

Science & Environmental Studies NEWSLETTER

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INSIDE THIS ISSUE

- 1 Dean's Message
- 2 Mr. Aaron Pearson
- 3 Dr. Brenda Magajna
- 4 Dr. Gautam Das
- 5 Dr. Monica Ilie
- 6 Maple Educational System
- 7 Seongjun Lim
- 8-9 Claude E. Garton Herbarium
Dr. Lada Malek
Ms. Emma Lehmborg
- 10 Announcements & Awards
- 11 APAIS International
Conference
Kangaroo Math Contest
- 12 Awards
Bank of Canada Governor's
Challenge

A Showcase of Activity Dean's Message

This is our second issue of the Alumni Newsletter for Lakehead University's Faculty of Science and Environmental Studies (SES). In these pages, we showcase a wide range of activities involving both our current students and alumni. In this and future issues the SES Newsletter highlights research activities of our Faculty, staff and students in pursuing both 'blue sky' and 'applied' research that have both long-term and more immediate benefit to society and to our local communities. Our faculty is diverse – there are approximately 80 faculty members in SES's 10 academic departments who teach and mentor students in both traditional science- and social-science programs. We also house a number of interdisciplinary programs such as Applied Life Sciences, Biotechnology, Environmental Science, Environmental Sustainability, Geoarchaeology, and Water Resource Science. We also have several combined diploma-degree programs in partnership with Confederation College in Thunder Bay and with Georgian College in Simcoe County.

In this issue, you will find researcher profiles for three researchers and educators in our faculty, **Dr. Gautam Das** (Physics), **Dr. Monica Ilie** (Math) and **Dr. Doug Morris** (Biology), providing you an opportunity to re-connect with themes they may have shared with you in a course here at LU and/or in their laboratories. Two of our recent SES alumni are also profiled, **Aaron Pearson**, HBSc (Math '11); MSc (Math '13); **Brenda Magajna**, BEd ('04); MSc (Biology '09); PhD (Biotech '15) whose capacities as educators and scientists have put them into important positions within SES to train and mentor students and particularly a growing international student body. You will also learn more about a project to modernize the University's **Claude E. Garton Herbarium** led by Professor Emeritus **Dr. Lada Malek** and Biology Technician **Ms. Emma Lehmborg**, and the University's partnership with China's **Maple Leaf Educational Systems**. We have included a profile of second-year student **Seongjun Lim**, originally from South Korea, who attended the Maple Leaf School in Tianjin and is planning to be a Math Teacher upon graduation.

I hope you enjoy reading about what is occurring in Science and Environmental Studies at Lakehead and invite you to share our Newsletter with others. I encourage you to seek out our companion publication – *Quaetiones Naturales* – that profiles undergraduate research in SES annually. Your input on our SES newsletter is welcomed. Please drop a line to ses@lakeheadu.ca if you have a good idea for a SES Alumnus to be profiled or if you wish to get in touch for other reasons. I look forward to sharing our stories and successes with you.

- Todd Randall, Dean

Aaron Pearson

“Never stop learning,” says Aaron Pearson (MSc Math '13). Since graduating, Aaron has been busy teaching math as a tutor, an instructor at Confederation College and a part-time lecturer at Lakehead University. His favourite aspect about teaching is how he gets to learn something new all the time. He also enjoys the challenges of teaching, but mostly he loves math. He brings his love of math to each lesson. He is sensitive to the student who struggles and appreciates the opportunity to find a way to help. He can often be seen at Lakehead carrying a bag of Mega Bloks® to the library for a tutoring session. Algebraic equations, linear relations and basic numeracy are made clearer with the structures he builds with these blocks. As a math tutor, he strives to design lessons that meet the unique challenges of his students by using relevant ideas to engage them, but this approach isn't limited to tutoring. His experience as a student at Lakehead University has given him ideas to apply in his own lessons. “I love revisiting the math skills I learned as an undergraduate and passing them on to others,” says Aaron.



He has a patient and creative approach to teaching that he attributes to his mathematical mentors, Dr. Razvan Anisca and Dr. Monica Ilie, but he also acknowledges the influences of his “honorary mentor” English professor Dr. Rhonda Dubec. Dr. Dubec was his instructor for Latin and first-year English course: ENGL 1031 *Rhetoric*. For Aaron, Dr. Dubec created an effective learning environment that was respectful, challenging and fun all at the same time. Her *firm, but fair* approach motivated Aaron to work harder in her classes and has also inspired Aaron to use similar teaching techniques. Aaron is not the only one to recognize Dr. Dubec's skills. She recently became

the Coordinator of Instructional Development at Lakehead University, which operates out of the Teaching Commons Office. As the Coordinator, she assists faculty members as well as graduate students develop effective teaching strategies.

Originally from Thunder Bay, Aaron chose Lakehead for his undergraduate studies not just because it was close to home, but also because it is the alma mater of his two older brothers. They both spoke highly of the university and encouraged him to attend Lakehead. He also chose the MSc Math program because, as he explains, “the Math Department is full of brilliant, supportive people who are doing research that aligned perfectly with my own interests.” The Math Department provided great research opportunities. MATH 3231 *Introductory Analysis*, taught by



“Never stop learning!”

Dr. Ilie, was a life-changing course for Aaron as it introduced him to the importance and power of establishing logical foundations for intuitive concepts. Dr. Anisca introduced him to the Cantor set (which is, in general terms, a set of points on a line segment). These became the subject area of his research as a graduate student and remain a focus of his career outside of teaching.



Anisca Razvan

Aaron also recognizes the skills he acquired from the university experience beyond his competencies in math. These skills include time management, teamwork, and problem solving skills that he learned as a graduate student. The research and the course work will always be memorable, but these immeasurable skills acquired sustain Aaron's success as a teacher that bring about many opportunities to learn for both himself and his students.

Dr. Brenda Magajna

“Take advantage of what the professors and university can offer,” says Dr. Brenda Magajna. Brenda did just that, completing a PhD in Biotechnology in 2015. Although she started out in Math and has credentials in Urban Geography, the foodborne pathogen, *Campylobacter jejuni* captivated her interest and was the subject of her dissertation: *Physiological adaptations contributing to stress survival in the foodborne pathogen Campylobacter jejuni*. Her love of biological sciences started with the dissection of a carrot in grade school, but was not fully realized, until 2001 when she registered for her first course at Lakehead with now-Professor Emeritus Dr. Lada Malek, from the Department of Biology. Dr. Malek’s approachable teaching style and love of biology left a lasting impression. Taking BIOL 2230: *Cell Biology*, subsequently changed the course of her life. Little did she know at the time, but she actually would be asked to teach it years later.

“Take advantage of what the professors and university can offer.”

It would be the influence and encouragement of Drs. Kam Leung and Heidi Schraft that cemented Brenda’s passion for science. Dr. Leung gave her the opportunity to collaborate on a literature review and encouraged Brenda to enroll in the MSc Biology program. This led to the lasting relationship she has with Dr. Schraft who supervised both her Masters and Doctoral degree projects. Brenda was one of the first facilitators of the PhD in Biotechnology program, and returned to this role upon completion of her PhD, assisting both students and faculty members involved in this interdisciplinary program. A key part of her role emerged in the past few years in supporting some of

the unique needs of an increasing number of international students. Her position, now re-titled, reflects her dual roles as the Faculty’s PhD Program Facilitator (Biotechnology as well as Chemistry and Material Sciences) and International Student Liaison.

In this role as our International Student Liaison, Brenda assists our international students at both the undergraduate and graduate levels, to connect with services at the university such as the Lakehead University International office, Graduate Studies, Student Central and the Academic Support Zone. She observes that most students don’t know what support



is out there for them and it is a big part of her job to connect them with the proper information. She works closely with the Lakehead University International office to provide guidance to help students adapt to the teaching methods and expectations of the Canadian post-secondary classroom. This guidance includes organizing a science lab orientation and simulation, which was done for the first time in Fall 2017.

Attending university is overwhelming for the average Canadian student, but what if you from a continent or two away? The typical challenges often faced by a first-year student such as time management, financial hardship and being away from home for the first time are potentially amplified for an international student. International students are typically now studying in a second language and face cultural adjustments, notably a first introduction to a real Canadian winter. It is in helping students making these social and cultural adjustments that Brenda provides a critical role beyond just academic supports. With her natural charisma and nurturing approach, Brenda helps international students feel more comfortable in the new surroundings.

To give students the chance to experience Canadian traditions, Brenda organizes weekly social events in the Fall and Winter semesters (every Friday from 4:30 pm to 6:30 pm) where they can interact and practice their English in an informal setting. She plans a wide variety of activities such as cross country skiing, hiking, and pumpkin carving. Brenda enjoys planning and hosting the activities. “It is rewarding to think I am helping someone feel more comfortable in new surroundings,” says Brenda. She is a compassionate advocate and as an alumna, Brenda is all too familiar with a student’s life. She can relate to the challenges faced by our international group. Learning from her own lasting relations with professors and staff at Lakehead University, she brings a level of comradeship to her role as international student liaison as she creates a sense of community for the students.



Heidi Schraft

Creativity, Ingenuity And An Inquisitive Mind

Honesty, punctuality, discipline and hard work bring success in life,” explains Dr. Gautam Das.

On the other side of the door to CBoo08, the Photonics Research Lab, you will find Dr. Das hard at work with his research team investigating the uses for fiber lasers. He has invented a fiber laser system to be used as a tool in environmental assessments for detecting greenhouse gases (e.g. carbon dioxide, nitrous oxide etc.) in the atmosphere. Most recently, he has also been researching medical applications for the laser to replace the scalpel.

Originally from India, Dr. Das completed his doctoral research on multiwavelength fiber lasers at the University of Waterloo. Following completion of his PhD in 2003, he received a one-year limited-term appointment at Acadia University in Nova Scotia before starting as an Assistant Professor in Lakehead’s Department of Physics in August

2004. Dr. Das credits his success to the motivational talks with his grandfather, who was a follower of Swami Vivekananda. Swami Vivekananda played a key role in introducing the Indian philosophy of yoga to the western world in 1893. His main preaching was to serve humanity, and empower women through education. His grandfather had encouraged him to follow the philosophies of Swami Vivekananda, and taught him the benefit of quiet meditation. Dr. Das’ appreciation for the art of meditation has helped him to focus, be disciplined in life; such focus, he says, has allowed his creativity for new research ideas to flourish. Above all, his grandfather instilled in him that success is achieved through hard work—true to these teachings, Dr. Das spends most of his days in the lab.

The field of Optics fascinates Dr. Das. He is always surprised by what the laser can do to advance existing practices in environmental assessment and medicine. He manipulates the environment establishing specific settings before exposing it to the light and observes the different results. These results

are recorded and consistent patterns will determine practical applications. For instance, the consistent change in laser’s light when exposed to chemicals in the air can assist with detecting these specific toxins in the atmosphere. His research has been documented as a way for detecting greenhouse gases. The value of the laser is multifaceted. Researching the potential of its use in medicine occupies most of his time these days. He is excited with the results from his research with how the laser can be used in the fight against cancer. The same process to detect gases in the atmosphere can be replicated to detect the level of gases in

“Honesty, punctuality, discipline and hard work bring success in life.”


the body to identify the presence of cancer. The laser’s abilities will assist doctors with early detection, but more significantly, the laser is noninvasive and reduces the need for exploratory surgery or painful diagnostic procedures.

Dr. Das is very appreciative of the support he has received in his career (to date) at Lakehead—while he has demonstrated numerous successes in research and teaching, he feels that his most memorable moment is yet to come. Amongst his most favourite roles as professor is the opportunity to interact with students in the classroom, and bringing his current research ideas to discuss with students in his group. Echoing his grandfather, he lectures about how successful research is a result of creativity that can only be achieved with hard work. One of his greatest challenges is finding graduate and undergraduate students to engage in his research, as they tend to shy away from physics because of its reputation to only appeal to the academically brilliant. Dr. Das assures prospective students that the application of physics is not about high marks. Creativity, ingenuity and an inquisitive mind combined with determination will produce results in a physics lab.

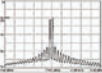
Current Students:


1. Mr. Jonas K. Valiunas, Post Doctoral Fellow
2. Mr. Joshua O. Trevisanutto, PhD Student
3. Ms. Navneet Kaur, MSc. Student



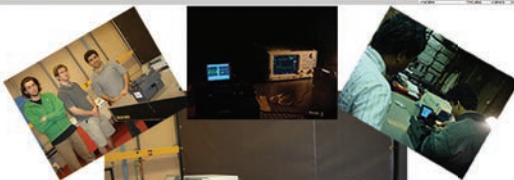


Photonics Research Group



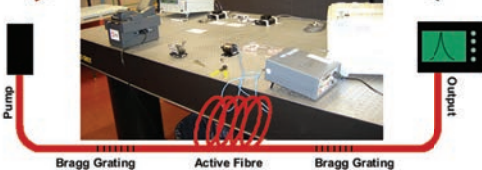


Gautam Das
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Lakehead University Is Alive With The Sounds Of Math

“Not many people realize that listening to music online, one of everyone’s favourite pastimes, is built on mathematics,” explains Dr. Monica Ilie professor in the Department of Mathematical Sciences. As the former chair of the Senate Committee on Teaching and Learning, she is well versed on the

importance of connecting teaching approaches and successful student outcomes. She presents math in new ways revealing its practical application reducing the stereotype that math is difficult to understand. Downloading music is actually downloading streams of numbers done by using a calculus-based technique first developed in the early Nineteenth century. In many ways, Dr. Ilie hears math. The mathematics used to convert music into numbers has its origins in the work of the French mathematician Joseph Fourier and his discovery to represent any waveforms as a sequence of numbers. From this discovery, a significant branch of mathematics called classical Fourier analysis or classical harmonic analysis was established with far reaching applications in physics, engineering, number theory, and neurosciences.

Dr. Ilie originally completed her undergrad in Romania and moved to Canada to complete a PhD at the University of Alberta in 1997. In the first year of her doctoral program, she took a course in abstract harmonic analysis with Dr. Anthony Lau and was captivated. Abstract harmonic analysis combined two areas that still interest her today, which are group theory and functional analysis. Dr. Lau was her PhD thesis supervisor, and inspired Dr. Ilie both as a researcher and as a teacher. After completing her PhD in 2003, she spent a year and a half at Texas A&M University as a Visiting Professor and NSERC Postdoctoral fellow. She started her academic appointment at Lakehead University in January 2005.

Dr. Ilie’s research field is abstract harmonic analysis. Her research is based on two fundamental fields of mathematics, which are analysis and algebra. It is the extension of the classical Fourier analysis derived by replacing the real line “R” with an arbitrary group “G”. In classical Fourier analysis, to rigorously understand the process of analyzing (extracting information from) and synthesizing (reconstructing) the solution of the wave equation in terms of harmonic waves, we need the theory of convergence of families of functions. To achieve a better insight into these processes we study spaces of these functions. These are called Banach algebras, and can be thought of as constructed from simpler mathematical objects called groups. Dr. Ilie’s most important contribution to the field is to show that even if the algebras are not exactly the same, but still connected, there remains a clear connection between the groups. This exciting discovery has not only led to applications in other algebras such as duals of algebras, but has also proven to be useful in the study of various properties of the Fourier algebra.

Dr. Ilie has continuously held an NSERC Discovery Grant since 2005, and the London Mathematical Society awarded her a one-time grant in 2008. The prestigious London Mathematical Society Scheme II Grant came with the invitation to present her research to prestigious mathematics departments at universities in the United Kingdom, such as the University of Oxford, Queen Mary’s University of London and the University of Lancaster. The success of her research gave her the opportunity to co-organize the Canadian Symposium on Abstract Harmonic Analysis in May 2013, which brought together world-renowned researchers.

Not only does Dr. Ilie enjoy sharing her enthusiasm for math with post secondary students, she is actively involved in several university initiatives for students of all ages. “I think it is extremely important to keep the interest in mathematics alive, and show kids the fun in mathematics,” says Dr. Ilie. She enjoys participating in outreach initiatives led by the Department of Mathematical Sciences. In terms of outreach, Dr. Ilie feels privileged to be part of the team that has organized the Annual High School Math Contest for the past 15 years. She has also coordinated the Canadian Math Kangaroo Contest twice. The Canadian Math Kangaroo Contest is open to a wide range of ages, from grades 1 to 12.

The role of professor has always been rewarding for Dr. Ilie as it combines the roles of researcher and teacher. For Dr. Ilie, teaching is a life long learning experience and a complement to research. She appreciates the classroom experience and has introduced her research to many students while supervising NSERC undergraduate summer research projects; undergraduate honours projects, graduate students and postdoctoral fellows. She advises students interested in research to follow their passion and choose a mentor that inspires them. She acknowledges how Lakehead fosters the development of successful researchers and points out that, “one of the advantages of Lakehead University is that students have a great opportunity to connect with research from an early point, thus giving them the opportunity to try various things in order to find their passion.”

Keep the tradition alive.

Since 2003 the Department of Mathematical Sciences has organized the Northwestern Ontario High School Mathematics Contest.

Annually, over 120 high school students from Thunder Bay and surrounding area demonstrate their math skills by writing a 75 minute contest, and participate in math activities. To celebrate their achievements, an award ceremony concludes the day. Mathematics today is increasing as the essential background for tomorrow’s successful graduate. Keep the tradition alive.

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Maple Leaf Educational System

The very successful Maple Leaf Educational System (MLES) was established in China in the mid-1990s. Graduates of this school system have for the past two decades made the transition to post-secondary institutions in Canada and particularly to British Columbia. More recently, graduates have journeyed to Lakehead University to begin concurrent education degrees in one of the STEM (science, technology, engineering and mathematics) fields, with the intent to one day return to their home country to teach in one of the Maple Leaf Schools back home in China. In Fall 2016, Lakehead welcomed its first cohort into Chemistry, Mathematics, Physics and Biology programs.

It was an initial random act of kindness while living in Canada that led Chinese businessman Dr. Sherman Jen to establish the MLES. While living in Vancouver, his young daughter fell hurting herself severely. His wife had no way to drive her to the hospital and ran into the street with her daughter calling for help. The first car that came by stopped and drove them to a nearby hospital. While very grateful and moved by the generosity of this specific random Canadian, he recognized that this experience embodied the overall hospitality and compassion he and his family continued to experience while living in Vancouver.

Recognizing a potential opportunity to bring some of these Canadian cultural ideals back home, Dr. Jen came up with the concept of MLES. Inspired by the ideas of globally integrated education, he developed his vision of blending Canadian culture with Chinese culture through an educational system. He met with officials from the BC Ministry of Education and proposed the idea of offering the British Columbia high school curriculum in combination with Chinese educational and cultural traditions. The then-BC Premier Mr. Michael Harcourt, endorsed the project and Dr. Jen began to implement his vision with the opening of the first Maple Leaf School in Dalian, China. The MLES has grown rapidly since this first school in 1995 and there are now more than 15 schools located in various cities throughout China with future plans to grow the number of schools in China as well as in other countries such as Canada and Australia. The Maple Leaf model provides a western academic curriculum in concert with Chinese educational and cultural traditions to prepare students for post-secondary education. The Maple Leaf system has enabled Chinese students to make a successful transition to study abroad at Canadian universities and at other English-speaking institutions around the world.

Lakehead International, the Faculty of Education and the Faculty of Science and Environmental Studies welcomed its first cohort of MLES students in the Fall of 2016. Within these units, we have deployed staff to ensure the academic success of these new students and to make them develop a sense of 'home away from home' while they complete their studies. In SES, our efforts are headed up by our SES International Student Liaison, Dr. Brenda

Majagna, herself a Lakehead alumna (PhD Biotechnology, 2015). Brenda has aligned her efforts with those of LU International and the departmental program chairs to offer critical supports to these students as they transition to life and school in Canada. A total of 17 students started in this program in 2016.

The Office of Lakehead International is committed to the success of the Maple Leaf students. Students are given detailed information about accommodation on campus and course registration. The fall Orientation in early September provides information on topics such as, cultural transitions, academic success, on campus and community services. The MLES students are monitored to ensure they transition well academically, socially and culturally. After each term, the MLES students meet with the International Student Advisor to discuss their experience and if needed, the students are referred to the appropriate on-campus services.

"The biggest challenge we have found Maple Leaf students face is getting used to the independent time management skills required to be a successful student in a Canadian university setting," explains International Student Advisor, Laura Pudas. As with most first year students, the transition from a structured secondary school system to university independence can be overwhelming, but the Maple Leaf students are committed to their studies.

The Maple Leaf students are enrolled in the Maple Leaf-Lakehead Future Teachers program, which is overseen by Mr. James Beeke, Superintendent of Global Education for the MLES. Mr. Beeke has visited Lakehead University several times over the years, most recently in March 2017 to meet with the first cohort of MLES students at Lakehead to monitor the students' success and to discuss the possibilities of expanding the program. The program's main goal is to prepare these students as future teachers to return home to teach the blend of Canadian and Chinese educational systems in MLES. They already have an advantage as global citizens acquired naturally due to the blended curriculum that embraces diversity. As Ms. Pudas observes, "We truly believe that their experiences as Maple Leaf students at Lakehead University will only benefit them in their careers as future educators."





Seongjun Lim taken in LU Residence



Student Profile: Seongjun Lim

Seongjun Lim is enrolled in the HBSc/BEd Concurrent Education program specializing in Mathematical Sciences. Seongjun belongs to our first group of students from the Maple Leaf Educational System (MLES) that joined the Lakehead University community in Fall 2016. Seongjun is a graduate from the Maple Leaf International School in Tianjin, China known as TEDA. Tianjin is a large city of nearly 11.5 million residents and located in northeastern China, about 125 km southeast of Beijing. Students in the Maple Leaf system complete their final three years of high school studying the BC curriculum and are then eligible to apply to a foreign post-secondary institution. Like all MLES schools, the TEDA School in Tianjin merges traditional Chinese with western values and strives to foster values of respect, responsibility, honesty and hard work to inspire students to grow in mind, heart, body and spirit. Seongjun chose Lakehead University to study and the concurrent education program to prepare him for a career as a high school Math teacher in a Maple Leaf school back in China.

Originally from Seoul, South Korea, Seongjun moved to China in 2011. There he studied Mandarin, English and took the required courses Math, Science, Social Science and Physical Education while enrolled in the Maple Leaf international school in Tianjin. At first he was interested in the Engineering program at Lakehead but his ambition to be a high school math teacher changed his mind. With Lakehead's increasing international profile, he felt that the university offered him the best opportunity to develop effective teaching skills and to instill in students his love of math. Lakehead has a strong track record of teacher education and placing its graduates in schools in Ontario as well as around the world. For Seongjun, teachers have a valuable role in society and he looks forward to a rewarding and exciting career as an educator.

Thunder Bay isn't the first Canadian city Seongjun has lived in. Before coming to Thunder Bay, he spent time in Vancouver at the Education First (EF) International Language Center to improve his communication skills in English. Seongjun enjoyed the classes, but his fondest memories were the ones spent with classmates visiting Vancouver's many tourist attractions. The diversity of the multicultural communities in both Vancouver and Thunder Bay were surprising and comforting. In the EF program in Vancouver and now in residence at Lakehead, he has met students from all over the world and come to appreciate a broad range of cultural differences amongst the international student community. As international students, they shared similar experiences that created lasting friendships. For Seongjun, the best part about living with international roommates was having the opportunity to eat each other's favourite food from their home country. Overall, Seongjun enjoyed living in Thunder Bay especially when he could take in the outdoors by playing Frisbee

when needing a break from studying. His one complaint is the long cold winter in Thunder Bay and his least favourite thing is going out to buy winter outerwear.

Seongjun is a perfect example of a global citizen. After graduation, his immediate plans are to return to China to share what he has learned with the students as a Math teacher at one of the Maple Leaf schools, preferably at his former school in Tianjin. He doesn't dismiss the idea of one day teaching in Thunder Bay or in Vancouver. He brings his life experiences from China to Canada and after graduation; he will share Canada with China. Graduation is a few years away and for now, he is happy to be a member of the Lakehead University community.

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The Claude Garton Herbarium Turns 50

The Claude Garton Herbarium is located on the third floor (CB3027) of the Centennial Building and is celebrating fifty years of service this year. The Herbarium is a collection of over 109,000 plant specimens that include plants from Thunder Bay and the surrounding region. Named in honour of Claude Garton, a local elementary school teacher, who began collecting local plants in 1933, the Herbarium came to fruition in 1967 after he donated 10,000 specimens that he had collected to Lakehead University. Mr. Garton was the founding curator until 1990. In addition to the Herbarium, his contributions as a local educator are also recognized in the naming of Claude Garton public school in Current River. Following Mr. Garton, the Herbarium was curated by Joan Crowe (1991 to 1993), Erika North (1993 to 2015) and currently by Emma Lehmborg since 2016. Ms. North has remained with the Herbarium as our “Curator Emeritus” as an important mentor to Emma and has taught courses using the Herbarium’s collections, including her course on the Biology of Flowering Plants. We all have benefitted from her extensive knowledge of the collection. At 50, the Herbarium is undergoing

its biggest change since its initial inception, as the records of dried plant specimens will be transferred to digital files to make the collection more widely available. Dr. Lada Malek, Professor Emeritus of Biology and its new Curator, Emma Lehmborg, are leading this modernizing of the Herbarium. He and Emma plan to have the herbarium collections fully digitized by 2020.

To increase the accessibility and relevance of the collection, part-time students, Dr. Malek and other volunteers have been busy taking images of plant species in their natural environment as well as photographing the collection’s dried specimens. The herbarium digitization project is an effort to popularize investigations of plants as an important component of the ecosystem. It will also make the herbarium collection accessible to the international research community. Dr. Malek points out that the Herbarium has already developed connections with the University of California (Davis), the Charles University (Prague) and the Canadian Museum of Nature (Ottawa). Once the project is completed and the collections are available on the Internet, the global connections will only increase. “In addition to generating new data on plants, I hope to contribute to the acceptance and better public understanding of scientific research on plants, and on living organisms in general,” explains Dr. Malek.

Born in Czechoslovakia, Dr. Malek credits his maternal grandfather for his interest in botany, as well as the time he spent assisting a regional conservation officer with the protection of nature reserves near his hometown. He came to Canada in



Dr. Lada Malek, Professor Emeritus of Biology

1968 with his sister and parents. He attended the University of Calgary where he completed a Bachelor of Science and Master of Science in Biology and Plant Physiology. With encouragement from his mentor, Dr. Derek Bewley from the University of Calgary, he went to Japan with his wife to study plant dormancy with Professor Yoshiharu Oda. He returned to Canada in part to be close to family and studied plant biochemistry (amino acid metabolism) under Dr. Edwin Cossins at the University of Alberta. On his advice, with a newly earned PhD and NSERC Postdoctoral Fellowship (PDF) in hand, he applied to study chloroplast metabolism with Dr. Lawrence Bogorad at Harvard. At Harvard, he worked with Dr. Alfred Goldberg and his project on ubiquitin and proteasome protein degradation pathways. This project had Dr. Malek looking for similar patterns in spinach chloroplasts. Once again, it was family that brought him back to Canada and with a second child on the way in 1984, he accepted a tenure track position at Lakehead University.

At Lakehead University, Dr. Malek continued to research protein degradation pathways, but more of his time focused on undergraduate teaching. He is one of the original committee members who established the Applied Life Sciences program (previously the Applied Biomolecular Science program), a popular interdisciplinary programming option within the Department of Biology and collaborating disciplines. The APLS program focuses on biochemistry and molecular biology of organisms exposing hundreds of students to the diverse topics that fall under the scope of biology, chemistry and anthropology. After retiring in 2016, Dr. Malek directed his efforts back to his earlier interests in Botany and has led the digitization of the Herbarium’s collection. His work with the Herbarium prompted him to focus on lichens and their wild array of secondary metabolites of unknown biological function, which have significant potential for discovery of new drugs. This area is being pursued in collaboration with Drs. Lew Christopher, Zach Sutures, Ingeborg Zehbe and others.

In 2016, Dr. Malek was awarded the title of Professor Emeritus. From his many years at Lakehead University, his most memorable moment was learning that some of his dedicated graduate students were working in their underwear, only covered by a lab coat. They were also using the cold room (meant to keep enzymes functional) to cool themselves off in an otherwise poorly air-conditioned lab.



Erica North with the Herbarium Profile



Herbarium Interview with Emma Lehmberg

1. What is a herbarium and what is its function for a university?

A herbarium is a collection of preserved plants kept for scientific study. Using the plant specimens - called vouchers - we can study things like distribution and changes in populations over time. They are also often used to describe species and determine evolutionary relationships between groups. We're able to do this because the plants provide a temporal and spatial record of the plant species present in a given area.

Herbaria (plural of herbarium) are found at many universities and museums - at a university they're used for both scientific study and teaching. Having students to examine preserved plants up close gives them the opportunity to learn key characters with a hands-on approach, rather than in theory or from textbooks. A number of courses have been run with a herbarium component at Lakehead, including Taxonomy of Vascular Plants, Biology of Flowering Plants, and Wetlands.

2. How do you obtain specimens?

We acquire specimens in one of two ways. The first is through doing our own collections. In the early years of the Claude Garton Herbarium, the founder, Claude Garton, collected thousands of plants himself and spent many of his summers as curator collecting plants in northern Ontario and the areas around Lake Superior, including Minnesota. The Thunder Bay Field Naturalists have also played a key role in expanding our collections and they have given us many of the collections they've done over the years as they've established and characterized their reserves around Thunder Bay.

The second way we acquire plants is through exchanges with other herbaria. When doing collections, we often will take more than one individual plant (but never more than 10% of a population). While we preserve and keep one or two of these plants, the others are sent off to other herbaria in exchange for some of their collected specimens. This practice is an old one, and has helped to ensure that not only do we have a very rich collection of plants from around North America but also that if our vouchers are ever damaged, there are others at other institutions.

3. What is your role with the Herbarium?

Currently, I'm the acting curator of the herbarium. This means I'm responsible for the care and upkeep of the vouchers, supervision of herbarium projects, outreach, and facilitating class use of the herbarium. I also act as a regional resource for anyone who is looking for information on local plant species. Of course, I don't do all of this alone - I'm very lucky to have the help of volunteers, the support of the Biology department, long-time curator and mentor, Ms. Erika North, and Professor Emeritus of Biology, Dr. Lada Malek. Dr. Malek and I are working on a program to modernize access to the Herbariums collection through a digitization project.

4. Can you describe why it is important to have a computerized database?

The aim of this project is to make these records publicly accessible, both for researchers and for members of the public who wish to know more about plants.

Claude Garton Herbarium has recently begun an independent digitization project, with long-term goals of imaging all specimens in the herbarium. Though we are in the early stages, we aim to have a number of specimens done by the end of the year, which will then be made available by request. Eventually, we hope to have an Internet database that's accessible to the public.

5. Do you know how the Claude Garton Herbarium ranks in Canada?

Claude Garton Herbarium is one of the smaller herbaria in the country, with approximately 109 000 vascular plants and 14 000 mosses lichens and hepatics. Approximately 32 000 of these specimens are from northern Ontario. While small, the depth of the collections is amazing, considering that most collections have been made by a few key people.

6. Who uses the Herbarium? Are there fees?

The herbarium is used by researchers, students, and scientists working for government (e.g. the OMNR), as well as by members of the public wishing to learn more about the flora of Thunder Bay. There are no fees associated with use of the vouchers in the herbarium - it was established to serve the public and the scientific community without financial barriers. The Department of Biology and the Faculty of Science and Environmental Studies are supporting the costs associated with the herbarium modernization project.

7. What causes plants to stop thriving? Does the Herbarium have a role in protecting the plants?

The threats to plants are many, but are often connected to human use and/or disturbances of the land. While it is not any one action that causes the threats, there are a few that are increasingly affecting plants and their associated ecosystems. Among these threats to plants are climate change, invasive species, and forests being cleared for agriculture and development.

Museums and herbaria definitely have a role in protecting plants species. Using the specimens we keep in the herbarium, we can construct an idea of how sensitive a plant, group of plants, or even an ecosystem may be to disturbance and change. Using this information, we can aid NGOs and government in establishing protected sites. We can also help delineate new species by conducting genetic studies on groups of plants that have unsure or complex evolutionary histories.

8. What is the oldest specimen? What is the newest specimen? Have new species been discovered?

Our oldest specimens date from the 1930s. This was around the time that Claude Garton, the herbarium founder, began to collect plants as a part of the Thunder Bay Field Naturalists. Since that period, collections have been made in a fairly consistent manner. Our most recent collections were made in May 2017.

While no new species have been discovered in this region recently, we have been tracking the appearance of introduced species to the Thunder Bay area for over two decades. Between 1998 and 2015, there have been 100 new species added to our regional checklist, nearly all of them introduced or previously not found here.

9. What fascinates you the most about the Claude Garton Herbarium?

One of the greatest things about the herbarium is that it represents a comprehensive record through time of the flora of the area. So even though the plant has been collected long before I was born, I can still see how that species has changed or adapted as we have continued to collect it. I've always thought of a herbarium as a way of straddling a line between the past and the present while allowing us to make predictions about the future - it's a bit like biological time travel. And who doesn't want to travel through time?

ANNOUNCEMENTS & AWARDS



Anthropology

Dr. Matt Tocheri is receiving \$305,000 from the Social Sciences and Humanities Research Council of Canada for a five-year project investigating pre-modern and modern humans. He will be researching whether our species played a role in the extinction of *Homo floresiensis*.

Biology

Dr. Wensheng Qin NSERC Discovery grant of \$140,000, *Understanding and optimizing enzyme efficiency for cellulose biodegradation*.

Chemistry

Dr. Mitchell Albert, NSERC Discovery grant of \$225,000, *Hyperpolarized Xenon MRI biosensors development program*

Dr. Zi-Hua Jiang, NSERC Discovery grant of \$110,000, *Modulation of innate immune responses*.

Computer Science

Dr. Vijay Mago, an assistant professor in Computer Science, has received \$100,000 to develop the software platform and hardware for a real-time analytic tool that will analyze large-scale social networking websites to determine the effectiveness of public health awareness social media campaigns.

Dr. Sabah Mohammed and Dr. Jinan Fiaidhi, have been named the Editors-in-Chief of the *International Journal of Extreme Automation and Connectivity in Healthcare (IJEACH)*, a new approved journal from the US IGI Global publisher that was added to its 170 highly cited and indexed journals. .

Geology

Dr. Amanda Diochon, an associate professor in Geology, is receiving more than \$100,000 over the next three years to develop an outreach program that provides culturally responsive, hands-on learning opportunities for Indigenous youth in Northwestern Ontario.

Dr. Peter Hollings NSERC Discovery grant of \$110,000 *Geochemistry of pyroxene-phyric komatiites in the Southern Superior Province; implications for Archean geodynamics*

Math

In spite of bad weather and a rescheduling the annual Northwestern Ontario High School Mathematics competition took place on May 4th 2017. One hundred and forty-five students from Thunder Bay and across the region participated, with Westgate C.V.I. taking first place in the local senior team competition, and St. Ignatius winning the junior contest

Physics

Dr. Gautam Das NSERC Discovery Grant \$105,000, *Investigation into optical fiber waveguides, lasers and applications*.

Dr. Hubert de Guise NSERC Discovery Grant \$105,000, *Understanding quantum systems with higher symmetries*

Sustainability Sciences

Dr. Christopher Murray, Sustainability Sciences (Orillia Campus), *EcoReach* grant of \$21,000.00 with co-applicants:

- ♦ Dr. Thamara Laredo, Sustainability Studies/Chemistry (Orillia Campus)
- ♦ Dr. Victoria Te Brugge, Laboratory Coordinator, Sustainability Studies (Orillia Campus)
- ♦ Dr. Rosario Turvey, Sustainability Studies/Geography (Orillia Campus)
- ♦ Dr. Maria Grazia Viola, Department of Mathematics (Orillia Campus)



SESBASS 2018

Science and Environmental Studies Biotechnology and Allied Sciences Symposium

Science and Environmental Studies is hosting the first annual SES Biotechnology and Allied Sciences Symposium (SESBASS).

The theme for the symposium is **“Technologies for a Changing World”**.

SESBASS is bringing together researchers with diverse skills and knowledge who share common goals, providing a forum for discussion and the development of collaborative projects. This two day symposium will consist of four oral presentation sessions, a poster session combined with the “Wine and Cheese Jeopardy Game Show” on Thursday evening and a “Themed Table Banquet” with a guest speaker on Friday evening. Topical Sessions will include biorefining, waste treatment, renewable energy, and diagnosis and treatment of emerging/evolving diseases.

For more information visit our website <https://sesbass.weebly.com> or contact us phd.ses@lakeheadu.ca

The 2nd APAIS International Conference on Applied Science and Engineering

Keynote Speakers from Lakehead University's Computer Science Department



Jinan Faiidhi Invited Speech:
The Next Generation Software through Learning Analytics

Abstract:

In recent years, driven by rapid, phenomenal advances in computing, storage, and communication, practitioners, academic institutions, and researchers are increasingly seeing the need for new student-centered approaches to education. While several approaches for this type of learning exist, Constructionism through learning analytics is one of the most popular and well-developed ones. Generally, learning analytics deals with the development of methods that harness educational data sets to support the learning process. This keynote talk highlights the importance of this new paradigm in developing the next generation of information technology systems.



Sabah Mohammed Invited Speech:
Trends in Using Machine Learning in Healthcare Applications

Abstract:

Health care and biomedical data are becoming increasingly complex with the advancement of pervasive monitoring devices, the genomic sequencing technologies, the availability of inter-linked open medical big data and the high adoption of electronic health records. For this reason health care is continuously expanding the knowledge forefront as new methods of acquiring data are becoming available. However getting the value out of such data need to rely on the ability to best interpret available data that may originate from a number of sources, including healthcare professionals, patients, and medical devices. Machine learning/deep learning and AI are transforming the healthcare industry, improving outcomes, and changing the way doctors think about providing care. It is improving diagnostics, predicting outcomes, and just beginning to scratch the surface of personalized care. This keynote talk provides the roadmap and the research trends for using Machine Learning in health data analytics to accelerate discoveries.



COSy 2017

The 45th Canadian Annual Symposium on Operator Algebras and Operator Theory took place at Lakehead University in Thunder Bay Ontario from May 29 to June 2, 2017. There were 47 participants, coming from across Canada and the United States, and from Europe. Results were presented from such diverse fields as: quantum information theory, K-Theory and the Elliott classification program, free probability, C*-dynamical systems, non-self-adjoint algebras, and single operator theory.

This conference was funded by the Fields Institute.



Kangaroo Math Contest

This past March, more than 6300 students ranging from Grade 1 to Grade 12, participated in the annual Canadian Math Kangaroo Contest. This year, Lakehead University saw a total of 36 students. The contest promotes the enjoyment and beauty of mathematics and is an event that is thoroughly enjoyed by all. Students are recognized for their efforts at the local and national level. The contest garners more interest with increased exposure and awareness, and we hope to see more students next year.

Awards

Northern Lake Superior Thesis Award Winners 2017

Arnold, Kira (MSc Geology)

Project Title: Analysis of the Terrace Bay Batholith and the surrounding Gold Occurrences in this area

McKee, Graydon (MSc Biology) Renewal

Project Title: Movement and Resource use of Walleye in Black Bay, Lake Superior

St. James, Michael (MSc Biology) Renewal

Project Title: The source of metal contamination in water bodies around the Barrick Gold's Hemlo Gold mine

Stratton, Kyle (MSc Biology)

Project Title: Diversity of Life History Characteristics of Lake Superior migratory rainbow trout

Wegher, Marissa (MSc Biology)

Project Title: Variation in the Direction and Pathways of Energy in Lake Superior Food Webs

Conference Travel Award Winners 2017

Trevisanutto, Josh

HBSc (PHYS with Concentration in APBI)

Supervisor: Dr. Gautam Das

Conference or Workshop: 2017 Canadian Association of Physicists (CAP)

Potter, Stephanie

HBOR BA (Geography)

Supervisor: Mr. Jason Freeburn

Conference or Workshop: Royal Geographical Society

Luu, Brandon

HBSc (Chemistry)

Supervisor: Dr. Stephen Kinrade

Conference or Workshop: United Nations Educational, Scientific and Cultural Organization (UNESCO)

Baidoc, Robert

MES (Northern Environments & Cultures)

Supervisor: Dr. Robert Stewart

Conference or Workshop: Esri User Conference

Prete, Braedan

HBSc (Chemistry)

Supervisor: Dr. Mitch Albert

Conference or Workshop: The International Society for Magnetic Resonance in Medicine (ISMRM)

Kopanski, Ashlyn

HBSc (Chemistry)

Supervisor: Dr. Mitch Albert

Conference or Workshop: The International Society for Magnetic Resonance in Medicine (ISMRM)

Bohemier, Marc

MES (Northern Environments & Cultures)

Supervisor: Dr. Robert Robson

Conference or Workshop: 2017 Wichiitowin Aboriginal Engagement

Suffak, Mark

HBSc (Physics)

Supervisor: Dr. Hubert de Guise

Conference or Workshop: 2017 Canadian Undergrad Physics Conference



(l-r) Dr. Karl Skogstad, Ryan Swaggert, Christine Williams, Raven Wheesk, Jason Baird, Leshya Lecappelain, and Dr. Michael Shannon.

Bank of Canada Governor's Challenge Results

By Karl Skogstad

This fall semester, the Department of Economics took part in the third Annual Bank of Canada Governor's Challenge. Universities across Canada take part in this yearly competition, which is designed to promote the understanding of the role that monetary policy plays in Canada's Economy. (<https://www.bankofcanada.ca/research/governors-challenge/>)

This year, the team was comprised of Christine Williams, Raven Wheesk, Leshya Lecappelain, Jason Baird, and Ryan Swaggert. The team was supervised by Dr. Michael Shannon and Dr. Karl Skogstad. The team spent the semester preparing a presentation that was delivered, via Skype, to judges at the Bank of Canada, on the morning of November 21st. Though the team did not succeed in advancing to the final round of the competition, the judges were nonetheless very impressed with the Lakehead team.

Their official feedback included the following statements:

"The structure of your presentation was very good and clear."

"You gave a good preview of your final recommendation throughout the process. That was a good strategy."

"The way that you decomposed the output gap was intuitive."

"Good review of the economic variables. You chose the right variables to look at."

We are already planning for next year's competition, where we expect to improve our performance thanks to the expected continued participation of some of this year's team members.

Editor-in-Chief Tina Maenpaa



Website: <https://www.lakeheadu.ca/academics/faculties/science-and-environmental-studies>



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Twitter: @LakeheadAlumni

Instagram: <https://www.instagram.com/lakeheadalumni/>



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