

Science & Environmental Studies NEWSLETTER

Issue 1, December 2016

Cover Image by Dr. Scott Hamilton

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A Showcase of Science and Environmental Studies

Dean's Message



Welcome to the inaugural 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. The SES Newsletter will highlight 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, Environmental Studies, Northern Environments and Cultures, Water Resource Science and Geoarchaeology.

In this first issue, you will find researcher profiles for two long-time researchers in our faculty, Dr. Azim Mallik (Biology) and Dr. Scott Hamilton (Anthropology), providing you an opportunity to re-connect with themes they may have shared with you in a course here at LU, and with three SES alumni Jason Prno, HBES (Geography) 2004, Ben Kuzmich, HBSc & MSc (Geology) 2014 and Katelynn Crawford (HBASc) Environmental Sustainability 2016 who've gone on to great success since graduation. You will also learn more about research activities in SES at our Orillia campus through a profile of the Research Centre for Sustainable Communities from Dr. Nanda Kanavillil, the founding director, and about a high school student, Ms. Emily Cross, whose investigations on the properties of Ironstone have received national and international science fair awards. Other profiles and interviews include Dr. Mary Louise Hill and Nick Bel from our long-standing summer camp program in Thunder Bay, Superior Science, which just celebrated its 17th consecutive summer. Read about our successful outreach program, the Aboriginal Mentorship Program, the accomplishments of Dr. Alla Reznik and Dr. Aicheng Chen and so much more.

I hope you enjoy reading about what is happening 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 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, Interim Dean



Lakehead
UNIVERSITY



Ben Kuzmich **Geology**

“My philosophy is that if you aren’t a little scared with what you’re doing, then you’re not playing to your full potential,” advises Ben Kuzmich. Ben acknowledges that the Geology industry is full of opportunities for motivated graduates. He graduated in 2014 with a Master of Science degree in Geology. His studies focused on magmatic Iron-Titanium-Vanadium deposits in the *Ring of Fire*, which is a mining project located 400 km northeast of Thunder Bay, Ontario. Upon graduation, Ben was immediately employed with the *Fladgate Exploration Consulting Corporation* in Thunder Bay. While consulting with *Fladgate*, he made a significant gold discovery in Northern Manitoba not far from Lynn Lake. Because of a his reputation as a prospector, he was featured as a guest on Discovery Channels *Fool’s Gold* TV series that aired on September 15, 2015.

“My philosophy is that if you aren’t a little scared with what you’re doing, then you’re not playing to your full potential,” advises Ben Kuzmich.

Although every class has influenced Ben, he credits the course, Geological Case Studies, for his success. The course is offered in the final year of the undergraduate Geology degree and encourages students to bring together everything they have learned throughout their degree. This course helped Ben overcome his shyness and develop his public speaking skills. It led to a “Best Student Paper Presentation” award at the *Institute on Lake Superior Geology* conference held in Thunder Bay in 2012.

Ben believes that Lakehead University’s unique position as the “hub of the north” allows students many opportunities to meet with professionals and gain relevant work experience. The Geology program takes full advantage of Lakehead’s unique position in the north and offers field school courses in the summer to provide students with hands-on experiences. The summer courses take students throughout Northern Ontario to learn about a variety of field techniques in diverse geological settings, teaching them the skills required to work as geologists in industry or academia. Ben believes that the summer courses give Lakehead University students a “huge advantage over most other Universities and makes them better connected, more experienced and ultimately more hireable upon graduation.”

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Katelynn Crawford **Environmental Sustainability**

“Going to Lakehead has really expanded my horizons and has allowed me to see things in a different perspective,” says Katelynn Crawford (HBASc ENSU ’16). Katelynn is an alumna from the Honours Bachelor of Arts and Science in Environmental Sustainability. The Environmental Sustainability program is a newer program established in 2010 that is only offered at the Orillia campus. The objective of the program is to graduate environmentally conscious citizens who are capable of finding scientifically-based solutions to environmental problems and issues.

Katelynn chose Lakehead University-Orillia because it is close to home and that made post-secondary education affordable. The hands-on experience, the variety of program and course choices were also attractive. Katelynn appreciates the specialized programs and the experiential learning that make many of Orillia’s programs exceptional. She also acknowledges that the number of courses that have field components influenced her decision. These courses have helped her gain skills that will prepare her for various opportunities in the environmental sector.

One course that stands out for Katelynn was fourth year Environmental Sustainability 4110 Freshwater Ecology taught by Dr. Nandakumar Kanavillil. It was after completing the challenging lab assignments that she realized how much she enjoyed aquatic sampling and decided to pursue a career working with aquatics. ENSU 4110 is designed to provide students with the opportunity to explore ecological, biological and physical properties of various freshwater ecosystems. The lab activities include the collection of water and sediment samples from lakes and rivers in the region to analyse the biological and chemical characteristics of aquatic weed and benthic samples.

Many of the students are given the opportunity to explore various freshwater ecosys-

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tems as part of the field course at Algonquin Park Wildlife Research Station.

Going to Algonquin Park, is one of Katelynn's most memorable Lakehead moments so far. The Algonquin Park experience provided training on how to implement her research experiments, but the adventure at Algonquin Park was not just fulfilling academic requirements. It was a great way to form relationships with peers who have similar interests. After class, the students had campfires and went on canoe trips. "Going on these sorts of trips with my classmates has led to me making some of my best friends,

Going to Lakehead has really expanded my horizons and has allowed me to see things in a different perspective.

we definitely bonded over trying to figure out various assignments," recalls Katelynn. These field course opportunities give our undergraduate students the chance to engage with the abstract ideas discussed in lectures and learn about the landscape and animals of Ontario by experiencing biology first hand.

As Canada's first Honours Bachelor of Arts and Science in Environmental Sustainability program, it has provided many students with practical skills desired by today's employer. For two summers, Katelynn has worked with the Department of Fisheries and Oceans Canada. She was working with Aquatic Invasive Species, Asian Carp Monitoring Program as a Student Fisheries Research Technician. She conducted fish population surveys to ensure that Asian Carp were not present in the Great Lake tributary rivers on the Canadian side. Katelynn credits her degree as giving her an advantage when it comes to finding contract positions with the Federal Government largely because of Lakehead's reputation for teaching field sampling techniques.

Katelynn believes that Lakehead is anything but ordinary because she has been given the opportunity to explore her ideas and complete a variety of courses and projects. She is continuing her adventure as a graduate student enrolled in MSc Biology supervised by Dr. Sreekumari Kurissery, Chair of the Sustainability Sciences Department at the Orillia campus.

Jason Prno Environmental Studies

"Throughout my years at Lakehead I always felt privileged to be attending such a unique university while being surrounded by amazing friends and individuals," says Jason Prno. Graduating in 2004 from the Honours Bachelor of Environmental Studies program has left him with fond memories of Lakehead University. These include trips and adventures exploring canyons, lakes

and forests in and around Thunder Bay. Many of his fond memories are the result of the Geography Honours Thesis Preparation course, which provides senior students the opportunity to research and prepare a project on a topic of their choice. Jason spent the better part of a year studying the glaciofluvial history of a remote area northeast of Thunder Bay, specifically looking at how massive amounts of water moved around during the melting of the last great ice sheets. The unprecedented access to the outdoors and wilderness is an incredible asset, as was the individualized mentoring this kind of thesis or research internship course provides to students at smaller universities. Jason acknowledges the exceptional mentorship of his undergraduate thesis advisor, Dr. Todd Randall, and of fellow LU Geography alumni Dave Clement (HBA, 1997). Their advice and support, combined with their encouragement helped Jason grow academically to achieve a number of personal goals.

Jason grew up in Waterloo Region in Southwestern Ontario. Although there are a number of nearby universities, Lakehead's unique Northern Ontario setting, interesting academic programs and available local amenities appealed to him. His undergraduate degree gave him a foundation of knowledge and skills that were essential for successfully entering the workforce. Jason is the owner of Jason Prno Consulting Services Ltd. His consulting business focuses on providing socio-economic research and analysis, stakeholder engagement, and regulatory support services for clients. "I spend a good part of my career working with resource developers (e.g. mining companies) helping to ensure their projects are developed sustainably and responsibly," explains Prno. His undergraduate degree program – the HBES (Geography) program – emphasizes the importance of sustainable development and provides an understanding of the challenges associated with achieving sustainability.

His experience at Lakehead also laid the groundwork for eventually completing a Masters and PhD. Jason remains involved in research and has presented the results of his academic and consulting work in respected journals, the media, and at various internationally attended conferences and workshops. The combination of a comprehensive education and a positive attitude brought Jason success. "Hard work and dedication will never steer you wrong. But, you can't work all the time! Be sure to take plenty of time for yourself to enjoy the fun things in life," advises Jason.



Throughout my years at Lakehead I always felt privileged to be attending such a unique university while being surrounded by amazing friends and individuals.



SUPERIOR S

An Interview with Superior Science Director, Nicholas Bel

Can you describe what Superior Science is all about?

Superior Science is a science literacy program for children in grades 1 to 8, our “campers,” which was started by our faculty mentor, Dr. Mary Louise Hill, and its first university student staff in

1999. Superior Science is all about showing today’s youth that science isn’t as hard as it is portrayed to be. It is something that we encounter in everyday things and everyone can do science. I enjoy being a part of the learning that takes place with each camper each week.

Why have a science camp on Campus?

I think it is crucial to have a Science Summer Camp on campus to show campers that a university (especially Lakehead) is a great environment to learn. Introducing campers to the whole university and all that it has to offer at a young age will hopefully make them want to pursue studies beyond their high school education. I know my exposure to Lakehead at a young age helped me decide to do my undergraduate degree here. It was the Superior Science University Instructors that sparked my interest in science when I was a camper many years ago. After spending a few summers with these science enthusiasts I realized that this was where my interest lay and also the path I wanted to follow.

Describe the various roles you’ve had with Superior Science.

I have been actively involved with Superior Science for 5 years, starting out as a high school volunteer in 2012. After being a volunteer, I knew I wanted to get more involved in the upcoming years so I applied to be a Junior Instructor for the summer of 2013. I organized activities, taught some lessons, made sure volunteers were on task, and ensured campers were having a great camp experience. I was a Junior Instructor for 2 years and loved every minute of it. After entering my first year at Lakehead I knew I still wanted to be involved in this great program so I applied for the position of University Instructor. As a University Instructor I was responsible for a class of 30 campers, 2 Junior Instructors, and a handful of high school volunteers. I became Director of Superior Science last winter.

My roles with Superior Science have put me on the front lines for engaging youth in Northwestern Ontario with STEM (Science, Technology, Engineering, and Math) and hopefully sparking their interest in a lifetime of learning. As Superior Science’s director, I am responsible for not only the 300+ campers we see in a summer, but also the team of 4 University Instructors, 3 Junior Instructors, and approximately 30 volunteers. What a great experience this is! I have not only learned about the management side of the program but also have seen first hand how important year long planning is to run a successful summer program.

What motivates you to be involved?

After being involved with Superior Science for 5 summers and moving through all the positions, what motivates me to be involved? The excitement on faces when they tell their parents at the end of the day what they made and did today at camp. Knowing that our programming has such an impact on the youth of Northwestern Ontario makes me want to continue being involved for as long as possible. The excitement that the campers have when they solve a problem on their own and invent something by themselves or in a group is why I stay involved.

Describe one of the favourite camper activities.

Most campers would say that dissection was their favourite part of each week at camp. At Superior Science, we do a hands-on dissection, which allows campers to look inside an animal or part of an animal that they wouldn’t normally get to see. This year we dissected pig eyes, Mexican Grey Perch, as well as American chameleons. The majority of the campers love dissections but for the ones that don’t I think they would say they enjoyed our weeklong activities the most. On Fridays, at our parent showcase they get to go on stage and show their parents what they have been working on all week. This year we had a wide range of weeklong projects, from making a dancing robot to a working waterfall model.

How did the different camps get their names? Sprocket? Circuit? Gizmo? Gadget?

As I said before, we host campers from Grades 1 to 8. Each age group has been named differently. The sprocket group consists of grades 1 and 2 campers. It’s called this because a sprocket is a very small part of an overall larger object. The circuit group is made up of grades 3 and 4 campers, and as well like the sprocket a circuit is a small part but a bit bigger than just a sprocket because it consists of more parts like wires LEDs and switches. The Gizmo group is for campers grades 5 and 6. A gizmo is a combination of many parts like circuits and sprockets, which make up that gizmo. The gadget group is the oldest group, which is for grades 7 and 8. A gadget contains all of the smaller parts like sprockets, circuits, and gizmos. The names of each group make up the object, which is Superior Science.

Several activities go on during the summer. Is there one that you look forward to? Why?

One of the activities that go on in the summer that I look forward to is computer coding. Coding is a newer addition to Superior Science in the past 3 summers. Campers are exposed to things that they might not be exposed to in school. They seem to really enjoy our new coding activities as it allows them to program something the way they want. One of the main websites we use for coding curriculum is Code.org. The campers can go on this website and learn coding with themes that would be interesting to them like Minecraft®, or the movie “Frozen”®.

Nicholas is currently a third year Applied Bio-Molecular Science student at Lakehead University. From a Sprocket to the Director, Superior Science could never ask for a better person than Nicholas Bel to inspire and nurture future Science and Environmental Studies Alumni.

CIENCE

Mary Louise Hill



I have been Faculty Advisor for Superior Science since July 1999. That summer we held our first science camp on Lakehead's campus. My role is to provide advice and guidance to the directors of Superior Science. Our directors are always Lakehead University undergraduates. The idea for Superior Science came from an undergraduate student at Lakehead University our Founding Director, Karen Kleihauer (BE'd '06).

Karen had attended science camp at the University of Waterloo as a child and wanted to start a similar camp at Lakehead for children in our region. She had been working with Dr. John Whitfield then Vice-President Academic and together they had made plans to test the idea with a pilot project. The pilot project involved a few weeks of science camp on Lakehead's campus during the summer of 1999 that operated as an extension of the camp at Waterloo. The camp was a great success and we decided to establish one at Lakehead. Karen and I applied to FedNor and obtained funding for two years to set up and operate Superior Science at Lakehead. We proposed that the program would be self-funded by the end of two years through camp fees and independent fundraising and that promise remains true today. Our proposal was to increase awareness and participation in science education for youth in the Thunder Bay area. The program is well supported by loyal funders in our community and we are thankful for their ongoing contributions and their belief in our mission.



The objectives of Superior Science are to give children fun, hands-on experiences with science and technology. This experience builds their competence and confidence so that they might choose university preparation courses in math and science while in high school and be eligible to enter STEM (Science, Technology, Engineering and Mathematics) programs

at university - hopefully Lakehead. We proposed that if more local students went on to study math, science and engineering at university, we could grow our own Northwestern Ontario scientists and engineers who would contribute to our local and regional economy. We think it is working! Several of our Superior Science Instructors and Directors had their first experience years before as campers, and many of them have since graduated from science and engineering programs at Lakehead and settled into careers in our region.

I have been involved all these years because I believe in the mission and objectives of the program. I also know that early experiences can profoundly impact attitudes towards science and technology. While there is still need for improvement in some disciplines, I think Superior Science initiatives like Girls Week and Girls Club are sending the right message and I am optimistic that change will continue. Superior Science has helped to counter gender biases in science with a goal of improving diversity among the ranks of scientists and engineers. I have seen great advances in the participation of women in STEM careers in my lifetime.

For many families, Superior Science is their very first time on campus. Having real experiences in actual university labs and meeting faculty and students who are enthusiastic about their work is very meaningful and can open up a whole new world of possibilities. I love hearing campers and their parents talk about the excitement of discovery when I attend the weekly parent showcases. Many other faculty have also been involved with Superior Science throughout its history, and that speaks volumes about their dedication to science outreach. I think Lakehead can be proud of Superior Science and its impact in our region.

Dr. Mary Louise Hill
Professor
Geology Department



HELP

Northwestern Ontario Kids

DISCOVER

their Promise



Since 1999, 'Superior Science' has raised greater awareness of science through a variety of outreach programs to over 30,000 children and youth throughout Northwestern Ontario.

Give a gift today at
donate.lakeheadu.ca
to support Superior Science Summer
Camps and Girls Club.

For further information, please contact:
Devon Ottertail, Philanthropy Associate
Tel: (807)343-8198
Email: devon.ottertail@lakeheadu.ca





AERIAL ARCHEOLOGY

Scott Hamilton's research takes flight



Since 1988, Dr. Scott Hamilton has sparked students' interest in the investigation of ancient communities by engaging them in field archaeology. Originally from western Canada, he received his HBA from Brandon University ('79), and MA from University of Alberta ('85) before joining Lakehead University. In 1991, he completed a PhD in archaeology from Simon Fraser University. His education gave him an extensive foundation in archaeological perspectives on different cultures, history and geography. Dr. Hamilton's academic specialization is fur trade archaeology and ethnohistory, but he also has ample experience in pre-contact archaeology of the northern plains and subarctic. He teaches historical archaeology, North American archaeology, archaeological methods and anthropological theory at the undergraduate level. In his classes, he uses his own research to present compelling case studies to students. Dr. Hamilton also supervises students at the graduate level enrolled in the Master of Environmental Studies in Northern Environments and Cultures program.

Detail of original image illustrating brick pavement around outdoor oven behind the kitchen.

Georeferenced images stitched together in a mosaic. The original is 104.6 by 71.6 inches (72 dpi). This version is rendered at 300 dpi 4% of original.



Dr. Hamilton admits that his own nosiness led him to archaeology, which sends him throughout Northwestern Ontario investigating the remains of ancient communities. "Thus, much of my work is very much discovery oriented, but slowly I am moving towards synthesis questions of culture adaptation and change through time and across space," shares Dr. Hamilton. His research involves documenting the archaeologically defined cultural history, and the Oral Traditions of Northern Ojibwe and Cree First Nations. This contributes to environmental impact assessment, documentation of Indigenous land use and occupancy, and potential themes for Aboriginal tourism initiatives. He was the co-investigator in a 5-year MCRI/SSHRC research project, known as SCAPE, investigating Aboriginal adaptations on the Canadian Plains during the last 10,000 years. He is also the primary investigator of a SSHRC grant obtained to investigate portions of the Woodland Caribou Signature Site and Whitefeather Forest Planning Area of northwestern Ontario.

One of Dr. Hamilton's most memorable moments was answering a request from Wapekeka First Nation in 1989 after human remains were discovered during construction of their first all-season airstrip. Investigation verified that the construction had intercepted a burial place that dates to about 7000 years ago. The discovery was remarkable as it proved that people were thriving in far northern Ontario within a few centuries of local deglaciation.

Currently, Dr. Hamilton is working with his graduate students to explore the utility of consumer-grade technology for archaeological investigation. This technology includes drones for air photo documentation of archaeological sites and terrain using photogrammetry software. Although Dr. Hamilton has described himself as a middle-aged novice when it comes to operating these drones, his recognition of their value in field archaeology demonstrates his ingenuity as he blends new technology with established practices.

Most archaeologists focus on recovering information from the dirt, but with the drones, they can explore sites from a vantage point 20 to 80 m in the air. A vertical takeoff and landing as well as diverse camera choices make the quadcopter drones a useful tool for low-elevation photography and spatial analysis. The drones redefine the scope of archaeological science by giving scientists new ways to document block excavations, surface features, vegetation patterns or sites in their geographic context. Based on work Dr. Hamilton has completed already, drone technology can expand on what has previously been documented and reveal new information.

The drone has provided an aerial view of several ancient archaeological sites such as the cultivated fields in the Rosslyn Village area, Manitoba fur trade posts and bison kill sites. It also has provided a new point of view on the Officers' Houses at the Fort William Historical Park. While the latter is not an archaeological site per se, it offers a valuable test of photographic precision and detail. The details from the images of the Officers' Houses demonstrate that the drones can be used to safely monitor inaccessible areas, and aid in evaluating the condition of heritage structures. According to Dr. Hamilton, archaeologists routinely use aerial images from satellites and manned aircraft, but the drones provide sharply improved clarity and detail. He hopes future research will move beyond visible light photography to gain new footage of cultural heritage features and architectural details.

Dr. Hamilton admits that the drones have their challenges, and there is always the risk of crashing them. He hasn't worked out all the kinks in the technology, but by working through the complications he is breaking new ground in archaeological research. The drone images also help overcome the limited quality of existing mapping, show us the beauty and historic complexity of the Lakehead region, and emphasize our close link to ancient communities. Dr. Hamilton and his students are just getting started. There is no way of knowing what the drones and the air photo documentation will reveal next.



The Will to Survive

Azim Mallik's critical research on the ecological recovery of disturbed habitats

If plants are in trouble the planet is in trouble,” says Dr. Mallik when asked to reflect on what inspires his research. He has been with LU’s Department of Biology since 1989. Dr. Mallik researches the fascinating survival techniques plants possess as they react to disturbance to better understand what is required to sustain healthy and productive ecosystems. Dr. Mallik’s curiosity for plants began as a young man growing up in a farming village in Bangladesh. “I was fascinated by the appearing and disappearing of plants in perfect synchrony with flooding, summer and the cooler seasons,” explains Dr. Mallik. His fascination with plant survival techniques took him to the University of Aberdeen, Scotland where he completed a PhD. There, Dr. Mallik had the opportunity to present a paper at the International Botanical Congress (IBC), held in Sydney Australia in 1981. This conference would have significant impact on his career as a chance-meeting led him to Canada.

It was at the IBC meeting in Sydney where he met Professor Ross Wein who invited Dr. Mallik to complete a Post-Doctoral Fellowship at the University of New Brunswick. During this post-doc, Dr. Mallik analyzed the effects of fire on drained Typha marsh, which is a natural perennial plant in the wetland that was crippling duck habitats. During this early phase of his research on plant life in NB, he became aware of the problems the forestry industry was having with shiplaurel (*Kalmia angustifolia*) and he began to research the aggressive regeneration patterns of *Kalmia* after forest harvesting and wildfires in Newfoundland. *Kalmia* is a hearty evergreen shrub that grows quickly and is an early colonizer on clearcut sites. His interest in the difficulties faced by the Newfoundland Forestry Centre with *Kalmia* led him to apply for an NSERC (Natural Sciences & Engineering Research Council) International Post-Doctoral Fellowship. His application was successful and he moved to Newfoundland to embark on his research on *Kalmia*.

Dr. Mallik presented some of his findings on *Kalmia* at the International Heathland Ecology Conference in Nantucket Island, USA in 1988. Here, he met another researcher - Dr. Paul Barkley from Lakehead University. Dr. Barkley promised that he would let him know about the possibilities of a teaching opportunity with Lakehead University. The rest, as they say, is history. His first appointment to LU was a 9-month Assistant Professor position in the Department of Biology in 1989 offered by then Chair Dr. George Ozburn. He quickly moved up the ranks, receiving promotion to full professor in 1997.

Dr. Mallik and Northwestern Ontario are a perfect match. “The unique location of Lakehead University provided me with the opportunity of conducting research on disturbance ecology such as forest fire ecology, forest regeneration after clearcutting, riparian ecology, functional niche differentiation, quality

and productivity of wild blueberries of Northwestern Ontario,” says Dr. Mallik. Lakehead University’s location has provided the perfect setting to research the disturbance survival techniques of plants may it be natural like wildfire or man-made such as forest harvesting and stand management.

Dr. Mallik’s research focuses on plant regeneration strategies following disturbances such as wildfires or clearcutting. His research showed how post-fire organic matter controls the direction of ecological succession from forest to heath or back to forest by selectively filtering species regeneration traits. The collective body of his research made a significant contribution in advancing our theoretical understanding of progressive and retrogressive succession in conifer forest with ericaceous understory, which also have important land management implications. He discovered that changes to boreal forests occurring at the boundary of two habitats, known as edge effect, are spatially and temporally shorter than tropical forests. These results have benefits to the forest industry in assisting with the selection of harvesting methods and areas to protect water quality and fish habitats in boreal streams. His research has also been considered in the revisions to the Ontario guidelines on how to sustain riparian areas of boreal streams in managed forests. His career at Lakehead has been rewarding not only because of the research opportunities, but his teaching experiences have been equally fulfilling.

“If plants are in trouble the planet is in trouble!”

“At university, students should be made aware of the excitement of creating new knowledge by doing research,” explains Dr. Mallik. Throughout his career at Lakehead, Dr. Mallik has mentored undergraduate and graduate students most of whom have joined him in field-based experimental work in the region as well as in long-standing field research areas in Atlantic Canada. Lakehead has provided him with opportunities to attract graduate students who successfully find careers in government research labs, natural resource management and nature conservation. Dr. Mallik has employed a range of teaching strategies to help students find research topics that excite them and encourages undergraduate students to get involved by employing them as summer research assistants. Dr. Mallik’s experiences are reflected in the courses he teaches at Lakehead. He regularly teaches courses in Plant Ecology and Ecology of Disturbed Habitats and leads the Graduate Seminar course for the MSc (Biology) program, the latter a critical part of career development for the next generation of scientists in Biology.

Dr. Mallik’s career at Lakehead University has thus far made significant contributions to the Faculty of Science and Environmental Studies and made lasting impressions on the careers of uncountable alumni.





Aboriginal Mentorship Program



Lisa Harris (HBA Geography '10) has been the coordinator of the Aboriginal Mentorship Program (AMP) since 2013. The program builds relationships with university students and Indigenous high school and elementary students. These relationships foster the interest of Indigenous students in Lakehead University by showcasing the university's many different educational opportunities.

The AMP began at the University of Ottawa in 2009. The program was created in response to visits by graduate students in their Let's Talk Science Outreach Program to rural and remote communities in Northern Ontario. They were troubled by the lack of resources available to the students and schools in the North. It was out of this realization that the Aboriginal Mentorship Program was created. As Lisa explains, "There is a significant education gap between First Nation peoples and the general Canadian population as the result of the many hurdles in the way of the successful completion of a high school diploma and even more in the completion of post-secondary education."

In 2013, Dr. Barb Vanderhyden from the University of Ottawa approached Dr. Andrew P. Dean, then Dean of the Faculty of Science and Environmental Studies, with the idea of starting an Aboriginal Mentorship Program. Because of Lakehead's already existing Indigenous programs and proximity to Indigenous communities, establishing a mentorship program at the university made sense. Dr. Dean was more than enthusiastic about the idea. He hired Lisa and nurtured the program for several years. Today the Office of Aboriginal Initiatives has become the AMP's home. Dr. Cynthia Wesley-Esquimaux, Chair on Truth and Reconciliation, has provided the program with assistance securing funding that has allowed the program to grow and engage more than 20 schools and 500 Indigenous youth from grades 5 to 12.

As coordinator, Lisa begins the academic year by recruiting Lakehead University students (from undergrads, graduates and PhD candidates) to volunteer as mentors. The mentors travel to regional elementary and secondary schools to work one-on-one with Indigenous youth. They follow the lessons from various hands-on activities in the faculties and departments within the university. The mentors spend two or three days at each school from September to April working with Indigenous youth in their schools. During the summer months, AMP keeps busy with several summer camps that enroll as many as 200 Indigenous youth. Lisa is also at the same time working hard to find additional funding to ensure that the mentorship program can continue from one year to the next.

Lisa tries to match volunteer mentors with the Indigenous students with mutual interests as this has proven successful in the past. For example, last year a student from Superior CVI who loved welding and wanted to research the strength of welds at varying temperatures was matched with a Lakehead



University Engineering student. The Engineering student made arrangements for the high school student to bring her completed welds to an Engineering lab on campus to be tested. She had an incredible experience and was excited by the results as she was able to test the strength of her welding.

Although Lisa has had many wonderful memories thus far, she reflects on one special moment: "At the end of our second year one of our students gifted me an eagle feather. Receiving such a gift is one of the highest honours you can receive in Anishnawbec culture and is one I will treasure for the rest of my life."

For more information about Lakehead's AMP, please contact their office via email amp@lakeheadu.ca or by phone (807) 343-8528.



Extracting Fossilized Remains from Ironstone: Emily Cross Wins Prestigious Award

By providing access to its facilities, the Department of Anthropology has given the creative and inquisitive mind of Emily Cross everything she needs to investigate the properties of Ironstone. Emily is a high school student from Hammarckjold in Thunder Bay, Ontario who on May 13, 2016 received the coveted Grand Award 4th Place in competition at the Intel International Science and Engineering Fair (ISEF) in Phoenix Arizona for her project, *Geochemical Extraction of Ceratopsian Remains and Opals from Ironstone*. The ISEF is the world's largest international pre-college science competition. High school students from all over the world showcase their research and compete for approximately \$4 million in prizes.

Dr. Carney Matheson, Department Chair of Anthropology, credits Emily for her creativity and ingenuity. Ironstone is a hard stone that makes fossil removal almost impossible. It was Emily's idea to explore solutions to the frustrations faced by paleontologists by researching strategies that will safely remove fossils from Ironstone. "The problem is a great one in paleontology as there are areas where there are significant number of fossils that are trapped in Ironstone and there is currently no way to get them out without damaging the fossil," explains Dr. Matheson. Emily discovered chemical treatments that break down the Ironstone without damaging the specimens encased in the stone. Her research revealed that specific treatments will actually reduce the chance of breakage during fossil extraction.

Emily discovered that hydrogen peroxide treatment is viable for removing bones from ironstone, but unsuitable for projects requiring recovery of preserved soft tissue. It damages soft tissues, but efficiently breaks down ironstone without significant damage to ceratopsian bones. Sodium hydroxide treatment is only viable for removing ceratopsian bones and opals from ironstone – not when fossilized soft tissue recovery is a primary goal. It breaks down ironstone without damage to opal or ceratopsian bones but severely damages soft tissue. Hydrochloric acid treatment is the best method for extracting opal from ironstone. It greatly breaks down ironstone matrices without damaging opals, but destroys all types of organic tissue and fossils and is entirely unsuitable for fossil bone or tissue extraction. Carbonic acid treatment provides the best balance of ironstone softening while preserving integrity of fossilized organic matter, and is the best method of extracting ceratopsian bones and preserved soft tissues. It significantly leaches out iron from ironstone matrices, softening ironstone without harm to dinosaur bones, opals, or preserved soft tissues.

"Emily is a very dedicated mature high school student and it was a pleasure working with her," says Clarence Surette, technician in the Anthropology Department. Clarence has been with the department since 2008 and provides support for lectures and labs as well as assistance

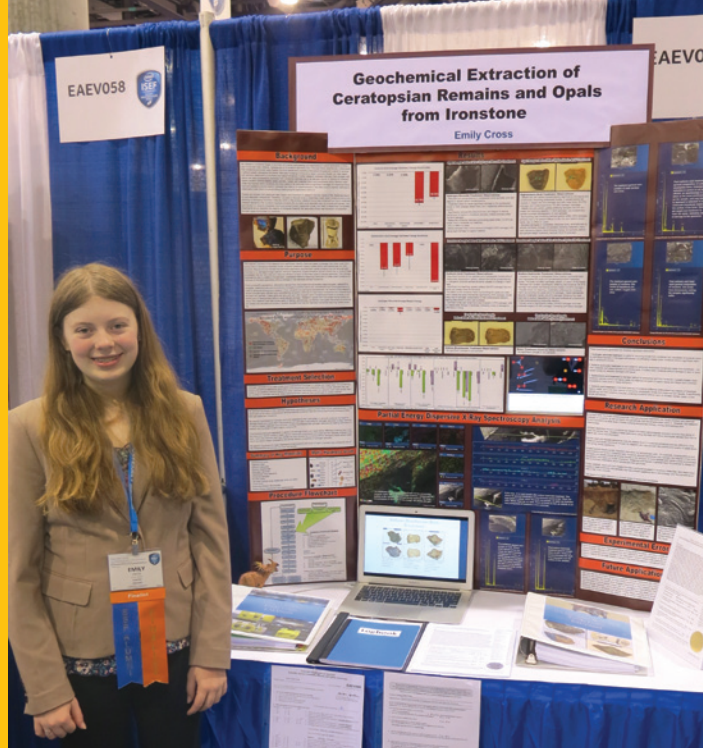


Photo by James Cross

with research for the six faculty researchers. He trained Emily how to use the chemicals and equipment and provided the proper resources for her project. Clarence explained that the ironstone fossils were provided by the Royal Tyrrell Museum in Drumheller, Alberta and many of the specimens trapped in the stone were dinosaurs. Other samples used for her project were opals trapped in ironstone purchased by Emily from a company in Australia.

Working with LU faculty researchers and staff, was a memorable moment for Emily. "I have really enjoyed working with the Anthropology department. They have been very generous in letting me use their lab and equipment. I would not have accomplished as much without their continuous support!"

Emily has competed in local, regional, national and international science fairs for 8 years. In addition to winning the 4th Place Grand category showing at ISEF this year, she also received best in fair at the Northwestern Ontario Regional Science Fair. She is also a regional director for Sustainable Youth Canada. Emily is an associate member of Sigma Xi. At the Sigma Xi Student Research Conference this November, she won the High School Geoscience medal. Congratulations Emily!

Dr. Carney Matheson, Department Chair of Anthropology



Announcements & Awards

- **Joseph Tassone** (MSc CHEM '16) was one of only five chemistry students in Canada to win a Vanier Scholarship 2016.


Northern Lake Superior Thesis Award Winners 2016

- **Hinz, Sheree** (MSc. Geology)
Thesis Title: *Nature and petrogenesis of komatiites in the Shebandowan greenstone belt*
- **Hossin, Motasser** (PhD Chem & Mat Science)
Thesis Title: *Development of bi-functional technology for water purification and wastewater*
- **Maendel, Lindsey** (MSc. Biology)
Thesis Title: *Effects of fire severity on post-fire boreal forest composition and successional trajectory, Pukaskwa NP*
- **McKee, Graydon** (MSc Biology)
Thesis Title: *Movement and Resource Use of Walleye in Black Bay, Lake Superior*
- **Salter, James** (MSc Geology)
Thesis Title: *The role of cryptogamic covers in the biogeochemical cycling of nitrogen on the Boreal Shield*
- **St. James, Michael** (MSc Biology)
Thesis Title: *Identification of source of metal contamination of water bodies around Hemlo mine site*

Award Announcements Undergraduate Conference Travel

- **Mr. Steven ENGLER**
HBSc (Computer Science) Co-op
Supervisor: Dr. Samuel Pichardo
Conference or Workshop: *Meeting of the International Society of Magnetic Resonance in Medicine in Singapore May 2016*
- **Mr. Ryan STEVENS**
HBASc (Environmental Sustainability)
Supervisor: Dr. Nanda Kanavillil
Conference or Workshop: *Muskoka Summit on the Environment May 27-28, 2016*
- **Mr. Trevor KAVALCHUK**
HBA (Geography)
Supervisor: Dr. Todd Randall
Conference or Workshop: *Canadian Association of Geographers Annual Meeting, hosted by St Mary's University and Dalhousie University, Halifax, NS May 30 to June 5, 2016*
- **Ms. Hannah HANCOCK**
HBASc (Interdisciplinary Studies)
Supervisor: Dr. Nanda Kanavillil
Conference or Workshop: *International Association of Great Lakes Research (IAGLR) at University of Guelph June 6 - 10, 2016*

Dr. Alla Reznik



Through the efforts and international initiatives of our faculty members, students at Lakehead University have limitless access to learning opportunities around the world. Dr. Alla Reznik, a Canada Research Chair in Molecular Imaging and Associate Professor in the Department of Physics, has orchestrated one such initiative. Lakehead University graduate students have the opportunity to participate in an internship program in Israel because of Dr. Reznik's global collaborations. In addition to her position at the University, Dr. Reznik is also a Senior Scientist with the Thunder Bay Regional Research Institute. She is a very successful researcher in medical imaging, and broadens the research of Physics at Lakehead by bringing her focus on health care. In addition, she has introduced, with her colleagues and collaborators at TBTRI, the Summer School in Medical Imaging program.

Most recently, she spearheaded the creation of a Memorandum of Understanding (MOU) to create an internship program for graduate students to study medical imaging at the Philips Healthcare R & D Centre in Israel, which was signed on June 10, 2016. The agreement was created under the Natural Sciences and Engineering Research Council (NSERC) CREATE program in Medical Imaging Detector Technologies lead by Dr. Reznik. The Internship program has two primary objectives. First, to prepare "employer ready" trainees equipped with technical and professional skills required by the Medical Detector industry through working with industrial partners. Second, to create the next generation of scientists and medical imaging researchers dedicated to the innovation of imaging techniques and technologies in order to lead to the development of needed commercial products to treat the ever-growing demands of patient care.

The Philips Healthcare R & D Centre is a leading global health technology company committed to delivering healthcare research that will make a difference in people's lives. This internship program gives graduate students the opportunity to study for 4 to 8 months through a hands-on curriculum with state of the art technology to maximize learning that will foster the skills needed to take on new and challenging healthcare issues in today's society.



Research Centre for Sustainable Communities

In March 2014, Lakehead's Senate, approved Orillia's first research centre - the Research Centre for Sustainable Communities (RCSC). One year later the RCSC's founding director, Dr. Nandakumar Kanavillil officially launched the centre during a

celebration at the Orillia Campus. Dr. Kanavillil is a Professor of Biology at Lakehead and is cross-appointed to two academic departments (the Department of Sustainability Sciences on the Orillia campus and the the Department of Biology on the Thunder Bay campus). He teaches several courses such as Animal Biology, Introductory Ecology, Environmental Biology, Freshwater Ecology and Wetland Ecology. Ecology of biofilms, phytoplankton, zooplankton, and inland water quality are Nanda's current research interests. Dr. Kanavillil describes the research centre as "an exciting platform to conduct interdisciplinary research on sustainable communities".

Today, words such as sustainability and interdisciplinary are commonly used, but their meaning is not easily conceptualized. The purpose of RCSC is to foster interdisciplinary research that will help to promote sustainable initiatives. Specifically, the Centre focuses on the impact of political, environmental, social and economic factors that are needed for nurturing a sustainable community. The Centre recognizes and supports the principles and processes required for environmental sustainability, economic prosperity and social justice.

The RCSC has a holistic, integrative and dynamic view of community. The community that thrives will support long-term human security, well-being and health, but it will also uphold social equality and a balanced interplay between economy, law, and politics. Rather than merely providing a "home" for contrasting research projects related to community sustainability, the Centre cultivates research programs using an interdisciplinary methodological approach.

The RCSC's membership includes eight founding faculty members from the Faculty of Science and Environmental Studies and the Faculty of Social Sciences and Humanities. The RCSC membership holds several grants from SSHRC, NSERC, Environment Canada, Ramara Township, Lakehead University, and Private Sectors and has engaged seventeen undergrad and grad students involved in various research projects in its initial two years. The Centre's innovative research approaches keep Lakehead

University on top of the changing trends in sustainability research.

The RCSC initiated Sustainable Community Speaker Series this past August. The inaugural speaker was Dr. Md Saidul Islam from Singapore's Nanyang Technological University on the topic "Globalization Project and the Neoliberal Paradox: Quest for a Sustainable Earth." Two or three invited speakers are planned annually. Anyone interested in the activities of the RCSC should contact Dr. Kanavillil for more information (nkanavil@lakeheadu.ca).



Dr. Chris Murray is a member of the RCSC

Retires & Hires



Retirement Profile: Rappon, Mani (Chemistry) 1981-2016

Mani Rappon came to Lakehead University with a diverse and international background. Following an undergraduate degree in Chemistry at the University of Sydney (Australia), he completed a PhD in Physical Chemistry at Dalhousie University, graduating in 1973. He then moved to Thailand to teach for a short time before returning to Canada and joining Lakehead University. He started as a post-doctoral fellow, later became a research associate, and then joined the faculty as an assistant professor in 1981. One research interest of which he is especially proud is the field of electrodilometry, a term he created because it was a new and original method he invented at Lakehead. As a result of this discovery, he was invited to present at the *NATO Advanced Research Workshop* in Poland in 2003 and at the *3rd International Conference on Physics of Liquid Matter* in Kyiv in 2005. He has given invited lectures around the world, but he feels very fortunate to have taught excellent students in his years at Lakehead. To show their appreciation, the Lakehead Undergraduate Chemistry Club hosted his retirement party, which featured a periodic table of the elements made out of 118 cupcakes - one for each element. They then added a 119th cupcake, which they named Rapponium.

Other Retirements 2016 June:

1. Allaire, Frank (Comp Sci) 1980-2016
2. Sears, William (Physics) 1990 -2016
3. Malek, Lada (Biology) 1996-2016

New Hire Profile: Dr. Emdad Ahmed (Limited Term Appointment in Computer Science)

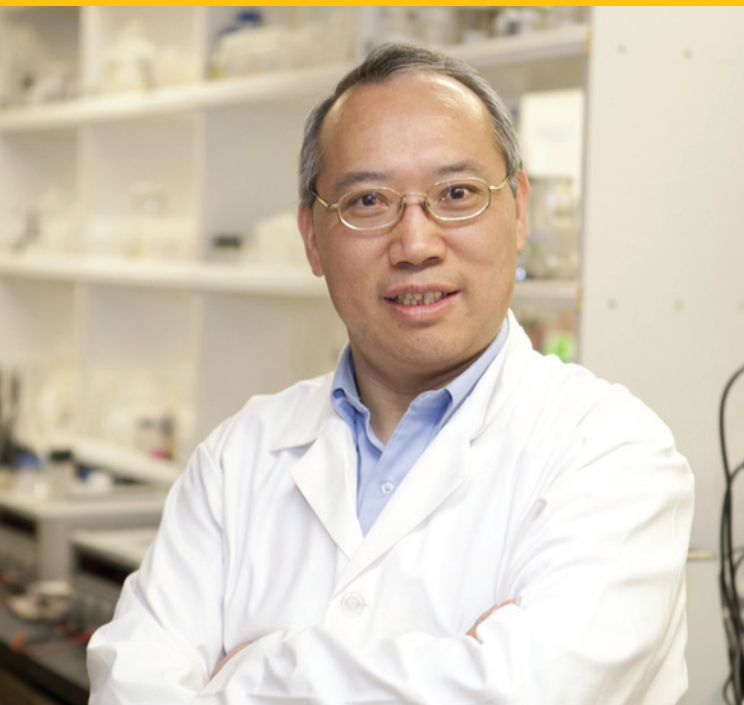
Emdad Ahmed received a Ph.D degree in Computer Science from Wayne State University, USA and a Master of Engineering Science in Computer Science and Engineering from University of New South Wales, Australia. He has worked as an Assistant Professor of Computer Science and taught a wide variety of courses in a number of Universities in USA. He is a professional member of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM). His research interests include Web Data Integration, Computer Networks and Bioinformatics. In the Fall of 2016, he joined the Computer Science department as Assistant Professor.

Other Hires (2015)

1. Rennie, Mike (CRC, Biology)
2. Tocheri, Matthew (CRC, Anthropology)
3. Mago, Vijay (Tenure-Track, Computer Science)
4. Zehbe, Ingeborg (LU-TBRII Research Chair, Biology)
5. Nelson, Reg (Technical Staff, Geography and the Environment)
6. Brazeau, Dan (Technical Staff, Biology)
7. Lehmsberg, Emma (Technical Staff, Biology)

Recent Hires (2016)

1. Chlebovec, Chris (LTA, Mathematics)
2. MacKay, Ian (LTA, Physics)
3. Summerfield, Fraser (LTA, Economics)
4. Oba, Gabriel (LTA, Chemistry)
5. Anzew, Connie (Administrative Assistant, Office of the SES Dean)



Chemistry Professor Wins another National Award

Dr. Aicheng Chen, Professor and Canada Research Chair, has been recognized with the W.A.E. McBryde Medal of the Canadian Society for Chemistry (CSC) for his outstanding contributions to the design of advanced nanomaterials-based electrochemical sensors and biosensors for medical diagnosis, pharmaceutical analysis and environmental monitoring. He received the medal in Halifax and delivered an award lecture at the 99th Canadian Chemistry Conference and Exhibition held on June 5 – 9, 2016.

The McBryde Medal, established in 1987, is one of Canada's most coveted chemistry prizes and is given to up-and-coming research scientists who have made significant achievements in pure or applied analytical chemistry.

This is the third award the CSC has bestowed on Chen – he received the Fred Beamish Award for demonstrated innovation in analytical chemistry research in 2009 and the Keith Laidler Award for a distinguished contribution to the field of physical chemistry in 2012. It's uncommon for a scientist to be honoured with three CSC awards in such a short space of time, testifying to the pioneering nature of his work.

NEWS & NOTES

- **Drs. Carney Matheson** and **Tim Kaiser** led a very successful international field course, *Splendors of Italy*, in spring 2016
- The Biology Department has created exciting new degree pathways in **Neuroscience, Animal Sciences, Biodiversity and Conservation and Plant Sciences**
- The Chemistry Department has a new program, **HBSc Chemistry with a Concentration in Medical Sciences**
- **Dr. Sabah Mohammed** received a contribution to teaching award that was presented at Senate on September 19, 2016
- In Fall 2016, the Economics Department welcomed, **Dr. Fraser Summerfield**, Assistant Professor
- Recent graduate, **Reg Nelson** (HBSc 2012) is now employed with the Geography and the Environment Department's **Geospatial Data Centre (GDC)**
- **Dr. Amanda Diochon's** manuscript was selected as one of the "Editor's Choice" articles for 2017 by the Canadian Journal of Soil Science
- With **Dr. Christopher Chlebovec** as the coordinator, the Math Department hosted in 2016 the Canadian Math Kangaroo Competition. Also, the Department hosted more than 100 students for the TD Canada Trust Northwestern Ontario High School Mathematics Competition
- **Drs. Apichart Linhananta, Gautam Das** and **Alla Reznik** from the Physics Department offered the Summer School in Medical Imaging for the 6th year
- A new book titled, *Environmental Sustainability*, edited by the Department of Sustainability Sciences members **Drs. Rosario Turvey, Sreekumari Kurissery and Florin Pendea** was published by *John Wiley & Sons*
- Students from the **Maple Leaf School System** in China will enroll this year in concurrent education-science degree programs in traditional STEM areas such as Physics, Chemistry, Math and Biology

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

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