



**Department of Earth and Space Sciences**



**International Geology Field Study of Iceland**  
**Summer 2025**





**Field Trip Leaders: Dr. Daria Nikitina; Dr. Ólafur Jón Arnbjörnsson**  
**Co-leader: Dr. Howell Bosbyshell**



## Trip participants:



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Anastasia Kelly Joshua Lantieri Aidan Mountain Lilah Rathman



Steven Sansone Mirna Torres Ayala Jacob Weinberger Katie Winward

## Preface

In July 2025 a group of twelve West Chester University Earth Science students travel to Iceland as part of 'International Geology Field Studies' course (ESS 448/548). The trip was led by Dr. Daria Nikitina in collaboration with Dr. Ólafur Jón Arnbjörnsson, a colleague and founder of GeoCamp Iceland, rooted *in the Reykjanes UNESCO Global Geopark* and Dr. Bosbyshell, the Chair of the Department of Earth and Space Sciences at WCU. The main goal of the trip was to explore Icelandic landscape as natural classroom to learn about its tectonic evolution, volcanism, active and former glaciation, impact of climate change, sustainable development and cultural heritage of the country. We covered a lot of ground (see the map in the end of this booklet) visiting many places of geologic interest along the Golden Circle, Southern Iceland, Snæfellsnes peninsula, Highlands, and Vestmannaeyjar, but by far we spent most time on Reykjanes peninsula where at the southwestern tip of Iceland Mid-Atlantic Ridge emerges from the ocean and marks the boundary between the North American and Eurasian plate. This part of Iceland is currently experiencing repeated volcanic activity that started on March 19, 2021, with eruption of Fagradalsfjall fissure. On July 16, on the last day of our trip we were lucky to witness the most recent eruption along the Sundhnúkur crater row.

What we saw and what we learned during our 14-day trip to Iceland were summarized in daily Blog and reflected in students' research papers. See some highlights of our field-based learning below.

Happy readings,

Dr. Nikitina



Professor of Geology at West Chester University of Pennsylvania

### Acknowledgement:

This trip would not be possible without a generous support from Mather Research Fund.



## Geological and Cultural History of Iceland

*Kelly Edmunds*

Iceland is a unique and valuable site for the study of the Earth's tectonic processes... (it) is one of the only major landmasses where a divergent oceanic plate boundary is exposed above sea level, making it possible to observe plate tectonics, rift propagation, and crustal deformation in real time...

*Kathleen Winward*

The island of Iceland is constructed from raised oceanic basalt plateau along the Mid-Atlantic Ridge following the divergence of the Eurasian and the North American plate (Fig. 1) ...

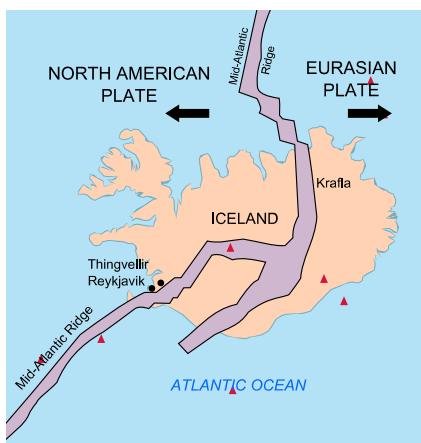


Fig. 1. Iceland Mid-Atlantic Ridge.

<http://pubs.usgs.gov/gip/dynamic/understanding.html>

*Kelly Edmunds*

The Mid-Atlantic Ridge enters Iceland from the southwest via the Reykjanes

Ridge and departs in the northeast via the Kolbeinsey Ridge (Fig. 2) ...

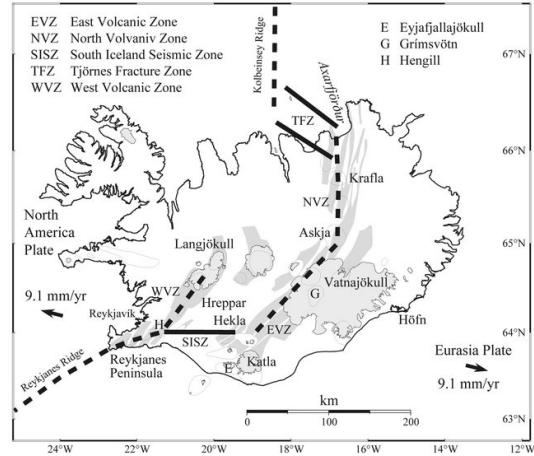


Fig. 2. Map of Tectonic and Volcanic zones.

What makes Iceland particularly important ... is a mantle plume, often called the Iceland hotspot, that interacts dynamically with the rift (Sigmundsson & Sæmundsson, 2008) (Fig. 3) ...

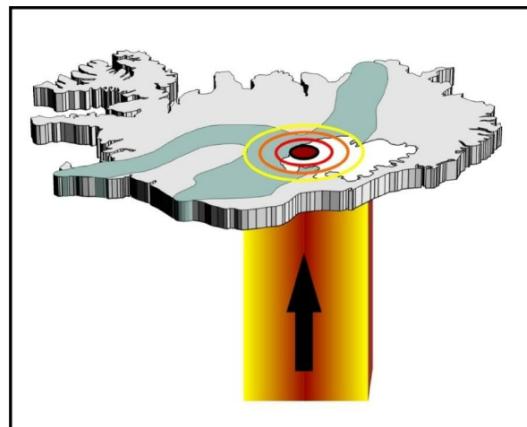


Fig. 3. Iceland Hot Spot Model. Andrew, 2008

Iceland's crust is exceptionally thick for an oceanic lithosphere, extending more than 40 km beneath central areas (Allen et al., 2002) ... due to long-term magmatic intrusion and crustal accretion related to the Iceland hotspot...

This plume is accountable for asymmetric spreading and regional uplift over the plate boundary zone. ... a rate estimated between 18 to 22 mm/year or 2 cm/year ... as a result of the combined influence of lithospheric extension and buoyant upwelling from the Iceland hotspot... the plate boundary in Iceland is manifested as a wide deformation zone, reaching up to 150 km in width (Einarsson, 2008) ...

The main rift zones in Iceland, absorb the extensional forces due to plate divergence by faulting and stretching of the crust...

In contrast to normal narrow mid-ocean ridges, the Icelandic plate boundary comprises several rift zones and fracture zones that migrate with time (Fig.4).

The rift zones are segmented by transform fault systems, most prominently the South Iceland Seismic Zone (SISZ) and Tjörnes Fracture Zone (TFZ). The SISZ is an active left-lateral strike-slip zone that connects the West Rift Zone (WRZ) and East Rift Zone (ERZ) and is recurrently devastated by high-magnitude earthquakes...

Iceland's tectonic evolution comprises periods of rift propagation and relocation. This is indicated by the existence of extinct rift segments like the Snæfellsnes Rift (SN on Fig. 4) ...

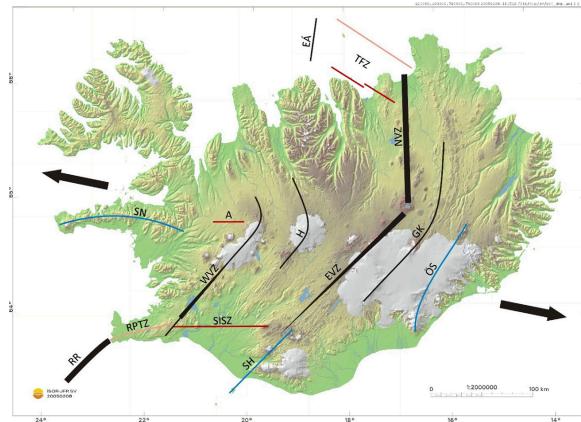


Fig. 4. Main tectonic elements of Iceland: spreading zones (black) and non-volcanic fracture zones (red). (Sæmundsson et al. 2020)

The Hreppar microplate, a slowly rotating tectonic block, exists between the WRZ and ERZ. ... microplate processes ... control rift development (Fig. 2).

The block is thought to rotate counterclockwise due to various extension rates on its borders, which (causes) the intricate stress regime over the SISZ (Einarsson, 2008).

Iceland's above-sea-level position provides a platform for accurate measurements and surface observations of tectonic processes otherwise obscured beneath oceanic basins.

Its changing geometry of rift zones, the existence of a rotating microplate, and the broad deformation zones observed throughout the island are indicators of dynamic processes in the lithosphere and asthenosphere.

Iceland is not just a geologic anomaly; it is an important template for examining

fundamental Earth processes in an active rift setting. ...therefore (it) serves as a model for lithospheric extension, crustal generation, and how mantle plumes modify tectonic boundary systems worldwide.

*Kathleen Winward*

Iceland has 31 volcanic systems, both active and inactive, and many are currently found beneath glacial ice, including one of its most active volcanoes, Katla (Fig. 5).

Iceland continues to experience growth through the divergence of the two plates and will also continue to experience various types of volcanism due to plume volcanism (Thordarson & Larsen, 2007).

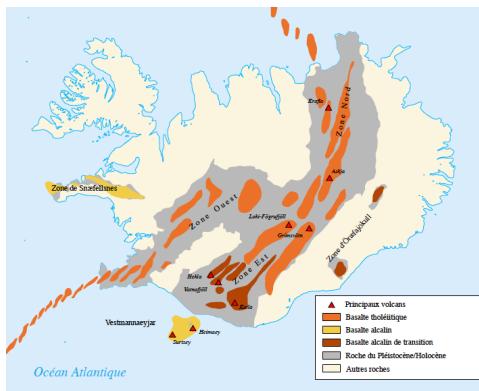


Fig. 5. Volcanic System of Iceland,  
[https://en.wikipedia.org/wiki/Volcanism\\_of\\_Iceland](https://en.wikipedia.org/wiki/Volcanism_of_Iceland)

*Paul Butera*

Iceland ... is home to a variety of volcanic formations, including stratovolcanoes, shield volcanoes, and fissure volcanoes. Iceland's unique position atop the divergent boundary of the North American

and Eurasian tectonic plates, as well as a mantle plume known as the Iceland hotspot, makes it one of the most volcanically active regions in the world (Thordarson & Larsen, 2007).

*Josh Lantieri*

Since Iceland is on top of a hot spot, fissure eruptions are a frequent occurrence.

Part of the Eastern Volcanic Zone... is the Grímsvötn volcanic system with the Laki fissure (Lakagígar), which trends SW-NE directionally along the southern part of the island. In 1783, the fissure erupted in a major event (Figs.2 and 6) ... It erupted for 8 full months (Thordarson & Self, 2003).

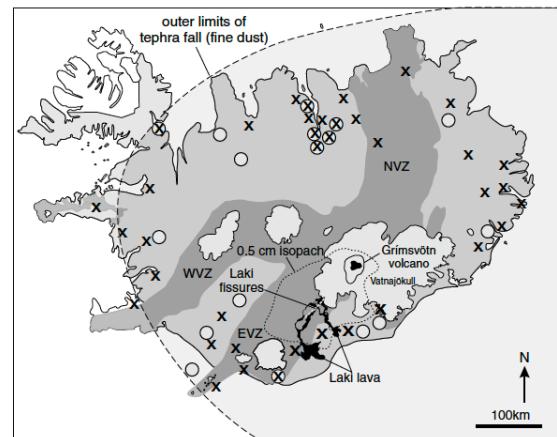


Fig. 6. Geologic setting of Laki fissure  
(Thordarson & Self, 2003)

The topography of (the southern part) of the island... was drastically changed because of the sheer volume of material that was produced and the volume of land that it covered.

...around 15 cubic kilometers (nearly 42 billion tons) of basaltic magma was produced from a 27 km (~17 miles) long crack. Intermittently, explosive eruptions occurred where large amounts of gas and tephra ash were produced.

After the explosive eruptions, the magma spread across the island in a pāhoehoe style flow. It covered about 500–600 square kilometers, or about 350 square miles of land. Valleys, streams, and low hills were covered by a flat, decollate plane of cooled magma. The magma flows also disrupted, diverted, or fully covered some rivers ... the Skaftá and Hverfisfljót rivers. The magma flows also covered large swaths of fertile soil and farmland...

Nearly 120 metric tons of sulfur dioxide gas were released, along with significant amounts of hydrogen chloride and hydrogen fluoride (*Highwood & Stevenson, 2003*) ... causing acid rain, which got into the freshwater systems and plants. It also contaminated the hay and grass that Icelandic livestock fed on and thus caused a major episode of acute ... fluoride poisoning (causing) major damage to teeth, bones, and internal organs. More than half of Iceland's cattle, horses, and sheep died because of it. Entire food webs were disrupted or destroyed due to the fatality of these animals, paired with natural grazing land being destroyed. Though no human deaths were related to the eruptions themselves, the ecological disruption

caused a major famine in Iceland. This famine led to nearly ten thousand deaths, which was about a quarter of the total population at the time.

The sulfur dioxide combined with atmospheric moisture to form sulfuric acid aerosols spread widely through the northern hemisphere. The aerosols blocked out some sunlight and dimmed the sky slightly. This was witnessed by European observers who nicknamed it the "Laki Haze." Along with the dimmed sunlight came temperature drops in Europe... by 1-3 degrees C, or 1.8-5.4 degrees F (*Thordarson & Self, 2003*). It also brought on longer and harsher winters. The ashy fog brought on a subtle but notable increase in reports of coughing, chest pains, eye irritation, and even fatalities from respiratory illness (*Grattan & Torrence, 2010*). Similarly to Iceland, the sharp increase in chemicals in the air resulted in crop failure, which led to some famines. (Some) historians link the Laki fissure eruption to the major French famine that sparked the French Revolution. The revolution started in 1789, just 6 years after the eruption started.

*Paul Butera*

While most Icelandic volcanoes are basaltic and associated with fissure eruptions, the presence of stratovolcanoes is linked to localized crustal processes and variations in magma composition.

Stratovolcanoes in Iceland pose several hazards, including explosive eruptions, ash fall, pyroclastic flows, and glacial outburst floods (jökulhlaups).

Two of Iceland's most well-known stratovolcanoes are Hekla and Eyjafjallajökull (Fig. 7 and 8).



Fig. 7. Hekla (above) and Eyjafjallajökull (below). Photos by D. Nikitina

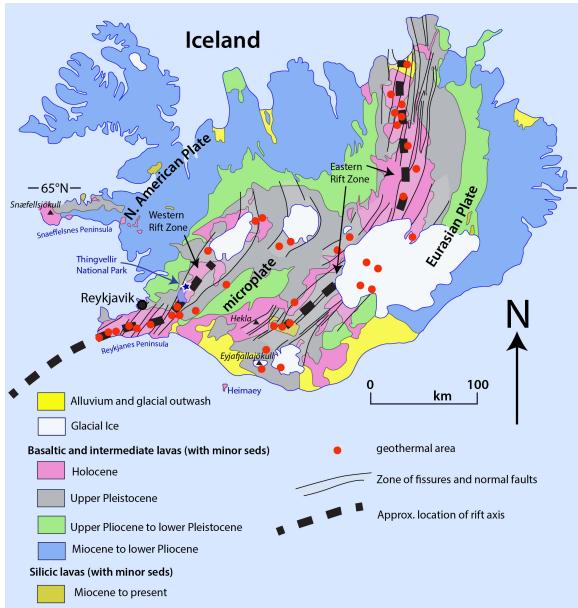


Fig. 8. Geologic Map of Iceland, Jóhannesson, 2014

Steven Sansone

Hekla is sited at a rift-transform junction in the area where the SISZ and EVZ meet (Figs. 2, 5 and 8).

During the settlement time period (~1200 years ago) 20 eruptions occurred that wiped out 1/3rd of the Viking Population during that period. The largest tephra eruption occurred in 1756 and covered 90% of Iceland with ash and the 1946 eruption released a large quantity of fluorine gas that killed a large number of livestock (*Iceland on the Web*, 2025)

Stasia Kelly

Mount Hekla is most often referred to as “Gateway to Hell”. This is because when it erupted it was on such a large scale it could be seen from all over the island. The eruptions were so powerful with their lava flow and ash deposit it almost looked like the gates of hell opening. Some settlers believe that Hekla is a gateway to the underworld and erupts when humanity is being challenged. It is represented in (Icelandic) culture as being evil and malevolent because of its frequent devastating eruptions.

Steven Sansone

Hekla has an eruption cycle of 10 years approximately, but its last eruption was on February 26th, 2000 (*Volcanism of Iceland*, 2025) ... becoming severely overdue for another eruption... Hekla has a very little to no warning when it starts to erupt starting with a large explosion...

.... Hekla is unusually aseismic, with (earthquake) activity typically beginning only 30–80 minutes before an eruption. Current readings of Hekla indicate that magma pressure levels beneath Hekla have been similar or higher than before the 2000 eruption, signifying that the next eruption may be far more devastating than the 2000 eruption and last longer than the 4 days (like in 2000) ...

*Paul Butera*

Eyjafjallajökull, famously erupted in 2010, causing widespread air travel disruptions across Europe (*Gudmundsson et al., 2012*). It is a classic stratovolcano, capped by a glacier and capable of producing phreatomagmatic eruptions, which result from interactions between magma and ice (Fig. 7).

*Lilah Rathman*

There is nowhere else in the world where the interactions between tectonic, volcanic, and glacial activity can be observed so directly and evaluated alongside changes in global temperatures.

*Mirna Torres Ayala*

The glacial evolution of Iceland is closely tied to the geologic processes. The combination of volcanic activity and glaciation allows scientists to map and estimate when there were changes in the glacial record in Iceland. The glacial landforms produced by the movement of ice in combination with the sedimentary

layers that have been found intercalated within the basaltic lava flows revealed repeated periods of glacial and interglacial cycles starting in the Pre-Quaternary period (before ~ 2.6 million years ago), extending to the Holocene epoch (11,700 years ago - present) (*Geirsdóttir, et al., 2007*). From about 2.6 million years ago, Iceland began to experience various advances and retreats of glaciers, which shaped the landscape. ...repetitive glacial and interglacial cycles lasted until around 11,700 years ago, allowing for the creation of glacier features like moraines, U-shape valleys, fjords, and cirques to form.

During the Last Glacial Maximum (LGM), in which ice sheets were able to reach their maximum extent due to the significant drop in the global temperature. During this time, Iceland was fully glaciated, and in some locations the ice sheet was about 2 km thick. Volcanic activity continued in Iceland during the LGM beneath the ice sheet, enabling the formation of various subglacial volcanic features, including Tuyas and Mörberg ridges.

*Adain Mountain*

Flat topped mountains are a common sight in Iceland; these are called Tuyas. Tuyas are formed during glacial periods when a volcano erupts completely under the thick ice sheet. Most Tuyas are born from fissures. The heat from the lava causes massive amounts of meltwater to form... The mixed meltwater and magma

make hyaloclastites and pillow basalt ridges... The oldest Tuyas were made during extensive glaciation in the Pleistocene, and many were covered during later glaciations (Gumundsson, 2005). But when a Tuya is not completely covered by a glacier younger than it, they gain the name of Nunatak. ... (the mountain peak that formed) during the next or one of the following glacier periods when the (Tuya) mountain wasn't completely covered. This gives the Nunatak its classic pyramid shape from only the sides being weathered by the moving glacier, they bear a slight resemblance to the tip of a fountain pen.

*Mirna Torres Ayala*

A rapid deglaciation due to the postglacial warming ... started around 11,700 years ago (Geirsdóttir, et al., 2007). Iceland was left with a few residual ice caps located on the highlands, like Vatnajökull. However, around 1300-1850 CE glaciers began to advance again during the Little Ice Age (LIA), causing outlet glaciers from the main ice caps to advance until they eventually covered the lowland areas and allowed for the formation of moraines and proglacial lakes.

Ever since LIA Icelandic glaciers have been showing a significant retreat... The rise in temperature, including other climatic factors, influences the increase in glacial melting during the summer and decreases the snow accumulation. Adding to this increase in glacial melting, the subglacial eruptions underneath the

ice caps contribute to the local melting, which triggers jökulhlaups, a glacial outburst flood.

*Rowan Kelly*

Many sub-glacial möberg ridges, cirques, moraines, and remnant glaciers which now make up the modern-day landscape of the country ... formed during the Pleistocene. ...the early Pleistocene stratigraphy ... is evidence not just of climate events but also their impact on faunal succession... sedimentary sequence (found at) the Fossvogúr Bay near Reykjavik, a glaciomarine catchment which collected glacial outwash from the waning glaciers of the late Pleistocene (Geirsdóttir & EIRIKSSON 1994)... contains a record of stadial-interstadial transition and show direct evidence of how these events altered the modern coastline through periods of transgression and regression.

...the results of regional paleoclimate (reconstructions)... may even have bearing into the present climate: the mechanism which caused the Younger Dryas Event (the influx of fresh melt water from Greenland into the Atlantic Meridional Current, also referred to as 'buoyancy forcing'), could plausibly reoccur according to some climate scientists (Weijer et al. 2019) ...

Such an event would cause a drastic cooling shift in the Arctic, something which Iceland would be particularly sensitive to. As such, the study of the past

climatic changes through stratigraphy and other means is not just a window into Iceland's past but may become a guide into what to expect in its future.

*Lilah Rathman*

In recent decades, Iceland's glacial landscape has changed dramatically due to rapid retreat of the large glaciers that lie over 1/10th of the total land area (*Iceland Meteorological Office, 2025*).

Vatnajökull and Langjökull—the two largest ice sheets... Vatnajökull, which covers roughly 8% of Iceland's total surface area is thinning at accelerated rates as the global climate continues to warm. Modelling done by the University of Iceland predicts that ... Vatnajökull could lose around 25% of its current volume in the next 50 years (*Flowers et al, 2005*). Additionally, the models indicate that in the next 200 years Vatnajökull will be reduced to small ice caps on the peaks of the highest mountains that currently lie underneath the massive ice sheet.

Langjökull or “Long Glacier” is Iceland's second-largest glacier, measuring 55 kilometers long from North to South and 22 kilometers thick from East to West. This ice sheet has lost a significant portion of its volume and will continue to as the spike in overall global temperature drives increased rates of melt, giving it an anticipated lifespan of 50-100 years until it has fully disappeared. Langjökull had a brother glacier named Okjökull which finished melting completely in 2014 as a

result of rising temperatures, marking the first Icelandic glacier to totally disappear as a direct result of climate change (*NASA Earth Observatory, 2025*).

*Stasia Kelly*

It is fascinating to see (how Icelandic) culture created these stories to explain the natural phenomena happening on their island. I have researched and put together a list of my favorite legends and how they relate to Iceland's Geology.

#### **Fire Demons and Volcanos:**

Early... settlers had little to no explanations for the eruption of volcanos. Some early settlers had believed that they were being punished for inhabiting the land or perhaps for something they had done earlier in their lives.

This legend also states that at the end of time there will be a battle called Ragnarök. This battle is an apocalyptic scenario where the Norse Gods will battle out to destroy the Cosmos.

**Elves or Huldufolk** (AKA ‘hidden people’): ... these creatures represent Iceland nature and Geology. They are believed to live in caves, hills, lava fields, and other rock formations. They are thought to be protectors of the land, preserving its natural geological features. ...Some believe that disobeying the elves can result in more natural disasters or banishment from the land. It is so engraved in the culture people will build

little houses for them on their land. ... construction work can sometimes ... be moved if there is reason to believe they could be disturbing an elves' home or domain (All Things Iceland, 2025).

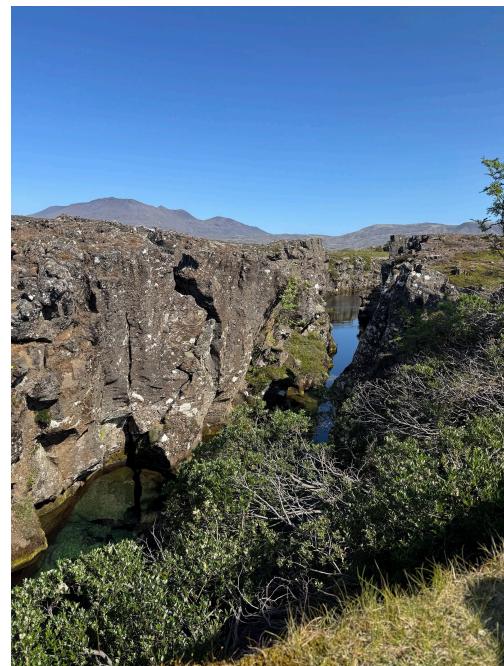


**Trolls:** ... Whether these beings are good or bad it depends on the individual you ask... These creatures are known to inhabit the natural landscape especially

*Stasia Kelly*

Overall, the 2025 Iceland trip was absolutely breathtaking... I am grateful to have been given the opportunity to attend, and I am in hopes of going back in the future

mountains and caves and are to blame for a large number of geological features. ... they cannot be in direct sunlight and if they are exposed, they are turned into stone. ... this is how some of the... rock formations were formed. ... the rock formations in Reynisdrangar... were formed (when) two trolls were trying to drag a ship to shore when day broke and turned them into stone.



*Steven Brown*

I also wanted to thank you for a fantastic trip around Iceland! I had a ton of fun learning about all that Iceland had to offer, and you did an excellent job teaching us about the geology of it all.

# Blogs

July 4<sup>th</sup>, 2025 – July 18<sup>th</sup>, 2025

## Day 1: July 4, 2025

By Daria Nikitina

Our group of 12 students with Drs. Nikitina and Bosbyshell arrived in Iceland early in the morning. As our plane approached the island the wiggly coastline and clouds of steam rising from the ground appeared in the window view. Going through customs was easy, however each of us was asked what brought us to Iceland and how long are we planning to stay studying geology.



At the airport we were met by Andrey, Dr. Nikitina's friend from Moscow and Olafur (Oli) Arnbjornsson, our Icelandic leader from GeoCamp Iceland. After short drive we arrived to Start hotel, had breakfast and waited for the rooms to be ready. We rested for a few hours and at noon gathered for an orientation meeting and lunch at the office of Reykjanes UNESCO Global Geopark. There we were introduced to the Geopark mission and one of the projects A.U.R.O.R.A focused on outdoor lifestyle and education. Dr. Nikitina briefly reviewed the objectives of our trip, course requirements and outcomes and Oli introduced

us to Iceland geography setting up the goals of connecting the study of geology with culture and regional history.

At around 1:30 we went on our first field excursion of Reykjanes peninsula. At the first stop by the side of the road we learned that the landscape was created by repeated fissure eruptions, some of which took place during the Ice Age when eruptions were subglacial forming the mountains of various shapes that raises above the surface of the old shield volcano. The next stop was by the Galgakettar Hanging Rock, the place where the early settlers performed executions. That last cruel punishment in Iceland was in 1847. Here we discussed what brought Scandinavian settlers during the Viking Age (874 – 930) to Iceland.



The 'hanging' rock originally brought here by ice showed the pattern of honeycomb weathering, multiple interconnected cavities developed on one side of the boulder resembling a honeycomb structure. We discussed and proposed various explanation for that type of weathering and decided that the most plausible is the action of salt and wave abrasion as the rock faces the coastline. After that we traveled to Garðskagaviti lighthouse that built in 1897 at the entrance to harbor (Vik – Icelandic for bay). This harbor was always important, but more so during the WWII when ship convoys with military supply from North America stopped over in this protected harbor on the way to Russia.

That was the last stop of our excursion after which we went to the hot pool to soak in natural hot spring, the most Icelandic way to spend time during the day. Dinner was at the nearby food court where everyone could choose their meal. Thai food seems to be the most popular among our group.

## Day 2: July 5, 2025

By *Kelly Edmunds*

On July 5th, 2025, we started our day with an overview of Iceland's tectonic setting, with a short talk by Dr. Nikitina titled "Tectonic Evolution of Iceland." We started the presentation with some evil technological issues, but everyone was very adaptable, and we were able to continue our learning. We learned that Iceland is one of the only places in the world where a mid-ocean ridge (the Mid-Atlantic Ridge) rises above sea level. This ridge runs about 11,000 kilometers from the Arctic to the South Atlantic, and Iceland just so happens to sit right on top of it, made even more dramatic by the presence of an underlying magma plume—a 300-kilometer-wide pulse of molten rock from the deep mantle that began rising 50 million years ago. Thanks to this plume, Iceland eventually lifted out of the sea about 25,000 years ago, becoming the little island we now study.

As the plates continue to diverge here, North America and Eurasia drifting, the landscape fractures and bleeds lava. The Kolbeinsey ridge is the most northern extent of the Mid-Atlantic Ridge in Iceland, and the most southern is the Reykjanes Peninsula. The plume now lies under the largest icecap in Europe called Vatnajokull. The phenomenon of eruptions happening under the ice caps create many different outcomes, one of them being an abundance of ice pools called glacial melts that flood the plateaus and flow across the coastal plain releasing many glacial sediments. Generally, melts occurring across a singular plane are called fissures, which we saw many of today, and series of those fissures are called swarms. We talked about faults and rift zones where magma leaks upward, forming gashes across the surface. One particular thing that was talked about was the Hreppar microplate, where three tectonic boundaries come together. The North American, Eurasian, and Hreppar microplate. Iceland's ruptures have been mainly tholeiitic basalts, meaning they have very high iron content.

Finally, in the recreation room upstairs, we were able to discuss the three main recent eruptions. Given the successive pattern, geologists believe that there is a fire event going on that is set to last around 100 years of active volcanism. These are not dramatic eruptions but more so flowing and oozing extremely hot basaltic rock. The peninsula is composed of shield volcanoes, specifically a shield volcano called Fagradalsfjall, with many elongated parallel fissures. When these eruptions occur, which there have been many in the past few years, the lava fills in craters and there were 3 very distinct ones in 2021, 2023, and 2025 that we got to see later in the day. The 2023 one in particular was creating very toxic gas that was dangerous to the people and many trails needed to be shut down. These fissures and eruptions create spatter cones where lava concentrates along the fissures in lines across the land.

From there, we drove along the Reykjanes Peninsula. The surface was torn by elongated fissures, steaming vents, and the recent scars of volcanic eruptions. The 2023 eruption, in particular, left the land looking foreign, moss burned away, ground charred black. We also took a short stop to see the geothermal power plant and Blue Lagoon which was under a lot of construction from the most recent eruption.



We were able to see the lagoon, which is blue because of coagulating silica, and understand how that was created somewhat naturally. The runoff water, full of minerals like silica, started pooling in the lava field and made this big, steamy, bright blue spot that just stuck around and turned into the iconic lagoon everyone (the tourists) now loves.



We then stopped for a nice lunch where we were served Cod in the fish town where Dr. Oli used to teach. We then toured that same town, the town of Grindavík, after lunch because it suffered greatly from a recent eruption. The government had to buy out homes at market

value after lava warped roads, destroyed parking lots, and forced entire neighborhoods to evacuate. The landscape was left jagged and unpredictable; lava flows thick and uneven. Some areas near the fault line weren't completely destroyed, but roads had to be leveled, and parking lots were torn apart. Around 50 buildings—including banks, restaurants, and schools—were abandoned after lava from the 2024 flow cut through barriers and entered parts of the city. The basalt lava was rough, jagged, and uneven ('A'ā type), and now iron fences line the area. Eruptions like this tend to happen in cycles every 800 to 900 years.



We then drove further inland, to landforms called Tuyas flat-topped mountains formed when lava erupts beneath glaciers. Along the way, we were able to see where new lava (1200 CE) met the old coastline and literally expanded the island of Iceland.



Upon arriving, we were standing in the area of the most recent eruptions, surrounded by some really cool features like Tuyas. These used to be grassy hills, but erosion (made worse by overgrazing) exposed layers of fragmented, glassy volcanic material called hyaloclastites, along with scattered clasts and iron-rich subglacial deposits. The fresh lava was filling in the craters. The area is a tundra landscape with scattered volcanic debris, including pyroclastic material that's been heavily fragmented. At this site, the lava cooled at high initial temperatures, forming minerals like olivine and calcium-rich plagioclase, you can see the surface is cracked in places, showing a texture known as "bread crust," which happens when the outside cools and hardens while the inside is still hot and expanding.



We stopped at this cliffside spot with tons of oxidation—everything had a rusty red tint to it. There was a scoria cone where, with a dark lava flow layered over bright red scoria. The scoria was super vesicular and loose, full of air pockets from gas escaping during the eruption. As it cooled, the gases oxidized the rock, giving it that deep red color and a rough, bubbly texture. There were chimneys where the gas was able to release itself. At this scale site, we saw that scoria is mafic, rich in magnesium and iron, and made of basaltic material full of gas bubbles. The area was marked by fissures cutting across an old shield volcano, in what is currently a gravel mine. These fissures looked like elevated cracks, tracing the paths

of past eruptions. What stood out most was how the lava had flowed right over the red scoria, layering on top of it like a dark, glossy blanket draped over a rough, bubbly surface, showing just how one eruption built directly on the remains of the last.



The next stop was the Reykjanesviti lighthouse, where we explored a coastal area shaped by both lava and ocean. We saw pillow basalts, which form when lava erupts underwater and cools quickly, round and smooth like beads on a necklace. The area was sunken where water meets land, and erosion had rounded the rocks closest to the shore. We also spotted older lava flows from around 1200 CE, layered on top of volcanic ash from earlier eruptions. Before we left, we walked across the Bridge Between Continents, literally standing over the rift between the North American and Eurasian plates, with one foot on each side of the divide. We talked a lot about continental drift and how the Earth's crust is being slowly pulled apart, creating a visible "stretch" along the plate boundary. We also compared shield volcanoes to composite volcanoes—shield volcanoes are broad, flat, and massive, built up from fluid lava flows, while composite volcanoes are steeper and more explosive, made from alternating layers of lava and ash. Down by the shore, we noticed how black sand from basaltic erosion mixes with seashells, and the more shells there are, the lighter and grayer the sand looks compared to the deep black volcanic sands nearby.



The final stop of the day was the Bridge Between Continents, where you can literally stand with one foot on the North American Plate and the other on the Eurasian Plate. The bridge spans a small rift valley formed by the slow spreading of the Mid-Atlantic Ridge and standing there really puts continental drift into perspective. It's a quiet, surreal spot, no earthquakes or eruptions in the moment, just the slow, steady pull of the Earth stretching the land apart beneath your feet. The surrounding terrain is cracked and rugged, with dark

volcanic rock lining the fissure below. There's even a sign marking the boundary, so of course we all took photos straddling the continents like the nerds we are. The sand here was remarkably darker but given the lack of shells present and basaltic rock, it does make sense.



We ended our day with a silly group picture and then made our way to get burgers and dessert at a local restaurant.

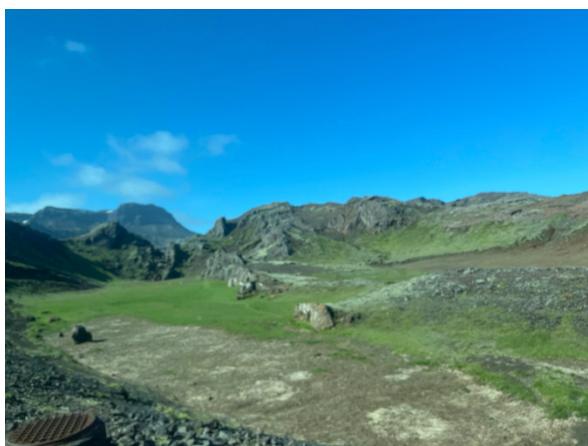
## Day 3: July 6, 2025

By *Lilah Rathman*

On 07/06/2025, we started the day with a long drive to examine the geology and geomorphology of the Hreppar microplate and its surrounding features. On the drive there, Oli told us all about the economy and industry in Iceland, such as the overfishing crisis that occurred in the 1960's and how it drove Iceland to be a large producer of aluminum. From the van, we were also able to view the Iceland State Penitentiary and tallest building in the country called Smaralind, which is located South of Reykjavik. On the ride, we also discussed some of the native vegetation present.



After the drive, we arrived at the Geothermal plant which lies close to the triple junction between Hreppar microplate, the North American and Eurasian tectonic plates. Since this is a tectonically active region, the frequency of earthquakes encourages mass-wasting events, such as rockfall, earthflow, and mudslides in this area.



The base of this landform was relatively flat and houses a geothermal plant that sources glacial meltwater that has seeped into the ground. Due to the high geothermal temperatures, this trapped water becomes steam but cannot escape the sediments it lies under. Boreholes are used to access this, and it comes to the surface at roughly 300 centigrade.



On the way to the next stop, Oli discussed some of the ancient Icelandic / Nordic literature that was vital to Iceland's history, as well as its significance around the world. He told us of 13th and 14th century stories and sagas, and how these were translated to different stories and how these have impacted our cultures. He also explained how these traditional pieces of literature do not follow the typical hero vs. villain dynamic, rather how the protagonists in these stories were viewed as humans who had both strengths and weaknesses. One story was of a man who was viewed as the strongest and best Viking in all of the town but was not very intelligent. His best friend was known as the "man without a beard" and was not respected amongst his people but was recognized for his kindness and intelligence. This was a fascinating experience as it also contrasts with the Western way of storytelling so much since in this, the hero is displayed as a 'perfect' person while the villain is shown as ugly and evil all around.



Our second stop today was to Þingvellir (trans. “Parliament plains) National Park. Here, we investigated the geological features and discussed this area's impact on Iceland's culture and society. We began by discussing Skjaldbreiður, which is a perfect shield volcano visible in the distance from where we stood. After some talk, we made our way to look at the Almannagja fissure, which is the largest one found in this area and marks the point of the Mid-Atlantic Ridge in this park. The North American, Eurasian, and a microplate meet in this place, forming a triple-junction and graben and is composed of basalt. The North American plate is moving away at a much faster rate than the Eurasian plate, but this fissure can spread roughly 2 cm/yr. Both locals and tourists frequent this area to dive between the tectonic plates.



After this stop, we moved along the trail and Oli explained the cultural significance of this area. He first showed us the area where old citizens accused of crimes went to declare their actions and receive punishment for them. At the time if you did not opt to do this, you were banished and outlawed. He also shared that Iceland at the time had established local parliaments as opposed to a centralized government. Oli also shared the history surrounding Iceland's independence, which was way more recent than expected. Iceland was occupied by the Danish until WWII, where Denmark was occupied by Germany while Iceland was occupied by the British. After, since the land was left undeclared, Iceland became an independent nation. However, this was not globally recognized until 06/17/1994 by the United States of America.



Our group went to lunch at the Frioheimar Tomato Farm after our time at the park was over, where we learned that they supply most of Iceland with tomatoes. Oli also explained the process of fermenting shark and the prevalence / significance of eating horse meat in Iceland's history.



When lunch was over, we headed over to a park filled with active geysers and even got to see a few of them erupt! High temperature magma interacts with groundwater that has accumulated in pores underground. When the water contacts this magma, it wants to boil but cannot do so since it is under high pressure and many layers of sediment. During the phase change, the water rapidly expands into a gas and quickly erupts at the surface with a temperature around 300-400°C.



Our last stop of the day was Gullfoss, a massive waterfall that is fully sourced from Langjökull (trans. “Long glacier”). The water was a light teal / grey color since it contains a heterogeneous mixture of suspended till and other suspended sediments that have not yet been deposited since this water is moving very rapidly. The till mixed into the water scatters blue, white, and yellow light, resulting in this unique color.



#### **Day 4: July 7, 2025**

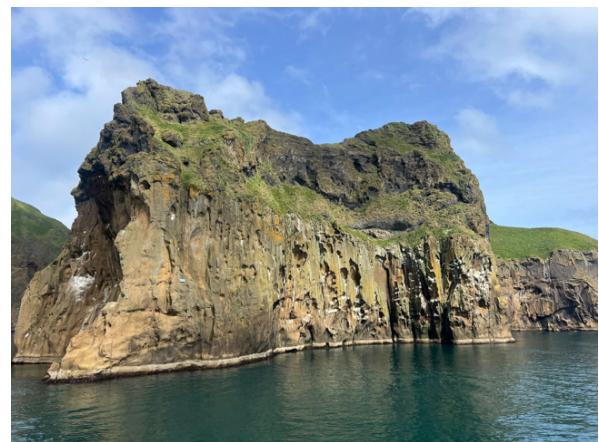
*By Mirna Torres Ayala*

On July 7, 2025, our day began in the parking lot of the Hellisholar hotel where we met before driving to Landeyjahöfn Harbor, which was about 35 minutes away. Unfortunately, just when we thought we were making it early for the first time, Dr. Nikitina realized that Dr. Bosbyshell was missing and left at the hotel parking lot. However, after hitting a few curves and speed bumps, we were able to make it just on time for the departure to the Ferry “Herjolfur”. This ferry took us to the volcanic island of Heimaey

where our main goal was to learn about the island's geology, the 1973 Eldfell eruption, and the consequences that it brought to its population.



However, before arriving at the island we got to see two geological features present near our destination. The first feature that we observed was a sea arch located southwest of the island. Sea arches form due to the constant erosion that takes place in a headland which first forms a cave, and it eventually cuts through it leaving an arch. Second, as we were getting closer to the harbor, we looked at a part of the island that showed small sea caves that are now exposed and serve as evidence of uplift that is taking place to correct for isostasy.



On our way to our first official stop, the Eldheimar - Volcano Museum of remembrance, we made a quick stop at one of the houses that was destroyed by

the lava flow from the Eldfell eruption. At this location, we saw that only the front part of the house remains standing and when we went towards the back, we got to see some of the remaining frames of the house that are partially covered with basalt.



When we arrived at the Eldheimar - Volcano Museum of Remembrance we were welcomed by a friendly cat. After petting the cat, we finally made our way into the museum where we were given a device that contained an audio tour of every section of the museum. At the museum, we learned about the history of the island and the impact that the Eldfell eruption had on the community. The Eldfell eruption took place on January 23rd, 1973, and its consequences were tragic because no one was prepared for it since not even the scientists expected it to happen. About  $\frac{1}{3}$  of the population of the island was lost and many houses were destroyed due to lava and ash emitted by this volcanic eruption. Also, we learned more information about the volcanic zones in Iceland, and how the Vestmannaeyjar archipelago which consists of 18 islands and a number of skerries forms part of a volcanic system that is centered around Heimaey. However, a major part of the volcanic system is submarine, and it could potentially be one of the sources of material building up in the Westmannaeyjar marine shelf.



After finishing up our tour of the museum, we got the opportunity to go on a hike to the Eldfell volcano. We started hiking up the volcano at 12:00 PM and made it to the top at around 12:35 PM. At this location, we got the opportunity to take a lot of pictures and enjoy the view and our way down we took the longer route along the lava flow where we got to see some of the wooden signs that have been placed where the streets that were covered by the lava flow used to be, as well as some parts of the houses that were destroyed.



Once we made our way down the volcano, about 1:30 PM we had lunch at a restaurant called Tanginn. After everyone finished eating we were given free time to explore the town

or go on another hike with Dr. Nikitina and Dr. Bosbyshell. Since my legs couldn't resist another hike, I decided to stay in town to explore, like most of the class did. Around 3:30 PM, we all met at The Brothers Brewery where we chatted about our adventures of the day and waited for the departure time which was 5:30 PM.



## Day 5: July 8, 2025

By Steven Brown

Our day started at 8:30 AM, where we made a stop at the Lava volcano exhibit. The exhibit had provided us with a "live" seismic activity map of Iceland. It records all the recent seismic activity within 48 hours and provides a visualization it over the island. We then headed into a brief movie that showcased all the relatively recent volcanic eruptions throughout the country. Then, we walked through an exhibit. It had included an interactive display explaining how the island of Iceland was formed, which led you to a room that showcased and displayed lava flows, more in depth visuals and details of how volcanoes work and more. It then led you to a room that

had a faux lava plume. The room was surrounded by this massive sculpture with information on the formation of volcanoes.



The 48 hour live seismic map

We then set off on a scenic two-hour drive to Landmannalaugar park where we had sat down for lunch and had a quick lesson from Dr. Nikitina about volcanic formation and a few other topics. After her lecture we embarked on a one-and-a-half-hour scenic hike throughout the park. We had multiple stops which had included an evil and smelly sulfur deposit, and in-depth explanations of the landscape.



One of the many views from our hike

After our hike, most of the class decided to indulge in Iceland's geothermal heating elements and took a dip in the parks hot spring for a brief moment. After our short swim we headed back to the vans and made a few stops. One was a crater classified as a "maar." We had also stopped for a moment to look at a nearby river which had included a small waterfall. Our last stop had included a very cold view of Mt. Hekla, a volcano that has exploded 20 times since it has been recorded. It was noted that before an eruption its seismic activity is very dormant.



Our class (and many more) in the hot spring

## Day 6: July 9, 2025

By Paul Butera

So today we started our journey in the parking lot leaving at 9am. The drive was smooth and easy till we started going off road, then it got very bumpy for about 10 miles. On the drive we talked about the glaciers Mýrdalsjökull and Eyjafjallajökull (which I'm still learning how to pronounce). Specifically, we talked about the glacial runoff, this formed a multitude of rivers and braided streams, which we drove through! Driving through the braided streams was super cool and we got to get such a good view of the stream itself and all the glacial till that makes it up.



After crossing the braided streams we got to the first stop, Gigjökull. This was a glacier tongue that branches off of the Eyjafjallajökull ice cap. The ice cap has a 2.5km diameter caldera underneath it. This is from an eruption in 2010 that opened up two fissures. The eruption started under the glacier and over time, the glacier started to cave in due to the heat, this is called an ice cauldron! After the eruption, a few hundred meters of glacier melted cousin excess runoff and flooding and gigjökull was covered in tephra. The glacial melt can be told by the terminal moraine which can be seen a few hundred meters from the current glaciers' extent. A terminal moraine is a moraine that was deposited at the glacier's fullest extent. There was also a lagoon in front of the glacier from the runoff, it has drained fairly recently but we could also tell the height of it from the same terraces that were formed, which indicates the shoreline of the lagoon. All of these were formed from the same thing as the braided streams, glacial till! The between the two though is the size of the rocks, as the moraines and terraces are made from larger rocks and the braided streams are made from smaller rocks, as they can be

moved by glacial runoff easier. The terraces and moraines can be seen on either side of the caldera. You can also see the tephra layers in Gigjökull!



Another cool feature we saw were kettle lakes. Kettle lakes are formed from when glacial runoff carries chunks of ice that get deposited and buried under till; then slowly over time, the ice melts and forms a kettle lake! Here is an example of a big one.



I'd say the coolest part about it was being in the edifice (body of volcano) and seeing the layers of tephra and lava pictured below.



Also, that it's one of a few stratovolcanoes on Iceland! This is all due to the use of two magma chambers allowing the magma to cool and gain silica. Stratovolcanoes already produce more tephra, but this one produced even more because it was sub glacial!

So then after exploring around we left and ventured our next stop which was less about taking notes and more about enjoying its beauty. This next spot was Nauthúsagil. This Waterfall rock scramble was one of the most beautiful things I've ever seen. We started by waking up a path to a creek valley that we climbed through and jumped over rocks to get to the end, the end though was more than I expected. After traversing the rocks and climbing a wall using chain, I was greeted by the most magnificent waterfall I've ever seen. This waterfall was secluded tall and covered on all sides by mossy basalt. As Óli said, it was like Narnia.



At the waterfall I decided to eat my two sandwiches I packed earlier and walked back to the car.

After a peaceful drive we ended up at the famous Vík! Here you can see the world-famous columnar basalt (and the puffins which I think are better). But when you arrived on the beach the first thing you see is the columnar basalt. This forms when the outer layer of the basalt cools and contracts, forming the hexagonal shape. They form mainly under ice and propagate in the direction of cooling. This basically means that if the cooling stays still the cool straight down. Here is some columnar basalt pictured.





We also saw some marine geologic features such as sea caves and sea stacks! Sea caves form from waves battering at the rock and eroding it, and sea stacks are a little different. They form from waves hitting rock from both sides causing a sea arch, and eventually the sea arch breaks and forms two sea stacks! Both sea cave and sea stacks pictured below.



After we finished up at Vík we drove to dinner and got burgers! But on the drive, we talked about a very evil volcano, we talked about the Laki fissure eruption of 1783. This eruption was so massive it was believed to cool down Siberia and shade the sun and is speculated to have been a player in the French revolution, as the ash spread as far as France and caused famine. After we finished that conversation, we started driving by Katla and through its massive flood plain which makes it so there are no houses or farms for miles. Katla is a volcano inside of Mýrdalsjökull and has been flooding east of the glacier consistently since settlement, allowing no settlement. The floods are so extreme

that after every flood, an average of two km of land is added to the island just in glacial till. Now this shows how powerful the volcanoes are under these glaciers, imagine if all the glaciers melted, it would be catastrophic to say the least. As global warming continues these glaciers will melt and melt and eventually unleash these volcanoes. As of now, they act as lids, protecting the country from the many volcanoes underneath of them, but it's not looking bright for the future. That was a very grim talk but on the drive to the hotel we took a pitstop to check on the “Bieber effect”. The “Bieber effect” is essentially celebrities and social media causing people to do dumb things that harm the environment because someone else did it. In this example, Justin Bieber shot a music video in Iceland walking on moss and skateboarding in a valley and this caused thousands to trample the moss and even get the valley shut down for half a year. So please be mindful of where you step and who you follow! Anyways after that we got to the hotel “hotel Hörgsland which is quite nice! Very pretty views outside the windows. I hope my blog post was entertaining and informative, have a good night!

## **Day 7: July 10, 2025**

*By Katie Winward*

Our day started at 9:00 am sharp, we began with a drive through part of the 1783 Laki eruption. Our first stop was a viewpoint of the Vatnajökull glacier, a glacier containing 6 active volcanoes as well as some dormant ones (including Laki), all part of one volcanic system. Vatnajökull is an ice cap, the largest ice cap in Europe, as well as the highest point in Iceland. While at this stop, we learned about terminal moraines, lateral moraines, median moraines, and cirques! While on the drive, we listened to Oli teaching us about a huge flood (Grimsfjall flood) that took out several of the bridges along the coastal plain. As we drove further, we could see the new bridges that were built to replace the old ones and remnants of the broken bridges, including giant iron parts from the old bridge that was left at the glacial viewpoint.





After looking at the beauty of Vatnajökull, we began our journey to our next location. While on the way, we stopped at historic Hofkirkja church. Oli had told us that a church had existed in this specific spot since the year 1000, however this specific church was built in the year 1883 and was the last church-built turf style, a style used when materials were scarce, where the materials they used were driftwood for structure and thinned cow skin for windows. Back during this time, it was believed that the size of the church determined the amount of people that could enter heaven, and those who had larger churches were seen as more wealthy as they could obtain more building materials for their churches.

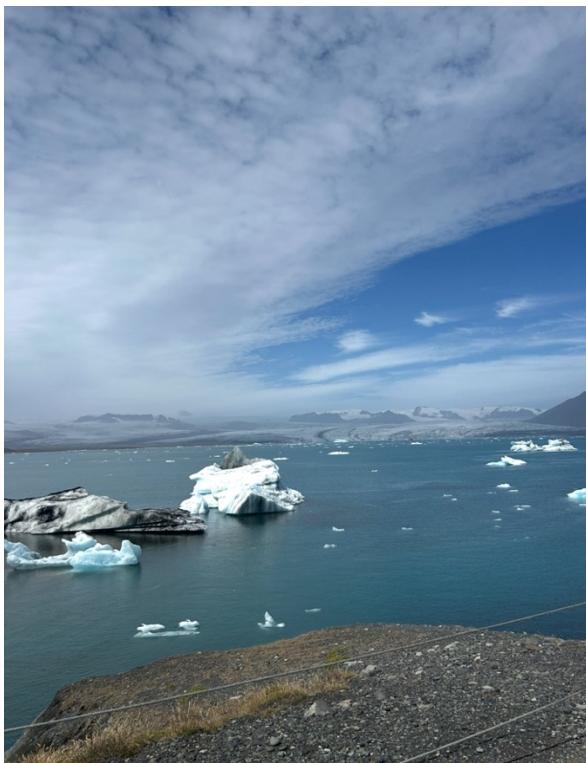


After the church, we continued to the Kviarjökull glacier, where we saw some more lateral and terminal moraines, this time at large and smaller scales. The large lateral moraines we saw were higher elevation, and likely would be able to withstand glacial outwash floods. While at this stop, we did some minor hiking and some major sketching. The area here was very peaceful, and this glacier was optimal for sketching, it had many of the glacial features that we had learned at previous stops. It was interesting to see the smaller moraines forming below the larger moraines, it was very cool to see the past life of the glacier and how big it built its walls.

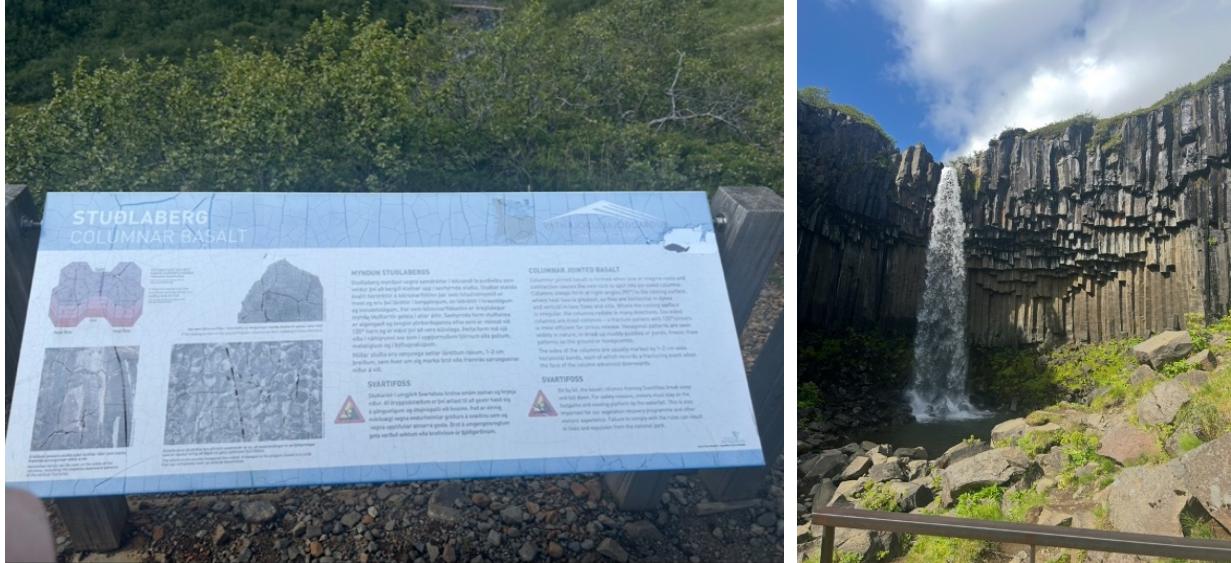


On the drive down to Diamond beach, we learned about aretes, which are ridges of rocks that separate a valley. Before going to Diamond beach, we looked around Jökulsárlón, a large glacial lagoon fed by multiple glaciers. This lagoon is a tidal lagoon, it's an area where fresh, glacial water meets sea water. Due to the mixing of these waters, it opens a new ecosystem where many marine birds come together, as well as seals! While standing on the shore, we were able to see many seals weaving their way around the icebergs. After admiring the view from the overlook point, we made our way

to the black sand Diamond beach. This beach was beautiful and accurately named for its giant diamond-like icebergs that find their way along the shore.



Our final stop of the day was a hike! We hiked the Svartifoss trail in Vatnajökull National Park. This trail was beautiful, although slightly challenging after a long day. The abnormally hot and sunny weather made me almost not want to go on the hike, but it was worth it for the destination. While on the way up, there were several smaller stops to make, including a waterfall and a point overlooking the floodplain (where you could also catch a nice, cooling breeze). While on the way up, we noticed a sign that we thought was the most accurate description of columnar basalts that we had ever seen (good job Vatnajökull National Park). It took 42 minutes to reach the top, a beautiful display of columnar basalts (I think Dr. Nikitina really loved the view). All in all, this was a very fun day, I really enjoyed getting to see glaciers and glacial features and also enjoyed the nice hike on this sunny day!



## Day 8: July 11, 2025

By Steven Sansone

Today we started out by packing in our luggage and leaving our hotel arrangements at 9:12 AM for the first stop of the day

We arrived approximately 20 minutes later at our first stop, Bjarnagardur, a small homemade of turf and stones that apparently was made prior to the settlement era of Iceland's history, that was designed will a "wall" to protect the landscape by the farmer. One feature is "rootless cones" which are formed by steam explosions as flowing hot lava crosses over a wet surface. The main piece here, is the tephra layers that were discovered by the farmer when constructing the wall which all show different eruptions from different volcanoes! The eruptions all give different depending on where they are from. The earliest eruption was in the year 900 on this tephra stratigraphy!



The 2<sup>nd</sup> part of our First stop was right next to the first rootless cone. The 2<sup>nd</sup> one took place in 939 CE from the Eldgja Eruption. This stratigraphy presents with ash on top where the surface initially was and prior tephra layers from the 1<sup>st</sup> site and even had a volcanic bomb in the layering.



After leaving this site, we were greeted by two friendly dogs or lava dogs (trademark) from the house next to it and were playing with a piece of volcanic rock or even trying to eat it (they just like me for real).



Stop 2 was at the Katla Geopark Center and we arrived at 10:40 AM. The Geopark Center had a variety of games, puzzles, dioramas that assist in visitors understand the geology and history of the volcanoes that are intwined with Iceland's history. One favorite poster I read at the center is The Haze Famine, where volcanic plumes carried enormous amounts of sulfur dioxide (100 million tons) into the stratosphere and transformed into sulfuric acid aerosol and the mist prevented solar radiation from reaching the surface for 2-3 years. The atmospheric pollution made humans and animals sick and killed crop yields. A 5<sup>th</sup> of the Population and 75% of the livestock sadly passed during this period. The center is also a UNESCO heritage site!



We then stopped for lunch at 12:13 in Vik at a restaurant and brewery called Smidjan Brugghaus for burgers and fries and left at 1:03. Quick aside, best burgers out of the 3 spots we have had in Iceland so far!

Stop 3 was the glacier, Solheimajokull. We passed by lateral moraines in the entrance to the parking lot area and multiple end moraines which are accumulations of glacial debris pushed forward by the glacier snout. We traveled halfway through the trail where Oli said that the glacier was actually at that point 50 years ago and he saw it for himself! The opposite side of the valley had kame terraces, which are deposits of sediment from meltwater streams flowing between the ice and the adjacent valley side. We encountered a few rocks that were dragged along with the glacier, leading to glacial striation on their surface. We also saw a Glacial Trough that was filled with ice around the halfway point. We eventually reached the glacier face that was slithering down the valley with the actual main glacier body being 3 miles away! The black smudge on the glacier is actually ash from the 2010 eruption. Oli stated how the gravel we walk on too has ice underneath the surface (ice in Iceland? No way). Part of the mountain had a piece of breccia that came from hexagonal basalt from the top of the mountain, similar to the black sand beach we visited! The main question we were tasked here with was “How are Glacier cones formed?” and the answer we led to from Oli was that they are formed by melting ice and water runoff that carve into the ice, and the tephra and ash insulate the ice, keeping the shape of the ice as a cone. We left at 3:16 from this to our last stop.





Stop 4 was the Skogafoss Waterfall. It is a cascading fall that actually has 5 more falls above it that we can hike to see but we only viewed the bottom level. One of the plaques I read of information is that the falls ran muddy due to the ash from an eruption. I ventured to the falls with Dr. Nikitina and took photos of the falls and we both left soaked by the mist from the falls (worth it). The main question here is how they formed

which is from marine erosion from the last ice age and the sea level was higher from the glacier's weight pressing the land down. The glaciers then melted and released pressure on the land and raised it up and lowered the sea level. We also viewed some settlement era turf homes on our exit from the falls.



The Dinner Stop was at Hofdoss Food Hall after finally reaching Reykjavik after 2 hours approximately. We then returned to the new hotel to rest and recharge for our break day to explore Reykjavik! I hope you enjoyed my blog post!

Day 9: July 12, 2025

*By Stasia Kelly*

## Lecture

Today we started off the day with a lecture by Dr Nikitina. This lecture included mostly information about Iceland's climate, and history regarding climate change. We were given an overview of the original Icelandic settlers and how the early settlement period was here. We also discussed an outline for the day and the events that were occurring.

After a short drive we had arrived at city hall but, to our disappointment they were not open until later into the day. We were met with a friendly cat outside who we then found out roamed around the area in town we were visiting whom we would see many times after this. We had a short conversation about the exhibit while viewing the map through the window but had decided to return later into the day. During the meantime we went to The Settlement Museum.



City Hall



Settlement Museum

In the late morning, we arrived at the Settlement Museum. It was a very large collection of rooms featuring the history of Iceland in time order. It went in detail to the different types of animals that roamed during each time period as well as the main successors to life at that time. It also dove into the cultural aspects of each town and why and how they were developed. We were given free time to roam around the museum to take notes and take in the real-life examples provided to us in the exhibit boxes. An example I'd like to share that I found the most interesting about this museum is the miniature town that was on display. In this room there was a pair of virtual reality eyewear to put on and view around the town to see our miniature townspeople in action! I felt as if this really brought the history to life and made the museum much more interactive and interesting to visit. Although most places here are very easy to navigate, I was appreciative of the museum having a multiple language translation to make it easy for us to understand their history without any issues. Mainly aspects to this museum made it differ greatly from other history museums I have visited. A majority of the text given to us provided

some type of display, whether it was a holographic image, or a display case, this museum did not cut out on the imagery. Here are a few pictures of my favorite rooms.



The picture here on the left is a late 18th to early 19<sup>th</sup> century room. It looks like it is probably an office. Everything was extremely detailed down to the calligraphy writing on the desk and the real books on the shelf. On the right it is a similar time period with popular artifacts during the time period. It looks like it is a dresser table or perhaps a hallway table.

The last picture is a fake farmers market. This room has what must have been a hundred different fake items with very detailed vintage food. Even the gum and candies near the register were perfectly placed and replicated to resemble the real thing!



## Lunch

After the museum we went downtown to have lunch at the Gróðurhúsið food hall. I had gotten a shrimp burrito bowl which I found to be very yummy.



## City Hall Pt. 2

After lunch we made our way back to city hall to revisit our map once it was open. City hall offered a 3-D display of all of Iceland as well as its geographic features. The map had a lot of detail and even shown the different elevations for each area of the county. The scale for the map was 1:50,000 for the whole map and 1:25,000 for the elevation. This model was crafted by carpenters at the Reykjavik model workshop.

## Fossvoturd

After visiting City Hall, we took a small drive to a shore called Fossvoturd to observe several outcrops. We were given about 6 different outcrops which we explored over the span of two hours. There was a small walk in between each one however we had to

battle the slippery seaweed and seagrass to get to each one. Me and my fellow students had to decipher sedimentation layers in the rock and determine the materials in order. One of the significant ones we found was the Roche Moutonnée, which is a rock carved and shaped by glacial erosion that has a smooth side gently sloping and the other being rugged. This location was followed by a couple more outcrops which we surveyed and tracked our data for. After this we were going to leave but found ourselves near a huge rock formation containing different color lichens. We spent a few minutes observing this before moving on.



### **Hot Spring**

We then walked a couple minutes to the hot pools next to our outcrop locations and in them for a couple hours enjoying ice cream and the company of our friends. After a very well needed relaxation we had to take two trips in the van back to the hostel and settled in for dinner. We had Domino's pizza which reminded most of us of home.

Some went out to the town to enjoy our last day in the wonderful city of Reykjavik and our needed long night sleep!



**Day 10: July 13, 2025**

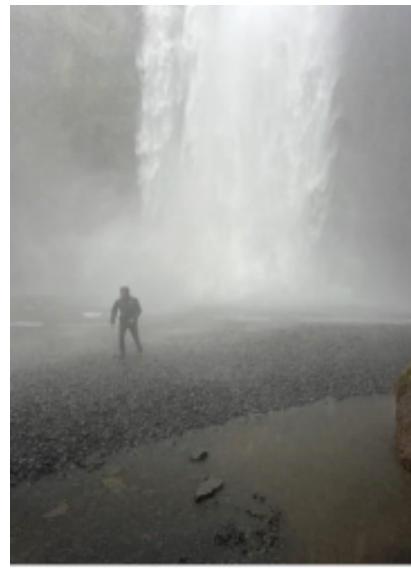
*By Josh Lantieri*

Hello! My name is Josh Lantieri, and I am a rising senior at West Chester. I am in the Secondary Education program, and I am pursuing a second major in earth systems.

Today, I learned the importance of human connection and how to effectively communicate with new people in a city 2,800 miles from home.

Friday, 7/12/2025, marked our group's (somewhat-unplanned) day off from the studies of Iceland's landscape. This gave us time to explore Iceland's capitol city, Reykjavik. You may be wondering what this blog post will be about if no geologic learning happened today. Well, the idea for a topic arose a few nights ago in the Hellisholar cabins' bar.

"What could we even do with 3 days in Reykjavik?" asked our professor, Dr. Daria Nikitina, who was in the middle of explaining her frustrations with recent changes of plans. Frankly, I was ready for a break after how action packed our week had already been. The group continued chatting over some drinks and eventually we all went to our cabins to rest. Her question did not leave my mind though. As I was settling in that night, I remembered some wise words from our wonderfully patient tour guide, Olafur "Oli" Arnbjornsson. As he put it, "Icelandic culture is just as important to immerse in as Icelandic geology is, so talk to people!" So, I did.



**Steven Brown**

*"Smiling, having a blast.  
Probably the best experience  
of my life"*



**Mirna Torres**

*"A Courageous Hike"*

because I used the apps automatic transcription feature for direct quoting. Regardless of if my interviewee was a new peer, or one of my closest friends, I kept the same tone and consistency throughout.

I had the wonderful opportunity to sit down with each one of my classmates and professors and talk about their free day in Reykjavik. I composed a series of questions to foster a conversation but took it deeper if the conversation allowed. Some conversations were a concise four minutes and others were over ten. I also used my voice memo app to record what they had to say. This was majorly advantageous for me,

To start the conversation off, I kept it casual and light, in the same way that I did in this blog post: name, year and major. There were two things that immediately stuck out to me in this incredibly simple series of questions. Firstly, there is a very wide range of academic levels here, all the way from rising sophomores to graduate students. Secondly, I was stunned by how many people transferred into the ESS major, and to West Chester University from different schools. Lilah Rathman transferred to WCU from James Madison University. Kelly Edmunds from Pitt, and Steven Brown from community college. Steven Sansone was once a Biochemistry major, and Rowan Kelley came to WCU with a Poli-Sci focus.

After a brief chat to get to know them all, I dug a little deeper and asked them what brought them to Iceland. Overwhelmingly, the answers were about how great of an opportunity it is to travel. Katie Winward described wanting to go since she was young. “I’ve always wanted to come to Iceland since I was, like, 12” she explained. “I’m really into glaciers and volcanos, and this is like, the only place in the world where you can find both together.” Rowan Kelley saw it as a fantastic opportunity for professional development. Anastasia Kelly said that it was her “only chance to leave the country,” so she took it.

Not everyone was as ambitious, though. My next question was to see if there was ever any doubt in coming. The main answer that I got was a flat out “No.” Many, though, had their doubts about traveling abroad. That, paired with the high price, caused a fair bit of hesitation. For the hesitant ones, I was curious to hear if there was anything or anyone that made them say yes.

“I always hesitate because I don’t like going away,” described Dr. Bosbyshell. He admitted that what made him say yes was the geology, volcanism, hanging out with students, and the fact that his expenses were paid for by the school.

Many people credited their parents as a major source of inspiration. Kelly Edmunds described how her mother’s reassuring phrase “we’ll make it work” gave her what she needed to commit. Other parents were a bit more... blunt. When Aidan Mountain talked



### **Katie Winward**

*“New Friend/Pink Duck*

to their parents about their hesitation, they responded, “Are you stupid? Go for it!” That seemed to do the trick, considering Aidan was here to tell me about it.

After this, I decided to shift gears and discuss what their day in Reykjavik was like. 4 people got tattoos. Others chatted with locals about music. Some met cats, and some enjoyed drinks at the bar. One of the main observations of the day was that everyone is nicer here in Iceland.

Architecture was brought up quite a bit as well. Dr. Nikitina pointed out that a lot of the architecture is based on the columnar basalt pillars, which are seen naturally in Iceland. Steven Brown describes it as “shockingly modern.” Paul Butera and Aidan Mountain both described the buildings as “generally boring, bland, and grey.”



**Dr. Howell Bosbyshell**  
“Whales”

Not everyone was in Reykjavik though. Dr. Bosbyshell went whale watching, far from town. “It was insane,” he said, “really fantastic.” He then explained that his phone died before he could take photos of the best encounter.

After they explained their day, I asked the group to take some time and reflect academically on their entire trip. The prompt was simple: “Teach me something that you’ve learned here as if I have no prior geologic knowledge.” This point was one of the most important for me, because “*To teach is to learn twice*” – Joseph Joubert.

“It would have to be the rootless cones,” explained Aidan, “and how they’re formed by lava flow going over wetlands.” Kelly gave me a brief but very intuitive lecture on soil succession. “You get the

unique ability to see the first few steps of succession here.” She continued to teach me and Steven B. who was at the table with her. The strength of her voice, paired with her incredible intelligence will enable her to be an excellent teacher one day.

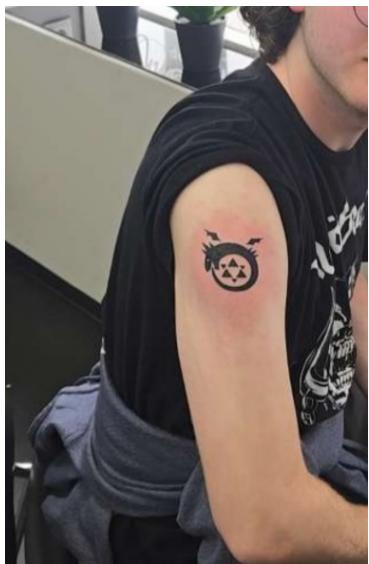
Jake Weinberger excitedly taught me about moraines and how they’re formed. “They are these rock shelves that are left over from glaciers,” he explained while using his hands to show the mechanism. Mirna Torres described the process of using tephra layers to figure out when the eruption happened, and from what volcano. Paul Butera taught me about how certain flat-topped mountains are formed when magma eruptions get trapped under a glacier. He later confirmed in his notes that this concept is called Tuya.

Something that really inspired me was the fact that both of my professors shared what they were learning as well. “I had never even thought about subglacial volcanic eruptions before,” Dr. Bosbyshell explained. I asked him if he thinks that it will enhance his teaching ability, and he responded simply: “Absolutely.” Dr. Nikitina believes that she is “learning just as much” as we are, and shared what she learned about settlers, historical connections and context and climate activity. Their testaments serve as reminders that there is always more to learn, no matter if you are a sophomore undergraduate, or a long-term professor.

Next, I asked the group what their MVI (Most Valuable Item) on the trip so far. “Honestly, my raincoat,” Katie said after



**Kelly Edmunds**  
“Euphoria!”



**Steven Sansone**

*“New Ink”*

some thought. “It has huge pockets so I can fit everything that I need in the pockets alone. [It helps] being next to waterfalls. Plus, it’s like a good windbreaker, with all the wind and stuff we’ve been experiencing.”

Steven Sansone said his battery pack has been incredibly useful to keep his camera working. This definitely could have come in handy for Dr. Bosbyshell during his whale watching.

Steven Brown said that it was his hand sanitizer. Aidan’s waterproof pants got a shoutout. Unsurprisingly, Paul’s item was his camera because he “can’t wait to have the photos for the rest of [his] life.” Like a true graduate level student, Mirna’s item of choice was her field notebook. Dr. Nikitina’s massive “geologic bible” has been her most useful resource. The mighty toothbrush was Anastasia’s item of choice. Of

course, Kelly decided to tell everyone in the room that I “don’t use those very often” as a joke. Very funny.

Everyone else in the group picked their backpack. Some answers were very matter of fact and literal, like Rowan who uses his bag as a place to “fill with rocks, or wet towels after swimming.” Others, like Lilah, explained why her bag had some sentimental value. “The backpack’s been with me every place I’ve ever gone,” she told me. “All the pins on my bag are from all of those places.” My personal favorite is the “It’s 4:19, Got A Minute?” pin. If I were to select an item, it would also be my backpack, that once belonged to my cousin John Greenwood.

~

Growing up, John was someone who tended to agree more with the animals in his life than the people. His dry sense of humor, paired with outright stubbornness was not exactly popular, but his horses and puppies did not seem to mind. The fact that he was much smarter than everyone else did not help in school either, but he eventually formed a motley group of other gifted-level super geeks. They bonded over Halo: Combat Evolved, and pretending to be soldiers battling with camouflage clothing and BB guns. John had a fascination with high quality equipment, so his camo set, and BB rifle were top notch. He frequently told the rest of my cousins and I about his “indestructible stainless-steel glasses.” Eventually it annoyed my cousin Liz enough for her to throw a yoga ball at his face, which of course caused the indestructible stainless-steel glasses to break.

After college, and when he was a bit older, he moved in with me and my family for a little while. I was around 8 or 9 at the time, but I still remember it vividly. We bonded over the same things, but our game of choice was Marvel: Ultimate Alliance and our BBs were replaced with the age-appropriate water gun. Many of my favorite nights with him were started by me asking my mom if I could text him on her phone and ask to play on the Xbox 360. My favorite day of all with him was when he took my cousins and I to the lake, where we had a water gun war. I was very little at the time, so my job on the boat was the munitions expert. I was to load the ammo (water balloons) into my tactical pack (camo backpack) and prepare for war (maybe getting wet). The backpack was about as big as I was though, so I was easily able to get to cover (hide behind it when I got scared). Like all of the best things in life though, him living with my family was not a permanent situation.

John had a long and complex history with his cardiac health. As a matter of fact, he had a heart transplant when he was in college. His new heart did not change how stubborn he was, which was definitely a bummer. Luckily though, his quick-witted humor and intelligence also remained. For many years, he led a relatively normal life, which briefly included living with my family. Eventually though, his health complications got worse again. For a while, he fought like the stubborn dork that he was. Ultimately it became too much, and he passed away in 2016. I was given many of his things, like his Xbox, a lifetime supply of Marvel comics, braided hair from his horse, and the camouflage backpack.

When I first agreed to come to Iceland, I immediately thought of John, and wanted to prepare myself with the best equipment that I could. I bought an overly expensive flashlight that I have only used once so far. I brought a battery pack that was so overkill that it could jump a car (which did actually come in handy). Most importantly though, I

brought his backpack to keep my things safe on hikes, wet or dry. I did quickly notice that his military grade backpack might be a little heavier than average, but that is because of its John-approved quality. The extra weight serves as a remembrance of his fascination with good equipment and represents the emotional weight of losing someone as great as he was. I think he would be overjoyed by the fact that I am using his bag (which once protected me from water guns) to protect my head from Icelandic waterfalls.

~



### **Paul Butera**

*“Probably one of the waterfalls”*

told me about her future niece, and about the blanket and toys she got her. Sticking to her theme of nice clothing, Katie told me about her “really cool Icelandic sweater.” She explained that “it’s a sheep’s wool. It was handmade by a mother and daughter who raised their own sheep.” Aidan talked about the “bracelets, magnets and dark chocolate” he got for home, and the “weird f\*\*\*ed up egg warmer, which I don’t know what I’m going to do with, but I had to buy it.” Seems like sturdy logic to me. Dr. Bosbyshell described how he really won’t be bringing much home besides “a few rocks from Oli.” He also describes having a hard time finding something for his wife, who “is not really much of a souvenir person.” He said that he will have to “find something that is just right for her.”

Others started off with the non-physical things that they’re bringing home. Lilah described a profound shift in perspective that she had. “Not only being grateful for what we have at home, but seeing the way we live at home compared to how they live here,” she described to me. Steven Brown said that he “finally had the time to slow down

Much like the last few pages of this blog, my next question focused on introspection. “Besides rocks, what will you bring home with you?” I asked. Many people responded with physical things first.

Mirna described buying “a lot of stuff for her family.” She



### **Lilah Rathman**

*“That’s my people”*



**Anastasia K.**

*“Cat”*

mentally and appreciate the surroundings.” Paul recognized immediately that I was hoping for a deeper answer than ‘magnets and a puffin shirt’. He responded “can I get all, like, cliché and corny? Well, the memories I’ve gotten here, and really gaining friendships with a lot of you.” Anastasia put it in a much more concise way: “Memories, photos, experiences.” Others described their photos as well.

Paul discussed how much use he is getting out of his camera. Kelly mentioned that she has over 1000 photos taken. Jake has her total beaten by another thousand. Such a high volume of photos must have made my next, and final prompt very difficult: Send me your favorite photo and explain to me why. Scattered throughout this blog post was everyone’s photo with a description of

who it is from and why it’s their favorite. After this, I shook their hand, thanked them for their time and went onto the next interview. I did this for all except for one conversation, which happened to stick out to me the most.



**Dr. Daria Nikitina**

*“Moments of student learning”*

Given that she is the reason why we are all here, I decided to dig a little deeper in my conversation with Dr. Nikitina. My favorite thing that she told me was about how she learned about Iceland when she was only in fifth grade, and it has fascinated her since. “As a matter of fact, the whole idea of Iceland was the reason why I became a geologist,” she explained. “[Iceland]’s actually what led me to choose my profession.” I asked her what it meant to her to be here after it being such a huge part of her passion for so long. She described it as a “dream” of hers that had come true. She then discussed how she originally thought it would be “very difficult to organize” which it turned out to be. “I knew quite a lot of other programs around the world taking trips to Iceland. They were sending itineraries and



## Rowan K.

### *"Kisurnar / The Cats"*

Later in our conversation, I asked her what it means to be responsible for and lead this field trip. She began by explaining that students learn better when they are shown what is going on, and that she really enjoys the “moments of student learning.” I call this the “Eureka” moment, when a student finally understands what is being explained to them. My biggest Eureka moment this trip was after a full day’s worth of wondering how plate boundaries move over hot spots. I think Dr. Nikitina was about ready to throw her wine glass at my head near the end, but luckily, I did eventually get my Eureka moment.

She then began talking about how it feels for her to travel like this. “I kind of realized that it is probably the happiest time ever, when there is a little bit of an adrenaline kick. Especially when you go into unknown places, taking a hike which you never took. The challenge of that really excites me. And the satisfaction of everything coming together in the right time and place. So, I think that’s what really makes me happy, like *literally* happy. I can feel the happy hormones in my brain.”

I know for me personally; the happy hormones have been all over my brain as well. I found it so fascinating hearing about everyone’s journey to Iceland, and to learn why they study geology. The hesitation into the fearful “I’m doing this” moment was present for nearly everyone. I loved hearing about what people have learned. There is a certain spark of passion in many people’s eyes when they begin talking about what they love. Hearing about everyone’s most useful item and comparing it to my own was great. Hearing about what everyone will be taking with them through their lives was amazingly inspirational.

suggestions, but it was still very intimidating,” she explained to me. Keeping everyone organized, fed, safe and educated was a huge task to do alone, so she recruited help from Oli. She described that their communication worked immediately, mainly because they both shared a passion for Icelandic teaching. “From day one he has never disappointed me,” she told me.



**Aidan Mountain**  
“Sandwich”

After such an action-packed week, I think everyone needed the free day in Reykjavík to reset. I hope my conversation with my peers gave them a chance to reflect on their time here thus far. Stop and smell the roses a little. For me though, the most important thing that I gained is my new friends.

Truly yours,

Josh Lantieri



**Josh Lantieri**

*“Thank you.”*

## **Day 11: July 14, 2025**

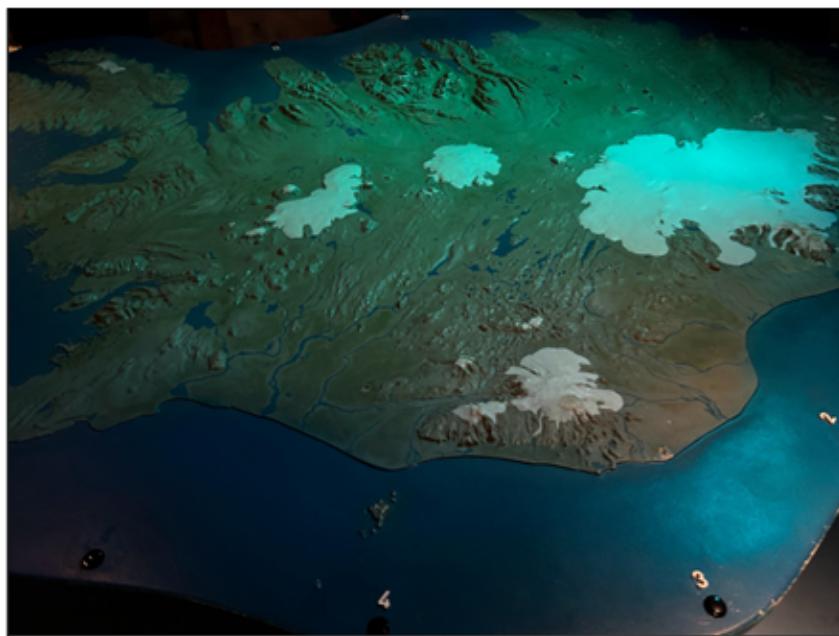
*By Rowen Kelly*

After a good breakfast and a nice cup of tea in my case, we set out from Reykjavík to visit the town of Borgarnes. Along the way, we saw many interesting geomorphological landforms related to western Iceland’s many fjords and glacial features. First, we crossed the Hvalfjordur fjord, a glacial trough carved by the Pleistocene glaciers, using the

unexpectedly long 5km tunnel built there (pictured here). We also observed kame terraces (also pictured) in the vicinity, likely left over traces from when the fjord was a proglacial lake.



After a moderately long van ride, we reached our destination. Borgarnes was built around an old trading post that the English used to trade salmon with the Icelandic. The town played host to this trade specifically because of its enclosed harbor, ideal for docking ships. Of course, no dock actually was built here, so the English had to anchor offshore and use rowboats to land on the town's pocket beach (also a landform). Although it is hard to tell, this might be why this bay is today called "the Englishman's Bay". I was also able to observe that the volcanic rocks in the riprap near the bay contain interestingly large quartz phenocrysts, and some looked very pretty and geode-like. Too bad they were too big to carry back.



Anyways, we then visited the Borgarnes Settlement Centre, which holds two exhibits: one centered around explaining how the Norse settled Iceland (according to the Books of Iceland & Settlement), and the other dedicated to the town's (semi?) mythical founder and his son Egil, who are characters in the (famous?) Icelandic saga, the Egilssyning. The exhibit features many exciting audio and video elements to help bring the old sagas to life, even if you have to wait in the heat in a thick sweater while the audio tour plays out. Here is a picture of the map displaying how the Norse first settled around bays, features which provide shelter for their longboats, and the glacial rivers which connect to the sea. This was because the climate temporarily enabled the growth of large birch forests which partially inhibited further inland expansion by the original Vikings (the subboreal period?). Meanwhile, the Egilssyning exhibit detailed Egil's coming of age and rivalry with the Norwegian royal family. Like many sagas (according to Oli) the story centers on revenge and preserving one's honor, important ideas in old Norse society. Unfortunately, I did not get to see the end of the story, but I'm sure the saga had an interesting ending.



After a nutritious veggie lunch, we then proceeded to drive over to the Hraunfoss Falls, a series of waterfalls on a basalt lava flow that meets a glacial outwash river coming from Langjokull (pictured below). Where the white glacial till laden water meets with the clear basalt-filtered fresh water coming off the lava flow, a sharp color gradient can be observed (also pictured). The basalt itself has a clear ropy pahoehoe texture in outcrop.

Coincidentally, the eruption which created the lava fields actually emerged from under Langjokull as well. On the sad side, two children purportedly died trying to cross a natural basalt bridge in the area, which is why the modern artificial crossing is called Barnafoss (children's bridge). Their bereaved mother ordered the original basalt bridge destroyed so that another accident could never happen again. Another natural basalt crossing can still be observed a couple of meters upstream of the former one.

To end the day, we had a nice fish dinner.

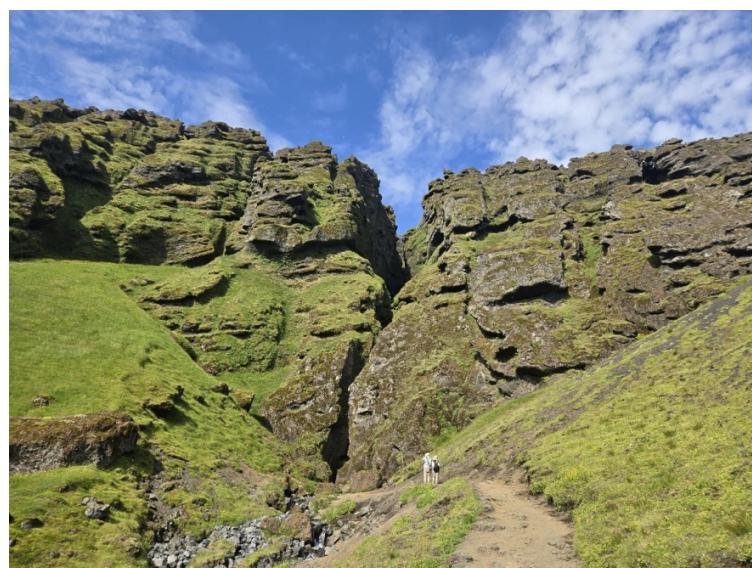
## Day 12: July 15, 2025

*By Jacob Weinberger*

We started the day off with a lecture from Dr. Nikitina about what we'd be doing and learning about today. She discussed Snæfellsnes Peninsula which has some of the oldest exposed rocks from the Miocene. There are green basalts near the coast because the system nearby is an abnormal stratovolcano. During the Miocene, the rift zone was in this area, making it Iceland's hot spot. This hotspot moved to where it is today around 6 million years ago. The peninsula is effectively a tracing of the hotspot over time as the plates shifted and changed. Also, with having so many eruptions during the Pliocene, the peninsula sank leading to many synclines in the area and old volcanoes were lifted at times exposing the blue lava gabbro. Fortunately, no real eruptions have occurred here in the eastern area since before Settlement took place, but it was very active during the Holocene. The coastlines have lifted since glaciers from the area have retreated causing most lakes in this area to be cattle lakes. She also noted that you can figure out the rate of the peninsula's uplift by referencing the rate at which the lakes turn from salt water to freshwater. After the information, we took some time to look at the maps then piled into the vans around 9:30 to start off our day.

### Stop 1: Slot Canyon, Rauðfeldsgjá

We arrived at this next stop around 9:50. Rauðfeldsgjá is a relatively small slot canyon created from continuous runoff water. The hike up took around 15 minutes up fairly steep and gravelly hills, but the main part was climbing into the canyon by rock hopping and avoiding the stream passing through. To reach the farthest part we went to only took another 5 minutes or so, but it had its challenges.



The Canyon is also mentioned in the Icelandic saga, Bárðar saga Snæfellsáss, which was written around 600 years ago about events that occurred about 12 centuries ago. In this story, Bárður, a half-troll and half- man, in anger over the loss of his daughter by two brothers, Rauðfeldur and Sölvi, throws them off the cliff and into the canyon to die. We hiked down after everyone was done taking pictures and gathered into the cars around 10:30 where Björn delighted us with a tale of Iceland's only known serial killer, Axlar Björn (unfortunately no relation). Axlar lived in the 16<sup>th</sup> century and had killed 9-18 people.

#### Stop 2: Hike Along Hellnar Coast

We arrived at the main lookout point of the Hellnar Coast around 11:00 for an hour-long hike. Before that however, Dr. Nikitina gave us a rundown of the area. The rocks in the area are around 3,500 years old or so and along the steep cliffs are columnar basalts with pillows basalts on top more than likely caused from an underwater eruption. There was a Tuya behind where we parked.

We stood up on an uplifted flat surface called a marine terrace with a few others visible in the distance. This coast has no glacial outwash and has many volcanic necks. Once a volcano that had magma in it that cooled with the outer volcano being eroded away leaving the cooled magma standing as stone pillars. The hike lasted closer to an hour and a half as we made our way seeing many of these same features, and plenty of birds along the coast in their nests with their little chicks.



We arrived at the end of the hike around 12:15 at a small café called Simply. We waited there for the cars to pick us up and most grabbed refreshments or pet the cute black dog that was wandering around. We then left for our next stop around 12:30.

### Stop 3: Sjominjasafn, Maritime Museum

We arrived at the museum around 1 for lunch which was fish soup and bread. Although I unfortunately didn't enjoy the soup, I hear it was very good, and the bread was crunchy and lovely, and my soup made another classmate happy. We finished lunch then around 1:30 we started the actual museum viewing. There were four main exhibits being a wildlife display, history display, turf houses, and a viewing point. Starting with the wildlife display, it was very impressive. There were over 60 species of bird present and an immense about of ocean life from fish and land animals to crustaceans and shellfish and the like, too much to fully take in in one go.



We then moved on to the history portion, which was the one to look out for mostly. The history portion was very big featuring a huge ship in the middle of the room. Along with the important facts like there being 10 Cod Wars, wars between Norway and England

over control of Icelandic fisheries since Christianity allowed fish meat to be edible during fasts where no meat can normally be eaten, we were tasked with finding a connection here to North America. Christopher Columbus more than likely visited Iceland to learn of the Norse discovery of America, but that wasn't the full answer. To find that we had to go outside to some signs posted about some more history and myths. The true connection was that Liefur Eriksson discovered America 500 years before Columbus did and around that same time in 1004 AD there was a well-traveled woman named Gludrider that made it to America around the current New York area too. Finally, we looked at the Turf houses which were all decorated up in what they'd look like in their time period. They had plenty of old tools and cookware and tight spaces to crawl through. After the information parts of the museum, they had some small activities to take part in such as a duck pen, ring toss and connect four. Unfortunately, I was unsuccessful at the ring toss game but the ducks were adorable so that made it all okay. The final thing we did before heading out was walk up to the viewing point overlooking the whole area ending this stop with a very pretty sight leaving around 2:20.



#### Stop 4: Kirkufell Waterfalls

We arrived at a small area around 2:50 and hiked about 5 minutes up a trail to view some beautiful waterfalls in a glacier valley. There was a feature behind where we parked called a Nunateck which is an old Tuya that was poking out above the glaciers

and as the glaciers retreated, gouged the sides but missed the top leaving a very tall and pointy hill.



This Tuya was formed in the Pliocene and had lots of rhyolites all around. A glacial cirque could also be seen in the area. The actual waterfalls themselves were very beautiful and we'll worth it for the short hike.



After a good amount of viewing time and picture taking, we left around 3:20.

### Stop 5: Berserkjahraun, Cinder Cone

We arrived at a tall cinder cone volcano around 3:40. It's from the pre settlement era with no exact age known. Along with the one we climbed; there are many in the area that were created from the same source of magma. They're aligned on a fissure zone and have rhyolite domes surrounding with plenty of pumice and scoria all around. The first part of the hike was difficult but manageable as we made it up there in no time. The second part was up a much steeper part of the cinder cone full of small tephra making each step difficult to place. The view at the top was worth it though as you could see all around and into the volcano itself as a far drop down.



We admired the view for a while and tossed plenty of stones in to keep us busy and the hiked down looked terrifying as well with the steepness. Luckily, we all made it safely down and met back up at the cars around 4:45 for our final stop of the day.

### Stop 6: Hot springs

Our final stop was at a very small and secluded hot spring around 5:50. We weren't the only ones there and unfortunately with no changing rooms or any amenities of the like

most of us didn't go in. We took the time to relax after the long cinder cone hike and reflect on the day before dinner. I have no pictures as I didn't want the possibility of catching anyone indecent. We didn't spend terribly much time here and ended up leaving around 6:30 for dinner at Óseyri Hlaðan. We had Chicken and Gnocchi and left around 7:30 to go back to the hotel and have everyone rest of their sicknesses.



### Day 13: July 16, 2025

By Aidan Mountain

Howdy! Bright in the morning having just woken up at 7:27am for our breakfast at Hofgardar which had unexpectedly been moved forward from 8am to 7:30am. Still being very tired and seeing this message whilst creating a 10-minute timer to get *more* sleep I rose out of my bed with a fire under my ass. Only 10 min later I got a text from a fellow student, Katie, asking if I was going to the grand food basement; and also, just casually if I'd heard about the eruption. Like pal, please lead with that! I hadn't since the eruption started at 3:56 on the Sundhnúksgígaröð Crater row, since then the crater had reached ~1km in length extending Northeast diagonally, but who even cares about volcanos? Anyways I'll get back to the eruption later with updates throughout the day.

Here is my delectable breakfast not at all photos bombed, merely my third hand so I can consume my sandwich, skyr, and that delectable red beverage all at once.



We hit the road at about 8:40am with full intent of disregarding our previous plans for the day, that being a geothermal plant tour. Still regardless of if the plans had changed or not our route hadn't since the geothermal exhibition is located near Reykjavik, with a clear goal and a light heart we drive Southeast. At ~10:10 we hit Hvalfjörður, an undersea tunnel spanning the 5km gap between the fjords. Right before entering the tunnel though we smelt that oh so familiar scent of sulfur in the air from volcanic fumes as it turns out the gas plume from the fissure was traveling Northwest to the Snæfellsjökull peninsula. As fate would have it this is our exact location at the time, and more importantly spanned the rest of the path south to the fissure.

At 10:30am we stopped for gas and a meetup with Oli as they would be switching out with their son Bjorn to lead us the rest of the trip; Daria had woken Oli up early in the morning to help plan our route to see a clear view of the volcano. Unfortunately fate is fickle, so the wonderful weather we had for this entire trip ended. With this quick turn even if we were right in front of the volcano, we'd still have difficulties seeing it, so back to the original plan! And off to the geothermal plant we went.

Here I am at 10:40 with some snacks moments before learning how the weather was turning for the day. On a side note, this licorice is wonderful and if you'd like a piece just ask! I'm nearly dying to give it away.



But hey! It wasn't all bad it's not like was almost no visibility whilst driving further south.

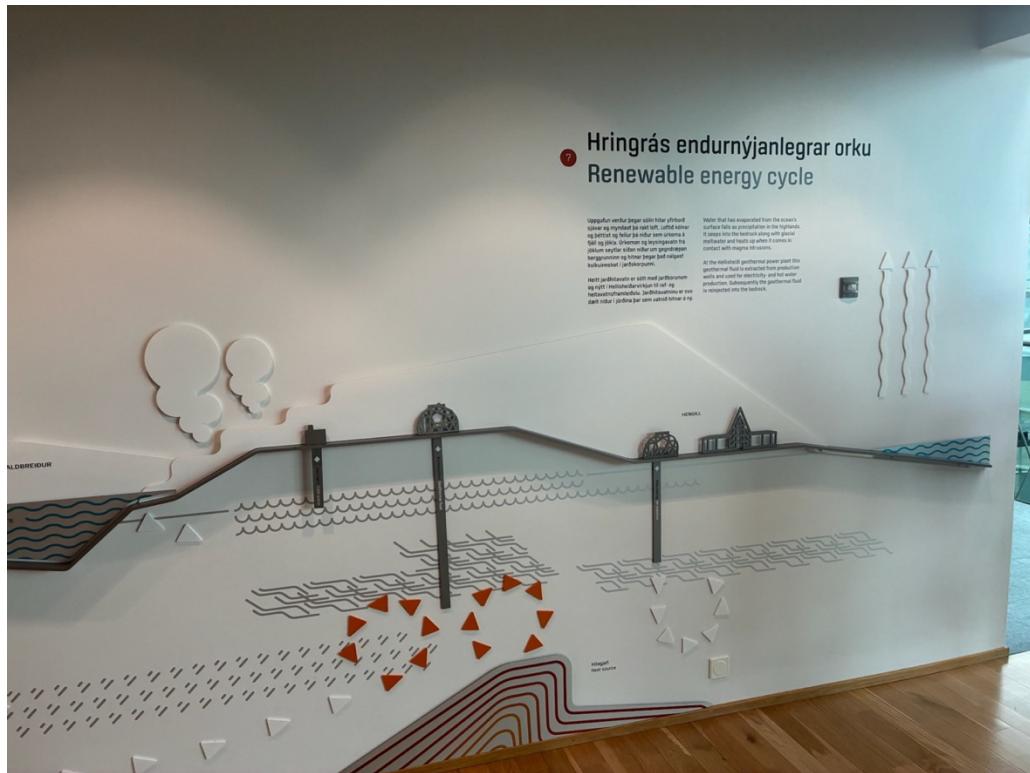


...I think its best I stopped trying to predict the weather from now on. Sadly, we could only see about 15 meters in front of our car for the next half hour with it lifting to just horribly foggy when we reached the geothermal plant.

At the plant we had a lecture about the different types of geothermal energy that can be extracted from the ground, with the two different temperature fields at Low and High temperature. Low temperature being from 50–250-degree Fahrenheit, and high temperature exceeding 280-degree Fahrenheit. There are only seven high temperature fields in Iceland and over a hundred low temperature fields, these plants combine with hydroelectric plants (there being ~50-60) such as dams account for nearly 99.99% of all the energy needs of Iceland.



The production hole is 2km deep into the bedrock to extract geothermal fluid at a staggering 500-degree Fahrenheit, the fluid is formed from the hot water dissolving minerals in the basalt; the most common mineral is silica. The geothermal fluid is used to make both hot water and electricity from steam: the hot water is made by piping more groundwater up, cold water is fine here since the water is going to be confined around the geothermal fluid pipe to transfer the heat from one liquid to another without mixing. Once the geothermal fluid is 'used' it is reinjected into the bedrock as far as it can be from the production hole. This slowly erodes the porous bedrock makes it very slowly over time worse at storing fluid, but it can be used very safely for the next 2,000 years. Depicted is the three bore holes.



1:15pm After the geothermal plant we had a lovely lunch at the Mathöll Höfða food hall in Reykjavik, I had a delectable serving of fish and chips. With that said here comes our last volcano update for a while. The fissure is ~2 km long and not contained to a single fissure anymore; with a smaller fissure at ~500 m, though the explosives of the eruption has gone down overall.

Paul for scale



Our next stop was Geraenavatn (green lake), just a very blue lake that is green at the edges. The color of the water is caused by the nearby high temperature field, chemical weathering from silica is the likely reason why it is that way. Down the road we visited the boiling mud pots that caused Geraenavatn, it also smelt so strongly of sulfur that I nearly passed out; lucky for me humans have fingers and a very easily held nose!



Next one up was the lava tube! One of the stops I had been most looking forward to on this trip, genuinely a great sight although it was admittedly kind of off-putting having a huge crack just over my head. The tunnel continues in both direction for about 2 km more.



Our last stop of the day before dinner I was starting to feel very faint, but it was looking at the fissure over the horizon from a nearby mountain. Not much to say we couldn't see the lava shooting out, but the smoke was breathtaking (literally it did make it hard to breath at times).

At dinner we went back to the public deli for burgers and fries, loved the fries but I was almost passing out so I couldn't finish the burger.

At much later at 11:49 the haze cleared up from Dr. Bos's hotel window.



#### **Day 14: July 17, 2025**

*By Kelly Edmunds*

We started our last full day in Iceland with breakfast and a final exam that pulled everything we've learned together. Over eggs and toast and Swiss cheese and yogurt, we prepared to show off all that we had learned. The exam itself was thorough. It covered

tectonics, glacial systems, volcanism, and cultural history, basically, everything we've been walking across, hiking through, and writing about. We explained how Iceland is split by the Mid-Atlantic Ridge, where the North American and Eurasian plates drift apart and magma rises along fissure swarms and rift zones. We talked about basaltic volcanism and how volcanic eruptions under glaciers can form tuyas and generate sudden jökulhlaups. The glacial section had us identify landforms shaped by advancing and retreating ice, moraines, outwash plains, and connect those features to Holocene climate shifts. And finally, we wrote about Iceland's settlement history, including the formation of the Alþing, the world's oldest parliament, and the expansion of Viking society across the North Atlantic. Honestly, it felt good to write about it all, to realize how much "just being here" has taught us.

After the exam, we walked down to the Viking Museum right on the water. From reconstructed longships to saga stories, the museum brought Viking life into focus. The museum was immersive, part historical deep dive, part cultural showcase. We began with the Dawn of Viking Society, learning how trade centers across Scandinavia flourished around 800 AD. Places like Ribe, Hedeby, and Birka transformed from farming communities into economic hubs, where mass production of tools and weapons supported voyages to places like Iceland, Greenland, and beyond.

Inside, a massive full-scale Viking longship stretched across the museum floor. These ships were technological marvels: fast, lightweight, and perfect for navigating both open ocean and shallow rivers.



We then followed panels on the Swedish, Norwegian, and Danish Vikings, each with distinct routes and cultural contributions. The Swedes went east, forming trading routes through Russia and into the Middle East. The Norwegians, with their fjords and shipbuilding traditions, set sail west to Iceland and beyond. The Danes, whose central government formed earlier, were the builders of forts, roads, and coastal kingdoms. One room showcased weapons, armor, and tools, axes with carved handles, iron swords, and chainmail helmets, lined up beside Viking shields. Another displayed jewelry, revealing the artistry and craftsmanship of the Norse people: intricate brooches, silver beads, and amulets shaped like animals and gods. This was my absolute favorite part because I personally love jewelry and that has always been an integral part of my life.

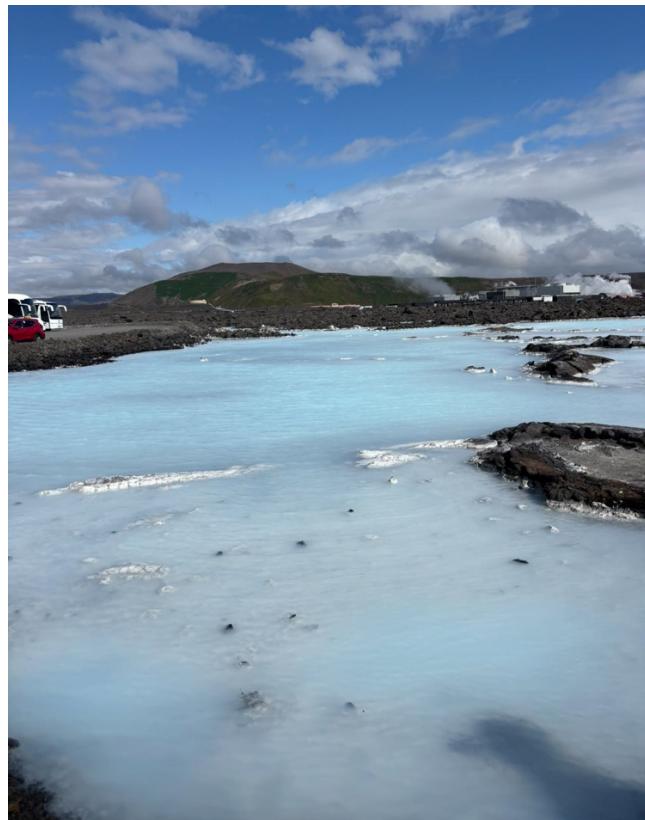


In another gallery, the focus shifted to literature and belief systems. We explored the Vinland sagas, epic tales about Leif Erikson, Erik the Red, and Gudrid, the first European woman to give birth in North America. These sagas weren't just entertainment; they preserved knowledge, seafaring techniques, and family histories. We also learned about the Christianization of the Norse world, which started around 800 and changed not only their religious beliefs but their laws and social structures. The shift from paganism to Christianity brought new rules, especially limiting the roles of women, who had held more power in pre-Christian society.

Finally, the exhibits turned to Thingvellir and the Alþing, Iceland's national assembly founded in 930 AD. We read how early settlers, facing no central government, created a democratic forum where free men debated and passed laws, establishing the world's oldest parliament, still active today.

The museum ended with reflections on emigration, driven by land hunger and the search for farming space. With most of Norway's farmland already claimed by the 850s, Norse farmers looked outward, colonizing places like the Shetlands, Orkneys, and Iceland. Here, they recreated their agricultural life, fishing, herding, and building turf houses against the wind. This museum was the perfect bridge between science and story, giving life to the people who once lived here, sailed here, and shaped the land we've been walking on for these past two weeks.

From there, we traded history for relaxation and headed straight to the Blue Lagoon, and honestly, it felt like entering another planet. The silica-rich, milky blue water looked unreal against the jagged black lava fields. But it's not just for show: the lagoon is a geothermal byproduct of the Svartsengi power plant nearby. Hot water drawn from deep underground, rich in minerals like silica and sulfur, is used to generate energy, and then it's released into the lava field, where it pools naturally, forming the lagoon we all now associate with dreamy Icelandic spa days.



We soaked for hours. Most of us tried the silica face masks, scooping it up from the provided stations and painting our faces. Most of us ordered the strawberry wine, and soon we were floating in the silica pool. You could feel the stress from the exam melt away with every minute we spent there.

On the way back, as we passed a ridge on the Reykjanes Peninsula, we saw a live volcano: faint orange glows flickering through the steam, an active fissure eruption, quietly shooting in the distance. We all begged Dr. Boss to stop so that we could take a look, and, as geologists, of course we did. Sadly, we came straight from the lagoon, so our hiking gear was not exactly adequate.



Even from far away, we could make out several eruption vents aligned along a linear fracture, classic evidence of a tectonic fissure event. Unlike explosive composite volcanoes, these eruptions are more effusive, releasing low-viscosity basaltic lava that oozes steadily from elongated cracks in the Earth's crust. This particular fissure is part of the ongoing volcanic episode that began in 2021, what geologists are calling a potential multi-decade fire event as the Reykjanes volcanic system reawakens after roughly 800 years of dormancy. Seeing this with our own eyes, an active eruption on the move, wasn't just cool, it was geologically profound. This is the kind of thing we study in textbooks and watch in time-lapse videos, but here, it was live. It was just beyond the road, quietly reshaping the land in real time.



We ended the day with one last dinner together. It wasn't fancy, but it didn't need to be. We were full of stories, still warm from the lagoon, still buzzing from seeing lava with our own eyes. We talked about our flights home, our favorite hikes, our longest field days, and all the cod we ate.

Tomorrow, we fly home... but tonight, Iceland is still steaming, glowing, and unforgettable.

### **Day 15: July 18, 2025**

*By Howell Bosbyshell*

Since our last day in Iceland technically began at midnight, I'll start with a photo from my window in the Hotel Konvin taken at 12:45am. The eruption was not quite as strong as the previous evening but was enough to hold my attention until well past my bedtime.



The last day got off to a slow start. The early breakfast crew was even smaller than usual. Steven B. was at breakfast early, leaving around 8:30 to meet his family. Checkout time was 11:00am, but Oli wasn't expected until noon, soon everyone gathered in the Konvin lobby to await transport to the airport. It turned out that Josh's film camera had some shots remaining on it, so he went outside to use up the film before we left. This provided Lilah with an opportunity for one last encounter with a Hopp scooter. I'll leave it at that.

Bjorn arrived at the hotel around noon to shuttle us to the airport. Students were disappointed not to see Oli! As Bjorn was alone, he had to leave the VW van at the hotel and return later with someone to drive.

The check-in process at Keflavík airport was different from any I've experienced. Passengers were asked to print and attach their own baggage claim tags for checked luggage, which involved scanning one's passport. Passengers then had to place their luggage on a conveyor belt and scan the tag they had just attached. After responding to some prompts, the luggage was scanned by some sort of security beam before being sent on its way.



A couple of students' bags (I won't mention names) were overweight, requiring some repacking.

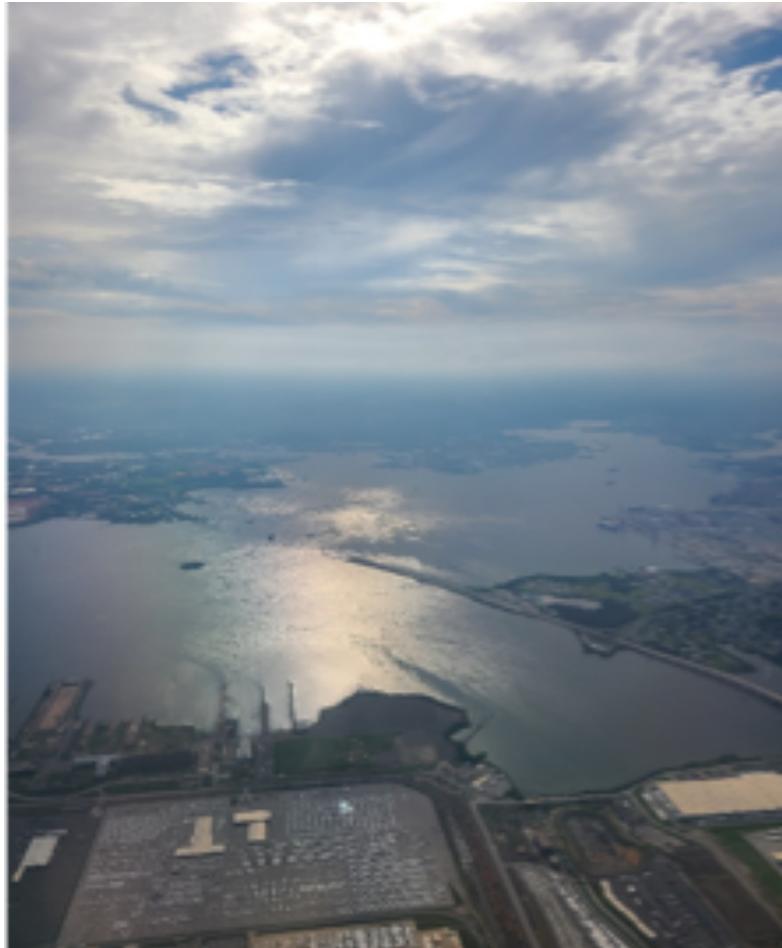
Our experiences with security varied. Most had an easy time, but random passengers, including at least two of our group, were asked to remove their shoes. Unlike our experience in Baltimore, we had to remove laptops from our bags. Getting mine out was no problem but putting it back in was a bit of a job as my backpack was crammed with dirty laundry. I don't think I was alone in this. One student didn't get the word about removing his laptop so had to go through a second time. Mirna had to unpack her bag because scans indicated the presence of a non-existent liquid. She gave her security experience a frowny face rating.

Ironically, Paul had a large bottle of hair conditioner in his bag which passed through unnoticed.

One student was actually checked out by security, for no apparent reason, while waiting in the gate area. His bags were thoroughly searched. Luckily, their rocks were safely stowed in the checked luggage (just kidding – I don't know this).

While inching along the jetway to board the plane we noticed a luggage cart on the tarmac and recognized Lilah's pink bag and possibly Aidan's bag as well. Hopefully the contents of the cart were loaded before take-off!

The flight was mostly smooth. When I looked out the window with a little more than an hour to go, I saw a very large and swollen river, which I reasoned must be the Hudson - I thought recognized the Shawangunk ridge. My observations were confirmed when the pilot pointed out the view of NYC to passengers on the left side of the plane.



As we approached BWI we had a view of the gap in I-695 where the Francis Scott Key Bridge used to exist. The bridge collapsed in a tragic accident in March 2024.

We had a smooth landing and, after a short wait for Customs to begin processing passengers, everyone made it through uneventfully and collected their luggage – including the bags that we had seen outside the plane as we boarded! Although Aidan and Katy's air tags seemed to indicate that the bags might not have been on the same flight!

While the Iceland trip was a truly amazing experience, it felt good to be home.

## PHOTO CONTEST



Volcanic Feature – Kathleen Winward



Waterfall – Paul Butera



Glacier - Steven Sanstone



Landscape – Aidan Mountain



People doing things – Anastasia Kelly

## GROUP PHOTOS



2021 Volcanic Eruption



Maar Crater in Torfjökull Caldera



On the summit of Edfell



Reynesfjara

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