CONGRATULATIONS

AWARD WINNERS

Sir William Young Gold Medal in Mathematics
Yuxin Chen

Emil and Stella Blum Award in Mathematics
Cody Watson

University Medal in Statistics
Miranda McMillan

Ellen McCaughin McFarlane Prize
Kelly Vanlderstine

Ralph & Frances Lewis Jeffery Scholarship
Yuxin Chen
Daniel Zhirov

Bernoulli Prize
Thomas Crowell

Professor Michael Edelstein Memorial Graduate Prize
Lucas Mol

Barry Ward Fawcett Memorial Prize
Joram Benham

Heller-Smith Scholarship
Holly Steeves

Ken Dunn Memorial Prize
Nathan Musoke

Field Prize in Statistics
Kim Whoriskey

Katherine M. Buttenshaw Prize
René Madden

Waverly Prize
Daniel Abarbanel

NSERC AWARD WINNERS

    PGS – M   *Celeste Vautour*

    PGS – D   *Darien DeWolf*

Undergraduate Research Awards (Sobey Awards)

Nathan Musoke (working with Alan Coley)

David Isenor (with Jeannette Janssen)

NEW KILLAMS   *Ali Alilooee Dolatabad*

                       Christopher Levy

KILLAM RENEWALS   *Huda Chuangpishit*

                       Emma Connon

HONOURS STUDENTS

Honours - Mathematics

Daniel Boudreau

Yuxin Chen

Ella Dubinsky (1st subject Neuroscience)

Adam Forget (1st subject Physics)

Benjamin Hersey

Daniel Zhirov

Honours - Statistics

Miranda McMillan (combined with Math)

Maria Rosario Reyes

Shivani Sood (1st subject Economics)

Gregory Walsh (1st subject Economics)

GRADUATE STUDENTS

October 2012 Convocation:

Mathematics

Bassemah Alhulaimi (MSc)

Hanadi Alzubadi (MSc)

Karyn McLellan (PhD)

Lucas Mol (MSc)

Antonio Vargas (MSc)

Amelia Yzaguirre (MSc)

Statistics

Jann Paul Mattern (PhD)

Jessica Wong (MSc)

Lingyun Ye (MSc)

Jiachi Zhu (MSc)

*May 2013 Convocation***:**

Mathematics

Leigh Herman (MSc)

Matthew Hurshman (PhD)

David McNutt (PhD)

Rebecca Milley (PhD)

Alanod Sibih (MSc)

Statistics

Wei Chen (MSc)

CHAIR'S MESSAGE
by Karl Dilcher

This is my last Chair's Message before my term ends in a few weeks, and Bruce Smith takes over as Chair on July 1st. As I prepared to write this, I looked at the 2006 Chase Report for guidance, and to see what my predecessor, Pat Keast, had to say in his last message. "It is said that time passes quickly when you are having fun", he wrote. He then listed a large number of retirements and new appointments, all in his three years as Department Chair. In comparison, my own seven years (minus one semester) seem to have passed much more leisurely. Unfortunately, there were no new regular appointments at all during all those years, while the wave of retirements continued, at least initially. Pat Keast himself and R.P. Gupta (another former Chair) retired in 2007, K.K. Tan in 2008, Bob Paré and Elizabeth Cameron in 2009, and George Gabor in 2010. To make up for all the lost teaching, we were forced to increase the section sizes of first- and second-year courses and decrease their numbers. We also had to slightly increase the teaching load for full-time faculty, which Pat Keast had managed to bring from four half-courses down to three. For several years now, it has been 3 1/2 courses, achieved by alternating between three and four. Overall, I believe that the quality of teaching did not suffer. This was due partly through a careful reorganization of tutorials for our first-year courses in both Mathematics and Statistics, thanks to Pierre Stevens and the Directors at the time. We also had a Calculus Oversight Committee, chaired by Richard Nowakowski, which steered the calculus courses through that period of change. And finally, an important role in providing relative stability was played by our two Instructors Ron Hilburn and John Barger, who each held a string of limited-term, but full-time positions, teaching huge numbers of first-year students and coordinating STAT 1060 and MATH 1000/1010, respectively. Ron retired in the Summer of 2012, and John has just retired, as reported later in these pages. I am confident that equally dedicated instructors can be appointed for the coming years.

My tenure as chair has seen numerous changes and improvements to the Chase Building; they have been reported in previous issues of this publication. These changes were all overseen by Gretchen Smith. Which brings me to the greatest change in the Department this past year: After 43 1/2 years with us, many of those years as Department Administrator, Gretchen retired in the Fall of 2012. A separate article about Gretchen and her retirement can be found later in this Report. Meanwhile, Gretchen's successor, Queena Crooker-Smith has been with us for just over half a year. Working with Queena has been just as pleasant as working with Gretchen had been before. In fact, I couldn't have survived in the chair's office for so long without the help, guidance and wisdom provided by Gretchen over the years, and now by Queena.

But it wasn't just these two who made my job so much easier than it might have been. I've been blessed with a fantastic office and support staff; so, thank you, Angela, Balagopal, Ellen, Maria, and Paula for all your help over the years, and for all the laughs in the office. On the academic side I would like to thank the Directors, Graduate Coordinators, Honours Coordinators, and Undergraduate Advisers for their hard work and attention to detail which kept everything running smoothly, and kept me out of trouble. And in general, I couldn't think of a better and more pleasant department to belong to, let alone to chair. Finally, special thanks to my only non-retired predecessor, Richard Nowakowski, who stepped in for half a year in 2009, allowing me to take a much-needed sabbatical leave. I also thank him for frequently dragging me out of the office for regular Chair Advisory Committee Meetings (which sounds better than going for a coffee at Timmy's).

I hope you will enjoy reading this year's Chase Report.

MATHEMATICS DIVISION
by Robert Milson

In 2012/13 the division of mathematics continued to enjoy strong student numbers across all program levels. To cite just one example, our second year honours courses, MATH 2135 and MATH 2505, saw enrolments of 39 and 31, respectively. Going back 5 years to the 2007/08 academic year, the numbers where 16 and 15 – an enrolment increase of more than 100%. It is comforting to know that in these times of cutbacks and fiscal constraints, the division's ability to deliver high-quality, cost-effective instruction is rising to new heights of achievement.

This year we are saying farewell to John Barger who is closing his 5+ year stint as instructor and calculus coordinator at the department. Post-retirement, John will continue to teach on a part-time basis, but I imagine his focus will shift more and more to winding roads and his fabulous BMW bike. John, your colleagues will miss you, the students will miss you, I will miss you.

A few weeks after the graduation ceremony the department will host the 2013 summer CMS conference. It's exciting to welcome back this flagship event after a 10 year absence. A number of the colleagues, post-docs and students in the department are organizing sessions and giving talks. The conference public lecture features Erik Demaine, a celebrated Dal alumnus, speaking on "Algorithms Meet Art, Puzzles, and Magic," on June 4 at the Scotiabank Auditorium, Saint Mary's University. Google "CMS 2013" for the conference schedule and registration information.

Yes, it's been another fine year for mathematics here at Dalhousie. Let's hope the positive trends continue, and that next year takes us to even greater heights of academic excellence, research achievement, and collegiate camaraderie.

STATISTICS DIVISION NEWS
by Hong Gu

Thanks to Chris Field for founding a new prize in statistics; Starting from 2013, the Field prize will be awarded to the top third-year statistics student.

Congratulations to Joanna Mills Flemming for being one of the co-winners of the 2013 Abdel El-Shaarawi Young Researcher's Award presented by The International Environmetrics Society (TIES). The TIES Awards Committee proposed the following citation for the award- For distinguished contributions to the development of novel statistical methodology to study marine biodiversity and sustainability, for passionate promotion of environmetrics by bridging the interdisciplinary gap between oceanography, marine biology and modern statistical science, and for excellence in interdisciplinary mentoring of a future generation of Environmetricians.

Since Ron Hilburn 's retirement on June 30, 2012, Ammar Sarhan has taken up an instructor position to cover his teaching load, and has contributed greatly to the success of this past academic year's teaching.

Starting from Sep. 2012, Prof. Fahimah Al-Awadhi from Kuwait University has been visiting our department. Her research expertise is in spatial temporal models for environmental data.

Welcome to Ximing Xu, who has joined our department in Sep. 2012 as a postdoctoral fellow, working with Chris Field.

Congratulations to Mahdi Shafiei, who was a postdoctoral fellow working with Joe Bielawski and Hong Gu, and was head-hunted by Samsung for the position of staff engineer at Samsung Research America, which he started in Aug. 2012.

Congratulations to all five PhD students, Stuart Carson, Philippe Fullsack, Li Li, Joey Mingrone and Jing Zhang for successfully passing their comprehensive exams in May 2012.

AWARDS DAY SPEAKER

This year's Awards Day Speaker is **Dean Tsaltas** who finished his honours B.Sc. in mathematics in 1994. After a brief stint working in Vancouver, Dean found himself back at Dalhousie doing graduate work in math and then taking under-graduate courses in C.S., before returning to Vancouver and kicking off a career in the software industry.

Dean worked at four startups during the dotcom boom—eventually landing at Compuware and then Microsoft in Seattle. He spent over a decade on the West Coast, and somewhere along the line he returned to graduate school and completed an M.Sc. with distinction in Software Engineering at the University of Oxford.

About 5 years ago, Dean returned to Halifax, first as a remote Microsoft employee and later moving to RIM, where he spent almost 4 years. Dean left RIM almost a year ago, and now owns Creative Logic Consulting and is Director of Product Development at Dadavan Systems Inc.

In addition, Dean is a founding partner at Quantum Research Analytics (QRA) – an exciting startup company using an adiabatic quantum computer to do verification and validation of flight control systems. Dean's fellow founders are both PhD's and both Dalhousie graduates – one from this department! Dean confesses that at QRA he sometimes feels like Howard Wolowitz (of "Big Bang" fame). Unfortunately, he says, he is not nearly as stylish as the "real" Mr. Wolowitz.

A NEW AWARD

As already mentioned in Hong Gu's report as Statistics Director, we are very pleased about the new award for Statistics students which has just been established, namely the *Field Prize in Statistics*. This annual award was made possible through a generous donation by Chris and Harriet Field. Our colleague Chris Field is a leading statistician who has received numerous honours throughout his career; for instance, the annual plenary Statistics lecture at the Science Atlantic Conference is named after him. We are now pleased to also have a student award bearing his name.

The inaugural recipient of this award is Kim Whoriskey, as already reported on the first page. Kim has just finished her third year in Statistics and Marine Biology, and she has an outstanding academic record. *-kd*

BOOM AND BUST

Last year I reported the stunning number of ten babies and one wedding under the heading "The Chase Family". And this year (that is, from May, 2012, to now): Nothing, zero, zilch! Aren't the mathematicians among us supposed to be good at multiplying? But before we get too worried, there is probably a statistical explanation for this. And more importantly: Rumour has it that at least one Chase baby is on its way. So, next year's family news will look better.*-kd*

GOOD FIBRATIONS

Some things are truly hard to believe. One of them is the fact that **Renzo Piccinini** has turned 80 on May 16th, exactly a week before publication of this Report. Far from slowing down, Renzo is as active as ever, travelling at a frightening pace, to Europe, South America, and within Canada, as well as writing and editing. In fact, his latest book, entitled "Fibrations and their Classification" (with Petar Pavešić) was just published; a copy is displayed in one of the 2nd floor book display cases. Speaking of fibrations: The list of talks at the end of this report shows that Renzo gave talks on this topic in three different countries and in three different languages, namely Italian, Portuguese, and English.

It has also come to our attention that Renzo has been moving in high circles in Europe: He recently met the Austrian prime minister, and he has known the father of the new Italian prime minister for a long time. Closer to home, in addition to his other pursuits, Renzo has been a very active Book Reviews Editor for the Canadian Mathematical Society, the same society of which he was President a few decades earlier.

Renzo Piccinini was born in the state of São Paulo in Brazil, and did his undergraduate studies at the University of São Paulo. He then received his M.A. at Harvard, and his Ph.D. at the University of Wisconsin, Madison. After an Instructor position in Wisconsin and positions as Associate Professor and then Professor in Brasília and São Paulo, Renzo spent almost 20 years at MUN, until 1991. His final position was that of "Professore Ordinario" at the Università di Milano-Biocca in Milano, Italy. Renzo held many visiting positions during his career, but we are fortunate that since 1997 he has made Halifax more and more his home, and that for many years now he has been a member of our department.

Happy Birthday, Renzo, and many happy returns! *-kd*

POSTDOCTORAL FELLOWS

Caroline Cochran did her undergraduate studies at Mount Allison University, before coming to Dalhousie for her graduate work. In the Summer of 2011 she finished her Ph.D. under the supervision of Roman Smirnov. Since September of 2012 she has held a partial postdoctoral fellowship, continuing her work with Roman Smirnov. Her research is in the area of invariant classification of orthogonal coordinate webs defined in spaces of constant curvature.

Alex Green received his B.Sc. at the University of Nottingham in the UK, where he also finished his Ph.D. in Computer Science in 2010. After working as a software engineer in the private sector, he joined this department in late 2011 to collaborate with Peter Selinger on research contract work in quantum computing. His research interests include quantum programming languages and related topics.

Rogers Mathew joined this department in the Summer of 2012 as the "AARMS Director's PDF", to work with Jeannette Janssen. Rogers received his B.Tech degree in Computer Science at the University of Kerala, and his M.E. in Computer Science at the IIT Bangalore, where he also finished his Ph.D. in 2012. His research interests are in graph theory, graph algorithms and combinatorics, with special focus on geometric graph theory.

Douglas Stones did his undergraduate studies at Monash University in Melbourne, Australia, where he also received his Ph.D. in 2009 with a thesis on Latin squares and rectangles. After a postdoctoral position at Nankai University in China and an Assistant Lecturer position at Monash University, Doug joined our department in January of 2013, to work with Jeannette Janssen. Apart from his continued interest in his thesis topic and in computational number theory, his research interests include complex networks.

Francis Valiquette spent the past two years with us as an AARMS postdoctoral fellow, working with Rob Milson. Francis received his undergraduate degree in Mathematics and Physics from the Université de Montréal. He did his graduate work at the University of Minnesota, receiving his PhD in 2009 under the supervision of Peter Olver. His research is in mathematical physics and the geometry of differential equations. Francis spent the next two years at McGill University as an NSERC post-doc where he pursued research in infinite-dimensional transformation groups. Francis will leave us later this summer to take up a tenure-track position at SUNY New Paltz.

Huaichun Wang received his Ph.D. in Biology at the University of Ottawa in 2005, and is a Postdoctoral Fellow funded by the Center for Comparative Genomics and Evolutionary Bioinformatics. His research interests include Molecular Evolution and Bioinformatics, and he has worked with Ed Susko and Andrew Roger of the Department of Biochemistry and Molecular Biology on statistical modelling of protein sequence evolution.

Ximing Xu received his B.Sc. in Mathematics at Nankai University in Tianjin, China, and his M.Sc. at the University of Ottawa. He then did his Ph.D. in Statistics at the University of Toronto under the supervision of Nancy Reid. After graduating in the Summer of 2012 he joined our department to work with Chris Field. His research interests include composite likelihood inference and comparative genomics.

VISITORS

In addition to our postdoctoral fellows, research visitors also contribute to the department's overall research climate. This year we've had several medium- to long-term visitors from at least eight different countries.

Fahimah Al-Awadhi is an Associate Professor at Kuwait University, and is the Head of the Statistics and Operations Research Department there. She received her Ph.D. at the University of Bath in England. She has spent the past academic year with us as a guest of Hong Gu; she is also engaged in joint research with Ammar Sarhan.

Iain Brown (Oslo), **Tim Clifton** (Oxford) and **Ernesto Nungesser** (Stockholm) were here at different times for medium-term visits, to work with Alan Coley.

Karen Chandler spent the year with us as a visiting scholar. She actually received her honours B.Sc. with us, and later received her Ph.D. in algebraic geometry from Harvard University. She has recently worked with Sara Faridi, and has also been a regular participant of the legendary Tuesday Lunch.

Henri Chataing of the École Polytechnique in Palaiseau, France, is working with Peter Selinger as an intern from April 15 to August 16, 2013. A second intern working with Peter is **Baranidharan Mohan** (IIT Delhi), who is be here from May 20 to July 27, 2013.

John Cosgrave, an annual visitor from Dublin, Ireland, spent 3 weeks with us in October and November, 2012. He worked with Karl Dilcher on problems in elementary and computational number theory, especially "Gauss factorials" and congruences of sums of reciprocals.

David Gomez-Ullate of Complutense University in Madrid, Spain, visited the department on April 14-24, 2013, to work with Rob Milson.

Tatiana Hessami Pilehrood and **Khodabakhsh Hessami Pilehrood** are longer-term visitors to our department. They both received their Ph.D. degrees at Moscow State University, and later taught at Shahrekord University in Iran. Both Tatiana and Khodabakhsh are number theorist, working with Karl Dilcher. Tatiana has also been teaching for us on a part-time basis.

Aaron MacNeil is actually a Dalhousie graduate with a B.Sc. in Marine Biology (2001). He received his Ph.D. in that field from the University of Newcastle upon Tyne (UK) in 2007, and now holds positions with the Australian Institute of Marine Science and the Bedford Institute of Oceanography. Here in our department he works with Chris Field and Joanna Mills Flemming.

ALUMNI NEWS

A number of alumni are mentioned in separate articles. Here are some brief news about other alumni.

Adam Clay (B.Sc. Hon., 2003) finished his Ph.D. in 2010 at UBC under Dale Rolfsen. He then held a 2-year NSERC PDF, and since the Fall of 2012 he has been a CIRGET postdoctoral fellow, both at UQAM, working with Stephen Boyer. Just 2 days before publication of this Report, on May 21st, Adam gave a Colloquium talk here, during a mainly private visit to Halifax.

Shannon Ezzat (B.Sc. Hon., 2005) received his Ph.D. from the University of Canterbury in Christchurch, New Zealand, in 2012, after having lived through the devastating 2011 Christchurch earthquake. After graduating he returned to his native Cape Breton, where he has been teaching at CBU. An article about his other pursuits, including music, can be found at http://www.whatsgoinon.ca/2013/04/dr-shannon-ezzat-shares-his-unique-perspective-on-math-and-community-at-ideas-powered-by-passion-april-23/ Shannon also gave a Colloquium talk in our department this past year, on October 29, 2012.

Paul Sheridan (B.Sc. Hon., 2003, M.Sc. 2007) received his Ph.D. in Statistics a couple of years ago at the prestigious Tokyo Institute of Technology. He is now finishing up a PDF in bioinformatics, still in Japan, and looks forward to returning to Canada some time soon.

Robert van den Hoogen, who received his Ph.D. with Alan Coley in 1995, has been Dean of Science at StFX for a couple of years now. At the time of the CMS Meeting this June, Robert will begin a two-year term as VP Atlantic of the CMS. Rob is also a frequent visitor to this department, working with Alan Coley.

Jin Yue (PhD Mathematics, 2005, MSc, Statistics, 2008) received the 2013 Faculty Award for Teaching Excellence in the Faculty of Agriculture. See
http://www.dal.ca/faculty/agriculture/news-events/news/2013/05/07/faculty_awards_presented.html.
This is the first such award in the new Dalhousie Faculty of Agriculture, previously the Truro Agricultural College. The award recognizes Jin's dedication to the improvement of teaching and learning in the Mathematics program. Well done, Jin.

George Yuan (PhD, Mathematics, 1993, MSc, Statistics, 1997) has recently moved from his position as Director of Deloitte China to take up a position as full professor in the
Department of Mathematics at Tongji University in Shanghai. George's research focuses on mathematical finance and financial engineering.

Jihua Wu (PhD, Statistics, 2010) has recently taken a position as Biometrician at
Merck Pharmaceuticals in Beijing.

Wei Chen (Msc, Statistics, 2012) has been appointed as a research assistant in the Department of Oceanography. Wei Chen is working as part of an ocean modeling group under the supervision of Prof. Jinyu Shen.

AWARDS RECEIVED BY ALUMNI

About a year ago already **Erik Demaine** and **Nigel Higson** were honoured as "Outstanding Students" at the 50th Anniversary Celebration of Science Atlantic (formerly APICS) in 2012. Erik received his B.Sc. in Computer Science in our department in 1995 at a very young age. He later finished his Ph.D. in Waterloo and is now professor at MIT. Among numerous honours, he received an honorary doctorate from Dalhousie in 2007.

Nigel Higson finished his honours degree in 1982 and his Ph.D., under the supervision of Peter Fillmore, in 1985. Nigel has been at Penn State University for most of his career, and holds the position of Evan Pugh Professor of Mathematics there. He too received many honours, most notably among them his election as Fellow of the Royal Society of Canada in 2000.

A more recent graduate is **Jin Yue** who, on May 3, 2013, was awarded the Dalhousie University Faculty of Agriculture 2013 Award for Teaching Excellence. Jin received his Ph.D. in mathematics in 2005 under the supervision of Roman Smirnov, and an M.Sc. in Statistics in 2008, supervised by Bruce Smith. Jin has taught for several years now at the Nova Scotia Agricultural College in Truro, which last year became a faculty of Dalhousie.

Congratulations to Erik, Nigel and Jin on their awards.-*kd*

AN INTERNATIONAL AWARD

I am happy to report that one of our faculty members also received an award.

Joanna Mills Flemming is one of the co-winners of the 2013 Abdel El-Shaarawi Young Researcher's Award presented by The International Environmetrics Society (TIES). The citation for the award reads:

"For distinguished contributions to the development of novel statistical methodology to study marine biodiversity and sustainability, for passionate promotion of environmetrics by bridging the interdisciplinary gap between oceanography, marine biology and modern statistical science, and for excellence in interdisciplinary mentoring of a future generation of Environmetricians."

The award will be presented at the Annual TIES Conference this June in Anchorage, Alaska. Congratulations, Joanna!-*kd*

TIMES AND TIMES AGAIN

While most of us are happy to be mentioned in the Chase Report, and even happier not to be mentioned in Frank Magazine, two of our alumni made it into the New York Times and the Japan Times, respectively.

Already in last year's Chase Report I mentioned **Daniel Burns**, who received his B.Sc. in Mathematics with us in the mid-1990s. The Globe & Mail considered him "The best Canadian chef you've never heard of". Now, in the "Off the Menu" feature in the New York Times of March 5, 2013, his new venture in New York City is mentioned:

"TORST - The name means thirst in Danish. And to slake that thirst, Daniel Burns, a chef who headed the research and test kitchen at Momofuku, has created a beer bar with Scandinavian and other European brews, including some exclusive ones. It's stage one; later this year, a dining room, Luksus, will be added, with 26 seats for a tasting menu each night: 615 Manhattan Avenue, Greenpoint, Brooklyn, (718) 389-6034, torstnyc.com."

For more details, and a great photo with Daniel, see the food blog http://ny.eater.com/archives/2013/03/torst_interview_march_2013.php

While the New York Times needs no introduction, the Japan Times is a leading English-language newspaper published in Japan. In the November 25, 2012, issue of this paper there is a long article about **Richard Hoshino** (Ph.D. 2008), entitled "Canadian scientist uses math to green Japanese baseball". Now, I don't know the first thing (or the second) about baseball, but I do know it is huge in Japan, rivalled perhaps only by Sumo wrestling. Therefore baseball involves a large amount of travel. To quote from the article:

"Using mathematical techniques (nearly unfathomable to this writer), Hoshino and his research supervisor, Ken-ichi Kawarabayashi, at the National Institute of Informatics, have developed a distance-optimal schedule for Nippon Professional Baseball that takes into consideration many of the leagues constraints, while reducing total travel distance by 25 percent, or about 70,000 km."

There is much more to this story, though, and the full article can be found at http://www.japantimes.co.jp/life/2012/11/25/life/canadian-scientist-uses-math-to-green-japanese-baseball/
Richard, by the way, was already mentioned in last year's Chase Report. He has been a faculty member at Quest University in Squamish, B.C., since earlier this year.-*kd*

MATH AND MUSIC

The connection between Math and Music has been well documented, among other places in past issues of the Chase Report. I am now happy to report that **Julia Tufts**, who works on a combined honours degree in Mathematics and Music, was the 2012 winner of the Nova Scotia Youth Orchestra's Concerto Competition. This accomplishment earned Julia the spot as piano soloist at the Season Finale Concerts of this high-level youth orchestra. These concerts took place on April 27 and 28 in Wolfville and in Halifax, respectively. Julia's wonderful performance of Beethoven's Concerto #3 for Piano and Orchestra was witnessed by several department members. For more information, see the Dal News article about Julia at http://www.dal.ca/news/2013/04/26/ending-the-year-on-a-high-note.html

MORE MATH AND MUSIC

Jason Brown continues to have a high profile in the public at large, and it seems to be expanding geographically. On September 3, 2012, Germany's largest and most prestigious weekly news magazine, Der Spiegel, published a feature article about Jason and his research related to the Beatles, entitled "All You Need Is Math". The title is a bit misleading because the article is actually in German, and begins with, "Ein kanadischer Professor analysiert die Musik der Beatles. Seine Bilanz: John, Paul, George und Ringo waren mathematische Genies." For the full article, see

http://www.spiegel.de/spiegel/print/d-87997207.html
Later, on February 15, 2013, Japanese public television, NHK, broadcast an interview with Jason, dubbed into Japanese. (Here I'll refrain from quoting the first sentence).

Closer to home, The Coast of August 30, 2012, featured Jason as one of five local professors who've made a splash outside of the classroom; see http://www.thecoast.ca/halifax/kind-of-a-big-deal/Content?oid=3331335
Both the above links have really nice pictures too. Finally, Jason continues to publish monthly columns in the Chronicle Herald, now in its fourth year; they can all be found at http://www.mathstat.dal.ca/community.html -*kd*

BACK FROM THE DARK SIDE

For someone supposedly "on the dark side" for years now, **Keith Taylor** has always been remarkably enlightened. Throughout his five years as Dean of Science (2004-2009) and four years as Associate VP Academic (with changing responsibilities) he has kept close contact with our (his!) department, taught an analysis course most of those years, supervised graduate students, served on supervisory committees, and managed to do research. In fact, as far as research is concerned, this past Winter term was an excellent one for Keith: First his book "Induced representations of locally compact groups", with Eberhard Kaniuth of Paderborn, Germany, appeared in the prestigious "Cambridge Tracts in Mathematics"; a copy can be seen in one of our book display cases on the second floor. Then, soon afterward Keith was awarded a new 5-year NSERC Discovery grant.

Keith was born and raised in Nova Scotia and did his undergraduate studies at StFX, not far from where he grew up, and where he still has family. He then received his Ph.D. at the U. of Alberta with Tony Lau, and spent most of his career at the U. of Saskatchewan. He has long been a friend of our department, and known by many, especially since he spent a sabbatical year here in 1983/84. When Keith returned to Nova Scotia as our Dean of Science, he once said that he considered this the best job in the Province. His next job at Dalhousie

required a great deal of travel, most notably to China, where he has been instrumental in fostering close relationships with universities there, including a very successful "2+2" agreement with the Shandong University of Finance and Economics, soon to be expanded to also include our Department in addition to Dalhousie's Department of Economics.

In just a few weeks, on June 30th, Keith's term as AVP will end, and he can enjoy an extended period of accumulated administrative leave. Throughout his leave he will continue to serve the mathematical community, as CMS President for another year – longer yet as member of the executive; as co-editor of the CMS book series; and as graduate supervisor and member of supervisory committees. We look forward to having all of Keith back after his leave. There will be a reception in Keith's honour on Thursday, May 30th, at 3 pm in the Foyer of the Henry Hicks Building. -*kd*

THE HIDDEN TRUTH

Something I will miss about being chair are the occasional real surprises. Surprises of the positive kind, that is (I won't miss the other kind). Some time in February I received, out of the blue, a phone call from Norway. It was from a Petter Amundsen, an organist by profession, who had done very extensive research into an old edition of plays by Shakespeare, with numerous connections to other areas including Astronomy, the Rosicrucians, and Oak Island, which is the connection with Nova Scotia. Petter Amundsen was looking for an opportunity to present in an academic setting his ideas and theories which also include some mathematics, statistics and classical cryptography. We were happy to provide this opportunity, and so he gave a 90-minute presentation in the afternoon of April 11, 2013. During this presentation in our Colloquium Room, which was very well attended by department members and members from the community, Mr. Amundsen also showed excerpts from a feature-length documentary that had been made the previous year and had its North American premiere the following day in the Chester Playhouse (with another showing also at the Museum of Natural History here in Halifax). The
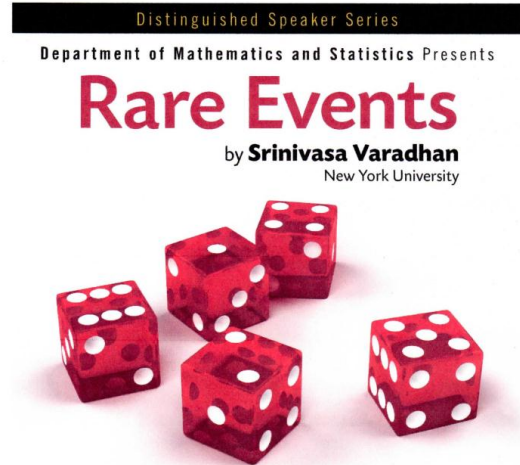
documentary is called "Shakespeare: the Hidden Truth"; more information can be found at
http://shakespearethehiddentruth.com
Both the producer and the director of this documentary were also present at the event in our Colloquium Room. It remains to be seen whether Mr. Amundsen's intriguing ideas will lead to any discoveries on Oak Island.-*kd*

DISTINGUISHED SPEAKER SERIES

This past year's lecture in our department's Distinguished Speaker Series took place on October 11th, 2012, in the Kenneth Rowe Building. The speaker, Srinivasa Varadhan, is a distinguished Indian-American mathematician who made fundamental contributions to probability theory. The title of his lecture was "Rare Events".

Professor Varadhan is the recipient of numerous awards and honours, among them the US National Medal of Science, the Abel Prize, Padma Bhushan (Govt. of India), the Leroy P. Steele Prize (American Mathematical Society), the G.D.Birkhoff Prize (AMS and SIAM), and the Margaret and Herman Sokol Award. He is also the recipient of Honorary Degrees from Université Pierre et Marie Curie, Paris, the Indian Statistical Institute Kolkata, and the Chennai Mathematical Institute in Chennai, India. He is a Fellow of the Royal Society of London, the National Academy of Sciences, the American Society of Arts and Sciences, the Institute of Mathematical Statistics, the Indian National Academy of Sciences, and the Hungarian Academy of Sciences. Since 1963, he has worked at the Courant Institute of Mathematical Sciences at New York University.

The day after his public lecture, Professor Varadhan also gave a colloquium talk in our department, entitled "Random graphs". As usual, a great deal of preparation for the public lecture and for the reception that followed was done by Gretchen Smith and R.P. Gupta.-*kd*

Distinguished Speaker Series
Department of Mathematics and Statistics Presents
Rare Events
by **Srinivasa Varadhan**
New York University

3.14 MINUTES OF FAME

Actually, it was more like 2 minutes and 5 seconds. For several years now, our Graduate Student Society has marked Pi-Day (March 14) by serving pie (what else?) starting at 1:59 and 26 seconds. But this year was a bit different. An innocent remark made by the department chair was overheard by the Faculty's Communications Officer who did what she is paid to do and alerted CBC TV. Before we knew it, Colleen Jones and a camera operator visited upon us, and the result can be found at
http://www.cbc.ca/news/canada/nova-scotia/story/2013/03/14/ns-pi-day.html
It was all great fun: Karyn recited the first 100 digits of pi from memory, Svenja gave a definition of pi, Joey explained the correct pronunciation of pee, and Stu sported his off-colour pi-shirt. Plus lots of pie and good company.

Thanks to Svenja Huntemann and her helpers for organizing this great event.-*kd*

Alain Gamache, Mikaela DeBoer and
Justine Gauthier (Photo: Svenja Huntemann).

THE END OF AN ERA

The Banner over the entrance to the Student
Resource Centre, also known as the Learning
Centre, read "Gretchen's Room" in large colourful
letters when the department officially said "Thank
You" to Gretchen Smith in the afternoon of October
23, 2012. That room has never been seen so
crowded before or after. In addition to virtually (and
really) the whole department, there were many
guests from other units, as well as a good number of
alumni and friends of the department and of
Gretchen's.

Gretchen Smith started her long career with our
department on June 2nd, 1969, as a young
secretary; she had been recommended to the then
Department Head, the late Arnold Tingley, by the
department's librarian, the late Mrs. Marginson.
Gretchen later became Department Administrator,
and as such oversaw every aspect of the
Department's operation, with the exception of
academic matters. The last several of Gretchen's 43
1/2 years with this department saw some very large
projects, such as large-scale renovations of the
Chase Building's exterior, done in at least three
stages and involving new windows throughout the
building. Or the first complete renovation of the
interior since we moved into the building in 1985.
But perhaps Gretchen's most visible achievement is
the Student Resource Centre, every detail of which

was planned and overseen by Gretchen, or with her
input.

It is impossible to do justice to the full extent of
Gretchen's achievements and the influence she had
on creating and maintaining such a positive
atmosphere in the department. But it must still be
mentioned that in recognition of her service to
students she was awarded the Rosemary Gill Award
on two separate occasions.

Gretchen continues to be a regular visitor to the
department, and she has become a regular
participant of the legendary "Tuesday Lunch". She
keeps her old e-mail address
(gretchen@mathstat.dal.ca) and would love to hear
from friends and alumni. *-kd*

THE WIZARD RETIRES

His beard is as big as his heart, and he has taught
many thousands of students over the last few years,
possibly more than anyone else in the department.
It was a sad sight to see **John Barger** move out of
his office which, although sparsely decorated, was
so unique that it defies the description by mere
mortals. His students called him "The Wizard",
mainly for his beard, but he must have been a
wizard in the classroom. The students loved him,
although he confessed to being a "fascist" when it
comes to keeping the classroom quiet. But perhaps
this was part of his success. Respect in teaching is
mutual, and John had a great deal of respect for his
students.

John received his B.Sc. at Pace University in
downtown Manhattan in 1970, having been a
student at a very interesting time in academia and in
New York City. He continued his education in
Connecticut and here at Dalhousie, where he first
received a B.Ed. in 1978, and then an M.A. in
Mathematics in 1982. Between 1981 and 2007 he
taught numerous courses in our department on a
part-time basis, apart from 2003-2004 when he was
a full-time lecturer. He also taught for many years
in Dalhousie's Business School, and in different
units at St. Mary's. By 2007 he had taught a total of
about 100 finance and mathematics courses.

Finally, in September of 2007 John became a full-time Instructor in our department, teaching two first-year calculus sections each term and coordinating MATH 1000/1010 most of those years. In addition, John taught a second-year course in each of those terms.

Although retiring from this Instructor position, John will not completely disappear: He is likely to continue teaching calculus on a part-time basis, while having more time to travel with his wife Jean – I hear that India is waiting for John and Jean, and so is a BMW motorbike which is in storage in Heidelberg, Germany. Happy travels, John, and thanks for all you've done for the department. *-kd*

IN MEMORIAM

We join family and friends in mourning the loss of two valued members of our department community.

Arthur Edward (Art) Sedgwick died of a sudden heart attack on July 5, 2012, while vacationing with his family in Vermont. He was 66, and had retired from his position in the C.S. Faculty just 18 months earlier. Art is survived by Jane, his wife of nearly 44 years, by their three children and their spouses, seven grandchildren and extended family. Art was born and grew up in North Toronto and received a Ph.D. in numerical analysis from the U of T, before becoming a member of our department in 1978. Although Art left the Chase Building around 1997 when the Faculty of Computer Science was created, he kept in touch; especially during his all too short retirement he was a regular visitor to our colloquia and various seminars. Art loved teaching, and for his exemplary service Science Atlantic (formerly APICS) honoured him with a distinguished service award and named the annual C.S. lecture after him. Art is also known as a passionate singer and member of several high-level choral ensembles, including the Dalhousie Chorale and Nova Voce.

Gillian Wood was another member of our community who died much too young, at age 64 on January 22, 2013. Gillian is survived by her husband, our colleague Richard Wood, and four children and two grandchildren. She was born in Winnipeg, and moved to Halifax in 1969. After completing a graduate degree in Economics, Gillian

worked for the Government of Nova Scotia and then for a corporate communications firm, before becoming Assistant Vice President, Government Relations, at Dalhousie. During her more than 8 years in this position she played an important role in helping Dalhousie achieve its goals during a critical period of growth. In 2012 the Government Relations Officers' Network of Canadian Universities established the "Gillian Wood Award" and in December Gillian herself was honoured as the inaugural recipient of the award. Later she also received the QE II Diamond Jubilee Medal for her contributions to the public good of our community. *-kd*

ONE YEAR – TWO CAUSES

2013 may not be a prime number, but it's a prime year for our two disciplines. It's the **International Year of Statistics** and the year of **Mathematics of Planet Earth**. Our Department has some involvement with both these wide international initiatives.

INTERNATIONAL YEAR OF STATISTICS

With the federal government's increasing disregard and disrespect for Statistics and Statisticians, this international initiative comes just at the right time for Canada, with its numerous resources and activities to raise public awareness for the importance of Statistics. Please see http://www.statistics2013.org

Related to this, I'm happy to point to an interview with **Hong Gu** and **Chris Field** in Arbitrage Magazine, Canada's first, and the world's largest, student-driven business magazine. The article is entitled "Statistics are an integral part of our every day life". It begins with Hong Gu saying, "I couldn't imagine a world without statistics", and ends with Chris Field quoting the eminent statistician John Tukey: "As a statistician, I can play in everyone's backyard." For everything in between, please see the full interview at http://www.arbitragemagazine.com/general/statistics-change-lives/

Another, even stronger, connection between our department and the International Year of Statistics is one of the official posters which in 21 "bubbles" points to contributions of statistics to society worldwide. One of those bubbles points straight to Halifax and says, "Scientists use state-space models to understand marine animal movements." This is the "Ocean Tracking Network" in which **Joanna Mills Flemming** and **Keith Thompson** are involved, as as well as **Stuart Carson**, a Ph.D. student under Joanna's supervision. Further details about the OTN can be found on p. 13 of last year's Chase Report.

MATHEMATICS OF PLANET EARTH

This international initiative was the brainchild of Canadian mathematician Christiane Rousseau (Univ. de Montréal). According to this initiative's website, "More than 100 scientific societies, universities, research institutes, and organizations all over the world have banded together to dedicate 2013 as a special year for the Mathematics of Planet Earth.

"Our planet is the setting for dynamic processes of all sorts, including the geophysical processes in the mantle, the continents, and the oceans, the atmospheric processes that determine our weather and climates, the biological processes involving living species and their interactions, and the human processes of finance, agriculture, water, transportation, and energy. The challenges facing our planet and our civilization are multidisciplinary and multifaceted, and the mathematical sciences play a central role in the scientific effort to understand and to deal with these challenges." For more information, see http://mpe2013.org.

One of the 100 partners mentioned above is AARMS (http://www.aarms.math.ca/) whose administrative office is at Dalhousie, and whose Director is **Jeannette Janssen**; see the AARMS article in this Chase Report. As part of a sequence of public lectures related to MPE-2013, AARMS in collaboration with the CMS will be hosting a lecture of Mary Lou Zeeman of Bowdoin College, with the title "Harnessing Math to Understand Tipping Points." This lecture will take place here in Halifax on Sept. 27, 2013.-*kd*

DALHOUSIE UNDERGRADUATE MATHEMATICS AND STATISTICS SOCIETY (DUMASS) REPORT

2012/2013 Council members:
President: Dario Brooks
Vice President: Nathan Musoke
Treasurer: Olivia Roberts
Secretary: Manisha Bali
Communications Officer: Rene Madden
DSS Representative: Thomas Crowell

The 2012/2013 year was an enjoyable and successful one for the Dalhousie Undergraduate Mathematics and Statistics Society. Comprised of undergraduate students in Mathematics and Statistics degrees, our executives volunteer many hours of their busy schedules to ensure the mathematics department is represented well across the university, and to help students in mathematical science programs have a fun and welcoming experience on the Dalhousie campus.

The society started off the year right with a welcome back barbeque which saw a great turnout of both faculty and students from many departments. Throughout the year, students were encouraged to meet fellow mathematicians-in-training outside of the classroom during movie and games nights taking place every few weeks. Also, the Annual Mathematics and Statistics Wine and Cheese event, taking place in early March this year, was an amazing time and saw one of its most diverse attendances of students across a number of disciplines in the Dalhousie community. As always, the December and April Math and Stats first year tutorials were a great success.

The executive would like to congratulate all those students who are graduating this year and wish them all the best in their future ventures. We would also like to thank all those who made an appearance at our events this past year and hope we will see all of you and your colleagues again this upcoming year.

Welcome and best of luck to the new executive for the 2013/2014 year (welcome back, to some):
President: Dario Brooks
Vice President: Nathan Musoke
Treasurer: John Mullins
Secretary: Julia Tufts
Communications Officer: Manisha Bali
DSS Representatives: Thomas Crowell and Ben Potter

MATH CIRCLES
by Karyn McLellan

As the university year draws to a close, NS Math Circles remains busy with mathematics outreach! This year has been an even greater success than last, as we continue to increase the number of students we've presented to, and visit more new schools throughout the province.

For the 2012-2013 academic year, the program has been run by director Danielle Cox and assistant director Karyn McLellan. We started the year off strong with a trip to Tri-County School Board, assisted by Hoda Chuangpishit and Leigh Herman. Over 400 students in Digby (including an adult high school class), Yarmouth, Lockeport and Barrington were visited, and the team even made the long trip (including a ferry ride) to Islands Consolidated School!

Throughout the year we've visited over 300 more students on day trips assisted by Abdullah Al-Shaghay, Julien Ross and Svenja Huntemann to schools in Annapolis West, Canso, Brookfield and Oxford (where we got to visit the giant blueberry!), among others. We also had the opportunity to visit with several ESL classes here at Dalhousie as well as some local home school classes, and a meeting with a high school math teacher and a provincial math consultant proved particularly fruitful. Our team is looking forward to a trip to the Strait Regional School Board this May, where we will visit several schools for the first time!

Our monthly local events brought in record numbers of students as well! Special thanks goes out to Dalhousie professors Jason Brown for giving his rockin' "A Hard Day's Math" talk, Dorette Pronk for opening our eyes to some new geometry, Karl Dilcher for making logarithms and slide rules exciting, and Richard Nowakowski for giving us some new games to play!

Math Circles has also been busy attending conferences! The annual Science and Math Teachers Conferences have been great places to network; many new teachers were introduced to the program and a talk was given at the Math Teachers Conference regarding our outreach activities. We have also branched out to junior high schools by

developing a new problem solving presentation, and in conjunction with the Education Session at the CMS meeting, a Junior High Outreach day will be held in the Chase Building in June. Also the 4th annual Discover Math Days will take place in May!

As our funding from the Imperial Oil Foundation comes to an end, with the help of the Development Office at Dalhousie we are actively searching for new funding opportunities so that we can continue to offer our fun outreach activities across the province, free of charge.

Thanks again to everyone who helped make this year a great success! Keep up to date with our events at www.nsmathcircles.com and on our Facebook page. We even have a Twitter account now! @NSMathCircles

NS MATH LEAGUE
by Danielle Cox

The NS Math League finals were held on April 27th, 2013 in the Learning Centre of the Chase Building. There were 16 teams in attendance from across the province. C.P. Allan took the top prize, beating last years winners, Kings Edgehill by 1 point! Special thanks goes to John Irving at SMU for organizing the contests, along with the volunteers, Andrew Hare from SMU, Richard Nowakowski, Abdullah Al-Shaghay and Matthew Stephen.

KANGAROO JUMPS

In addition to other competitions, such as the Putnam (for undergraduates) and the Math League mentioned above, our Department has also been affiliated with two relative newcomers on the competition scene.

The **Math Kangaroo Contest** is an international contest with national chapters, and the competition administered in various locations across the country. Currently 15 cities from Newfoundland to BC are involved, and here in Halifax the contest is organized and administered by Lois Murray of the Department of Microbiology and Immunology. This year's contest was held on March 24th in various rooms here in the Chase Building; we were happy to make our Learning Centre, Colloquium Room and Seminar Room available for this worthwhile endeavour. The awards ceremony will be held a little later on the same day as our departmental awards ceremony, namely May 23rd. This year 52 students, from grades 1 to 12, wrote the contest, which was a substantial jump from the 37 students who participated the year before. We thank Lois for choosing the Chase Building as the competition and awards venue, and look forward to further collaboration. For further information about the Canadian Math Kangaroo Contest, see http://kangaroo.math.ca/

Another competition, mainly for high school students, is the *Canadian Open Mathematics Challenge*. This contest, which is something like a "feeder competition" for the (invitational) Canadian Mathematical Olympiad, is administered by the CMS. Last year our department joined as an institutional partner under the leadership of Richard Nowakowski. In particular, after the competition was written in schools throughout the country, Richard organized the grading effort for a number of exam papers (roughly 100) which corresponded to the number of participants in Nova Scotia. Several faculty and graduate student helped with the grading, which was done via a novel on-line system. For more information on the COMC, see http://cms.math.ca/Competitions/COMC/2012/

Finally, a few words of caution about contests can be found in an article I recently wrote for the CMS Notes, "The pros and cons of contests"; see

UNDERGRADUATE MATH CONFERENCE

For many years now, undergraduate students from this department have attended the annual Canadian Undergraduate Mathematics Conference. The 2012 conference took place at UBC Okanagan in Kelowna, BC, and the Dalhousie team consisted of three of our honours students who all gave talks, mainly on their summer research. The participants were **Abdullah Al-Shaghay** ("An Irreducibility Criterion of A. Cohn"), **Jimmy Hsu** ("The convergence criteria of the Bayesian Monte Carlo simulation on the quantification of the number of fluorophores in a cell"), and **Julia Tufts** ("Domination Polynomials of Graphs and Their Roots"). Although at that time representing a different university, **Svenja Huntemann** also participated, with a talk entitled "On MDS Codes, the Main Conjecture, and the Partition Weight Enumerator". There was actually even more Dalhousie participation: Among the plenary speakers were **Heinz Bauschke** who was a graduate student here around 1990/91, and now holds a CRC Chair at UBC Okanagan. Our student participants received travel funds through generous donations to Dalhousie's annual fund. For more details, including abstracts of the student talks, see http://cumc.math.ca/2012/

This year's CUMC will take place at the Université de Montréal, July 10-14, 2013. Once again, a number of undergraduate students will attend this conference, again largely funded by the department through donations. See http://cumc.math.ca/2013/
-kd

MATH CAMP FOR BLACK STUDENTS
by R.P. Gupta

The Dal-BEA Math camp for Black Students was held July 15-20, 2012. The camp is organized by the Department of Mathematics and Statistics and the Black Educators Association of Nova Scotia. Thirty students, selected from schools all over N.S., attended the camp. Of the thirty campers twenty were female and ten male. The aim of the camp is to generate interest in mathematics, statistics and computer science so these students can pursue further studies in these subjects.

On Sunday, July 15, 2012, parents brought the campers to Howe Hall, where registration and a reception are held. The campers and their parents were told about the expectation and responsibilities. They stayed in Howe Hall under the supervision of four chaperones-D'Arcy Higgins, Nakie Davies, Jasmine Hudson and Kabu Davies. Mornings and two afternoons were devoted to the academic teaching. The instructors were: Mr. Gerry Clarke, Dr. Chelluri Sastri, Mr. Preman Edward and Mr. Leigh Herman. On Monday afternoon the campers visited the museum, and in the evening a career night presentation was made by Mr. Jason Vallincourt (CEO of Bin Doctors). He discussed the importance of education and the vital role mathematics plays in the business world. The students were very focused, and engaged and the Q&A session was amazing. On Tuesday and Wednesday, they visited the Department of National Defence. There was a presentation made by LCdr Dunkley of the St. John's ship. He explained the importance of mathematics on the job and in our daily lives. The tour of the ship (St. John's) was informative, the tour guide demonstrated how mathematics and science are used to operate the ship. The students were given a tour of the Captain's Center, control center and engine room. On Wednesday night the students went to the Black Cultural Center where Mr. Henry Bishop (Curator) gave a lesson on the history of African Nova Scotians. On Thursday night, the students were given a tour of the Discovery Center where they engaged in several activities of science experiments. We express sincere thanks to Mr. Chris Rozee to permit campers to use the Biology department's computer lab.

From 3:30 - 4:30 p.m. they had a relaxed time at Dalplex where they were engaged in volleyball, swimming and other sports. The Camp was organied under the directorship of Professor R.P.Gupta and Mr. Alex Bizzeth of BEA. It was financially supported by the Pesident's office of Dalhousie University, Black Educators Association and the Canadian Mathematics Society.

DALHOUSIE CMS MATH CAMP
July 8-13, 2012
by Roman Smirnov

Last year the Department of Mathematics and Statistics at Dalhousie University as usual hosted two math summer camps for high school students, namely the BEA and Dalhousie-CMS math camps, whose goals were to identify, stimulate and encourage mathematical talent among Nova Scotia high school students. The Dal-CMS math camp was jointly sponsored by Dalhousie University and the Canadian Mathematical Society (CMS). It consisted of lectures and problem-solving sessions conducted by Faculty members from Dalhousie and Saint Mary's Universities and also included extracurricular activities.

The camp was organised by Sastri Chelluri, Suraj Sikka and Roman Smirnov. The speakers at the Dal-CMS math camp were follwoing Faculty members (with the titles of their respective talks in the parentheses): Stuart Carson (Why Study Stats?), Alan Coley (An Introduction to Chaos), Karl Dilcher (A Mathemagical Mystery Tour: Large Numbers and Great Mathematicians), Art Finbow (Adventures in Problem-Solving), Wendy Finbow-Singh (3D Geometry), Richard Nowakowski (Games with Hidden Information), Neil Julien Ross and Elham Roshanbin (Graph Theory), Roman Smirnov (Mathematical Induction), Srinivasa Swaminathan (Solving Polynomial Equations). The students were chaperoned by Leigh Herman and Elham Roshanbin. Last but not least, our great staff, - Maria Fe Elder, Paula Flemming, Balagopal Pillai, Ellen Lynch and Gretchen Smith, - were responsible for all the administrative aspects of organising the math camp.

AARMS
by David Langstroth

 AARMS continues to stimulate and encourage research and education in the mathematical sciences. Our programs enable new discoveries in the mathematical sciences, and their reach stretches far beyond the Atlantic region. The impact and quality of our program is not universally known to the Canadian mathematical community but It has been the goal of Director Jeannette Janssen to increase the visibility and recognition of AARMS across Canada and internationally.

For AARMS' newest program, the Collaborative Research Groups (CRG) program, 2012/13 was the second full year. The three CRGs that are currently funded represent three strong research groups in the Atlantic region - The Atlantic Algebra Centre, under the administration of Yuri Bahturin (MUN); The Collaborative Research Group in Dynamical Systems, under the administration of Theodore Kolokolnikov (Dal); and the Collaborative Research Group in Mathematical Ecology and Epidemiology, under the administration of James Watmough (UNB). Funding from AARMS has been used by these groups to invite international guest lecturers to give specialized mini-courses, to give undergraduate students a taste of research through summer research projects, to award a student prize, and for a number of other research activities. This program has given AARMS the opportunity to stimulate research groups that are especially active. The current CRGs will finish their term in summer 2013, and new grants for Autumn 2013 have been awarded: The Atlantic Collaborative Research Group in Numerical Analysis and Scientific Computing, under the administration of Ronald Haynes (MUN); Statistical Modelling of Complexly Correlated Data with Applications, under the administration of Renjun Ma (UNB); and Graphs and Games, under the Administration of Richard Nowakowski (Dal).

The summer school is our flagship program, now in its eleventh year. The 2012 summer school was held at Memorial University for the second year. Credit-earning graduate courses in Combinatorics and Algebra were given by prominent guest lecturers. The school had great participation from Atlantic students and also attracted good students from the rest of Canada and from abroad. Two advanced undergraduate students who attended the school consequently decided to enroll in graduate studies at Memorial University. Two of the courses led to manuscripts submitted to our book series, and a research collaboration between a school director, two lecturers, and students resulted in a paper submitted for publication. In addition, the school was followed by a workshop in Algebra in which two of the lecturers and eight of the students

participated. In short, the summer school amply fulfilled its goal of being a focal point for research and advanced education. The 2013 Summer School will also be held at Memorial July 15 - August 9, with courses in Stochastic Modeling with Applications in Biology, Reaction-Diffusion Equations and Application, Mathematical Methods to Gain Biological Insight, and Mathematical Modeling in Developmental Biology and Medicine. Plans are underway for the Summer School to be held at Dalhousie in 2014-16.

AARMS supported 18 research events and 4 outreach events in 2012. The events greatly differed in scope and size, ranging from a large formal meeting with multiple concurrent sections and over 300 participants to small specialized and collaborative workshops with 20-30 participants. There is high participation in almost all of our scientific events by researchers from outside the region, both from Canada and abroad. Many were collaborative ventures by researchers from different parts of Canada. The outreach events were equally diverse, comprising a math camp, a public lecture, a math competition and a series of school visits. AARMS is proud to support activities that help motivate and recruit the next generation of mathematicians.

The competition in 2013 for our post-doctoral program (PDF) was fierce, with 24 high quality applicants. Two new PDFs were awarded to Justin Tzou from Israel, who will be working with Theodore Kolokolnikov at Dalhousie, and Yuzaho Wang from China, who will be working with Jie Xiao at Memorial.

AARMS has been able to maintain and develop its programs thanks to the support of its member universities, the provinces of New Brunswick and Nova Scotia, and the institutes CRM, Fields and PIMS. We wish to thank our donors for their continued support.

FOUR IN A ROW

The four largest and most important professional societies for our department are without doubt the CMS, SSC, AMS, and SIAM. And now, between 2012 and 2015, they are taking turns with large conferences here at Dalhousie. First we had the large SIAM Discrete Mathematics meeting in June of 2012, with Jason Brown, Jeannette Janssen, and Richard Nowakowski as local organizers (see the article in the 2012 Chase Report). Next is this year's CMS Summer Meeting, as already mentioned above in Rob Milson's Report from the Mathematics Division. In fact, Rob is one of two Scientific Directors of this meeting, and he has done a great deal of work behind the scenes.

Then, on the weekend of October 18/19, 2014, an AMS Eastern Sectional Meeting will take place here on campus. There will be a call for special sessions later this year, with the opportunity of significant involvement by department members. Finally, the 2015 annual SSC Meeting is scheduled to take place here at Dalhousie, June 15-18; Ed Susko is responsible for local arrangements. Anyone for 2016?-*kd*

GAMES AT DAL
by Richard Nowakowski

Games-At-Dal 7, a Combinatorial Games Workshop, was held in conjunction with the SIAM Discrete Math Meeting here at Dalhousie, June 24-27. The workshop attracted researchers from Australia, North America, Sweden, France, Portugal and Israel and included four graduate students.

Again this year, Games-at-Dal 8 will be held in June 2013, in conjunction with a special session at the Summer Meeting of the Canadian Mathematical Society in June. Researchers from China, North America, Sweden, France, Portugal and Israel will attend.

As evidence of the `Shrinking World', Games-at-Dal 9 is slated to be held in Bordeaux 2014 and Games-at-Dal 10 in Lisbon 2015.

GRAPHS AND GAMES

Related to the previous item I would like to report that the Graphs and Games Group was awarded a Collaboration Grant from AARMS ($12,000.year for 2 years). The Academic Administrator of the group is Richard Nowakowski. Members of the

group are Jason Brown, Jeannette Janssen, Richard Nowakowski (all from this department), Richard's former students Nancy Clarke (Acadia), Stephen Finbow (StFX), Shannon Fitzpatrick (UPEI), and Margaret-Ellen Messinger (MtA), as well as Danny Dyer (MUN), Art Finbow (SMU), Bert Hartnell (SMU), and David Pike (MUN). *–kd*

COMPUTING RESOURCES
by Balagopal Pillai

Some of the additions this year include upgrades to the printing infrastructure to enhance our bulk printing facility in the basement of the Chase Building, and the addition of one new color printer in the mailroom. Our NSERC Equipment Grant was successful, and the department's compute cluster received a software overhaul to integrate the new equipment. The new compute node purchased through the NSERC grant is useful for computations that need a large amount of RAM or compute cores, or both, as the server has 48 processing cores and 512 GB RAM. Other than the occasional data center air conditioning issues caused by water supply disruptions, the computing infrastructure was trouble-free for the year.

One major change that is happening this year is the department website migration to the Adobe CQ content management system that complies with the university website design guidelines. This will result in a change to the official url for the site. Another change is Dalhousie's adoption of Microsoft Office 365 as the solution for messaging and collaboration.

THE DEPARTMENTAL LIBRARY

As reported in previous years, I keep a stock of old mathematics, statistics, and C.S. books, with the more elementary books stored in Room 107, and the more advanced ones in the library and in Room 305. All are for sale, with the proceeds going towards the purchase of new books. Many of the more advanced books are catalogued at http://www.mathstat.dal.ca/~dilcher/oldbooks.html This stock is being replenished regularly through donations. For instance, just a few weeks ago a retired teacher walked in with two boxes of high-

level books of high quality. Any such books not already in the Killam library will be placed in the library. Further donations of Math, Stats and CS books are welcome, and that includes textbooks.

Last Fall Maryam Ehya Jahromi took over from Huda Chuangpishit as Library Assistant who looks after the day-do-day operation of the library. Meanwhile, Swami continues to send out the weekly "New Books" mailings, with those interesting biographical/historical sketches. I thank them all. *-kd*

MATHEMATICS COLLOQUIUM IN 2012/2013

Organizer: Peter Selinger

The Mathematics Colloquium always offers a welcome opportunity to learn about the work of colleagues from other areas of mathematics, some from far away, and others closer to home. This year, we were able to welcome Abel Prize winner Professor Srinivasa Varadhan as a Distinguished Speaker, who gave a public talk on October 11, followed by a colloquium on October 12. Special thanks are due to R.P. Gupta, Renzo Piccinini, and C.C.A. Sastri, who organized Prof. Varadhan's visit. I would also like to thank Karl Dilcher, who once again filled in as colloquium chair, and did a great job, while I was away in the Fall. This year's talks were:

Apr 30, 2012: Miklos Bartha (Memorial University), *Feedback, trace, and iteration in computer science.*

May 30, 2012: Simona Paoli (University of Leicester), *From homotopy to higher categories.*

Jun 13, 2012: Tobias Müller (Utrecht), *First order logic and random (geometric) graphs.*

Aug 9, 2012: Piotr Rudnicki (University of Alberta)*, Mizar and its applications.*

Aug 21, 2012: Ray McLenaghan (University of Waterloo)*, On the quasi-linearization of the equations of motion of a mechanical system.*

Sep 17, 2012: Jeff Egger (Physics, Dalhousie), *A gentle introduction to Adiabatic Quantum Computing*.

Sep 27, 2012: M. Ram Murty (Queen's University)*, The partition function revisited*.

Oct 12, 2012: Srinivasa Varadhan (Courant Institute)*, Random graphs*.

Oct 22, 2012: Rogers Mathew (Dalhousie), *Cube representation of a graph: a probabilistic approach*.

Oct 29, 2012: Shannon Ezzat (U. Canterbury, Christchurch, NZ), *Representation growth: an introduction*.

Nov 5, 2012: Francis Valiquette (Dalhousie), *Group foliation of differential equations using moving frames*.

Nov 19, 2012: Rob Noble (Dalhousie), *Algebraic numbers with rational parameters*.

Nov 26, 2012: Caroline Cochran, *Applications of the invariant theory of Killing tensors*.

Jan 28, 2013: Robert Milson (Dalhousie), *Exceptional orthogonal polynomials*.

Feb 18, 2013: Douglas Stones (Dalhousie), *The trouble with network motifs: an analytical perspective*.

Mar 25, 2013: Karl Dilcher (Dalhousie), *The mathematics of Paul Erdős*.

Apr 18, 2013: Will Traves (U.S. Naval Academy), *Generalizing Pascal's Theorem*.

May 21, 2013: Adam Clay (UQAM), *Ordered groups and 3-manifolds*.

STATISTICS COLLOQUIUM

Organizer: Joanna Mills Flemming

The speakers in 2012/2013 were:

September 13, 2012 - *A new methodology for identifying multiple class labels in a satellite image*, Reshu Agarwal, Acadia University.

September 27, 2012 - *Modelling the effectiveness of searches for invasive tunicates in a Prince Edward Island estuary*, Lisa Kanary, Department of Fisheries and Oceans, Bedford Institute of Oceanography.

October 11, 2012 - *More or less: some paradoxes concerning composite likelihood inference*, Ximing Xu, Department of Mathematics and Statistics, Dalhousie University.

October 25, 2012 - *Recent advances in statistical inference and computational methodologies*, Anthony Hayter, University of Denver.

November 8, 2012 - *The Perinatal Epidemiology Research Unit: research projects and statistical challenges*, Linda Dodds, Bill Gardner, Stephan Kuhle and Christy Woolcott, IWK Health Centre.

November 22, 2012 - *Gradient forests: calculating importance gradients on physical predictors to describe species distributions*, Stephen Smith, Fisheries and Oceans Canada, Bedford Institute of Oceanography.

January 24, 2013 - *The role of the medical research specialist and the statistical concepts in a large, multi-Centre, double blind, RCT in a trial fibrillation stroke prevention trial*, Stephen Graham, Pfizer Canada Inc.

February 14, 2013 - *Selective infanticide of (eclectus) parrots: a statistical analysis*, Chris Field, Department of Mathematics and Statistics, Dalhousie University.

March 7, 2013 - *Optimal stopping rules in general Bayesian change-point detection problems*, Mikhail Zhitukhin, Department of Probability and Statistics, Steklov Mathematical Institute, Moscow, Russia.

March 21, 2013 - *An example of the Newton-Rapson and Fisher scoring iterative methods*, Pantelis Andreou, Department of Community Health and Epidemiology, Dalhousie University

AND *Statistical aspects of Diagnostic testing*, Gordon Flowerdew, Department of Community Health and Epidemiology, Dalhousie University

April 4, 2013 - *Multivariate statistical modeling of knee osteoarthritis gait patterns*, Janie Wilson, School of Biomedical Engineering, Dalhousie University.

@CAT SEMINAR

Organizer: Bob Paré

Sept. 11, 2012, Toby Kenny, *Graphical Composition*.

Sept. 18, 2012, Geoff Cruttwell, *The 'fundamental theorem' of tangent structures*.

Sept. 25, 2012, Margaret Beattie, *Classifying low dimensional Hopf algebras with the Chevalley property*.

Oct. 2, 2012, Robert Paré, *Multi-valued functors*

Oct. 9, 2012, Gabor Lukacs, *Cardinal Algebraic invariants of topological structures*

Nov. 6, 2012, Dorette Pronk, *Weakly Globular Double Categories*

Nov. 20, 2012, Dorette Pronk, *Weakly Globular Double Categories* (continued)

Nov. 27, 2012, Dorette Pronk, *Weakly Globular Double Categories* - continued (continued)

Dec. 4, 2013, Dorette Pronk, "Weakly Globular Double Categories - the final frontier"

Jan. 22, 2013, Robert Paré, *Kaput Profunctors*

Jan. 29, 2013, Robert Paré, *Kaput Profunctors*

Feb. 5, 2013, Peter Selinger, *Approximations in quantum computing*

Feb. 12, 2013, Peter Selinger, *Approximations in quantum computing* (continued)

Feb. 19, 2013, Peter Selinger, *Clifford+T approximation - the proof*

Mar. 5, 2013, Geoff Cruttwell, *An introduction to quasicategories*

Mar. 12, 2013, Alanod Sibih, *Orbifold Atlas Groupoids* (Thesis presentation)

Mar. 19, 2013, Rick MacLeod, *Higher Algebra*

Mar. 26, 2013, Rick MacLeod, *Higher Algebra* (continued)

Apr. 16, 2013, Peter Selinger, *Clifford+T approximation - the proof*

GRAPH THEORY SEMINAR

Organizer: Rory Wilson

September 26, 2012: Rogers Matthew, *Box and Cube Representations of Graphs*.

October 17, 2012: Elham Roshanbin, *Star Coloring of Graphs*.

October 24, 2012: Jeannette Janssen, *Geometric embeddings of graphs and graph limits*.

December 10, 2012: Svenja Huntemann and Celeste Vautour, *Toppling Dominoes*.

January 30, 2013: Catharine Baker, Mount Allison University, *Decomposing Complete Tripartite Graphs into Gregarious 6-cycles*.

February 13, 2013: Bert Hartnell, Saint Mary's University, *Watchers and Listeners: The Art of Detection*.

February 21, 2013: Toby Kenney, *Combinatorial Problems in Phylogeny*.

March 13, 2013: Richard Nowakowski, *Lattices from Cleaning Configurations*.

March 20, 2013: Aysel Erey, *Chromatic Roots and Restrained Chromatic Polynomials*.

April 10, 2013: Hoda Chuangpishit,
Recognition of graphs with small cubicity.

NUMBER THEORY SEMINAR

Organizer: Rob Noble

September 27: Ram Murty,
Automorphy and the Sato-Tate conjecture.

October 25: John Cosgrave,
The multiplicative orders of certain Gauss factorials (again).

November 29: Kira Scheibelhut,
A Classification of Integer-valued Polynomials using a Generalized Factorial Function.

January 7: Timothy Caley,
A new algorithm for the Prouhet-Tarry-Escott problem.

January 24: Abdullah Al-Shaghay,
The Prime Number Theorem and Dirichlet's Theorem.

February 21: Karl Dilcher,
Some number theoretic results due to Euler.

April 29: Matilde Lalin,
Mahler measure and special values of L-functions.

OUTSIDE TALKS

Graduate students, postdocs, and faculty members presented a large number of talks nationally and internationally, at conferences and at department seminars and colloquia. Below is a list which is probably not complete.-*kd*

Bassemah Alhulaimi:
Harmonic Potential, Atlantic General Relativity 2013 Conference, UNB Fredericton, April 26, 2013.

Ali Alilooee:
Rees Algebra of Some Classes of Simplicial Complexes, MSRI, Berkeley, CA, November 2012.

Rees Algebra of Square Free Monomial Ideals, MSRI, Berkeley, CA, September 2012.

Jason Brown:
A Hard Day's Math: The Connections Between Mathematics and Music, invited guest speaker, Onatrio Association of Mathematics Educators, Toronto, May 2, 2013.

A Hard Day's Math: The Connections Between Mathematics and Music, invited keynote talk, Emergent Learning 2013, Halifax, April 19, 2013.

Roots of Combinatorial Polynomials, SIAM Conference on Discrete Mathematics, Halifax, June 20, 2012.

A Hard Day's Math, invited keynote talk, Discovery Centre, June 14, 2012.

Network Reliability, Seminar talk, Ryerson University, May 24, 2012.

Mathematics and Music, Rothesay Netherwood School, February 7, 2012.

Emma Connon:
When do monomial ideals have linear resolutions?, Program Associate Seminar, MSRI, Berkeley CA, December 11, 2012.

Karl Dilcher:
Congruences for sums of reciprocals, CMS Summer Meeting, Univ. of Regina, June 2-4, 2012.

Stern polynomials, Fibonacci numbers, and continued fractions, Colloquium talk, Univ. of Calgary, June 5, 2012.

Sums of reciprocals modulo composite integers, Conference of the Canad. Number Theory Assoc., Univ. of Lethbridge, June 17-22, 2012.

A mod p^3 analogue of a theorem of Gauss on binomial coefficients, Elementary and Analytic Number Theory Conference, Schloss Schney, Germany, August 16, 2012.

Gauss factorials and Gauss's binomial coefficient theorem, Seminar talk, Brock University,

St. Catharines, ON, October 18, 2012.

A congruence of Emma Lehmer related to Euler numbers, CMS Winter Meeting, Montreal, December, 2012.

Stern polynomials and continued fractions, AMS-MAA Joint Mathematics Meeting, San Diego, CA, January 10, 2013.

Mike Dowd:
Statistical Data Assimilation for Biological Ocean Models, BIRS Workshop on Probabilistic Approaches to Data Assimilation for Earth Systems, Banff, Feb 17-22, 2013.

Physical Aspects of Habitat Restoration at Kejimkujik Seaside, Atlantic Canada Coastal and Estuarine Science Society Annual Meeting, Lawrencetown NS, May 9-12, 2013.

Inference for Biophysical-Statistical Models, CSIRO Cutting Edge Science Symposia Series: Data Assimilation for Marine Biogeochemical Models, Hobart, Australia, May 27-30, 2013.

Sara Faridi:
Ideals of conjugacy classes of nilpotent matrices, AMS Sectional Meeting, Special session: Commuting Matrices and the Hilbert Scheme, Boston College, Chestnut Hill, MA, April 2013.

Monomial Resolutions, Combinatorial Algebra meets Algebraic Combinatorics, Tenth Annual Meeting, Fields Institute Toronto, ON, January 2013.

Resolutions of monomial ideals using simplicial complexes, Mathematical Sciences Research Institute seminar talk, Berkeley, CA, December 2012.

Monomial Resolutions Supported By Simplicial Trees, CMS Summer Meeting, Special session: Interactions Between Algebraic Geometry and Commutative Algebra, Regina, June 2012.

Chris Field
Robust Issues in Molecular Evolution, Invited talk, SSC Meeting, Guelph, ON, June 2012.

Birds: A Statistician's view on Numbers and Trends, A talk in honour of the International Year of Statistics, UNB Saint John, February 2013.

Tatiana Hessami Pilehrood:
Rational approximations to Euler's constant, XII Canadian Number Theory Association Meeting, University of Lethbridge, June 17-22, 2012.

David Iron:
Lattice patterns in the periodic Gierer-Meinhardt system, CMS Summer Meeting, Halifax, June 4-7, 2013.

Jeannette Janssen:
Infinite random geometric graphs from the hexagonal metric, International Workshop on Combinatorial Algorithms (IWOCA), Kalasalingam University, Kerala, India, July 20, 2012.

Infinite random geometric graphs, Colloquium, Indian Institute of Science, Bangalore, Karnataka, India, July 30, 2012.

Geometric embeddings of graphs and graph limits, Colloquium, University of Twente, the Netherlands, October 30, 2012.

Geometric embeddings of graphs and graph limit, Colloquium, Trent University, Peterborough, ON, November 9, 2012.

Keith Johnson:
Homogeneous integer valued polynomials and the stable homotopy of BU, Special Session in Topology, CMS Summer Meeting, Regina, SK, June 2, 2012.

Integer valued polynomials on non-commutative rings, Special Session in Number Theory, CMS Summer Meeting, Regina, SK, June 4, 2012.

Integer valued polynomials on integer marices, Algebra conference, Université de Picardie, Amiens, France, December 15, 2012.

p-orderings for non-commutative rings, Algebra conference, Technical University of Graz, Austria, December 21, 2012

Karyn McLellan:
A New Computation of Viswanath's Constant,
Canadian Number Theory Association Meeting XII,
University of Lethbridge, June 17-22, 2012.

*Two Growth Rates of Random Fibonacci
Sequences*, CMS Winter Meeting & Number
Theory Satellite Session, Montreal,
December 6-10, 2012.

*Periodic Coefficients and Random Fibonacci
Sequences*, Departmental Colloquium, Juniata
College, Huntingdon, PA, April 26, 2013.

Joanna Mills Flemming:
Challenges in Marine Statistical Ecology, The
Canadian Mathematical Society (CMS) Summer
Meeting, Halifax, NS, June 2013.

*Modelling and Prediction for Clustered Count Data
with Excess Zeros*, Statistical Society of Canada
Meetings, Edmonton AB, May 2013.

Rob Milson:
Exactly and Quasi-exactly solvable potentials,
Workshop on Symmetries of Differential Equations,
University of Minnesota, May 18, 2012.

*A Conjecture on Exceptional Orthogonal
Polynomials*, CMS Summer Meeting,
Regina, SK, June 2, 2012.

A new characterization of the Painlevé-I equation,
NEEDS 2012, Kolymbari, Greece, July 10, 2012.

*Reduction of the NP formalism to 3-dimensional
geometry*, Atlantic GR 2013, UNB Fredericton,
April 26, 2013.

Rob Noble:
*Minimal polynomials of algebraic numbers with
rational parameters*, CMS Winter Meeting 2012,
Number Theory Satellite Session, Montreal,
December 6, 2012.

Richard Nowakowski:
Playing for Time, Bordeaux Graph Workshop 2012,
University of Bordeaux, November 2012.

Profiling Games, Recreational Math Colloquium
III, University of the Azores, April 2013.

Location, Location, Location, GrasCan, Ryerson
University, April 2013.

Bob Paré:
*An application of profunctors in the study of
colimits*, Workshop in Category Theory, Coimbra,
Portugal, July 2012.

Multivalued Functors, Category Theory
OctoberFest, Concordia University, Montreal,
October 27, 2012.

Renzo Piccinini:
Fibrações, Universidade de São Paulo, Campus de
São Carlos, Brazil, June 12, 2012.

La Storia della Teoria delle Fibrazioni,
Università di Milano-Bicocca, April 17, 2013.

Fibrations, University of Calgary, May 3, 2013.

Dorette Pronk:
Bredon Cohomology with Local Coefficients, CMS
Summer Meeting, Session on Homotopy Theory,
Regina, June 2, 2012.

Weakly globular double categories of fractions,
Category Theory Octoberfest, Concordia
University, Montreal, October 27, 2012.

Neil Ross:
Quantum Interaction Nets, AQUA Student
Conference, U. of Waterloo, June 22, 2012.

Peter Selinger:
Logical methods in quantum information theory,
Invited lecture, 19th Workshop on Logic, Language,
Information and Computation (WoLLIC 2012),
Buenos Aires, Sept 3-6, 2012.

Semantics of Quantum Computation, Invited
tutorial, 19th Workshop on Logic, Language,
Information and Computation (WoLLIC 2012),
Buenos Aires, Sept 3-6, 2012.

Roman Smirnov:
*Orthogonal separation of variables in hyperbolic 3-
space*, 21st International Conference on Integrable
Systems and Quantum symmetries,
Prague, Czech Republic, June 17-23, 2012.

Douglas Stones:

Latin squares: counting and symmetry, National Taiwan University, January 17 2013.

The trouble with network motifs: an analytical perspective, Academia Sinica, Taiwan, January 18 2013.

Counting Latin rectangles modulo p via partial orthomorphisms, Wright State University, May 2, 2013.

Ed Susko:

Testing Phylogenies, Keynote address at Mathematical and Computational Evolutionary Biology 2012, Montpellier, France, June 2012.

Likelihood Ratio Tests with Boundary Constraints, Symposium in Honor of Jack Kalbfleisch, Ann Arbor, Michigan, September 2012.

Keith Taylor:

Groups with (Essentially) One Point Duals, Special Session on Harmonic Analysis and Operator Spaces, CMS Summer Meeting, Regina, SK, June 3, 2012.

A 4D Wavelet Transform, AMS Conference Special Session on Wavelet and Frame Theoretic Methods in Harmonic Analysis and Partial Differential Equations in Memory of Daryl Geller, Rochester, NY, September 23, 2012.

Groups with Atomic Regular Representation, Conference on Harmonic Analysis, Operator Algebras and Representations, CIRM, Luminy, France, October 22-26, 2012.

Group Representations and Continuous Wavelet Transforms, Seminar at Shandong University, Jinan, China, March 14, 2013.

Group Representations and Continuous Wavelet Transforms, Seminar at Xiamen University, Xiamen, China, March 21, 2013.

Group Representations and Continuous Wavelet Transforms, Seminar at University of Barcelona, Barcelona, Spain, May 13, 2013.

Images of Wavelet Transforms, Conference Abstract Harmonic Analysis 2013, Granada, Spain, May 23, 2013.

BRAIN TEASERS
Edited by
Dr. S. Swaminathan

[Solutions will be posted in the department website: *www.mathstat.dal.ca*]

1. Type 2^29 into Google and look at the result. What is peculiar about this result?

2. What is the 100th digit in $(1 + \sqrt{2})^{500}$ in the decimal expansion?

3. What is special about the following number?
   8,549,176,320

4. *Show that any polynomial $p(x) = a_0 + a_1x + \ldots a_nx^n$ of degree n, can be determined completely from just two values of $p(x)$.*

5. What are the next two terms of the following sequence?   1, 1, 5, 17, 61, 217, ….

6. What word in English contains four consecutive letters of the alphabet?

7. How many persons are there when the phrase "two pairs of twins twice" is mentioned?