



Newsletter

Autumn 2007

A Successful Third Summer School at Dalhousie

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, Macquarie University). 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.

- Pat Keast

SSC 2007: Special Session

AARMS sponsored the Special Session, 'Controversies over Fish Stocks' held at the 2007 Statistical Society of Canada Annual Meeting in St. John's last June. Dr. Peter Shelton of Fisheries and Oceans Canada gave a talk titled 'From Science-based to Ad Hoc Fisheries Management Off the East Coast of Canada'. Dr. Shelton illustrated the weakening role of science in the management of some fisheries over the last 15 years. Dr. Shelton suggested two reasons for this: low credibility of scientific advice and the perceived need for substantial flexibility in the decision-making process.

The northern cod stock off the northeast coast of Newfoundland and Labrador was used for illustration. Catch quotas were introduced in 1973, based on theoretical maximum sustainable yield (MSY). However, by 1975 it was recognized that the quotas were not preventing severe stock declines because of variability in recruitment, under-reporting of catches and errors in the assessment. Extension of Canadian jurisdiction out to 200 n. miles in 1977 limited foreign fishing effort and, combined with the implementation of a new more conservative harvest control rule termed "F0.1", elicited a partial recovery of the stock. F0.1 equates to harvesting about 20% of the biomass in the case of northern cod. Fishing at F0.1 should allow the population to rebuild to above the biomass that gives MSY, which is generally considered to be a healthy or safe state for a stock.

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However, we now know that we consistently over-estimated population size during this period and, unbeknownst to us at the time, fishing mortality steadily increased above the $F_{0.1}$ level. The cause of the over-estimation has not been definitively determined; however, the consequences of over-estimating stock size and the delayed reaction by decision makers to reduce fishing effort has been devastating to the economy of Newfoundland and Labrador. By the spring of 1992 the stock was commercially extinct and only then was the fishery closed. The fallout was that the credibility in DFO science was largely destroyed and also public trust in the ability of government to manage fisheries evaporated.

Dramatic stock collapses in many other east coast fisheries have also occurred. Some of the cod fisheries have reopened, but they are unsustainable and are impeding further recovery.

Dr. Shelton suggests there are two main lessons the need to account for the uncertainty in the scientific advice, and the need for fisheries managers to use a structured decision-making approach that sets objectives, provides performance measures, and takes risk or uncertainty into account. However, the opposite has occurred. Fisheries management decisions have become increasingly ad hoc, seemingly because of changing social, economic and political pressures. This has considerably weakened the role of fisheries science in the process.

Sustainable fisheries are possible, but they require a sound scientific basis and a precautionary approach framework that is robust to uncertainty, and keeps fishing mortality moderate and results in reduced fishing mortality when a stock decreases. Moreover, a societal will must exist to have fisheries managed sustainably.

- Noel Cadigan

Workshop at Acadia on High Performance Computing

In July, Acadia's Centre for Mathematical Modelling and Computation (ACMMaC) hosted a 6-day training and research workshop on High Performance Computing in the Mathematical Sciences. Among the over 60 participants were academic researchers, scientists from government labs, and a large number of undergraduate and graduate students from as far away as the University of Victoria. What brought them together was a desire to learn how high performance computing tools are changing the culture of research in many areas of the

mathematical sciences.

Four days of the workshop were dedicated to training, providing information on how to design and implement parallel programs that solve a variety of complex problems in the mathematical sciences. After being introduced to the nuts and bolts of HPC, such as programming MPI and OpenMP, participants were given experience in implementing these techniques on one of ACENet's newest cluster machines.

"Core" techniques that occur in a wide variety of mathematical problems, as well as in many applications of mathematics were covered, including linear methods and stochastic simulation. Participants also got a flavour of more exotic HPC topics such as combinatorial group theory, and experienced a wide variety of remote collaboration tools including Access Grid videoconferencing, Wikis, internet telephony, tablet PCs, and online communication using mathematical notation. Videoconference technology enabled presentations from Trent, Dalhousie and Los Alamos National Labs.

The workshop culminated in a two-day research event, covering large-scale weather modelling, statistical methods for the design and analysis of computer experiments, geophysical modelling, and even how the new SONY Playstation 3 processors might be the next significant HPC engines. Student participants gave posters on a rich variety of topics including combinatorial methods in DNA sequencing, seismic profile modelling, and problems in number theory.

This was the inaugural event of the ACENet Institute for Advanced Computing, which, along with AARMS and MITACS provided significant funding for the event. Additional sponsorship was provided by the NSERC Atlantic Regional Office, D-Drive, NPCDS, and Sun Microsystems. Additional information is available at:

<http://ace.acadiau.ca/math/hpcworkshop2007/>

- Hugh Chipman

Postdoctoral Fellowships Boosted

In 2008 the minimum value of new AARMS postdoctoral fellowships will increase to \$35,000. This will include \$17,500 from AARMS and the equivalent, or more, in matching funds from the supervising professor(s), their departments or universities.

People

Our Thanks and Best Wishes to Jon Thompson



Jon Thompson has recently retired, after a long career in which he made significant contributions to his department, the university, and the profession at large. His PhD, under G.F.D. Duff at the University of Toronto solved a long-open problem in wave diffraction (three-dimensional diffraction of a

spherical pulse by a wedge). He received the Beaverbrook scholarship (1960-64) and an NRC scholarship (1964-67). He has had a long and productive involvement with the Association of UNB Teachers (AUNBT), playing an important role in the founding of AUNBT, and has been dedicated to the defense and promotion of academic freedom in Canada. He was chairman of the math department at UNB for many years. He was one of the authors of the well-known Oliveri report (2001), and was on the Committee of Enquiry formed to investigate the tragic event (1992) at Concordia involving Dr. Fabrikant. He received the James B Milner Memorial award from CAUT in 1993, and the Prix Nicole Raymond from FNBFA in 1992. Jon was one of the founders of AARMS in 1996 and has been its New Brunswick leader ever since.

- Dan Kucerovsky

Intérêt de Recherche à l'Université de Moncton

Le département de mathématiques et de statistique inclut sept chercheurs en mathématiques. Bernard de Dormale travaille en physique mathématique et en modélisation mathématique. Paul Deguire travaille en analyse multivoque: sélection et approximation d'applications multivoques et théorie des points fixes faibles. Mohamed Farhloul travaille sur la méthode des éléments finis et les applications à la mécanique du milieu continu. Samuel Gaudet travaille sur les phénomènes vibratoires dans les réseaux de cordes. Claude Gauthier travaille en arithmétique matricielle et sur les vibrations couplées. Nabil Sayari travaille en topologie des 3-variétés et en théorie des noeuds. Donald Violette travaille en applications multivoques différentiables, en théorie du point fixe et en topologie algébrique.

Le département inclut quatre chercheurs en statistique. Jacques Allard travaille en statistique appliquée, particulièrement dans les domaines des pêcheries, de l'environnement et de la santé. Fahim Ashkar travaille en hydrologie statistique avec une

emphase sur l'ajustement des distributions. Vartan Choulakian travaille en analyse multivariée et est rédacteur adjoint à la Revue Computational Statistics and Data Analysis. Thu Pham-Gia travaille en statistique bayésienne et sur leurs applications à l'industrie.

Le département a reçu ses premiers étudiants à la maîtrise à l'automne 2000 et depuis l'automne 2002 il a décerné 6 maîtrises en mathématiques et 2 en statistique. Actuellement nous avons cinq étudiants d'inscrits à la maîtrise dont deux en instance de thèse.

- Paul Deguire

Richard Nowakowski wins the CMS Adrien Pouliot Award

Richard Nowakowski of the Department of Mathematics and Statistics at Dalhousie University was recently named the winner of the Canadian Math Society's Adrien Pouliot Award, a national award recognizing individuals who've made significant and sustained contributions to mathematics education in Canada. He'll pick up the prize at the society's 2007 meeting in London, Ont. in December.

For the past four years, he's been instrumental in setting up Math Circles, monthly puzzle-solving and pizza parties for high school students, and the Math League, a year-long series of math competitions for high school students which culminates in a provincial final.

Through the 1980s and 90s, Dr. Nowakowski was a leader with the Canadian Mathematical Olympiad and the International Mathematical Olympiad (IMO). Through his involvement, he traveled to Australia, Germany, China, Hong Kong and Argentina.

Richard Nowakowski is also an active researcher and author as well as a successful graduate teacher and supervisor in the rapidly developing field of combinatorial game theory. He served as Department Chair at Dalhousie from 1998 to 2003.

An astronomer, a physicist and a mathematician (it is said) were holidaying in Scotland. Glancing from a train window, they observed a black sheep in the middle of a field. "How interesting," observed the astronomer, "all scottish sheep are black!" To which the physicist responded, "No, no! Some Scottish sheep are black!" The mathematician gazed heavenward in supplication, and then intoned, "In Scotland there exists at least one field, containing at least one sheep, at least one side of which is black."

Recent and Upcoming Events

Joint AARMS/CRM Workshop on Recent Advances in Functional and Delay Differential Equations

Organizers: J. Appleby, H. Brunner, A.R. Humphries, D.E Pelinovsky, P. Keast, P. Muir

Location: Dalhousie University, Halifax, Nova Scotia

Date: November 1-5, 2007

Contact Information: www.crm.umontreal.ca/Dynamics2007/avancees_e.shtml

Dalhousie Euler Symposium

Organizers: K. Dilcher, R. Smirnov, S. Swaminathan

Location: Dalhousie University, Halifax, Nova Scotia

Date: October, 26-27 2007

Contact Information: dilcher@mathstat.dal.ca

Pure Math Graduate Student Conference

Organizers: Kseniya Garaschuk, Mahdad Khatirinejad

Location: Simon Fraser University

Date: October 12-14

Contact Information: pmgsc@math.sfu.ca

APICS Meeting: Special Sessions in Mathematics and Statistics

Organizers: Colin Ingalls, Rolf Turner, Maureen Tingley

Location: University of New Brunswick, Fredericton

Date: October, 12-13 2007

Contact Information: colin@math.unb.ca

Coast to Coast Seminars

Organizers: Veselin Jungic, David Langstroth

Location: Collaboration rooms across Canada

Dates: Every second Tuesday at 3:30pm Atlantic Time

Contact Information: www.aarms.math.ca/events/c2c.php

Key Dates

October 12-13, 2007	APICS Meeting Special Sessions
October 12-14, 2007	Pure Math Graduate Student Conference
October 26, 2007	Dalhousie Euler Symposium
November 1-5, 2007	Functional and Delay Differential Equations Workshop
January 31, 2008	Deadline for 2008 PDF applications

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"The world in AARMS is not spending money alone. It is spending the sweat of its labourers, the genius of its scientists, the hopes of its children." - Dwight D. Eisenhower