WELCOME FROM THE HEAD, TROY DAY

Welcome once again to the latest installment of the Queen's University Mathematical Communicator. We apologize for the slight delay in getting this Fall 2024 issue into your hands, but hopefully it provides you with some fun and interesting updates as we go into the new year. We are also thrilled to announce that this is the **40th installment of the Communicator** since the inaugural issue was published in February 1979!

This year again saw some important changes in our staff and faculty complement. **Dan Offin** retired after more than 35 years in the Department, and **Anne Burns** retired after 23 years of dedication as our Undergraduate Assistant for Mathematics and Statistics. We wish them both the very best as they enjoy a much-deserved increase in their free time!

We are extremely pleased that **Israte Afroze**, who has been our Departmental and Financial Assistant, has taken over the huge task of becoming our new Undergraduate Assistant. We welcomed **Kexue Zhang**, a new tenure-track faculty member in our Mathematics and Engineering Program, and we also welcomed back **Bahman Gharesifard** to the Department as a Full Professor. Last (but certainly not least!) we welcomed three new postdoctoral fellows: **Liangbing Luo** and **Neige Paulet** as Coleman Postdoctoral Fellows and **Shaza Alsibaai** as an externally funded Postdoctoral Fellow.

It has been another very successful year for our faculty and students in terms of recognitions and awards. You can read about several of these in the following pages, but I want to mention two of them. First, congratulations to **Ram Murty** who was awarded the prestigious CRM-Fields-PIMS Prize this year. This prize is the premier Canadian award for research achievements in the mathematical sciences and it brings well-deserved recognition to Ram and his research. Second, congratulations to **Héctor Pastén**, a former PhD student in the Department, who was awarded the 2024 Ribenboim Prize. This prize is awarded by the Canadian Number Theory Association for distinguished research in number theory. You can read more about both prizes in the following pages. Fittingly, Héctor was a PhD student with Ram while he was at Queen's!

This past year has also been exceptionally busy in terms of events hosted by the Department. In June 2024 Queen's and the Department of Mathematics and Statistics hosted the Canadian Applied and Industrial Mathematics Society's Annual Meeting. This meeting welcomed more than 300 mathematicians to campus from across Canada and internationally to share their latest research. It would not have been possible without the enormous organizational efforts of **Bahman Gharesifard**, **Felicia Magpantay**, and **Giusy Mazzone**.

Coupled with this event, the Department also hosted the inaugural Queen's Mathematics Summer School. This school consisted of 1 week of intensive instruction in three different areas of mathematics, and is intended for undergraduate and early graduate students. It was also an enormous success and attracted around 70 students from as far away as South Korea. The summer school was organized by **Francesco Cellarosi**, **Maria-Teresa Chiri**, **Bahman Gharesifard, and Felicia Magpantay. Maria-Teresa**, **Bahman** and **Mike Roth** kindly taught the three different courses, which included topics on Scalar Conservation Laws, Machine Learning, and the Topology of Maps between Curves. Coleman Fellow **Zach Selk** also kindly gave a special lecture on Rough Path Theory. This summer school will now be a biennial event and we are already looking forward to planning the next offering for 2026.

Lastly, I mentioned in the previous issue that there are challenges facing the university in the coming years related to its budget. Although such fiscal constraints are never comfortable, we have taken this as an opportunity to carefully examine our programs and course offerings. In any university, programs and courses evolve gradually over time and this piecemeal change sometimes results in structures that are not very efficient. Our department is no exception and through some overdue housekeeping and thoughtful re-organization we have managed to make some substantial improvements this past year. In fact, through these changes we have actually managed to develop some new course offerings that have long been desirable, including courses in Data Science, Differential Equations, and Topology to name a few. These new developments will help to both strengthen our degree programs and to make them more attractive to future students. In all it has been a great exercise in how to take lemons and make lemonade!

A group of students at our summer school wandering downtown on a warm summer evening.
Picture credit Kyle Sung

FACULTY NEWS

RAM MURTY
WINNER OF THE 2024 CRM-FIELDS-PIMS PRIZE

Canada's three main mathematics research institutes are CRM (Montreal), Fields (Toronto) and PIMS (Vancouver). Each year, they award a prize for distinguished research in mathematics and this year's winner is Ram Murty, the A.V. Douglas Distinguished University Professor at Queen's University.

Taken from the Fields Institute website:
https://www.fields.utoronto.ca/news/Ram-Murty-to-receive-2024-CRM-Fields-PIMS-Prize

After completing his PhD at MIT in 1980, and post-doctoral fellowships at the Tata Institute and at the Institute for Advanced Study, Ram moved to McGill in 1982, remaining there until 1996. In 1996, he moved to Queen's University, where he is now the A.V.Douglas Distinguished University Professor.

Ram first came to prominence in the early 1980s with his breakthrough result (joint with Rajiv Gupta) on Artin's conjecture (that each prime multiplicatively generates infinitely many finite fields of prime order). This, and subsequent refinements, tell us that the conjecture holds for all but possibly two primes. This was followed by an analogous result for elliptic curves E defined over the rationals, showing that there is an infinitude of primes for which E(Fp) is cyclic. With his brother Kumar, he supplied the key result needed to make Kolyvagin's work on the rank 0 case of the Birch-Swinnerton-Dyer conjecture unconditional, showing that the central critical values of the Hasse-Weil L-series of an elliptic curve twisted by a quadratic Dirichlet character are non-zero for infinitely many such characters.

Other highlights include a clarification of a class of L-functions, the Selberg L-functions, capturing the desired properties of the L-functions which occur in the Langlands program; basic results on modular forms and their Fourier coefficients; and some transcendence results for special values of L-functions.

Ram works on a wide front, with imagination and originality, combining both analytic and algebraic techniques and bringing real philosophical depth to the questions he considers. Few parts of the subject of number theory, including its ties to far-afield topics like mathematical logic, p-adic geometry, and foundations, have been left untouched by his wide-ranging intellectual curiosity.

The research presence of Ram Murty on the Canadian mathematical scene is far from being measured only by his own research publications. There is an impressive list of monographs that he has authored, which have served as both introductions and reference works to generations of scholars. Indeed, he has played an active role in forming the next generation of number theorists in Canada, India, and throughout the world, mentoring thirty-nine post-doctoral fellows and supervising over fifty PhD and Master's theses. If not a Canadian record, it is close; and to this, one should add his foundational role in several structural initiatives that have built up the strong Canadian number-theoretic school, such as Montreal's Centre Interuniversitaire en Calcul Mathématique Algébrique (CICMA) lab and the very successful Canadian Number Theory Association (CNTA) conferences.

FELICIA MAGPANTAY

THE SENATOR TOBIAS C. ENVERGA MEDAL OF EXCELLENCE

https://senatorenverga.com/medal-of-excellence/

The Senator Tobias C. Enverga Medal of Excellence was established in 2017 to recognize outstanding individuals and organizations who have demonstrated strong leadership and who have made significant contributions towards the betterment of their communities.

PETER TAYLOR
CMS-SMC 2024 GRAHAM WRIGHT AWARD

Taken from: https://cms.math.ca/news-item/dr-peter-taylor-named-2024-graham-wright-award-recipient/

Peter Taylor obtained his B.A. and M.A. from Queen's University, before completing his Ph.D. at Harvard in 1969. He is currently a Professor of Mathematics and Statistics at Queen's, cross appointed to the Department of Biology and the Faculty of Education. He has been an active member of the CMS since 1973. He serves as a leader for Education Sessions at CMS Meetings, offering guidance and coordination.

Beyond his involvement with the CMS, Peter has played a pivotal role in math education across Canada. He was a founding member of the Canadian Mathematics Education Study Group (CMESG), the Canadian Math Ed Forum (CMEF), and the Ontario Association for Mathematics Education (OAME) and was instrumental in initiating math education initiatives at the Fields Institute.
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BAHMAN GHARESIFARD: WELCOME BACK!

Bahman returns from UCLA!

Bahman completed his PhD at Queen's in 2009, and followed that with postdoctoral fellowships at University of California, San Diego and University of Illinois, Urbana-Champaign, and ultimately a faculty position at UCLA. This past year we enticed him back to Queen's and we are extremely happy to have him here as a Full Professor.

Bahman's interests lie within the areas of systems and controls and intersects with network sciences and graph theory, stochastic processes, algorithm design, machine learning, social and economic networks, and game theory.

In an article in the 2020 edition of the Communicator celebrating his Humboldt Research Fellowship, Bahman made a fascinating distinction between control theory and machine learning.

"As control theorists, we are often worried about stability; we don't want systems to go unstable, ever. So, in making these decisions, we are very conservative. But the drive to enforce stability prevents exploratory decision-making and ultimately this drops system performance.

"This is not the case for folks who work on machine learning problems, where dealing with unknowns and lack of robust models is often part of the setting. For them, stability is not the main concern, but performance is.

"The same goes for estimation problems (i.e., make an input, observe the output and draw conclusions about the states), where again as control theorists, we always worry about the possibility making the system unstable. When we formulate all this mathematically, we can capture how much "regret" we accumulate over time by making conservative decisions.

"The interesting question now is whether we can strike a balance. This would have been taboo a decade ago in control theory, letting stability go, but with the emergence of techniques from machine learning and the abundance of data we have access to, we are learning that we can implicitly regularize a system. In a sense, rather than enforce stability, we can learn the beats of the system over time, and drive safely with that."

Some of Bahman's close collaborators and co-authors at the Elm cafe right after wrapping up CAIMS 2024. From left to right: Bahman, and Professors Alex Olshevsky (Boston University), Behrouz Touri (UC San Diego), Mohamed Ali Belabbas (UIUC), and Xudong Chen (Washington St. Louis).

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NEW FACULTY APPOINTMENT
KEXUE ZHANG

The Faculty of Arts and Science is pleased to welcome Kexue Zhang, a newly appointed faculty member in the Department as Assistant Professor and Verner Family Fellow.

This faculty Fellowship focuses on advancing his research in hybrid systems and control theory and applications and strengthening undergraduate and graduate programming in mathematics and engineering at Queen's University.

Dr. Zhang is jointly appointed with the Department of Electrical and Computer Engineering within the Smith Faculty of Engineering and Applied Science.

Prior to joining Queen's, Kexue held postdoctoral positions at the Pacific Institute for the Mathematical Sciences, the University of Calgary, and Queen's University. He obtained a PhD in Applied Mathematics from the University of Waterloo and a PhD in Control Theory and Control Engineering from Shandong University in Jinan, China.

"The collaborative and supportive research and teaching environment, along with my previously established relationships with faculty and staff and my familiarity with the Queen's culture are what drew me back and made the transition to the University so smooth." says Dr.Zhang.

Kexue is excited to be advancing his research in event-triggered control theory. Event-triggered control offers a practical method to update the control signals at a sequence of moments determined by specific execution rules, often called an event. The key benefit is improving the efficiency of control implementations while still maintaining the desired performance levels. In the next year or two, he plans to work on event-triggered control with time delay effects which will greatly impact many fields, including robotics.

Outside of academia, Kexue enjoys hiking and skating along with practicing his serve on the volleyball court.

FUN FACT: In Chinese, "Kexue" means "Science". "Ke" and "Xue" separately mean "discipline" and "study," respectively. His grandmother named him with the hope that he would become a scientist.

DAN OFFIN RETIRES…

"I came to Queen's on July 1,1988 from University of Missouri, Columbia where I had spent 4 years as an assistant professor in the Department of Mathematics. Queen's was my second appointment after graduating from U of Calgary with a Phd under David Rod, an early student of Charlie Conley in Madison Wisconsin. Conley was a student of Juergen Moser at Courant. This connection to some of the deepest researchers in Hamiltonian dynamical systems had a major impact on my own research interests, which continued on after I came to Queen's. My appointment at Queen's was shepherded by Leo Jonker whom I had met at the Midwest Dynamical Systems Conference in 1987. My time at Queen's was devoted to pursuing different aspects of this topic which I had initiated in my Phd, that of using variational methods and symmetry in seeking global periodic solutions and their resulting qualitative properties such as hyperbolicity, chaos and or orbital stability under different topological conditions and geometries. This topic has exploded in recent years with the growth of symplectic techniques in dynamics and hundreds of new researchers worldwide using the Conley-Zehnder index to explore these properties. Some of my PhD students continue this tradition with positions at BYU, Norwich University in Vermont and Trent University here in Ontario.

Dan with his partner, Janice James

"Leo Jonker often commented that he thought I had come to Queen's partly to take advantage of the sailing conditions in particular the windsurfing opportunities. Point taken! I have had a great time enjoying the water and its environs, while I simultaneously enjoyed the research atmosphere and graduate supervision here at Queen's. Lorne Campbell was Head when I joined Queen's, Bill Woodside, Bruce Kirby, Jon Davis, David Gregory, Norm Pullman, Dan Norman, John Coleman, Bob Erdahl, Malcolm Griffin, Grace and Morris Orzech, Tony and Joan Geramita, David Pollock, Robin Giles (who was also a rock climber with multiple first ascents on Squamish Chief and Shawngunks in the Adirondacks), Dom DeCaen, Terry Smith, Agnes Herzberg, Ron Hirschorn and Kirti Oberai, were prominent faculty members who have since moved on through the doors of Jeffery Hall.

"One of the outstanding connections made in my first years at Queen's had to do with the Queen's-Steklov exchange run and maintained by Bob Erdahl and John Coleman. My climbing mentor and partner Jim Jones at Calgary was a recipient of several high level exchanges including his interactions with Yuri Matiyasevich, renowned for his negative solution of Hilbert's tenth problem. My collaboration with the exchange and a visit to Soviet Russia in 1989, resulted in Oleg Bogoyavlenskij coming to Queen's in 1992. Sadly, Oleg and I collaborated on only one publication during this period.

"Coming to Kingston, I brought my young family transplanted from the Midwest. This was followed in the ensuing years with three more great children whom have been a wellspring of inspiration, and a guiding light for me during my time at Queen's."

ANNE BURNS RETIRES…
…AS UNDERGRAD CHAIR ASSISTANT AFTER 23 YEARS.

Losing Anne is not only a loss to the Department; the entire Faculty will miss her unfailing grasp of the way things run, and even of more value, the way they used to run in simpler times.

Students counted on her a lot. She had a remarkable way of being both firm and supportive. Students who write to me with course problems of all kinds, continue to copy Anne by name.

And now for the deep secrets. There are many regulations about what can't be done. A good example, that arises at the start of every term, is that a course that is required for our majors is full (i.e. #students = #seats) and there are 3 students clinging desperately onto the edge of the waiting list. When I would vent my frustration to Anne, she'd say "Let me see..." I never asked how she did it.

And I was delighted that she agreed to accompany me to the service dinner where I celebrated 55 years at Queen's.

And that gave us a fine picture of Anne with the Principal, Patrick Dean. -Ed.

OUR PHD STUDENTS STRUT THEIR 3-MINUTE STUFF

That's right—they had three minutes and one slide to summarize years of research work and at the same time entertain an expectant audience of their professors and peers!
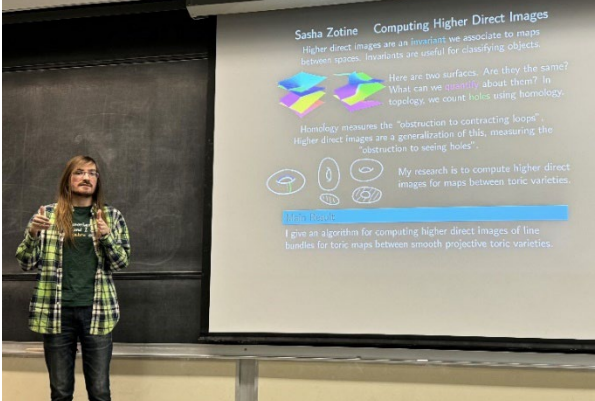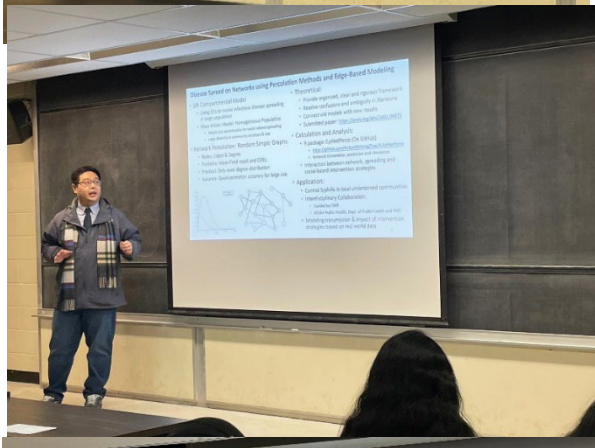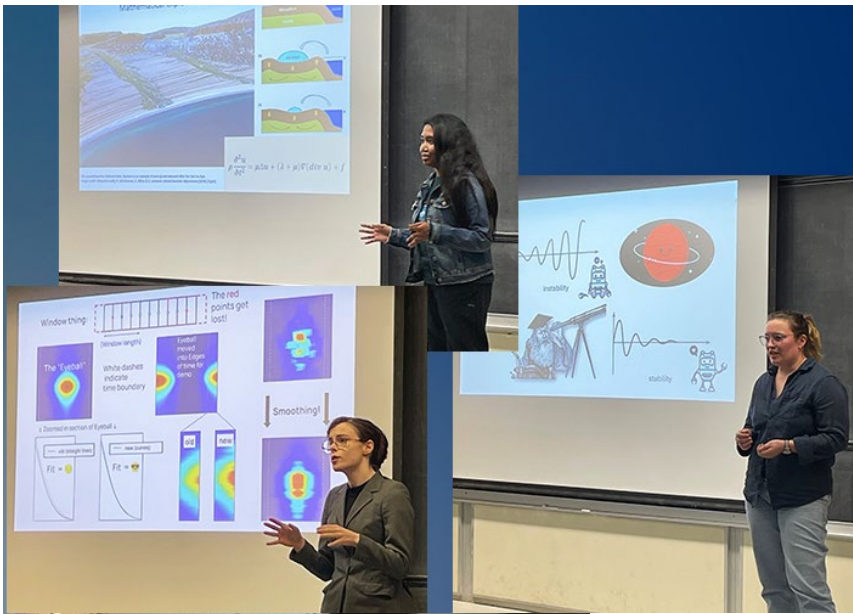
Presenters (top to bottom)

Jerin Farin (Giusy Mazzone) Mathematical Exploration of Post-Glacial Land Rise

Annika Fuernsinn (Bahman Gharesifard) Stability Theory

Skye Griffith (Glen Takahara and Wes Burr (Trent)) "Smooth Spectrograms at the Edges of Time"

Neil MacVicar (Francesco Cellarosi and Jamie Mingo) Title: Sizes of Certain Self-Similar Sets

Richard Zhao (Felicia Magpantay) Disease Spread on Networks using Percolation Methods and Edge-Based Modeling

Sasha Zotine (Mike Roth and Greg Smith) Computing Higher Direct Images

Nic Fellini (Ram Murty) On some problems in p-adic analytic number theory (no photo).

STUDENT AWARDS

DANIEL DAVID

THE UNIVERSITY MEDAL IN MATHEMATICS AND ENGINEERING and THE JB STIRLING GOLD MEDAL

The first is awarded to a student in Mathematics and Engineering with the highest Grade Point Average for all courses of third and fourth year, and the second is awarded to the graduating student with the highest standing in the entire Faculty.

Reflections on Queen's University
"My time spent at Queen's has been such a tremendous privilege. The amazingly unique Math and Engineering curriculum was the exact education that I never knew I needed. To Dr. Yuksel, Jen, Dr. Alajaji, Dr. Mansouri, and all of you amazing faculty members, you have no idea the impact you've had on the choices that I make and on all that I continue to do. I owe a tremendous debt to the Apple Math program for how it's helped shape my character.

"If I take away nothing else from my academics here, studying math has shown me a more robust version of the world; its axioms shape the confines of what's possible. I also want to give a special shoutout to Chabad Kingston and the Simon family—you guys are responsible for so many of the highlights of my campus experience."

Stooley's after submitting our thesis submission
L to R: Basil, Thomas, Dan, Henry, Hank, Shalom (all Apple '24)

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Personal Touch
"I try to hold by the words of Coach Herb Brooks of the 1980 U.S. Olympic men's hockey team, who would famously relay to his skaters that 'the name on the front is a hell of a lot more important than the name on the back.' I'll never take for granted being surrounded by such great people."

Future Aspirations
"Since the start of this last semester, a couple of friends and I have been working to get a startup off the ground. I'm pretty excited about it. Hopefully it'll be cool. I might work next year to help fund it. Still figuring it out. I hope I'm always just still figuring it out; I don't think there's anything quite like the toil of figuring it all out in pursuit of charting a novel and noble course. I couldn't imagine anything more boring than having it all figured out.

Until it's all figured out, I'm hoping to have some fun putting out a weekly newsletter and making and reviewing herring with the fellas. Wow, I'm going to miss Queen's. Great barn. COYG."

> "Some of the boys on the way to review some herring (probably gave an inflated rating; everything is better with the boys)".
>
> Ed: I wondered what reviewing the herring actually meant. Dan explained that it meant exactly what I thought: cook, eat, review!
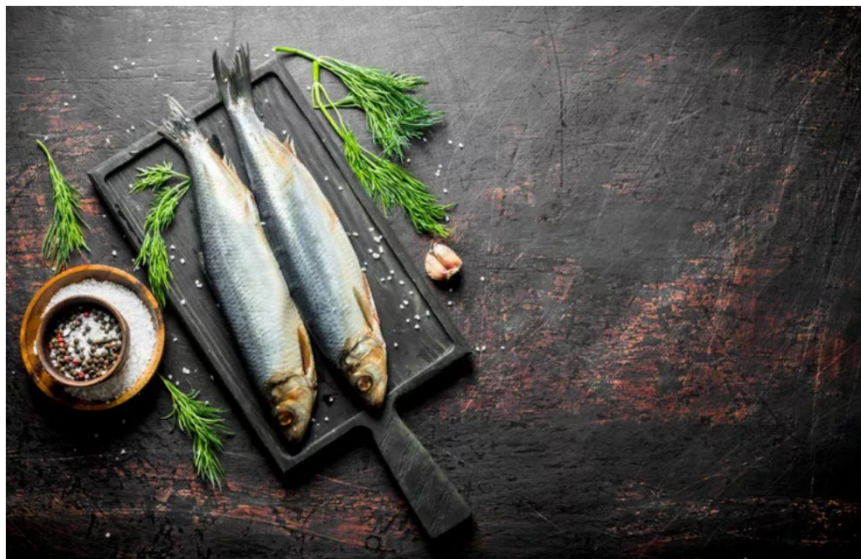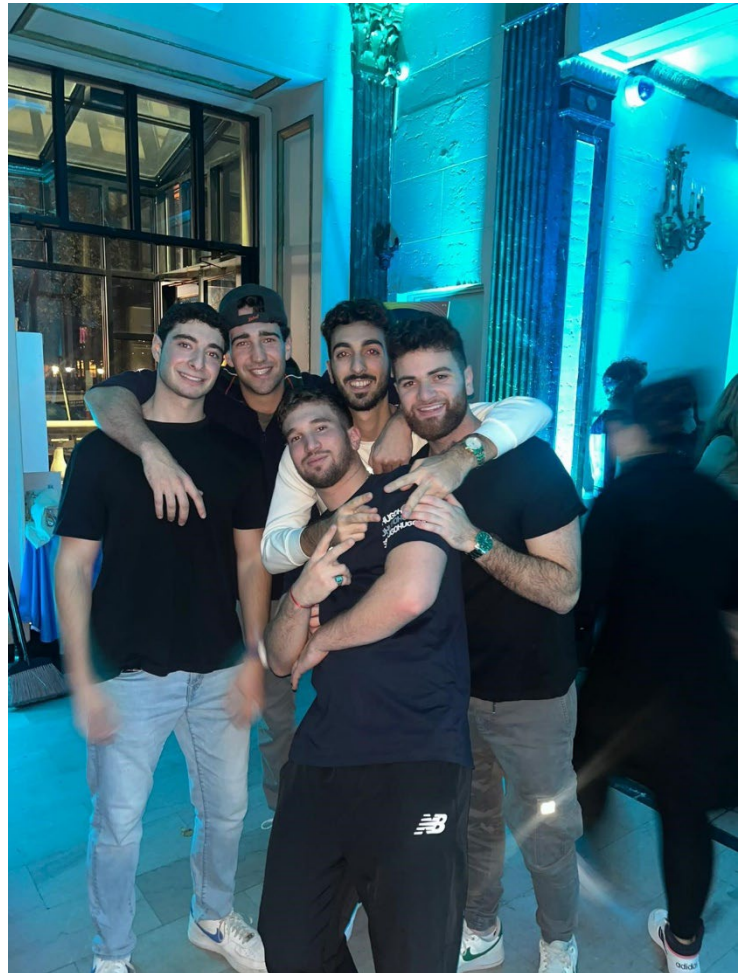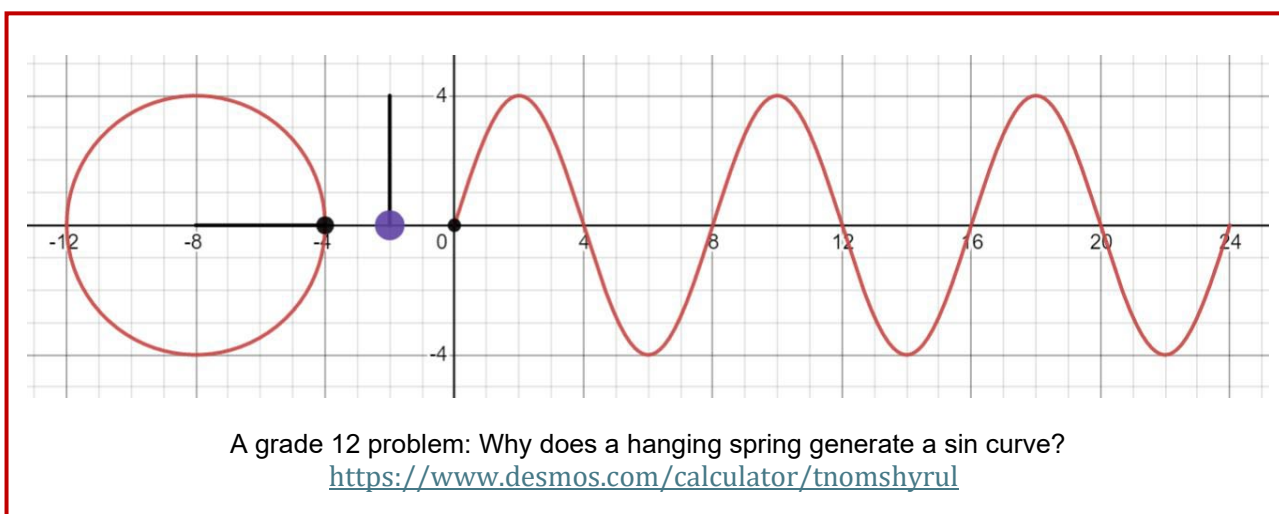
TREVOR SHILLINGTON
MEDAL IN MATHEMATICS AND STATISTICS

The medal is awarded annually by the University to the graduating candidate who has demonstrated academic excellence in an honours degree who is deemed by a Department to have achieved the highest standing in a Plan offered by that Department. Departments within the Faculty of Arts and Science will consider students in a major, joint honours or specialization Plan offered by that Department.

"My name is Trevor. I am a Concurrent Education student who studied math and physics. My interest in math is in communication; being able to explain higher maturity math at younger ages. Thanks to the flexibility of the math major program at Queen's, I have been able to experience first-hand a vast array of different branches and ideas. I am thankful for the entire department in creating such a program.

"I feel that all the professors I have had the honor of being taught by deserve recognition, however there are a few I must acknowledge. I want to sincerely thank Prof. Francesco Cellarosi, Mike Roth, and Ivan Dimitrov for their classes and pedagogy. Each of them I view as exemplars for not only being a mathematician, but also being a math communicator/ educator. Whether it be offering hands-on help during office hours, expanding the course content by posing interesting problem sets, or championing the beauty of their research or area of expertise, they define what I aim to be in the future. For that, I thank you.

"This fall, I am completing my 5th year in the Faculty of Education, ideally bringing the content I learned over the past 4 years to younger students to inspire them to pursue math as well. Beyond that, I am still deciding on applying for grad school within Queen's for Fall 2025."

A grade 12 problem: Why does a hanging spring generate a sin curve?
https://www.desmos.com/calculator/tnomshyrul

MARNI PHILLIPSON
THE IRENE MACRAE MATH & STATS SCHOLARSHIP

Established in April 1986 by Margaret Crain in memory of Irene MacAllister MacRae, Arts 1914, who was vice-president of the Mathematical Club while at Queen's. Awarded on the basis of academic excellence to a student graduating with a BA (Hons) or a BSc (Hons) degree with an academic plan in Mathematics or Statistics.

"Hi, I'm Marni! Last spring I graduated from Queen's with a BScH in math and this year I'm enrolled in teacher's college. I originally decided to major in math because it was my favorite subject in high school — I loved the challenge of solving puzzles and finding patterns. As my time at Queen's progressed, my passion for math grew further. I was able to take a lot of really interesting classes and spent countless nights in Jeffery working through problem sets with my friends.

Marni with classmates Daniel Enge and Jada Marsh.

"I also had the opportunity to work with Professor Catherine Pfaff to learn about her research in geometric group theory and topology. Through these experiences I learned just how creative math can be.

"While studying at Queen's, I also worked as a high school math tutor and discovered my passion for math education, leading me to join the concurrent education program. I love math, and through tutoring, I learned how much I love inspiring my students to love math too.

"However, I've noticed that in high school math classes, it can sometimes be hard to convey to students how creative math can be.

"In my education classes this year, I hope to use my passion for both math and education to explore some ways to incorporate creativity into my future math classroom.

"Next year, I plan to attend math graduate school to further explore the field and eventually teach math at either a high school or university level. Along with math and education, I also love dancing, doing gymnastics, and spending time in nature!"
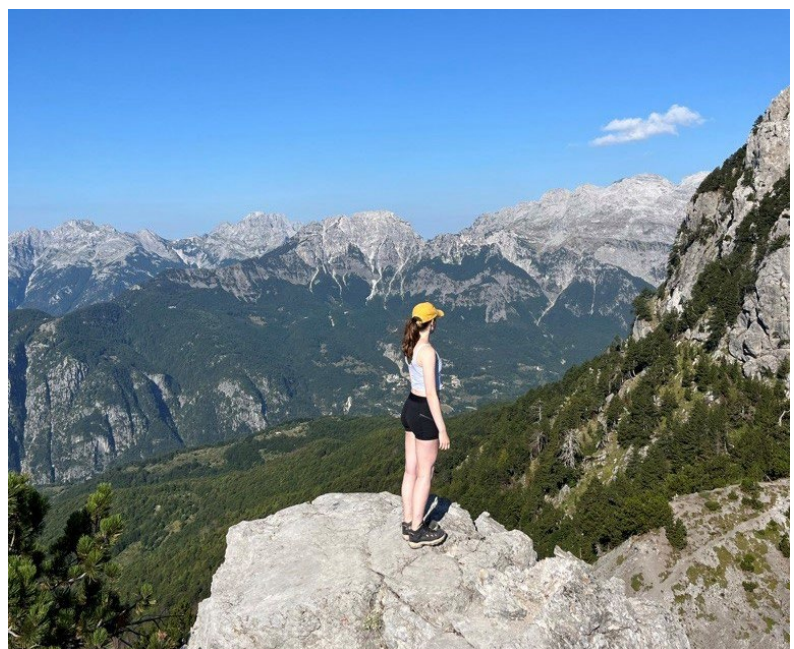
DANIELLE (DANI) RIVARD
J.D. MCCOWAN PRIZE IN INTEGRATED LEARNING,

Awarded to the graduating student or graduating members of a student team who has made a significant contribution to the Integrated Learning Initiative in the Faculty of Engineering and Applied Science.

"Being part of the Queen's Engineering community has provided me with significant growth that I will cherish forever. I came to Queen's from a small town where everyone knows everyone, and I had been a dedicated figure skater my entire life. Growing up in a close-knit community, we relied on each other when bad things happened. Unfortunately, my town faced many tragedies, and we supported each other through these difficult times, making community invaluable to me.

"I was initially attracted to Queen's for its smaller campus and vibrant student life, but I doubted I would find the same sense of community I had in my small town. I was very wrong about this. I had no idea what Orientation would be like, and I could never have guessed the surprises in store. The grease pole event was especially meaningful to me, as it captured the magic of working together both mentally and physically.
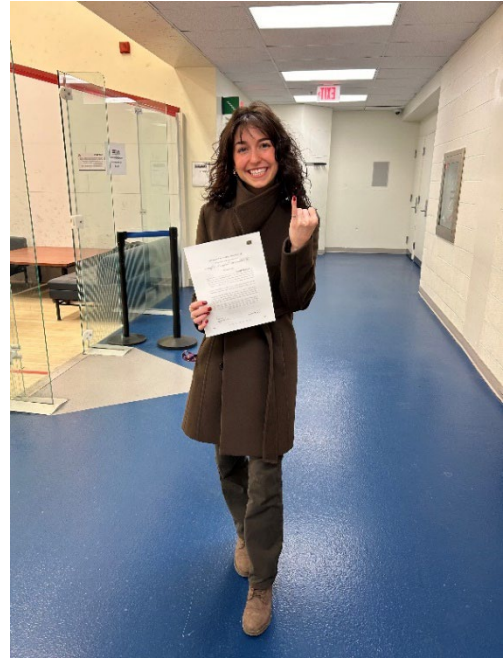
Dani after receiving her iron ring

Dani (right) at the grease pole with Alexa Hadley, Chem., Sci '23

"I carried this mantra throughout the rest of my degree and took a leap by running for EngSoc president in my fourth year. This position gave me a wide range of collaborations.

"One thing that stood out to me was the overlooked difference in treatment between men and women, often due to subconscious biases. This sparked my passion for addressing gender discrimination and understanding the specific messages that can ingrain toxic ideologies.

"I also encountered students who confided in me about harassment from peers, urging for their removal or prevention from applying for certain positions. This placed me in a difficult position, as EngSoc is a volunteer-based organization with barriers to removing or preventing volunteers. Unlike workplace laws outlined by the Ontario government, our society only had grounds for removal if an official police report was filed or disciplinary action took place from the University, which was never the case in my experiences.

"As President, I knew offering direct support would be harmful to both myself and the student, yet I struggled to identify where to refer them for help. This left me feeling stuck, unable to improve the situation AND not knowing what supports to offer. There was a dire need to fill this gap of unknown knowledge within The Society.

"This is when I created the Sexual Violence Prevention and Response (SVPR) Lead, inspired by the Arts and Science SVPR Director. The role was designed not to directly intervene in cases, but rather collaborate closely with the Human Rights and Equity Office and investigate existing university resources. The aim was to ensure these resources were readily accessible within EngSoc and to equip student volunteers with the knowledge to guide survivors to the appropriate university professionals for support.

"After my presidency, I was fortunate to be elected into the SVPR Lead role where I gained valuable insights into the complexities of sexual violence and gender discrimination. The more I learned, the more empowered I felt to take action against it. It became clear to me that education is key to fostering a healthy consent culture within the Faculty of Engineering and the workforce beyond school. I participated in awareness booths and initiated the implementation of various training sessions aimed at educating senior leadership roles within EngSoc on how to respond to disclosures, cultivate healthy relationships, and promote a culture of consent. When the Outreach Coordinator of the SVPR Office approached me with the idea of integrating SVPR workshops and trainings into first and second-year Smith Engineering classes, I was determined to support this initiative in any way I could. Leveraging the connections I made during my presidency, I facilitated introductions between the SVPR Office and professors who I knew would champion this cause.

"While these efforts may appear small, I take pride in initiating these connections and starting conversations that have resulted in integrating SVPR education into the curriculum. And with the recognition of this award, it shows how important this work is and how it needs to continue. Following my graduation, I will continue to advocate for better SVPR practices and proper education regarding gender-discrimination in the workplace. I am so thankful for Aphra Rogers who nominated me, and for her support in advancing this cause."
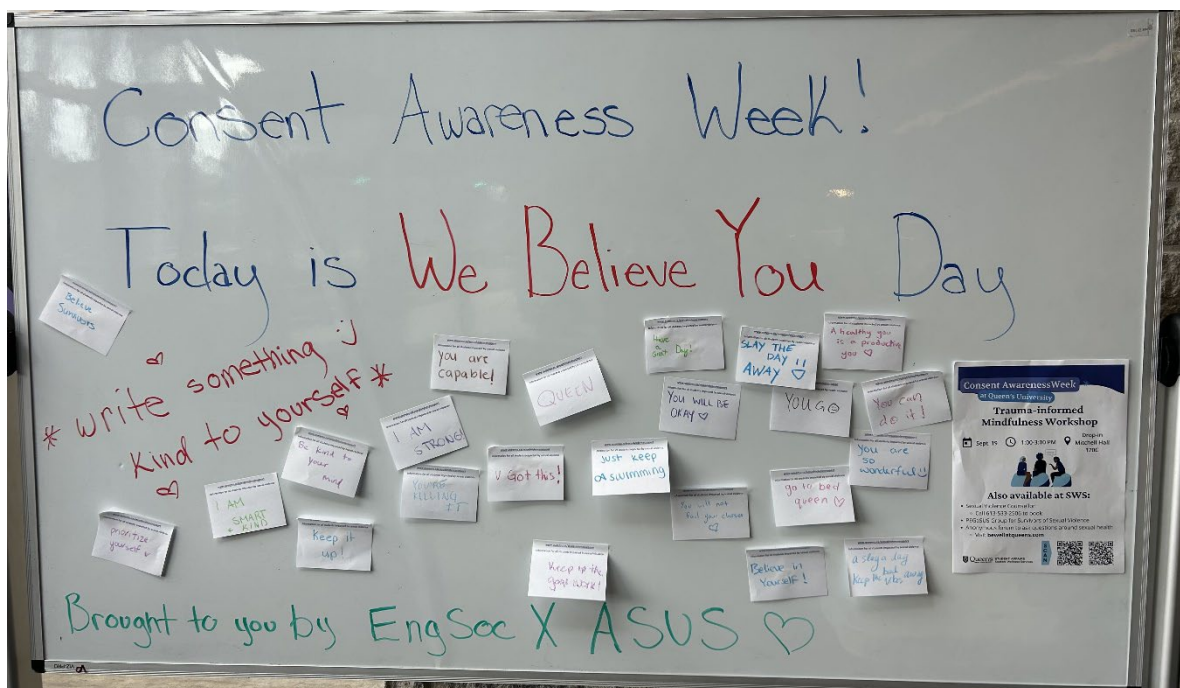
"My booth during consent awareness week. The goal was to encourage students to write a nice message to themselves and post it on our whiteboard."

RENNER SIEBENS

H.G. CONN AWARD

Awarded for valuable and distinguished service to the Engineering Society and the University through extra-curricular activities.

"Ever since I was young, I've taken an unconventional path. While most children in Canada were playing hockey, I competed in gymnastics. This unique approach to life taught me how to be adaptable. When my hand didn't quite grip the high bar or rings correctly, I had to reposition my body in order to find my grip again.

"My time at Queen's was no different. Applied Mathematics and Engineering is fairly unconventional, and I often hear other engineers say, 'I didn't even know that existed.

"Just as in gymnastics, Applied Mathematics taught me versatility. At the surface, mathematics can describe and predict phenomena in fields such as engineering, health care, and business. While this is fascinating, I'm going to discuss my experience with mathematics in the context of languages and intuition.
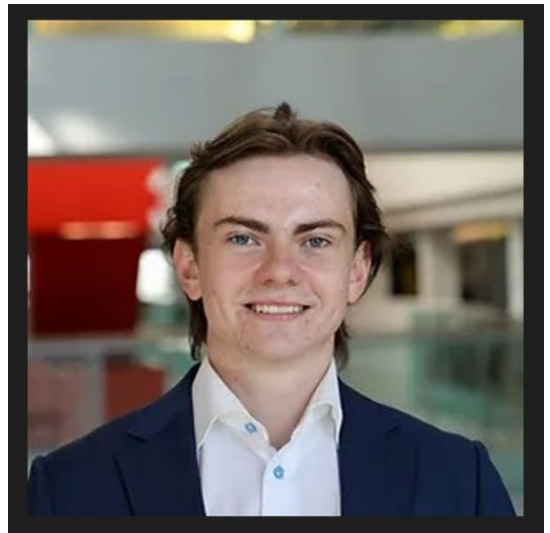
"At its core, mathematics is a language that describes spaces, quantities and relations between them, much like language is used to describe the physical world. This language extends to poetry, where words are transformed into a more elegant form based on set conditions. Similarly, mathematics builds complex ideas on established theorems and proofs.

"Mathematics is a powerful tool that hones our natural intuition. By engaging with mathematical concepts, we enhance our ability to recognize patterns and think creatively. The number of times I have erased a full-page answer on a final exam solely based on my intuition is testament to the power of recognition and working on unique solutions. This ability was instrumental when I planned the Ontario Engineering Competition in my final year. During the preparations for the competition, I recognized a lack of communication with the hotels. In response, I took an unconventional route by pre-paying them for their services which enhanced their commitment to the event.

"Everyday, I use the skills that I developed in Applied Mathematics. Clearly, they've helped me while I worked on the various conferences at Queen's. Planning events, like many aspects of life, involves solving a series of problems, each one like an equation waiting to be tackled. But the mathematical skills that I honed at Queen's go so much further. I hope this article has opened the perspective of readers to the idea that mathematics can be found everywhere. For this, I'm immensely grateful for choosing this path."

KALENA MCCLOSKEY
PETER CARTY MEMORIAL AWARD

The winner of the Peter Carty Memorial Award is the Engineering student who has contributed the most to the spirit and good reputation of the Queen's Engineering Society.

"Choosing Apple Math at Smith Engineering was the best decision of my life. I have had so many incredible academic and extracurricular opportunities after only three years at Queen's.

"I have held a number of positions in the Engineering Society, but the highlight of my undergraduate experience so far has been acting as the Director of External Relations for the Engineering Society. In this position, I represented Queen's at ESSCO (Engineering Student Societies' Council of Ontario) and CFES (Canadian Federation of Engineering Students) meetings, and ran community service events such as the annual Fix N' Clean. This position is especially near and dear to me, because it inspired me to become the Vice President of Communications for ESSCO the year after, and the CFES President this year. I also had the pleasure of acting as the Apple Math Discipline Club President last year, which enabled me to continue to build the strong community that is Apple Math through events such as our annual end-of-year banquet.

"Apple Math has also opened the door to academic opportunities that I would never have dreamed of. I am spending this year applying the knowledge I have gained from Apple Math to the field of robotics as an AI and Robotics Software Engineer Co-op student at InDro Robotics. Additionally, I had the opportunity to publish a paper on data analytics to improve asphalt life cycles, and present my work at a conference in Poland last summer.

Kalena presenting a paper at the 10th International Conference of the European Asphalt Technology Association.

"I have also recently had a paper describing a deep reinforcement learning algorithm for a reach-avoid game accepted to the 10th International Conference on Control, Decision and Information Technologies. I hope to continue my academic journey with a Master's degree after I graduate from Apple Math in 2026."

L to R: Aidan Shimizu (Apple Math 24), Kalena, and Simon Yung (BioMech '25) at the 2024 Canadian Engineering Leadership Conference in Newfoundland. We have each held the position of Director of External Relations for the Engineering Society of Queen's University in three consecutive years.

BLAIR HAMILTON

MCLEAN FAMILY AWARD IN STUDENT DESIGN

Awarded to an upper year student in the Faculty of Engineering and Applied Science who is actively involved in a student design team, with preference to students who are members of the Solar Team.

"Being a student from Manitoba, I have had a deeply rewarding experience in Kingston, at Queen's, and especially in the Mathematics and Engineering program. As a first-year engineering student, I was originally set on entering the mechanical engineering discipline. However, as I became familiar with how the Mathematics and Engineering program intertwines traditional mechanical courses with a mathematical element, I was enamoured by how enriching the program could be. I am grateful for how I have been introduced and challenged to complex mathematical subjects while still obtaining an understanding of fundamental mechanical concepts through the coursework.

"It is an honour to be awarded the McLean Family Award in Student Design. Since my first year, I have been a part of the Queen's Formula SAE Racing Team, which designs and builds a formula-style race car. This extracurricular experience has enabled me to practice pragmatic problem-solving techniques to handle challenges faced in engineering design and manufacturing.

"Throughout my time with the team, I have also been able to collaborate with a fantastic group of peers from across Queen's University. Working across the team as the Composites Lead has enabled opportunities to collaborate and lead students in a variety of activities contributing to the collective design capabilities, analytical approach, and of course, the development of a race car.

Blair working with the Queen's Formula SAE Racing Team. He is vacuum sealing a composite sandwich panel to cure under vacuum pressure. The panel is to be water jetted and used in the aerodynamics' assembly.
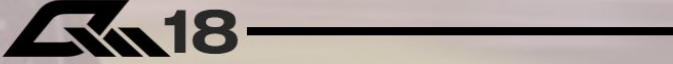
"Experiences in the Mathematics and Engineering program, on the Queen's Racing team, and across the university have demonstrated to me how I can apply problem-solving skills with a motivated attitude to realise substantial results. In previous summers, I interned in various mechanical-oriented roles. This year, I have transitioned into strategy consulting – where I can directly see the effects of the Mathematics and Engineering program. Being able to digest complex information and approach it with a logical and succinct methodology has been an important skill honed through the program, which I have found effective in consulting so far.

Photo taken in the Accursed Mountains in Albania, near Valbonë, which Blair backpacked through this past May for a month of post-exam recovery!

"This upcoming school year, I am excited to continue to TA first-year engineering mathematics courses as well as start a new role as VP of Academics for the "Apple Math" Discipline Club. I foresee these roles to continue to allow me to positively interface with the student body and spread excitement for mathematics. Previously, I loved being able to convey Calculus topics as a Calculus II TA.

"As someone who was unsure what the Mathematics and Engineering program was three years ago, I reflect on my experience with overwhelming positivity. Through this journey, I have developed strong relationships, developed an appreciation for different mathematical topics, and enjoyed a broad variety of interests. I am confident that the skills and attitude towards complex conceptual challenges bolstered throughout the program will be applied throughout the remainder of my professional and personal life."

Weight: 201kg

Max Power: 82hp @ 10.500rpm

Max Torque: 45ft-lbs @7.500rpm

Acceleration: 0-100kph in 3.5s

Engine: Honda F4i [599cc I-4]

Redline: 13.000rpm

Body Material: Carbon Fiber

Frame Material: Steel Space-Frame

ALUMNI NEWS

HECTOR PASTEN
THE 2024 RIBENBOIM PRIZE

The annual Ribenboim Prize is named in honour of Paulo Ribenboim, Emeritus Professor of Mathematics at Queen's University. It is awarded by the Canadian Number Theory Association for distinguished research in number theory by a young mathematician who is Canadian or has close connections to Canadian mathematics.

THE 2023 G. DE B. ROBINSON AWARD

The G. de B. Robinson Award was inaugurated to recognize the publication of excellent papers in the _Canadian Journal of Mathematics_ (CJM) and the _Canadian Mathematical Bulletin_ (CMB) and to encourage the submission of the highest quality papers to these journals. Hector received this award for his paper "Arithmetic derivatives through geometry of numbers" that appeared in the **Bulletin**.
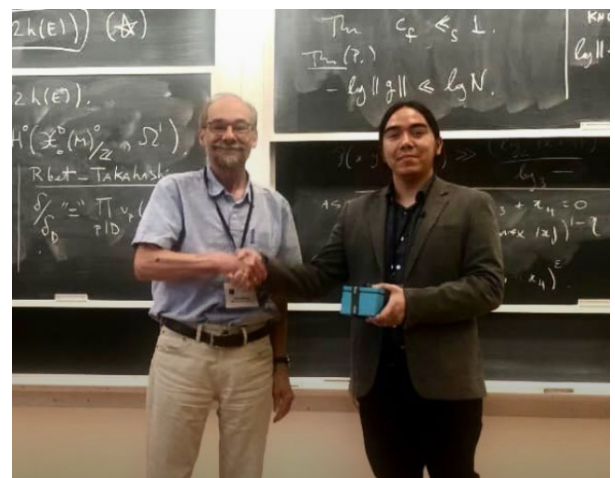
The Ribenboim prize
Hector's mathematical interests are focused on Diophantine problems, interpreted very broadly. Indeed, his research is notable for its diversity, depth and the ingenuity of his arguments. His most striking recent works include papers on Hilbert's 10th problem on Diophantine decidability, on Chabauty-Coleman for surfaces, and on connections between Shimura curves, modularity and the abc-conjecture. To be such an established force in such varied areas on Number Theory, at such a young age, is remarkable and truly deserving of the 2024 Ribenboim prize. Here's a link to an announcement that appears on a Chilean university website: CNTA awarded Ribenboim Prize to academic of the Faculty of Mathematics, Héctor Pastén (uc.cl)

The G. de B. Robinson Award
This paper exhibits in concrete terms an analogy between derivatives in function fields, and phenomena in the geometry of numbers. Specifically, this work defines a certain class of arithmetic derivatives on the ring of integers, and shows that the existence of "small" arithmetic derivatives is equivalent to the abc Conjecture of Masser and Oesterlé. A major contribution to the Vojta dictionary between Diophantine geometry and Nevanlinna theory, this paper is sure to be a significant influence on further research in the field.

Hector was born in Chile and completed his BSc and MSc there, at the Universidad de Concepcion, in 2008 and 2009, respectively. He completed his PhD at Queen's University, under the supervision of Ram Murty, for which he was awarded both the Governor-General of Canada Academic Gold Medal from the university, and the Canadian Mathematical Society Doctoral Prize in 2014/2015. He subsequently held postdoctoral positions at the Institute for Advanced Study, Princeton, and as a Benjamin Peirce Assistant Professor at Harvard, before returning to Chile where he is currently an Associate Professor at the Ponfificia Universidad Catolica de Chile.

At the right, we see Hector receiving the Ribenboim Prize.

BREAKING NEWS: a new Quanta article:
One morning last November, Hector finally solved a problem that had been dogging him for more than a decade by using a time-tested productivity hack: procrastination.
https://www.quantamagazine.org/big-advance-on-simple-sounding-math-problem-was-a-century-in-the-making-20241014/

KATHY (LOGAN) ERDMAN (MATH&CHEM '73)

I ran into Kathy at the homecoming reception in Fall 2023 with her husband Ron (Chemical Engineering '73) and was captivated by her stories, very much parallel with my own. A snapshot of how much has changed in 50 years. Well, I'll let her tell the story-Ed.

"We have both found it amazing to look back and recall how much things have changed, particularly in the area of computing.

"In our first years, in 1969, both my husband and I purchased the best possible slide rules thinking them to be life time investments. In my fourth year I had the privilege of being allowed to use the Head of Chemistry's calculator and Ron remembers simple calculators chained up in the Chem Eng building for students to use.

"We both recall early days of computing. Ron worked for Imperial Oil as a summer student and tipped a tray full of computer cards into the gap when the elevator door opens. The cards were important records, so the company hired people to go in and fish the cards from the top of the elevator and throughout the elevator shaft.

"My first job was as a computer programmer at Polysar in Sarnia. We spent the morning key punching out cards in one building. After lunch, we had the opportunity to bring our cards across the street for the once a day run through the computer. It sure took a long time to correct all my mistakes!

"Later, I worked in the oil industry in Calgary. We programmed using APL and my matrix algebra came in handy. It was fun to see your HP calculator which was a treasured commodity and considered the only way to go.

"In 1982, we became acquainted with early "portable" computers. We investigated an opportunity for franchise marketing of Compaq computers, which were in a giant carry case and the size and weight of sewing machines. Missed that chance to make our fortune.

"In the world of gaming, these computers could play the game " Space Invaders". Shortly thereafter Pac-Man became all the rage.

"This all makes us realize how long 50 years is. Also, we both feel very appreciative of our time at Queen's and the opportunities that opened up to us thereafter."

Oh my! Kathy's reminiscences parallel mine in so many ways.

My slide rule always hung down from my belt.

One summer I worked at Imperial Oil in Toronto and late each afternoon a truck arrived to collect the decks of punch cards and take them down to UofT where the computer was located. If you made a small error you had to replace the bad cards and wait 24 hours for the next verdict.

When I returned to Queen's in the 70's, the punch card machine was in JEF 203 and the campus computer was next door in Ellis Hall.

It was Harold Lightstone in his Jeffery office who showed me my first calculator. He put in e^2 and the red lights flashed for 2-3 seconds and out came 8 decimal places. Magic.

And APL—what a beautiful language that was!-Ed.

QUEEN'S MATHEMATICS SUMMER SCHOOL

https://mast.queensu.ca/~qmss24/

In mid June, the Department ran the Queen's Mathematics Summer School, open to both undergraduate and Master's students who are interested in spending a week learning exciting, cutting-edge mathematics on our beautiful campus.

The summer school ran the week before the 2024 Canadian Applied and Industrial Mathematics Society (CAIMS) Annual Meeting (June 24-27, 2024) which was also held at Queen's.

There were three minicourses, each with 9 hours of lecture time over the week. Each was run by a professor in the Department.

From left to right in photo below:

Scalar Conservation Laws
Instructor: Maria Teresa Chiri

Topology of Maps Between Curves
Instructor: Mike Roth

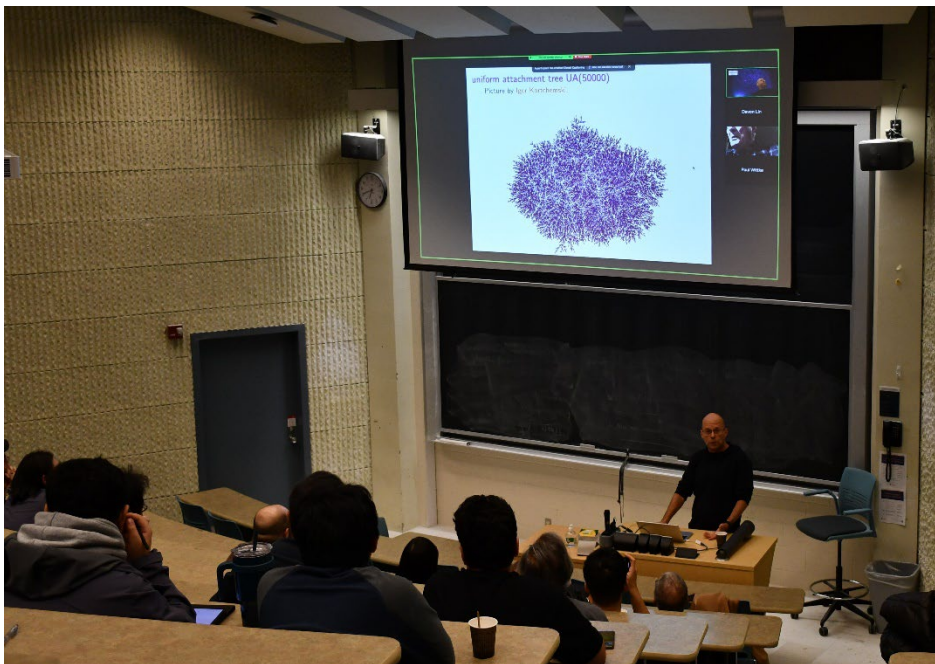*Topics in Machine Learning*
Instructor: Bahman Gharesifard

GABOR LUGOSI (UNIV. POMPEU FABRA, SPAIN)

THE 2023 LORNE CAMPBELL LECTURE

On November 24, 2023, we were privileged to meet Professor Gabor Lugosi and attend his lecture on *Mathematical Models of Network Archaeology*. The archaeological aspect of this is that one studies a current complex network in a way that can tell us something about its past. In Lugosi's words:

"Large networks that change dynamically over time are ubiquitous in various areas such as social networks, and epidemiology. These networks are often modeled by random dynamics which, despite being relatively simple, give a quite accurate macroscopic description of real networks. In "network archaeology," we study statistical problems of inferring the past properties of such growing networks, given the current state of the network. In this talk, we discuss some simple network models and review recent results on revealing the past of the networks."
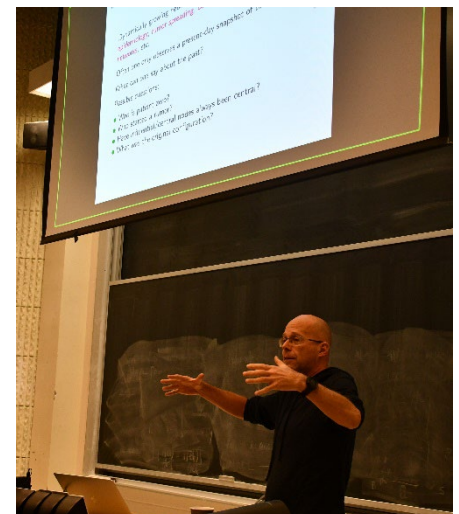

Professor Lugosi talking with Wenyu Jiang, one of the co-organizers of the event along with Fadi Alajaji.
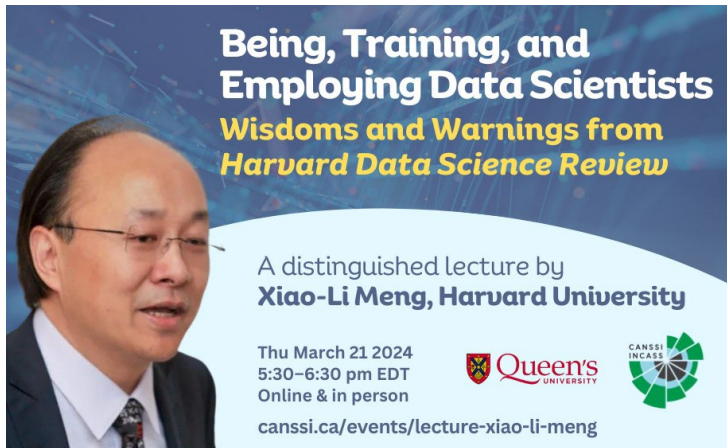

Professor Lugosi received a PhD degree in electrical engineering from the Hungarian Academy of Sciences. He is an ICREA (Catalan Institution for Research and Advanced Studies) Research Professor at the Department of Economics, Pompeu Fabra University, Barcelona, Spain.

His main research interests include statistical learning theory, sequential prediction, nonparametric classification and regression, random graphs, and concentration inequalities.

He was an invited speaker at the 2022 International Congress of Mathematicians, and he delivered the "Breiman Lecture" in 2021 at NeurIPS (Neural Information Processing Systems), the prime conference on Machine Learning.

XIAO-LI MENG, HARVARD UNIVERSITY.
QUEEN'S-CANSSI DISTINGUISHED LECTURE

On March 21, Queen's hosted a distinguished lecture by Xiao-Li Meng, Founding Editor of the *Harvard Data Science Review* and one of the world's leading statisticians. The event was co-sponsored by the Canadian Statistical Sciences Institute (CANSSI).

Being, Training, and Employing Data Scientists
Wisdoms and Warnings from *Harvard Data Science Review*

A distinguished lecture by
Xiao-Li Meng, Harvard University

Thu March 21 2024
5:30–6:30 pm EDT
Online & in person

canssi.ca/events/lecture-xiao-li-meng

Dr. Meng is the Whipple V. N. Jones Professor of Statistics at Harvard University, is well known for his depth and breadth in research, his innovation and passion in pedagogy, his vision and effectiveness in administration, as well as for his engaging and entertaining style as a speaker and writer.

Meng was named the best statistician under the age of 40 by the Committee of Presidents of Statistical Societies (COPSS) in 2001, and he is the recipient of numerous awards and honours for his more than 150 publications. In 2020, he was elected to the American Academy of Arts and Sciences. Meng received his BS in mathematics from Fudan University in 1982 and his PhD in statistics from Harvard in 1990. He was on the faculty of the University of Chicago from 1991 to 2001 before returning to Harvard, where he served as the Chair of the Department of Statistics (2004–2012) and the Dean of the Graduate School of Arts and Sciences (2012–2017). https://canssi.ca/events/lecture-xiao-li-meng/

I recently came across an interesting 2020 interview with Professor Meng:

"What I meant is that compared to the research progress on data science methods, the research on data science education is still at the dinosaurs' age. Many universities are creating masters-level data science programs. There are good reasons to start there, but show me a curriculum and I can tell you with good statistical confidence which species of dinosaurs had put their weight down on it, that is, whether it was created by statisticians, or computer scientists, or engineers, etc. That is ok for now, because things are happening too fast and everyone needs to contribute, and naturally we contribute in ways we know how. But this is not a systematic, optimal data science education. The problem is that we all have a narrow view, myself included until I got involved with HDSR. Most of us think of data science as a new discipline, which for university administrations means a new department. But creating a new department of data science is the wrong way to go. You need to think of data science like a science, like a social science, like the humanities. You rarely hear of a "Department of Science" or "Department of Social Science", but rather a School of Science or School of Social Science. So we need to ask how will we teach data science coherently, and what will be the right infrastructure to support it? I will give a shout out to the University of California at Berkeley for doing the right thing. They are creating a division of data science – it's university wide, a new school – recognizing that data science permeates other fields and requires this scale. But overall we are really behind with infrastructure as well as how to deliver pedagogically."
https://scholarlykitchen.sspnet.org/2020/01/16/data-science-revolution-interview-xiao-li-meng/

In fact Professor Devon Lin (pictured) has designed a new course, Introduction to Data Science, STAT 161, based on the Berkeley Course that Meng singles out in the interview above. We expect this course to become quite popular. Already Economics is thinking of using it as a component in its major plans.- Ed.

MATH QUEST
OUR GIRLS' MATH CAMP

This year we had 30 campers at our annual girls' camp and some came from far away: Brazil, Bermuda, Whitehorse to name three of these. It's a Monday to Friday camp and most of the girls stay in residence and get an experience of university life. That's expensive and we are grateful to have funds that can support a generous bursary program.

There were eight counsellors, graduate and senior undergraduates students and they chose the problems they wanted to work on. That gave us a wide range of disciplines, for example:

Physics: build a boat out of a fixed supply of plasticene that will hold a max number of glass marbles before it sinks.

Coding: use fractal geometry to design a 2-D art work.

Paige, Yuwei, Asia and Claire admiring Claire's set of 30 3-D printed towers of Hanoi. Each camper got one to take home.

The Friday Treasure hunt is always a highlight and here are more than 30 smiling faces waiting to devour the treasure.

RABBITMATH
PARKING THE ELEVATOR

By Peter Taylor

We had 20 students this year at our annual RabbitMath camp in the first week of August. The students ranged from grade 7 to grade 11 and for that reason I was glad to have 8 amazing counsellors who came to discover some of the remarkable things that these kids could do.

In fact my objective was to try out some of the problems that I would really like to see incorporated into the school math curriculum, and what could be a better place to workshop them than our summer camp!

Here I describe one of the problems. I was really impressed by what the kids did with this.

Consider an apartment building with six floors and only one elevator. Floor 0 is used to enter and exit the building and floors 1-5 each have the same number of residents. The elevator is used only for the residents to leave the building (going from their floor to floor 0) or to return to their floor (starting at floor 0). The problem is to design the "parking policy" for the elevator. Once it has dropped a resident at a destination, does it stay where it is to await the next call, or does it move first to a "better" floor?

|	
5	3
4	3
3	3
2	1
1	1
0	0

As an example, the diagram at the right depicts a possible parking policy. After it delivers a resident to floors 5, 4 or 3, the elevator parks at floor 3; a delivery to 2 or 1 parks at 1, and a delivery to 0 stays at 0.

What does "better" mean? Well, we want to minimize cost. The cost has two components. One is the simple cost of motion, 1 unit per floor travelled. The other is the more significant cost of waiting for the elevator to come. The residents are busy folks who are always pressed for time, and that incurs an additional cost of w (for "waiting") per floor travelled by the elevator from where it is parked to the point of pickup. For this problem we took $w = 5$.

A Monte-Carlo simulation. We used a beautiful app (built by Jack, one of the counsellors) that allows the students to hunt for the optimal parking allocation.
https://j15a.github.io/ElevatorSimulationWebBuild/
A great feature of the app is that it was based on Jack's grade 12 computing course. So building something like this would in fact be a great project for students in that course. Anyway, they got into small groups and played with the app. Who could find a parking policy that no other policy could beat?
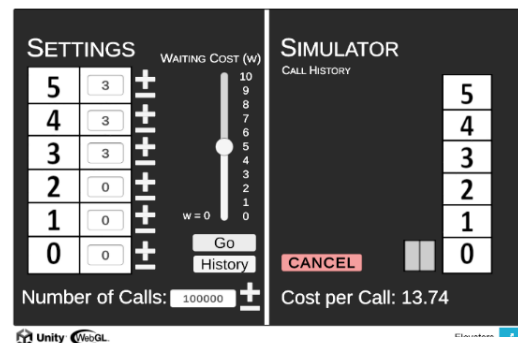
In fact it didn't take them long to find the policy at the right: always park at 1 except stay at 0 when you are already there.

5	1
4	1
3	1
2	1
1	1
0	0

At that point we rolled up our sleeves and did some math—and that's where I really got impressed. It's an elementary problem, but it requires careful thinking and excellent organizational skills. And in many ways, those are the things that are needed to do good mathematics.

IN MEMORIUM

BRUCE KIRBY

Bruce Kirby passed away on July 30, 2023 at age 94. Born in Toronto, he got his degree in Mathematics at the University of Toronto and then went overseas to teach at the University of Liverpool. Returning to Canada to join the Queen's faculty, he met his future wife, Frances, on board ship. In the late 60's he went to Imperial College in London to get his PhD, and then returned to Queen's to continue his 34-year career. He was Chair of Math and Engineering for a number of years.

Bruce was always a keen world traveler. He and his family traveled for many years and after retiring, he spent much time in England and Scotland, going to various towns and villages learning about their history and then going to a play in the evening.
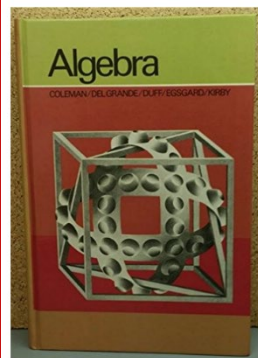

L-R: Bruce with Ron Hirschorn and Bill Woodside.

Algebra (Elements of Modern Mathematics) - Hardcover
A.J. Coleman; J.J. Del Grande; G.F.D. Duff; J.C. Egsgard; B.J. Kirby

View all 6 copies of Algebra (Elements of Modern Mathematics)

Hardcover
ISBN 10: 0771536364 ? ISBN 13: 9780771536366
Publisher: GAGE, 1979

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3 Used
From US$ 6.71

1 New
From US$ 51.27

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from US$ 6.71

In the late 70's Bruce was part of a team of authors of the new grade 13 Algebra textbook. The lead author was John Coleman and the other members of the team were George Duff (Previous Chair of the Mathematics Department at the University of Toronto) and two senior high school teachers John Del Grande and John Egsgard.

A Memorial Tree for Bruce.
This was a gift from Jim Hodder BSc '77. He writes that when he heard of Bruce's passing, he recalled that he took the course in the calculus of variations from Bruce in his fourth year, and that subsequently, for his MSc Thesis, he got some help from Bruce.

The tree fits well here as Bruce loved spending time, often with colleagues, out at a property on Sangster Lake north of Kingston. His son, Chris, recalls a time that he and Jon Davis were doing a survey of the property, using a handy stick and a patch of dirt to do a Taylor Expansion…

Reforestation
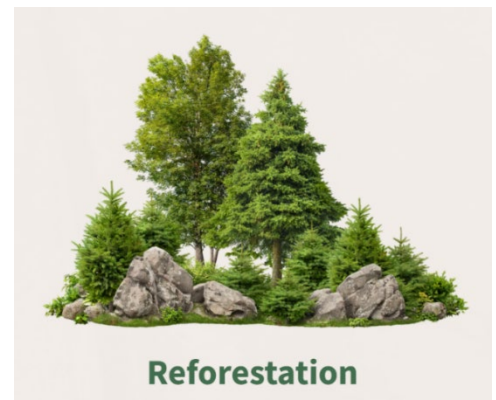
HANS KUMMER

Hans' longtime partner, Danielle Michel, shares her reflections and memories of Hans.

"Hans had a complicated relationship with mathematics. Mathematics fascinated him and was always present in his thinking and activities, from producing pages of formulas long after the end of his university career, to solving puzzles in the domains of computer programming and dishwasher-organizing. He was devoted to his students and always proud of the Golden Apple award which he received in 1975. While at Queens, he derived pleasure from performing an interpretive dance at a mathematics event on Wolfe Island. Despite frequently declaring himself a hermit, he was also proud of having hosted several annual department parties at his home, for which he made chocolate-hazelnut cakes and many open-faced sandwiches.
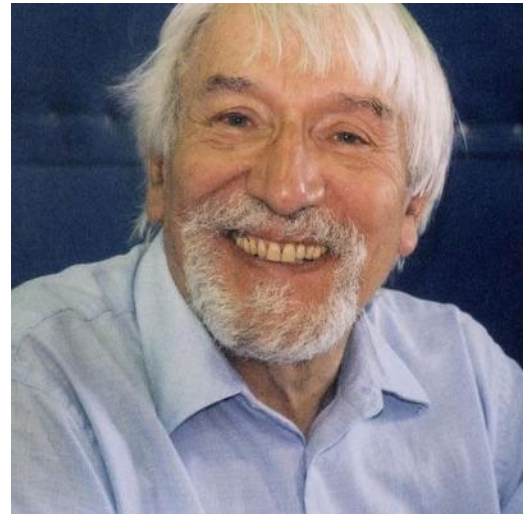
"On the other hand, mathematics also provided an escape from a closed and painful life in Switzerland. In Canada, he felt finally able to "breathe deeply" and he relished the open spaces, lakes and sunsets he discovered in his new home. Having eagerly accepted John Coleman's invitation to join the faculty, he still always quietly wondered whether he would have also thrived as a psychologist or a philosopher, and he remained interested in those topics his entire life. He was an avid reader and a wonderful cook, and he enjoyed his walks in nature to the full.

Hans with Joan Geramita at a Department dinner

"To his family, Hans was wise, gentle and loving. To his Victoria friends, he was above all thoughtful — a quiet person who, when he did speak, was always worth listening to and discussing with. He strove to live his life with as much awareness and broad-mindedness as possible. Having envisioned a quiet retirement alone at his beloved property at Loughborough Lake, he proceeded to embark on a new relationship, be father to a child, move across the country, and become an owner of a beloved dog. He was often unsure of his abilities as a father, yet Calen remembers him as unfailingly supportive, open, and funny. The two of them spent many happy moments dancing in the living room, and many frustrating moments trying to solve elementary school arithmetic problems. He was deeply loved and is deeply missed."
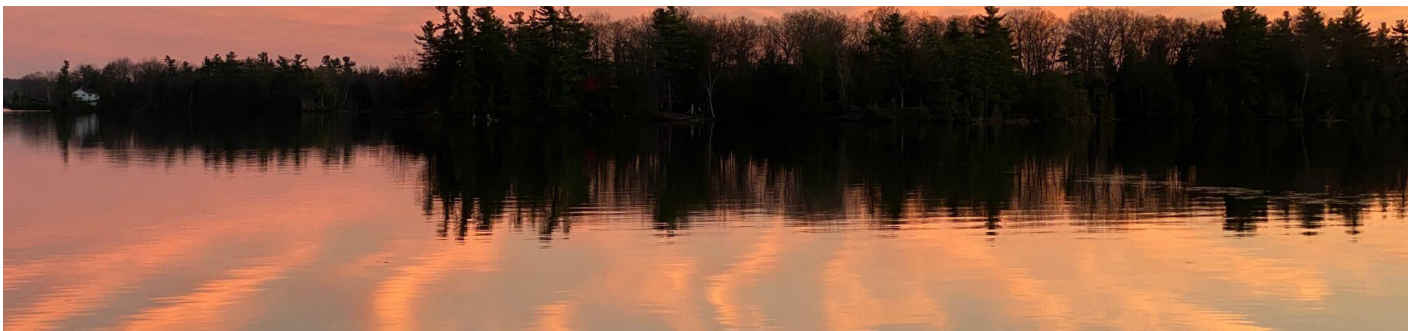

Loughborough Lake at the setting of the sun.
From https://www.loughboroughlake.org/

EDWARD JAMES WOODS

By James A Mingo

Our former colleague Jim Woods died in Berlin on March 18. Jim was a faculty member at Queen's for around 25 years. In 1991, he took early retirement following complications from pneumonia. Jim was an undergraduate student at Queen's and wrote a PhD in physics at Princeton. He was a postdoctoral fellow at Maryland and a faculty member at the University of Alberta before coming to Queen's. I believe that Jim was an engineering student here, but he must have been already interested in mathematics because I came across Jim's name in a book in the Queen's library presented to the university by the Mathematical Association of America recognizing the success of the Queen's Putnam Team.

Jim is remembered for his work on what are now known as Araki-Woods factors. When Murray and von Neumann came up with their axiomatization of quantum mechanics they classified the algebras into three types: I, II, and III. For a long time there were not many examples of type III and they were considered mysterious. Jim and Huzihiro Araki introduced their examples and this attracted the attention of Alain Connes who came to Queen's as postdoctoral fellow around 1975. While here Connes proved important theorems which are now at the core of operator algebras.
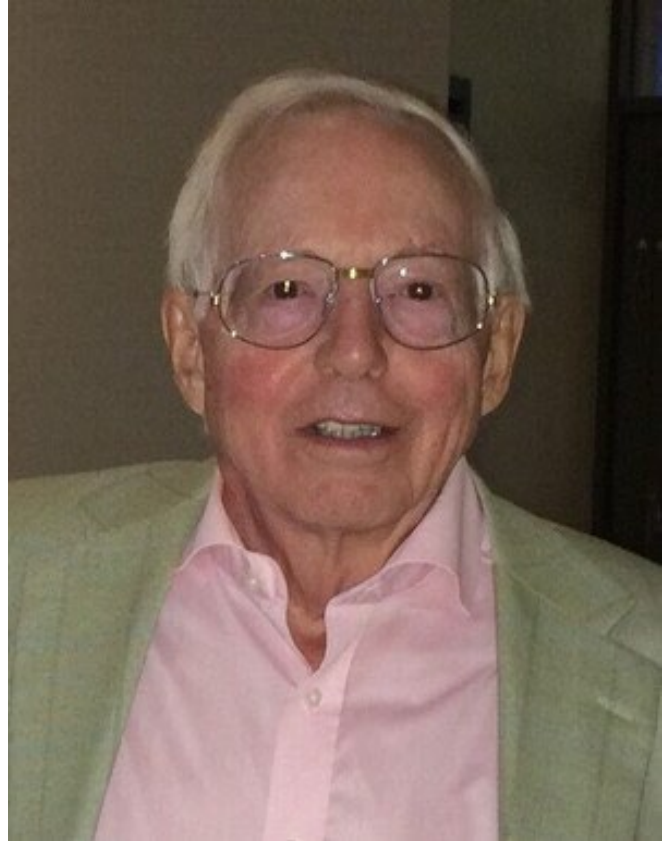
In the summer of 1980 Jim and Dick Kadison organized a three week conference with 300 mathematicians and physicists from around the world. We stayed over in Victoria Hall in a hot summer with no AC. This was a big event because many people met for the first time in person, previously only knowing each other through publications. This applied in particular to people from the Eastern bloc were allowed to visit the West. Connes was inventing non-commutative geometry, Vaughan Jones was talking about subfactors, and Dan Voiculescu was starting to think about free probability. Connes and Jones later were awarded Fields Medals, so this was about as good as it gets for a conference.

Jim was heavily influenced by his background in physics and worked hard to build connections between mathematics and physics. This had an influence on me and many others.

OLEG BOGOYAVLENSKIJ
(Contributed by Dan Offin)

Oleg Igorevich Bogoyavlenski (1948 - 2024)
Our dear friend and colleague Oleg Bogoyavlenski passed away on June 7, 2024 in Kingston Ontario. He is survived by his wife Tatiana Bogoyiavlenskaia, son Dimitri, daughter Anna, and eight grandchildren.

Oleg had an outstanding and very active scholarly career including an output of 154 publications with 146 in MathSciNet. His earliest paper appears in 1970 and his latest in 2021. His PhD thesis supervisor was Sergei Petrovich Novikov, renowned for his celebrated work on topological invariance of Pontryagin classes which earned him the Fields Medal in Nice, 1970. Oleg is credited with 1691 citations over 88 publications covering global analysis on manifolds, topological methods in PDE's, dynamical systems and ergodic theory, knot properties of periodic solutions in fluid dynamics, relativity and gravitational theory. Recently the number of citations to Oleg's work has been growing exponentially. He told me once that it was a mistake to try to put more than one idea in a paper! His contributions were innovative and highly original.

Oleg was a member of the Landau Institute for Theoretical Physics, from 1973 to 1983, when he joined the Steklov Institute for Mathematical Research, and remained a member until long after his 1992 appointment at Queen's. Prior to that, in 1989, I had the opportunity to visit Oleg in Moscow through the Queen's Steklov exchange. This was a crazy time in Russia, Perestroyka had been in place for about four years, and there were many circumstances including commerce and culture which for me were difficult to understand. John Coleman was visiting Russia at this time as well, but we did not interact except for an afternoon outing.

Subsequently, I invited Oleg to visit me for one month at the end of 1991. His initial contacts at Queen's were me and Richard Hendrickson in Physics. While he was in Kingston, he was invited by Jerrold Marsden to come to Waterloo, to initiate the opening of the Fields Institute of Mathematical Research. The appointment was for six months and the situation in Russia at that time was complicated enough that he needed to think of not only mathematics but also his family who would accompany him to Canada. Leo Jonker was Head of the department at that time, and helped to facilitate an application for a Queen's National Scholarship. This was successful and helped to persuade Oleg to accept an appointment at Queen's.

Going forward, Oleg was awarded a Humboldt Fellowship in 2004-2005 and spent a year in Germany. He was also successful with a Killam fellowship in 2008-2009.

Oleg showed a broad talent early in his life and developed that talent into an incisive and penetrating insight, combining formidable technical expertise with an inherent ability to detect hidden symmetries in dynamics, and to uncover new invariants of motion. These qualities were coupled with a very strong desire to create new mathematics. And that is exactly what he did over a career spanning more than 50 years.

Oleg and Tatiana in the late 70's on the shore of Lake Baikal.

OPPORTUNITIES FOR SUPPORTING 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:
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Mathematics and Statistics

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