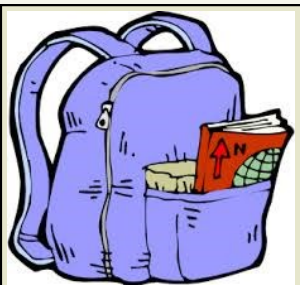


Math & Computer Science

U N I V E R S I T Y O F L E T H B R I D G E

DEPARTMENT NEWSLETTER



FACULTY IN WAITING...

With funding issues at play in the University hiring process, two resourceful couples in the department decided to grow their own replacements.

CONTENTS

- P. 1—Faculty in Waiting
- P. 2— Long Service Awards
- P. 3—LUMACS in the summertime
- Pp. 4-5—ADTHM 2014
- P. 6—Line of Defense
- P. 7—Imagine Cup: claVision
- Pp. 8-9—Coming & Going
- P. 10—Russia 2014: ACM
- P. 11—A Great Foundation: Esteban Gomez Riviere
- P. 12—MITACS 2014
- P. 13—Grad Student Update
- P. 14—Seminars, Colloquia, Conferences



Léon Wilfrid Ng-Kadiri, born 24 May 2014. Proud parents are Habiba Kadiri and Nathan Ng, both department math professors. Léon is brother to big sister, Lucie. He was born at 7:49 pm and weighed 9 lbs 3 oz,, 20 7/8 inches long, for those wanting this information!



Daniel Francis Fitzpatrick, born 31 July 2014. Proud parents are Jana Archibald and Sean Fitzpatrick, both math instructors in the department. He is the first grandchild on both sides of the family, so lots of special treatment coming his way. Daniel was 7 lbs 2 oz; 21 inches.

LONG SERVICE AWARDS 2014 (HELD MAY 7, 2014)



Aminmohamed Adatia—10 years

Amin is a stalwart instructor in the department's statistics courses. His evaluations often contain many positive comments from students, and how he effectively makes stats easy to understand—if that's possible! Thank you for your 10 years of service.



Yllias Chali—15 years

Yllias is one of the most pleasant members of the department, taking on several grad students in addition to his teaching load and committee duties. Students speak highly of his superb teaching and kind personal character. Thank you for the last 15 years of service.



Shahadat Hossain—15 years

Shahadat is dedicated to providing the best computer science courses he can. He has helped to establish an optimization group in the department, as well as supervising graduate students in this specialized field. Thank you, Shahadat, for your 15 years of service.



David Kaminski—25 years

25 years of solid teaching, research, ULFA service, committee work, and down-home camaraderie. It is always a pleasure to deal with David and the students support this in his many positive course evaluations. Congratulations, David.



Shelly Wismath—25 years

Shelly has been involved in a number of areas at the university including mathematics, liberal education, woman and gender studies, native American studies, and the woman scholars group. Her research has been funded by NSERC since 1990. She has won the distinguished teaching award and held the inaugural Board of Governor's teaching chair.

LUMACS

This summer LUMACS hosted 4 camps:

Robots, Robots, Robots Camp

Robotics integrates the theoretical world of programming with the real world problems of sensing and navigating. This camp featured a series of robotics challenges culminating in a Friday afternoon showcase.

Short Circuit Camp

To build a better mouse trap, you need the right tools. You must know how power sources, circuitry, sensors, and engines work together to invent the future.

Raspberry Pi Camp

Did you know you can buy a computer that fits in the palm of your hand? That's what you get when you buy a Raspberry Pi. Do you want to know what you can do with a Raspberry Pi—many came to the camp and checked it out.

Living a Digital Life Camp

We live in a digital world, where the ground shifts faster than it can be mapped and the risks are reported on the evening news. In this ever changing landscape, identifying what is safe and what is not can be a real challenge. Spam, spoofing, hacking, flame wars, captchas, social media, MMORPG -- this camp explored the digital world from both the user and the providers end. Society must always be ready to shine light in dark places.

We also participated in and provided resources for several Destination Exploration Camps.

L. Nicole Wilson

Instructor & LUMACS Coordinator

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LUMACS = Life, yoU, Mathematics And Computer Science = FUN



ADTHM 2014



The university recently hosted a Workshop on **Algebraic Design Theory and Hadamard Matrices 2014**, welcoming about 60 experts and interested individuals in the area from around the world— Australia, Croatia, Finland, Hungary, India, Iran, Ireland, Japan, Russian Federation, Poland, Singapore, Spain, Turkey, United Arab Emirates, United States, and from several provinces in Canada.

The conference also celebrated the upcoming 70th birthday of Hadi Kharaghani whose contributions to the field have been significant. A reception was held for this purpose. There was a slide presentation of his younger years in military service in Iran, graduating with his Master's, and various slide contributions from others. Special speakers shared their memories and appreciation for all he has brought to the university and the field of mathematics. A booklet of best wishes and special memories from colleagues, past and present, was presented to him as well.

In 1985, he published a very useful method for constructing some orthogonal matrices, subsequently named Kharaghani matrices. In 1991, he gave the first infinite sequence of Hadamard matrices with maximum excess. In 2000, he constructed one of the largest classes of designs using Kharaghani matrices, introduced twin designs for the first time and developed a new method to generate arrays for orthogonal designs.

Hadi and colleague Behruz Tayfeh-Rezaie discovered a Hadamard matrix of order 428 in 2004; the order had been for a long while the smallest order for which no Hadamard matrix was known.

Hadi is the author or co-author of more than 85 papers published in refereed journals and four book chapters or sections. He is a Foundation Fellow of the Institute of Combinatorics and its Applications and has been named to the editorial board of the Journal of Combinatorial Designs. Hadi has also organized workshops, conferences and seminars (although this time he has had fade into the background a bit) that have promoted research in combinatorics and increased the University of Lethbridge's profile and reputation.

He has won the top research award and the top teaching award at the University. Lastly at an age when many consider retirement, he has taken on the ultimate challenge - administration - by serving as Chair of the largest department at the university! His six year sentence ends next! ;-)



LINE OF DEFENSE



RYAN JOEL BENNETT, MSc 2014 (Computer Science)

Joel's thesis entitled *Voxel Octree Intersection Based 3D Scanning* was successfully defended on August 15, 2014 to a glued audience as he presented a live demo of the 3D scanner. His schedule is even busier now that he's teaching CPSC 1000 this fall while also working full time for Dr. Kevin Grant. Despite being busy, he plans to continue to work on his Pylons online service. He and his wife, Janna, are expecting their first child in early December - and he thought he was busy before!

Members of Joel's committee: Stephen Wismath and Kevin Grant (co-supervisors); Denton Fredrickson and David Kaminski (supervisory committee members); Howard Cheng, exam committee chair.



ZAHRA GHASEMAGHAI, MSc 2014 (Computer Science)

Zahra defended her thesis on August 15, *Analyzing and Improving Genre and Style Classification in Music Through Experiments*. At this time, Zahra hopes to complete a Master's co-op program but her long-range goal is to find a job that will lead to a lifelong career in computer science.

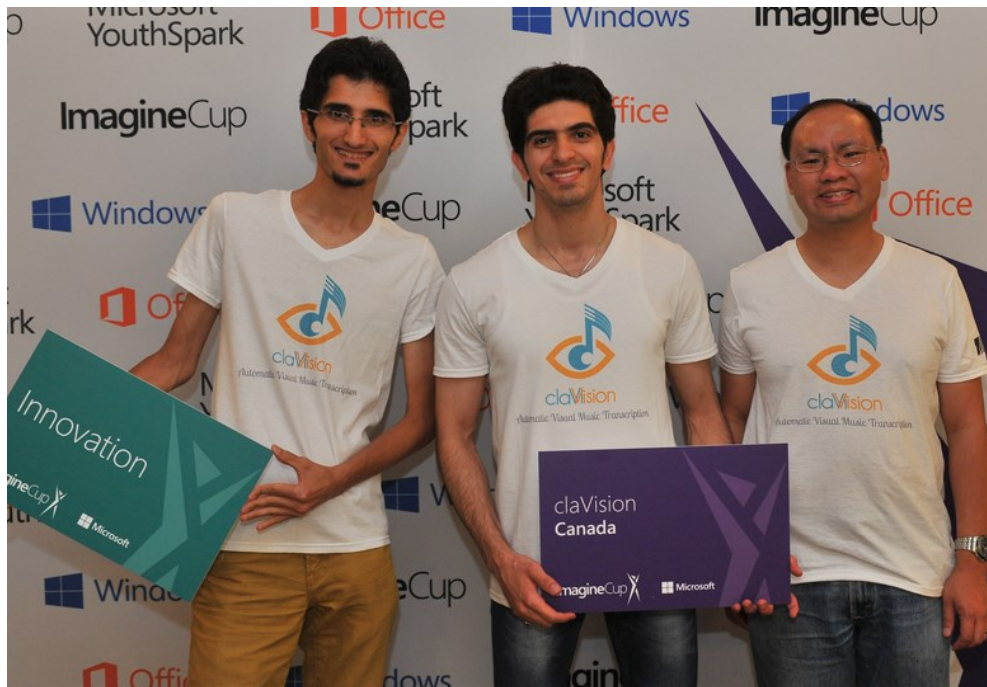
Members of Zahra's committee: John Zhang (supervisor); Gongbing Shan and Yllias Chali (supervisory committee members); Howard Cheng, exam committee chair.



ALLYSA LUMLEY, MSc 2014 (Mathematics)

Allysa is one of those people who fits any and everywhere, able to contribute whatever is asked of her—Arts & Science Booth Fair, U of L Open House, help sessions, tutorial leader, and on and on. After defending her thesis on August 11, Allysa agreed to work for the department as a term position, and this is a boon for us. Her thesis, *Explicit Results on Primes*, was supervised by Habiba Kadiri and Nathan Ng (co-supervisors); Soroosh Yazdani and Omar Rodriguez (supervisory committee members); Hadi Kharaghani was exam committee chair.

IMAGINE CUP—claVision



Mohammad Akbari and Hossein Naseri, under the supervision of mentor Dr. Howard Cheng of the Department of Mathematics and Computer Science, were the Canadian representatives and one of just 11 teams to qualify for the World Finals of Microsoft’s Imagine Cup competition in July. And while their innovative software program that utilizes video to capture a person’s hands as they play piano and converts it into sheet music did not garner the championship prize, it certainly earned attention from some key contacts – which bodes well for its future commercial development.

“We had some very successful demonstration sessions and our technology impressed many people, including professionals as well as reporters in both computer- and music-related industries,” says Akbari, who started the project as his master’s thesis and through the competition, was able to turn theory into practice and create a usable and marketable product. “I think getting familiar with the potential market of our product and making a good number of contacts are the main positives that we took away from this competition.”

Those in the music industry quickly understood the potential practical applications of Team claVision’s software product. Akbari says the project itself evolved throughout the various stages of the competition as the team advanced to the World Finals.

That a pure research project and master’s thesis could so readily translate to a marketable product is testament to the experiential learning opportunities available to U of L students.

As for Akbari and Naseri, Imagine Cup has opened up a host of opportunities.

“There is a huge potential market for our novel technology,” says Akbari. “We are very interested in utilizing this technology in order to develop different software products based on a variety of applications, both professional and educational.”

Reference: <http://www.uleth.ca/unews/article/microsoft-imagine-cup-experience-opening-doors-u-l-students>

COMING ...



SEAN FITZPATRICK joined the department July 1st, as an Instructor III, and we're very glad to have him on board (pun on the boat in the background!). Prior to arriving at UWO, he spent three years at UC Berkeley in the Department of Mathematics. During his last year at Berkeley, he worked as a lecturer and taught a rather large section of multivariable calculus each semester, along with some smaller classes. Before that, he spent two years at Berkeley as a postdoctoral fellow, working with Alan Weinstein. His fellowship was funded by NSERC, the government of Canada's science funding agency.

Sean was previously an assistant professor in the Department of Mathematics and Computer Science at Mount Allison University, located in Sackville, New Brunswick. When he's not in the classroom, Sean does research in differential geometry; in particular, he is interested in symplectic, Poisson, contact and CR geometry, and analogues of these, especially in the context of quantization, index theory and "Dirac-like" operators. Right now, he is working on a couple of different problems related to his earlier works on contact quantization; namely, how is his approach related to the Toeplitz structures of Boutet de Monvel and Guillemin, and whether it is compatible with contact reduction. He is also compiling a catalogue of various definitions of contact-like structures of higher corank.

Sean did my PhD studies in mathematics at the University of Toronto, under the advising of Eckhard Meinrenken. His thesis work involves the application of the equivariant index theorem for transversally elliptic operators to a class of differential operators that can be constructed on any manifold equipped with an almost CR (Cauchy-Riemann) structure. In the particular case of a contact manifold, this can be interpreted as a "quantization" procedure analogous to geometric In the particular case of a contact manifold, this can be interpreted as a "quantization" procedure analogous to geometric quantization in symplectic geometry. When applied to complex homogeneous spaces, the resulting index formula includes character formulas for both the L^2 and holomorphic induced representations as special cases.

Sean and his wife, Jana Archibald, recently welcomed their first child, **DANIEL FRANCIS FITZPATRICK**, see p. 1 for further details.



JEFF BLEANEY, MSc 2014

Although Jeff planned to travel to Europe and distance himself from Lethbridge for awhile, we were fortunate enough to entice him to stay on as a term position. He and Allysa lead the tutorials for Math 1410 this semester (for Hadi Kharaghani) while Jeff in addition handles the tutorials for Math 2000 (for Dave Morris and Sean Fitzpatrick). Lucky for us he was willing to alter his plans!

AND GOING



ABBAS MOMENI, with the department since 2012, has moved on to Carleton University. He was a truly valuable member of the department while here, helping to organize the Fun With Math program for Jr. and High School students. The purpose of the weekly Friday meetings was to work with interested community students, introducing them to university-level mathematics. Abbas also was integrally involved in the annual Day of Math, with students coming from all over the area, to participate in a day of math challenges, both on a personal and team level. Abbas will be remembered for his total commitment to research and teaching, in addition to the outreach programs mentioned above.



SOROOSH YAZDANI, another loss for the department, has moved on to join Google's office in Waterloo, Ontario. He joined the department in 2011, instantly making a very favourable impression on students and co-faculty alike. Like Abbas, Soroosh was an indispensable force in organizing the Fun With Math and Day of Math outreach programs for community children. He was involved in developing the number theory math curriculum in the department, while working on other curriculum changes to better the department's offerings. Both Abbas and Soroosh were Math Olympiad silver medalists, which made their interaction with community children that much more valuable. His infectious smile and tender heart qualify him as a man worth remembering.



KEVIN GRANT, an exceptional member of the department for many years, decided to try his hand fulltime in the private sector at the company he co-founded with Guy Duke. At the university, he shared the HCI/Visualization lab with Steve Wismath. Kevin has a comfortable and casual manner that not only enhanced his teaching style, but made all around him feel welcome. Who can forget that laugh? We're very pleased that Kevin will remain in contact with the University, having been granted adjunct status. Kev, when you're ready, come back.

RUSSIA 2014 –ACM PROGRAMMING CONTEST

The University of Lethbridge Programming Contest team competed in the 2014 ACM International Collegiate Programming Contest World Finals in Ekaterinburg, Russia on June 25, 2014. A total of 122 teams participated from all over the world, including 21 teams from North America.

Our team (Farshad Barahimi, Darcy Best, Chris Martin) finished 90th overall, and 15th of all North American teams. This year's contest was significantly more challenging compared to previous years, with the winning team solving only 7 problems. The only other Canadian participant is the University of Toronto, solving 2 problems and finishing 59th.

The team was accompanied by Howard Cheng (coach) and Kevin Grant (assistant coach).

A GREAT FOUNDATION



ESTEBAN GOMEZ-RIVIERE, instructor, has been with the University since the Fall of 2011, having taught in the United States for several years after receiving his Masters in Mathematics from Penn State.

His position is shared with the First Nations Transition Program, a program which assists incoming students, or students returning to university education after an absence, in making a smooth transition into life at the University of Lethbridge. By connecting Aboriginal and university cultures, this program aims to increase access to post-secondary education and completion rates for First Nation's, Metis and Inuit students. The program is two semesters (8 months) and it allows the student to transition into most programs at the U of L.

Esteban teaches Math 0100 (Preparation for Essential Mathematics) and Math 0500 (Essential Mathematics) for this program, as well as a mainstream section of Math 0500 for all students, which covers a large number of topics—linear, quadratic, rational and absolute value equations; functions; polynomial, rational, exponential and trigonometric functions; logarithms; and trigonometry.

By all accounts, Esteban is one of the most hardworking and popular instructors on campus... according to his students and co-workers. It's a pleasure to have him associated with the department.

MITACS

Mitacs Globalink Research Internships invite undergraduate students from around the world to experience Canada as a leading destination for research and innovation. This competitive initiative pairs top-ranked students and faculty at Canadian universities for a research project of mutual interest. Faculty members benefit from students' international perspectives and experience, and can evaluate potential graduate students while demonstrating the breadth of Canadian research opportunities. Globalink Research Interns network with professors, government representatives, and business leaders, and develop their skills in a variety of professional development workshops. The experience is enriched by the presence of Globalink Mentors who help interns acclimate to life on campus and in Canada. This summer, we welcomed two MITACS students:

GAURAV GITE

I am a senior student at the Indian Institute of Technology Roorkee, India. I worked under Dr. Jackie Rice, in the Department of Mathematics and Computer Science at U of L, as part of my summer project. The project was about developing a new approach to online testing of reversible logic circuits. Our devised method is capable of detecting single missing gate faults and cross point faults in any reversible logic circuits made up of Toffoli gates. The project was funded by Mitacs Globalink program. This program provides an opportunity for students from different countries, to explore the superior research infrastructure of Canadian universities. My stay at the U of L has been extremely unique. Lethbridge is a beautiful town, full of lakes and parks. People are very hospitable, and it's amazing to see various cultures prospering together here. I remember a dinner where we were having people from 11 different nations at the same table. The best thing about Canada is things are pretty organized—be it the buses arriving at the exact minute to self-check-out counters in supermarkets, there is the maximum use of technology at every step. My future goals are to develop software applications which would have a direct impact on the lives of the common man to make it more easy and to be connected.

PRYIA SOUNDARARAJAN

Hello! My name is Priya Soundararajan, and I'm from India. I'm in my 5th year of an Integrated Master of Science program in Applied Mathematics at the Indian Institute of Technology, Roorkee, India. I was lucky to get selected in the MITACS Globalink program to do an internship at the University of Lethbridge, on Line systems in Rn and Cn, under professor Hadi Kharaghani! In my project, I had to solve/find Hadamard or related matrices of certain orders, to test special cases of some conjectures, or see if a general method of construction works for small orders. I had to do this by writing programs in C++. What I liked about the project was that the problems were easy to pick up and tinker with. It was not always easy to find matrices however, when they seemed too elusive, I would turn to different problems. Along the way I came across a couple of mathematics software systems like Sage, Magma and Maple. Sage got me interested in open source software and I wish to be able to contribute to it sometime in the future! Lethbridge is a quaint, beautiful little town, very different from the hustle and bustle of the cities in India. The first thing I noticed when I came here was the amount of sky visible all the way to the horizon! The second was the level of technology Canadians were used to interacting with in their daily lives. The third was the concept of get-aways on the weekend. It's so peaceful to just go biking around and relax on a park bench, no? I visited Writing On Stone with my mentor and a couple of other GRI's and the infamous Lethbridge winds nearly blew us away. We barely managed to pose for a picture. :D One of the perks of being a MITACS Globalink Research intern is that you meet people from so many different countries. I spent a long time talking to people (like Sara Sasani and Fariha Naz) and learning about their cultures. I'd really like to come back to Canada again sometime in the future, probably to do a PhD. I had a really great time here and met a bunch of wonderful and warm people. Adios!

Pleasure to have had you both with us this summer!

GRADUATE STUDENT UPDATE



ASIF KHAN joined the department in May, to undertake his Master’s in computer science, working with Hua Li. “Attending U of L in the summer was a blessing for me. Though I found it really quiet most of the time that gave me the opportunity to explore different parts of the university all by myself. I took an independent study course with Dr. Hua Li on Cryptography and Network security; that helped me to decide my thesis topic for my Masters. I will be working on the security scheme of wireless sensor network. Fortunately, I got an amazing opportunity to work for the Teaching Centre as a Moodle developer for the summer, and to be honest, that was an experience of a lifetime. I was exposed to real life problems related to Moodle and the web. Besides all this, I have visited Waterton and Calgary during the summer. But I just love the simplicity of the city of Lethbridge. Each day is a new experience for me.”



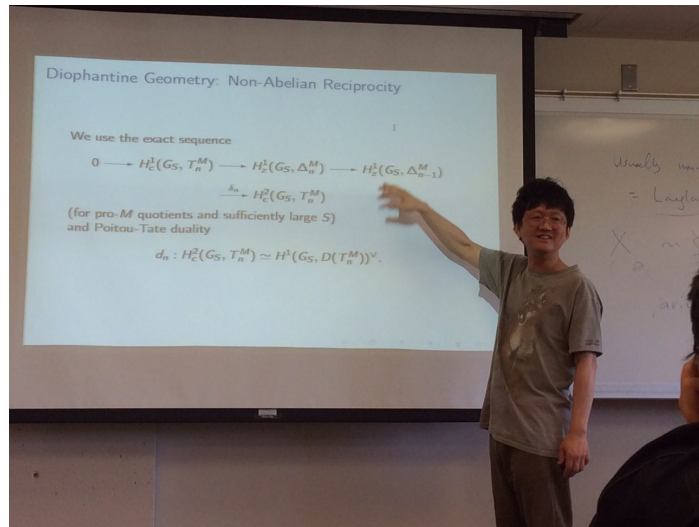
DARCY BEST, Master’s in Mathematics 2014, in a more serious moment. After completing all the requirements of his Master’s degree in December 2013, Darcy headed to Australia with his new bride, Kayleigh, to begin his PhD studies with Dr. Ian Wanless at Monash University in Melbourne. In front of friends, family and his esteemed supervisor, Darcy was awarded not only his Master’s degree but also the prestigious Governor General’s Gold Medal for Graduate Studies.



ADELA GERGHA, PhD student (mathematics)

Adela has taken her PhD studies to UBC, and will be working with Mike Bennett, while pursuing her studies on diaphantine equations. Tiny in stature but big on class, Adela will be missed by fellow grad students and department members alike.

DEPARTMENT SEMINARS, COLLOQUIA, CONFERENCES



Dr. MINHYONG KIM
Mathematical Institute
University of Oxford

Dr. Kim gave a series of presentations on **Arithmetic Fundamental Groups and Diophantine Geometry** during the month of May. He was an invited PIMS distinguished visiting speaker.

Abstract: We recall the formalism of arithmetic fundamental groups according to Grothendieck and the circle of ideas surrounding his 1983 letter to Faltings. We discuss also non-abelian reciprocity maps and applications to Diophantine problems.



ALWAYS TIME FOR WATERTON!