It is time for another fact filled and exciting Geocetera. Things continue to be busy in the Department. This term has been exceptionally so as we are preparing for a Departmental Review (something that happens every 7 years), that has meant a lot of meetings, a retreat, and lots of work for many of us. Some of you will have already received surveys from Robbie for this report. The actual site visit is not until March 2018, and will have an excellent review committee consisting of: Dr. Stephen Johnston (University of Alberta), Dr. Claudia Schöder-Adams (Carleton University), Dr. Brian Branfireun (Western University), and Dr. Bernhard Mayer (University of Calgary).

It was a large convocation group in June, likely our biggest ever (see picture later), and we had the traditional ring ceremony out by the reflecting pool. This contrasts to our October convocation with only one undergrad convocating and a ring ceremony held outside the office.

Everyone had productive summers with much fieldwork being done. I don’t think the excessive fire situation affected too many people. Although Glyn Williams-Jones was dealing with some “fire” in a Masaya volcano (see article later).

I spent a lot of time this summer in the Yukon and Northwest Territories, and then taught Fieldschool 308 on Vancouver Island for the last part of August with Shahin Dashtgard and Dirk Kirste.

This fall seemed to involve a lot of travelling. I went to Ottawa for the yearly Council of Canadian Chairs of Earth Sciences Departments. It was an insightful 2 day of meetings discussing issues with other Departments across Canada, with speakers from NSERC, CFI, GSC, and Geoscientists Canada. Many of us travelled to the GSA in Seattle for another excellent meeting.

Brendan Dyck arrived October 1st, and it is great to have a new Assistant Professor in the department. He has been busy writing NSERC and other grant proposals as well as getting ready to teach Metamorphic Petrology next semester.

We have started the process to replace John Calgue. We have received over 90 applications for the advertised Natural Hazards position and the selection committee is busy evaluating applicants.

Also in this Geocetera you will find the usual announcements, awards etc. Enjoy!

“we are preparing for a Departmental Review...”
### Graduate Degrees

<table>
<thead>
<tr>
<th>Student</th>
<th>Thesis Title</th>
<th>Defended</th>
</tr>
</thead>
<tbody>
<tr>
<td>JACOB VERBAAS (PhD)</td>
<td>&quot;PALEOPROTEROZOIC TO MESOPROTEROZOIC EVOLUTION OF YUKON TERRITORY, CANADA&quot;</td>
<td>NOVEMBER 20, 2017</td>
</tr>
<tr>
<td>ALEXANDRA PULWICKI (MSc)</td>
<td>&quot;MULTI-SCALE INVESTIGATION OF WINTER BALANCE ON ALPINE GLACIERS&quot;</td>
<td>NOVEMBER 17, 2017</td>
</tr>
<tr>
<td>LIANNA VICE (MSc)</td>
<td>&quot;LATE CRETACEOUS TO PALEOCENE EVOLUTION OF THE BLANCHARD RIVER ASSEMBLAGE, SOUTHWEST YUKON: IMPLICATIONS FOR MESOZOIC ACCRETIONARY PROCESSES IN THE NORTHWESTERN CORDILLERA&quot;</td>
<td>NOVEMBER 2, 2017</td>
</tr>
<tr>
<td>CHRISTIAN SAMPLEANU</td>
<td>&quot;THE ROLE OF INTACT ROCK FRACTURE IN ROCKFALL INITIATION&quot;</td>
<td>OCTOBER 11, 2017</td>
</tr>
<tr>
<td>ZENNON WELESCHUK (MSc)</td>
<td>&quot;CHANNELIZED DEPOSITS AND REGIONAL PARASEQUENCE SETS OF THE GROUSE PALEOVALLEY: McMURRAY FORMATION, ALBERTA, CANADA&quot;</td>
<td>SEPTEMBER 20, 2017</td>
</tr>
<tr>
<td>EMILY MOASE (MSc)</td>
<td>&quot;GUIDANCE FOR DEBRIS-FLOW MITIGATION DESIGN IN CANADA&quot;</td>
<td>AUGUST 3, 2017</td>
</tr>
<tr>
<td>LIBBY GRIFFIN (MSc)</td>
<td>&quot;OPTICAL DATING OF STABILIZED PARABOLIC DUNES, SAVAY ISLAND, BRITISH COLUMBIA&quot;</td>
<td>JUNE 13, 2017</td>
</tr>
<tr>
<td>CARIE-ANN LAU (MSc)</td>
<td>&quot;CHANNEL SCOUR ON TEMPERATE ALLUVIAL FANS IN BRITISH COLUMBIA&quot;</td>
<td>JUNE 1, 2017</td>
</tr>
<tr>
<td>FLAVIEN BEAUD (PhD)</td>
<td>&quot;NUMERICAL INVESTIGATIONS OF SUBGLACIAL HYDROLOGY AS A DIRECT AND INDIRECT DRIVER OF GLACIAL EROSION&quot;</td>
<td>MAY 26, 2017</td>
</tr>
<tr>
<td>RYAN BURGESS (MSc)</td>
<td>&quot;CHARACTERIZING RECHARGE TO FRACTURED BEDROCK IN A TEMPERATE CLIMATE&quot;</td>
<td>MAY 16, 2017</td>
</tr>
<tr>
<td>SARAH MAKIN (MSc)</td>
<td>&quot;DEVELOPING FLUORITE AS A GEOCHEMICAL PATHFINDER MINERAL USING GLOBALLY REPORTED REE-Y CONTENTS&quot;</td>
<td>MAY 11, 2017</td>
</tr>
<tr>
<td>ANDREW CLARK (MSc)</td>
<td>&quot;TECTONOMETAMORPHIC HISTORY OF MID-CRUSTAL ROCKS AT AISIHIK LAKE, SOUTHWEST YUKON&quot;</td>
<td>APRIL 12, 2017</td>
</tr>
<tr>
<td>ALLISON WESTIN (MSc)</td>
<td>&quot;DOWNIE SLIDE: AN INTEGRATED REMOTE SENSING APPROACH TO CHARACTERIZATION OF A VERY SLOW MOVING LANDSLIDE&quot;</td>
<td>APRIL 4, 2017</td>
</tr>
</tbody>
</table>

### Colloquiums, Oral Exams, Defences

**RAJESH VAYAVUR** will defend his PhD thesis on December 8th, 2017. Title: "Seismic and Potential Field Constraints on the Shallow Crustal Structure of Inner Bering Shelf, Offshore Southwestern Alaska".

**CRAIG MILLER** will defend his PhD thesis on November 27th, 2017. Title: "Volcanic Architecture and Unrest Processes: Insights from Static and Time-Varying Potential Field Models".

**JOCELYN ROSS-LINDEMANN** will present her PhD candidacy exam on November 24th, 2017. Title: "Bonding Environment and Distribution of Arsenic and Selenium in Pyrite and Controls on Element Mobilization".

**STEPHANIE VAN PELT** presented her PhD candidacy exam on November 10th, 2017. Title: "Multiproxy Approach for Investigating Paleohydrologic Drought".

**TERESA ROSALES RAMIREZ** presented her thesis proposal on October 12th, 2017. Title: "Characterizing Wastewater Spills from Shale Gas Operations in the Shallow Subsurface Zone".

**LUCIAN RINKE-HARDEKOPF** presented his oral exam on October 10th, 2017. Title: "Evolution and Architecture of Terrestrial to Shallow-Marine Deposits in a Variable Accommodation Setting: McMurray FM, Northeastern McMurray Sub-Basin, Athabasca Oil-Sands Region, Canada".

**ANTONINA CALAHORRANO-DIPATRE** presented her colloquium on "Detection of a Possible Magmatic Intrusion at Cotopaxi Volcano, Ecuador Using Time Series Gravity" on September 12th, 2017.

**YANNICK LE MOIGNE** presented his oral exam on "Investigating Canada’s Deadliest Volcanic Eruption and Mitigating Future Hazards" on September 6th, 2017.

**NAKARI DIAZ** presented her colloquium on August 3rd, 2017. Title: "Sequence Stratigraphy and Facies Model of the Viking Formation in Crossfield and Adjacent Areas, Alberta, Canada".


**BRYAN KENT** presented his colloquium on May 29th, 2017. Title: "Building a Sequence Stratigraphic Framework for the North Nanaimo Basin – Comox to Campbell River, British Columbia."
LAUREN HOCKIN

SFU GRAD FELLOWSHIP
FALL 2017
SUSANNE FIETZ
LAUREN HOCKIN
CHUIGAO HUANG
CRAIG MILLER
TAYLOR PILLER

SPRING 2018
ANTONIA CALAHOHRANO
LUCIAN RINKE-HARDEKOPF
SARAH SCHULZ

LAURA DESAUNOY
MATTHEW SIMONS

MATTHEW SIMONS, SAMANTHA MORGAN AND TERESA ROSALES-RAMIREZ WON A TEAM AWARD FOR THE BEST POSTER AT SFU’S CLIMATE AND ENERGY RESEARCH DAY. THE TITLE OF THEIR POSTER WAS “THE LIFECYCLE OF FRACKING WATER: FROM SOURCE TO SINK AND BACK AGAIN”

FLAVIEN BEAUD WON AN OUTSTANDING STUDENT POSTER AWARD FOR HIS POSTER TITLED “NUMERICAL MODELLING OF ESKER FORMATION IN SEMI-CIRCULAR SUBGLACIAL CHANNELS”

LAURA DESAUNOY

PETO CANADA SCHOLARSHIP
NAKARI DIAZ

LAURA DESAUNOY

KEY BIG DATA SCHOLARSHIP
ALEX PULWICKI

CONGRATULATIONS TO LAURA THOMSON WHO WAS A PRIZE WINNER AT THE POSTDOC RESEARCH DAY FOR HER SPOTLIGHT TALK “THE STABILITY OF GLACIER CHANGE: WHITE GLACIER, NUNAVUT”

SAMANTHA MORGAN
Congratulations to our Graduands at the June 2017 Convocation.

Science Rendezvous is the largest science festival in Canada that seeks to engage the public (and especially kids!) through interactive science activities, demonstrations, and laboratory experiences at various locations across Canada.

This year’s event was held on Saturday, May 13th, 2017 from 11am - 3pm in the hallways of the Academic Quadrangle at SFU’s Burnaby campus, marking the 10th year of celebration. Participants were on hand to explore dozens of science activities and demonstrations for all ages.

Thank you to all the Earth Science volunteers who helped make this event a huge success!
Scientists are using extreme science to install a lava monitoring system around a lava lake of Masaya volcano in Nicaragua.

Gas sensors and a temperature probe will be deployed around a bubbling lava lake convecting at almost 100km/h in hopes of extracting valuable data. SFU partnered with GEOARC, a non-profit organization specializing in extreme science expeditions, to deploy over 1.1km of rope directly above the lava lake to enable the lowering of equipment into the crater.

Volcanologist GLYN WILLIAMS-JONES has been studying volcanoes in Central America for over 20 years. The recent formation of a lava lake at Masaya volcano has given him a rare opportunity to help launch a series of experiments above a rapidly overturning molten lava lake.

Williams-Jones explains that a lava lake is a skylight that provides a window into the much broader magma system beneath the crater. “This gives us a chance to see part of what is going on underneath the surface,” he says. Getting access to this window is not small feat given the fact that the lava lake is at the bottom of a 500m wide, 400m deep crater.

Williams-Jones says that the temperature and gas data will provide information on the toxicity of the gases that are being emitted and the degree of dilution that takes place as it travels downwind towards populated areas.

“We hope to collect data that will be extremely useful for volcanologists, biologists, and atmospheric scientists. The hard data will be critical in confirming whether our current models are realistic”. He adds, “Visually, it’s absolutely awe inspiring to look at something this vigorous. We know what happens scientifically, but to see it and to know that this is a small window of a much larger system is absolutely mind blowing.”

Check out this video for more information: https://www.youtube.com/watch?v=VKhP-MGqVUZo&feature=youtu.be

**DR. GWENN FLOWERS**’ focus is on the terrestrial cryosphere, or land-based ice; she primarily studies contemporary glaciers and ice sheets. Working in the St. Elias Range in Kluane National Park, Yukon, her group looks at how glaciers respond to climate, specifically studying the internal processes (i.e. dynamics) and the way those dynamics affect the response of ice masses to climate. This area serves as a natural laboratory to understand general glacier processes. It is a remarkable place to do science, especially glaciology: it has extreme environmental gradients – from sea level in the Gulf of Alaska, the highest peak in Canada, Mount Logan (5,959 m elevation), is located only 100km inland – and hosts extreme ranges of topography, ecosystems, climate zones and natural processes.

For the full article see: http://www.sfu.ca/science/research/featured-researchers/interview-with-dr-gwenn-flowers.html

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**EXTREME SCIENCE IN VOLCANOLOGY**

**July 6, 2017**

**SPOTLIGHT ON RESEARCHERS**

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**SUBDUCTION ZONE EARTHQUAKES OFF BC’S SOUTH COAST**

The motivation – People living on the south coast of British Columbia are at risk from extremely large (magnitude 8-9) earthquakes sourced at the Cascadia subduction zone, which is located off the coast of North America from northern California to Vancouver Island. The Cascadia subduction zone marks the boundary between two of Earth’s crustal plates – the oceanic Juan de Fuca plate and, to the east, the much larger North America plate over which it is riding. Geologists have shown that about 20 giant earthquakes have happened along the fault that marks this plate boundary in the past 10,000 years, most recently in AD1700. Previous research suggests that all, or nearly all, of these earthquakes have involved the full rupture of the 1100 –km long fault and thus would have magnitudes of 9 or larger. Such behavior is unique among the world’s subduction zones, all of which display rupture of sections or ‘segments’ of the plate-boundary fault, commonly with earthquakes in the magnitude 8-8.8 range.

In their recent paper, veteran Cascadia earthquake researchers Drs. Hutchinson and Clague test the full-rupture hypothesis with geological data from the northern (Canadian) portion of the Cascadia subduction zone. They tested the assumption that earthquake events in Northern Cascadia coincided with earthquake events documented farther south, while bearing in mind the uncertainties in the large body of radiocarbon ages that have been obtained to date these events. Specifically, they tested the hypothesis that the ages of the northern and southern events are statistically equivalent. If this hypothesis were shown to be invalid, at least some of the great earthquakes must have been the product of segmented rupture and thus were probably smaller than magnitude 9.

The discovery – Drs. Hutchinson and Clague conclude that most of the subduction zone events in Northern Cascadia satisfy the hypothesis of temporal equivalence, that is they cannot be statistically separated in age from events in central and southern Cascadia. Some of the northern events, however, have no matches to the south suggesting that the Canadian portion of the subduction zone, on occasion, ruptures independently of the American portion.

Its significance – Why is this important? A magnitude-9 earthquake releases about 30 times the energy of a magnitude-8 quake, and cited in south-coastal British Columbia would experience far more damage from the larger quakes. This study highlights the need to better characterize the extent of segmentation of the Cascadia subduction zone.
On Tuesday November 7th, 2017, EASC Grad students had their 2nd Chili and Bread Cook-Off. We had many entries and our judges had the difficult task of making the final decisions!

Congratulations to all participants…and the winners are:

**CHILI**
- Lauren Hutchinson – Best Meat
- Laura Desaunoy – Most Creative & Fan Favorite
- Jocelyn Ross-Lindeman – Best Veggie

**BREAD**
- Chloé Château – Most Creative
- Matt Simons – Best Bread
- Matt Simons/Chloé Château/Dave Bigelow - Fan Favorites

**DR. DOUG STEAD** was awarded the prestigious R.F. Legget Medal by the Canadian Geotechnical Society President Dharma Wijewickreme at the GeoOttawa conference in October 2017. The R. F. Legget Medal is the society’s highest honour and is presented to an individual for ‘outstanding, life-long contributions to geotechnical field in Canada’.

**DR. ANDY CALVERT** has been appointed to the Editorial Board of the journal Geology for three years from 2017-2019. Geology is published by the Geological Society of America, and strives to publish papers that are provocative, innovative, and of broad interest to the global geological community.

Adjunct Professor **DR. BERT STRUIK** is the recipient of the CRHNet “Lifetime Achievement Award” for 2018. This is the organization’s highest honour and is named after the late T. Joseph Scanlon, journalist, researcher, professor for his lifetime contributions to disaster risk management. The award recognizes the lifetime contributions and achievements of exemplary individuals to the enhancement of Canadian disaster safety.
LAURA DESAUNOY was awarded beamtime at two synchrotron facilities to conduct X-ray Absorption Near Edge Structure (XANES) analysis on her samples in order to accurately determine the selenium speciation. She spent 5 days at the Canadian Light Source in Saskatoon, SK in May and another 2 days at the Advanced Photon Source in Chicago, IL in July.

EASC HIGH SCHOOL CAREER DAY  April 26th, 2017
This was a full day event involving a Rocks to Riches workshop, plate tectonics activities, a fieldtrip and a lunchtime Earth science career panel. Attended by 50 Grade 11 and 12 students, it was co-developed and run by Brent Ward, Eileen van der Flier-Keller and Matt Plotnikoff. The event’s success was largely due to the energy, passion and hard work of the five graduate students, two undergraduates, and post doc who gave so generously and enthusiastically of their time to engage with the students.

EASC PHOTO CONTEST

Portrait
Lucian Rinke-Hardekopf

Landscape
Jacob Mattson