#### Winter 2015

# **DEPARTMENT OF MATHEMATICS AND STATISTICS** FACULTY OF SCIENCE, YORK UNIVERSITY

The Chair's Perspective

What is the difference between an introvert mathematician and an extrovert mathematician? The extrovert mathematician looks at your shoes while talking to you. While this old joke might not paint an accurate picture of the mathematical community, it is probably quite accurate in its representation of how the general public sees mathematicians. And this probably explains a custom practiced by the staff of one the world's premier institutes for research in mathematics, Oberwolfach, a custom intended to get



Juris Steprāns

participants to socialize with each other. At each lunch and dinner served at the institute, napkins with participant names are shuffled so that each meal is partaken with a different group of researchers, the intention being that even the most shy will be able to meet everyone else taking part in the week long workshop.

So it was that, several years ago, I found myself at a table in the Oberwolfach institute, which is located in a remote part of the Bavarian Black Forest, with a group of people, some of whom I knew and others not, but all somewhat younger than me. Mathematics, of course, always provides a common interest for mathematicians and likely topic of conversation, but an effort is usually made at mealtimes to shift the conversation to another topic. In this particular case, I found myself not able to join in since the topic was the Simpsons, a television show about which I knew almost nothing at that point. After trying to listen politely for a while I could no longer contain myself, "The Simpsons is a children's cartoon show! Do you guys (and I am afraid to report that they indeed were all guys at my table) really watch this show?"

Well not only did they watch it, but they watched it with great attention. Indeed, I learned, very close attention is needed in order not to miss the mathematical references that occur more frequently than one would expect. For example, in one episode Homer writes the "equation"  $3987^{12} + 4365^{12} = 4472^{12}$  on a blackboard. If true, this would disprove Fermat's Conjecture, which is now known to be true. But if you were to do the calculation on an eight digit calculator you might be fooled into believing the equation actually does hold, since it is accurate to the first (leftmost, to be precise) eight digits. However, the remaining 32 digits of Homer's equation are way off.

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It turns out that a number of the writers for the Simpsons series have mathematical backgrounds and do not hesitate to include jokes (okay, admittedly not uproariously funny jokes) in their scripts that can be appreciated only by those with an education in mathematics. Under the guise of helping viewers better appreciate the mathematical humour of the Simpson's, our department's celebration of the Faculty of Science's 50th anniversary will be combined with our student awards celebration and feature some brief lectures by members of our department that explain the mathematics underlying some of the Simpson's gags. I encourage everyone to attend.

## Departmentpedia

#### Transitions

Huaiping Zhu, effective January 1, 2014, was promoted to Full Professor. He heads the Laboratory of Mathematical Parallel Systems, with a research focus on modelling and dynamics of vector-borne diseases, regional climate, ecology, and epidemiology.

Seyed Moghadas, effective July 1, 2014, was promoted to Associate Professor. He is the director of the Agent-Based Modelling Laboratory, with a focus on computational epidemiology and immunology. His research involves the development of mathematical, statistical, and computational models for the dynamics of infectious diseases, with the aim of linking theory, policy, and practice using models and innovative knowledge translation methodologies.

**Michael Chen**, effective July 1, 2014, was promoted to Associate Professor. His research involves theories of numerical optimization, especially the stochastic optimization under uncertainty, with applications to many problems including energy and image processing.

#### Awards

Jeffery Kay has been selected as one of the three recipients of the 2014 governor-general's silver medals.

#### Appointments

Jianhong Wu was appointed Director of York Institute for Health Research.

Hoaxiong Huang was appointed Associate Director for Industry Liaison at the Fields Institute for Research in Mathematics.

Jane Heffernan was appointed Director of the Centre for Disease Modelling.

#### Other News

A future mathematician was born to the department member: Cara Lily (to Professor Michael Haslam and his wife in September 2014).

#### **New Alumni**

At convocations in 2014, 119 students received undergraduate degrees in Mathematics and Statistics departmental programs. In addition, the following graduate degrees were awarded:

**PhD in Mathematics and Statistics:** Jiawei Li, Chunhua Shan, Jinlian Wang, Xiao Yu, Qiang Yuan, Ahmed Hassan Manaa Abdelrazec, Oliver Jovanovski, Nemanja Kosovalic, Yegor Sorokin, Xiaofeng Zhou

**MA in Mathematics and Statistics:** Ekaterina Arkadyev, Jacob Miller Armstrong, Enas Nabil Awad, Tara Claire Bittles, Franco Paul Cerullo, Sahar Eslami Nejad, Shabnam Kashani-Gharavi, Denis Grigorievitch Kourktchan, Sara Maghdoori, Jeffrey Peter Mcmanus, Tony Raad, Nancy Moufid Temraz, Samuel Da Silva Vieira, Jordan Elijah Collins, Bartek Ewertowski, Shengwei Hu, John Raymond Jarvis, Shu Xiao Li, Shuyu Lin, Catherine Johnson Madukayil, Justin Christopher Miles, Sze-Chun Yeung

*Graduate Diploma in Financial Engineering:* Jacob Miller Armstrong, Shabnam Kashani-Gharavi, Denis Grigorievitch Kourktchan, Sara Maghdoori, Tony Raad, Nancy Moufid Temraz, Jinlian Wang

# THE Pi DAY

One final story regarding Allan's impressive insights. Some time later. when I saw Walter Feit, he informed me that he had given a talk at a conference in Europe concerning the Schur index, and asked me if I knew anything of Allan Trojan. Feit met Trojan at the conference. Walter, who knew most people working in

representation theory, said that Trojan seemed to have interesting ideas. I told Feit that, yes, Trojan has very creative ideas." Colleagues and collaborators knew Allan as a gifted and creative mathematician. His final publication<sup>1</sup> was a joint paper with John Conway (Princeton) and John McKay (Concordia).

Allan cared deeply about teaching and his students. He prepared meticulous colour coded lecture notes even into his last years of teaching at York. One student wrote of Allan: "Peter Allan Trojan is the classic crusty Math Professor. Scratch a bit beneath the surface and you will find a brilliant and warm teacher. Show some interest and do the homework you will be fine. Anyone who has held their PhD since 1964 knows their stuff."

Allan strived for excellence in all his pursuits, be it teaching, research or his keen interest in world cultures. Alan travelled extensively and was a student of many languages. In addition to his fluency in French, German and Italian, he studied Turkish (his wife's mother tongue), Japanese and most recently Hindi -indeed, it was while on a trip to India in the summer of 2013 that Allan unexpectedly passed away.

Allan is survived by his wife, Guljan Ozel, their son Demirhan, and a son Alexander, from a previous marriage. Allan is missed by his family, friends and colleagues.

<sup>1</sup>Conway, John; McKay, John; Trojan, Allan. Galois groups over function fields of positive characteristic. Proc. Amer. Math. Soc. 138 (2010) no. 4, 1205-1212.



 $14159265358979323846264338327950288419716939937510582097494459230781640\\62862089986280348253421170679821480865132823066470938446095505822317253\\59408128481117450284102701938521105559644622948954930381964428810975665\\93344612847564823378678316527120190914564856692346034861045432664821339$ 

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#### 2013–2014 Undergraduate Student Awards

Our annual award ceremony was held on November 26, 2014 in the Senate Chamber. Opening Remarks were delivered by Professor Juris Steprāns and Associate Dean Robert Tsushima, Faculty of Science. The awardees were:



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Chair's Honour Roll	Nathan Gold	Sean Polan
	Saad Himyary	Victoria Prayogo
	Timothy Hirst	Angie Raad
Tanoa Ahouma	Lidia Iniac	Dany Sadiq
Mihai Alboiu	Flora Kampogo	Jagdish Saggu
Satchal Aminuddin	Dongsoo Kang	Emerson Sauder
Alexander Ashbourne	Leffrey Kay	Seyed Shervin Shams Shoaaee
Zachary Axelrod	Justin Kim	Pavel Shuldiner
Stanislav Balchev	Rasha Lawrence	Navid Tahiri
Yosef Bisk	Zhe Li	Japjeet Toor
John Campbell	Rui Liang	Vima Villalba
Bernardo Cardona	Vieshuang Liang	Shuting Wan
Suran Chen	Stephen Lidderdale	Jing Wang
Kosal Chhin	Brenden Livshits	Zihan Wang
Ji Choi	Juan Loia Roiorque	Shixi Xiao
Keegan Dasilva Barbosa	Talva Mandel	Juan Xu
Caleb Dewey	Nusavba Moftah	Jing Zhang
Alexander Dietrich	Dobert Noehammer	LiZhang
Amina Enkhbold	Zain Odeh	Zhenghan Zhang
Stephen Giang	Lain Dage	Benjamin Zhou
Michael Gimelfarb	Tain Page	2



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# Statistical Research & Statistical & Statist

To celebrate the cutting-edge statistical research and consulting work at York, we were proud to host the York Statistics Symposium. The symposium took place on Oct 31, 2014 in the Senate Chamber, 9th floor of the Ross Building's north tower at York's Keele Campus. The speakers included Jin JiaShun from Carnegie Mellon University, Peter Song from the University of Michigan, as well as Helene Massam, Georges Monette, and Steven Wang from York University. The talks covered a variety of problems in high dimensional analysis, net work analysis, statistical paradox, and composite likelihood. More than 40 faculty and graduate students attended the symposium. It was a great event to showcase our research and consulting achievements and a great opportunity for students to socialize with researchers in the field.

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# PUBLISHED BOOKS AND MONOGRAPHS IN 2014

Fields Institute Monographs 33

Thomas Lam · Luc Lapointe Jennifer Morse · Anne Schilling Mark Shimozono · Mike Zabrocki

#### *k*-Schur Functions and Affine Schubert Calculus

**Mike Zabrocki** and his colleagues published a new book in 2014 on "k-Schur Functions and Affine Schubert Calculus" in Fields Institute Communications series. The subject of this book lies at the crossroads of combinatorics, geometry, and representation theory. Read more at **Springer** website.

Walter Tholen and his colleagues published a new book in 2014 on "Monoidal Topology," an active research area that after various past proposals on how to axiomatize 'spaces' in terms of convergence, began to emerge at the beginning of the millennium. Read more at Cambridge University Press website.

D Springer



Encyclopedia of Mathematics and Its Applications 153

### MONOIDAL TOPOLOGY

A Categorical Approach to Order, Metric and Topology

Dirk Hofmann, Gavin J. Seal and Walter Tholen $x \leq y & y \leq z$ $x \leq y & y \leq z \rightarrow x \leq z$ $\leq y & y \leq z \rightarrow x \leq z$	Ord Ord
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Met Met
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$x \rightarrow y  \&  y \rightarrow z$	

Rigidity and<br/>SymmetryAsia Ivić Weiss, Walter Whitel<br/>published a new book in 2014<br/>Fields Institute Communicatio<br/>recent contributions of the rig

Asia Ivić Weiss, Walter Whiteley, and their colleague published a new book in 2014 on "Rigidity and Symmetry," in Fields Institute Communications series. This book contains recent contributions of the rigorous treatment of rigidity of structures, and the interaction of geometry, algebra, and combinatorics. Read more at Springer website.

Departmental Newsletter

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Fields Institute Communications 70

Robert Connelly Asia Ivić Weiss Walter Whiteley Editors

# THE LIFE AND WORLD OF LEE LORCH 1915-2014



Lee (Alexander) Lorch was born in New York City on September 20, 1915. He received a BA (Mathematics) from Cornell University in 1935 and an MA from the University of Cincinnati in 1936. Around this time he became a member of the American Mathematical Society, a membership he was to maintain for 77 years (not quite a record!). He worked under the supervision of Otto Szász, a refugee Hungarian mathematician, to complete a PhD degree (for research on the Lebesgue constants for Borel summability) at the University of Cincinnati in 1941. He worked for some time with NACA (predecessor of NASA) before joining the US Army, seeing service in India and the Pacific from 1943 to 1946. In India he took the opportunity to make contact with local mathematicians and even presented a lecture and published a paper in the Bulletin of the Calcutta Mathematical Society.

Returning to the US, he got a job at City College, a public tuition-free institution in New York City, known for the excellence of its students. One of these, Donald Newman (1930-2007), who placed in the top five in the Putnam competition three years in a row, was to become Lee's life-long friend and co-author. There was a shortage of housing in New York at the time and (legal) discrimination in how it was assigned. Lee was one of the leaders in attempts to remedy this situation. This aroused opposition which in turn put pressure on City College leading to the non-renewal of his position in 1949. He managed to get another job at Penn State. Before leaving New York, Lee and his family rented an apartment in the newly-built Stuyvesant Town Project. He allowed a black family to occupy his apartment which got him into trouble with the large insurance company that owned the building. This led to pressure on Penn State so that his position there lasted only a year (1949-50), in spite of strong support from a variety of people, including Albert Einstein. Returning to the US, he got a job at City College, a public tuition-free institution in New York City, known for the excellence of its students. Next, Lee was able to get a position as chair of the department of mathematics at Fisk University, a traditionally Black institution in Nashville, Tennessee. His time there is fondly remembered by some of the graduates. He encouraged some of then to go on to graduate work and a number of his students were among the earliest Black women to go on to get doctoral degrees in mathematics. Also, while in Nashville, Lee publicized the problem that the Mathematical Association of America held a meeting that included a banquet in a hotel that did not admit the black members. When the US Supreme Court decided, in the case "Brown vs Board of Education" (1954), that school segregation was unconstitutional, the Lorchs sent their daughter to the (hitherto all black) school nearest to their home. This was the "McCarthy era" and Lee's history of activism meant that, like many others, he was called to testify before the House Committee on Un-American Activities. He refused to answer questions on communist affiliations, citing First Amendment rights. This led to a charge of contempt of congress of which he was later acquitted. In the meantime, pressure on Fisk University meant that he was terminated.

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Lee's next position was at another black institution, Philander Smith College, in Little Rock, Arkansas. There, he and his wife were active in the National Association for the Advancement of Colored People, and in the 1957 Little Rock Central High School crisis. This led to the college having to let him go. It is remarkable that, in spite of the disruptions in his employment, Lee managed to keep up a good research output during the 1950s. This seems to have been partly due to summer visits, with his family, to California where he had contacts at Stanford and Berkeley. His long collaboration with Peter Szego (1925-2014) dates from this period. After a year at Wesleyan University (1958-59), Lee moved to Canada where he was a faculty member at the University of Alberta (1959-68). This was a period when universities were expanding and Lee made a major contribution to building up the mathematics library at Alberta and hosting international mathematical visitors. Because both Lee and his wife had most of their family contacts in the east, he was persuaded to move to York University in 1968 where he remained until retirement in 1985 and continued to be active for several more years. (He would say: "I haven't retired; it's just my salary that has been retired.")

During his time in Canada, Lee continued to be active in the US mathematical circles, including active opposition to the Vietnam war, activity concerning the treatment of women and minorities and the struggle against apartheid South Africa. Since about 1990, Lee was the recipient of several honorary degrees and other awards. His wife Grace did not live to see these honours though she was honoured posthumously for her earlier activism in the teaching profession in Boston.

Shortly after he turned 90, Lee had difficulty walking but continued to come to York campus on a regular basis with the help of a walker. He was restricted in out-oftown travel, but liked to attend local events. In 2011, he made a presentation concerning Paul Robeson, his favourite singer and role model. He was able to attend much of the December 2011 meeting of the Canadian Mathematical Society in Toronto, but his last two years were spent in hospital or long-term care.

York librarian John Dupuis, has created links to a great deal of information about Lee. See the last external link in the Wikipedia article "Lee Lorch". Several interviews with Lee have been recorded. They are most easily assessed by a search of his name on youtube.com. See especially the video "Conversations with Lee Lorch" by Rachel Deutsch.



Martin Muldoon Professor Emeritus

#### New Degree Program in Mathematical Biology

We are very excited to announce a new degree program in Mathematical Biology. The combination of mathematics and biology has become an essential discipline in the understanding of life processes. Our researchers in Mathematical Biology will train and mentor students in this interdisciplinary field. We welcome students in this self-contained BSc degree program to our department at York University from September 2016.





This issue of Connexio was edited by S. Moghadas, S. Rainey, and T. Salisbury. The editors wish to thank all those who contributed or commented on this issue of newsletter.

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