NSF/UVM Community Cosmogenic Facility

Visitors and Visitor Projects
Age and retreat of Ohiopyle Falls, Youghiogheny River, Pennsylvania

Lehigh University

I am using cosmogenic dating to determine how fast Ohiopyle Falls are marching upstream and, by extrapolating that velocity downstream, estimate where the falls were born. This will test the idea that integration of the Ohio River downstream of Pittsburgh following an early glaciation ~2 million years ago could have triggered lowering base-level, migration of waterfalls, and carving of the western Pennsylvania landscape.

Visitors: Christy Li, Josh Gonzales, and Katrina Gelwick
Visit dates: November 2017 and January 2018

Christy Li is a senior undergraduate working on her senior thesis and the lead P.I. on this project. Josh and Katrina are M.S. students learning the cosmogenic technique as they will be applying it on their respective thesis projects in 2018-19.
Late Quaternary Glacial History of McMurdo Sound, Antarctica

Marine-based portions of the Antarctic ice sheets are susceptible to under-melting from the surrounding ocean, leading to sea level rise within the next few centuries. Cosmogenic exposure and radiocarbon chronologies of glacial sediments deposited during past glacial periods in McMurdo Sound provide useful insights into deglaciation dynamics and regional Antarctic contributions to sea level rise relevant to on-going global climate change.

Visitor: Andrew J. Christ
Visit dates: January 15-26 and March 19-23 2018

Drew is a PhD candidate from the Dept. of Earth & Environment at Boston University. During his visit to the UVM Cosmo Nuclide lab he will learn essential Be-10 and Al-26 sample preparation techniques and learn more about geochemical methods.
The Vredefort Dome is the largest and oldest known meteorite impact crater in the world and a world heritage site in Parys, South Africa. The Vaal river flows through the remnants of the eroded dome (from east to west) eating away at the rocks that the river flows along. The relative erosion rates of these rocks will help determine how quickly the river erodes, contributing towards landscape evolution studies in South Africa.

Visitor: Rivoningo Khosa
Visit dates: January 15-26 2018

Rivoningo is an MSc candidate at the University of Johannesburg(UJ) and NRF iThemba LABS. Her visit to UVM will see her learn how to extract Be-10 and Al-26 from quartz samples and learn more about cosmogenic nuclides and the cosmolab.
Filling in the final holes of our knowledge regarding the deglaciation of Antarctica remains a vexing problem. Complications in dating have made it difficult to understand rates of future ice sheet change and the distribution of past contributions to sea level change. I am using in situ cosmogenic carbon-14 to elucidate the patterns of ice sheet retreat in the outer Ross Sea area of Antarctica.

Visitor: Brent Goehring
Visit dates: January 22-23 2018

I’ll be visiting the lab to talk all things cosmogenic nuclides and to present my research in Antarctica using in situ cosmogenic carbon-14.
My research is part of a larger NSF funded project aimed at understanding the relationship between land use and erosion in Cuba. I am developing a method for measuring erosion in carbonate lithologies using $^{26}$Al, and the background erosion rates I measure will be paired with short-lived fallout radionuclide measurements to quantify erosion at multiple temporal scales in a country that has experienced rapid changes in land use.

Student: Mae Kate Campbell, M.S. in Geology
Graduating: Spring 2019

I am a masters student working with Paul and Lee here in the Cosmo Lab! I am really excited to be a part of all the fun here and love meeting our visitors. Outside of the lab I am a plant mom and I love cooking (pizza nights!), hiking, and exploring Vermont.
Using $^{10}$Be to Understand the Erosion Effects of Hurricane Maria on the Island of Dominica

The University of Vermont

Hurricane Maria caused massive erosion throughout Dominica’s landscape. This project, serving as an honors thesis, will use meteoric $^{10}$Be and in situ $^{10}$Be of samples pre- and post-hurricane to determine erosion rates. The temporal replication analyses and parameters affected by the hurricane (i.e. precipitation, landslides) will be used to understand the effects of the Hurricane.

Student: Melinda Quock, B.S. in Geology
Graduating: Spring 2019

Melinda is an undergraduate student at UVM working on her honors thesis. In the cosmolab, she extracts meteoric and in situ $^{10}$Be. She is also working on a side project with Paul and Lee on refining methods of extracting $^{10}$Be from olivine.
Quantifying bedrock fracturing controls on the relationship between topography and erosion rate

Penn State University

Visitor: Alexander (“Al”) Neely
Visit dates: January 22 – March 2 2018

Al Neely is a 3rd year Ph.D. student at Penn State University. He enjoys collecting data and substantial hikes into seldom-visited parts of steep mountain ranges. Outside of geology, he also enjoys drawing, traveling, going really fast down hills, and playing games.
Miocene-Pleistocene landscape evolution of the Cascadia backarc: clues from the Ringold Fm.

U.S. Geological Survey

My field area is the Pacific Northwest and I am focusing on the history of faulting and river reorganization. The Ringold Formation is a terrestrial stratigraphic unit in central Washington that is a key marker for understanding when and how fast faults have moved. It also contains amazing fossil information that will help us define how rivers have responded (or driven) landscape evolution from Idaho to the Pacific Ocean.

Visitor: Lydia Staisch

Visit dates: January 24 – February 23 2018

I’m a research geologist with the US Geological Survey. I work primarily in the Pacific Northwest on neotectonics, tectonic geomorphology, structural geology, and earthquake hazards.
Cenozoic landscape evolution of the southern Rocky Mountains – Geologic Mapping

This work is part of a larger USGS National Cooperative Geologic Mapping Program effort to complete new, detailed bedrock and surficial geologic maps of the San Luis Basin (SLB) in southern Colorado and northern New Mexico. Moraine exposure ages are being used to constrain the timing of deglaciation in the mountains surrounding the SLB, fault slip rates, and the interplay of alluvial, fluvial, and glacial deposition at range fronts.

Visitor: Lydia Staisch
Visit dates: January 24 – February 23 2018

Andy is a research geologist at the USGS working on Quaternary tectonic and geomorphology problems in southern CA and CO, USA. Lydia is a research geologist and colleague at USGS who is processing samples from CO along with some of her own work.
Determining the Timing and Rate of Laurentide Ice Thinning in New England using In Situ 10Be

The retreat of the Laurentide Ice Sheet out of New England approximately 21 – 13 thousand years ago had profound impacts on sea level, ocean circulation, and even global climate. Accurately depicting this retreat is difficult due to uncertainties about the rate and timing of ice thinning in the region. This project uses in-situ 10Be exposure ages from various elevations around New England to constrain this thinning history.

Visitor: Christopher Halsted
Visit dates: January 29 – February 2 2018

Chris Halsted is a graduate student at Boston College, working towards a Master’s of Geology. He works on ice sheet reconstructions and cosmogenic nuclide geochemistry. He intends to pursue these interests while working towards a PhD at UVM.
Exploring geochronologic techniques in action with a graduate-level class

*Université du Québec à Montréal*

The visit to the Cosmogenic Laboratory was carried out in the context of our Dating Methods class, a MSc level course on dating techniques available for geologists, geomorphologists and archaeologists. This lecture runs every winter term and has about 5 to 10 students. The visit was our first experience going to a lab. The goal was to see how one starts with a rock sample and ultimately gets a cosmo age from which geological interpretation can be drawn. The visit was a true success, students and professors were extremely satisfied with the visit. This lab is world class. Thanks Lee and Paul.

**Group Tour**

**Visit date:** February 21, 2018

**Names of Participants:**
Dr. Michel Lamothe  
Dr. Martin Roy  
Marjorie Bogur  
Philippe Roberge  
Zeinebou Laraibi  
Marc-Antoine Lévesque  
Laurence Forget Brisson (PhD student)  
Florent Bigot  
Charles Kavanagh-Lepage  
Gaëlle Labat
Kicking off the Community Cosmogenic Facility with an open house

Northeastern Geological Society of America Meeting, Burlington VT

To celebrate the opening of the NSF/UVM Community Cosmogenic Facility, we hosted an open house as part of the Northeastern Geological Society of America Meeting. Visitors ranged from undergraduate students to graduate students to faculty, and came to see the facility, learn about cosmogenic nuclide science, see laboratory procedures in action, and brainstorm for future collaborative projects and visits.

Group Tour
Visit date: March 19, 2018

Names of Participants:

Dwight Bradley (USGS)                                            John Hughes (U. Vermont)
Duane Braun (Bloomsburg U.)                                      Eli Orland (Middlebury Coll.)
William Caffee (U. Buffalo)                                      Will Ouimet (U. Connecticut)
Tim Cook (Worcester U.)                                           Noel Potter (U Maine)
Ben DeJong (Norwich U.)                                          Mariah Radue (U. Maine)
Autumn Hanley (Lock Haven U.)                                    Mike Retelle (Bates Coll.)
Linley Hanson (Salem State U.)                                   Sam Rickerich (Bates Coll.)
Greg Hoke (U. Syracuse)                                          Noah Snyder (Boston Coll.)
The Fortymile River flows from eastern Alaska to the Yukon River in Canada. A deeply incised strath terrace flanks the lower Fortymile and records landscape-altering bedrock incision that sequestered gold-bearing river gravels hundreds of m above the modern channel. Cosmogenic techniques allow us to test base-level lowering mechanisms, determine terrace abandonment timing, and quantify subsequent incision.

Visitor: Adrian Bender
Visit dates: April 9-27 2018

I’ll be visiting UVM from Anchorage, Alaska, where I work for the U.S. Geological Survey on projects that utilize cosmogenic nuclide techniques to quantify geomorphic processes related to active tectonics or, in this case, coevolution of landscapes and placer gold.
Coupled interactions between drainage reversal and escarpment evolution

*Department of Geosciences, Colorado State University*

Drainage reversal is a mechanism by which drainage divides and escarpments move across landscapes, and are associated with peculiar topographic features such as hooked-shaped channels and windgaps. Despite implications for drainage reorganization and landscape evolution, the mechanisms driving flow reversal are unclear. This study will address this knowledge gap using field studies, cosmogenic nuclides and modeling.

**Visitor:** Sean F. Gallen  
**Visit dates:** April 9-13 2018

I’ll be visiting the UVM from Colorado State University to learn about their cosmo lab procedures in preparation for projects that apply cosmogenics to study landscape evolution and to gain information for setting up a quartz purification facility at CSU.
Testing the relationship between erosion rates and rock properties on ridgeline outcrops in Virginia

We are testing the relationship between erosion rates and rock properties on outcrops along ridgelines in Shenandoah National Park.

Visitor: Gregory Hancock
Visit dates: April 9-13 2018

I am a professor in Geology at the College of William and Mary. Although I’ve had a small Cosmogenic Radionuclide processing lab for almost 20 years, I am interested in updating the methods I use.
Using glacial isostatic adjustment to understand ice volumes during the last glaciation phase

Harvard University

Rapid glaciation of the Laurentide Ice Sheet late in the glaciation phase can induce high rates of solid Earth crustal deformation. I explore the effects of glacial-isostatic adjustment induced deformation on river dynamics on U.S. east coast rivers.

Visitor: Tamara Pico
Visit dates: April 9-11 2018

I will be visiting the lab to observe and learn about cosmogenic nuclide dating methods and learn laboratory processes.
Assessing the origin of boulder deposits within a late Eocene erosion surface of Colorado

Department of Geosciences, Williams College

Inspired by decades of work by Professor Bud Wobus (Williams), Erikka Olson will seek to unravel the origin of obscure boulders in her senior thesis. The boulders reside within a flat surface of central Colorado that has been unperturbed by erosion for millions of years. With petrography, cosmogenic dating of the boulders could unlock the mystery of how such flatness was preserved in the midst of great tectonic and climatic upheaval.

Visitor: José Constantine
Visit dates: April 12 2018

As Erikka’s co-advisor (with Bud Wobus), I will be visiting the lab to learn more about the potential to age the boulders as a part of Erikka’s thesis.
Why is *that* study news? Getting your research covered in the popular science press

*Science Magazine*

Visitor: Tim Appenzeller
Visit dates: April 12 2018

Tim is the News Editor of Science Magazine. He came to University of Vermont to give a public seminar on science research in the popular media.

Tim visited the Community Cosmogenic Facility to learn about the laboratory, meet other visitors, hear about collaborative projects, and observe cation column chromatography methods.
Meteoric accumulation of 10Be in the Shackleton Glacier Region, Antarctica

As the East Antarctic Ice Sheet (EAIS) began to retreat ~20 kya, surfaces that were once overlain by glaciers became exposed. This research will 1) measure concentrations of 10Be in shallow soil pits to help determine the relative surface ages of soil where biological communities are found, 2) estimate the highest elevation of the EAIS during the LGM, and 3) determine meteoric accumulation rates of 10Be over time.

Visitor: Melisa Diaz
Visit dates: April 19 – May 2 2018

Melisa Diaz is a PhD student in the School of Earth Sciences at The Ohio State University. Her research focuses on the geochemistry of ice-free areas in Antarctica, particularly regarding the use of isotopes to understand surfaces processes and change.
Laboratory assistance, website development, and database work

I’ll be helping to process samples while learning laboratory methods. I’ll also be working on improving the lab website and database.

Student: Landon Williamson, B.S. in Geology
Graduating: Spring 2020

I am currently a sophomore from Dover, Massachusetts with a passion for skiing, hiking, and science! I will be working in the laboratory this summer, and plan to continue working there during the rest of my time at UVM.
One of the problems we regularly encounter is estimating the probabilities of rare geohazard events. We think these events are probably clustered temporally, maybe all occurring in the paraglacial time or later under the influence of widespread triggers like large earthquakes. If we could put ages on a number of past events of various magnitudes (and triggers) it would help us characterize the risk much more precisely.

Cosmogenic nuclide dating has many under-utilized applications in both my research and professional practice, and this visit is to learn more future possibilities. Ideally a graduate student project, supported by BGC and Queen’s, would help us get started!
This project is an investigation into the disequilibrium that exists within the Poultney River watershed. A knickpoint, gorge and multiple terraces were formed by fluvial bedrock incision and could result from several possibilities. These hypothesis include: (1) passive margin tectonic uplift increasing slope and stream power, (2) glacio-isostatic rebound leading to uplift in the area, (3) or post glacial variables such as the base level drop of Lake Champlain. The study will help us gain a better understanding of Vermont’s complicated environmental history.

Visitor: Alden Woodard
Visit dates: June 13 - July 13 2018
I have recently graduated from Castleton University with a BS in Environmental Science and a Minor in Chemistry. I am from Vermont, and grew up in the small town of Waterville. I enjoy the outdoors and hope to find myself employed in a career that deepens my understanding of our scientific world.
This project is interested in answering two main questions about dryland landscapes and
dryland landscape evolution. These are as follows; how have Pleistocene changes in
climate altered rates of soil production? How does climate change influence soil
production processes in dryland regions? We look to answer these questions by analyzing
samples from two field sites in the Sandia Mountains, NM and the Mojave Desert, CA.

Visitor: Christoph Suhr
Visit dates: June 13 – July 27 2018

I am a rising senior at Whitman College in Walla Walla, WA, and am majoring in Geology.
More specifically, I am particularly interested in surficial geologic processes and how
anthropogenic activity and changes to the climate affect these processes.
Soil residence times on an ancient surface, Nicoya, Costa Rica

Central Michigan University

For this project, we are extracting meteoric $^{10}$Be from a soil profile collected from the Nicoya Peninsula, Costa Rica. The samples are collected from a ridgetop location to measure the soil residence time on a high elevation, low relief surface, thought to be relict topography from a pulse of uplift during the Miocene. Profile samples were collected at 10cm depth intervals to refusal (saprolite interface) at ~70cm.

Visitor: Nicole West
Visit dates: June 20-28, 2018

Nicole West is an Assistant Professor at Central Michigan University. She visited the cosmogenic lab at UVM several times during her PhD and has come back twice as a faculty member.
I am a geomorphologist interested in how humans and climate shape landscapes. My current research projects include investigations of 1) how climate, aspect, vegetation, and weathering interactions influence hillslope form and processes in the desert southwest, 2) geomorphic controls on human settlement patterns in the Aleutian Islands, and 3) natural and historical variability in rivers, beavers, and climate in Yellowstone.

Visitor: Lyman Persico
Visit dates: July 16-20, 2018

We want to visit the CCF to learn more about the lab methods involved in CRN analyses. We are processing samples from our research in the southwest and are interested in comparing slope erosion histories using both CRN and OSL.
Determining the timing and rate of Southeastern Laurentide Ice Sheet thinning using $^{10}$Be dipsticks

University of Vermont

The thinning history of the Laurentide Ice Sheet during the last deglaciation is poorly constrained due to a lack of empirical data. To address this issue I am calculating $^{10}$Be exposure ages along vertical transects of mountains in the northeastern United States and southern Quebec and performing statistical analyses to determine the most likely timing and rate of ice thinning in each location (the ‘dipstick approach’).

Student: Christopher Halsted, PhD in Natural Resources
Graduating: Spring 2022

I am originally from the greater Boston area of Massachusetts but always loved exploring the mountains of northern New England. When not working I am either reading, cooking, or hightailing it to the mountains to ski, hike, and climb.
We plan to improve tectonic evolution, deglaciation, and erosion models of Southeast Alaska. We will use cosmogenic nuclide dating methods to determine the Pleistocene and Holocene glacial history of the Juneau Icefield. We also hope to use dating methods to determine if there is a lateral difference in Holocene deglaciation and erosion history across the icefield from maritime to continental regions.

Visitor: Annie Chien  
Visit dates: August 20-24, 2018

Annie is a recent graduate of Occidental College (’18), with a degree in geology. She is from Los Angeles, CA, and completed the Juneau Icefield Research Program in the summer of 2018. She came directly off the ice to travel to UVM for a week of sample preparation work.
Marine-based portions of the Antarctic ice sheets are susceptible to under-melting from the surrounding ocean, leading to sea level rise in the next few centuries. Cosmogenic exposure and radiocarbon chronologies of glacial sediments deposited during past glacial periods in McMurdo Sound provide useful insights into ice sheet dynamics and regional Antarctic contributions to sea level rise relevant to on-going global climate change.

Student: Andrew Christ, PhD in Earth and Environment
Graduating: Spring 2019

Drew is a Visiting Graduate Fellow at the University of Vermont and a PhD candidate from the Dept. of Earth & Environment at Boston University. He is currently writing his dissertation at UVM and continuing to learn lab methods in the cosmo lab.
We are quantifying $^{10}$Be in samples from southwest Greenland to estimate post-glacial isostatic uplift rates over thousands of years. Our results will allow us to generate an uplift curve for south Greenland, quantify how the landscape responded to ice retreat, assess the responsiveness of mantle flow, and study the relationships between surface Earth and deep Earth.

Student: Landon Williamson, B.S. in Geology
Graduating: Spring 2020

Landon is an undergraduate student at the University of Vermont. He has been working in the Cosmogenic Laboratory for the past year as an assistant and to do website design; this is his first independent project.
Reading and Lancaster Counties in Pennsylvania experience seismicity that has historically been absent in neighboring areas. In order to compare the seismic and aseismic regions, I will be looking at knickpoint elevations as a measure of crustal deformation, and at erosion rates (derived from alluvial samples for an upstream basin-average) below, within, and above the major knickpoints in two tributaries to the Susquehanna.

Visitor: Joshua Gonzales
Visit dates: September 11-October 11, 2018

Joshua Gonzales is an MS student visiting from Lehigh University. He is working with Dr. Frank Pazzaglia and Bookyo Sur, an undergraduate student at Lehigh. Joshua graduated with a BS in Geologic Sciences from Arizona State University in 2017.
Periglaciated basins as novel records of climate-modulated erosion

This project will study the erosional, depositional and ecological history of a structurally-controlled basin in central PA called Bear Meadows, which is a modern peat bog but bears topographic and sedimentological evidence of pre-Holocene cold-climate processes. We seek to analyze sediment for both erosion/burial rates and paleobiological evidence of past ecosystem and hydrologic conditions.

Visitor: Joanmarie Del Vecchio
Visit dates: September 10-20 and November 26-30, 2018

Joanmarie is a Ph.D. student with Roman DiBiase. It is her fourth year at Penn State. Her projects include periglacial geomorphology, geophysics in the critical zone, and waterfall morphology. She is seeking bike routes, hikes and rock climbing locales in Burlington.
In this student project, we examine the spatial distribution and characteristics of precipitation-induced landslides and compare them with catchment erosion rates in the eastern end of Himalaya. We expect erosion rates to potentially be greater than 1 mm/yr. Close inspection of how climate and tectonics influence landslide processes will offer insight into the mechanics of long-term landscape evolution in the region.

Visitor: Kevin Shao  
Visit dates: September 17-21 2018

I am a 1st year graduate student from the University of California Los Angeles studying under Professor Seulgi Moon. I was born and raised in New Jersey and am interested in studying geomorphology as well as how it applies to natural hazard mitigation.
We are an environmental science class at VTC looking at various ecosystems across the state of Vermont. Our scientific backgrounds are varied, with majors ranging from business to dairy farm management. Most of us signed up for the class to fulfil a degree requirement. Our visit to the CCF is an opportunity to learn how researchers determine the glacial history of VT, helping us better understand the modern day ecosystems.

**Group Tour**

**Visit date:** September 20 2018

**Names of Participants:**
Sophia Bourgeois
Jordan Camp
Jessica Chapman
Deibyoday Dey
Gabrielle Fenton
Louis Grove
Brendan Lahue
Cayden Theberge
Ross Lieblappen
Cross-pollination between cosmogenic nuclide sample preparation facilities

Friedhelm von Blanckenburg visited the Community Cosmogenic Facility on a trip to the northeastern US. He observed lab methods, met with faculty, students, and visitors, and exchanged ideas about running a lab with a visitor program.

Visitor: Friedhelm von Blanckenburg
Visit date: September 26, 2018

Friedhelm von Blanckenburg is a geomorphologist and geochemist who studies Earth surface processes primarily through isotopic analyses. He does cosmogenic nuclide work, and also uses isotopes of metals such as Li, Mg, Si, and Sr.
Reconstruction of relative sea level history in Finnmark, northernmost coastal Norway

Bates College and University Centre in Svalbard

As part of an interdisciplinary study of Holocene marine climate in Finnmark, my main contribution is to locate, survey and determine the age of postglacial beaches that are currently above sea level. These raised beaches are dated using radiocarbon on mollusk shells and cosmogenic $^{10}$Be on beach cobbles and boulders. The timing and nature of the postglacial sea level history provides critical information on the timing of ice sheet retreat.

Visitor: Mike Retelle
Visit dates: September 24-28 and November 12-16, 2018

Mike Retelle is a professor of Geology at Bates College, Maine and adjunct professor of Arctic Geology at the University Centre in Svalbard.
My introduction to research was via work in Remote Sensing as an undergraduate. Subsequent training and research centered around Physiology, Biophysics, and Neuroscience, with a major focus on chemical and electrical signaling mechanisms in the Basal Ganglia. I served as Associate Director of the NASA GESTAR Program from 2011 to 2016. My current interests include institutional leadership, sustainability and innovation.

Visitor: Joseph Whittaker
Visit dates: October 7-10, 2018

Dr. Joseph A. Whittaker is the Associate Provost/Associate Vice President for Academic Affairs at Jackson State University in Jackson, MS. In this capacity, he also has oversight for research and sponsored programs, federal relations, technology transfer and commercialization, and economic development.
I’m an ethnogeologist and geoscience-education researcher who is interested in better understanding how our connections to places and our diverse cultural identities influence the way we explore, study, learn about, and teach about the Earth system. I’m working with the Cosmolab and NSF as an external evaluator, applying ethnographic educational research and analysis to help the Lab’s principal investigator and team meet project goals.

Visitor: Steven Semken
Visit dates: October 7-10, 2018

I’m a professor of Geology and Education at ASU and I’m here at UVM to learn much as I can about how the Cosmolab serves its participants, the University, and the broader geoscience community. I’ll also present some of my work on place-based teaching.
Our research group studies ancient phases of mountain building and erosion to understand how tectonics, surface processes, and climate interact to influence the Earth’s dynamic mountain belts. Our research draw upon numerous methods in our research, including low-temperature thermochronology, provenance analysis, field mapping, geochronology, and structural reconstructions.

Visitor: Julie Fosdick
Visit dates: October 8-9, 2018

I am looking forward to visiting the UVM CCF to learn more about the state-of-the-art facility and its capabilities, interact with the lab’s research team, and discuss strategies for running successful community laboratory facilities and promoting inclusivity and diversity.
The Oldest Ice on Earth?

University of North Dakota, Vanderbilt University, and Berkeley Geochronology Center

We are studying a buried ice mass in Ong Valley in the Transantarctic Mountains, Antarctica. The ice has been suggested to be greater than 1.1 million years old, and some of Earth’s oldest ice. We are measuring cosmogenic nuclide concentration in both the ice and the above laying till to determine the age of the ice and rate at which it is sublimating.

Visitor: Marie Bergelin
Visit dates: October 8-26, 2018

Marie Bergelin is a Ph.D. student at University of North Dakota. She is originally from Copenhagen, Denmark and has been in the United States for the past 10 years. She is an active person and enjoys outdoor activities such as golf, running, biking, and swimming.
New Views on the Deglaciation of Mt. Mansfield, Vermont’s Highest Peak

Field trip of the New England Intercollegiate Geology Conference

This field trip investigated the deglaciation history and geomorphology of Mt. Mansfield and discussed new cosmogenic nuclide data from a collaborative project between University of Vermont, Boston College, and Bentley University. We examined deglaciation timing, ice thinning history, and erosional processes through the lens of both field evidence and isotopic data. As part of the field trip, a subset of the group came to the Community Cosmogenic Facility to see how samples are processed.

Group Tour

Visit date: October 12, 2018
Refining Methods for the Stanford Cosmogenic Radionuclide Facility

Stanford University

I am a thermochronologist interested in tectonic and glacial geomorphology. My last project used sediment cores drilled in the Gulf of Alaska to reconstruct exhumation rates and sediment routing in Southeastern Alaska from 10 Ma – 60 Ka. We were specifically interested in the efficacy of thermochronometry to record exhumation patterns in synorogenic sediment.

Visitor: Katie Dunn
Visit dates: October 15-19, 2018

I am the Earth Materials Lab Manager at Stanford’s School of Earth, Energy & Environmental Sciences. PhD student, Aaron Steelquist, and I look forward to observing the procedures at UVM to help us update the methods we use at Stanford.
Constraining San Juan River incision rates using 10Be and 36Cl

One chapter of my PhD dissertation is focused on fluvial deposits which currently sit 32 meters above the modern San Juan River near Mexican Hat, Utah. Our goal is to constrain the <1 million year incision rates for the San Juan River to further our understanding of how the Colorado River basin may be affected by the incision of the Grand Canyon.

Visitor: Aaron Steelquist
Visit dates: October 15-19, 2018

Aaron and Stanford Earth Materials Lab Manager Katie Dunn will be coming to learn processing protocols as they exist at Vermont and compare to current operating procedures at the Stanford Cosmogenic Radionuclide Target Prep facility.
Collecting Compositional Data for a variety of International Samples from Oberlin College

We are a team of students from Oberlin College visiting the lab in order to gather compositional data using UVM’s new XRF. We’re running samples from China, Dominica, Cuba, Ohio and Puerto Rico, in addition to the grain coatings of some of these samples suspended in neutralized salts (site photo from Cuba). The exciting challenge of the week will be discovering if the XRF is able to accurately process the composition of those salts.

Visitors: Monica Dix, Ely Bordt, Amelia Lewis
Visit dates: October 22-26, 2018

Amelia is a second-year student and Monica and Ely and third-year students at Oberlin College. We are all Geology majors working under Dr. Amanda Schmidt, with research backgrounds in geomorphology and geochemistry.
Traditionally, cycles in the stratigraphic record are interpreted as the result of large-scale forces, like climate change. However, recent studies have shown that smaller-scale fluvial and hillslope processes can dominate stratigraphy. We are using cosmogenic nuclides to date and determine paleo-erosion rates for cyclical sediments exposed in the northern Apennines, Italy to determine whether the cycles are tied to Pleistocene glaciations.

Visitor: Katrina Gelwick
Visit dates: January 21-25, 2019

Katrina is a second year MS student at Lehigh University, studying with Dr. Frank Pazzaglia. This is her second visit to the UVM Cosmo Lab and this time it’s with her own samples. The Maine native is happy to be back and is enjoying “real” winter.
I am processing samples collected from different drainage basins, close to the San Andreas fault, in the San Bernardino Mountains in California. By obtaining erosion rates from these samples I will be able to compare them to previous studies done nearby in order to better understand how the San Bernardino Mountains are forming in relation to tectonic activity and river incision.

Visitor: Marina Argueta
Visit dates: February 11-15, 2019

I am from Torrance, California and graduated from the University of California Los Angeles with a Bachelor of Science in Geology. I am currently working as a lab assistant in both the cosmogenic and the optically stimulated luminescence labs at UCLA.
We are working in two landscapes, the Klamath Mountains in northern California (above) and the Nicoya Peninsula of Costa Rica (below). Tectonic processes are thought to engender transient denudation rates at both sites. We hope to capture the complex responses of chemical erosion to changing patterns of physical erosion using $^{10}$Be, geochemical mass balance, topographic analysis, and regolith formation modeling.

Visitor: Miles Reed
Visit dates: April 1- May 10, 2019
I am a 1st-year PhD student with Dr. Nicole West at Central Michigan University. I studied erosion on mountaintop removal/valley fill landscapes at West Virginia University for my master’s degree. I enjoy watching European soccer, hiking, and chilling with my cats.
The Fortymile River flows from eastern Alaska to the Yukon River in Canada. Deeply incised strath terraces flank the lower Fortymile and records landscape-altering bedrock incision that sequestered gold-bearing river gravels hundreds of m above the modern channel. Cosmogenic techniques allow us to test base-level lowering mechanisms, determine terrace abandonment timing, and quantify subsequent incision.

Visitor: Adrian Bender
Visit dates: April 8-12, 2019

I’ll be visiting UVM from Anchorage, Alaska, where I work for the U.S. Geological Survey on projects that utilize cosmogenic nuclide techniques to quantify geomorphic processes related to active tectonics or, in this case, coevolution of landscapes and placer gold.
Expanding our knowledge about quartz purification and $^{10}\text{Be}$ and $^{26}\text{Al}$ extraction

Aarhus University, Denmark

The Aarhus Cosmogenic Nuclide Group specializes in pairing cosmogenic nuclide analyses with computational modelling to resolve questions related to (1) the history of ice sheets, (2) erosional processes under glaciers and ice sheets, and (3) desert landscape processes. Our field sites include mainly Scandinavia and Greenland.

Visitors: Birte Lindahl Eriksen and Rikke Brok Jensen
Visit dates: May 6-10, 2019

We are laboratory technicians at Department of Geoscience, Aarhus University, and work with all processes in purifying quartz as well as the column chemistry and packing the targets for the AMS. We are interested in optimizing our laboratory procedures.
I am a 2nd year PhD candidate working with Arjun Heimsath in the Sky Island topography of southeast Arizona. We are using a combination of cosmogenic radionuclide, paleoclimate, and paleomagnetism techniques to constrain the timing and rates of landscape evolution following Basin and Range tectonics.

Visitor: Lorraine Carnes
Visit dates: May 6-10, 2019

I process samples in the ASU cosmogenic lab, but I’m interested in a formal lab training experience. I want to learn the latest cosmogenic lab procedures to implement at ASU, as well as learn how to effectively teach new lab users the protocol.
Geological analysis of the impact of glaciation in western Pennsylvania

Lehigh University

We are working in two primary locations: The Slippery Rock Gorge in Butler County and the Carmichaels deposits in Fayette County. We are analyzing these glacially created formations to determine their absolute age as well as a rate of formation. From this we will be able to determine if they were formed quickly over the course of one glaciation, or incrementally over multiple glacial cycles. This work is important in understanding the glacial and drainage evolutions of a large area of Western Pennsylvania. This is a student project that I am working on with the advising of Frank Pazzaglia.

Visitor: Mike Simoneau
Visit dates: May 13-17, 2019

My name is Mike Simoneau and I am a junior year Environmental Science major at Lehigh University in Bethlehem PA. I was born here in Bethlehem and have lived in the area my whole life. Next year I will be working on my senior thesis based on the results of this project.
I will be quantifying in situ and meteoric $^{10}\text{Be}$ in river sediments collected from two watersheds in Puerto Rico (Guabá and Icacos) following Hurricane Maria in 2017. By analyzing $^{10}\text{Be}$, I will quantify the effect of episodic events on the use of cosmogenic nuclides in sediments as an erosion monitor. This study is important for understanding the effects large storms like Hurricane Maria have on erosion.

Visitor: Alexandra Grande
Visit dates: June 26- August 9, 2019

I’m a rising, fourth-year undergraduate student at Oberlin College, and I’m very excited about this project! I have previously worked on a similar project, using different fallout radionuclides to determine the effects of deforestation on erosion in southwestern China.
I am an undergraduate student studying relict landforms associated with recurrent cold-climate conditions during Pleistocene glacial episodes in northern Pennsylvania. I am observing boulder fields and analyzing cosmogenic nuclides produced in the near surface. In discerning mechanisms and processes for formation as well as constraining an “exposure age” for these boulders, I will be evaluating the impact of cold-climate conditions, primarily those associated with permafrost, on landscapes in the mid-Atlantic.

Visitor: John Ruck
Visit dates: July 1-5, 2019

My name is John Ruck, and I am very much looking forward to visiting UVM’s cosmogenic facility and meeting members of the laboratory. I am a rising senior at Franklin and Marshall College studying Geoscience and Business.
Determining the exposure age of glacial moraines in Ong Valley, Antarctica

The goal of this project is to determine the exposure age of two glacial moraines in Ong Valley, Antarctica. Our data can tell us how the Argosy Glacier has changed over time, and the ages of these moraines themselves will help constrain the age of buried glacial ice in the Valley. We estimate that our samples will be on the order of 1-2 million years old.

Visitor: Emma Rimmer
Visit dates: July 28- August 3, 2019

Emma Rimmer is a rising senior at Vanderbilt University, and is double majoring in Environmental Sociology and Earth & Environmental Science. From Jupiter, Florida, Emma is interested in research that deepens our understanding of Earth’s climate and its impact.
I am an undergraduate student studying relict landforms associated with recurrent cold-climate conditions during Pleistocene glacial episodes in northern Pennsylvania. I am observing boulder fields and gelifluction lobes and analyzing accumulation of cosmogenic nuclides produced in near surface material. In discerning mechanisms and processes for formation as well as constraining an exposure or burial “age” for these boulders, I will be evaluating the impact of cold-climate conditions, primarily those associated with permafrost, on similar landscapes in the mid-Atlantic.

Visitor: Nic Hertzler
Visit dates: August 19-23, 2019

My name is Nic Hertzler, and I’m a senior at Franklin & Marshall College majoring in Geoscience and minoring in Film Studies. I was born and raised in Lancaster, Pennsylvania. I’m looking forward to meeting new people and seeing the cosmo lab!
We are investigating the glacial history of the Juneau Icefield in Alaska. Questions we seek to answer are 1) How much larger was the Juneau Icefield during the Last Glacial Maximum 2) How quickly did the icefield shrink during the deglaciation?, 3) How was the Little Ice Age expressed at the Juneau Icefield?, and 4) Is the current configuration of the Juneau Icefield unprecedented during the Holocene?

Visitor: Allie Balter
Visit dates: August 19-23, 2019

Allie Balter is a PhD student at the Lamont-Doherty Earth Observatory of Columbia University. She studies how glaciers and ice sheets in Antarctica, Greenland, and North America have responded to past climate change.
I am analyzing surficial rock samples taken from the Juneau Icefield, AK, for cosmogenic nuclide concentrations. These concentrations will provide estimates of how long ago the rocks were covered by glaciers, helping to constrain the glaciation history and thinning rates of this area. These samples were taken as part of the Juneau Icefield Research Program, a two month glacier science field camp in SE Alaska, in the summer of 2019.

Visitor: Jacquelyn Bellefontaine
Visit dates: August 19-23, 2019

My name is Jacquelyn Bellefontaine and I am an undergraduate at the University of Maine, studying Earth and Climate Sciences. I was part of the Juneau Icefield Research Program 2019 field season, where I collected rock samples for surface exposure dating.
I am analyzing surficial rock samples taken from the Juneau Icefield, AK, for cosmogenic nuclide concentrations. These concentrations will provide estimates of how long ago the rocks were covered by glaciers, helping to constrain the glaciation history and thinning rates of this area. These samples were taken as part of the Juneau Icefield Research Program, a two month glacier science field camp in SE Alaska, in the summer of 2019.

Visitor: Julia Brazo
Visit dates: August 19-23, 2019

My name is Julia Brazo and I am a recent graduate of the State University of New York at Geneseo. I received a Bachelor of Arts in Physics and a Bachelor of Arts in Mathematics with minors in Environmental Studies and Geography. I was part of the Juneau Icefield Research Program 2019 field season.
I am analyzing surficial rock samples taken from the Juneau Icefield, AK, for cosmogenic nuclide concentrations. These concentrations will provide estimates of how long ago the rocks were covered by glaciers, helping to constrain the glaciation history and thinning rates of this area. These samples were taken as part of the Juneau Icefield Research Program, a two month glacier science field camp in SE Alaska, in the summer of 2019.

Visitor: Eve Cinquino
Visit dates: August 19-23, 2019

My name is Eve Cinquino and I am a recent graduate of Bates College, with a BS in physics. I was part of the Juneau Icefield Research Program 2019 field season, where I collected rock samples for surface exposure dating.
I am analyzing surficial rock samples taken from the Juneau Icefield, AK, for cosmogenic nuclide concentrations. These concentrations will provide estimates of how long ago the rocks were covered by glaciers, helping to constrain the glaciation history and thinning rates of this area. These samples were taken as part of the Juneau Icefield Research Program, a two month glacier science field camp in SE Alaska, in the summer of 2019.

Visitor: Colby Rand
Visit dates: August 19-23, 2019

My name is Colby Rand and I am an undergraduate at the University of Maine, studying Earth and Climate Sciences. I was part of the Juneau Icefield Research Program 2019 field season, where I collected rock samples for surface exposure dating.
Late Glacial to Holocene Sea Level History of Kapp Linné, Svalbard, Norwegian High Arctic

This study will describe the relative sea level in Kapp Linné during the Holocene, located on the western coast of Svalbard. Major ice sheets have covered Svalbard and evidence from the last major ice age as well as shifts in the regional sea level can be observed throughout the landscape. The sea level reconstruction will be developed through the assessment of marine terraces and raised beaches using radiometric dating.

Visitor: Hannah Johnson
Visit dates: August 26-30, 2019

My name is Hannah Johnson I am a rising senior at Bates College and from Brewster Massachusetts. I am a geology major with a minor in anthropology. I am very excited for this opportunity to be working in the cosmogenic lab and starting my thesis!
Using cosmogenic nuclides in ice-rafted debris to constrain the ice dynamics of Heinrich events

To better understand the ice dynamics associated with Heinrich events – periodic discharges of iceberg armadas expelled from the Laurentide Ice Sheet during the last glacial period – we are measuring cosmogenic nuclides in North Atlantic ice-rafted debris. Because ice-rafted sediments were entrained beneath the Laurentide prior to iceberg discharge, measurement results will suggest a subglacial exposure and erosion history.

Visitor: Danielle LeBlanc
Visit dates: August 25-30 and October 21-25, 2019

Danielle is a master’s student at Boston College studying past climates and ice sheets. Before attending BC, she studied petroleum engineering at Louisiana State University and worked briefly as an environmental engineer.
The aim of this study is to reconstruct the postglacial relative sea level history of Kapp Linné, located on the western coast of Svalbard (Norwegian high Arctic). The sea level reconstruction will be developed utilizing raised marine shorelines whose ages are determined using radiocarbon analysis on bivalve shells and cosmogenic exposure ages on boulders.

Visitor: Mike Retelle
Visit dates: September 30- October 4, 2019

I’m a geology professor at Bates College and an adjunct professor position in the Arctic Geology Department at the University Centre in Svalbard. My main interests are in Quaternary geology and Paleoclimate in the North Atlantic region and New England.
Marc is the director of the Purdue Rare Isotope Measurement (PRIME) Laboratory, where many of the 10Be and 26Al samples from the Community Cosmogenic Facility are analyzed. In addition to running the lab, his work involves applying a diverse array of radioactive and stable isotopes to understanding the dynamic surfaces of Earth and other planets. He collaborates on a broad range of projects with PRIME Lab users.

Visitor: Marc Caffee
Visit dates: September 30- October 1, 2019
Marc will be visiting the Community Cosmogenic Facility to see the lab, spend time with other visitors, and give a talk in the Geology department seminar series.
This project uses cosmogenic and OSL dating techniques plus field mapping to better understand potential megaflood sources in the Pioneer Mountains. Evidence for the Big Lost River Flood(s) is recognized 100km downstream, but little evidence links it to a specific source area. This work will yield the first systematic ages from moraine sequences in the Pioneers.

Visitor: Braedon Warner
Visit dates: October 7-18, 2019
Braedon is an MS student from Idaho State University studying under Dr. Glenn Thackray. He grew up in Idaho and has seen his fair share of the Rockies—backpacking, climbing, and hunting.
I use $^{10}\text{Be}$ and $^{26}\text{Al}$ to understand Earth surface processes, landscape evolution, and the behavior of the climate system on millennial to million-year time scale. My current interest is improving the extraction methods to measure low-level samples. I am revisiting the preparation method of carrier solution from deeply-mined minerals.

Visitor: Atsunori Nakamura
Visit dates: October 7-11, 2019

I am a researcher at Geological Survey of Japan. I look forward to learning the procedure at UVM to update the methods used at cosmogenic facilities in Japan.
Study of the past fluctuations of the Greenland Ice Sheet through the Pleistocene

Centre for Petrographic and Geochemical Research (France)

This project aims to better constrain the past fluctuations of the Greenland Ice Sheet through the Pleistocene. Samples come from the bottom of a Greenland ice core; measurements of meteoric $^{10}$Be will help us to understand the origin and age of the sediment found there.

Visitor: Marie Protin
Visit dates: October 21-30, 2019

I am a French post doctorate. I did my PhD in France during which I worked on glacial fluctuations during the Holocene in the French Alps using in situ $^{10}$Be and $^{14}$C on boulders and bedrock. I just start my post doc, working this time on meteoric $^{10}$Be.
I am an undergraduate student studying relict landforms associated with recurrent cold-climate conditions during Pleistocene glacial episodes in northern Pennsylvania. I am observing boulder fields and gelifluction lobes and analyzing accumulation of cosmogenic nuclides produced in near surface material. In discerning mechanisms and processes for formation as well as constraining an exposure or burial “age” for these boulders, I will be evaluating the impact of cold-climate conditions, primarily those associated with permafrost, on similar landscapes in the mid-Atlantic.

Visitor: Nic Hertzler
Visit dates: January 6-10, 2020

My name is Nic Hertzler, and I’m a senior at Franklin & Marshall College majoring in Geoscience and minoring in Film Studies. I was born and raised in Lancaster, Pennsylvania. I’m looking forward to meeting new people and seeing the cosmo lab!
This project seeks to explain the origin of the Carmichaels Formation in Western Pennsylvania. By dating river terraces, we hope to develop an explanation of how this unit was deposited atop terraces. We are expecting to find that the terraces have formed in the most recent glacial-interglacial cycle, with terrace ages increasing further downstream and at higher elevations, with ages ranging from 1.5 Ma to 500 ka. The dates of these terraces will also be used to further constrain Glacial Isostatic Adjustment in the area.

Visitor: Ethan Kurak
Visit dates: January 6-10 and May 4-8, 2020

Ethan Kurak is a first year MS student studying Geomorphology at Lehigh University. He graduated from the University of Minnesota with a BS in Earth Science in 2018. He hopes to uncover the story of past landscape evolution using rivers and their geomorphic expression in the landscape.
Periglaciated basins as novel records of climate-modulated erosion

Periglaciated basins as novel records of climate-modulated erosion

This project will study the erosional, depositional and ecological history of a structurally-controlled basin in central PA called Bear Meadows, which is a modern peat bog but bears topographic and sedimentological evidence of pre-Holocene cold-climate processes. We seek to analyze sediment for both erosion/burial rates and paleobiological evidence of past ecosystem and hydrologic conditions.

Visitor: Joanmarie Del Vecchio
Visit dates: January 13-17, 2020

Joanmarie is a Ph.D. student with Roman DiBiase. Her projects include periglacial geomorphology, geophysics in the critical zone, and waterfall morphology. She is seeking bike routes, hikes and rock climbing locales in Burlington.
Using cosmogenic nuclides in ice-rafted debris to constrain the ice dynamics of Heinrich events

To better understand the ice dynamics associated with Heinrich events – periodic discharges of iceberg armadas expelled from the Laurentide Ice Sheet during the last glacial period – we are measuring cosmogenic nuclides in North Atlantic ice-rafted debris. Because ice-rafted sediments were entrained beneath the Laurentide prior to iceberg discharge, measurement results will suggest a subglacial exposure and erosion history.

Visitor: Danielle LeBlanc
Visit dates: February 10-14, 2020

Danielle is a master’s student at Boston College studying past climates and ice sheets. Before attending BC, she studied petroleum engineering at Louisiana State University and worked briefly as an environmental engineer.