

QUEEN'S MATHEMATICAL COMMUNICATOR

SUMMER 2015

An aperiodical issued by the
Department of Mathematics and Statistics
Queen's University, Kingston, Ontario, Canada K7L 3N6



WELCOME FROM THE HEAD, RAM MURTY



I welcome readers of our newly designed communicator. Our last issue was published in the Winter of 2012 and since that time, we have had three new faculty appointments, **Serban Belinschi**, who works in operator algebras, **Bahman Ghahesifard**, who works in mathematical engineering, and **Francesco Cellarosi**, who works in Dynamical Systems and Number Theory. We welcome them all to the department. You will find more details below.

Several of our students, both graduate and undergraduate, have won numerous awards and we are proud of their achievements. Our postdoctoral fellows have also been applauded for their exemplary teaching. Professors **Leo Jonker**, **Morris Orzech**, **Ole Nielsen**, **Tony Geramita**, and **Leslie Roberts** have officially retired, though they still continue to participate in our academic and seminar activities. We wish them all well in their retirement life. Clearly, they are difficult to

replace and we are making every effort to expand our faculty recruitment. **Greg Smith** is our new undergraduate chair, and **Jamie Mingo**, our graduate chair. **Ivan Dimitrov** is our Associate Head and **Abdol-Reza Mansouri** our Mathematics and Engineering program chair.

On a sad note, some former colleagues are no longer with us. **David Gregory** passed away in 2013. His contributions to the department and vivacious approach to mathematics were exemplary. In June 2014, there was a meeting organized by our department and the Fields Institute to celebrate his work. Conference proceedings arising from this event have been published by the Fields Institute. **Jim Whitley** passed away in January of this year. Jim was the master of the famous "Section J" engineers and though Jim has gone, their motto "In Jim we Trust" will surely live on. Finally **Doug Crawford**, emeritus professor in the Faculty of Education as well as Math&Stats also died last January. Again more details will be found in this issue.

The department continues to face new challenges. Faculty recruitment is definitely one of our top priorities. Our class sizes and our teaching responsibilities are ever increasing and so this is all the more urgent. I am happy to report that still, our students say they find a friendly atmosphere here in which to learn mathematics and share their joy with fellow students. We are grateful to all our students and alumni for their continued support, so that we can continue this time honoured tradition of learning and teaching.

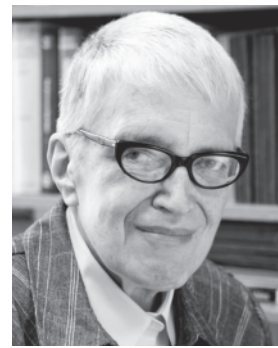
DEPARTMENT NEWS



TROY DAY was the 2012 winner of the Canadian Industrial and Applied Math Society (CAIMS) Research Prize. He was cited for his work in Evolutionary medicine, particularly for his investigations of the best way to use drugs and other interventions (such as vaccines) to treat disease. Troy also received a 2013 NSERC Discovery Accelerator Supplements. This award provides an extra grant of \$40,000 per year for three years to researchers whose work explores high-risk, novel or potentially transformative concepts and lines of inquiry, likely to have impact by contributing to ground breaking advances. In 2013 Troy received a Queen's University Prizes in Research Excellence, and quite recently was awarded a prestigious Killam Fellowship — one of only six awarded in Canada!



DAVID J. THOMSON received 2013 Statistical Society of Canada Award for the Impact of Applied and Collaborative Work. This award was given to David both for his creation of the multitaper spectrum estimator and for its myriad applications including those to the related fields of geophysics, climatology and helioseismology; especially in connection with his discovery of the existence of solar g-mode signatures in scientific data, to Nuclear Test Ban Treaty verification and to the accuracy of touch-tone phone signals against noisy backgrounds. David's 1990 *Nature* and 1995 *Science* papers were the first statistical analyses of climate data that conclusively showed a relationship between global temperature and atmospheric CO₂.



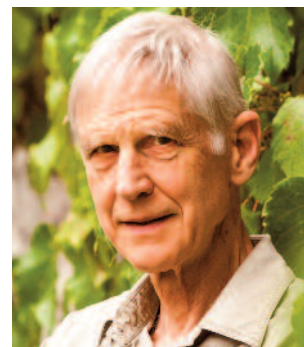
AGNES HERZBERG is the winner of the 2014 Lise Manchester Award given by the Statistical Society of Canada. The award recognizes excellence in statistical research which considers problems of public interest and which is potentially useful for formation of Canadian public policy. Agnes was cited for her work in bringing together statisticians, scientists, politicians and public servants from Canada and around the world annually since 1996 to tackle problems at the intersection of statistics, science and public policy at the Conference on Statistics, Science and Public Policy.



ELSA HANSEN, one of Troy's PhD students, won the 2012 CAIMS Doctoral Dissertation award. Her doctoral research focused on applying techniques from optimal control theory to understand the effects of different intervention strategies on epidemics. Elsa is currently a Research Associate at Penn State's Center for Infectious Disease Dynamics.



TAMÁS LINDER was elected IEEE Fellow, in recognition of his contributions to the area of source coding and quantization. He was also awarded a 2013 NSERC Discovery Accelerator Supplement (see above). His research focuses on the mathematical theories information transfer and storage as well as the development of efficient algorithms for information processing.



PETER TAYLOR received the 2013 Partners in Research Mathematics Ambassador Award. The award recognizes outstanding contributions of a body of work over a period of time to the field of mathematics and Canadians by a Canadian researcher. He was also appointed as a 2014 Fellow of the Fields Institute.

DEPARTMENT NEWS



GREG SMITH received the 2012 CMS Coxeter-James Prize. “Dr. Smith has made significant contributions to many different fields of mathematics and has demonstrated a strong sense for identifying problems in his area of research that are likely to be key for further progress,” said Lia Bronsard, Chair of the CMS Research Committee. Greg’s research centers on “combinatorial varieties,” the fundamental objects at the interface between algebra, combinatorics and geometry, an area has recently become important in its applications to quantum computing as well as in Computer Science, such as computation complexity.



ROLAND SPEICHER received the 2012 CMS Jeffery Williams Prize. “Speicher is an internationally recognized expert on the combinatorial side of free probability,” said CMS President, Jacques Hurtubise, when announcing the award. “His research in this previously unexplored branch of free probability has had a great impact on the mathematical community.” Roland’s work focuses on the combinatorial side of free probability, and the links he has explored between different areas of mathematics have led to the resolution of several mathematical problems that have long been in question.



SERDAR YÜKSEL received the 2013 CAIMS/PIMS Early Career Award in Applied Mathematics. Serdar was cited “for his contributions to the areas of information and control theory, and the interface between these. These are mainly in two areas, in the study of control of systems under information constraints, and in decentralized control—situations in which one has many agents whose behaviour one is trying to control, but who do not communicate fully with one another.”



HECTOR PASTEN VASQUEZ, Ram’s PhD student, was the winner of the 2014 Governor-General Academic Gold Medal for PhD studies, and subsequently won the Canadian Math Society Doctoral Prize. His thesis title was “Arithmetic problems around the ABC conjecture and connections with logic.” Hector has taken a three-year appointment as a Benjamin Pierce Instructor at Harvard University. He will also spend an academic year at the Institute for Advanced Study in Princeton.



RAM MURTY was elected Fellow of the American Mathematical Society. The Fellows of the American Mathematical Society program recognizes members who have made outstanding contributions to the creation, exposition, advancement, communication, and utilization of mathematics.



In October of 2013 a conference, SCHOLAR — a Scientific Celebration Highlighting Open Lines of Arithmetic Research, was held to celebrate Ram’s 60th birthday and in honour of his mathematical legacy in the field of number theory.

TEACHING EXCELLENCE AWARD



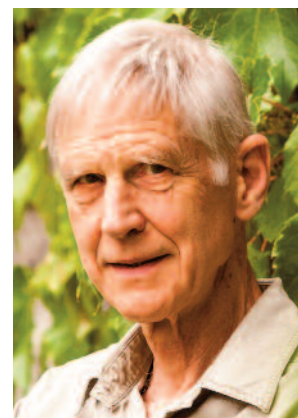
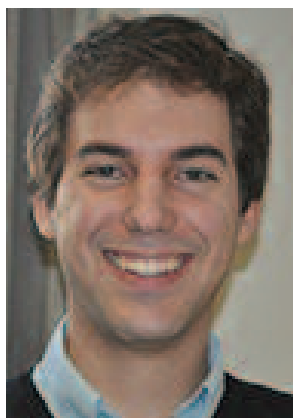
ALAN ABLESON



LEO JONKER

Alan Ableson and Leo Jonker both received the 2012 Alma Mater Society Frank Knox Award for Excellence in Teaching. Alan was also the guest speaker at the 2012 university-wide award ceremony. Alan was cited for his enthusiasm and his patience and described as always willing to go out of his way to help a student. In his speech, Alan remarked that winning the award “is reenergizing and motivating. It gives you the faith and encouragement you need to keep going with innovative teaching methods.” In 2005, Leo was appointed the inaugural University Chair of Teaching and Learning, where he developed initiatives to change how students learn so that they could get more out of their formal education. This work was significant in bringing the art of teaching more to the forefront at Queen’s.

APPLIED SCIENCE FIRST-YEAR TEACHING AWARDS



Left to right: **Andrew Hoefel** Fall 2012, APSC 171. Andrew was a post-doctoral fellow working with Tony Geramita, David Wehlau and Greg Smith. **Patrick Reynolds** Winter 2013, APSC 172. Patrick was a post-doctoral fellow working with Oleg Bogoyavlenskij. **Peter Taylor** Winter 2014, APSC 172.

“BLENDED LEARNING”

by Peter Taylor

No doubt you’ve read about MOOCs (massive open online courses) and perhaps you’ve also heard of the “flipped classroom.” These are just a couple of the ways in which technology is having an impact (in fact a transformative impact) on the way we teach. This “transformation” has a number of inter-related dimensions—two of which are high student/teacher ratios leading to many more large classes and significant heterogeneity among the students, both in terms of knowledge and learning skills. What that means for our many large first-year courses is that it’s difficult to pitch our lectures at a level and pace that works for all the students—and a middle-of-the-road compromise works for no-one.

The solution for many of us lies in the direction of what is called blended learning—a blend of technology, doing what it can do best (short video presentations of standard technical examples), and formal classes doing what they do best (playing as interactively as possible with ideas and techniques). In short, class time can be more engaging and study time can be

more profitable. Of course some considerable development work is required to present a course in this manner and we (and the university) are well on our way to getting a good system in place. Already a number of our large introductory courses are routinely videotaped. Does that mean a number of students don’t bother to come to class as they can always “watch the movie” later? The answer turns out to be no—students come and enjoy the more active environment, and later they also watch excerpts from the tape to catch things they might have missed.

One thing you discover when, for example, you go to make a short video solution of a math problem, is that making a video can be (ought to be?) a lot different from writing the solution down on paper. The non-linear “real-time” nature of the video allows and even encourages the explanation to be freer, more visual and more connected. In McLuhanesque terms, it’s a different medium and that seems to make a big difference for our students. Anyway, they are always asking for more videos.

MARGE LAMBERT WINS A 2014 QUEEN'S UNIVERSITY SPECIAL RECOGNITION AWARD



MARGE LAMBERT

In honour of this award we present a sampling of "Marge" comments from faculty and staff:

Without getting into details, personnel problems with office staff seemed largely to disappear after Marge became administrative assistant.

*Lorne Campbell, Head, Math & Stats
1980 – 1990*

One thing I continue to appreciate in Marge is the way she is friendly with anyone who stops in to talk to her. She treats everyone with the same respect and warmth, whether they are students, faculty, foreign or Canadian resident, prosperous or financially challenged. She keeps track of, and shows an interest in, all the people who come through the department, both students and faculty.

Leo Jonker, Head, 1990 – 1995

Marge is one of those wonderful people that makes the life of Head of Department much smoother than it would be otherwise. Her institutional knowledge is unmatched and she has built an exceptional, highly competent and stable staff team around her.

Eddy Campbell, Head, 1995 – 2000

No one knows the inner workings of the Department better than Marge; no one knows the pyramid of responsibilities in the Department better than Marge; no one knows how to get things done better than Marge; no one can keep more balls in the air than Marge. No one has a clear idea on how Marge accomplished what she did, and no one knows how we will manage when she retires.

Bob Erdahl, Head, 2000 – 2004

Extraordinary folks come in two flavours. Some have extraordinary accomplishments, lead extraordinary lives and often get all kinds of awards. Others seem to perfectly understand the pulse of life around them and are always there to provide the right support, advice and quiet leadership at the right moment. Marge Lambert is one of the latter.

Peter Taylor, Head, 2004 – 2008

Her conscientious dedication to her work and general working of our department goes well beyond the nine to five work hours. I have seen her consistently working late and often when I came in on weekends, she would be here dealing with department issues. Her attention to detail, her knowledge of all the collective agreements has helped me immensely in my role as department head.

Ram Murty, Head, 2008 – present

I came to the department in July 2008, and Marge was the first person who greeted me and showed me around in the department. Soon after that, I realized Marge was usually the first person to ask when I had an administrative question, or simply needed help. She always shows compassion and support the minute I walk into her office, and she is ready to help with a smile and her graceful style.

Wenyu Jiang, Associate Professor

We used the word "caring" in describing Marge's approach to the department secretaries. The department has a sizable office staff. Marge has always been concerned to help everyone do their best. She has been masterful in understanding who can do their best work in their own space and who needs a communal or more supervised office environment, who is particularly well-suited for dealing with students, or in acquiring new technical skills in response to technological changes. The harmony that has prevailed has meant that students and faculty have received excellent assistance.

*Norman Rice, Grace Orzech and
Morris Orzech: former Undergrad Chairs*

We know that most departments on campus share the same work environment as the Department of Mathematics and Statistics. However, we doubt that any other can boast that their support staff's combined years of service, under one leader, exceeds one hundred years. Note that we are not including Marge's years of service in this calculation. We think this fact alone confirms the excellent working environment we all enjoy and appreciate in the Department of Mathematics and Statistics.

*Anne Burns, Johana Ng, Jennifer Read,
Cathy Smith, Office staff*

WE WELCOME THREE NEW MEMBERS OF FACULTY

BAHMAN GHARESIFARD was appointed Assistant Professor in 2013. Bahman received his undergraduate and master's degrees in Mechanical Engineering from Shiraz University in 2002 and 2005, respectively, and his Ph.D. in Mathematics from Queen's University in 2009. He held post-doctoral positions with the Department of Mechanical and Aerospace Engineering at UC San Diego 2009-2012, and the Coordinated Science Laboratory at Illinois Urbana-Champaign 2012-2013. His expertise includes systems and controls, distributed optimization, social and economic networks, game theory, and geometric mechanics and control. Already in his first year with us, he was shortlisted for the Frank Knox Award for Excellence in Teaching. In his spare time, he plays soccer and volleyball and reads the New Yorker, the New Republic, Harper's, and the Economist.



FRANCESCO CELLAROSI received a B.Sc. and Ph.D. from Princeton University in 2011 and he is currently completing a three-year Doob Research Assistant Professorship at the University of Illinois, Urbana-Champaign. He was a member of the Institute for Advanced Study at Princeton for a semester in 2012 and of the Mathematical Sciences Research Institute (MSRI) in Berkeley for a semester in 2012 and 2015. He is an unusually gifted mathematician in the areas of Dynamical Systems and Number Theory and so his appointment will greatly strengthen the Department in these and related areas. He has been described as a talented teacher with a strong record of student mentoring.



SERBAN BELINSCHI was appointed Assistant Professor in early 2012. He obtained his PhD from Indiana University Bloomington in 2005 and came to Canada for a post-doc position at the University of Waterloo. From there he went to the University of Saskatchewan, won a prestigious Humboldt Fellowship and came to Queen's. His expertise is in non-commutative probability from an analytic perspective, and various related fields. He was a co-recipient of the 2013 CMS Robinson Award for his joint paper "Free Bessel Laws," which appeared in the Canadian Journal of Mathematics. This paper has received attention from free probability and quantum group communities as it introduces promising new examples of a compact group.



LESLIE ROBERTS RETIRES

By Asia Matthews

In well-worn construction boots, **LESLIE ROBERTS** taught mathematics in a way that was concise and unembellished. Though he glowered at you if you asked a question, you soon came to realize it was the face he made while patiently thinking up an insightful and precise explanation. Leslie's many published works reflect this habit of precision and insight. He made a significant contribution to the Department through his years as Associate Head, particularly managing the demanding process of hiring new faculty. He arrived at work by bicycle in all weather and anyone who needed a spot of alcohol to thaw a frozen brake cable need only seek Leslie out.



RETIREMENTS OF LEO JONKER, MORRIS ORZECH AND OLE NIELSEN

By Asia Matthews

Leo, Morris and Ole. The Department of Mathematics and Statistics has said goodbye to three outstanding professors, and they will be missed. I know I'll miss them. One is my supervisor. His is one of six portraits on the registrar's wall of Queen's professors acknowledged for their excellence in teaching.



LEO JONKER has been a professor at Queen's since 1969, and was the head of the Department from 1990 to 1995. Of course, he has taught a million courses, but he also invented a course: MATH010, which is an advanced perspective of elementary mathematics for students interested in education. It's an enormously well-received mathematics course that includes students' going out to local schools to teach weekly enrichment classes. He even received NSERC funds to help develop a similar course in Physics (Leo got NSERC funds for education!?!). Leo taught MATH010 for around ten years, but with his retirement the course is suspended, at the students' loss. But who's to say anyone could have taught it like he did? In his tenure at the university, Leo has received eleven significant honors recognizing his dedication to teaching. In 2004 he received both the Excellence in Teaching Award of the Canadian Mathematical Society and the prestigious 3M National Teaching Fellowship. A 3M Teaching Fellow "embodies the highest ideals of teaching excellence and scholarship with a commitment to encourage and support the educational experience of every learner". There have been six 3M Teaching Fellows from Queen's in the past ten years, and half of them have been from the Department of Mathematics and Statistics. That is more than statistically significant, it's anomalous. Leo Jonker is one of these Fellows. Morris Orzech is another.



MORRIS ORZECH came to Queen's in 1968 and over the years has inspired students with the natural ease of a truly dedicated educator. He has vast funds of knowledge, not only about mathematical properties and relationships, but the history and development of these ideas. It was evident to students and university-types alike that Morris was really into what he was teaching, and that he was dedicated to giving students a broad understanding of mathematics by showing them formal ideas within a context – by telling them a story. It takes an exceptional educator to do this effectively, and it is also more fun. Morris has received many teaching awards, including the Ontario Confederation of University Faculty Associations Teaching Award in 1997, and in 2000 he was awarded the 3M National Teaching Fellowship. His is another of those six portraits that you see on the registrar's wall. Morris has been a frequent contributor to Mathematics Education seminars both at Queen's and at other universities and his own work and his service to the university never took away from his focus on the students. In his first year as Undergraduate Chair (2004-2006) he was awarded the Chancellor A. Charles Baillie Teaching Award, and in the last year, the Clarence F. Stephens Award for Distinguished Teaching, Presented by the Seaway Section (Upstate N.Y., Ontario, Quebec) of the Mathematical Association of America.



OLE NIELSEN took over from Morris as the Department's Undergraduate Chair (2006-2012). He began teaching at Queen's in 1970 and his service to both the students and to the university throughout his tenure has been remarkable. He became the chair of the Arts and Science Faculty Board in 2000, holding the position until 2009, and, according to colleague Peter Taylor, he was "known for his wise views on many matters affecting the university". Ole is one of those professors that inspires students, and one of the reasons for this is that his teaching included *doing mathematics in the classroom*. Now, this may sound funny to you, but there is a distinct difference between doing mathematics and presenting mathematics that has already been done. Ole was able to communicate to students what it looks like to engage in higher mathematics, and this is an important part of learning how to think mathematically. In 2002 Ole was awarded the highest honor given by Queen's students to instructors: the Frank Knox Award for Excellence in Teaching, as well as the Golden Pillar Award from the Engineering Society.

These three mathematics professors are all kind, thoughtful, and dedicated mathematicians, respected and admired by many students, whose service to undergraduate mathematics education has made a noticeable difference. Their retirement will be felt across the university. Nevertheless, their dedication will also be felt outside the university in the years to come, where we can imagine the emergence of new, exceptional teachers who have had as their role models, Morris Orzech, Leo Jonker, and Ole Nielsen. In that regard, all three are happy to hear from former students, and current emails can always be obtained from the Math & Stats Dept.

TONY GERAMITA RETIRES

By Asia Matthews

TONY GERAMITA was a constant contributor here at Queen's and to the University of Genova in his beloved Italy where he had a part-time appointment and spent half of the last ten years. He had a formidable international reputation with well over 100 invited lectures and colloquia in Canada, USA, Europe and Asia. And he was an enthusiastic teacher. He had a way of drawing you in with explanations, helping you to visualize the larger machinery so that you were inspired to become interested in details. His enthusiasm and generosity (he invited students to his house for Wednesday dinners) flowed freely and is recognized globally. The annual Route 81 conference series (see article below!) held at Queen's in October 2012 was nicknamed TonyFest to celebrate Tony's 70th birthday (auguri, caro!).



TONYFEST! – OCTOBER 19-21, 2012



The "Route 81" conference series rotates each year between Cornell, Queen's and Syracuse Universities and the 2012 conference was held at Queen's October 19-21 and was informally known as "TonyFest" in celebration of the 70th birthday of Tony Geramita. The interactions between commutative algebra and algebraic geometry have been of great interest to Tony throughout his career, and the talks focused on many aspects of this relationship, most notably, secant varieties, properties of fat points, and homological invariants.

Two of the four co-organizers were Greg Smith at Queen's and Adam Van Tuyl at Lakehead. Adam was a grad student here (MSc 1997 Ernst Kani and PhD 2001 under Tony). He is past Chair of Mathematical Sciences at Lakehead and is now an Associate Professor at McMaster University. The 50 participants included many from the "Route 81" area as well as others from different parts of Canada, the US, and Italy.



Adam Van Tuyl and Ted Hsu (2nd and 3rd from left) talking with Tony. Ted is our current MP and Liberal Science Critic and was a member of our 1983 Putnam team.

IN MEMORIAM



DAVID GREGORY (1942 — 2013)

by Peter Taylor

David embodied what good mathematics ought to be; he was elegant and understated. Often when we were talking about a problem David would suddenly say “stop.” He understood a fundamental principle of learning math, one that we both learned from Halperin, that you have to know when to put the book aside or stop listening, and pick the pencil up.

David led the way for me as an undergraduate at Queen's. He was a year ahead of me and demonstrated that it was possible to do a math degree in three years. In fact Norm Rice had already discovered that path a couple of years earlier. It wasn't so hard in those days; the books were a lot thinner, the professors, Coleman, Fixman, Ribenboim, Halperin, Kemp, Obreanu, let us learn in our own way, and there wasn't any technology to slow us down. Bob Kemp used to have us mark our own assignments and then he called the roll in class and we reported our mark out loud.

David went to Michigan for his Ph.D. and did topological vector spaces with M.S. Ramanujan. I recall getting a letter from him describing the Thanksgiving dinner he had at the Halmos'. I came back to Queen's

on staff in 1969 and at 9:50 on my first morning David appeared and observed that there was probably coffee by now in the lounge. In those days it was a large silver percolator that one of the secretaries started up at 9 o'clock.

David started his career in analysis, but soon switched to discrete math. David, Norm Pullman and Dom de Caen formed a thriving research group in what was a strong Departmental offering. David had a dozen graduate students, for example Jian Shen, who won the Governor General's Gold Medal and the CMS Doctoral Prize, and Kevin Vander Meulen, now at Redeemer College, and Randy Elzinga, now at RMC. The most colourful, in my memory, was Lee Jeff Bell whose thesis was published in *Gambling Times*. I remember him trying to convince anyone who would listen to lend him \$10,000 which was the stake he needed to implement his theory on the Las Vegas two-arm bandit and win \$50,000 dollars with probability 95% after 72 continuous hours of pulling the two handles in a fixed pattern at 5 seconds per pull. [Sounds like fun? – he actually went down with some friends and did it, taking shifts, but they didn't take along a big enough stake.]

David became a Full Professor in 1988. At that time he was Communicator Editor and coach of the Putnam team. He was known as a superb teacher and many students and I can attest to that. Probably both the elegant and the understated are at work there.

Fourteen years ago David was diagnosed with cancer and it got serious very quickly. He retired and put his psychic energies into fighting the disease. The class he left behind asked about him almost every week. There were rough times, but in a year there was huge progress and after 18 months he was his old self again, out on the lake in his kayak.

IN MEMORIAM



JIM WHITLEY (1931 — 2015) "IN JIM WE TRUST"

by Peter Taylor

Jim started teaching mathematics at Queen's in September 1963. From 1966 to 1974, in addition to his teaching workload, he served as executive assistant to the dean of Arts and Science, and later, as assistant to Principal John Deutsch. He was the 2001 recipient of the Alumni Award for Excellence in Teaching, given annually by the Queen's University Alumni Association.

"Jim demystified Mathematics with his unique teaching style." (Globe and Mail Jan 6 2015). He certainly did. His fame was greatest for his extraordinary success with his "Section J" students. These were the applied science students who did poorly enough in the fall of their first year (why a misjudgment, not being quite ready?) that they were put into a section that moved more slowly and went from January till

June. Jim worked them relentlessly and met with them Saturdays and evenings somehow cultivating an awesome enthusiasm for their studies and for the wonder of mathematics. Often, when June finally arrived, their resulting marks exceeded those of the regular students and they graduated successfully and on time. They revered Jim, and Jim in turn took every opportunity to sing their praises.



DOUG CRAWFORD (1921— 2015)

by Norm Rice

Doug Crawford, a professor of Mathematics Education, died January 19th, in his 91st year. Doug was born in Scotland, and long maintained his passion for Scottish dancing. However, he immigrated to North America and completed a PhD in mathematics education at the University of Syracuse.

In 1962 he joined the Department of Mathematics at Queen's University, with his focus primarily on math education and

secondarily on statistics, and subsequently joined the Queen's Faculty of Education when it was founded in 1968.

As well as his regular teaching he was heavily involved until his retirement in 1988 in numerous studies and reports on school mathematics (again, often concentrating on statistics), most often in collaboration with the Ontario Institute for Studies in Education (OISE).

Both at work and at church Doug had a wide range of strong opinions, and was not shy about sharing them, but always well-reasoned and articulated (even if not always persuasive). He was a voracious reader with many areas of interest, and this naturally went along with a sharpness of mind that stayed with him right to the end. Indeed, almost his only complaint about the nursing home where he spent his last years was what he felt was rather a lack of intellectual stimulation.

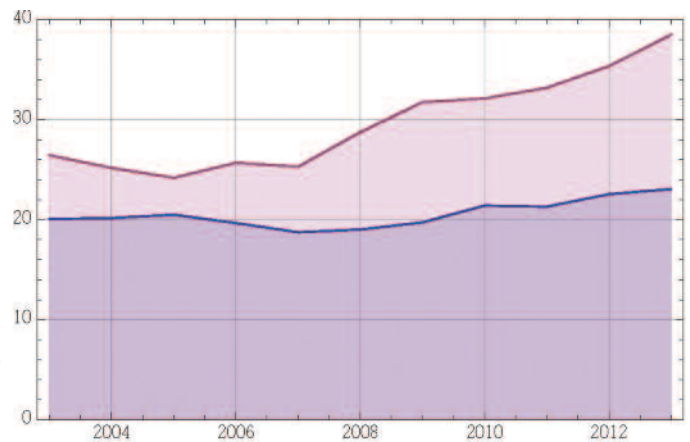
QUEEN'S NEW BUDGET MODEL

by Peter Taylor

As you may know, Queen's is in the process of implementing a new budget model based on revenue attribution—money should flow, as much as possible, in direct proportion to salaries and activities that support the academic mission of the university. We in Math&Stats are quite interested in how this might affect our own budget and in particular our capacity to hire new faculty. Let's point out that faculty hiring is the big ticket item here as it is by far the biggest potential factor behind enhanced research performance and teaching effectiveness. This is particularly true in Math&Stats as we have experienced many retirements over recent years and significant increases in student numbers.

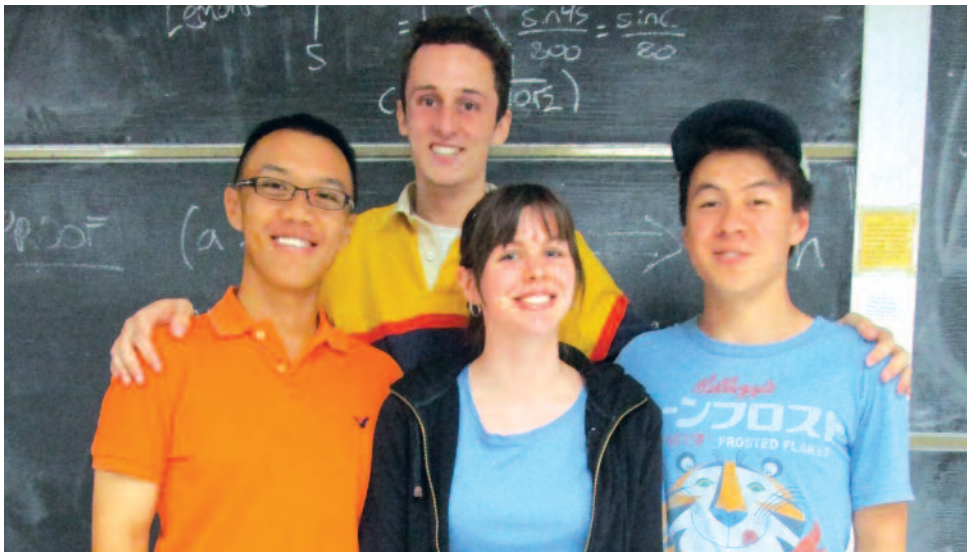
In fact we are a spectacular outlier on any chart of student number against faculty

size. For example here is a rather rough approximate of the "teaching" student-faculty ratio in the Faculty of Arts & Science at Queen's. I say "approximate" because there are many ways to do the counting which give slightly different numbers but essentially this gives a measure of average class size. The red line is Math & Stats and the blue is an average of all other departments in the Faculty. One thing that has certainly "saved" the Department in these past years is the Coleman Postdoctoral Fellows program. When we started our



search for donors 15 years ago (when times were much better) little did we realize what a life-saver this would be. Thanks to Jamie Mingo for this graph.

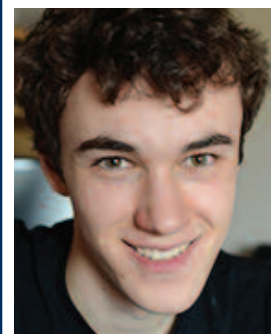
MATH INVESTIGATIONS



The team of tutors are (L to R) Floyd Shou, Andrew Van Den Hoeven, Nicole Pashley, Greg Chung.

Math Investigations is an enrichment program for first year students in Math 121 and 120. It meets once a week and grapples with interesting investigative problems from various areas of mathematics. The program is funded by *The Norman Miller Assistantships in Mathematics Education*, established in 2003-04 to provide exceptional teaching and learning opportunities for third or fourth year undergraduate students. Norman Miller was a member of the Queen's Math Department from 1919 to 1959. Through

his clear lectures, his encouragement of able students to take up the teaching of high school mathematics, his active participation in a succession of organizations of mathematics teachers and his co-authorship of high school textbooks, Norman Miller made an enormous contribution to the teaching of mathematics in Ontario. He was undoubtedly one of the most beloved and respected teachers of mathematics in Canadian universities. [Queen's Mathematical Communicator, Jan. 1985.]



RYAN KAVANAGH

One of our senior undergraduates, **Ryan Kavanagh** won the 2014 NSERC-CMS Math in Moscow Scholarship.

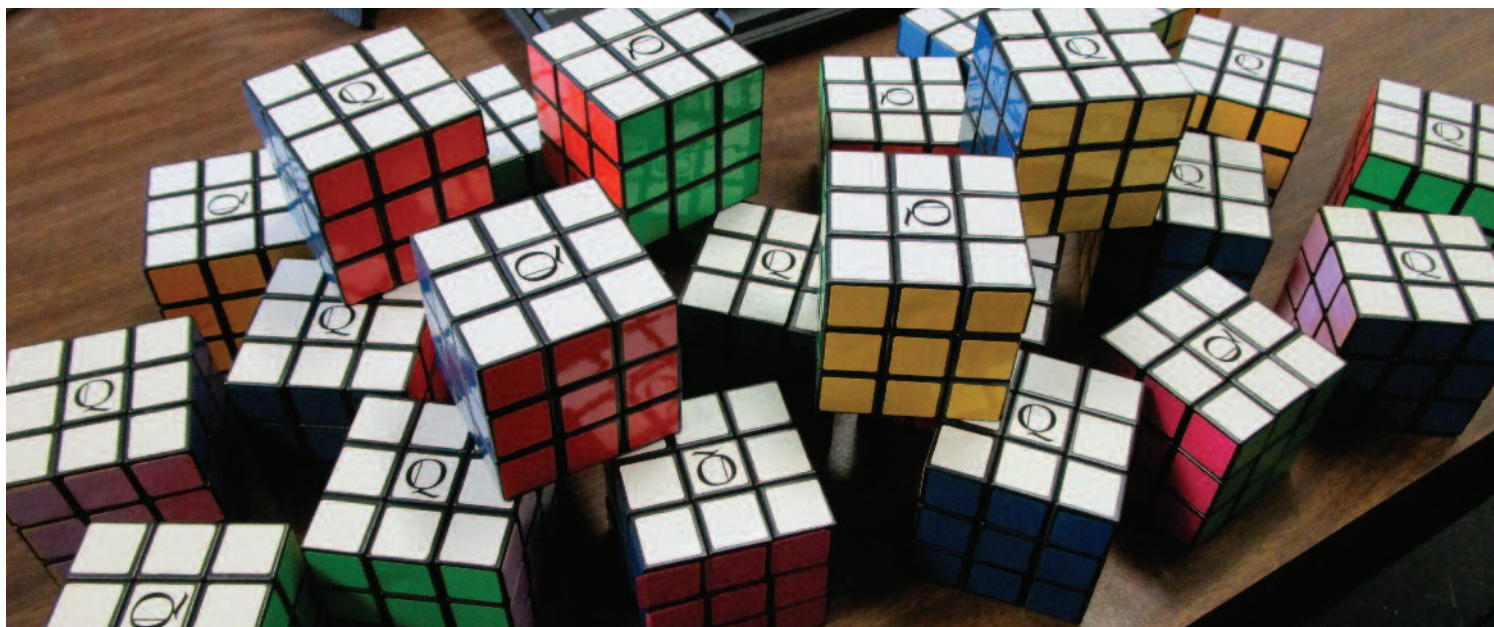
MathQuest

QUEEN'S MATH CAMP FOR GIRLS

Last year marked the beginning of an extended version of our Queen's Math Camp for Girls, which we have held each August for the past four years for some 15 local girls entering grades 9 to 11. Initiated and nurtured for the first three years by

Maja-Lisa Thomson, and with the support of an alumni donor, we incorporated a residential structure and were able to accept campers from far and wide. The emphasis is on problem solving and on learning about areas of mathematics that

are not normally covered in the school curriculum and the counsellors come from the ranks of our own wonderful graduate and senior undergraduate students.



MATH QUEST

by Siobhain Broekhoven (including photos)

Words fail me when I try to express how pleased I was when Peter Taylor approached me about expanding the Queen's Summer Math Camp for Girls into a residential program: more time, more math, more instructors, more girls. Just a wonderful project from tip to toe. The camp was started by Maja-Lisa Thomson under the name "Explore Mathemagics." Maja-Lisa's labour of love was sponsored by both the Department and the Canadian Mathematical Society. Next, a Jeffery alumnus, Tom Higgins, wanting to create opportunities for youth through extra curricular math, stepped up to start the "Peter Taylor Math Camp Fund" and our future was secured.

I am very grateful for the support from the community in promoting our camp. Local papers ran articles; our posters went up at dojos, gyms, libraries and community boards. (One camper found our camp because our poster was decorating a horse trailer at an equestrian event.) Our MP for Kingston and the Islands – also a Queen's alumnus, Ted Hsu, posted our event on his community Facebook Page. Alumna Shelley McLean, math coach for a local school board and now a math department head, was one of many local math teachers who also promoted our camp. (Shelley is a former student of Peter's; she also used to bring high school students to Peter's "every other Wednesday" Enrichment Sessions.) The Queen's University Alumni

Association sponsored a camper. The Camp Fund provided many more bursaries for girls to attend. The new website I built, along with more Internet presence, led to inquiries from BC, Alberta and the US. The logo was designed by Peter, Carly and me, and incorporates the rational Q logo developed by Harry de Valence (currently doing his master's here) and the Department Student Council (DSC), at one of our regular "brainstormy" weekly meetings back in 2012. This logo can often be seen on departmental clothing and merchandise sold by the DSC to fund undergraduate events. There are many more who shared ideas, resources and spread the word. I thank all of you. With so many people contributing, it is no surprise

Continued...

MATH QUEST



...Continued

photo by Leo Jonker

that a final survey shows that our camp met or exceeded every camper's expectations.

Each summer this camp has unique material so that campers may return for

new adventures in math. Activities are developed by our awesomely talented graduate and undergraduate students to be especially appealing to young women who

are currently under represented at math camps. (In 2013, only 21% of participants in CMS math camps were female.) Activities are designed to be hands-on, collaborative

Continued...



Suzanne Findleton's drum circle at the waterfront near Victoria Hall

MATH QUEST



...Continued

Maja-Lisa Thomson tells campers about her early days in Bell Labs at a lunch at the Ban Righ Centre supporting the continuing education of women.

and project based. Some of our sessions were Topological bagel carving with Asia Mathews, probability theory, Texas Holdem' style, with Joanna Hansen, group theory through braiding with Suzanne Findleton, and the always popular cryptography with Emilie Wheeler. New last year, the Electrical and Computer Engineering department (through Evelyn Morin) let us use their resources to get our campers into coding. Carly Rozins lead the way, and with Tyson Mitchell, had campers manipulating and writing code in RobotC to make Lego Robots dance and twirl. Evening activities included Yuliya Nesterova's math bingo and Suzanne's drum circle.

Math Quest 2015 took place Aug 10-13, 2015. For more information or to view more photos, please visit our website, www.mast.queensu.ca/~mathquest or contact us at mathquest@queensu.ca.

For further reading, please see the spring 2015 issue of the Alumni Review: queensu.ca/alumnireview/creatingopportunities-kids-shine.



Mike Cabral and Carly Rozins after Math Quest's Amazing Race, an activity designed by Natalie Corneau. Carly is the outgoing President of the Queen's Graduate Math Society. Mike is the elected 2014-2015 GMS President.

SHAD VALLEY ULTIMATUM GAME 2015

By Peter Taylor

A game, much studied by psychologists, economists and biologists is the Ultimatum Game. In the basic version a proposer P is “given” a sum, (say \$100) to split with a responder R. The proposer announces the split, say, “I’ll keep 75 and you get 25,” and the responder either accepts the division (in which case that’s what happens) or refuses, in which case both parties get nothing. So in a one shot game, what would you as the proposer do? There are interesting stories and articles online about what happens, with adults, with preschoolers and with chimpanzees. One might ask what the Nash equilibrium is.

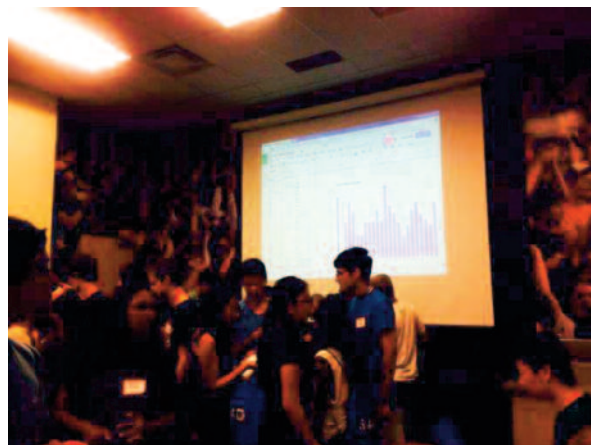
In July we played a version of this game with 48 high school students at the Queen’s Shad Valley Camp. We put them into 24 boy-girl teams and each team played many rounds against other teams, half the time in each role, P and R. The objective was to be the winning team. A group of our undergrad students set up a computer system to allow the total score of each of the 24 teams to be posted as the tournament progressed. In the picture at the right the game is in progress and you can see the current scores displayed on the screen. We found that many teams chose their strategy according to the current score of the team they were playing.

Here’s the variation we used. The R-team first makes a demand: “We will accept no less than X”. The P-team then makes an offer Y. The R-team then reveals its predetermined (and secret) MinAccept value Z (which they could change from round to round). If $Z \leq Y$ then the R-team gets Y and the P-team gets $100 - Y$ and these scores are added to each team’s cumulative total. If $Y < Z$ both teams get a zero score for that round. That is, if the offer of the P-team does not meet that secret MinAccept, neither team gets anything.

You can think about what you’d expect to happen but what did happen quite surprised us. The teams that did the best tended to play a “fair” strategy with a Proposal and MinAccept not too far below the midpoint 50.

At the end, the teams that placed 1st and 2nd played off for a real pot of 20 dollars. What do you think they did?

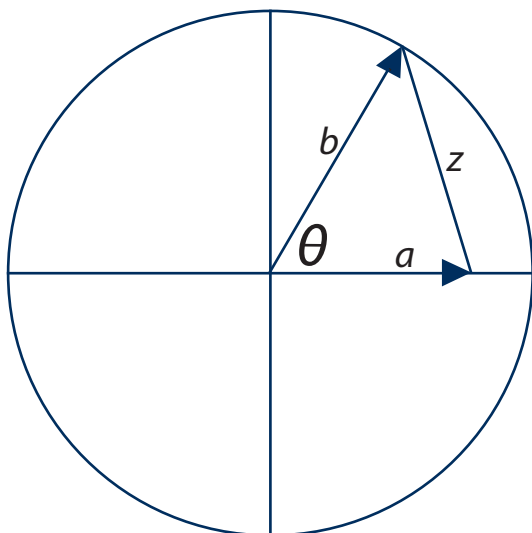
The R-team (at the left) made a demand of \$11. The P-team proposed \$9. In the picture you can see the look of dismay on every face as the MinAccept was revealed as \$10. Both teams went away empty-handed!



NEW PROBLEM *(Thanks to Jamie Mingo)*

The hour hand of a clock has length 3 and the minute hand has length 4.

- (a) What is the angle between them when the two ends are moving apart at a maximum rate?
- (b) Your answer has a simple and striking geometric interpretation. Does this remain true in general-if the hour hand has length a and the minute hand has length b ?



Send solutions or new problem suggestions to peter.taylor@queensu.ca.

Solutions to past Communicator problems can be found at:
www.mast.queensu.ca/communicator_soln.php

OPPORTUNITIES FOR MAKING A GIFT TO THE DEPARTMENT

There are lots of quite interesting opportunities for participating in the life of the Department by making a gift. And it's easy. Go to the Office of Advancement's secure website: www.givetoqueens.ca/mathstats

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