



The Geology Department hopes you had a great summer. Here are updates from the Geology faculty and their research over the summer. Please send Diane photo's and a summary of your adventures to share with the department.

Update from Tekla Harms: Greg Call interns...



For six weeks in June and July, Joy Johnson '25 and Lucia Venegas '24 worked as Greg Call interns with Tekla on a project to transfer an instructional CD covering the methods of structural geology to an open-access,

interactive, web-site. During the project they learned html and Photoshop (not to mention some structural geology) and got to use Apple computers that are older than they are (see the images of the white computers next to the slick, new PC's that Nick lent the project).



...to Montana field work:

Kaetu Wleh '24E and Ruth Zuraw '25 experienced a week of field work in Montana as Tekla's field assistants. It was hot, and they traversed over a good deal of marble – but in the end we discovered kyanite! The image shows just how blue it is. They were also responsible for obtaining several geochronology samples of amphibolite and schist. As you can see from the photo – this required them to swing a sledge hammer in the hot sun. What fun!



Update from Victor Guevara:



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Victor has been enjoying the first few months of his sabbatical so far, having already been on an array of geoscience-related adventures this past summer. This included: 1) meeting with a collaborator and giving a research talk at University of Oxford, followed by a 10 days of vacation in Scotland - some



highlights included hiking up to see the type locality of mylonite, where it was first realized by early Scottish geologists that earth's crust could be transported laterally along reverse faults, as well as seeing many well-exposed glacially-sculpted landscape features (see photo for roche moutonee from the hanging wall of the aforementioned reverse fault), 2) meeting with collaborators in Miami, Florida, to work on an NSF-funded modelling project on how subduction zones form and evolve, and 3) travelling to Penn State University to shoot a laser at minerals in thin sections of metamorphic rocks to date when they grew, and measure their trace element chemical compositions in order to tie their timing of growth to the depths and temperatures at which they formed (see photo for a picture of the mass spectrometry lab at Penn State).

When not travelling, Victor was working with James Maeder '23 and Cameron Mueller-Harder '23 on the brand new scanning electron microscope (SEM), which they used to measure the chemical compositions of minerals in Iron-Oxide-Apatite deposits from New Jersey. The work that Cameron and James undertook this summer (and are continuing to pursue throughout the semester) is part of a collaborative NSF-funded project that aims to understand how and why iron and rare earth elements become concentrated in earth's crust during mountain building events. Cameron and James also submitted an abstract to present their research at the Geological Society of America Meeting in October, which they are quite excited about (ask them about it!).



Update from Dave Jones:



Clara Danhof '25, Hugh LemmonKishi '24, and May Takiguchi '25 worked on projects in my geochemistry lab as part of the SURF and Call intern programs. They tested hypotheses relating sediment burial to climate change in the Miocene, and investigated the potential relationships between the eruption of large igneous provinces and global warming in the geologic past. Along the way they gained skills in R programming, crushing and dissolving rocks, and analyzing elemental and isotopic abundance on the lab's new isotope ratio mass spectrometer. They were part of the Beneski summer research community and the larger Amherst SURF summer community. Here is a lab group photo, illustrating the connection between geochemistry (represented by the centrifuge tubes) and climates of the past (represented by the Pleistocene megafauna fossils).



From left: May Takiguchi '25, Hugh LemmonKishi '24, Wally Jones, Dave Jones, Margo Jones, and Clara Danhof '25



Update from Rachel Bernard:



Above from left: Claire Jensen '24, Isabelle Caban '23 and Rachel Bernard



Rachel's summer was bracketed by two awesome conferences. The first, the "Structural Geology and Tectonics Forum", was held at Bowdoin College and included several field trips in Maine led by experts studying the local geology. The second was one Rachel co-organized called "The Second National Conference: Justice in Geoscience", which brought together people from many disciplines (from social science to geology to ocean sciences to humanities) to explore how the field of geoscience can better serve our diverse society. Claire Jensen '24 and Isabelle Caban '23 played a key role in the conference as facilitators. Claire, Isabelle, and Rachel got to celebrate the success of the conference (held at the American Geophysical Union headquarters in Washington, DC) by attending a gala at the Smithsonian National Museum of Natural History. Fancy!

Update from Anna Martini:



Shay Hernandez '23, Ethan Ruderman '25 and Roxanne Main '25 worked in (and outside) on geochemistry projects both local and remote. The summer started with getting ready for a **23 HOUR** road trip to Biscayne Bay, Florida. Along with colleagues from Wesleyan University we cored and took pore waters from multiple sites covering both restored and undisturbed seagrass and mangrove environments. This project was the centerpiece of Shay's and Ethan's summer work, and will be continued as part of Shay's thesis work this coming year!



From left: Braden (Wesleyan '23), Shay '23, Brittany (Wesleyan '23), Ethan '25, and Roxanne '25



In the "Field" Lab: Brittany (Wesleyan '23), Roxanne '25 & Shay '23

Once we were back at Amherst, we started another project looking at a town's sewage pipe (see picture), emplaced in 1914 and perhaps in need of a replacement, that *may* have contributed to an increase in *E. coli* counts in the Fort River. These high counts have led to a ban on swimming at a popular site. Data from this work is being presented to the town, and various techniques to remediate the site are being explored.



Update from Nick Holschuh:

Nick spent the summer thinking about glaciers with a range of Amherst scholars, including current students participating in the SURF and Gregory Call Internship programs (Sophia Price '25, Ruth Zuraw '25, and Fiona Anstey '24, pictured below) and recent alumnae Caroline Needell ('22) and Ellen Mutter ('17), who have been working to support Nick's external research. While folks in his lab spent most of their time analyzing geophysical data using Python, they also got the chance to deploy geophysical instruments locally in an effort to better understand our own campus.



From left to right: Sophia Price, Fiona Anstey, Ruth Zuraw, instrumenting the Book & Plow

Over the summer, Nick and his students made progress on a range of projects spanning North America, Greenland, and Antarctica, contributing to ongoing efforts to find and collect Earth's oldest ice (something Nick will be working on in Antarctica during the 2023-24 Academic year). Research highlights include --

- **Ruth Zuraw:** Identified and described entrained debris in Petermann Glacier using radar data, finding indications of widespread basal freeze-on and deformation in the ice column.
- **Sophia Price:** Modeled the subglacial hydrology of Whillans Ice Stream to estimate the likelihood of ice-flow reactivation.
- **Fiona Anstey:** Quantified the form and orientation of postglacial features across North America to better understand the drumlin formation process.
- **Ellen Mutter:** Compiled and analyzed radar data at all historical ice core sites to inform future ice core site selection efforts. [See her work at AGU!]
- **Caroline Needell:** Deconstructed the retreat, stabilization, and regrowth of Crane Glacier to better understand mechanisms for ice loss in Antarctica. [See her work at AGU, and with any luck, soon published in Geophysical Research Letters]