University of California, Berkeley–NTNU–Rice University
Collaborative Arctic Research Program, 2018–2019

Project:	*The New Arctic and the Digital Ocean: Assembling and Interrogating Arctic Expertise*	
Principals:	Berkeley: Michael Watts (mwatts@berkeley.edu), Alexander Arroyo (a.s.arroyo@berkeley.edu); NTNU: Arthur Mason (arthur.l.mason@ntnu.no), Vidar Hepsø (vidar.hepso@ ntnu.no); Christian Ritter (christian.ritter@ntnu.no); Rice: Dominic Boyer (dcb2@rice.edu), Cymene Howe (ach1@rice.edu), Marcel LeFlamme (marcel.laflamme@rice.edu); U Tromsø: Berit Kristoffersen (Berit.Kristoffersen@uit.no)	
Objective:	To model and create a system for seeding collaborative research in Arctic Social Science between Berkeley's Department of Geography, NTNU's Department of Anthropology, and Rice's Center for Energy and Environmental Research in the Human Sciences.	
Project Theme:	Bringing together expertise in science and technology studies, anthropology, geography, and the energy humanities, this project explores the coproduction of a "New Arctic" and a "digital ocean" across U.S. and Norwegian contexts. This New Arctic is inextricable from the infrastructures, representational techniques, and systems of governance through which it is rendered as a digital ocean. The emerging New Arctic–digital ocean complex opens out on the geo-economics of Arctic resources, logistics, and finance; the geopolitics of polar militarism and international law; and geophysical observation, modeling, and simulation. These research themes are robustly grounded in the project's institutional hubs, providing the basis for comparative and conjunctural research: at NTNU, with its strength in Arctic studies and the presence of extractive and energy industries in Norway; at Berkeley, with its strength in critical geography and its proximity to technology firms and NGOs in the Bay Area that are building digital ocean platforms; at Rice, with its interdisciplinary focus on climate change and media/artistic praxis. Creating a durable research network across these three institutions stands to advance disciplinary and area scholarship, enhance graduate training, and promote international scientific exchange.	
Project Structure:	Initial Meeting Fall 2018, Berkeley	Principals and other prospective partners will outline ongoing research activities and explore synergies. A two-day meeting intended to surface common interests, identify core problems, and outline a program of work.
	Midterm Gathering Spring 2019, Norway	Principals and partners will carry out short-term, team-based research at a site to be designated. A three-day opportunity intended to assess complementarity of research methods, plus individual updates and planning for summer seminar.
	Final Gathering Summer 2019, NTNU	Presentation of individual and collective work, plus discussion of avenues for further collaboration. An open event to be held in conjunction with NTNU's Arctic Pilot Program to mark the launch of the Global Arctic Research Consortium.
	Next Steps 2019–2020	Draft funding proposals for future project phases, which may include additional principals and partners. Draft publications based on individual and team-based research. Disseminate reflections on process of initiating the research network.

University of California, Berkeley–NTNU–Rice University
Collaborative Arctic Research Program, 2018–2019

Project:	*The New Arctic and the Digital Ocean: A Comparative Study of US and Norwegian Arctics*
Principals:	Berkeley: Michael Watts (mwatts@berkeley.edu), Alexander Arroyo (a.s.arroyo@berkeley.edu); NTNU: Arthur Mason (arthur.l.mason@ntnu.no), Vidar Hepsø (vidar.hepso@ntnu.no), Christian Ritter (christian.ritter@ntnu.no); Arctic University of Norway: Berit Kristoferrsen (berit.kristoffersen@uit.no).
Abstract:	In 2017, the US National Oceanic and Atmospheric Administration (NOAA) released a report proclaiming a "New Arctic," designating a material and epochal phase change in the Arctic Ocean and its peripheries. No longer to be characterized as a remote frozen ocean but instead by its thaw, this New Arctic is driven by unprecedented global climate change with radically uncertain effects. As the possibility of a liquid Arctic comes into view in laboratories, think tanks, military bases, and investment banks, novel political, economic, and social geographies are being imagined—indeed, invented. Actors at these and other sites are conceptualizing the New Arctic as a space to be digitally sensed, mapped, and surveilled. In so doing, they conjure the prospect of a "trillion dollar ocean" to be exploited, insured, and policed. These figurations suggest that the geostrategic and financial value of the New Arctic will inhere not merely in polar resources or shipping routes, but in an infrastructural and institutional complex both within and beyond the circumpolar North. Our project investigates the New Arctic complex through two hubs that are proving critical in constructing a digital ocean and its actuarial specter: Norway, focusing on the strong presence of Arctic governance institutions alongside extractive and energy industries; and the San Francisco Bay Area, with particular focus given to venture capital, technology firms, and NGOs.
Research Strategy:	Drawing on expertise in science and technology studies, anthropology, and geography, this project explores the coproduction of a "New Arctic" and its "digital ocean" as an emerging framework for geopolitical intervention and geo-economic speculation across US and Norwegian contexts. While this framework is often figured at the oceanic scale of state sovereignty and maritime territoriality, its rendering as such depends on highly localized complexes of infrastructures and actors (think tanks, technology firms, state agencies, universities). By conducting ethnographic and document-based research in these settings, the investigators seek to map out a broader New Arctic complex through its geographies of information, capital, and power. Over the course of several months, we will conduct parallel, collaborative research into the digital ocean as materialized in the systems, practices, and infrastructures of its architects in Norway and the Bay Area. We will focus on forms of speculation that address geo-economic investment in energy and infrastructure (oil and gas, in particular), geopolitical securitization and resurgent polar militarism, and the mediation of these domains by geospatial data and so-called "environmental intelligence." In so doing, we aim to better understand how the New Arctic proposes to arbitrate the representation and governance of both Arctic and global climate change as calculative, computational domains of risk and opportunity.

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Collaborative Arctic Research Program, 2018–2019

Project:	*Autonomous Shipping and the Future of Expertise at Sea*
Principals and Partners:	NTNU: Arthur Mason (arthur.l.mason@ntnu.no); Rice: Marcel LaFlamme (marcel.laflamme@rice.edu); Higher School of Economics, St. Petersburg: Nikolai Ssorin-Chaikov (nssorinchaikov@hse.ru)
Abstract:	Remotely operated and autonomous vehicles have become charismatic symbols of new, networked forms of mobility. Yet the proliferation of these technical systems also raises cultural questions about the nature of expertise: no longer an embodied property of an encounter between operator, vehicle, and environment, it can now be distributed across mediated, discontinuous settings or even rendered algorithmic. This project takes autonomous shipping—that is, the use of crewless vessels to transport marine cargo—as an occasion to explore broader contemporary transformations in expertise and its institutionalization. Even as machine intelligence threatens to displace the knowledge (and livelihood) of the seafarer, other forms of expertise have been placed under erasure by social dynamics ranging from the leveling effects of digital media ecologies to the resurgence of populist politics. Arctic states including Norway, Finland, and Russia have positioned themselves as early adopters of marine autonomy. These developments might, on their face, reflect a desire to gain competitive advantage in a global innovation economy or to align national infrastructures with the circulatory logic of logistical life. Yet, in seeking to understand the origins and implications of this appetite for autonomy, this project centers two exogenous factors: first, the shifting geopolitics of the Arctic in the context of a northern sea route that is increasingly navigable year-round, and, second, the shipping industry's reliance on migrant seafaring labor in the face of a European refugee crisis. How, we ask, will these factors inflect the development of autonomous shipping in Arctic states? What forms of expertise will be valued and devalued?
Research Strategy:	One member of the project team, LaFlamme, will conduct two weeks of pilot research in Norway, Finland, and Russia, conducting interviews at key firms and testing sites. (The first autonomous shipping testbed in the world was created in the Trondheim fjord in 2016, and another was established off the coast of Finland the following year.) These interviews will elicit actors' accounts of the factors driving marine autonomy and the technical and social challenges that accompany it. This data will be analyzed with an eye for differences across national contexts as well as common thematics. It will also inform the design of longer-term ethnographic research in these settings. Before research commences, the project team as a whole will gather at the Norwegian University of Science and Technology to discuss protocols for data sharing and storage, prioritizing open science while protecting confidentiality and security for stakeholders who are potentially sharing proprietary information. These discussions will also feed into a broader project on methods and epistemological frameworks for the study of expertise in a post-truth era; a planned edited volume will include contributions from each member of the project team, as well as other international collaborators.

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Project:	*Navigating the New Arctic: Digitizing Knowledge of Long-Term Oil Spill Effects*
Principal:	NTNU: Arthur Mason (arthur.l.mason@ntnu.no)
Abstract:	The opening of formerly ice-bound waters as a result of climate change has prompted a so-called "rush for the Arctic," marked by intensified shipping activity, resource capture for energy extraction, and scientific observation. This project creates Information and Communications Technology (ICT)-based tools for (1) examining how vulnerable areas of Arctic waters overlap with planned oil drilling sites, and (2) developing a digital repository and integrated set of tools that enable researchers to archive, index, and collaborate around this geospatial data. Today, Arctic Council member states are creating organizational processes that are aimed at the management of knowledge for oil and gas development. Policymakers in Alaska, Canada, and Norway want to know how an oil spill in northern waters will affect marine environments (cod spawning areas, cold coral reefs) as well as human inhabitants of the Arctic. Despite increasing public and scientific attention, knowledge of the long-term effects of oil spills in Arctic regions remains limited. The *Exxon Valdez* disaster, for instance, gave rise to unexpectedly strong sublethal and cascade effects on biotic as well as socio-economic systems. Yet, to date, there are no common standards for data sharing around Arctic oil spill research so that findings can be operationalized across contexts. What is needed are strategies for developing an e-infrastructure so that Arctic researchers, industry actors, and community members can collaborate around both qualitative and quantitative data. Such a platform would require developing a controlled vocabulary for describing interrelationships between heterogeneous data and expressing these relationships in an ontology that could be queried within a content management system. It would support the ambitions of externalizing and preserving Arctic research and facilitating its uptake by community, industry, scholarly stakeholders.
Research Strategy:	The project team, which includes NTNU partners in Marine Biology and Engineering. We will use the GIS database LOFBASE to develop risk assessment maps of potential oil release areas that can be used as part of monitoring studies as well as postspill decision-making. Drawing on data from Alaska's fisheries, aquaculture, and oil sectors, as well as a review of research on the human dimensions of the *Exxon Valdez* spill and additional expert interviews, we will create a baseline model for responding to economic, societal, and ecological impacts that can be adapted for use in other contexts.