi Jun Lin, National Cheng Kung University

"On the incompressible limit of the fluid dynamics equations and their related topics"

May 6, 2004, Professor Yingfei Yi, Georgia Institute of Technology

"On Almost Automorphic Dynamics of Differential Equations"

May 13, 2004 B.R. Ruddick, Dalhousie University

"Differential Mixing of Heat and Salt by Braking Internal Waves"

June 30, 2004 X. Markenscoff, University of California

"Stress Formulation of Elasticity Problems"

July 12, 2004, Jun Zou, The Chinese University of Hong Kong

"Numerical methods for solving some inverse problems"

July 20, 2004, Jun Zou, The Chinese University of Hong Kong

"Numerical Methods for Solving Interface Maxwell's Systems"

July 30, 2004 Professor Frank Stenger, University of Utah

"SINC-PACK, A Family of Programs for Computation"

August 3, 2004, Professor Charles Chui, Stanford University

"From PDE Models to Filter Design for Image Processing"

August 19, 2004, Dr. Quanan Zheng, University of Maryland

"Solitary Waves in the Atmosphere and Ocean Observed From Space"

August 20, 2004, Siv Sivaloganathan, University of Waterloo

"Brain Biomechanics"

September 20, 2004, Professor Wei Cai, University of North Carolina at Charlotte

"Solving Maxwell's Equations in Inhomogeneous Dispersive Media"

September 30, 2004, Professor Camilo Rindt, Technische Universiteit Eindhoven

"Fouling of heat exchangers and heated cylinder flows"

(Continued on page 10)



Department of Mathematical and Statistical Sciences
Annual Christmas Party

*Please join us for an evening of food and fellowship...
some entertainment and dancing as well!!*

Date: December 3, 2005

*Location: Santa Maria Goretti Community Centre
Theatre Hall
11050 ~ 90 St. Edmonton, AB
(West of Commonwealth Stadium
Parking lot)*

*Time: Cash Bar opens at 6:00 pm
Dinner commences at 7:00 pm
Prize draw and ethnic dance demonstration to follow!
Music and Dancing from 9:00 ~ 1:00 am*



Ticket Prices:

\$17.00 per person for academic and retired staff and their guests

\$12.00 per person for sessionals, postdoctoral fellows, graduate students, support staff and their guests

***Note:** Tickets are to be paid for in cash only and will be given out upon receipt of payment. They will be available from Riyaz Sharan or Andrea Morris in the Mathematical and Statistical Sciences General Office, CAB 632*

Seating is limited to 150 guests, so get your tickets early!

Deadline for purchasing tickets is November 28 at 4:30PM

Menu

We will be enjoying the Festive Buffet

Vegetable Soup

Variety of Salads

Alberta Roast Beef with Gravy

Roast Turkey

Oven Roasted Potatoes

Penne with Tomato Sauce

Assorted Cheese

Fruit Season

Pastry Selection

Dinner Rolls & Butter

Freshly Brewed Coffee, Tea or Decaffeinated Coffee

A vegetarian offering is available upon request

See You There!

Applied Mathematics Institute (cont'd from page 7)

Michael Li

October 18, 2004, Dmitry Firsov,

“Finite volume method on example of incompressible Navier-Stokes equations”

October 26, 2004, Professor Lou Fishman, MDF International

“Classical Wave Propagation, Quantum Physics, and Microlocal Analysis – the Holy Trinity of Classical Wave Theory”

AMI Speakers in 2005

January 18, 2005, Peter Mudge Zatko, BBN Technologies, Cambridge, MA

“The Psychology of Winning in Information Warfare”

April 15, 2005, Professor Svetozar Margenov, IPP - BAS

“Preconditions of non-conforming FEM elasticity problems”

April 22, 2005, Professor Ralf Hiptmair, ETH Zürich

“Discrete Electromagnetics”

June 29, 2005, Doug Blount, Arizona State University

“Weak Convergence Results Using Mapping Techniques”

August 30, 2005, Dr. Kevin Painter, Heriot-Watt University, UK

“Multiscale models for chemotaxis and applications to fish pigmentation”

October 7, 2005, Professor Raymond J. Spiteri, University of Saskatchewan

“Introducing odeToJava: A problem-solving environment for initial-value problems”

October 11, 2005, Professor Yiming Long, Nankai University, China

“Multiple closed geodesics on Finsler 2-spheres”

October 18, 2005, Professor Qianshun Chang, Chinese Academy of Sciences, China

“Algorithms and Convergence of the Multigrid Methods”

A Bit of Humor



A piece of string walked into a small town on a hot, dusty day.

He was thirsty, so he sauntered into the first establishment he encountered and asked the waiter for a glass of water.

“Sorry”, said the waiter, “we don’t serve strings here.”

Discouraged, the string walked out. A little further down the street, he met a stranger.

“You look hot,” said the stranger. “Why don’t you go into that café and get a drink of water?”

“I tried that,” said the string, “but the waiter wouldn’t serve me anything because I’m just a string.”

“No problem” said the stranger. “I’ll fix you up.” He grabbed the string, tied him in a bowline and frayed his ends. “Now try it.”

The string slipped back into the café and asked the waiter for a glass of water. “Hey,” said the waiter, “aren’t you the piece of string that was just in here?”

“Nope,” retorted the string, “I’m a frayed knot.”
