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Ambassador Story

# *Ponds of Utqiaġvik: Exploring Hidden Life in Arctic Alaska*

Archie Clarkson taking environmental measurements, including oxygen percentage and pH, of a polygonal pond in the Arctic coastal tundra. Photo © Anne D. Jungblut


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"TWILIGHT" project

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## Exploring an Invisible Arctic World

**Protists** are microscopic organisms that play essential roles in ecosystems by recycling nutrients, consuming bacteria, and producing oxygen through photosynthesis. They form a key layer of the food web, and without them many ecosystems would struggle to function. Although protists can be found even in the frozen ponds and lakes of the Arctic, we still know little about which species live there or how they survive such extreme, low-oxygen conditions. Understanding these microbes is especially important as the Arctic experiences rapid environmental change.

To explore these questions and study protists living in permafrost ponds, I travelled to **Utqiaġvik, Alaska**, the northernmost city in the United States and home to the Iñupiat people.
By studying how Arctic protists survive and respond to simulated winter conditions, we can gain insights into how life adapts to extreme environments and how climate change may reshape these fragile ecosystems.

While working across the flat, pond-dotted tundra, our team learned about local life and culture from Roxy, a bear guard who kept us safe from polar bears. I collected pond water and measured environmental conditions. I am now back in the Museum's lab examining these samples using microscopy and DNA sequencing to identify species, including those new to science.

***Figure 1**. Sampling day in Utqiaġvik, Alaska. Collecting pond water to study the protist community and understand how Arctic microbes survive winter conditions in a changing climate. Photo © Anne D. Jungblut. Archie Clarkson featured.*

## How POLARIN Made Arctic Science Possible

Preparing for the TWILIGHT project revealed just how much work goes into Arctic field research long before arrival. POLARIN supported us through the entire process: securing permits, arranging travel, and making sure everything was ready at the **Barrow Arctic Research Center (BARC**). Thanks to this groundwork, our focus in Utqiaġvik could remain on the science rather than the logistics.

Staying at BARC meant that our fieldwork began and ended each day within a vibrant research community. Sharing accommodation and facilities with other Arctic scientists created countless moments of informal learning conversations over meals, discussions in shared workspaces, and exchanges about ongoing projects across the coastal tundra. These interactions helped us understand the broader scientific landscape of the region and shaped the way we approached our own work.

Every morning, we met with the BARC operations team to plan our field activities. Because our project involved sampling ponds that had never been studied for microbial eukaryote ecology, arriving with a detailed, fixed plan wasn't realistic. Instead, we relied heavily on their recommendations to identify suitable and accessible sites, particularly within the Barrow Environmental Observatory. **Their familiarity with the terrain saved us time, expanded our sampling opportunities, and ensured that our efforts were both safe and productive.** On our final field day, BARC arranged for us to use All-Terrain Vehicles (ATVs), giving us the chance to reach more remote ponds that would have otherwise been out of range.

## Lessons From the Field

Throughout the week, bear guards accompanied us in the field. Their role was essential to our safety, but they also generously shared stories and knowledge from their experiences living in Utqiaġvik. Hearing about their connection to the land and the significance of the coastal tundra deepened our understanding of where we were working and why this environment matters so deeply to the Iñupiat community.

***Figure 2***. ***On the left****: A polygonal pond in the Arctic costal tundra with a small wooden platform left over from when this pond was first studied during the International Biological Program of the early 1970s.* ***On the right****: The upper layer of pond water was sampled carefully to avoid disturbing the sediment below so that just the planktonic microbial eukaryote community was captured. Photo © Archie Clarkson, right photo featuring Anne D. Jungblut.*

Back at BARC, we had access to the laboratory space and equipment we needed including a microscope and cold-storage facilities which allowed us to process our water samples immediately after collection. Being able to prepare the samples onsite before transporting them back to the Natural History Museum in London made an enormous difference in the quality and integrity of the material we brought home.

Among all the moments from that week, one stands out clearly. On our final afternoon, after finishing our last sampling session, we travelled back along a black sand beach on ATVs. To our left, the Arctic Ocean stretched into the distance; to our right rose a muddy permafrost cliff. Whale bones and driftwood lay scattered across the shore. **Realising this would be my last time seeing this landscape on the trip, I felt a mix of sadness and gratitude, a deep awareness that I was in a place truly unlike anywhere else.**

Before we headed back to BARC, our bear guard brought us to Point Barrow, the northernmost point of the United States. Standing together at the edge of the continent, skipping smooth black stones into the Arctic Ocean, felt like a quiet but perfect conclusion to **a week that had not only shaped my research, but broadened my perspective on the Arctic and the communities who call it home.** It was a unique privilege to conduct research alongside members of the Iñupiat community. I found it particularly meaningful to ask questions that went beyond my own project, and I am grateful for the opportunity to learn from them about their lives, experiences, and connections to the Arctic coastal tundra ecosystem.

For future POLARIN users, I would encourage arriving with openness and flexibility and to make time to talk with local people and resident researchers who know the landscape and ongoing research best; their insights are sure to transform your plans for the better.

***Utqiaġvik is a wonderfully peaceful place to conduct fieldwork, and I hope that one day I might have the opportunity to return to experience it all over again.***

**Figure 3.** A nearby groundhog became an unexpected companion during sampling. Photo © Archie Clarkson.

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