

Arctic System Science



John Farrell, US Arctic Research Commission
75th Anniversary of NARL, Utqiagvik, AK, 8.3.22



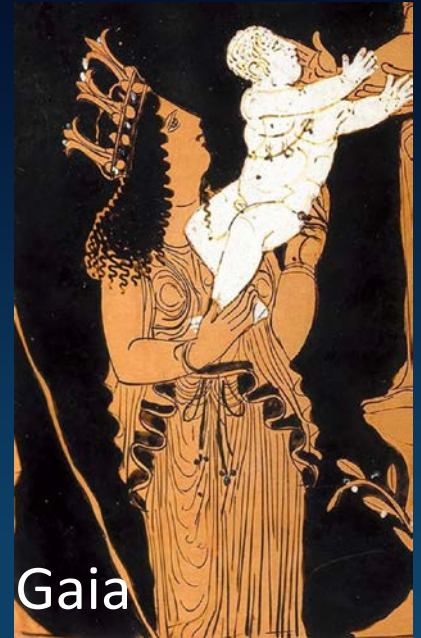
What is it?

Arctic system science is research on the interaction between the Arctic and **Earth systems***, with a focus on the relationships among physical, chemical, biological and human processes.

***Earth systems** are: geosphere, biosphere, cryosphere, hydrosphere, and atmosphere

Arctic system science:

- advances our understanding of the Arctic as a coupled system
- is often interdisciplinary
- often seeks to understand how humans drive or respond to enviro. change



Gaia



Simon Paneak

Circa 1950

Photographer unknown

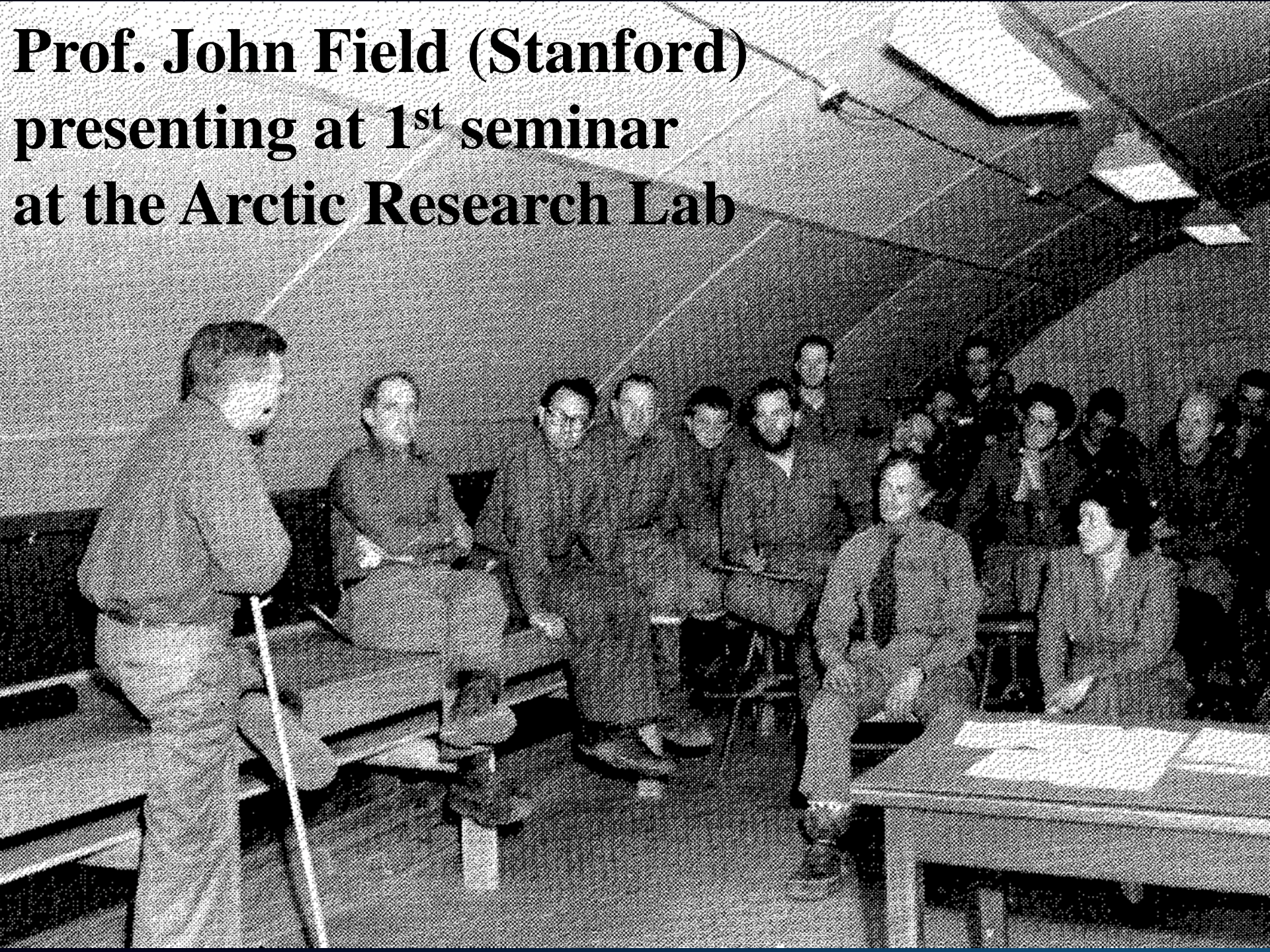


Harry Brower, Sr.

Barrow, Alaska, 1986

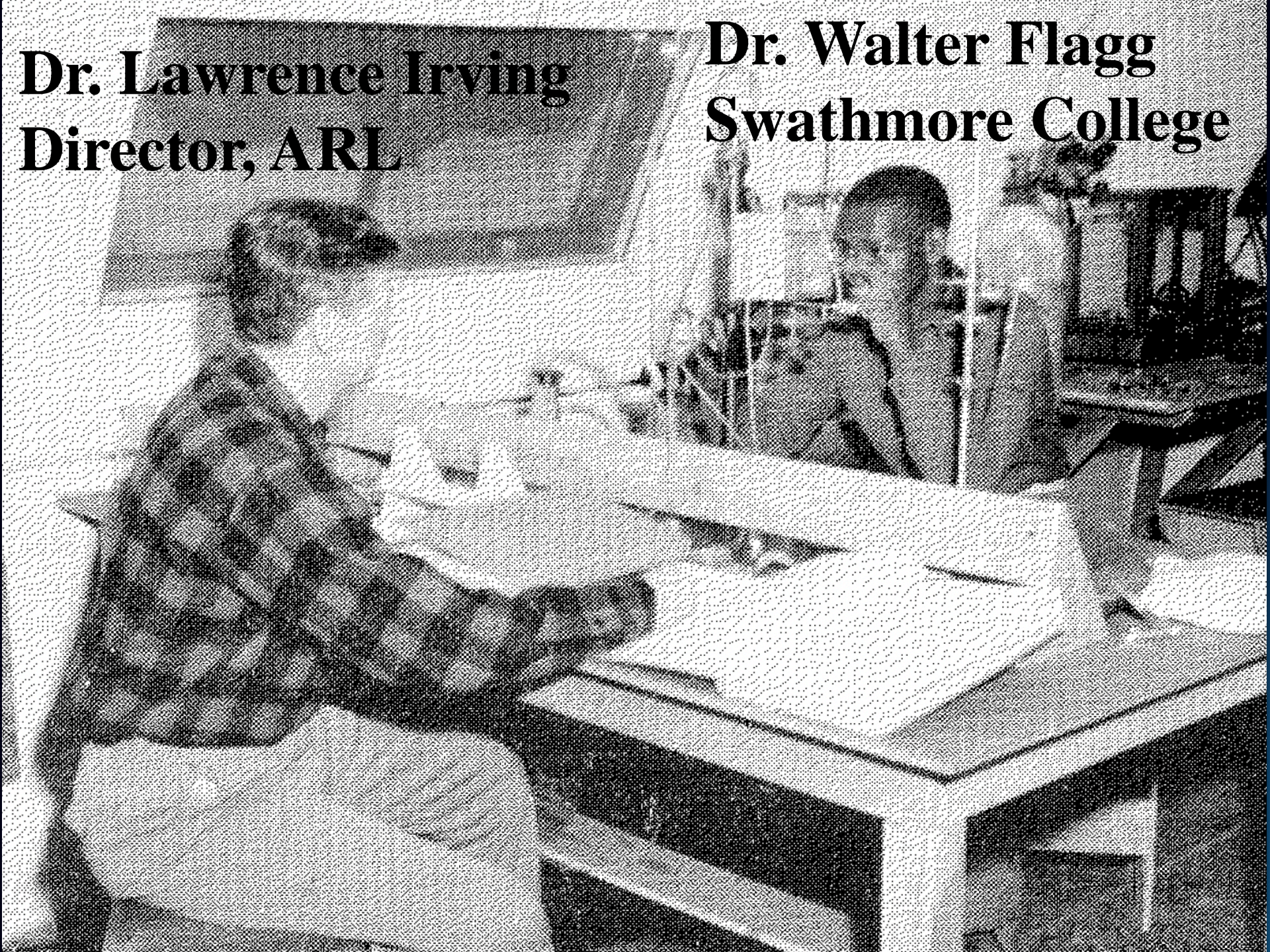
Photo by Trish Brower McFarlin

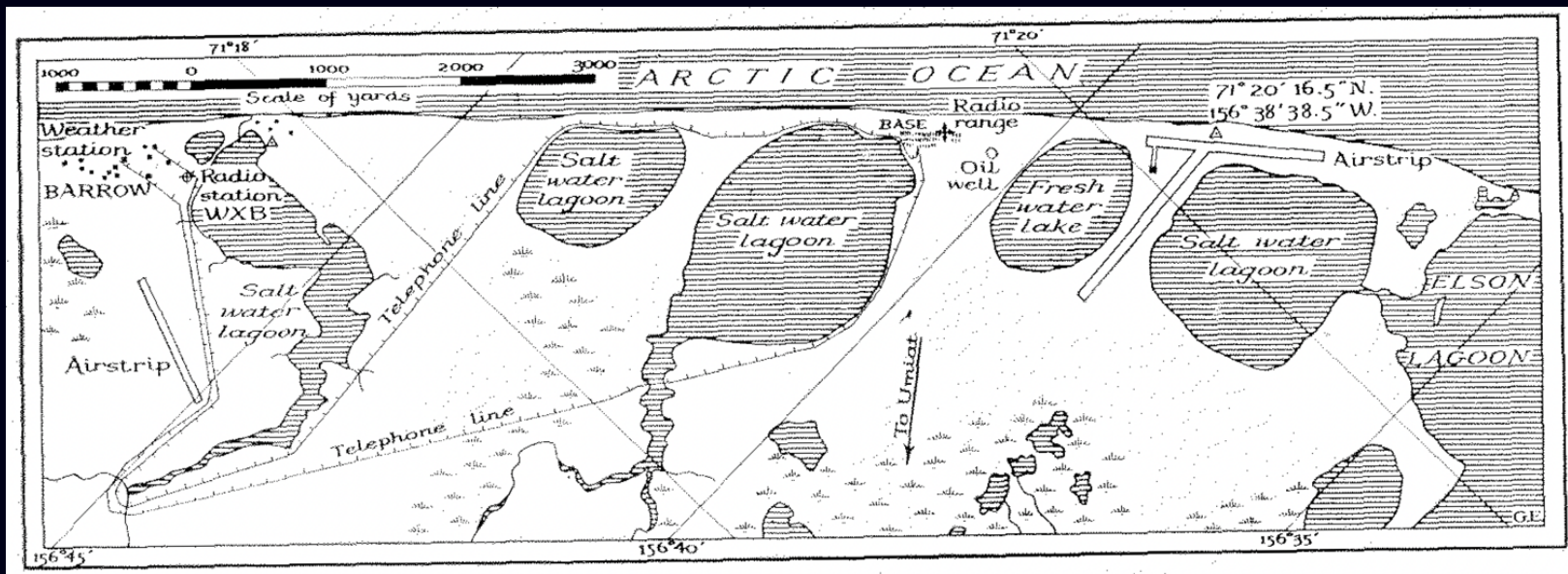
**Prof. John Field (Stanford)
presenting at 1st seminar
at the Arctic Research Lab**



**Dr. Lawrence Irving
Director, ARL**

**Dr. Walter Flagg
Swathmore College**





Arctic system system science is everywhere...

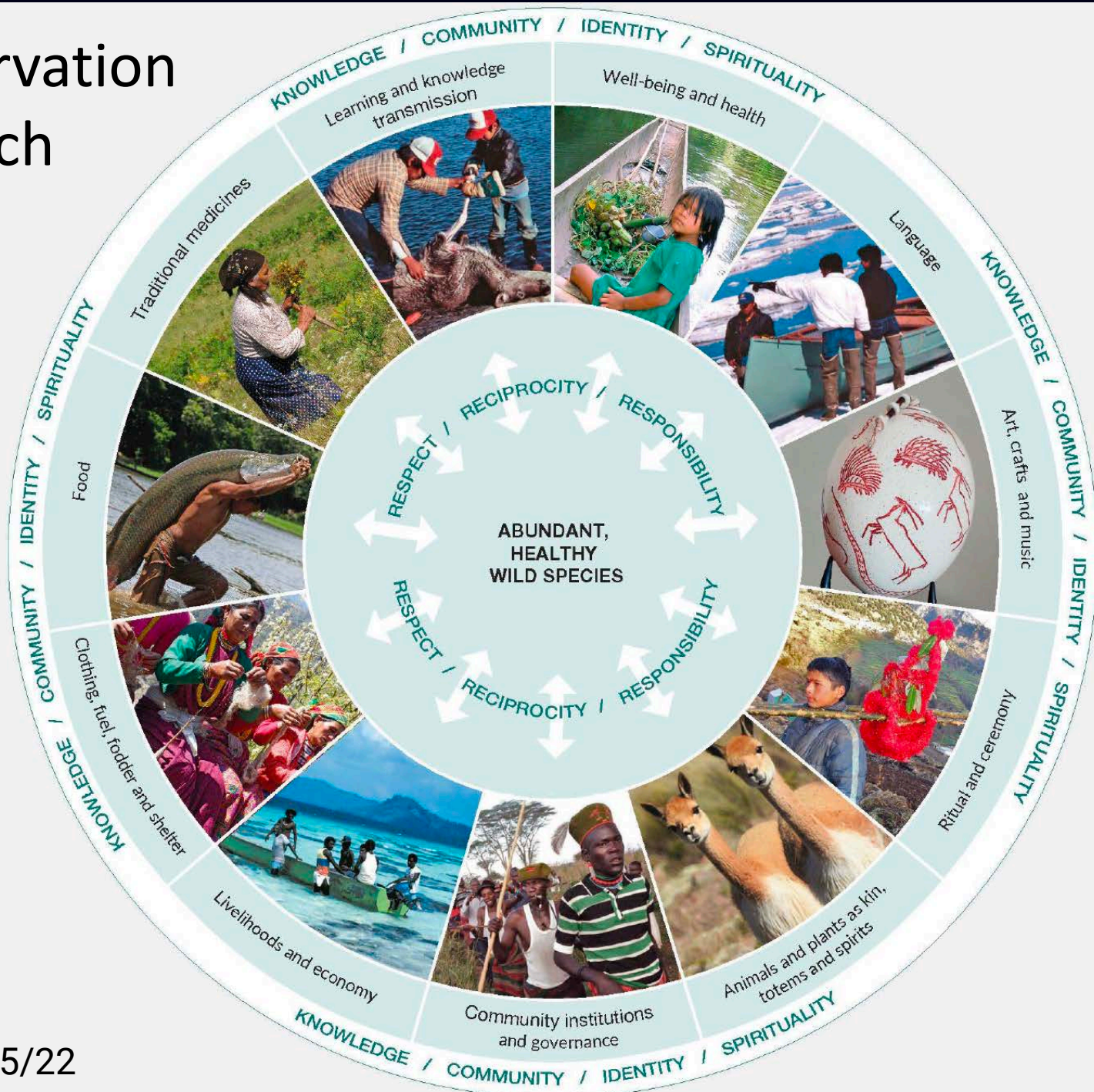
Experiment...

Find examples in June/July 2022 issues of:
Nature and Science

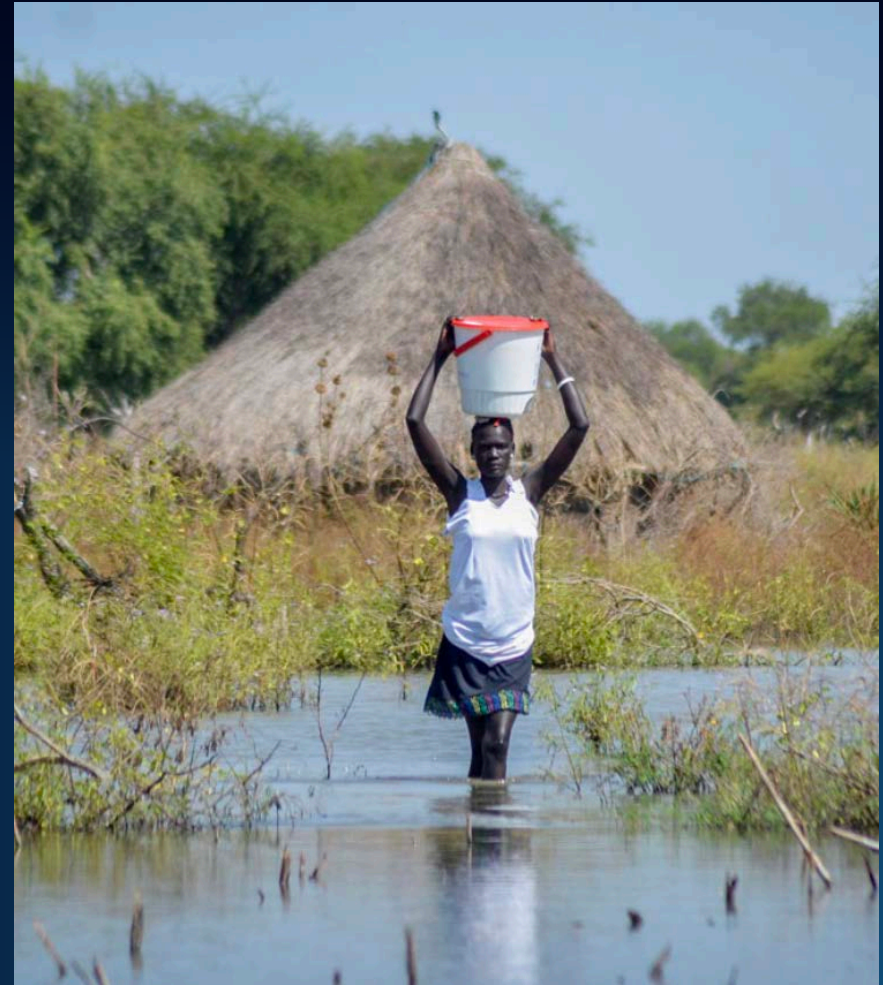
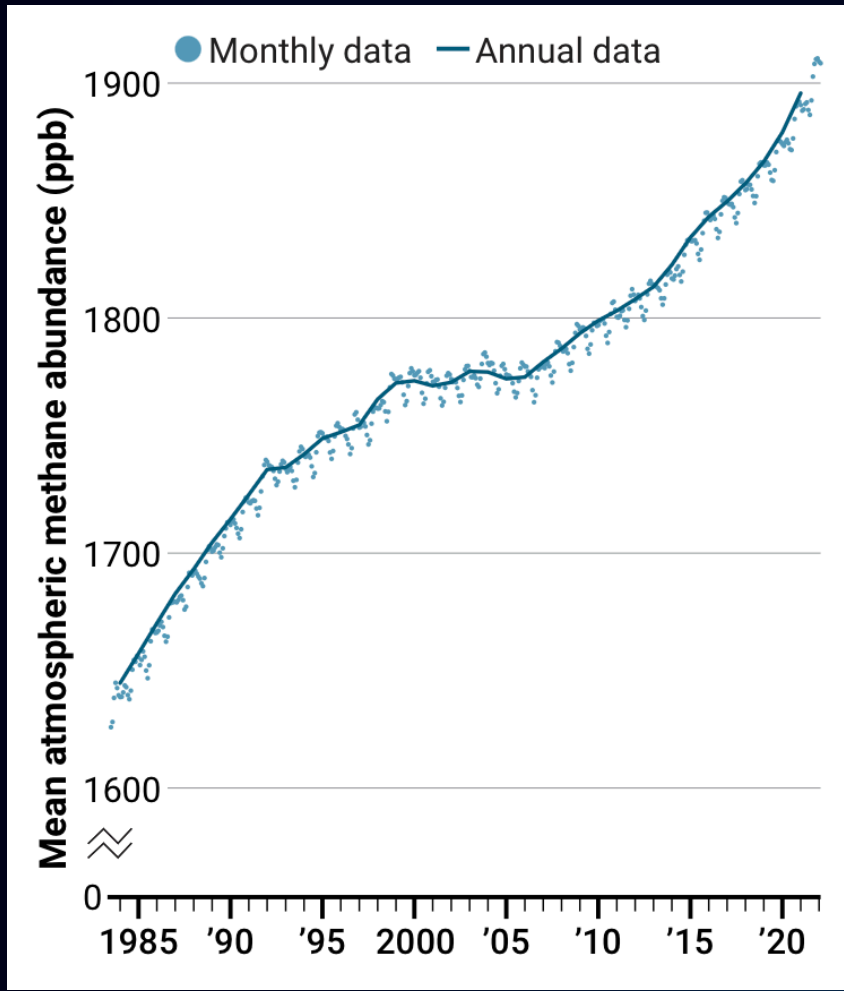
11 examples

- UN calls use of wild species called “unsustainable”
- Methane emissions
- Glaciers in the tropics, and at the poles
- Nuclear power...a solution?
- Polar bears
- War in Ukraine impacting research
- Climate risk is financial risk
- US gun policies, what research says about effectiveness
- Carbon layer sparked ancient bout of global warming
- “Helicopter research”
- Bird flu outbreaks, Arctic flyway

Conservation research



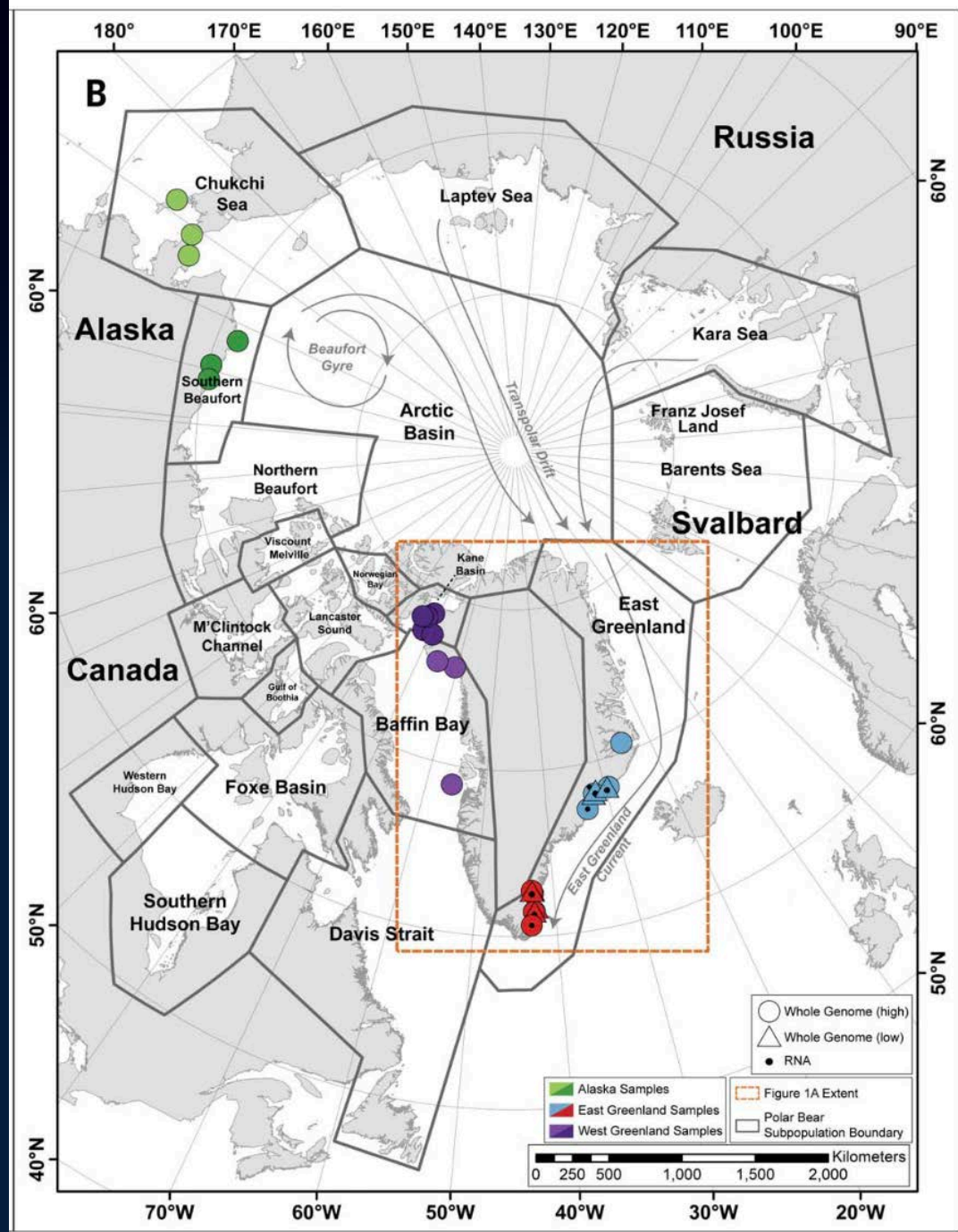
Methane rising



Polar Bears



Laidre *et al.* have identified a distinctive and isolated population of polar bears in southeast Greenland.



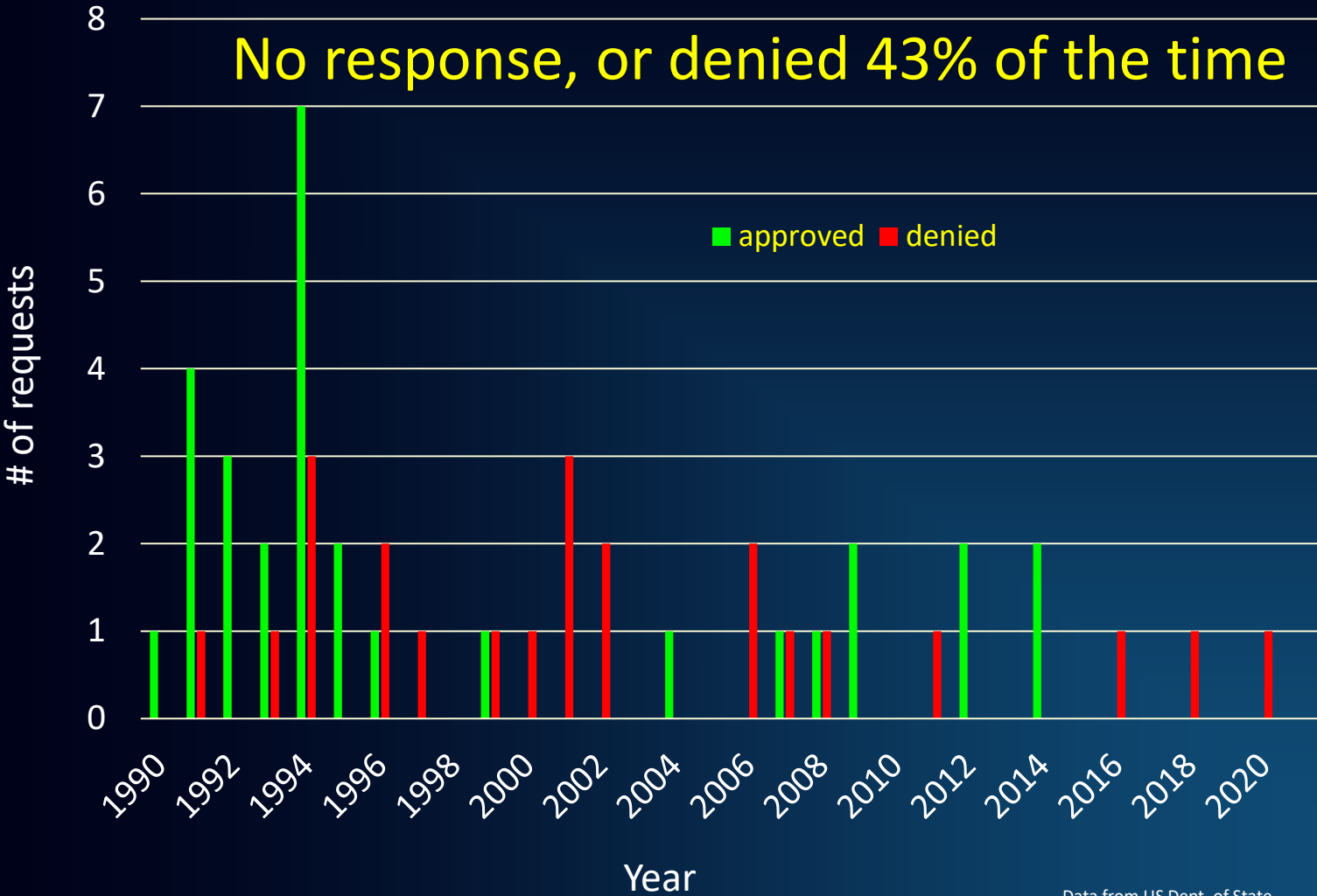
Science, 6/17/22

Russia's war in Ukraine...impact on Arctic research

- “...a moral crisis that we can't ignore.” Brendan Kelly
- Research on hold, esp. between Russia and N. America / Europe
- Global science reshaped?
- “...we are embarking on a multi-year – maybe even decadal-scale – interference to Arctic collaborations.” Matt Druckenmiller
- Cutting off all research links is in no one's interests
- “Science should go on, no matter what.” Vlad Romanovsky

Russia's war in Ukraine

US requests to conduct marine scientific research in Russian EEZ



Data from US Dept. of State

“Helicopter research”

7th World Conference on Research Integrity in Cape Town



A local farmer looks on as a field researcher examines soil in Ethiopia.

IARPC

Interagency Arctic Research Policy Committee

Melissa Maktuayaq Johnson

Indigenous Communication and Engagement Specialist



ARCTIC RESEARCH PLAN

2022-2026



Product of the Interagency Arctic Research Policy Committee
of the National Science and Technology Council

DECEMBER 2021

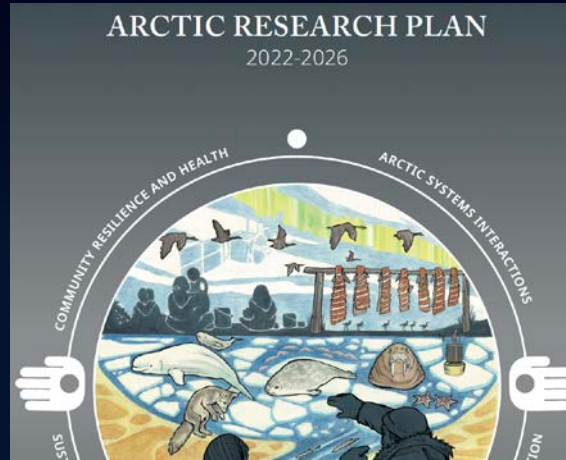


Priority Area 2: Arctic Systems Interactions

Enhance our ability to observe, understand, predict, and project the Arctic's dynamic interconnected systems and their links to the Earth system.

U.S. Army Corps of Engineers researchers Jackie Richter-Menge and Bruce Elder install an ice mass balance buoy in the Beaufort Sea. Photo: Art Howard, via DOD

Federal Arctic research policy/process



USARC set goals



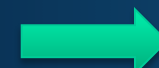
IARPC adopts, creates & executes research plan



White House: OMB/OSTP coordinate & review budget



“The Commission shall, after submission of the President's annual budget request, review the request and report to Congress on adherence to the Plan.”



Congress: Authorizes & Appropriates



ARCTIC UPDATE

THE US ARCTIC RESEARCH COMMISSION DAILY EMAIL NEWSLETTER

August 3, 2022

TODAY'S EVENTS

August 1-4, 2022 | Utqiagvik, Alaska USA

75th Anniversary of the Naval Arctic Research Laboratory: Celebrating the Past—Planning for the Future

The events during the week of August 1st, 2022, will include Enhancing Arctic Science and Engineering Workshop along with Regional Development Tours and forums on the Arctic science to plan for the next 25 years of Arctic research. Participants will include scientists and engineers, Indigenous leaders, Arctic community members, policymakers, government organizations and businesses to celebrate past research success, take stock of current challenges and opportunities and plan for the next generation of collaboration and knowledge co-production that will keep Utqiagvik and Indigenous knowledge at the forefront of Arctic science and contribute to a safe and sustainable future for the Arctic.

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Thank you

