The Hidden World of Permafrost

Hot Times in Cold Places

DRL – 1423550 (UAF) & 1423587 (OMSI)

Project Overview

This collaborative research project, led by teams at the University of Alaska Fairbanks (UAF), and the Oregon Museum of Science and Industry (OMSI), will engage the public in the nature and prevalence of permafrost, its scale on the earth, and the important role it plays in the global climate. It builds on 50 years of informal education and outreach at the Alaskan Permafrost Tunnel, the Nation's only underground facility for research related to permafrost and climate. UAF will engage new audiences in Alaska by improving the visitor experience at the tunnel, and by taking traveling programs to Native villages. A traveling exhibition and related programs produced and disseminated by OMSI will reach a national audience at science museums across the U.S.

Project Goals

- Improve visitor experiences at the permafrost tunnel with new tours, exhibits and signage in the tunnel and in the new log cabin visitor center.
- Create and disseminate traveling programs and exhibits about permafrost and climate change to remote Native communities in Alaska.
- Engage in an active program of dialog in the villages to collect Northern stories of climate change.
- Produce an interactive traveling exhibition designed to engage families at science museums in the big idea that "Permafrost is old, cold, huge, and thawing so fast it will change our world."
- Conduct research on the relative importance of real and replicated materials in ISL.

Project Team

UAF Team

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Permafrost Project Research

The research component of our project investigates the broad question "What is the power of a real object?" We will use ethnographic methods to study learning using real, replicated, and virtual objects in Years 2–4 of the project. We will observe, videotape, and interview visitors to the permafrost tunnel in Fairbanks and the museum exhibit in Portland, focusing on the following research questions:

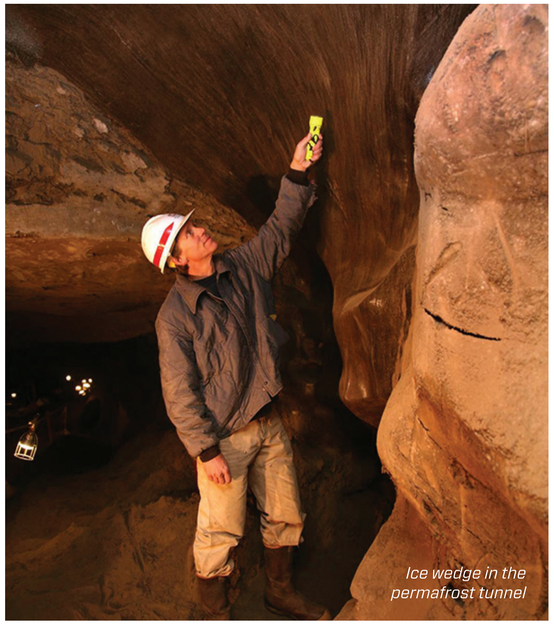
- What is the nature of visitor talk with respect to explanations and elaborations about permafrost, tipping points, climate change, and geological time?
- How do attributes of "realness" (such as scale, resolution, uniqueness, history and adherence to an original) affect the visitor's experience of objects, as perceived through the senses and emotions?
- What is the nature of science identity work when visitors engage with real, virtual, and replicated objects?

Major Front-End Themes

Evaluation participants understood the Arctic's significance as a bellwether of changing climate and as a motivating image for expressing agency and taking action to mitigate the effects of climate change.

- Most participants had a general idea of what permafrost is but did not understand its complex composition or how and when it was formed, although most articulated some level of understanding of permafrost as an indicator for climate change.
- Nearly all participants in both Alaska and at OMSI indicated an understanding of climate change.

Permafrost tunnel



Ice wedge in the permafrost tunnel

However, in both settings participants noted a lack of confidence in their scientific knowledge about the causes and consequences of climate change. In further discussion about climate change, many Alaska participants focused on adaptation to climate change, whereas many Oregon participants focused on the need to mitigate change in addition to adaptation.

- Among all participants there was a strong interest in learning about permafrost in a "real" setting with "real" objects. At the tunnel, Alaska participants valued being able to experience the atmosphere of the tunnel, as well as see bones and other objects as they are found rather than in a museum. In Oregon, several participants suggested replicating the tunnel; participants wanted to touch ice, feel cold, see objects that would be in the real tunnel, and navigate in dimmed lighting.
- Participants in both locations thought about climate change in relation to what it meant for them personally. In Alaska, tunnel visitors thought about climate change in terms of local adaptations to changing circumstances and underscored a personal connection to the Arctic. OMSI visitors also expressed concern for the Arctic in relation to what it meant for them personally ("it's all connected"); it may be effective to design exhibit materials that provide ways for OMSI visitors to connect with the science of the tunnel through what it means for helping mitigate climate change elsewhere.

Primary Audience

- **Underserved Public Audience:** Alaska Native youth (ages 9–14) and their communities
- **Professional Audience:** ISL professionals
- **General Public Audience:** families with children (ages 9–14)

Outreach program at Native community

Anticipated Project Challenges

- Trying to serve communities and populations that live in very remote places where delivering content can often entail dangerous travel conditions, darkness, extreme cold, and snowy weather that would shut down places like Washington, D.C.
- Trying to serve Alaskan communities where on one hand permafrost is a very familiar everyday part of life, but on the other, is not really well known or understood because it is below ground and hidden.
- Trying to bring permafrost content to lower 48 communities where permafrost does not exist, and where it is so alien that we have to explain many basic features and properties.

Evaluation

Front-end evaluation focused on gathering visitor feedback to inform the development and implementation of public audience deliverables.

Exhibit front-end evaluation data was collected from:

- Permafrost Tunnel visitors (22 pre- and post-interviews and 25 family group observations in Fairbanks, Alaska)
- OMSI visitors (60 interviews with individuals or family groups in Portland, Oregon)
- Community Science Night participants (38 comment cards and open-ended comments)

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Everyday Encounters with Science