OFFICE OF POLAR PROGRAMS

U.S. National Science Foundation Current & Future Plans

Kangerlussuaq Science Workshop – January 23, 2024 Renée D. Crain, Program Manager, Arctic Research Support & Logistics



National Science Foundation

Background on NSF

- The U.S. National Science Foundation is a government agency with the mission to promote the progress of science; to advance the national health, prosperity and welfare; and to secure the national defense.
- Nearly all funding is competitively awarded to research grants and agreements and some contracts
- Battelle Arctic Research Operations includes Battelle and a subcontract to Polar Field Services <u>https://battellearcticgateway.org/</u>
- Projects in Greenland are shared to Isaaffik and visible at <u>https://armap.org/</u>





NSF Science – Martin Team



Significance of ice-loss to landscapes in the Arctic

NSF award 2000649: Jonathan Martin, University of Florida

How are rock weathering and stream geochemistry affected by changes in glacial landscapes?

- **Measuring:** sediment composition, plant and microbe colonization, water availability in glacial watersheds.
- Work locations: ice surface near Point 660, the Watson River, Lake Helen watersheds west of Kangerlussuaq, sites near Sisimiut and Nuuk.
- Collaborative activities: Wintertime measurements
 performed by Asiaq Greenland Survey.
 Collaboration with secondary schools.



NSF Science - Hawkings



Mercury biogeochemical cycling and export in Greenland (MEGA)

NSF award2232980: Jonathan Hawkings, University of Pennsylvania

What are the sources of mercury in the Arctic? How is it transported / deposited?

- **Measuring:** Mercury isotope concentration in rivers, fjords and air
- Work locations: Kangerlussuaq and Point 660, Nuuk
- **Collaborative activities:** Work includes researchers from US, Greenland, Denmark, Norway, Germany, Czech Republic. Workshop at Nuuk community center that used puzzle solving to demonstrate computer algorithms in scientific computing.



NSF Science - Post

Caribou population declines and warming-related vegetation changes

NSF award 2327566: Eric Post, University of Pennsylvania

Has warming reduced food quality for caribou near Kangerlussuaq? Has this affected their population?

- **Measuring:** survey of caribou and musk ox and calf population, sampling of grasses, bushes and other plant
- Work locations: caribou calving areas near Kangerlussuaq
- Collaborative activities: Team has shared 20 years of caribou and muskox counts with the Greenland Institute of Natural Resources (GINR) dating back to 2002. Vegetation samples collected for leaf chemistry analysis related to caribou and muskox forage quality are still being processed but will also be shared with GINR.





NSF Logistics – Kangerlussuaq

- USSUCC Office of Polar Programs
- Five "flight periods" support Greenland-wide scientific research
 - Flights are provided by US Air National Guard airlift
 - In 2023, there were 58 on-island science support flights. In 2024, 71 are planned.
 - Use of the Kangerlussuaq airport and Greenland vendors supports the science mission.
- Kangerlussuaq:
 - Cargo operations, field equipment, vehicle support
 - Support of local and long-distance science teams
 - Housing and local resources for researchers







National Science Foundation

Kangerlussuaq and deep field



- The Kangerlussuaq hub supports science teams locally and throughout Greenland from field preparation to redeployment.
- In 2023, NSF supported approximately 178 scientists and students from 23 projects with overnight stays in Kangerlussuaq.



NSF Logistics - Remote Fixed Camps

- Raven Camp:
 - LC-130 training for Air National Guard missions
 - Science missions camp staff of 2
- Summit Station
 - Cargo and science support for the Summit mission
 - <u>44 flights in 2023, 50 planned in 2024</u>









Research at Summit Station



- **Cryospheric** studies of the ice sheet including ice-mass balance, processes for the formation of ice, deep ice core studies, geophysical measurements, hydrology, and remote sensing
- Atmospheric research to understand the global presence of aerosols, the role of clouds in the climate system and improve models
- **Astrophysical** investigations of high-energy neutrinos from outside the Milky Way and cosmic rays
- **Engineering** for the extreme cold and testing of instruments, structures, power systems, electric vehicles, and more
- **Training** for new investigators across many disciplines
- https://geo-summit.org/



Summit Station Plans



• SuMR – Summit Modernization and Recapitalization



Multi-year project to redevelop the station for future scientific research in a scalable design to meet evolving needs. Six platforms: Utilities, Cold Storage, Station Services, Berthing #1, Berthing #2, Science

NSF Education and Engagement

JSEP: Experiential polar science education in Greenland

Collaborative support from NSF (Virginia 2229033) and Government of Greenland

Three-week educational science field camp for 30 high school students from Greenland, Denmark, and the U.S.

- **Measuring:** Students observing and taking part in a variety of Arctic field science activities.
- Work locations: Kangerlussuaq, Summit Station/EGRIP, Point 660
- **Collaborative activities:** Inspiring the next generation of polar scientists and future collaborators through communication, cultural sharing, science training, and field experience.



National Science Foundation Office of Polar Programs

NSF Education and Engagement

Running of the Moskus

- Community event and fundraiser for Qinnguata Atuarfia (Kangerlussuaq school)
- The 13th annual race is planned for Sunday, 18 August 2024!









Thank you! Qujanaq!





www.nsf.gov/geo/opp