

Kalaallit Nunaanni USA-
milu ilisimatusartut
akornanni suleqatigiinneq
annertuneg
ineriartortinneqarnissaa

Facilitating increased
engagement between the
research communities of
Greenland and the U.S.

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KALAALLISUT // ENGLISH



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Eqikkaaneq

Kalaallit Nunaanni USA-milu ilisimatusartut annertuunik isumalluutunik atuisarput nunarsuarmi avatangiisinilu allanngoriartornerit inuiaqatigiinnilu kulturikkut unammillernartut Kalaallit Nunaannut sunniuteqartartut pillugit. Issittumi allanngoriartorneq ilutigalu qulequttat taakkua iluanni ilisimatusarnerup pisariaqartinneq annertusiartornerani ilisimatusartut suleqatigiissinnaanernik isumalluutunik ilisimasanullu ilisimatuunik, aalajangiisartunik inuiaqatigiinniillu pigineqartunik atorluaasunik ujartuipput. Suleqatigiinnikkut ilisimasanik nutaanik pilersitsineq tapertaralugulu inuiaqatigiinnik peqataatsineq ilinniartunillu ilinniartitsineq ilutigalugit USA Kalaallit Nunaallu Issittumi ilisimatusarnermut saarpiaanut inissineqarsinnaapput. Suleqatigiinneq USA-p Kalaallit Nunaallu attaveqatigiinnerat nukittorsassavaa, Issittumilu unammilligassat suliarinissaanni kinguaariit tullii piareersarlugit.

Naapeqatigiinneq ullunik marlunnik sivisussusilik Nuummi Pinngortitaleriffimmi 27-28 August 2018 ingerlanneqarpoq, USA-p Kalaallit Nunaallu akornanni suleqatigiinnerit nukittorsarneqarneqarnissaannut periarfissat ilisimatusartunik assigiinngitsunik peqataaffigineqarluni USA-miik (19) Kalaallit Nunaanniillu (29) isumaliuutigineqarlutik. Peqataasut siunissami sulinnissamut aningaasaliinissanullu pillugit pingaarnersiupput makkunungu tunngasunik: Ilisimatusarnermut pilersitseqatigiillunilu ilisimatusarnermut, inuiaqatigiinnut saqqummiisarnerit, aammalu ilinniartitaaneq ilinniartunillu sungiusaasarnerit. Naapeqatigiinnermiik nalunaarusiaq manna USA-mi Kalaallit Nunaannilu ilisimatusartut Issittumi suliniutini pingaarutilinni suleqatigiinnerat pitsanngorsarnissaanut isumassarsiat, piunassuseq aannertoq innersuussutillu ersersippaa.

Naapeqatigiinnermi inernilussaq pingarneq tassaavoq USA Kalaallit Nunaallu akornanni suleqatigiinneq nukittorsarneqassasoq ilisimatusartut piunassuseqarlutik ataavartumillu suleqatigiittarpata. Taassumap iluanippooq suleqatigiinneq aallartiaartarnissaa suliniutip apequtissai anguniagassaa lu ataatsimoorluni ilusilersorneqartarniassammata, piffissaliussarlu naammattoq pisassasoq suleqatigiinnerit tatiginnittut suliananillu erseqqissumik tunniussisut anguniassagaanni. Nalunaarusiap imarai isumassarsiat aalajangersimasut, aqqissuussinerit, attavissallu USA-mi Kalaallit Nunaannilu ilisimatuunut neriutitigisagut iluaqutaasinnaassasut innersuussutit ukua siunissami suliaminnut ilanngunnissaannut:

- ▶ Naapeqatigiinnerit, isumasioqatigiinnerit, ilisimatusartunillu paarlaasseqatigiinnerit ukioq naalluguingerlattassagaat, ilisimatusartut naapittarniassammata
- ▶ USA-mi ilisimatusarfiit Kalaallit Nunaanni annertuumik ilisimatusarnermi suliallit namminneq anguniartassagaat naapeqatigiinnerit ilinniartunillu ilisimatusuunillu paarlaasseqatigiinnerit aningaasalersornissaat
- ▶ Nittartakkatigut attaveqaatit nittartakkallu atorineqartassasut Kalaallit Nunaanni ilisimatusarnermi suliniutit allaatiginninneranni suleqatissanillu ujaasinnermi
- ▶ Suleqatigiilluni ilisimatusarnermi pingaarnersiunerit, pissusilersuutissat naatsorsuutigisat, suleriaatsillu pitsaasut suleqatigiinnermut ilisimatusarnermilu pilersitseqatigiinnermut tunngasut pilersinneqartassasut
- ▶ Kalaallit Nunaanni inuiaqatigiinni ilisimatusarnermi suleqatigisinnaasat siusissumik ilisimatusarnermilu akulikitsumik attaveqarfigisarnissaat
- ▶ Inuiaqatigiinnut saqqummiisarnissaq USA-miik Kalaallit Nunaanniillu ilinniartunik pikkorissaasarnerit ilisimatusarnermut suliani tamani anguniakkatut allanneqartassasoq

Kalaallit Nunaanni ilisimatusarneq inuiaqatigiinnut pingaarutilerujussuuvooq nunarsuarmi Issittumilu allanngoriartornerit sukkaasut pillugit paasinnittariaatsinnut ilusilersueqataalluni. USA-miik Kalaallit Nunaanniillu ilisimatuut Nuummi naapeqatigiinnermi najuuttut isumaqatigiipput ilisimatusarneq pitsaanerusoq anguneqarsinnaasoq suleqatigiikkaanni, isiginnittariaatsit assigiinngitsut ilisimatusarnermi atoraanni, Kalaallit Nunaanni inuiaqatigiinnut ilisimatusarnerup iluaqutai ersersikkaanni, taavalu kinguaariit tullii suleqatigiinnissamut pikkorissaraanni. Nuannaarutigaarput naapeqatigiinnerup kingunerereerai suleqatigiilluni qinnuteqaatit ineriartortinneqarneri, suliniutit pilersaarusiortneranni ilinniartitaanermut innuttaasunullu saqqummiisarnermullu tunngasut allanngortinneqarneri, siunissamilu pisussat USA-p Kalaallit Nunaallu Issittumilu ilisimatusarnermi suleqatigiinnerulernissaannik periarfissaanillu sammisallit pilersaarusiortneqarneri. Neriutigaarput nalunaarusiaq manna Issittumi ilisimatuunut iluaqutaajumaartoq aamma aningaasaliisartunut Kalaallit Nunaanni faginut arlalinnut tunngasuni nunallu assigiinngitsut suleqatigiinneranni periarfissanut unammilligassanullu paasitsitsissalluni. ■

Executive Summary

The Greenland and U.S. research communities invest substantial resources towards understanding global processes, environmental change, and social-cultural issues in Greenland. As the need for this research intensifies along with the rate of Arctic change, both research communities seek new and stronger bilateral collaborations that leverage resources and expertise held by researchers, stakeholders, and community members. The production of new knowledge through these collaborations along with increased community engagement and student education will place the U.S. and Greenland at the cutting edge of Arctic research. It will strengthen U.S.-Greenland relations and prepare a future generation for taking on the challenge of navigating the new Arctic.

A two-day workshop was held 27-28 August 2018 at Pinngortitaleriffik (Greenland Institute of Natural Resources, GINR), in Nuuk, Greenland, where diverse participants from the U.S. (19) and Greenland (29) research communities explored possibilities for strengthening U.S.-Greenland collaborations. Participants set priorities for future work and funding related to: Research & Co-Production of Research, Public Outreach, and Education & Student Training. This workshop report captures many thoughtful, creative, and overwhelmingly enthusiastic ideas and recommendations for improving the way that the U.S. and Greenland researchers collaborate on important Arctic projects.

The key finding from the workshop was that U.S.-Greenland collaborations will strengthen if researchers work together intentionally and continuously. This includes starting collaborations early to co-define project questions and objectives and allowing adequate time to develop trusted partnerships with defined roles. The report contains specific ideas, mechanisms, and contacts that we hope will be helpful to U.S. and Greenland researchers as they consider the following recommendations in their future work:

- ▶ Host workshops, symposia, and scholar exchanges year-round that bring researchers together in person
- ▶ U.S. universities with significant research presence in Greenland should pursue self-funding for workshops and student and scholar exchanges
- ▶ Use online networks and websites to describe research projects based in Greenland and seek collaborations
- ▶ Co-develop research priorities, codes of conduct and best practices for collaboration and research co-production
- ▶ Engage potential research partners and Greenland communities early and often during research
- ▶ Make public outreach and training of U.S. and Greenland students an explicit goal of all research projects

Research in Greenland is of substantial relevance to Greenland society and will continue to shape our understanding of global processes and rapid Arctic change. The representatives of the U.S. and Greenland research communities present at the Nuuk workshop acknowledged that we can do better research by working together, considering more diverse perspectives as we conduct our research, articulating the benefits of research to Greenland society, and training the next generation in a collaborative framework. We are excited that the workshop has already led to the development of joint proposals, revised project plans related to education and outreach, and plans for future events that will emphasize the growth and potential of U.S.-Greenland collaborations on Arctic research. We hope that this report is helpful to the broader Arctic research community and will help funding agencies understand the opportunities and challenges of interdisciplinary and international collaborative research in Greenland. ■

Aallarniineq

Tunuliaqut

Kalaallit Nunaat ilisimatusarnerup iluani sumiiffik nunarsuarmi ilisimatusartunut pingaaruteqartuuvoq. Nunarsuup sinneranut sanilliullugu Issittoq marloriaammik sukkanerusumik kissatsikkiartorerani, Kalaallit Nunaanni sersersuaq annertuumik imermik imarmut annissuivoq. Tamanna Kalaallit Nunaat ilisimatusarnermi sumiiffittut pingaaruteqartorujussuuvoq silap pissusaata imarpiillu qaffakkiartorerisa imminnut qanoq ataqatigiinneranut paasiniarnerani. Kalaallit Nunaanni sersersuaq aamma paasissutissanik pingaarutilinnik imaqarpoq nunarsuup qanga siunissamilu silap pissusaa pillugu. Sumiiffik innarlerneqanngitsoq astronomimi astrofysikkimilu ilisimatusarnermi laboratoriatut ukiorlu naallugu silaannap pissusaanik allanngoraatinik misissuiffusarluni. Kalaallit Nunaanni inuiaqatigiinni avatangiisinilu ataqatigiinneri aamma silaannap pissusaanik aallaaveqartunik inuiaqatigiinni, kulturikkut, avatangiisini økologiimilu allannguutitut takussutissartaqartarput. Kalaallit Nunaat oqaluttuarisaanikkut, kulturikkut sociologimilu paasissutissanik pisuujuvoq takutitsisinnaasoq qanoq inuit inuiaqatigiillu inuulluarsinnaanerannik avatangiisinillu allanngorartunut nalimmassarlutik. Qulequttani taakkunani ilisimatusarnerup pingaaruteqarnera isigineqarnera ilutigalugu suliffeqarfiit ilinniarfeqarfillu USA-mi Kalaallit Nunaannilu annertuumik ilisimatusarnermut aningaasaliisarput (Ilanngussaq A).

USA-mi Kalaallit Nunaannilu ilisimatuunik apeqqutit nunarsuami avatangiisit allanngoriartorerannut inuiaqatigiillu qisuariaataannut tunngasut suleqatigiinnissaq annertuumik soqutigineqarpoq. Ineriartortitsinissaq ilisimatusarnermi nukittuumik nunallu assigiinngitsut peqatigalugit anguniagaqatigalugit toqqammavigalugu. Kalaallit Nunaanni anguniagaavoq inuiaqatigiinni. Kalaallit Nunaanni Inatsisartut inatsisaanni nr.5 29. Novemberip 2013-imeersoq ilisimatusarnermi siunnersuineq aningaasaliisarnerlu sammivaa. Inatsik erseqqissarpaa ilisimatusarnermi suliat ataqatigiissaarneqartarnissaat pingaarnersuinerlu Kalaallit Nunaata nunat allat suleqatigalugit ilisimatusarnermi suliniutit peqataaffigisarnissaata ineriartortinneqarnissaa aallaavigisassagaat. Kalaallit Nunaanni ilisimatusartut suliaata annerpaartaat toqqaannartumik inuiaqatigiinnut tunngassuteqartarput tamatigunqajallu sineriammi ingerlanneqartarluni nunap pissarititaanut tunngasunut

unammillernartut sammiveqartarlutik. Akerlianik, USA-mi ilisimatusartut, ingammik pinngortitamut fysikkimullu tunngasunut ilisimatusartut, sermermuarmiittarput imaluunniit illoqarfinni ungasissuni tupeqarfinni.

Taakkua paasissutissanik katersueriarlutik aallartarput, annikitsumik, taamaattoqarsimassapat, Kalaallit Nunaanni ilisimatusartut inuiaqatigiillu attaveqarfigisarlunikkit. USA-mi suliffeqarfiit ilisimatusarnermut aningaasaliisartut ilagaat: the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), the National Institutes of Health (NIH), the National Oceanic and Atmospheric Administration (NOAA), the Smithsonian Institution (SI), and the Smithsonian Astrophysical Observatory (SAO).

Suleqatigiinnernik pitsaasunik assersuuteqarpoq, ingammik Kalaallit Nunaanni ilisimatusartut USA-milu ilisimatusartut akornanni Kalaallit Nunaanni inuiaqatigiinni kulturikkullu allanngoriartorerit nunasiaataasimanerup, nutaanngorsaanerit nunarsuarmioqataanerup silaannallu allanngoriartorerata kingunerisaanik suliaqartartunik (Ilanngussaq B). Pinngortitami fysikkimilu ilisimatusartut inuiaqatigiit attaveqarfiginerunissaat kissaatigigunikku, inuiaqatigiilerinermi ilisimatusartut piginnaasaat nalunngisaallu ilikkagaqarfigisariaqarpaat. Tamakkununga ilaapput oqaatsitigut paatsoorsinnaasernerit qaangerniarnissaat, kulturikkut ilisimaarinnerq, taavalu inuit peqataatillugit ilisimatusassagaanni piumasaqaatit ileqqorissaanerlu pillugit pikkorissarneqarnerq. Taamaasioraanni USA-p Kalaallit Nunaanni ilisimatusarnermik ingerlataqarnera kisermaassisutut taavalu innuttaasunut ersinngittarnerata isigineqarsinnaanera annikillisinneqassaaq, inuiaqatigiillu USA-p Kalaallit Nunaanni suliaqartarneranut apeqqutaat ernumassutaallu akineqarsinnaanngussallutik.

Ilisimatuut attaveqatigiiffimmik ujartuipput, suleriaatsinillu allanik isumassarsiaminnik soqutigisaminnillu, peqatigiillutik ilisimatusarnermi apeqqutit ineriartortinneqarnerani, taavalu ilisimatusarnerup aaqqissuusaaanerata pillugu paasissutissanik avitseqatigiiffittut atornerqarsinnaasumik. Suleqatigiinneq ilisimatusarnermi paasissutissanillu pilersuineri

Kalaallit Nunaannut attuumassutilinnik taavalu inuiaqatigiinnut aalajangiisartunullu saqqummiunneqartartunik pilersuinermi iluaqutaassaaq. Ilisimatusarnermi suleqatigiinneq ilinniartut paarlaasseqatigiittarnerannik pikkorissaanermillu aallaaveqartumik, ingammillu pingaartillugu inuiaqatigiit suleqatiginissaat, kinguaariit tullii piareersarniarlugit pingaaruteqassaaq. Kalaallit Nunaat USA-llu attaveqarnera nukittorsarneqassaaq suliniutit Kalaallit Nunaanni inuiaqatigiit pisariaqartitaannut nalimmassarneqartarpata, taavalu inuiaqatigiit USA-p Kalaallit Nunaanni suliaqarneranut paasinninnerannut iluaqutaassalluni. Tamanna assut pingaaruteqarpoq Kalaallit Nunaat suli nunasiaataasimanermik iperaaniarsarimmat.

Issittumi ilisimatusarnermi periuitsit nutaat ilisimatuut, inuiaqatigiit aalajangiisartullu suleqatigalugit ineriartortinneqarnissaat tassaavoq periarfissaq immikkuullarissaq National Science Foundation-ip isumassarsiaata qulit ilagisaat tassaasoq “Navigating the New Arctic” anguniarneqarnissaanut. Kalaallit Nunaannut ilisimatusarnermut aqqissuussiaq makkuninnga imalik: 1) USA Kalaallit Nunaallu ilisimatuut akornanni pilersitseqatigiilluni ilisimatusarneq, aamma 2) inuiaqatigiinnik peqataatitsineq ilinniartunillu pikkorissaaneq annertunerusoq, USA Kalaallit Nunaallu Issittumi ilisimatusarnermi saarpiaannut inississavaat. Tamanna annertuumik iluaqutaassaaq Nunarsuup aqqissuussaanerata ingerlassusaatalu; Kalaallit Nunaanni inuiaqatigiinni kulturikkut inuiaqatigiinnilu peqqissutsimut sunniisartut, atugarissaarneq, nalimmassartarneq inuuniarnerlu; aammalu Issittumi allanngoriartorneq sukkaasoq misissornerani avatangiisit aningaasaqarnermilu sunniutissat paasilluarnissaannut. ■

Assit Lars Demant-Poort-imik assilineqarput.



Introduction

Background

Greenland is an important research site for scientists from around the world. As the Arctic warms at twice the rate of the rest of the world, the Greenland Ice Sheet is discharging significant amounts of freshwater to the oceans. This makes Greenland a critical research site for understanding feedbacks to the climate system and sea level rise. The Greenland Ice Sheet also contains essential information for understanding Earth's past and present climate. It serves as a pristine and remote laboratory for astronomy and astrophysics research and year-round observations of climatic and atmospheric variables. Greenland's social-ecological and coupled human-natural tundra ecosystems are also bellwethers of climate-driven social, cultural, environmental, and ecological change. Greenland is rich in historical, cultural and sociological information that can contribute to how human beings and the communities they live in thrive and adapt to environmental conditions. With recognition of the importance of research in these and other disciplines, institutions in the U.S. and Greenland sponsor a significant amount of scientific research in Greenland (Appendix A).

There is significant interest from the U.S. and Greenland research communities in working together to address questions related to global processes,

environmental change, and social response. Greenland's policy is to promote the development of its society with a strong and sound international research program based on shared objectives. Greenland's Parliament Act no. 5 of 29 November 2013 addresses research consultancy and the allocation of research funding. The Act emphasizes coordination and prioritization of research efforts and enhancing Greenland's participation in international cooperative research initiatives. Most work by Greenland researchers has direct relevance to society and is located almost exclusively along de-glaciated coastal areas on issues related to natural resources. In contrast, most U.S. researchers, particularly natural and physical scientists, are based on the ice sheet or in remote field camps away from population centers. They collect data and then depart, having had little, if any, contact with Greenland scientists and communities. The U.S. institutions that fund this research include the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), the National Institutes of Health (NIH), the National Oceanic and Atmospheric Administration (NOAA), the Smithsonian Institution (SI), and the Smithsonian Astrophysical Observatory (SAO).

Examples of successful collaborations exist, especially between Greenland researchers and U.S. social scientists who are working to understand the vast cultural and societal



changes that are taking place in Greenland as a result of colonialization, modernization, globalization, and climate change (Appendix B). If natural and physical scientists wish to engage with communities on research and outreach, they must cultivate the skills and expertise held by social scientists. These include understanding and overcoming language barriers, cultural competency, and training in the ethical conduct of research with human subjects. These steps will make U.S. research in Greenland less of a unilateral, foreign pursuit that is invisible to the public and can resolve questions and concerns that local citizens have regarding U.S. scientific presence in Greenland.

Both research communities seek a network and other mechanisms for sharing interests and ideas, co-developing research questions, and learning about existing research infrastructure and institutions. Collaborative efforts will help produce research and knowledge that is relevant to and communicated with communities and key stakeholders in Greenland. Working on collaborative research endeavors with students through education exchanges and training, with particular emphasis on civic collaboration, will prepare a future generation for working in this updated framework. The Greenland-U.S. relationship will strengthen if projects are tailored to meet the needs of local communities and Greenland citizens can better understand U.S. scientific presence in Greenland. This is especially important given that Greenland is still in the process of emerging from its colonial past.

Developing new approaches to Arctic research, through cooperation with scientists, communities, and stakeholders in Greenland, is a unique opportunity to contribute to “Navigating the New Arctic,” one of the National Science Foundation’s 10 Big Ideas. A research framework for Greenland that involves: 1) co-production by members of the U.S. and Greenland research communities, and 2) increased community engagement and student education, will place the U.S. and Greenland at the cutting edge of Arctic research. This will lead to significant advancements in understanding Earth systems and processes; cultural and social determinants of health, well-being, adaptation and survival in Greenlandic communities; and a critical examination of the ecological and economic impacts of rapid Arctic change. ■

Photo by Robert Gill.





Naapeqatigiinnermi anguniakkat

Naapeqatigiinneq ullunik marlunnik sivisussulik ingerlanneqarpoq Aggustip 27.-28.-iani 2018 Pinngortitaleriffimmi Nuummiittumi. Peqataasut USA-minngaannerput (19) Kalaallit Nunaanniillu (29) tunuliaquteqarlutik assigiinneqisunik; ilisimatusarnerup iluaniik, suliffeqarfinniik naalakkersuisoqarfinniillu. Ataatsimoorlutik peqataasut USA-p Kalaallit Nunaallu ilisimatusarnermi attaveqarfittut aallarniisuupput, taamaasillutillu attavissatut pingaaruteqarlutik (Ilanngussaq C). Peqataasut kajumissuseqaqalutik suleqatigiipput siunissamilu ilisimatusarnermi suleqatigiinnissaq Kalaallit Nunaanniik USA-miillu ilisimatusartut aqutseqatigiilluni suleriaaseqarsinnaanissaq neriulluarnartutut isigalunikku. Peqataasut isumaqatigiipput suliaq annertuneq ingerlanneqarsinnaasoq inunnik ataasiakkaaniik, suliffeqarfinniik, aningaasaliisartuniillu suleqatigiinnermi unammilligassat qaangerniassagaanni.

Siunissami periarfissat misissornissaanni peqataasut Kalaallit Nunaanni ilisimatusarnerup aaqqissuussaanaera ilikkagaqarfigaat, oqallitsitsinerillu peqataatitsisut aallaavigalugit oqallisigalunikku qanoq suleqatigiinnerit pitsaasut ineriartortinneqarsinnaasut ingerlanneqarsinnaasullu. Ataatsimiinnerit aaqqissuussat saniatigut, peqataasut Katuami innuttaasunut saqqummiipput ataatsimoorlutillu kalaaliminernik nereqatigiillutik.

Naapeqatigiinnermi anguniagaq pingaarneq tassaavoq siunissami suleqatigiinnissami aningaasaliinissamilu pingaarnersiutinissaq. Apeqqutit ukua isumaliuutigineqarput:

- ▶ Ilisimatusarneq aamma suleqatigiilluni ilisimatusarneq: Qanoq USA Kalaallit Nunaallu akornanni ilisimatusarnermi suliani Kalaallit Nunaanni ingerlasuni suleqatigiinneq annertusarsinnaavarput? Qanoq isillutik ilisimatuut USA-mi Kalaallit Nunaanniluunniit suleqatissaminnik nassaartorsinnaappat? Suleqatigiinnernut aningaasaliisarnerit suut pilersorneqarsinnaappat? Aaqqissuussinerit suleriaatsillu suut suleqatigiinnerit annertunerit pitsaasullu anguniarlugit ikorfartuisinnaappat?
- ▶ Innuttaasunut saqqummiussisarnerit: Suleriaatsit pitsaasut ilisimatusartut innuttaasunut saqqummiisarnissaannut suuppat? Kalaallit Nunaanni suliffeqarfiit aaqqissuussaanerilluunniit sorliit innuttaasunut saqqummiisarnissamut ikorfartuisinnaappat? Qanoq USA Kalaallit Nunaallu inuiaqatigiinnut attaveqatigiinneq pitsanngorsarnissaa sulissutigisinnaavaat?
- ▶ Ilinniartitaaneq ilinniartunillu sungiusaaneq: USA-mi Kalaallit Nunaannilu ilinniartut paarlaasseqatigiittarnerannut ilinniartarnerannullu aaqqissuussat pioreersut suuppat? Suut aqutigalugit ilinniartoq Kalaallit Nunaanneersoq USA-mi ilisimatusarnikkut ilinniartitaasinnaava paarlattuanillu? Ilinniartitaanerit suut siunissami kinguaariit tullii suleqatigiinnissaannut piareersaasinnaappat? ■

Assit Cameron Planck-imik assilineqarput.



Workshop Objectives and Overview

The two-day workshop was held 27-28 August 2018 at Pinngortitaleriffik, the Greenland Institute of Natural Resources, in Nuuk, Greenland. Participants were from the U.S. (19) and Greenland (29) and represented diverse backgrounds, disciplines, institutions, and government agencies. Collectively this group represents an initial U.S.-Greenland research network and is a valuable resource for points of contact (Appendix C). The group was enthusiastic about working together and optimistic that future research co-led by scientists from Greenland and the U.S. would be mutually beneficial. Participants agreed that more can be done by individuals, institutions, and funding agencies to overcome barriers for implementation of joint projects.

To explore future possibilities, participants learned about research organization and infrastructure in Greenland, participated in interactive panels and discussed how to develop and facilitate successful collaborations. In addition to structured meetings, participants interacted during an outreach event at Katuaq and during communal meals with local foods from Greenland.

The overarching goal of the workshop was to set priorities for future work and funding. The following questions were considered:

- ▶ Research and Co-produced Research: How can we increase U.S.-Greenland collaborations on research projects in Greenland? What are the mechanisms through which scientists find collaborators in Greenland or the U.S.? What funding can be provided in support of joint projects? What infrastructure or processes would support increased and high-quality collaborations?
- ▶ Public Outreach: What are the best practices for researchers to approach community outreach? What institutions or infrastructure in Greenland can help support community outreach? How can the U.S. and Greenland work to improve community relations?
- ▶ Education and Student Training: What are the existing frameworks in support of U.S.-Greenland student exchange and training? Through what pathways can a Greenland student receive research/scientific training in the U.S. and vice versa? What training will help prepare future generations for collaborative work? ■

Photos by Cameron Planck.

Pilersaarusiatic

ATAASINNGORNEQ 27 AUGUST: NAAPEQATIGIINNERMI ULLOQ SIULLEQ

08.30 – 10.30 Ilisimatusarnermi aqqissuussaaneq attaveqarfyllu

Peqataasut Naalakkersuisumik Vivian Motzfeldt-imik tikilluaqquneqarput. Kingorna Kalaallit Nunaanni USA-milu ilisimatusarnerup aqqissuussaanaera saqqummiinerit assigiinngitsut aallaavigalugit paasisaqarfugaluniku.

11.00 – 12.30 Suleqatiilluni pilersitsineq: Ilisimasat Ilisimatusarnerlu

Paasisimasallit arfinillit Kalaallit Nunanniik USA-meersullu sassartinneqarlutik suleqatigiilluni ilisimasanik ilisimatusarnermilu misilittakkatik pillugit oqallitsinneqarput. Kingorna apeqquteqarnissamut piffissaliineq aqqutigalugu naapeqatigiinnermi peqataasut suliaminnut suleriaaseq qanoq ilanngussinnaaneraat isumaliortitsivoq.

15.00 – 17.30 Katuami innuttaasunut saqqummiineq

Pisoq una ammarneqarpoq USA-p Danmarkimi ambassadøriata Carla Sands-ip oqalugiarnanik. Oqalugiarnanata kingorna USA-miik Kalaallit Nunaannillu ilisimatusartut ilisimatusarnerminnik inuiaqatigiinnut Katuami saqqummiippu. Saqqummiinerit assigiinngitsut aallaavigineqarput, ilisimatusarnermi plakatit, misilinneqarsinnaasunik takutitsinerit, saqqummiinerillu. Pisoq naggaserneqarpoq ilassinniniarlu aggersaanermik Naalakkersuisunik aqqissuunneqartumik.

MARLUNNGORNEQ 28 AUGUST: NAAPEQATIGIINNERMI ULLOQ AAPPAA

08.30 – 09.30 Arktis-imi Ilisimatusarfiit innuttaasut peqataatinnaannut ilinniartitaanermilu akisussaaffi

Kalaallit Nunaanni USA-milu ilisimatusarfinni pisortat pisussaaffitsik qanoq innuttaasut peqataatinneqarsinnaanersut tunngasut pillugit (ilisimatusarnermi, ilinniartitaanermi inuiaqatigiinnullu saqqummiisarnermi).

10.00 – 12.30 Peqataasut ilanngussaate: Inuiaqatigiinnut saqqummiinerit, ilinniartitaaneq, aamma pilersitseqatigiinneq.

Naapeqatigiinnermi peqataasut Kalaallit Nunaanneersut USA-meersullu suliatik naapeqatigiinnerup qulequtaannut tunngasut pillugit naatsunik saqqummiippu.

13.30 – 17.30 Ataatsimiinnerit avinneqarneri naapeqatigiinnerullu naggasernera

Ataatsimiinnerit ukua siumut eqqarsartut peqataasut nalunaarusiassamut ilanngukkusutaannik katersuippu, ilaatigut innersuussutit siunissamilu pingaarnersiuiinissamut imallit. Ullup aappaa nereqatigiinnermik Dartmouth-imiik ingerlanneqartumik naggaserneqarpoq. ■

Assit Robert Gill-imik assilineqarput.



Schedule

MONDAY 27 AUGUST: DAY 1 OF WORKSHOP

08.30 – 10.30 Research Organization and Infrastructure

Participants were welcomed by Minister Vivian Motzfeldt and then learned about research organization and infrastructure in Greenland and the U.S. through a series of presentations.

11.00 – 12.30 Co-Production: Knowledge and Research

A panel of six experts from Greenland and the U.S. shared experiences with co-producing knowledge and research. A Q & A allowed time for all workshop participants to consider how they could adopt a co-production model in their own work.

15.00 – 17.30 Public Outreach Event at Katuaq

This feature event was opened with remarks by U.S. Ambassador to Denmark Carla Sands. Following her remarks, researchers from the U.S. and Greenland shared science with the local community at Katuaq, Nuuk's Cultural Center. The format included scientific posters, hands-on displays, and presentations. This event was followed by a reception hosted by Naalakkersuisut.

TUESDAY 28 AUGUST: DAY 2 OF WORKSHOP

08.30 – 09.30 The Roles of Arctic Universities in Community Engagement and Education

University leaders from Greenland and the U.S. led a discussion about the role of institutions in facilitating engagement with communities (research, education and outreach).

10.00 – 12.30 Participant Contributions: Outreach, Education, and Co-Production

Workshop participants from Greenland and the U.S. gave brief presentations about projects related to the workshop topics.

13.30 – 17.30 Breakout Sessions and Meeting Wrap-Up

These forward-thinking sessions solicited participant input to frame the workshop report, including recommendations and priorities for future work. Day 2 concluded with a group dinner hosted by Dartmouth. ■

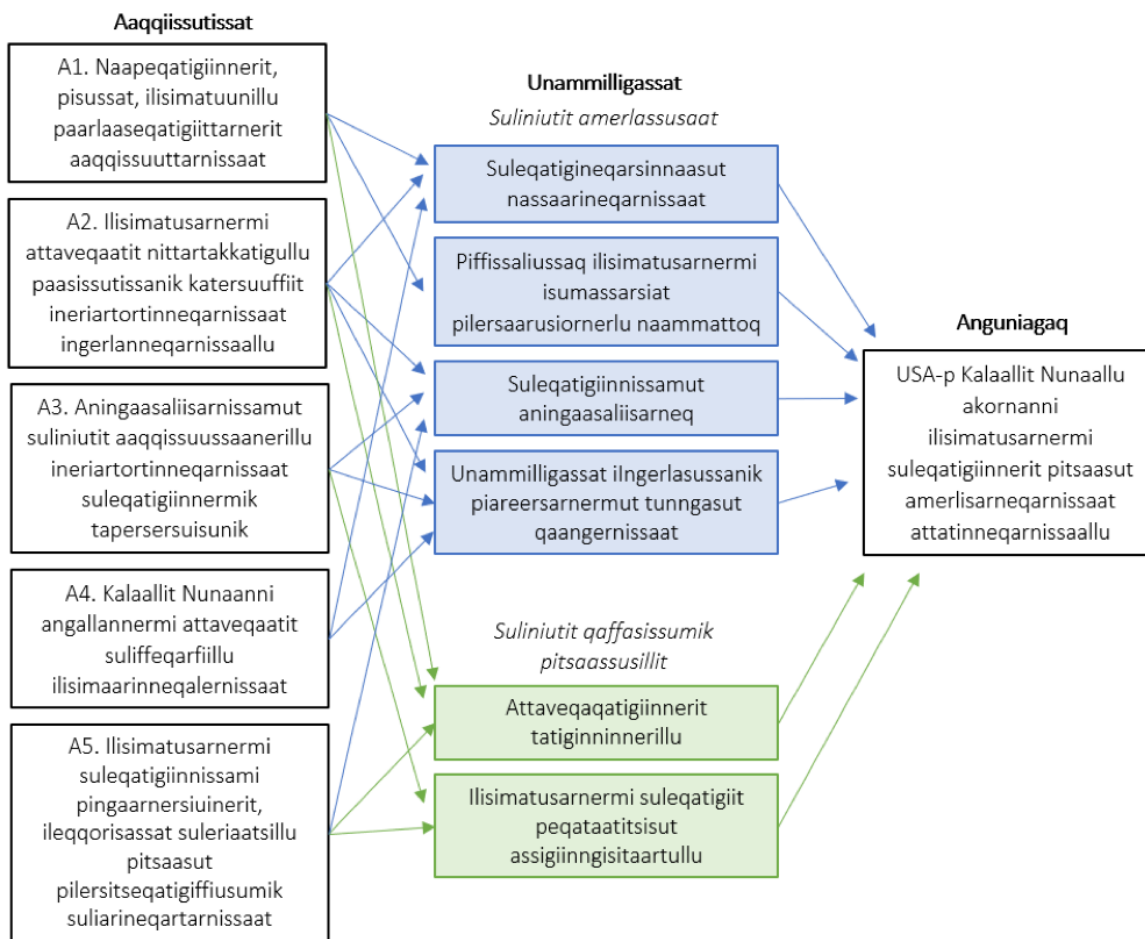
Photos by Robert Gill.



USA-p Kalaallit Nunaatalu suleqatigiinnerulernissaannut innersuussutit

Ilisimatusarneq

Nuummi naapeqatigiinnermi anguniagaq aneq tassaavoq oqallisigissallugu qanoq USA-p Kalaallit Nunaallu akornanni suleqatigiinneq pitsaasoq, ingammik pinngortitami ilisimatusarnermi suliniutini, ingerlanneqarsinnaanersoq. Peqataasut suleqatigiinnerunissamut aaqqiissutissat eqqartorpaat (Takussutissiaq 1), takussusertalerlugu inuiaqatigiit pillugit ilisimatuut, annikinnerusumillu biologit, iluatsilluartumik pilersitseqatigiillutik ilisimatusarneq ingerlattarsimagaat.



Takussutissiaq 1. Takussutissiaq manna takutippaa suleqatigiinnerit pitsaasut anguniarneranni unammillernartut. Aaqqiissutissat tallimat (A1 – A5) takutinneqarput, amerlasuut suleqatigiinnissamut ingerlariaatsit assigiinngitsut tapersersuisut.

Recommendations For Increased U.S.-Greenland Collaborations

Research

A primary goal of the Nuuk workshop was discussing ways to increase and maintain high quality U.S.-Greenland collaborative projects, especially in the natural sciences. The group identified solutions for increasing collaborative work (Figure 1), with recognition that social scientists, and to some extent, biologists, have successfully completed co-produced research.

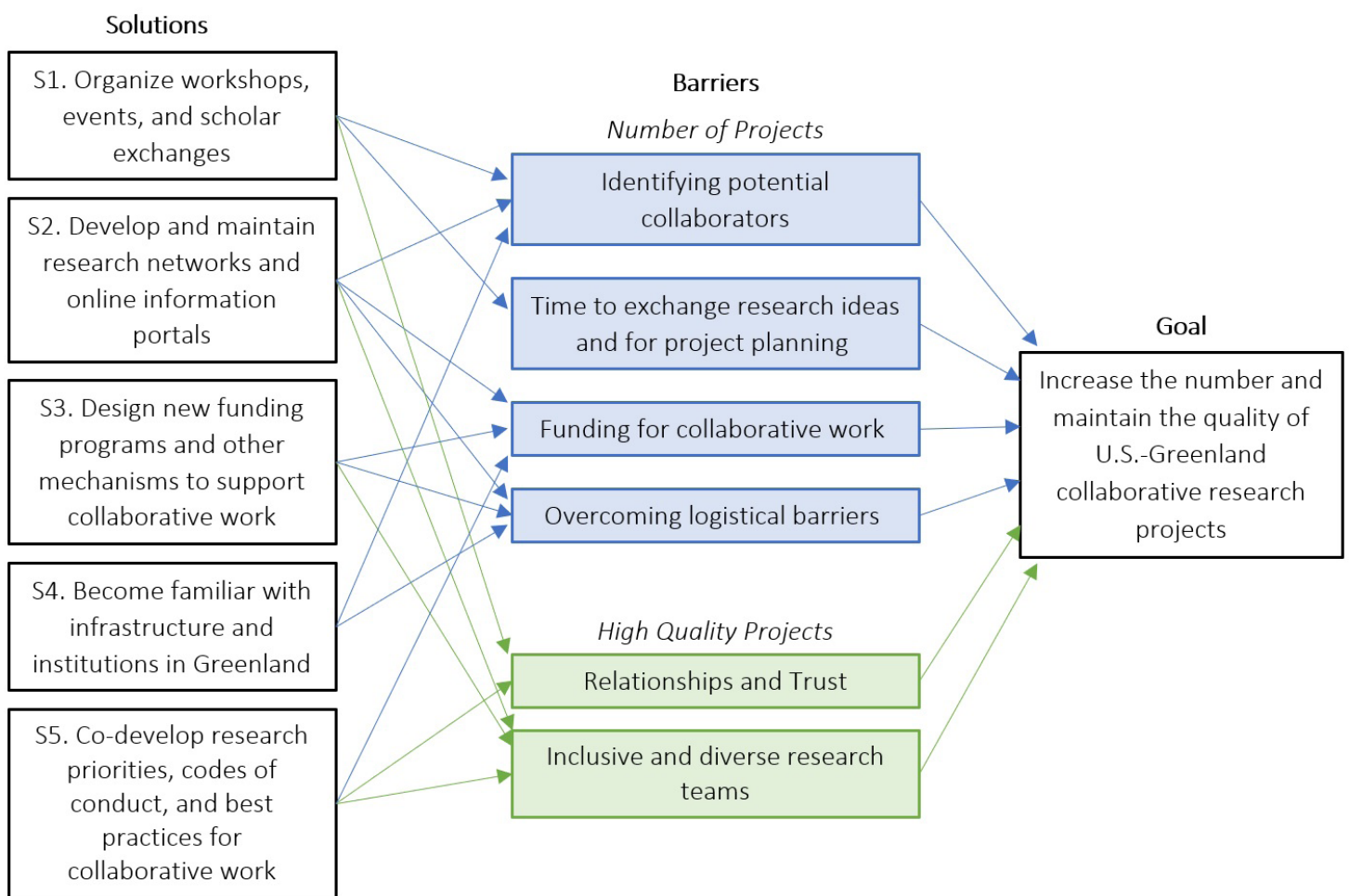


Figure 1. This diagram outlines the core barriers to successful collaborations. Five solutions (S1 – S5) are provided, many of which support multiple drivers of successful collaborations.

A1. Naapeqatigiinnerit, pisussat, ilisimatuunillu paarlaaseqatigiittarnerit aqqissuuttarnissaat

USA Kalaallit Nunaallu akornanni ilisimatusarnermi suleqatiinneq annertusarnissaanut pitsanngorsarnissaanullu aaqqiissutissaq oqallisigineqarnerpaasoq tassaavoq naapilluni ataatsimiinnernut periarfissat ineriartortinneqarnissaat. Ataatsimiinnerni inummiik inummut attaveqaatit, ingammik pilersaarusiutaareersumik pisarsinnaappata (soorlu ukiumut ataasia, imaluunniit ukiup marlukkaarlugit), suleqatigiilluarnissamut sunniuteqarluartarput. Kalaallit Nunaanniik peqataasut oqaatigaat oqarasuaatikkut e-mailikkulluunnit attaveqareernermi naliginnaasooq suleqatigiinnissamik allakkamik tunniussisoqartartoq, kisianni amerlasuutigut kingorna susoqarneq ajortoq. USA-miik ilisimatuut oqaatigaat ajornartorsiutigalugu Kalaallit Nunaanni ilisimatuut suliaminnut attuumassutillit nassaariniarnissaat attaveqarfiginiarnissaallu. Naapilluni ataatsimiinnerit pitsaasuupput aallaqqaasiullugu ilisarititsinissanut, isumassarsiat apuunnissaannut, suliniutini akisussaaffiit aningaasalersuinerillu inissinnissaat, taavalu attaveqatigiinneq tatiginninnerlu ineriartortinnissaa, tamarmik suleqatigiissagaanni toqqammavissat pingaartut (Takussutissaq 1).

Innersuussutit aalajangersimasut:

- ▶ *Naapeqatigiinnerit Kalaallit Nunaanni ingerlanneqartarnissaat* – Kalaallit Nunaanniik angalaneq akisullunilu piffissamik annertuumik atuisarpoq, Kalaallit Nunaanniillu ilisimatuut sulininermi piffissaliusaaq nikerarsinnaassusaat annikinnerusinnaalluni aamma angalanissaminnut aningaasaliissutit annikinnerusinnaallutik. Tamanna aamma ilinniartunut kalaallinut atuuppoq, ajornakusoorsinnaalluni nunanut allanut angalanissaaq aningaasat ilaqutariinnilu akisussaaffiit peqquataallutik.
- ▶ *Nunani assigiinngitsuni ataatsimiinnerit Kalaallit Nunaanni ilisimatusarnermik saqqummiisunik aqqissuuttarnissaat siuttuuffigisarnissaallu* - Ilisimatuut nunanut assigiinngitsunut angalakulapput Kalaallit Nunaanni suliaminnik saqqummiartortarlutik. Isumasioqatigiinnerit tamakku periarfissiisarput ataatsimiinnernik aqutsinissanik Kalaallit Nunaanni ilisimatusarnermik imalinnik (soorlu AGU-mi ataatsimiineq Kangerlussuup eqqaani ilisimatusarnermik pillugu imarisalik imaluunniit Kalaallit Nunaanni avatangiisini misissuinermi piffiit pillugit imarisalik) imaluunniit sammisat aalajangersimasut pillugit (soorlu Sermersuaq). Pisut tamakku ilisimatuunik assigiinngitsunik ornigarneqartarput ataatsimiinnerni isumasiornerup sioqqullugu naammassereerneraniluunniit peqataasinnaasuni. Ataatsimiinnernik aqqissuussisut innersuunneqarput Kalaallit Nunaanniit ilisimatuut qaaqquarnissaannut, ilisimatuunut nunanik allaneersunut attaveqarluarnissaat anguniarlugu.
- ▶ *Naapeqatigiinnerit ataatsimiinnerillu allanngorartunik peqataatitaqarnissaat* – Ilisimatusarnermi naalakkersuisoqarfinniillu ilisimatuut USA-meersut Kalaallit Nunaanneersullu, ilisimatuut aallarlerlaat misilittagartuullu, ilinniartut, peqataasullu suaassusaat oqimaaqatigiittassapput. Naapeqatigiinnerit faginut arlalinnut tunngassullit aalajangiisartunik peqataatitsisut suleqatigiinnerit Issittumi pissutsit paasiniarneranni ilisimatusarnermilu pingaarnersuinermi pisariaqarput. Tamanna isumalluutininik illikartitsinermi nunanik assigiinngitsuneersunik, ilisimatuut akornanni, suliffeqarfiit inuiaqatigillu akornanni (soorlu timmisartut atorlugit misissuinermi imarmi misissuinermit ataqatigiissaarneranni) ikorfartueqataassaaq.
- ▶ *Ilisimatuunik paarlaasseqatigiittarnissaq ineriartortinneqarnissaa* - Kalaallit Nunaanni ilisimatuunik paarlaasseqatigiinnerit sivikitsut, paarlattuanillu USA-mi, sulianik pilersaarusiornissamut, attaveqatigiinnermik pilersitsinissamut, ilinniartunillu suleqateqarnissamik piffissamik tunisissaaq. Tamakkua ukioq kaajallallugu pilersaarusiorneqarsinnaapput ukiumilu atuartitsiffusumi (Septemberimiik Majip tungaanut) pisinnaapput, aasaanerani USA-miik ilisimatuut Kalaallit Nunaanniinermi ulapittamik sulinngiffeqartarlutillu). Paarlaasseqatigiinnerit Kalaallit Nunaanniittussanut, periarfissiissaaq inuiaqatigiit peqatigalugit suliuniutininik pilersaarusiortarnissamut.

S1. Organize workshops, events, and scholar exchanges

The number one discussed solution for increasing and improving U.S.-Greenland research collaborations was to develop opportunities for face-to-face meetings. Individual connections at meetings, especially if they can be at regular intervals (e.g., annual or biennial), are effective at advancing collaborative work. Greenland workshop participants noted that they often provide letters of collaboration after an initial phone or e-mail contact but that there is often no follow-up. U.S. researchers note that they have had difficulty finding and getting responses from researchers in Greenland within their discipline. In person meetings are great for initial introductions, advancing ideas, defining project roles and funding allocations, and building relationships and trust, essential elements of successful collaborative projects (Figure 1).

Some specific recommendations:

- ▶ *Host workshops in Greenland* - It is expensive and time consuming to travel to meetings from Greenland and Greenland researchers may have less flexibility in their schedule and fewer resources for travel. This is also true for Greenland students who may have difficulty in traveling to foreign venues due to travel costs and family obligations.
- ▶ *Organize and lead sessions at international meetings that feature research in Greenland* - Researchers often travel to national and international conferences to present about their work in Greenland. These conferences offer the opportunity to lead interdisciplinary sessions/symposia that feature research from particular areas of Greenland (e.g., AGU session about research around Kangerlussuaq or the Greenland Ecosystem Monitoring program sites) or focused on particular topic areas (e.g., the Greenland Ice Sheet). These events may attract a diverse group of researchers who could also participate in side meetings in advance of or after the main conference event. Organizers of these sessions should ensure that invitations are sent to researchers from Greenland to keep them connected to the broader research community.
- ▶ *Workshops and sessions should include diverse representation* - Include academic and government researchers with representation from the diverse communities in the U.S. and Greenland, early-career to senior researchers, students, and balance participants by gender. Interdisciplinary workshops that include stakeholders are essential for developing collaborations that produce a novel understanding of the Arctic as a system and identifying research priorities. This will help to leverage resources among different countries, research groups, agencies, and communities for better science (e.g., combining large-scale aircraft surveys with land- and ocean-based ground-truthing).
- ▶ *Develop scholar exchanges* - Short-term fellowships and teaching opportunities in Greenland for U.S. researchers, and vice versa, will create time for project planning, building relationships, and working with students. These can be planned year-round and could occur during the academic year (approximately September through May) because the summer months, when U.S. researchers are in Greenland, are quite busy with field work and holiday schedules. For exchanges based in Greenland, there is also the potential for visits to and project planning with local communities.

A2. Ilisimatusarnermi attaveqaatit nittartakkatigullu paasissutissanik katersuuffit ineriartortinneqarnissaat ingerlanneqarnissaallu

Nittartakkat atorineqarnerisigut suleqatigiinnissamut attaveqatigiinneq aallarniisoq ilisimatusarnerup iluani fagini assigiinngitsuneersunut, suliffeqarfinnullu pilersinneqarsinnaavoq (Takussutissaq 1). Soqutigisaqaqatigiit inuiaqatigiinnilu soqutiginnittut kaammattorneqassapput nittartakkatigut attaveqatigiiffinni taakkunani peqataanissaat. Nittartakkat suliniutinut assigiinngitsunut, aningaasaliisunut, angallannermullu aaqqissuussanut paasissutissanik pilersuisinnaapput. Tamanna Kalaallit Nunaanni ilisimatusarnerq paasiuminarsarnissaanut pingaaruteqarpoq taavalu ilisimatuunut aamma paasititsissalluni ilisimatuussutsikkut suliat siammasissusaannik piffinnilu sorlarni ilisimatusarnermik suliaqartoqarsinnaaneramik. Tamakkua aallartissutitut pingaaruteqarput ilisimatuunut kissaateqartumut Kalaallit Nunaanni suliumummik aallartissutitut. Nittartakkat ukua sisamat Kalaallit Nunaanni ilisimatusarnermi suliniutinut paasissutissanik aallerfusinnaapput:

1. Isaaffik: The Arctic Gateway (www.isaaffik.org): Kinaluunniit Issittumi ilisimatusarnerup, ilinniartitaanerup, nunap ataqatigiinneranut attaveqarfinut, logistikkimiluunniit suliaqartoq Isaaffik, nittartagaq ilisimatusarnermut suleqatigiinnermullu ikorfartuisoq, ilaasortanngorfingisnaavaa.
2. Interagency Arctic Research Policy Committee (IARPC) Collaborations (www.iarpcollaborations.org): Nittartagaq una USA-meersoq ilisimatuut naalagaaffeqatigiimmiik, naalagaaffimmiik, ilisimatusarfinniik, NGO-niik, industriimiik, nunap inoqqaavisa nunallu assigiinngitsut peqatigiiffii ataatsimoortittarpei sulianik assigiinngitsunik avitseqatigiitsillugit suleqatigiisillugillu Issittumi unammilligassat imaannaanngitsut ukkatariniarlugit.
3. Arctic Research Mapping Application (www.armac.org): Nittartagaq una interaktiviusoq, aningaasaliisartunut, logistikkikkut pilersaarusiortartunut, ilisimatusarnermi paasiniaasartunut, ilinniartunut allanullu suliarineqarnikoq, Issittumi suliniutinut hornorujulikkaanut paasissutissanik aallerfigineqarsinnaavoq.
4. The U.S. National Science Foundation-ip Issittumi paasissutissanik katersuuffia (<https://arcticdata.io/>): USA-mi ilisimatuut piumaffigineqartarput paasissutissaatitik tunniussallugit ukiut marluk katersuinermiik qaangiutsinnagu imaluunniit suliniut aningaasaliinerluunniit qaangiutsinnagu.

Innersuussutit aalajangersimasut:

- ▶ *Innersuussutaavoq ilisimatuut USA-meersut Kalaallit Nunaanni suliniutitik Isaaffik-mi nalunaarsortassagaat* – Ilisimasat kikkut sumiinnerisut sulinerisullu logistikkikkut, paasissutissat isumassarsiallu, suleqatigiinnermut iluaqutaassapput, aningaasartuutit annikillineqassapput, sunniutillu annertusarlugit. Tamakku aamma annertuumik Kalaallit Nunaanni upalungaarsimanermit pingaaruteqarput, suliniutit Isaaffik-mi takulersinnaassagamikit.
- ▶ *Listserv-imik pilersitsinissaq ingerlatsinissarlu USA-miik Kalaallit Nunaanniillu ilisimatuut suleqatigiinnermik soqutigisalinnut* - 2018-imi Nuummi naapeqatigiinnermi peqataasut aallaaviussapput (Ilanngutaq C) kisianni kikkulluunniit suleqatigiinnissamut soqutiginnittut ilanngussinnaallutik. Tamanna aallartissutaasinnaavoq isumassarsianut, suliniutinut suleqatigiinnissamut, saqqammersitanut nutaat nalunaarutiginnissaannut imaluunniit ikiortissarsiornermut.
- ▶ *Nittartakkakut naapeqatigiinnerit, aningaasaliiffigineqarnissamut periarfissat ikkullugit, paasissutissanillu, nalunaarusianik, saqqummersitanik Kalaallit Nunaanni ilisimatusarnermi suliniutinut tunngassuteqartunik avitseqatigiinnermut atorineqarsinnaapput* - Nittartakkat tamakku periarfissiissapput ajornanngitsumik suliniutinik paasissutissat anguniakkallu tigussaasunnngornissaat.

S2. Develop and maintain research networks and online information portals

The use of listservs and networking-focused websites can facilitate introductions to potential collaborators from different disciplines, agencies, and institutions (Figure 1). Interested stakeholder groups and community members should be encouraged to participate in these online networks. These websites can also provide information about ongoing projects, funding, logistics, and infrastructure. This is important for increasing the transparency of research in Greenland and so that researchers are aware of the breadth of research and research locations. These should be an initial starting point for any researcher wanting to embark on a new project in Greenland. The following four websites provide information about ongoing research in Greenland:

1. **Isaaffik: The Arctic Gateway** (www.isaaffik.org): Anyone engaged with Arctic research, education, infrastructure, and logistics may join Isaaffik, a web platform in support of research and collaboration.
2. **Interagency Arctic Research Policy Committee (IARPC) Collaborations** (www.iarppcollaborations.org): This U.S.-based website brings together scientists from Federal, State, academic, NGO, industry, indigenous and international organizations to share their work and team up to solve complex Arctic issues.
3. **Arctic Research Mapping Application** (www.armac.org): This interactive web map, designed for funding agencies, logistics planners, research investigators, students, and others, shows information about hundreds of projects around the Arctic.
4. **The U.S. National Science Foundation's Arctic Data Center** (<https://arcticdata.io/>): U.S. researchers are required to submit their data here within two years of collection, or by the end of the award, whichever comes first.

Some specific recommendations:

- ▶ *Make it a requirement for U.S. researchers to register their Greenland projects at Isaaffik* - Knowledge about who is where and doing what would be helpful in sharing logistics, data, and ideas, which seeds collaborations, reduces costs, and increases efficiency. This also is highly relevant to Greenland Search & Rescue, who would be able to see projects within Isaaffik.
- ▶ *Create and maintain a listserv of U.S. and Greenland researchers interested in collaborations* - The base of this group is the 2018 Nuuk workshop participants (Appendix C) but anyone interested in collaborations could join this listserv that could be a starting point for collaboration on ideas, projects, announcing new publications, and requests for assistance.
- ▶ *Use online platforms to host webinars, post funding opportunities as well as share data, reports, and publications associated with Greenland research projects* - These platforms provide potential for organizing project information and outcomes in an easily-accessible format.

A3. Aningaasaliisarnissamut suliniutit aaqqissuussaanerillu ineriartortinneqarnissaat suleqatigiinnermik tapersersuisunik

Naapeqatigiinnermi peqataasut arlaleriarlutik aningaasaliisarnissamut aaqqissuussaaneri pingaaruteqarneri suleqatigiinneq pilersinneqassappat (Takussutissaq 1). Peqataasut oqallisigaat aningaasaliissutit USA-meersut Kalaallit Nunaanneersulluunniit ilisimatuunut avataaneersunut piffissaliinerannut sulinerannullu atorneqartarsinnaaneri. Peqataasut isumassarsiat uku aningaasaliisarnermut ineriartortitsinermullu saqqummiuppaat:

- ▶ Ataatsimoorussanik aningaasaleeriaatsit ineriartortinneqarnissaat (nunat, aqutsisoqarfiit, suliffeqarfillu akornanni) ilisimatuunik Kalaallit Nunaanneersunik USA-meersunillu tamakkiisumik peqataasoqartarnissaanut piumasaqaatitalimmik imaluunniit kaammattuisumik
- ▶ Kalaallit Nunaanni pisortat suliffeqarfillu suleriaatsit ineriartortittariaqarpaat naalakkersuisoqarfinni ilisimatuut piffissaqalersinniarlugit ilisimatusarnermi sulianut innuttaasunullu saqqummiinernut peqataasarnissaannut
- ▶ USA-p suleqatigiinnermut tapersersuinissaata qulakkeernissaa aningaasaliinerni piffissaq isumalluutillu Kalaallit Nunaanni ilisimatusarnermi suliffeqarfinni atugassat
- ▶ Ilisimatusarnermut ataqatigiissaarisumik attaveqaat suliniutinut sivisuunut ikorfartuisinnaasoq aaqqissuunneqarnissaa
- ▶ Ilisimatusarnermut hub-imik pilersitsinissaq (A4 takuuk) atortussanik USA-meersunik, Kalaallit Nunaanneersunik nunanillu allaneersunik ilisimatuunut ilisimatusarnermi suleqatigiinnissamut periarfissiisumut

A4. Kalaallit Nunaanni angallannermi attaveqaatit suliffeqarfillu ilisimaarinneqalernissaat

Naapeqatigiinnermi USA-miik peqataasunut angusaq annertoq tassaavoq Kalaallit Nunaanni suliffeqarfiit assigiinngitsut ilisimatusarnermut ikorfartueqataasut ilisimalerneru (Ilanngussaq A). Tamanna aallartiffik pingaartuuvoq suleqatissanik atortorissaarutinillu ujaasinermi.

Naapeqatigiinnermi naatsumik saqqummiunneqartoq *International Arctic Science Hub* -I Nuummiittussaq. Qallunaat Nunaanni ilinniartitaanermut ilisimatusarnermullu Naalakkersuisoq aamma Kalaallit Nunaanni Inuussutissarsionermut, Nukissaqarnermut ilisimatusarnermullu Naalakkersuisoq suleqatigiipput Kunngeqarfik Danmark sinnerlugu hub-I pilersinneqarnissaa Issittumi ilisimatusarneq oqilisarniarlugu. Qullersaqarfik Nuummi inissinneqassaaq minnernillu immikkoortortaqaassalluni Kunngeqarfik Danmark tamani tamaani. Hub-I atorneqassaaq iserfittut siullertut ilisimatuunut suleqatiginnissamut soqutiginnittunut. Tulluarnepaassaaq, Kalaallit Nunaanni illoqarfinni annerni nunaqarfinniluunniit ilisimatuunut attaveqarfusinnaasumik peqartassasoq, suleqatissarsionerminni, ilinniartussarsionerminni imaluunniit ilisimatuunik.

S3. Design new funding programs and mechanisms to support collaborative work

Workshop participants repeatedly stressed the importance of funding mechanisms for collaborative work (Figure 1). Participants discussed how funding from the U.S. or Greenland could be used to support time and effort of foreign researchers. Participants offered the following ideas for funding and development:

- ▶ Develop pooled funding sources (across countries, agencies, institutions) that require or incentivize full participation by researchers from Greenland and the U.S.
- ▶ Government agencies and institutions in Greenland should develop a mechanism to give government researchers release time for participating in research and outreach beyond government mandates
- ▶ Ensure U.S. support for collaborative work by budgeting for sub-awards that support time and resources from local Greenland research organizations
- ▶ Organize a research coordination network that could support longer-term projects
- ▶ Develop a research hub (see S4) that includes facilities for U.S., Greenland, and international researchers to set up collaborative research spaces

S4. Become familiar with infrastructure and institutions in Greenland

One significant outcome for the U.S. workshop participants was learning about the various agencies and organizations in Greenland that support research (Appendix A). This is an essential starting point for identifying facilities and collaborators.

Briefly described at the workshop was an *International Arctic Science Hub* to be located in Nuuk. The Ministry of Higher Education and Science in Denmark and the Ministry of Industry, Energy, and Research of Naalakkersuisut are working to establish the hub to facilitate Arctic research on behalf of the Kingdom of Denmark. The headquarters will be placed in Nuuk with satellite hubs around the Kingdom of Denmark. The hub will serve as a main access point for researchers interested in collaborations. Ideally, each major town or settlement in Greenland will have a point of contact for researchers to connect with partners/students/researchers in Greenland.

A5. Ilisimatusarnermi suleqatigiinnissami pingaarnersuinerit, ileqqorisassat suleriaatsillu pitsaasut pilersitseqatigiffusumik suliarineqartarnissaat

Siunissami naapeqatigiinnerit pilersissinnaavaat USA Kalaallit Nunaallu peqatigiillutik ilisimatusarnermi pingaarnersuinerit, ileqqorineqaqqusanik aamma ilisimatusarnermi suleqatigiinnermi suleriaatsit pitsaasut pillugit allagaqaatit ineriartortinneqarnissaannut (Takussutissaq 1). Allagaqaatit taakku naapeqatigiinnerillu imminermi attaveqatigiinnernik nukittuunik suleqatigiit akornanni pilersitsissapput suliniutinillu qaffasissumik pitsaassusilinnik pilersitsillutik.

- ▶ *Ilisimatusarnermi pingaarnersuineq* - USA-p Kalaallit Nunaanni ilisimatusarnera ilisimatusarnermik silarsuarmik assigiinnisitaartumit aallaaveqarpoq, Kalaallit Nunaalli ilisimatusarnera Naalakkersuisunit pisussaaffiligaanermik ilisimatusarneq inuiaqatigiinnut attuumassuteqarnissaanik aallaaveqakajuttarluni taavalu pinngortitami pisassanillu aqutsinermik aatsitassarsionermullu sammiveqakajuttarluni. Tamanna imminut ataqatigiinnilaq. Peqataasut suleqatigiilluni ilisimatusarnermi pingaarnersuusalernissaq innersuussutigaat taavalu ilisimatuunut USA-meersunut suliaat qanoq Kalaallit Nunaanni inuiaqatigiinni attuumassuteqarnerseq imaluunniit iluaqutaasinnaanersoq eqqarsaaatigisalernissaat piumasaaqataalissasoq. Taamaasiornikkut ajornannginnerulissagaluarpoq Kalaallit ilisimatuut suliniutini USA-miik aningaasalersugaasuni peqataasalernissaat.
- ▶ *Ileqqoreqqusat aamma suleriaatsit pitsaasut* - Suleqatigiilluarneq oqimaqatigiittoq anguneqassappat aallartinnermiik naammassinissap tungaanut attaveqatigiilluarneq pisariaqarlunnarpoq. Isummassiarnik isummiussaagallartunillu suliaqarnermi USA-miik Kalaallit Nunaanni ilisimatuunik aamma Kalaallit Nunaanni aalajangiisartunik suliffeqarfinnillu (soorlu inuiaqatigiit, Inuit Circumpolar Council (ICC), Ilisimatusarfik, KNAPK) peqataatitsisarnissaq. Ilisimatusarnermi periutsit suleqatigiilluni ineriartortinneqartassapput. Isumalluutit ataatsimoortinneqartassasut innersuussutigineqarpoq logistikkikkut unammillernartut qaangerniarlugit (soorlu inuiaqatigiinneersut paasissutissanik katersuinerat, suliffeqarfiit laboratoriami suliaasat suliarineri). Ilisimatusarnermi peqataasut tamarmik eqqartortariaqarpaat qanoq angusanik avitseqatigiissinnaanerlutik qanorlu saqqummiussinermi peqataasinnaanerlutik (inuiaqatigiinnut saqqummiussineq, nalunaarusiat, saqqummersitat, isumasioqatigiinnernilu saqqummiisarnerit). ■

Assit Robert Gill-imik assilineqarput.



S5. Co-develop research priorities, codes of conduct, and best practices for collaborative work

Future workshops can lead to the development of joint U.S.-Greenland statements of research priorities, codes of conduct, and collaborative research best practices (Figure 1). These statements and the workshops themselves will build relationships among collaborators and lead to high-quality future projects.

- ▶ *Research Priorities* - U.S. research in Greenland is driven by a diverse academic research community whereas Greenland research is mandated by the government to be relevant to society and is often directed at natural resource management and extractive industries. These are not mutually exclusive. Participants recommended development of joint research priorities and a requirement for U.S. researchers to consider how their work is relevant to and of benefit to Greenland society. This would make it easier for Greenland researchers to participate in U.S.-funded projects.
- ▶ *Codes of Conduct and Best Practices* - Communication from start to finish is essential for equal and successful partnerships. Idea and hypothesis generation should involve researchers from the U.S. and Greenland and stakeholders/institutions in Greenland (e.g., local communities, Inuit Circumpolar Council (ICC), Ilisimatusarfik, the Hunter and Fisher Association (KNAPK)). Methods should be jointly developed. Resources should be pooled to overcome logistical issues (e.g., community members doing field sampling, institutions doing lab work). All research participants should discuss how to share results and be involved with some aspect of dissemination (outreach, reports, publications, and presentations). ■

Photos by Robert Gill.



Pilersitseqatigiilluni ilisimatusarneq

Kalaallit Nunaanni ilisimatuut politikikkullu sinaakkusisiisut nunap inoqqaavisa piffimmilu ilisimat ilisimatusarnermi ilanngunneqartarnissaat inuiaqatigiinni ineriartortitsinermi soqutigisarivaat. Piumasarineqarpoq ilisimatusarneq inuiaqatigiinnut iluaqutaasoq peqataatitsisorlu, taamaammat pingaaruteqarpoq ilisimatuut Kalaallit Nunaanni inuiaqatigiinni attuumassuteqartunik suliaqartarnissaat. Ilisimatuut USA-meersut, ingammik pinngortitami fysikkimilu ilisimatuut, amerlanertigut Kalaallit Nunaannut tikittarput suliniutinut isumassarsiaqarlutik inuiaqatigiinnik imaluunniit Kalaallit Nunaanni suleqatigisinnaasanik suleqateqarani peqataatitsinanilu ineriartortitanik.

Ilisimasanik pilersitseqatigiinneq ilumoortoq tassaavoq aallaqqaataaniilli suleqatigiilluni, ilisimatusarnermi apeqqutissat ilusilersorneqarnermi suleqatigiillunilu qanoq akinissaat inississorneqarnerani. Pingaarnersuineq annertoq tassaavoq soqutigisat ernumanartitallu assigiiaat nassaariniarnissaat, aalisartut, piniartut soqutigisaqartullu allat peqataatinneqarnerini, soorlu nunatta pisassat uppernarsarneqarnerani aqunneqarneranilu (soorlu PISUNA ilanngussaq B-mi takuguk).

Pilersitseqatigiilluni suliaqassagaanni pisariaqarpoq inuit attaveqatigiinnissaannik periarfissinnissaat. Ilisimatuut pisortatigoortumik pisortatigoortuunngitsunillu attaveqaatinik pilersitsisariaqarput inuiaqatigiinnilu ilisimatuut inuiaqatigiinnilu ilaasortat attavigalunikkit. Taamaasionerme pingaarnersuineq tassaavoq piffissaq. Peqataasut siunnersuutigaat minnerpaamik ukioq ataaseq ukioq ataaseq affarlu missaani pisariaqartartoq piginnaasanik, ilisimatusarnermi attavissat nassaarinissaat, taavalu tatiginninneq attaveqatigiinnerlu suleqatigiinnissamut pisariaqartoq pilersinneqassappat. Tulluarnersuutigaat pisarpoq suliniummik qinnuteqaammik suliaqarnermi. Peqataasut aamma siunnersuutigaat piffissaq aningaasaliissutillu suleqatigiinnermik pilersitsiniartut suliniutinut qinnuteqaasionerme ilanngunneqartassat, USA-mi ilisimatusarnermut suliniutinut aningaasaliisarnert siviikkittaraluartut (ukiut 3-5).

Eqimattakkaat arlariit pisussaaffeqarput pilersitseqatigiilluni ilisimatusarnermut piginnaasanik pilersitsiniarnermut:

1. *Kalaallit Nunaanni ilisimatuut amerlanngillat inerisarneqarsinnaallunilu inuusuttut ilisimatusarnermut ilinniagaqartalernissaannut piomassuseqalernissaannut pikkorissaasoqartalernerani. Joint Science Education Project-ip taanna anguniagarisaasa ilagaat. Ilisimatuut amerlisarnissaat pingaaruteqarpoq Kalaallit Nunaanni ilisimatuut annertuumik piomaffigineqartaramik nunat assigiinngitsut akornanni suleqatigiinnissamut inuiaqatigiinnullu saqqummiisarnissaminut piffissaliinissaminut.*
2. *Ilinniartitsisut (atuarfinni ilinniartitsisut, ilisimatusarfinnilu professorit Kalaallit Nunaanni USA-milu) pikkorissarneqartariaqarput ilisimasanik pilersitseqatigiinnermut suleriaatsinik atuartitsinissaminut aamma ilinniartunut suliaminnik aallartitsinnginnerannik Kalaallit Nunaanni inuiaqatigiinnut tusarnaarsinnaanerannik periarfissanik tunisisarlutik. Apeqqut ammasoq tassaavoq qanoq Kalaallit Nunaanni USA-milu ilinniartitsisut ilisimasanik pilersitseqatigiinnermi peqataatinneqartassanersut, ilinniartunik pikkorissaanerisa saniatigut. USA-mi ilisimatuut, amerlanertigut professoriusartut ilinniartunik ilitsersuisartut, innersuunneqarput pilersitseqatigiinneq pakkutissagaat, Kalaallit Nunaannilu ilisimatusarnermi pingaaruteqarnera erseqqissarlugu.*
3. *Kalaallit Nunaanni inuiaqatigiit ilaatigut ilisimatusarnerup suunera iluaqutiginnaasaalu tamatigut paasilluarneq ajorpaat. Taamaammat ilisimatuut peqatigalugit apeqqusiornissaminut inissisimanerat ajornakusoorsinnaalluni. Tamanna sammissallugu pingaaruteqarpoq Kalaallit Nunaannilu ilisimatuut sulissutigisinnaavaat inuiaqatigiinni paasinnittariaaseq pitsanngorsarnissaa taamaasillunilu USA-miik nunanilu allaneersuni ilisimatuunik suleqateqartarnissaq ikorfartorlugu. Taassuma saniatigut inuiaqatigiinniik paasissutissanik katersuinissaq ajornakusoortarpoq, ingammik oqaatsitigut akimmiffiit eqqarsaatigalugit. Aaqqiisutissaq siunnersuutigineqartoq tassaavoq Kalaallit Nunaanni inuit ilisimatusarnermut ataatsimiinnernut qaaqquneqartalernissaat, ilisimatusarneq pillugu ilikkagaqartinniarlugit inuiaqatigiinnilu soqutigisat pisariaqartitallu apuuttarniassammassik. Assersuut ataaseq tassaavoq ataatsimiinneq Ilulissat Climate Days 2-5 Juni 2015 pisoq, ilisimatuunik soqutigisaqatigiinnillu nunarsuami sermersuini unammilligassat Kalaallit Nunaannullu avatangiisinut inuiaqatigiinnullu sunniuteqaatai pillugit oqallinnermi peqataatitsisoq. Pisut tamakku iluatsissappata aningaasaliinerit Kalaallit Nunaanni inuiaqatigiinniik peqataatitsarnissaq ilannguttariaqarpaat. Ataatsimiinnerit Kalaallit Nunaanniikkaluarpataluunniit angalanermut akiitsut annertusarsinnaammata. ■*

Co-Produced Research

The research community and the political system in Greenland are particularly concerned with the involvement of Indigenous and local knowledge in research and the development of communities in Greenland. There is a large push for research that directly benefits and involves society, and it is important for researchers to engage in issues that are of importance to Greenland society. U.S. researchers, particularly natural and physical scientists, often arrive in Greenland with project ideas that were developed without direct engagement with communities or potential colleagues in Greenland.

True co-production of knowledge means working together from the very beginning, formulating research questions together and collaboratively determining how to proceed to answer them. A priority is identifying overlapping interests and concerns, and strengthening the involvement of fishers, hunters, and other stakeholders interested in the documentation and management of natural resources (e.g., see PISUNA in Appendix B).

The preliminary work for co-production requires creating opportunities for people to develop relationships that will lead to collaboration. Researchers must build formal and informal networks and connect with local researchers and community members. The most important element of this is time. Participants suggested that it takes at least a year to year-and-a-half to build capacity, find research contacts, and develop trust and relationships that are essential for collaborations. Ideally this happens during proposal development. Participants also suggested that time and funding for developing collaborations should be built into proposals, despite the short funding cycles (3-5 years) of U.S. research projects.

Multiple groups have a role in building capacity for co-production of research:

1. *The research community in Greenland* is relatively small and could be nurtured by developing a research pipeline to inspire and train young people from Greenland to become independent researchers in Greenland. This is one goal of the Joint Science Education Project. Growing this community is important because Greenland researchers have huge demands on their time for international collaborations and community outreach.
2. *Educators (teachers, professors) in Greenland and the U.S.* must be trained to teach and embrace models of co-production of knowledge and to provide opportunities for students to meet and listen to Greenland communities before they begin their work. An open question is if and how to involve Greenland and U.S. teachers in the co-production of knowledge beyond training students. U.S. researchers, who are often professors who mentor students, should embrace co-production and emphasize its importance to research in Greenland.
3. *The general public in Greenland* may lack an understanding of what research is and what benefits it can bring them. Thus, they may not be in a good position to formulate questions in collaboration with researchers. This is an important area where Greenland researchers can build public understanding and support for long-term collaborations with U.S. and international scientists. There is also no obvious mechanism for gathering information from the public, especially given the presence of language barriers. One proposed solution is inviting people from Greenland to attend scientific meetings, where they can learn about research and give input about community interests and needs. One example is the Ilulissat Climate Days meeting that took place 2-5 June 2015 and involved both scientists and stakeholders in discussions on cryosphere changes and their effects on the Greenland environment and society. For these events to be successful, funding must be available to support the participation of Greenland community members. Even if the meeting takes place in Greenland, travel costs can be prohibitive. ■

Innuttaasunut saqqummiisarnerit

Kalaallit Nunaanni inuiaqatigiit amerlatigut malugisarpaat ilisimatuut nunanik allaneersut nunami suliaqartut imaluunniit ungasinnerusumukarnermikkut illoqarfimmuut aqquasaarneranni. Kisianni ilisimatuut inuiaqatigiillu akornanni attaveqaqatigiinneq annikittarpoq, aningaasaliinermi piumasaqaataasimangippat. Assersuutigineqarsinnaavoq inuiaqatigiinni ilaasortat ilaat ilisimatuut tikerartarnerat iluarinnginnerarlugu oqaatigisarpaat najugaqarnermut annertuumik sunniuteqartarmat. Peqataasut aamma oqaluttuaraat oqaloqateqartarsimallutik ilisimatuut Kalaallit Nunaanniinnissaat apeqqusiisunik toqqaannartumik iluaqutissartaat ersarinngimmat.

Tamarmik isumaqataapput innuttaasunut saqqummiisarnermi pitsaanerujussuarmik sulisoqarsinnaasoq. Kalaallit Nunaanniik peqataasut isumassarsiaat nalitupput pingartinneqarlutillu tassami paasinnikkamik attaveqarnermi periutsit assigiingitsut suleriaatsillu iluatsilluartut suut Kalaallit Nunaanni innuttaasunut saqqummiinermi atorneqarsinnaanersut.

Innersuussutit siammasinnerit:

- ▶ Innuttaasunut saqqummiisarneq Kalaallit Nunaanni suliniutini ingerlanneqartuni anguniakkatut ersarissumik allanneqartarnissaat innersuussutigineqarpoq, aningaasaliisoq suminggaanneernersoq apeqqutaatinnagu.
- ▶ Isumalluutit (piffissaq aningaasallu) innuttaasunut saqqummiinissamut illikartinneqartassapput
- ▶ Ilisimatuut ilisimatusarnerup iluaqutissartai nunarsuup sinneraanngitsoq, kisianni Kalaallit Nunaanni inuiaqatigiinnut erseqqissartassagaat (soorlu ilinniartitaanermut pikkorissarsinnaanermullu periarfissat annertunerit, ataqatigiinnermut attaveqarfii pitsanngorsarneqarneri, nunap pissarititaanik atuineq aqutsinerlu pitsaanerusoq)
- ▶ Innuttaasunut saqqummiisarneq imak eqqarsaatigineqartassasoq inuiaqatigiit oqaloqatigalugit, saqqummiiffigiinnarnagit. Ilisimatuut Kalaalliniik piumasaqaatit paasissutissanut iliuusissanulluunniit tunngasut sapinngisamik iliuuseqarfiginiartassavaat.
- ▶ Atortut angisuut atserneqarnerini Kalaallit atii atorneqartassasut
- ▶ Ajornangippat, Kalaallimik ilisimatuumik nutserisumilluunniit suleqateqarnissaq oqaatsitigut unammilligassat qaangerniarlugit – peqataasoq ataaseq oqaatigaa Kalaallit apeqquteqarnerusartut saqqummiinerit kalaallisut ingerlanneqaraangata.
- ▶ Nuummi The International Arctic Hub inuiaqatigiinnut saqqummiisarnissanik aaqqissuussisinnaavoq, ingammik sulisoqarpat inuiaqatigiinnut attaveqartarnissamut saqqummiisarnissamullu ataqatigiissaarisinnaasumik aqutsisinnaasumillu, aamalu nutsigassanik ikiutaasarsinnaalluni.

Innersuussutit siammasinnerit:

- ▶ *Radiukkut piffimmillu nalunaartarneq* - Kalaallit Nunaata Radio-mik (KNR) aamma Sermitsiaq-mik, (sermitsiaq.ag) ilisimatusarneq soqutiginarsarneqarnissaa. Taakkumi nuna tamakkerlugu nutaarsiassanik saqqummiisarput inuiaqatigiinnullu pingaaruteqarlutik susoqarnissaanut paasissutissiinermi. Taakkua atorlugit inuiaqatigiinnut saqqummiinissat nalunaarutigineqartarsinnaapput, soorlu aamma bussit unittarfini Nuuk Ugeavisimilu, Nuummi aviisi akeqanngitsoq, allagartaliisarsinnaaneq. Naapeqatigiinnermi isumassarsiaq nuannersoq tassaavoq ilisimatuut ilisimatusarfimmi tusagassiortunngorniartut suleqatiginissat, taamaasillutik ilisimatusarnerminnik paasissutissat angusallu inuiaqatigiinnut radio-kkut aviisikkulluunniit allatanik apuussinnaallunikkat.
- ▶ *Nittartakkatigut inuit naapittarfi* - Ilisimatuut Twitter-i ilisimatusarnermikkut attaveqaatit saqqummiussinikkullu atortarpaat, kisianni Kalaallit Nunaanni Facebook (Instagram-ilu tullertut) inuiaqatigiinnut apuussiffissatut pitsaanerpaalluni. Kalaallit Nunaanni Facebookkikkut pisussanik nalunaarsuineq suleqatinillu kammalaatinilluunniillu nalunaarsuineq sukkasuumik ilisimatusarnikkut sulianik aamma inuiaqatigiinnut saqqummiussinissanik paasititsisarpoq.

Public Outreach

People in Greenland are often aware of foreign researchers working in local field stations or as they transit through to more remote field camps. However, there is often little interaction among community members and researchers unless this is part of the funded work. In some instances, community members have expressed frustration at the influx of foreign researchers who have significant impacts on local resources such as housing. Participants recounted interactions with community members who questioned the need for researchers to be in Greenland as the direct benefits are not apparent.

All agree that there is room for significant improvement with regards to public outreach. Ideas offered by Greenland participants were particularly valuable and appreciated because of their understanding of the nuances of communication and best practices for outreach in Greenland communities.

General recommendations:

- ▶ Public outreach should be prioritized as an explicit goal of all projects conducted in Greenland regardless of funding source
- ▶ Resources (time and money) should be allocated to outreach
- ▶ Researchers should emphasize the benefits of research to Greenland society beyond global impacts (e.g., enhanced education and training opportunities, improved infrastructure, improved natural resource use and management)
- ▶ Think of outreach as a conversation with the public rather than a one-sided presentation. Researchers should try to respond to requests from Greenlanders for information or action on questions that the Greenlanders raise
- ▶ Use Greenlandic names to refer to major equipment installations
- ▶ If possible, partner with a Greenland scientist or translator to overcome language barriers - one participant noted that more Greenland citizens ask questions when presentations are in Greenlandic
- ▶ The International Arctic Hub in Nuuk could facilitate outreach in communities, especially if there is a dedicated person to coordinate and facilitate community outreach and assist with translations

Specific recommendations for reaching the Greenland public:

- ▶ *Radio and Local Advertising* - Seek interest from Kalaallit Nunaata Radio (KNR) and Sermitsiaq, the print media outlet (sermitsiaq.ag). Both broadcast nationally and are ubiquitous ways for the public to learn about news and events in Greenland. These venues are a significant way to advertise science outreach events, as is using local flyers in bus stops and Nuuk Ugeavis, the free newspaper in Nuuk. One exciting idea from the workshop is to connect researchers with Ilisimatuserfik journalism students, who can collaboratively work to convey information about research and results to the public through radio stories and written articles for the local free newspaper in Nuuk.
- ▶ *Social Media* - Researchers use Twitter for science communication and outreach, however, in Greenland, Facebook (and Instagram, secondarily) is the best way to reach the public. Posting events on Facebook and tagging colleagues or friends in Greenland is a fast way to spread awareness of research projects and outreach events.

Kalaallit Nunaanni innuttaasunut saqqummiisarnissanut periarfissat:

Nittartakkatigut

Kalaallit Nunaanni illoqarfiit tamarmik qarasaasiaqarput 4G internet-imik attavilimmik innuttaasunik atornerqarsinnaasumik. Kalaallit Nunaanni nittartagaq ilisimarineqarluartoq paasissutissanillu nutaanik ilaartorneqartartoq, akeqanngitsumillu atornerqarsinnaasoq, paasissutissanik allanik imaqaereersoq, tuugassaqaarsinnaavoq “Innuttaasunut saqqummiussat”. Tuugassaq toorlugu ilisimatusarnermik tunngasunik inuiaqatigiinnut saqqummiussassat soorlu video-liat naatsut atuartitsinermiluunnit sammineqarsinnaasut Kalaallit Nunaanni inuiaqatigiinnut paasinartunngorlugit sanaat takuneqarsinnaassapput. Isaaffik (www.Isaaffik.org) ilisimaarinneqarluareerpoq, tatigineqarluarluni, paasissutissanillu nutaanik ilaartorneqartarluni. Innuttaasunut saqqummiussisarnissamut atortussat uku imarisinnaavai:

- ▶ Ilisimatusarnermi video-t tusarnaagassiallu: tusarnaagassiat soqutigintut naatsut 5-7 minutsinik sivilissusillit ilisimatusarnermi suliani angusanik imallit Kalaallit Nunaanni inuiaqatigiinnut soqutigintut. Ajornanngippat tusarnaagassiaq oqaatsini assigiinngitsuni arlariinni suliarineqartassapput, tuluttut kalaallisullu ilanngullugit. Tusarnaagassiat YouTube-mut ilineqartassapput, Isaaffik-miik iserfigineqariaannanngorlugit, saniatigullu ilisimatusarfiup YouTube-ianni aamma iserfigisinnaanngorlugit. Ilisimatusarnerq nunat assigiinngitsut Kalaallit Nunaannilu ilisimatusartut akornanni suleqatigiinneruguni, ilisimatuut nunani allaneersut ilisimatuullu Kalaallit Nunaanneersut assiliani ilanngunneqartassasut innersuussutigineqarpoq.
- ▶ Ilisimatusarnermut tunngasut Kalaallit Nunaanni atuartitsinermit atuartitsissutit: Atuartitsissutit pædagogikkimi pitsaassuseqassapput (soorlu U.S National Science Standards innersuussutaat malillugit), ajornanngitsumik paasineqarsinnaasassapput, piffinni avinngarusimasuni atortussat aallaavigalugit*, ilinniartitsisumullu nassuiaatinik ilaqartassallutik atortussat nassiunneqartut atorluarneqarnissaat anguniarlugu. *Atortussat ilaat, soorlu plakatit imaluunniit anisitassat, piffinnut avinngarusimasunut nassiunneqartarnissaat pisariaqarsinnaavoq, anisitsisinnaanissaq piffinni ilaanni killeqartarsinnaammat. Taassuma saniatigut ilinniartitsisut atuartitsissutissanut attavilernissaannut pisariaqarpoq (immaqa Ilinniartitaanermut Naalakkersuisoqarfik Ilinniarfissuarluunniit aqqutigalugu).
- ▶ Suliniutit paasissutissallu takussutissartalerlugit saqqummiunneqarneri: NASA takussutissiisarpoq kusanartunik, akeqanngitsumik aaneqarsinnaasut uangaanniik: NASA Science Visualization Studio (SVS): svs.gsfc.nasa.gov

Nuummi Greenland Science Week ingerlanneqartartoq

Ukiut tamaasa issittumi ilisimatusarnerq pillugu ulloq Danmarkimi ingerlanneqartartartoq Kalaallinik ilisimatuunik peqataaffigineqartartoq, nuannaarutigineqartumik Nuummumut nuunneqarpoq atserlugu “Greenland Science Week” 2-5. December 2019 ingerlanneqartussamik. Pisussaqaq siunissamilu pisussat piffiusassaqaq ilisimatusarnermik Kalaallinik nunanillu allaneersunik ilisimatuunik takutitsiffissaq pingaarutilik. Immaqa aamma periarfissatut misissorneqarsinnaavoq illoqarfinni minnerni USA-miik Kalaallit Nunaanniillu peqataasumik minnerpaamik ataatsimik ilalerluni ingerlatsisarnissaq. Peqataasut siunnersuutigivaat Nuummi ingerlanneqarneqartartoq Unnuk Kuultoorisiorfik, suliffeqarfiit aqutsisoqarfillu amerlanerpaat inuiaqatigiinnut ammasarnerat takussutissartarluutik sammisaqartitsisarnerallu assigiinngitsunik, aallaaviulluarsinnaasoq. Tassunga peqataasarput Pinngortitaleriffik Nunattalu Katersugaasiviat, peqataaffigineqarluartaqisut bussit akeqanngitsumik ingerlaartarnerisa ilutigisinnaasaannik. USA-miik ilisimatuut pisumut pingaarutilimmut tikinnissaminnut periarfissaqaqngikkunik, atortussanik saqqummiussasanilluunniit sanasinnaapput Kalaallit Nunaanni ilisimatusarnermi suliffeqarfinni atorsinnaasaannik. Nuummi naapeqatigiinnermi atatillugu Katuami taamak aqqissuivugut.

Opportunities for Outreach in Greenland:

Online

Every town in Greenland has a computer with 4G internet that is available to anyone living in or near that town. A well-known website that is regularly maintained within Greenland, freely available, and that already has a lot of other information on it should have a tab created for “Outreach”. Someone clicking on that tab would be able to see science outreach film clips and science classroom activities that are crafted to be easily understood by a Greenland citizen. Isaaffik (www.Isaaffik.org) is already widely known, recognized, and regularly maintained. Outreach materials could include:

- ▶ Science videos and podcasts: 5-7 minute brief, interesting podcasts about science results that are relevant to the citizens of Greenland. If possible, each podcast should be in multiple languages, including English and Greenlandic. The podcast should be posted on YouTube, linked on Isaaffik, and could also be linked to the official YouTube channel of Ilisimatusarfik. When the research is a partnership between scientists from other nations and Greenland community-scientists, both the local and the international scientist should be included within the footage and in the design of the video or podcast
- ▶ Science lessons for classrooms in Greenland: The lessons should be pedagogically sound (e.g. follow guidance in the U.S. National Science Standards), easily understood, use materials readily available in remote communities*, and should be accompanied by a teacher’s guide to help the local teacher be prepared to use the material in his/her classroom. *Some materials, including paper-handouts and posters, may need to be sent to communities because access to printing is very limited in the smallest communities. Also, there needs to be an avenue to connect local teachers to these materials (perhaps through the Ministry of Education in Greenland and the Institute of Learning at Ilisimatusarfik).
- ▶ Visualizations of projects and their data: NASA has amazing visualizations, freely available at the NASA Science Visualization Studio (SVS): svs.gsfc.nasa.gov

Greenland Science Week in Nuuk

There has been a polar research day every year in Denmark that Greenland researchers attend, and, excitingly, this event is moving to Nuuk and is scheduled for 2-5 December 2019 as “Greenland Science Week”. This and future events will be a significant venue to showcase research by Greenland and international scientists. It may also be worth exploring satellite versions in smaller towns with at least one researcher from each the U.S. and Greenland in attendance. Participants suggested a good model for this event is the annual Culture Night in Nuuk, when most businesses and institutions are open to the public and host various displays, exhibitions, and activities. This has included the Greenland Institute of Natural Resources hands-on display and the Greenland National Museum and Archive exhibit and history quiz game, which are well attended in part because bus services are free during this period to encourage residents to attend. If U.S. researchers are unable to travel to partake in this important event, they could design and provide the materials for hands-on activities to partners at research institutions in Greenland. For part of the Nuuk workshop, we hosted such an event at Katuaq.

Illoqarfinni ilisimatusarnikkut suliaqarfiusuni inuiaqatigiinnut saqqummiisarnissaq

Ilisimatusartut Kalaallit Nunaannut suliaqarfiusartut tikiinginnerminni Kalaallit Nunaanneersunik ilisimatuunik piffissami pisussamik (soorlu mittarfimmi, innuttaasut illuaniluunniit) pilersaarusernermik suleqateqarnissaat innersuussutigineqarpoq. Suleriaaseq periarfissaasoq ataaseq tassaavoq ilisimatooq ilisimatusarnermut tunngasumik naatsumik saqqummiinissaa, piffissaliilluarlunilu tusarnaartunik apeqquteqartoqarsinnaanissaanut saqqummiinermut tunngasumik imaluunniit ilisimatusarnermut tunngasumik peqataasunik aaliangersakkanik. Inuiaqatigiinnut saqqummiisarneq ingerlanneqartartoq ataaseq tassaavoq Kangerlussuup mittarfiani ukiut tamaasa Joint Science Education Project ingerlanneqarnerani pisartoq. Ilinniartut takussutissanik sammisassanillu piareersaasarput, ilinniartullu USA, Danmark Kalaallit Nunaanniillu peqataasaramik ilisimatusarnermi suliniutitik apeqqutillu kalaallisut, qallunaatut tuluttullu saqqummiussinnaasarpaat akillugillu.

Nunatta Katersugaasivia

Nunatta Katersugaasivia Allattugaateqarfialu peqquneqarnikuuvoq Kalaallit Nunaata piorsarsimassutsikkut oqaluttuarisaanermi inuiaqatigiinnikkullu ineriartortoqarnerani paasisat isumannaatsumik paarsinissamut saqqummiisarnissamullu. Aqutsinermiik isiginiassagaanni, suliaasaq annertoorujussuuvoq Kalaallit Nunaata angissusaata logistikkikkut piffiit avinngarusimasut tikinnissaannut unamilliisarami. Nunatta Katersugaasivia aamma pisussaaffeqarpoq ilisimatusarnikkut suliaqassalluni paasissutissanillu nutaanik Kalaallit Nunaata pinngortitakkut oqaluttuarisaaneranut tunngasumik saqqummiisassalluni. Taamaammat, Nunatta Katersugaasiviata suliniutinut suleqatiginninnissamut pinngortitamik inuiaqatigiilerinermillu ilisimatusarnermi atassusiisumut, taavalu piorsarsimassutsikkut isumalluutinik aqutsinermi (soorlu kultoorikkut kingornussat itsarnisarsiornerlu) avatangiisinut silaannullu pissusaanik ilisimatusarnermut ataqatigiissilernissaanut, soqutigisaqarpoq siuarsaaqataarusullunilu. Nunatta Katersugaasiviata aningaasat, takutitsinissamut inissaq Kalaallit Nunaatalu pinngortitami oqaluttuarisaanerata pillugu paasisimannineq amigaatigaat, pinngortitalu oqaluttuarisaanerata ilisimatusarneratalu pillugu inuiaqatigiinnut saqqummiisarnerminnut ilanngussorusuppaat taamaasiornerminnikkullu ilisimatuut paasisaat takussaasunngorlugit tikiqqarsinnaalersillugit. Katersugaasivimmi inissaq takutitsinissamut annertuunut annertunngimmat, katersugaasiviup neqeroortigaa nittartakkaminni Facebookkiminnilu videonik ikkussisinaanissartik allanillu takussutissanik ineriartortitsisinaanissartik. Assinganillu periarfissaavoq KNR-i ilisimatusarnermut ilisimanut piffimmilu ilisimatusarnermut soqutiginninneq annertusarnissaanut ikiuutaasinnaavoq. Tusarnaartussat anguniakkat tassaassapput Kalaallit Nunaanni nunanilu assigiinngitsuneersut, nutsikkat kalaallisut, qallunaatut tuluttullu pilersorneqartarlutik.

Assit Lars Demant-Poort-imik assilineqarput.



Outreach in towns where field work is conducted

Scientists coming to Greenland should work with local scientists well before their arrival to organize an event at a local venue (e.g., airport, community center in Pituffik/Qaanaaq), which would then occur while the visiting scientist is in town. One possible format is having the scientist briefly talk about a research topic, allowing a lot of time to answer questions from the audience about their talk or on a range of scientific topics suggested by attendees. One currently implemented outreach event occurs at the Kangerlussuaq airport each summer during the Joint Science Education Project. Students put together displays and hands-on activities and because the teams include students from the U.S., Denmark, and Greenland, they can share their science projects and answer questions in Greenlandic, Danish, and English.

Greenland National Museum and Archives

The Greenland National Museum and Archives is tasked with protecting, preserving and disseminating information on the entirety of Greenland's cultural history and intangible heritage. From a management standpoint, this is a daunting task as the sheer size of Greenland presents incredible logistical challenges to accessing remote parts of the country. The National Museum also holds an obligation to perform research and disseminate information on new discoveries related to Greenland's natural history. Therefore, the National Museum has a standing interest in promoting and participating in collaborative projects that bridge the natural and social sciences and can combine cultural resource management (i.e. heritage & archaeology) with environmental/climate science. The National museum lacks funds, exhibition space and expertise in the natural history of Greenland and would like to incorporate more natural history and science into their larger public outreach efforts and in the process help scientists make their discoveries more accessible. As there is not a lot of space in the museum for full exhibitions, the Museum has offered to post videos and develop new virtual platforms on the museum's website and Facebook page and possibly KNR that help promote scientific literacy and general interest in local scientific research. Again, the target audience would be both local and international, with translations provided in Greenlandic, Danish and English.

Photos by Lars Demant-Poort.



Katuami innuttaasunut saqqummiineq

Naapeqatiginnermut atatillugu USA-miik Kalaallit Nunaanneersullu ilisimatuut Katuami, akunnernik marlunnik sivilissuseqartumik, ilisimatusarnerminnik suliaminnik inuiaqatigiinnut takussutissiipput misileraaffusinnaasumik. Pisoq una ammarneqarpoq USA-p Danmarkimi ambassadøriata Carla Sands-ip oqalugiarnernik. Oqalugiarnernata kingorna USA-miik Kalaallit Nunaanniillu ilisimatusartut ilisimatusarnerminnik inuiaqatigiinnut Katuami saqqummiipput. Peqataasut ilaat qinerpaat minutsinik tallimanik sivilissusulimmik inuiaqatigiinnut ilisimatusarnermi suliniutertik anguniakkatillu saqqummiussallugu. Saqqummiinerit ilaliullugu imarivaat ilisimatuut imminnut ilisaratinnerat, tunuliaqutaat, Kalaallit Nunaanniillu ilisimatuutut sulinertik oqaluttuarilaarlunikkut. Plakatit qulit sinnerlugit Kalaallit Nunaanni ilisimatusarnermi suliniutit USA-miik Kalaallit Nunaanniillu ilisimatuunik aqunneqartut nassuiaatitallit nivinngaassuunneqarput saniatigullu misileraaffusinnaasunik takutitsisoqarluni assilianik, videonik, ilisimatusarnermi atortunik aamma misissuinerneq takussutissanik imaqtunik. ■

Assit Bo Gregersen-imik assilineqarput aamma Lauren Culler, Kisser Thorsøe.



Simon Thaarup & U.S. Ambassador Carla Sands

Public outreach event at Katuaq

As part of the workshop, researchers from the U.S. and Greenland set up hands-on exhibits and shared science with the community at a two-hour event at Katuaq, Nuuk's Cultural Center. This feature event was opened with remarks by U.S. Ambassador to Denmark Carla Sands. Following her remarks, researchers from the U.S. and Greenland used various formats for communication. Some participants elected to prepare a five-minute presentation describing their project and research for the general public. The talks included a personal dimension, i.e., ensuring to introduce yourself, your background, and tell a little bit about your story of being a researcher in Greenland. We displayed over ten posters that described various projects in Greenland led by U.S. and/or Greenland researchers and we had a collection of hands-on exhibits featuring photographs, videos, scientific equipment, and field samples. ■

Photos by Kisser Thorsøe, Bo Gregersen, Lauren Culler.



Exploring Science in Greenland

U.S. and Greenland partnerships



Presentations and Exhibits by Scientists from
Greenland and the U.S.

MONDAY 27. AUGUST 2018

15.00 – 17.00 at KATUAQ

FREE ENTRY

Activities for Children



NAALAKKERSUISUT
GOVERNMENT OF GREENLAND



DARTMOUTH



Ilinniartitaaneq

Peqataasut oqallisigaat ilisimatusartut kinguaariit tullii qanoq ilinniartitaasinnaanersut sungiusarneqarlutillu. Kalaallit Nunaanni ilisimatusartut paasinarsitippaat ilinniartut suliffimmillu misiliisut toqqammaviumik ilisimatusarnermut ilinniagallit taavalu teknikkikkut ilinniagaqarnissaat soorlu ungasissumiik uuttuisinnaanissaq aamma GIS (geographic information systems) pisariaqartut. USA-mi Kalaallit Nunaannilu ilinniartut suleqatigiinnissamut piareersimanerusinnaapput tamakkua ilinniartitaanerminni sammeneqartarpat.

Innersuussutit aalajangersimasut ilagaat:

Kalaallit Nunaanni STEM-ip iluani atuartsissutit pikkorissarnerillu periarfissat ineriartortinneqassapput -

- ▶ Kalaallit Nunaanni atuarfiit ilisimatusarnermut atuartsissutit (ilinniartsinermut immikkoortukkaat, atuartsinermut pilersaarutit, atuakkat il.il.) kalaallisoortut piimavaat, pingaartumik apeqqutit aallaavigalugit ilinnisut. Ilisimatusartut taavalu Ambassade-miik stipendiatit Nuummi ilinnisiorfik, ilinniartsisut, Ilinniarfissuaq Ilinniartitaanermullu Naalackersuisoqarfik suleqatigisinnaavaat kalaallisut ilisimatusarnermut ilinnisiutit ineriartortinnissaannut.
- ▶ Peqataasut sulissutigerusuppaat Ilisimatusarfimmi ilisimatusarnermut pikkorissaanerit ilinniartsinerillu ingerlanneqartalnissaannut taavalu ilinniarneq ineriartortinneqarnissaa. USA-miik ilinniartsisut tikeraat amerlanerit pikkorissaanerit naatsunik ingerlatsitsisut ikorfartorsinnaavaat pensum-i siammasinnerusooq ineriartortinneqarneranut taavalu tuluttut pikkorissaanerit tapertaralugit.
- ▶ Kalaallit Nunaanni Ph.D. -mik pikkorissaanerit naapeqatigiinnernik ataqatigiissarlugit ilisimatusartut kinguaariit tullii suleqatigiinnissaannut attaveqaatinillu pilersitsinissamut aqutissatut isigineqarpoq. Assersuutigalugu Ilisimatusarfik Oktoberip 2.-9. 2019 Ph.D.-mik pikkorissarnek "Community based health research – methods and strategies" Ingerlattussaavaa. Pikkorissarnek taanna iluani ilinniartut NUNAMED 2019-imi (Kalaallit Nunaanneq peqqinnissaq nakorsaatillu pillugit isumasioqatigiinneq, 5-7 Oktober 2019 ingerlanneqartussa, www.nunamed.org) saqqummiissutissatik ineriartortissavaat.
- ▶ Aasaanerani ilinniartitaanermut suliniutit Kalaallinik ilinniartunik peqataatitaqartartut ataavartumik ingerlanneqartarnissaat. Suliniut ingerlalluortoq tassaavoq USA-miik NSF-imik taavalu Naalackersuisunik aningaasalersorneqartoq Joint Science Education Project (ataaniittoq ilanngussa takuguk) kisianni suliniutit pikkorissaanerillu allat aamma ineriartortinneqarsinnaapput (soorlu pikkorissarnek ataatsimut isiginnilluni pinngortitap pissarititaanut avatangiisini allanngorartuni aqutsinermut) ilinniartunut ukiunut tamanut naleqqussakkat.
- ▶ Nittartakkakkut pikkorissaanerit nittartakkallu ilinniakkat, soorlu University of Alaska-Fairbanks-imit ingerlanneqartartut periarfissaasinnaapput Kalaallit Nunaanni ilinniartut pikkorissarnermik peqataaffigisinnaasaannik. Tamanna ilinniarnernik tamakkiisunik naammassititsinngikkaluarluni, ilinniartut Ilisimatusarfimmi ilinniarnerninnut point-itik nuutsissinnaassavaat.



Ilinniartut Kalaallit Nunaanneersut USA-mi ilisimatusarnikkut paarlaasseqatigiinnermik ilinniarsinnaanissaat paarlattuanillu USA-miik ilinniartut Kalaallit Nunaanni ilinniarsinnaanissaat kaammattornissaa ineriartortinneqarnissaat - Kalaallit ilisimatuut Danmarkimi ilinniagaqartarnerat suleqatigiinnermut nukittuumik toqqammiliivoq. USA-mi assinganik iliortoqarsinnaasuuguni USA-p Kalaallit Nunaallu akornanni suleqatigiinnermik oqilisaassagaluarpoq. Taassuma saniatigut aamma kissaatigineqarpoq Kalaallit ilinniartut USA-mi ilinniarnissaannut periarfissineqarnerulernissaannut, USA-p naalakkersuisoqarfiannik tapersorsoneqartumik, Kalaallit Nunaata USA-p ilisimatusarnermut isumannaallisarnermullu suliaqarneri peqataasarnera eqqarsaatigalugu. USA-mi ilinniartoqarfiit ilinniartunik laboratoriani peqataatitsisarsinnaapput ilisimatuutut tikeraatut inissillugit taamaasillutik ilisimatusarfinnut allatsittariaqarnatik akiliisariaqarnatillu. USA-mi ilisimatusarfiit Kalaallit Nunaanni annertuumik aningaasalersorneqarlutik suliniutillit namminneq ilinniartunik ilisimatuunillu paarlaasseqatigiinnerit akilersortarnissaat innersuussutigineqarpoq. Iliuutsit tamaattut, annikkaluit, annertuumik illugiissitamik attaveqatigiinnermut sunniuteqassapput. Assersuutigalugu, 2009-imiik ukiut tamaasa Dartmouth-imi Institute of Arctic Studies Ilisimatusarfimmik ilinniartuq ataaseq semesterimik ataatsimik sivisisussulimmik ilinniariartornissaa aningaasalersortarpar tamannalu suleqatigiinneq ineriartornikuuvoq Dartmouth-imiik ilinniartut Ilisimatusarfimmut semester ataaseq ilinniariartortalersinnaanikuullutik.

USA-mi Kalaallit Nunaannilu ilisimatuunngorniat nunap inoqqaavinik suaallit attaveqalernissaat - Tamanna Kalaallit Nunaanni ilinniartut ilisimatusarnermi annermik imminnut takusinnaalernissaannut iluaqutaassaaq USA-meersullu nunap inoqqaavinik suaallit ilinniartut Kalaallit Nunaanni ilisimatusarnermut suleqatigiinnerit assigiingitsunut ilisimaarinnitsilerlugit. Tamanna ilinniartunut nunap inoqqaavinik suaasalinnut Issittumi pinngoritami inuiaqatigiilerinermilu ilisimatusarnermi soqutiginninneq periarfissiinerlu annertuneq pilersissavaa.

Ilinniartitsisunut pikkorissaasarneq - USA-p Københavnimi Ambassade-iat, Naalakkersuisut aamma Ilisimatusarfik ilinniartumik pissarsiorput. Ilinniartuq taanna Kalaallit Nunaanni Ilinniarsissuaq peqatigalugu soqutigisat pisariaqartitallu qulaajarnissaat sulissutigissavaa, atuartitsinermit atortussat misileraaffusinnaasut apeqqutinillu aallaaveqartut, aamma ilisimatusarnermik atuartitsinermi atuartitseriaatsit ukiunut assigiingitsunut naleqqussarneqarsinnaaneriniq, imaqarsinnaasunik. USA-miik assersuut tassaavoq NSF-imik aningaasalersorneqartuq School of Ice Project ilinniartitsisunik issittumi ilisimatusarnermik atuartitsinissamut pikkorissaasartuq. Suliniutit allat hydrologi, geologi, biologi allanilluunniit ukkatarinnittut aamma pisariaqarput. Tamanna aamma tuluttut atuartitsineq annertusarsinnaavaa, Kalaallinut ilinniartunut ilisimatuunut attaveqarnissaannut iluaqutaasinnaasumik. ■

Assit Lars Demant-Poort-imik assilineqarput.



Education

Participants discussed how to educate and train the next generation of Greenland and U.S. researchers. Greenland researchers indicated a need for students and interns with basic scientific training as well as with technical skills such as remote sensing and GIS (geographic information systems). U.S. and Greenland students can be prepared for collaborative work if it's emphasized in their training.

Specific recommendations include:

Develop greater access to STEM resources and courses in Greenland -

- ▶ Greenland schools want more science materials (education modules, lesson plans, textbooks etc.) in Kalaallisut (Greenlandic), especially inquiry-driven materials. Researchers and Embassy Science Fellows could work with the publishing house in Nuuk, with teachers, the teachers' college, and the Ministry of Education to develop science materials in Kalaallisut.
- ▶ Participants were excited about the idea of developing and leading research-based science courses and a possible science degree at Ilisimatusarfik. More visiting lecturers from the U.S. offering lectures or short courses at Ilisimatusarfik would be helpful in broadening the curriculum and adding English coursework.
- ▶ Ph.D. courses combined with a workshop in Greenland is another way to train and engage the next generation in research and build networks. For example, from 2-9 October 2019, Ilisimatusarfik will host the Ph.D. course "Community based health research – methods and strategies." As part of that course, students will develop presentations to give at NUNAMED 2019, a conference on Greenlandic health and medicine (5-7 October 2019, www.nunamed.org).
- ▶ Continue to implement summer school programs that include Greenland students. A successful model is the U.S. NSF- and Naalakkersuisut-funded Joint Science Education Project (see Insert below) but other courses should be developed (e.g., a course focused on holistic management of natural resources in rapidly changing environments) including for students of all age groups.
- ▶ Online Courses and online certificate programs, such as those offered by the University of Alaska-Fairbanks might be another avenue for Greenland students to access coursework. While this would not lead to completed degrees, the students could transfer some of these credits into Ilisimatusarfik degree programs.



Develop and encourage student exchanges or mechanism for Greenland students to study in the United States and vice versa - The education of Greenland researchers in Denmark has built a strong base of collaboration. An equivalent pathway in the U.S. would facilitate U.S.-Greenland collaborations. There is also desire for greater access for Greenland students to study in the U.S., with U.S. government support in acknowledgement of Greenland's engagement with the U.S. for research and security missions. U.S. hosts could have students participate in labs as visiting researchers without having to enroll and pay tuition. U.S. universities with a large funding effort in Greenland should pursue self-funding their student and faculty exchange programs. Even at very modest scale, these efforts will be impactful in building reciprocal relationship. For example, each year since 2009 the Institute of Arctic Studies has funded a student from Ilisimatusarfik to spend a term at Dartmouth and this relationship has grown where recently Dartmouth students can now spend a term at Ilisimatusarfik.

Connect Indigenous U.S. and Greenland undergraduates - This would aid Greenland students in identifying with science to a greater degree and introduce U.S. Indigenous students to the research collaborations operating in Greenland. This would produce greater interest and access to Arctic physical and social sciences among Indigenous students.

Provide training for teachers - The U.S. Embassy in Copenhagen, Naalakkersuisut, and Ilisimatusarfik are recruiting an Embassy Science Fellow to work with the teachers' college in Greenland to identify their interests and needs, some of which include creating hands-on materials and inquiry-based field teaching, and how to teach science to different age groups. An example from the U.S. is the NSF-funded School of Ice Project that trains educators about teaching polar science. Other programs that focused on hydrology, geology, biology, etc. would also be appreciated. This would also provide more English instruction, which could help Greenland students connect with the broader scientific community. ■

Photos by Lars Demant-Poort.



The Joint Science Education Project (JSEP)

JSEP tassaavoq USA Kalaallit Nunaallu akornanni suleqatigiinneq U.S. National Science Foundation-imik Naalakkersuisunillu aningaasalersorneqartoq. 2009-imiillli aasat tamaasa ilinniarnertuunngorniarni ilinniartut Kalaallit Nunaanneersut, Danmarkimeersut USA-meersullu Kangerlussuarmut angalasarpit avatangiisini allanngoriartortut sukkaasut paasisassarfiortorlugit. Suliniut Kangerlussuup eqqaani avatangiisini Sermersuarmilu ilisimatusarnermi piffiit soorlu USA-p ingerlataa Summit Camp aamma Danmarkip ingerlataa East Greenland Ice Core Project (EGRIP) aallaavigineqartarput. Suliniut ingerlanerani ilinniartut pinngortitami ilisimatuut ilisimatuunngorniallu suleqatigalugit fagit assigiinngitsut atuartitsinermiik naliginnaasumiik allaanerusumik misileraaffigisarpaat. Ilinniartut apeqqutit aallaavigalugit suliaqartarput Kangerlussuarmilu mittarfimmi inuiaqatigiinnut saqqummiisarlutik taamaasillutik inuit hornorujulikkaat Danmarkimiik Kalaallit Nunaallu iluani angalasut saqqummiiffigisarlunikkitt. Ilinniartut taamatut paasisaminnik saqqummiinissaannut periarfissinneqarnerisigut siunissami aqutsisussatut piareersarneqartarput. Suliniut aamma ilaavoq kulturikkut avitseqatigiinneq- ilinniartitsisut ilinniartullu unnessiortitsisarput nunaminnik ileqqorisat nerisallu sammillugit. Tamanna ammasumik kulturikkullu ilisimatusarnermi suleqatigiinnikkut siunissami USA-p Kalaallit Nunaallu akornanni ilisimatusarnermi nutaanik pilersitsisinnaasumik periarfissiisarpog. Pingaaruteqarluinnartoq aamma tassaavoq JSEP-ip ilinniartut Kalaallit Nunaanneersut ilisimatusarnermut suliaqalersittarmagit Sermersuarmullu pisittarlugit, Kalaallit Nunaanni pinngortitaq annertoq ilinniartunik inuiaqatigiinniillu tikinneqarpiarneq ajortoq. ■

Assit Lars Demant-Poort-imik assilineqarput.



JOINT SCIENCE EDUCATION PROJECT

The Joint Science Education Project (JSEP)

JSEP is a U.S.-Greenland collaboration funded by the U.S. National Science Foundation and Naalakkersuisut. Each summer since 2009, high school students from Greenland, Denmark, and the U.S. travel to Greenland to study rapid environmental change. The program is based in tundra ecosystems around Kangerlussuaq and on the Greenland Ice Sheet at research sites such as the U.S. Summit Camp or the Danish East Greenland Ice Core Project (EGRIP). Throughout the program, students work in the field alongside scientists and graduate students to get hands-on experience in interdisciplinary field research and the process of science beyond what most classrooms can offer. Students complete inquiry-driven projects that they then present at an outreach event the airport in Kangerlussuaq where they reach hundreds of people traveling to, from, and around Greenland. Giving the students a voice to share their discoveries is an important step for preparing them as future leaders. Built in to the program is intentional cultural sharing- the educators & students host a U.S. night, Denmark night, & Greenland night. This fosters open and creative multicultural research teams that represent the future of U.S.-Greenland research. Importantly, JSEP also gets Greenland students engaged in research and onto the Greenland Ice Sheet, a massive part of the Greenland landscape that is largely inaccessible to Greenland students and the public. ■

Photos by Lars Demant-Poort.



Nalunaarummik Allagaqartunik Naggasiummik Oqaaseqaatit

Qujamasoqaagut suleqatitta naapeqatigiinnermi ammasumik piumasusilimillu periarfissat iliuusissallu USA-p Kalaallit Nunaallu akornanni ilisimatusarnermi suleqatigiinnerulernissaq eqqartormassuk. Naalakkersuisut Nuummilu suleqatigut amerlasuut avatingiisit ataatsimiiffillu pitsaalluinnartut oqaloqatigiinnitsinnut attaveqatigiinnitsinnullu pilersippaat. Peqataasunut tamanut ersarippoq naapeqatigiinneq pisoq pingaaruteqartoq suleqatigiinnissami attaveqaatit suliniutillu pitsaasut angusaqarfiullu anguniarneranni aqqutissat ujtartorneranni. Pisinnaasarpur naapertorlugu peqataasunit oqaloqatigiinnerit innersuussutillu ilanngunniarsimavagut, minitaqartoorsimaguttalu akisussaaffik tigussavarput.

Neriutigaarput nalunaarusiaq manna innersuussutillu aalajangersimasut ilisimatuunut Kalaallit Nunaanilu aalajangiisartunut iluaqutaajumaartut. Aamma neriutigaarput nalunaarusiaq USA-mi aningaasaliisartunut Kalaallit Nunaanni fagini assigiinngitsuni nunanilu assigiinngitsuni ilisimatusarnermi suleqatigiinnermi periarfissat unammilligassallu pillugut paasitissasoq. Naapeqatigiinnerup attaveqatigiinnerit suliffeqarfit ilisimatuullu akornanni pilersinneqarpoq, taamaasillunilu Kalaallit Nunaanni ilisimatusarneq pitsaaneq qanoq ingerlanneqarsinnaanerani inuiaqatigiinnullu saqqummiussinnermut tunngasunik isiginnittariaasinik paasisanillu avitseqatigiissinnaaneq pilersinneqarluni.

Ukua naapeqatigiinnermut toqqaannartumik tapersersuisut qujaffigerusuppagut: Naalakkersuisut, U.S. National Science Foundation (aningaasaliissut #1837806 L.E. Culler aamma R.A. Virginia tunniunneqarnikoq); Pinngortitaleriffik ataatsimiinnernut inissanut peqataanerannullu; Kalaallit Nunaanni ilisimatusarnermut Siunnersuisoqatigiit; the National Aeronautics and Space Administration (NASA); the Smithsonian Astrophysical Observatory (SAO), aamma CH2MHill Polar Services. Peqataasut tamarmik qujaffigerusuppagut Nuummi naapeqatigiinnermut pingaarutilimmut piffissaq tunniussaannut. Mitdlarak Lennert qujaffigaarput nalunaarusiaq tuluttuumiik kalaallisuumut nutserneranut.

Ilisimatusarneq tassaavoq ilisimasat paasinninnerlu, inuit peqataatinngit anguneqarsinnaanngitsut. Naatsorsuutigaarput naapeqatigiinnerput suleqatigiinnerit Kalaallit Nunaat USA-llu ilisimatuut akornanni nutaat nukittuullu pilersissimagaat, attaveqatigiinnerit pingaaruteqarluinnartut ilisimatusarnermi sammisat Issittumi allanngoriartorneq sukkaqisumut tunngasut Kalaallit Nunaannut nunarsuarmullu sunniutit iliuuseqarfiginissaannut.



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Concluding Remarks by Authors

We are overwhelmingly appreciative of the efforts of our esteemed colleagues at this workshop for openly and enthusiastically discussing opportunities and actions to enhance U.S.-Greenland research collaborations. Naalakkersuisut (the Government of Greenland) and our many partners in Nuuk offered an excellent environment and venue for our dialogue and network building. It was apparent to all that this workshop was a watershed event in identifying pathways for joint long-term productive relationships and programs. We have done our best to capture the dialogue and recommendations made by the participants and take responsibility for any omissions.

We hope that this report and the specific recommendations are helpful to the broader research communities and to stakeholders in Greenland. We hope the report will also help U.S. funding agencies understand the opportunities and challenges facing interdisciplinary and international collaborative research in Greenland. From this workshop we have an emerging network of institutions, centers, and researchers who can share their perspectives and knowledge of how to better conduct and share research with Greenland and the public.

We wish to thank the following for their direct support of this workshop: Naalakkersuisut (the Government of Greenland), the U.S. National Science Foundation (award #1837806 to L.E. Culler and R.A. Virginia); Pinngortitaleriffik (the Greenland Institute of Natural Resources) for meeting space and their active participation; Kalaallit Nunaanni Ilisimatusarnermut Siunnersuisoqatigiit (the Greenland Research Council); the National Aeronautics and Space Administration (NASA); the Smithsonian Astrophysical Observatory (SAO), and CH2MHill Polar Services. We thank all participants for their willingness to be in Nuuk and dedicate their time to this important workshop. We thank Mitdlarak Lennert for translating the report from English to Greenlandic.

Research is about science, knowledge, and understanding, all of which are impossible without people. We are confident that our workshop has brought about new and stronger partnerships among the Greenland and U.S. research communities, connections that are critical for addressing urgent scientific issues related to rapid rates of Arctic change and its impacts on Greenland and global society.



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Ilanngussat // Appendices

Ilanngussaq A – Kalaallit Nunaanni USA-milu Ilisimatusarneq

Kalaallit Nunaanni ilisimatusarnermut tunngutillugu suliat USA-miik Kalaallit Nunaanniillu aningaasalersorneqartut nalunaarsorneqarneri.

Kalaallit Nunaat

Kalaallit Nunaanni Ilisimatusarnermut Siunnersuisoqatigiit, nuna tamakkerlugu peqatigiifikk namminersortoq, sulissutigaa nukittorsarpaalu ilisimatusarneq Kalaallit Nunaanni sorlaqartoq iluaqutissiisorlu. Kalaallit Nunaanni 2016-imiilli suliniutit 100 sinnerlugit Kalaallit Nunaanni suliffeqarfinnik, soorlu Asiaq, Pinngortitaleriffik aamma Ilisimatusarfik (Takussutissiaq A1) ingerlanneqarnikuupput. Suliniutit amerlanerit sineriammi ingerlanneqartarput (Takussutissiaq A1). Aqutsisoqarfiit suliffeqarfillu Danmarkimeersut Kalaallit Nunaanni ilisimatusarnermi amerlaqatingajaanik suliniuteqarnikuupput.

Pinngortitaleriffik, Nuummi allaffeqarlutillu laboratoriaqarput immikkoortortaqlutillu ukuninga Aalisakkat Qalerualillu, Miluumasut Imarmiullu, Timmissat, aamma Avatangjiisit Aatsitassallu. Kalaallit Nunaanni Silap Pissusianik Ilisimatusarfik Pinngortitaleriffiup ataaniippoq, silaannallu allangoriartornerata Issittup avatangjiisiinut Kalaallit Nunaannilu inuiaqatigiinnut sunniuteqarnera ilisimatusarnermi suliaqartarluni. Pinngortitaleriffik aamma Niaqornani allaffeqarpoq. Kalaallit Nunaat aamma Kobbefjord Research Station, Nuup eqqaani inissisimasoq ingerlataaraa aamma Zackenberg Research Station, Naalakkersuisunit pigineqartoq kisianni Aarhus Universitet-imik ingerlanneqartoq. Qeqertarsuarmiittoq Arctic Station Københavns Universitet-imik ingerlanneqarpoq. Kalaallit Nunaanni namminersorerullutik oqartussat ingerlataaraat Kangerlussuaq International Science Support (KISS) Kangerlussuarmiittoq, nunanik assigiinngitsuneersunut ilisimatuunut ineqartitsisoq laboratoriaqartitsisorlu.

USA

Ukiut tamaasa USA-meersut ilisimatuut 250-300 missaanniittut Kalaallit Nunaannut angalasarpur suliniutit assigiinngitsut 50-it missaanniittut aqutitigalugit. Piffiit suliniuteqarfusut 100 missaanniippur (Takussutissiaq A2), kisianni, amerlasuut atortuupput nammineq ingerlasut. U.S. National Science Foundation's Research Support and Logistics (RSL) suliniutaasoq ataqatigiissartarpaat NSF-imik ilisimatusarnerit aningaasalersukkat aamma aqutsisoqarfinnik allaniik aningaasalersukkat. RSL, periarfissaagaangat, Kalaallit Nunaanni angallannermi logistikkimilu suliaqartur atorniartarpaat (soorlu Air Greenland, Royal Arctic Shipping, Mittarfeqarfiit, KISS). USA-p Summit Station sananikuuaat ingerlatalarugulu, Issittumi kisiartaalluni ukioq kaajallallugu portusuumi, avannarpasissumi, nunap iluani nakkutiginnilluni stationi.

USA-p Kalaallit Nunaanni ilisimatusarnera aningaasalersorneqartarpoq aqutsisoqarfinnik soorlu National Science Foundation, the National Aeronautics and Space Administration (NASA), the National Institutes of Health (NIH), the National Oceanic and Atmospheric Administration (NOAA), aamma the Smithsonian Astrophysical Observatory (SAO). Aqutsisoqarfiit taakkua suliniutit ilisimatuunik ilisimatusarfinneersunik NGO-nillu (tamaani nalunaarsornissaannut amerlavallaarput) aqutsisulinnik. Ilisimatusarneq faginik amerlasuunik aallaaveqartarput Kalaallit Nunaannilu avinngarusimasuniittarlutik (Takussutissiaq A2). NSF RSL-illu U.S. Air Force aamma the U.S. Air National Guard toqqammavigisarpaat Kalaallit Nunaannut Kalaallit Nunaatalu iluani ilisimatusarfusunut angallassinermi. Logistikkikkut suliaqartartoq, maanna CH2MHill Polar Services, ikuutaasarpooq suliniutit assigiinngitsut logistikkikkut pisariaqartitaat naammassiniarlunikkit. ■

Appendix A - Greenland and U.S. Research

An overview of the extent of research in Greenland funded by the U.S. and Greenland.

Greenland

The Greenland Research Council, a national and independent organization, promotes and strengthens research that is rooted in and benefits Greenland. In Greenland, over 100 projects since 2016 have been conducted by Greenland institutions such as Asiaq, Pinngortitaleriffik, and Ilisimatusarfik (Table A1). Most of these projects are location along the coastal areas (Figure A1). Danish agencies and institutions have supported a similar amount of research projects in Greenland.

Pinngortitaleriffik, Greenland's Institute of Natural Resources, has office and laboratory facilities in Nuuk that are home to the Department of Fish and Shellfish, the Department of Birds and Mammals, and the Department of Environment and Mineral Resources. The Greenland Climate Research Centre is embedded in Pinngortitaleriffik and conducts research about the effects of climate change on the Arctic environment and Greenlandic society. Pinngortitaleriffik also has an established field station in Niaqornat. Greenland also maintains the Kobbefjord Research Station outside of Nuuk and the Zackenberg Research Station, which is owned by the Government of Greenland but run by Aarhus University (Denmark). The Arctic Station in Qeqertarsuaq is maintained by the University of Copenhagen. The Government of Greenland maintains and runs the Kangerlussuaq International Science Support (KISS) building in Kangerlussuaq, which provides accommodations and laboratory space for international scientists.

United States

In any given year, 250-300 U.S. researchers travel to Greenland as part of approximately 50 different projects. There are about 100 project locations (Figure A2), however, many are semi-autonomous instruments. The U.S. National Science Foundation's Research Support and Logistics (RSL) program coordinates support of NSF-funded research as well as research funded by other government agencies. RSL, whenever possible, relies on local Greenland infrastructure and resources (e.g., Air Greenland, Royal Arctic Shipping, Mittarfeqarfiit, KISS). The U.S. built and maintains Summit Station, the only high altitude, high latitude, inland, year-round observing station in the Arctic.

U.S. research in Greenland is funded by government agencies such as the National Science Foundation, the National Aeronautics and Space Administration (NASA), the National Institutes of Health (NIH), the National Oceanic and Atmospheric Administration (NOAA), and the Smithsonian Astrophysical Observatory (SAO). These entities fund projects that are led by principal investigators at public and private universities and non-governmental organizations (far too many to list here). The research spans many disciplines and covers many remote parts of Greenland (Figure A2). The NSF RSL works work the U.S. Air Force and the U.S. Air National Guard to provide transportation to/from and around Greenland research sites. A logistics contractor, currently CH2MHill Polar Services, helps cover the unique logistics needs for each project. ■

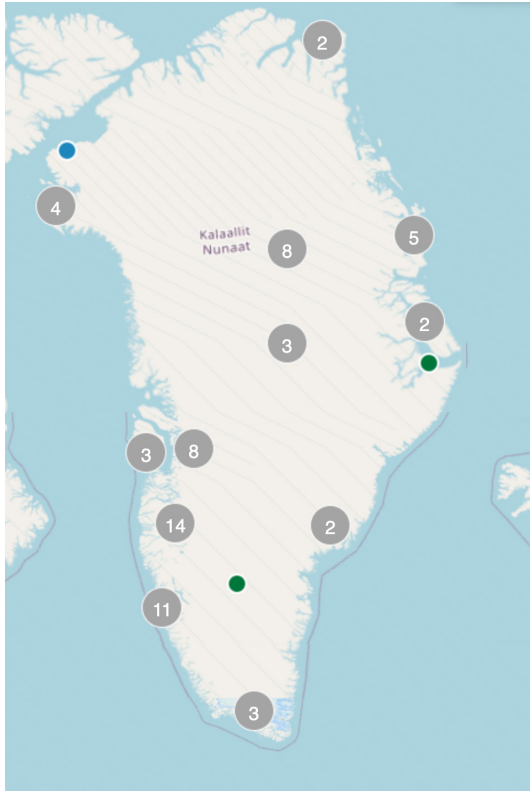
Takussutissaq A1. Suliffeqarfiit aqutsisoqarfillu Kalaallit Nunaanni ilisimatusarnermik ikorfartuisut suliaqartullu nalunaarsorneqarneri.

Table A1. A list of the major organizations and institutions in Greenland that support and conduct research.

- ▶ Asiaq Greenland Survey
- ▶ Center for Arktisk Teknologi (ARTEK)
- ▶ Dronning Ingrid's Hospital i Nuuk (SANA)
- ▶ Geological Survey of Denmark and Greenland – GEUS, Nuuk Office
- ▶ Greenland National Museum & Archives
- ▶ Greenland Representation in D.C.
- ▶ Greenland Research Council
- ▶ Ilisimatusarfik – University of Greenland
 - ▶ Greenland Centre for Health Resources
 - ▶ Greenland Perspective
- ▶ Inerisaavik (Pædagogisk Center)
- ▶ Ministry of Industry, Energy and Research
- ▶ Ministry of Fisheries, Hunting & Agriculture
- ▶ Ministry of Mineral Resources and Labour
- ▶ Mineral License and Safety Authority
- ▶ Pinngortitaleriffik – Greenland Institute of Natural Resources
 - ▶ Greenland Climate Research Centre
- ▶ Statistics Greenland

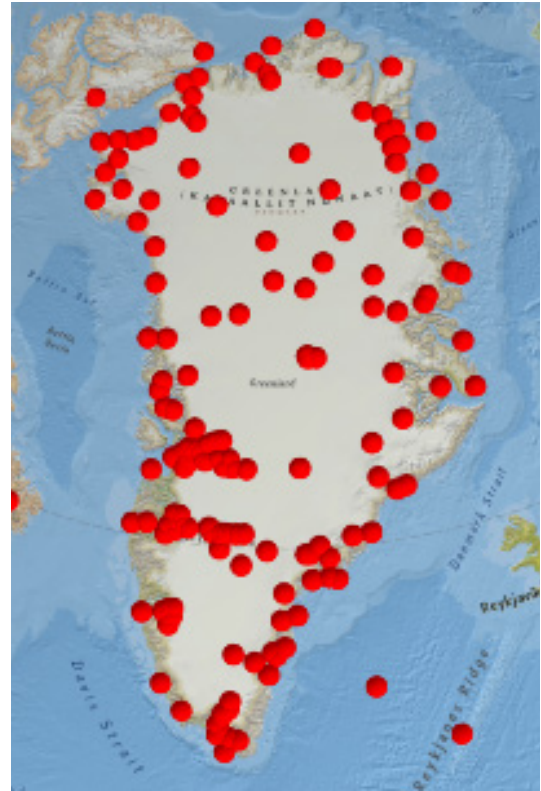
*Assit Lars Demant-Poort-imik assilineqarput.
Photos by Lars Demant-Poort.*





Takussutissiaq A1.
Kalaallit Nunaanni ilisimatusarnermi 2017-imiik suliaqarnermi piffit amerlassusaallu. Takussutissaq sananeqarpoq 05/13/2020, allannguutinut, takuguk: www.isaafik.org.

Figure A1.
The locations and numbers of Greenland-funded projects since 2017. Green nodes indicate there is one project at site location. Map generated on 05/13/2020, for updates, visit: www.isaafik.org.



Takussutissiaq A2.
2017-imiik Kalaallit Nunaanni USA-mik aningaasalersorneqartut ilisimatusarfiit sumiiffii. Nunap assinga sananeqarpoq 05/13/2020, paasissutissat nutaat nittartakkami uani takuneqarsinnaapput: ARMAP.org.

Figure A2.
The locations of U.S.-supported field-based research in Greenland since 2017. Map generated on 05/13/2020, for updates, visit: ARMAP.org.

Ilannugsaq B - Suleqatigiilluni ilisimatusarnermi assersuutit

USA Kalaallit Nunaallu suleqatigiinnerannik assersuutit pingasut.

Assersuut 1: Piniakkanik sumiiffinni nalunaarsuineq (PISUNA)

PISUNA (<http://www.pisuna.org>) suliniutaavoq Kalaallit Nunaanni avatangiisit piniagassallu nalunaarsorneqarneranni aqunneqarnerannilu piffit assigiinngitsut qanittuini innuttaasunik peqataatitsisoq. 2018-imi Avannaamioqatigiit Ministerit Siunnersuisoqatigiiffiata avatangiisinut nersornaataannik Attumi isumalluutit pillugit siunnersuisut, suliakkerneqarnikut aalisartut piniartullu peqatigalugit paasissutissanik takusaminnillu nalunaarsuinissaminnut, nersornaaserneqarput. Nersornaat piffimmi siunnersuisoqatigiit immami avatangiisit pillugit nalunaarsuinerata nutaalamillu aqunneqarnissaanik siunnersuinerata pingaruteqassusaanik takutitsivoq. Suliniut PISUNA NSF-imik taparserneqartoq Exchange for Local Observations aamma Knowledge of the Arctic (ELOKA, <https://eloka-arctic.org/pisuna-net/en>) aamma the University of Alaska Fairbanks' Alaska Arctic Observatory and Knowledge Hub (A-OK, <https://arctic-aok.org/>) suleqatigisimavaat qarasaasiatigut katersuiffimmik pilersitsinerminni, isumalluutit piniagassallu tungaatigut aqutsinermi ikiuutaasinnaasumik (<https://eloka-arctic.org/pisuna-net/en>). Suliniut Alaskamiittoq Kalaallit Nunaallu akornanni paasissutissanik suleriaatsinillu pitsaasunik paarlaasseqatigiittarneq, taavalu ELOKA-mi paasissutissanik aqutsinermi paasisallit peqataatinneqarnerini malitsigivaa atortussaag pilersitseqatigiilluni suliaq Kalaallit Nunaanni aalisartut piniartullu takusartakkaminnik paarlaasseqatigiinnissaannut piginnaatinneqalernerat taamaasillunilu isumalluutininik aqutsineq pitsaanerusoq anguneqarluni.



Assit Denis Defibaugh-imik assilineqarput.

Assersuut 2: The Rockwell Kent aamma Early Twentieth Century Greenland pillugit suliniut

Suliniut suleqatigiilluni ingerlataq takussaasoq, oqaluttuarisaanermik aamma antropologimi misissueriaatsit ataqatigiissippai takuniarlugu qanoq inuiaqatigiinni, kulturikkut aamma avatangiisitigut allannguutit isigineqartarnersut misigineqartarnersullu Kalaallit Nunaanni. Suliniut aallartinnikuvoq Rockwell Kent-ip suliai aallaavigalugit, Amerikkarmioq eqqumiitsuliortoq atuakkiortorlu, Kalaallit Nunaanni 1930-ikkut aallartinneranni najugaqarsimasoq, annertuumillu suliaqarsimasoq assiliisarsimalluni, eqqumiitsuliortorlu atuakkiortarsimallunilu najugaqarnini pillugu. Ilisimatusarnerup aallartinnginnerani, suliniummi aqutsisut (marluk USA-miik marlullu ilisimatusarfimmiik) inuiaqatigiit misissuiffisassat Illorsuit, Sisimiut, Nuuk, aamma Uummannaq tikeraarpat, suliniut oqallisigalugu, Kent-ip eqqumiitsuliai assilisaalu takutillugit, inuiaqatigiillu piumasaat ilisimatusarnerup suliniup pilersaarusiorneranut ilannugussorlugit. Misissuinerne kingusinnerusukku Kent-ip suliai aallarniissutisut atornerarput inuiaqatigiit peqatigalugit socialimik, kulturimik avatangiisitigillu allannguutit aammalu pereersunut ataqatigiinnerannut qanoq paasineqartarnerannut nassuiarneqartarnerannullu oqallisigineqarneranni. Inuiaqatigiinni ilaasortanik apersuisoqarpoq inuunerminni taavalu najugaqarfigisaminni ikaarsarfiit qanoq misigisimaneeraat ukkatarineqarlutik. Inuiaqatigiinni ilaasortat aamma apersorneqarput Kent-i pillugu paasisimasaat taavalu suliai

Appendix B - Examples of Co-Produced Research

Three examples of U.S.-Greenland collaborative projects.

Example 1: Piniakkanik sumiiffinni nalunaarsuineq (PISUNA)

PISUNA (<http://www.pisuna.org>) is a project that involves local people in the documentation and management of the environment and living resources in Greenland. The Nordic Council Environment Prize in 2018 was awarded to the Natural Resource Council of Attu, West Greenland, who is tasked with collecting information and observations from fishers and hunters in the community. The award recognized the value of the local council in documenting the marine environment and proposing new ways of managing it. The PISUNA project has worked with the NSF-supported Exchange for Local Observations and Knowledge of the Arctic (ELOKA, <https://eloka-arctic.org/pisuna-net/en>) and the University of Alaska Fairbanks' Alaska Arctic Observatory and Knowledge Hub (A-OK, <https://arctic-aok.org/>) to jointly develop a database and interface for sharing community-based observations that can help inform management of marine living resources (<https://eloka-arctic.org/pisuna-net/en>). The exchange of information and best practices between the project in Alaska and that in Greenland, along with involvement from the ground up of the ELOKA data management experts resulted in a co-produced tool that further empowers local Greenland fishers and hunters to share observations amongst themselves for better resource management.



Photos by Denis Defibaugh.

Example 2: The Rockwell Kent and Early Twentieth Century Greenland Project

This collaborative study combines visual, historical and anthropological methodologies to approach how social, cultural and environmental changes and continuities are constructed and experienced in Greenland. The project started with the work of Rockwell Kent, an American artist and writer, who resided in Greenland in the early 1930s and produced an extensive collection of photographs, art, and literature about his time in the country. Prior to the start of research, the PI and Co-PIs (2 from U.S. institutions and 2 from Ilisimatusarfik) visited the study communities of Illorsuit, Sisimiut, Nuuk, and Uummannaq, discussed the project, displayed Kent's art and photographic works and gathered community feedback which was incorporated into the research design. In the later research stage, Kent's work served as a starting point to engage communities and discuss how social, cultural and environmental changes as well as continuities with the past are understood and defined. Interviews were conducted with community members focusing on the transitions they have experienced in their own lives and in the life of their town/city. Community members were also asked about their knowledge of Kent and his work related to Greenland. In an effort to engage youth in this research and incorporate their perspectives into the project, photographic workshops were carried out with the aid of local schools in 2017/2018 in each of the study communities. During the 1-2 week workshops, the

Kalaallit Nunaannut attuumassuseqartut pillugit. Misissuinerimi inuusuttut peqataatinniarlugit isiginnittariaasaallu ilanngunniarlugit, 2017/2018-imi atuarfiit peqatigalugit assiliisarnermik naapeqatigiisitsisarnerit najugaqarfanni misissuiffiusuni tamani ingerlanneqarput. Naapeqatigiinnerni sapaatit akunnerini 1-2 sivissuseqartartuni, ilisimatuut ilinniartitsisut ikiortigalugit atuartut naapittarpaat saqqummiiffigalugillu assiliisarnermut oqaluttuarisaaneq pillugu, assiliisarnermut pikkorissaasarlutik atuartullu assiliivinnik tunillugit. Atuartut peqquneqarput ilaqtattatik, inuiaqatigiit, neriutitik sinnattutillu assilisassagaat assinillu ullorsiutilioqquneqarlutik. Peqataasut assit 1000-it sinnerlugit naapeqatigiinnerni assilivaat. Misissueqqissaarnerq siulleq kingorna, 2018-imi ilisimatuut ilaasa piffinnut misissuiffiusunut uterput naapeqatigiinnernilu peqataanikut naapeqqillunikkat assiutaat misissuataarlugit allagartartalerlunikkillu atuakkami atornerqartussami. Ilisimatuut ilungersuutigisimavaat atuartut misissuinermit peqataatinnissaannut, taamaammat piffinnut misissuiffiusunut utersinnaaneq naapeqatigiinnernilu peqataanikut naapeqqinnissaat pingaaruteqarluinnarsimavoq. Peqataasut tamarmik assilistatik tamarmik USB-mut ilineqarnikut pissavaat, atuagarlu assilianik imalik pissarsiarissallunukku, aamma atuakkap tuniarneqarnerani sinneqartoorutigineqartut tamaasa Kalaallit Nunaanni meeqqanuluni suliniutinut tunniunneqassallutik. Inuusuttut peqataatinneqarneri, atuarfiit ilinniartitsisullu ikioqatigalugit, ilisimatusarnermi suliami pingitsoorneqarsinnaanngitsuvoq, taamaasilluni takutitsivoq Kalaallit Nunaanni inuusuttut qanoq piffissartik, inuit akunnerminni pissusaat, siunissamullu neriutaat sinnattuulu qanoq isiginaat. Takussaasoq pingaaruteqarluinnarpoq, porsarsimassutsikkut silarsuarput qanoq ilusilersortarnerput pillugu, kisianni aamma suut takusarnerigut, qanoq takusarnerigut, qanoq isumaqarnersoq, qanorlu sunniuteqartarnersoq.

Assersuut 3: Kalaallit Nunaanni Inuttussutsit Allanngornerarnerat: Arlalinnik aallaaveqarluni misissueriaaseq atorlugu naartusarnermut allannguutit pillugit Kalaallit Nunaanni misissuineq (PDG)

PDG misissugaraa naartulertarnermut, naartusarnermut angajoqqaajunermullu aalajangertarnerit qanoq pissutsinik assigiinngitsunik Kullorsuarmi, Kalaallit Nunaanni nunaqarfik inuusuttoqarluartoq aningaasaqarnikkut avatangiisitigullu allanngoriartorfusoq, sunnerneqartarnerisut. PDG tassaavoq inuiaqatigiit aallaavigalugit peqatigalugillu ilisimatusarnermi suliniut (CBPR). Misissuinerup teoriit tungaaticut avatangiisit pillugit teori aamma ileqqutoqqanik ilisimasanik ataqatigiisitsilluni aallaaveqarpoq qanoq Kullorsuarmi naartusarnermi aalajangertarnerit pissutsinik assigiinngitsunik sunnerneqartarneri paasiniarneqarnerani. Paasissutissanik katersuinermi pilersarusiat ilagaat innuttaasunik qanimut apersuinerit taavalu etnografriimi misissueriaatsit. Suliniut PDG-p inerniliussai pingaarnerit pingasuupput. Siulleq, CBPR misissueriaasiuvoq Issittumi inuiaqatigiinnik peqataatitsilluni angusaqarfiulluartoq. Aappaattut, ilisimatuut inuiaqatigiit akornannut inissinnerat ilisimatuut inuiaqatigiilluni akornanni tarnikkut-misigissutsikkut ataqatigiisavarivoq. Pingajuattut, Kullorsuarmi naartunissamut peqqinnissaq assigiinngitsunik kultoorikkut, inuiaqatigiinni pissutsinik, aningaasaqarnikkut avatangiisikkullu pissutsinik sunnerneqartarpoq aammattaq Kalaallit Nunaanni tamakkiisumik politikikkut, inunnik ikiuinermi peqqinnissamilu pissutsit sunneeqataasarlutik. Kullorsuarmi naartunissamut pissutsit pitsanngorsassagaanni pisariaqarpoq assigiinngitsunik aallaaveqarnissaq. Inuit ataasiakkaat eqqarsaatigalugit pisariaqarpoq kultoorikkut naleqqussakkat atoqatigiittarnermut naartusarnermullu peqqissutsimut pikkorissaatit saaffiginnittut taavalu piginnaasat atoqatigiinnermut, naartunaveersaatinut, naartulertarninut, atoqatigiittartut ilaqtariillu akornanni atassuteqaatit peqqinnartumik pilersarusiortut pisariaqarput. Ilaqtariit akornanni akuleriinnerit killissanik ersarissunik ikorfartuisut pisariaqarput taavalu ilaqtariit akornanni meeqqiornermut perorsaanissamut naatsorsuutinik. Inuiaqatigiit akornanni inuiaqatigiinni ileqqorisat kultoorimit upperisanik periusinillu aallaaveqartut inuit ataasiakkaat, aappariit ilaqtariillu akornanni attaveqatigiinnerit ataqinnittut pisariaqarput. Politikikkut attaveqaatinik ineriartortitsinerimi kultoorikkut naleqqussakkanik pikkorissaanerit, inunnik ikiuinermi peqqinnissamilu sulinerimi Kullorsuarmi Kalaallit Nunaannilu inuiaqatigiinnik aallaaveqartut pisariaqarput. ■

researchers with the aid of local teachers met with students and presented a brief history of photography, lessons in basic photographic techniques and provided students with cameras. Students were asked to take photos of their families, communities, hopes and dreams and keep a photo journal. Participants produced over 1000 photographs during the workshops. After initial analysis, part of the research team returned to each of the study communities in late 2018 and met with workshop participants again to examine their photos and write captions which will be used in a book of the student photos. The researchers have efforted to incorporate students into the various stages of research, thus the ability to return to study communities and meet with workshop participants has been essential. All participants will receive their photos on a USB drive and a copy of the photobook and the proceeds from any sales of the book will be donated to a children's charity in Greenland. The incorporation of youth with the aid of local schools and teachers was an indispensable component of this research allowing for a glimpse into how young people in Greenland see their own time, their social lives and their hopes and dreams for the future. The visual is crucial, not only for how we culturally construct our world, but for what we see, how we see, what it means to us, and how it affects us.

Example 3: Population Dynamics in Greenland: A Multi-component Mixed-methods Study of the Dynamics of Pregnancy in Greenland (PDG)

PDG examined how decisions regarding conception, pregnancy and parenthood are shaped by multiple interacting constraints and influences in Kullorsuaq, an indigenous, predominantly youthful, northern community in Greenland undergoing economic and environmental changes. PDG was a community based participatory research study (CBPR). The study's theoretical framework combined ecological systems theory with traditional knowledge to investigate the complexity of factors that create the context in which people in Kullorsuaq make reproductive decisions. Data collection strategies included semi structured in-depth interviews and ethnographic methods. There were three overarching PDG findings. First, CBPR is an effective method to engage community members in the Arctic. Second, the positionality of the research team within the community creates a psycho-social-emotional relationship between research team members and community members. Third, reproductive health in Kullorsuaq is influenced by an interplay of cultural, social, economic, and environmental factors in the community as well as within the large context of Greenland's political, social service, and health care system. Improving reproductive health outcomes in Kullorsuaq requires a multi-faceted approach. At an individual level culturally relevant sexual and reproductive health education and skill building that addresses communicating about sex, birth control and pregnancy with sex partners and within families and strategies for developing and maintaining healthy intimate relationships is need. At the family level interventions are required that support clear boundaries and expectations within families related to having and raising children. At the community level social norms grounded in pro-cultural beliefs and practices that promote respectful relationships between individuals, couples, and families are warranted. At a political systems level development in the infrastructure that establish culturally relevant educational, social and health care services that are based on the needs of people in Kullorsuaq and Greenlanders are necessary. ■

Ilannigussaq C – Peqataasut nalunaasorneqarneri

Appendix C - Participant List

Greenland

Mikkel Høegh Bojesen
Lars Demant-Poort
Klaus Georg Hansen
Hans Husyan Harmsen
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Lene Kielsen Holm
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Kirsty Langley
Mîtdlârak Lennert
Nette Levermann
Sten Lund
Arnajaaq Lyngø
Christian Koch Madsen
Eva Mätzler
Kirstine Eiby Møller
Vivian Motzfeldt
Gert Mulvad
Klaus Nygaard
Josephine Nymand
Allan Olsen
Hans Kristian Olsen
Martin Olsen
Qupanuk Olsen
Najaaraq Paniula
Gitte Adler Reimer
Jette Rygaard
Simon Thaarup
Kisser Thorsøe

United States

Alden Adolph
Mary R. Albert
Kelly Brunt
Zoe Courville
Lauren E. Culler
Denis Defibaugh
Hajo Eicken
Bo Gregersen
Lenore A. Grenoble
Jay T. Johnson
Ellen Martin
Jon Martin
Jennifer Mercer
Nimesh Patel
Elizabeth Rink
Cynthia Suchman
Kirsty Tinto
Susan Vanek
Ross A. Virginia
Jeff Welker



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