This summer (May-June, 2017), members of the Glacial Sedimentology Research Lab (Rodrigo Narro Perez, Chimira Andres and David Bowman) led by Dr. Carolyn Eyles, travelled to Huaraz, Perú to start a new research program in collaboration with Peruvian scientists.

In 2016, the Faculty of Science at McMaster and the National Institute for Research on Glaciers and Mountain Ecosystems of Peru (INAIGEM) signed a Memorandum of Understanding to foster research, education and community service in areas of glacial and ecosystem change and development. The research trip this summer had three main objectives: 1) to deliver a 2-day short course on glacial sedimentology to twenty INAIGEM staff and local university students; 2) to collect an initial suite of field data; 3) to explore ways to strengthen the research partnership between McMaster and INAIGEM.

The city of Huaraz, and surrounding communities, receive their freshwater supply from the glacially-fed valleys of the Cordillera Blanca mountain range. This region features future water scarcity issues as climate change is causing the glaciers in the Cordillera Blanca to rapidly retreat. However, there is poor understanding of the sediments infilling the glaciated valleys or their ability to either store or transmit water. One of the first tasks faced by the McMaster research team was to investigate the sedimentological and geomorphic characteristics of the valley fill deposits in order to better understand the current and past geological processes operating in the valleys and their subsurface stratigraphy. This information will allow the characteristics of surface and subsurface water flow to be determined and water storage and transfer capacity to be estimated more accurately.

In addition, rapid glacier retreat has caused numerous glacial lakes to form throughout the Cordillera Blanca. These are commonly dammed by glacially-formed frontal and lateral moraines, most of which are poorly cemented and are prone to failure. Communities in the Cordillera Blanca, such as Huaraz, have experienced several catastrophic glacial lake outburst floods (GLOFs) that have caused heavy destruction and loss of life. In 1941, the city of Huaraz experienced a GLOF from Lake Palcacocha which killed ~2,000 people. Unfortunately, very little is known about the sedimentology of the moraines damming the glacial lakes. Investigation of the sedimentological and architectural characteristics of the moraines to determine the processes involved in their formation was therefore a second focus of the research team this year. It is hoped that these data will help identify points of weakness in the moraines and will enhance the hazard mitigation efforts of INAIGEM.

In addition to conducting field work in the Huaraz region, the research team also visited the Canadian Embassy in Lima to discuss McMaster’s initiatives in Peru and potential educational exchanges between McMaster and Peruvian universities.

Overall, this was an incredibly successful visit to a beautiful country with exciting research opportunities for partnerships with Peruvian scientists. Members of the Glacial Sedimentology Research Lab are keen to see these partnerships grow in the coming years but first, they have lots of data to analyze and lots to write!
After a year’s research leave, I’ve returned to my role as SGES Director refreshed and energized. Thanks to Janok Bhattacharya for serving as the Acting Director over the past year and for continuing to guide the School forward.

We have much to be excited about. Introduced elsewhere in the newsletter, Dr. Karen Kidd has been cross-appointed with Biology and is the Stephen A. Jarislowsky Chair in Environment and Health. We have recently hired Melanie Bedore as our new Teaching Track faculty member. Melanie completed her PhD at Queens, and joins us from Quest University (Squamish, BC) where she has been teaching geography over the past few years. Melanie’s teaching will include courses in geography and environmental studies. We are also continuing our search for a research faculty member in Remote Sensing and GIScience, as well as a Structural Geologist. So, after several years where we saw several of our long-term faculty retire or resign, we are able to start to re-grow our teaching and research potential.

Our focus remains firmly on the future of the School. Over the coming year, we will start to take a close look at our undergraduate programs and course offerings to make sure that we continue to offer what is relevant and important to our students. We are also working to ensure that our students are prepared for employment when they leave McMaster.

Our various research groups and programs (and I’m sure to miss one), including Global Water Futures, FloodNet, Centre for Climate Change, and all of our individual research activities have attracted recognition and graduate students from around the world. We continue to punch above our weight in terms of research productivity.

We were saddened by the recent passing of Dr. Bob McNutt. Bob first joined the then Department of Geology in 1965. He later went on to serve as Chair of Geology and Dean of Science. He also held various senior leadership roles, including Acting Provost, the interim Dean of the DeGroote School of Business and Acting Dean of Humanities. Bob received an honorary Doctor of Science degree from McMaster in 2014. He also served as the principle at Erindale College (now known as the University of Toronto Mississauga) between 1995 and 2003.

In the area or have a comment? I would love to hear from you and/or have you visit the School.

Bruce Newbold
Director, SGES
newbold@mcmaster.ca

The Practice of Spatial Analysis, written by Mark Ferguson, Chris Higgins, and Moataz Mohamed, is an honourary volume published in late June 2018 in Greece, dedicated to McMaster School of Geography & Earth Sciences Professor Pavlos Kanaroglou. The essays provide expert contributions related to land use and transport analysis applications of spatial analysis in diverse contexts.

The School of Graduate Studies is pleased to inform us that Jillian Scott was selected by the SGS to receive the 2018-2019 Harry Lyman Hooker Senior Master’s Fellowship, commencing May 2018 or September 2018. The student can hold this Master’s fellowship for one year as long as they remain a good standing. A student in a two-year Master’s program may receive $6,000/term for each of the first two terms of his/her second year, provided that they remain in good standing in the Master’s program they originally entered at McMaster University.

2018/19
HARRY LYMAN HOOKER
SENIOR MASTER’S FELLOWSHIP

Dr. M. Altaf Arain, a professor at McMaster’s School of Geography and Earth Sciences (SGES) and director of the McMaster Centre for Climate Change, received a $500,000 grant from the Global Water Futures Program entitled “Southern Forests Water Futures” to investigate how forest ecosystems in Southeastern Canada function and respond to climate change and extreme weather conditions (e.g. droughts).

The project will help guide municipalities and conservation authorities in developing watershed management strategies that will take into account the effects of shifts in land use and climate change. The work will also help improve how Canadian models forecast the effects of climate change.

Global Water Futures aims to make Canada and global leader in water science for the world’s cold regions.

“Global Water Futures solutions to water threats in an era of global change.” (Altaf Arain)

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IN THE RESEARCH SPOTLIGHT

**DR. KAREN KIDD**

Dr. Karen Kidd is the Jarlsklowy Chair in Environment and Health and a professor at McMaster University’s Department of Biology and School of Geography & Earth Sciences. Karen has been studying the fate and effects of contaminants in aquatic food webs and how wastewater discharges, agriculture, aquaculture and forestry affect the health of aquatic systems for over 20 years, and she has published >100 articles on systems from the Canadian Arctic to Antarctica. The results have been used in national and international state-of-the-environment assessments, generated new knowledge on why some species and systems are more contaminated than others and the risks these metals and organics pose to aquatic life, and informed management decisions on resource extraction and industrial discharges.

**What brought you to McMaster?** I can’t pin it on one thing. I am really happy with the great vibe the campus and area have, the opportunities to work with fantastic people, and the chance for some new challenges.

**What is your research?** My group and I have spent blissful summer and fall days sampling lakes and streams to understand the fate of contaminants in aquatic food webs and their effects on invertebrates and fish.

**Where is your research?** By design, it is mainly in beautiful/remote places. We have worked in the Canadian Arctic, national parks in Atlantic Canada, Norway, Patagonia, and the Baja. It seems that our field sites are more often at lower latitudes these days. Hmmm...

**What is the biggest challenge that your research faces?** Flat tires, inclement weather, and students that don’t like mosquitoes.

**What keeps you enthused about your career?** Without a doubt, it is the people--students and colleagues--that I get to meet and work with. I really enjoy my time with such talented, engaged, and engaging people.

**What are you most looking forward to about working with SGES?** My joint appointment with Biology and SGES was done because I see a lot of potential to contribute to research and teaching in both groups. It is also a great way to expand my horizons.

**Where did you grow up?** I am from Sarnia, ON and spent many summers on the beaches of Lake Huron.

**What was your first job?** The Ontario Ministry of Natural Resources hired me to be Junior Ranger. It was a summer of tree planting and trail clearing, with a formative week doing a lake survey with their biologists.

**What is your education/employment background?** My undergraduate degree is from Guelph and my PhD is from Alberta. My first real job was with Fisheries & Oceans Canada in Winnipeg and for 6 years I worked at the Experimental Lakes Area. Before moving to Mac, I was a CRC at the University of New Brunswick in St. John.

**Who or what inspires you?** Anyone with a sense of humor. How do you manage stress? Aside from the usual ways, I make sure to laugh at myself at least once a day.

**Besides work, what are your passions?** The biggest one is travelling so I feel very lucky to have a job that allows me to combine one passion with another.

**What is the best advice you’ve been given?** Each day is a gift and we should make the most of it.

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**DR. MIKE WADDINGTON**

Dr. Mike Waddington is a Canada Research Chair (Tier 1) in Ecohydrology and a professor at McMaster University’s School of Geography & Earth Sciences. By examining the effects of drought and wildfire disturbance on peatlands, his research is developing innovative ecosystem adaptation, species at risk habitat restoration, and watershed reclamation strategies to mitigate the impacts of wildfire, land-use change and mining in sensitive wetlands. Mike has over 25 years of boreal wetland research experience and over 20 years of ecosystem restoration expertise. He has published over 125 scientific papers.

**Where did you grow up?** My father was a Professor of Physics here at McMaster so I grew up in Hamilton.

**What was your first job?** Cartographer for Orienteering Ontario. I made orienteering maps of Toronto schools.

**What is the best advice you’ve been given?** Wayne Rouse told me something like: "No matter how much work you do, a manuscript will never be perfect and you can’t predict the review process. Don’t waste time trying for perfection. Work hard and do a good job then let the peer review process decide the manuscript’s fate.”

**What is your educational/employment background?** BS Geology and Geology (McMaster University). PhD Geography (York University) and Forestry (SLU, Sweden).

**What brought you to McMaster?** Queen’s didn’t want me (interviewed me twice), but seriously the opportunity to work in my hometown in the same faculty as my father was rather special.

**What is your research focus?** My research focuses on examining how resilient wetlands are to land-use change (e.g. mining, resource extraction) and climate-mediated disturbances (e.g. drought and wildfire).

**Where is your research going?** Wetland habitat restoration and adaptation technologies for at-risk reptiles (rattlesnakes, turtles).

**What is the biggest challenge that your research faces?** Historically, it was the funds, but now, it is time (I have a lot of ideas).

**What inspires you to teach?** Environmental science ignorance is reducing societal quality of life. Canada needs more environmentally informed citizens and corporations.

**What keeps you enthused about your career?** Applying my wetland ecohdrology knowledge to new areas and getting to work with other brilliant scientists and social scientists. I am leading the Boreal Water Futures (BWF) and a fascinating team of academic and government researchers, industry users, NGOs, and key provincial and national stakeholders and students to assess and ensure the resilience of boreal Canada’s primary hydrological systems and propose strategies to mitigate water risks to this region’s ecosystems, associated industries and infrastructure, and growing urban population. That's pretty challenging and also looks like I took that statement right off the BorealWaterFutures.ca website.

**Who or what inspires you?** Who: Hok Woo (great scientist, mentor, and artist). What: nature (the love of the outdoors).

**How do you manage stress?** Being outdoors in nature (and preferably with a map and no GPS).

**Besides work, what are your passions?** Adventure Racing and Adventure Running. Racing and navigating through unknown terrain with just a map and compass gives me an important sense of adventure.

**What is the best advice you’ve been given?** Wayne Rouse told me something like: “No matter how much work you do, a manuscript will never be perfect and you can’t predict the review process. Don’t waste time trying for perfection. Work hard and do a good job then let the peer review process decide the manuscript’s fate.”
The School of Geography and Earth Sciences is one of 10 Esri Canada Centres of Excellence in Higher Education for GIS (ECCE). This initiative is aimed at encouraging innovation in GIS research and promoting teaching excellence, especially in application development, web mapping, and 3D mapping in higher education across Canada, and we are very proud to be part of this initiative.

The 2016-2017 academic year was a very active and successful one for the ECCE. In the summer of 2017, we hosted Shad Valley (a group of gifted high school students), as well as elementary school students on a weekly basis, where they learned about GIS and applied it to solve real world problems.

Several high school students attended our annual GIS Day event in December 2016, and knew, during the 2016-2017 year was the introduction of a GIS Day event for the campus. At this event, 16 speakers presented their work with GIS to an audience of 70 people. This year's GIS Day event was held on November 17th with 15 presenters covering GIS projects in both Science and Social Sciences (see https://www.science.mcmaster.ca/geo/gis/gis-day.html for more information).

Our students were very successful in competitions sponsored by Esri Canada this past year. In December 2016, 15 students from Patrick DeLuca’s fourth year course entitled “Special Topics in GIS” (GEOG 4GT3) submitted Story Maps to Esri’s Global Content Challenge. SGES did incredibly well in this competition, placing 5 students in the winning positions, earning anywhere from $2000-$5000 USD in prize money. Two students submitted Story Maps to the IGYU Story Map Challenge and both earned 2nd place honours in their respective categories (and 500 Euro in prize money). In the Annual ECCE App Challenge, SGES again was successful, with 4 teams entering (more than any of the other ECCEs across the country) and another third place finish from the team of Anastassios Dardas, Karl Chastko, and Spencer Elford. You can check out their app and those of all of the other entrants, plus all of the story map challenge winners at: https://www.science.mcmaster.ca/geo/gis/esri-canada-centre-of-excellence.html!

Finally, Sean Leipe won the Undergraduate award in the Esri Young Scholar Competition for his work on his Honours BSc Thesis exploring the Bad Lands in the Basilicata Region of Italy. You can see some of his work, along with our other award winners here: https://www.science.mcmaster.ca/geo/gis/esri-award-winners.html

Karl Chastko’s 2nd place winner in the Land Category and Michael Kirchin’s 2nd place winner in the Population Category.
have been undertaking research on various aspects of the housing scene. Much of this has been funded by and/or coordinated with, the Neighbourhood Change Research Project (NCRP) that is funded by SSHRC and directed from the University of Toronto by David Hulchanski. This project is tracking neighbourhood change in seven Canadian cities, and paying particular attention to the private rental sector.

In Hamilton, students have been looking at landlords, tenants, secondary suites, and patterns of property ownership. For her Master’s thesis, which she defended in September 2017, Larissa Dibartolo undertook a survey of landlords and followed up with interviews. Landlords are often criticized, and sometimes reviled, and so it was important that she secure the trust of respondents by obtaining the assistance and support of the Hamilton and District Apartment Association. Her research showed that local landlords are extremely diverse, in terms of gender, ethnicity, motives, and size of holdings. An obvious conclusion is that it is misleading to generalize about them!

In counterpoint, with assistance from an Undergraduate Student Research Awardee, Ashleigh Patterson (now in the Master’s program) undertook a survey of tenants in secondary suites. These are self-contained dwelling units in buildings that were not erected for that purpose. Many are in basements or attics, and are illegal, in the sense that they do not conform to zoning, building, or health regulations.

Among other things, Patterson found that most tenants subsist on low incomes and are unaware of, and perhaps indifferent to, the legal status of their apartments.

Two studies, one completed and one underway, will help to frame this research. For the NCRP project, Richard Harris has summarized and interpreted trends in the social geography of Hamilton since 1970. Like many Canadian cities, Hamilton has seen a polarization of neighbourhoods; what has made it exceptional is the degree, and scale of concentration of, poverty. This study will appear in a book on trends and patterns of neighbourhood change in Canadian cities, to be published in 2018. With more particular reference to the housing scene, Master’s student Geoff Rose is building research on local condominiums that he undertook for a fourth-year research project. One of the maps that he produced is reproduced above. He is now using the City’s property assessment database to document patterns of property ownership across the urban area. In cooperation with the City of Hamilton, he is focusing, in particular, on geographical patterns in the incidence of absentee and resident property ownership.

Remarkably, little is known about the private rental sectors in Canadian cities. Together, these studies of Hamilton should throw light not only on the local scene but also on broader patterns and issues.
A REFLECTION FROM THE ACTING DIRECTOR
by Dr. Janok Bhattacharya

Dear Friends of SGES,

We were delighted that as a consequence of the review SGES leadership earlier in 2017, Dr. Bruce Newbold has agreed to serve as Director for another five years. However, Bruce also elected to take a well-deserved sabbatical, and I was asked to serve as Acting Director during his leave. There were some major changes at McMaster in 2017, including appointment of Dr. Maureen MacDonald as our new Dean of Science, as well as David Farrar as our new Provost and we are all very excited about the new leadership and the opportunities they present.

We have a lot of news to share. Dr. Karen Kidd is the newly appointed Stephen A. Jarislowsky Chair in Environment and Health. Karen is jointly appointed to Biology and SGES, and we are thrilled to have such a distinguished scientist as a new member of our school. We have highlighted Dr. Kidd’s research in our spotlight section. We are also pleased that our own Dr. Mike Waddington has been awarded a prestigious Canada Research Chair, recognizing his outstanding work in hydrology and wetlands.

We congratulate Mike on this accomplishment and also spotlight his research.

Following a successful request for hires, SGES is in the process of searching for two new faculty members. We have already received a number of applications for a tenure-track research and teaching professor in the area of Remote Sensing/GIScience as well as a teaching professor in the area of Geography and the Environment. Following our loss of 6 faculty in 2015-2016, this renewal is critical for us, and we are all very excited about the expansion of our faculty.

Last fall, we had the opportunity to present the past, present, and future of SGES to our new Dean. Some of you may not know, but SGES has a very long history at McMaster. The first course in Geology was taught in 1892, and in 1905 separate departments of both Geology and Mineralogy were founded long before McMaster relocated in 1930 from Toronto to Hamilton. Soon after moving, the first Geography class was taught in 1939, and a new Geography Department founded in 1946. Three of our most distinguished alumni have been awarded the Order of Canada (Dr. Paul Hoffman, BSc Geology, 1964; Dr. Marc Gertler, BA Geography, 1977; and Dr. Frank Hawthorne, PhD Geology, 1973) and we have 19 Fellows of the Royal Society of Canada (10 faculty, 9 alumni). We have quite a legacy to be proud of, and we are looking forward to a bright future, especially as we begin to rejuvenate our faculty losses of the past few years.

To that end, I have been very involved in helping pursue advancement opportunities. We were honored this year to receive a $250,000 gift from the estate of Winnifred Hewetson to create an endowed fund to support student scholarships in Earth and Environmental Sciences. We are also delighted that Keith MacDonald began his funding of an outreach fund for students in the program. We also received generous support from a number of other alumni, including Susan Cunningham, Jennifer Dunn, Ken Potma, and Steve Vansickle. Their donations to the Earth Sciences Alumni Fieldwork Fund supports costs associated with fieldwork opportunities directly related to undergraduate earth sciences programs. We thank those who contributed this year and hope that many others of you will choose to support McMaster in the future.

NOTEWORTHY NEWS

The Hamilton Spectator published a series of three articles that our very own Dr. Richard Harris, professor at McMaster’s School of Geography and Earth Sciences, wrote on the subject of gentrification, following a small, organized riot that occurred in the city on Locke Street. Below is a snippet from the articles combined:

A few weeks ago, 30 people smashed windows along Locke Street. An anonymous blog explained their actions. The target, it seems, was ‘gentrification’, a word used several times. Gentrification involves an upgrading of the physical environment coupled with a rise in average incomes.

Since 2005, gentrification has begun to leave a mark. There are two areas (three census tracts) in the Lower City where incomes rose between 2005 and 2015, one just north of downtown and the other adjacent to Locke Street.

Hamilton has seem growing income inequality. The standard measure is the Gini coefficient, which varies from 0 (perfect equality) to 1 (complete inequality). The Gini for Hamilton rose from 0.34 in 1980 to 0.39 in 2000. Other Canadian cities have seen the same trend, but the rate of increase in Hamilton has been greater than most.

And Hamilton has been affected by other big trends. Obvious ones are the loss of fairly secure, well-paid manufacturing jobs; the growth of precarious, part-time employment; and a virtual standstill in the production of rental housing.

And something else has been going on. Hamilton and Toronto used to be separate, physically and psychically. They looked down on us; we raised a finger. Slowly but surely this changed... Hamilton has become part of what planners now talk about as the GTHA.

And so that Audi may be owned by a commuter; that upscale store may be patronized by immigrants from Oakville; the landlord who is raising your rent may live in central Etobicoke.

The gentrification that we see in Hamilton is not wholly, or perhaps even primarily, homegrown. It reflects the gentrification of Hamilton. It is this, more than anything, which has pushed up prices and rents, sharpening contrasts between rich and poor, not just in gentrifying areas, but across the whole city.