

REXSAC

ARCTIC RESOURCES & COMMUNITIES

Annual Report 2018



RESOURCE EXTRACTION AND SUSTAINABLE ARCTIC COMMUNITIES
A NORDFORSK CENTRE OF EXCELLENCE

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1. PROGRESS AND RESEARCH RESULTS

REXSAC is a comprehensive and large Center of Excellence, with 15 partners in all Nordic countries, including Greenland and reaching out to Canada and Russia as well. Research is structured along 8 (originally 10) Research Tasks. There is work ongoing in all RTs and progress is made in the work of individual scholars, research groups, and projects. Progress is also made in outreach activities and in collaborative projects. More on these dimensions of progress will follow in this report and specific outputs and outcomes are listed in appendices for overview.

In what follows here we have tried to select and single out some of the features of our work in REXSAC that speak most distinctly to the instructions for this report, namely unique research achievements and key findings. Specific findings included here are unique and central to the goals of REXSAC research, having wider and more immediate societal relevance in the short to middle term. The list is thus neither a complete nor a final compilation of research findings and does not imply that research not included below is less unique or its findings less valuable.

The report has been composed in light of the recommendations adopted by the Programme Committee on its meeting 1 June 2018. In particular we would like to emphasize our effort to focus on synthesis and integration of our multi- and interdisciplinary work. Interdisciplinarity cuts across most of the things we do in REXSAC and we trust this becomes evident in the pages that follow.

1.1 Unique research achievements and key findings

Can resource extraction contribute to sustainable Arctic communities? This seemingly simple question can be answered in many ways depending on what we mean by “sustainable Arctic communities” and who provides the response. Even when formal processes for making assessments of impact are in place, decisions about extractive industries are often fraught with conflicts between different perspectives. As REXSAC reaches half-way into the project time, several key insights have emerged that are immediately relevant for policies related to extractive industries and sustainable development. They all emphasize the need for more attention to the social implications of extractive industries and that these activities constitute one of several pressures on people and environments in the Arctic. Furthermore, because today’s decision landscape is shaped by past experiences and today’s decisions will shape the future, policies on extractive industries need long-term perspectives looking both back in time and towards different potential futures. These insights shift the focus from questions of impacts of extractive industries as project-specific concerns about the local environment, which characterizes decision making today, to a holistic approach based on an understanding of extractive industries as interlinked socio-technical-ecological systems, and a focus on the decision processes as such.

The key insights presented below have their origin in a discussion at REXSAC’s Coordination Board meeting in Alta in October 2018, where the participants, based on discussion in small groups, were asked to identify key insights from their research thus far, including work that has yet to be published. The raw material from this exercise was analyzed and transformed in the text below in an iterative process of synthesis and comments among research task leaders and within the REXSAC Executive Committee (Excom). As these key insights are based on ongoing research, they will likely be further elaborated and revised as REXSAC work continues. The key

insights stem from work across specific research tasks and are presented here in relation to REXSAC's three overarching research questions.

Q1. How and why does resource extraction commence?

Key insight 1: Investments in Arctic extractive industries are often linked to emotionally loaded expectations about the future.

REXSAC research in Greenland shows how different interests and ontologies affect how mining is seen. For some it is an agent of hope, while for others it is the destroyer of their livelihood. Others regard mining as a combination of the two. Also in Fennoscandia, mining projects have been connected to both positive expectations of job opportunities and local economic growth and fear of damage to nature and traditional livelihoods. Such expectations and emotions affect how the industries are anticipated, planned, and managed. However, because emotions are often seen as non-rational and therefore not relevant in assessments of extractive industries, emotions have rarely been subjected to further analysis. A key insight from REXSAC is that emotions appear as an inherent feature of extractive industries that warrant both research and consideration in mining policies. In a forthcoming issue of *Polar Record*, REXSAC researchers investigate 'the work emotions do' in cases across the European Arctic.

Many emotions are linked to expectations about a certain future, though the future is inherently uncertain. This uncertainty relates to a range of concerns that neither communities nor mining companies or national governments can control, such as market prices and geopolitical developments, where directions have shifted many times in the past. The impacts of climate change add an additional dimension of uncertainty. High emotional stakes can easily create blind spots regarding both the viability and potential impacts of mining.

A policy implication of the pervasiveness of emotional stakes and uncertainty about the future is that decision processes must include mechanisms for critically assessing the long-term viability and risks of extractive industries in relation to different potential futures.

Q2. What consequences does resource extraction have for communities and environments in the Arctic and beyond?

Key insight 2: Extractive industries affect landscapes and livelihoods under pressure from multiple processes, including climate change.

REXSAC research in Sápmi highlights how reindeer herding is squeezed from multiple pressures, including expanded mining and wind power that fragment the landscape and shifting weather and snow conditions in the wake of climate change. Results from the collaborative research with reindeer herders in northern Sweden clearly demonstrate that higher temperatures and more variable snow conditions force new herding strategies to be adopted (Rosqvist and Inga, in prep). This demands high flexibility in choice of grazing areas which requires interconnected and undisturbed areas and corridors. Unfortunately, flexibility is instead reduced due to different types of societal disturbances from resource extraction, infrastructure developments and tourism, for example.

A theoretical achievement in REXSAC is that we combine social-ecological systems theory with socio-technical systems theory from the field of Science and Technology Studies (STS) in our analyses. This approach makes it possible to assess the system dynamics that will influence long-term development in mining regions rather than assessing the impacts of one industrial project at a time. Systems change - sometimes slowly and sometimes abruptly. Even as mines close at the end of their economic lifetime and land is restored, the system impacts remain – as illustrated through the physical imprints of the mine, as well as the social, environmental, cultural and technological processes that the mine has set in motion.

A policy implication of applying such a systems perspective is that assessments of impacts of extractive industries must take into account multiple pressures on landscapes, including legacies of past land use activities, and how plans for mining and mining processes are likely to shape the dynamic relationships with cultures, natures and technologies for centuries to come.

Key insight 3: Planning, operating, and closing extractive industries is a social process that shapes relationships.

REXSAC research in Sweden, Norway, Finland, Greenland and Svalbard, as well as in Canada and Australia highlight how processes in relation to opening and closing mines have shaped relationships among people, between people and the environment, and the behaviour of states. Despite significant social, economic, and environmental implications, mine closure and remediation are often overlooked in public and scholarly debates regarding the impacts and benefits of mineral development. For example, although seemingly positive, mine remediation (also known as reclamation) can generate controversy around clean-up objectives, remaining health risks, and other transformations of the post-mining landscape. For Arctic Indigenous communities, mine remediation efforts may reawaken or reproduce the negative effects of past industrial developments. Central findings from the Nordic countries indicate de-commissioned mining sites can be ascribed new post-extraction values through re-purposing and re-economization (such as new research activities or new businesses) and / or through heritagization. For these reasons, planning for decommissioning of extractive industries must consider relevant measures to avoid toxic hazards in addition to local perceptions of the meaning and value of former extraction sites. Perceptions of the past and a community's long-term future must also be considered within social licensing processes that typically focus solely on the present.

A policy lesson of viewing extractive industries as part of an on-going social process is that decision-making about extractive industries must heed the implications of the process as such, including how it is affected by past experiences and how it will affect future relationships. Integrating local community participation is key to ensuring remediation activities are equitable and effective while also protecting community and environmental health.

Q3. What opportunities exist for transitions to post-extractive futures?

Key insight 4: Engaging with local communities in co-production of knowledge can improve the quality of impact assessments and facilitate transition to positive post-extractive futures.

REXSAC research where scientists have worked closely together with Sami reindeer herding communities have highlighted impacts and potential consequences of mining that do not usually feature in impact assessments. In particular these include social and cultural impacts as well as cumulative impacts on landscape functionality. The fragmentation of grazing areas inhibits adaptation to the effects of climate change.

REXSAC research in Sápmi as well as with aboriginal communities in Australia show that high-quality assessments that take all relevant knowledge into account require investment of resources. To ensure that future research on the implication of mining can provide a more complete picture of the challenges related to extractive industries, structures and resources are needed to support Indigenous and local communities in leading, co-governing or otherwise actively engaging in research activities related to issues that affect them. This is equally relevant for formal decision-making processes regarding the planning, operation and closure of mining projects and the management of post-mining transitions where Indigenous and local knowledge are often marginalized.

A policy implication is that assessment processes for extractive industries need to be designed to support learning among people with different background and knowledge traditions, including realistic possibilities for Indigenous and local groups to conduct their own assessments.

Key insight 5: Negotiations about ‘Sustainable Development’ are at the heart of decisions about extractive industries.

Scenario research in REXSAC highlights that the sustainability of a community is affected by many factors often overlooked by impact assessments and that tensions between different notions of sustainability are common. Furthermore, a recent book with contributions from REXSAC researchers highlights that national perspectives commonly take precedence over local concerns within political sustainability discourses (Gad and Strandbjerg, 2019). There is therefore a need for more dialogue about what sustainability could mean locally for Arctic communities, beyond possibilities of short-term economic development. Such broader dialogues are especially important given the long-term environmental and social impacts of existing and envisioned industrial operations. Key questions include: Sustainability of what? and Sustainability for whom? Such dialogues are also timely given the political focus on implementing the United Nations’ Sustainable Development Goals.

A policy implication of the negotiated nature of “sustainable development” is that more dialogues involving a range of local actors are needed when the notion of sustainability is operationalized in the Arctic, not least in assessing the consequences of extractive industries.

Key insight 6: Innovative research on extractive industries benefits from interdisciplinary training and exchange of highly qualified personnel, such as PhD students and postdoctoral fellows.

A distinctive aspect and outcome of the REXSAC project is the interdisciplinary training offered to PhD students and their integration into the research activities of the network. Unlike traditional training opportunities, PhD training within REXSAC seeks to transcend national, institutional and disciplinary boundaries through network exchanges and field courses, offering unique opportunities for collaboration and training. In turn, through their international research activities, REXSAC PhDs are contributing new perspectives and innovative interdisciplinary methods to the study of Arctic communities and resources. These highly qualified personnel represent the next generation of Arctic researchers who will guide future research into critical questions of Arctic sustainability.

A policy implication of this is that future funding schemes for research on problems requiring multidisciplinary approaches, should encourage applicants to build long term capacity by training new generations of scholars in how to work in a multidisciplinary way.

1.2 Nordic added value the project brings 1) scientifically, 2) for the consortium 3) for stakeholders

REXSAC has a continuous and active collaboration across fifteen partner institutions and multiple research sites in the Nordic countries. It also engages with numerous stakeholders in the Nordic region, including Greenland. A main activity is the extensive researcher training. The consortium consists of senior and established Arctic scholars as well PhD students and junior scholars who are the coming generations of Arctic specialists. Therein lies the perhaps central Nordic added value: the formation among this community of a *'Nordic mindset'* and a *Nordic community of emerging Arctic scholars*. Through REXSAC the scholars train to identify issues and approaches in a pan-Nordic, and indeed pan-Arctic fashion. They move away from the methodological nationalism', so common in the social sciences and humanities, and carve out their topics in a Nordic collaboration. REXSAC also moves stakeholders together across Nordic boundaries. We in a sense, *train the stakeholders* too, in defining issues as common and also comparable. The *consortium itself is growing increasingly Nordic* in outlook and issue orientation. REXSAC methodologies, focusing on rotation, common field visits across the entire region, and multidisciplinary, 'multigenerational' writing groups for papers and conferences have proven to work well in this regard.

1.3 Description of the development of gender perspectives and an analysis of the importance of this development

The CoE at large and the cohort of PhD students have a good gender balance. Several of the research tasks address gender issues, for example, the role of women in transition post-mining and 'affective' economies (RT 5) or in the work on Arctic futures in RT 9 and RT 1. Furthermore women's perspectives and approaches to fairness in the context of mining developments are central to one of the PhD projects. Gender issues are also a central component in the REXSAC thematic issue of Polar Record currently in production. The issue builds on the papers presented at the REXSAC workshop 'Uchronotopia' in November 2017. The editorial work is done entirely by female scholars.

1.4 Any difficulties encountered - e.g., in staffing, data analysis, etc. and how these are addressed

One challenge encountered in REXSAC stems from the substantial costs for conducting field work in the Arctic. Although we have set aside funding for field research in the REXSAC budget, data collection is also dependent on the ability of members to couple field work funding and data from projects related to REXSAC or by securing separate fieldwork funding.

The need to synthesise from a large multidisciplinary program like REXSAC requires us to develop a comprehensive and coherent conceptual framework, that successfully can integrate theoretical concepts from different fields. REXSAC started on this important work in 2017, as reported in its 2017 annual report, building on conceptual frameworks from socio-technical systems theory in history of technology and socio-ecological systems theory from the field of resilience research. The task of making this theoretical apparatus useful for all research groups in REXSAC remains an important challenge to tackle.

Finally, on the level of personnel issues, two REXSAC PhD students have been on parental leave in 2018. Jean-Sébastien Boutet was absent from January-May 2018, followed by 80% worktime and Anna-Maria Fjellström has been absent from January 1, 2018 until the present. Both students were less active in 2018 due to these family commitments.

1.5 Changes introduced or envisaged in the research objectives or design

In 2017, REXSAC initiated a major structuring of the research design of the CoE, by defining a) how the different research tasks addressed its three main research questions, b) how to achieve a continuously ongoing syntheses work, c) how to implement this work in terms of research activities, publications (e.g. the cornerstone papers) and the PhD school, and d) a time-plan indicating when these activities would take place. REXSAC described this plan thoroughly in its annual report of 2018, pages 20-29. This work will be ongoing through 2019.

Another change introduced by REXSAC in 2018, was to launch a concerted effort to define what the main findings of the centre have been so far, as well as what the policy implications of those findings are. This work was begun at the program wide meeting of REXSAC in Alta in late October and further discussed and defined within the REXSAC Excom in the following months. The result of this work is published under section 1.1. in this report.

1.6 Specific efforts undertaken to encourage synergistic collaboration across academic fields and disciplines both in the research and outreach efforts of your project?

The first main effort for cross-disciplinary collaboration during 2018, was the work to write the REXSAC cornerstone articles. The Coordination Board discussed the plans / dispositions for these articles at its first annual meeting in March 2018 and drew up a time plan for the continued work on the publications. At the program wide meeting in Alta, REXSAC devoted a special session to these publications where authors presented their ongoing work and received feedback. The second main effort to encourage cross-disciplinary synergy was the above mentioned work on findings described in sections 1.1. and 1.5. in this report, to define REXSAC's main findings and the policy implications of those findings.

2. RESEARCH MOBILITY

Gender, job title, organization	Site of work	Purpose of visit	Duration of visit	Comments, output of the visit
Patrik Andersson (M), PhD student, Aalborg University and the Geological Survey of Greenland and Denmark	Nuuk, Greenland	Interviews and discussions with key stakeholders	August 14, 2018- August 28, 2018	Discussed the project with stakeholders, including Greenlandic and Danish civil servants and politicians, academics, mining companies, consultancies and NGOs.
	China	Interviews and discussions with key stakeholders	December 9, 2018- January 25, 2019	Meetings with geologists at China Geological Survey and researchers at the Polar Research Institute of China (PRIC), the Shanghai Institutes for International Studies (SIIS), and the Ocean University of China.
Lill Bjørst (F), Associate Professor, Aalborg University, Aalborg, Denmark	Scott Polar Research Institute, University of Cambridge, Cambridge, UK	Guest researcher	February 12, 2019- April 7, 2019	Use the Polar library, networking, writing articles and book manuscript, experience another university

<p>Christian Fohringer (M), PhD student, Swedish University of Agricultural Sciences, Umeå, Sweden</p>	<p>Department of Integrative Biology and Evolution – genetics lab, University of Veterinary Medicine Vienna, Austria</p>	<p>To determine Relative Telomere Length from moose DNA and to evaluate its performance as a biomolecular marker for metabolic expenditure (stress) for the target species/system</p>	<p>August 20, 2019-September 23, 2019</p>	<p>Developed valuable skill-set and protocols of a novel method; Completed full set of analysis; Extended network with foreign department</p>
<p>Arn Keeling (M), Professor, Memorial University of Newfoundland, St. John's, Canada</p>	<p>KTH Royal Institute of Technology, Sweden Stockholm</p>	<p>Visiting researcher</p>	<p>March 2018</p>	
<p>Ritva Kylli (F), Adjunct Professor, University of Oulu, Oulu, Finland</p>	<p>Hokkaido University Arctic Research Center, Sapporo, Japan</p>	<p>Contributing to research project: Healthy, Tasty, Sustainable – Arctic and Northern Food Resources in Sápmi and Ainu Lands (1700–1950)</p>	<p>April 2018–November 2018</p>	
<p>Rebecca Lawrence (F), Research Fellow, Stockholm University, Stockholm, Sweden</p>	<p>Department of Geography and Planning, Macquarie University, Sydney, Australia</p>	<p>Academic collaborations, fieldwork at Ranger Uranium Mine site</p>	<p>January 2018-present</p>	<p>Collaborative report with Australian Conservation Foundation on Ranger Mine to be released this year</p>

Jasmiini Pylkkänen (F), PhD student, University of Oulu, Oulu, Finland	University of Alberta, Department of Sociology, Edmonton, Canada and Rankin Inlet, Nunavut, Canada	REXSAC PhD student rotation: visiting graduate student (research only) and ethnographic fieldwork for doctoral thesis	June 2018-January 2019	
Carl Österlin (M), PhD student Stockholm University Stockholm, Sweden	Navarino Environmental Observatory, Messinia, Greece	Paper writeshop	October 2018	Finalized publication (Larsen et. al 2018)

	Female	Male
Number of visiting months by gender	31	5
Number of visiting researchers by gender	4	4

Plans for future rotation

As can be seen from the above, some of the REXSAC PhD students have begun their rotations. In addition, the PhD students as well as several senior researchers in REXSAC are planning for extended research visits at other REXSAC partner universities over the year. In the fall of 2019, Camilla Winqvist and Jean-Sebastien Boutet plan to work at the Memorial University of Newfoundland, together with Arn Keeling's team. Christian Foringer and Sandra Fischer will make a second rotation later the same autumn. Anna Maria Fjellström plans two rotations, one at InSARC in Arjeplog late 2019 and one at the University of Tromsö in 2020. Jasmiini Pylkkänen will spend a second rotation at KTH in the fall of 2019. Among the senior researchers Dag Avango, Albina Pashkevich and Ninis Rosqvist plan an extended research visit at Stefansson Arctic Institute, Akureyri in the spring of 2020.

3. RESEARCHER TRAINING AND EDUCATION

How many PhDs and Post Docs are recruited from the Nordic countries and how many are recruited from the other countries?

	Female	Male
Number of Nordic PhD students recruited	4	
Number of non-Nordic PhD students recruited		2
Number of Nordic Post Docs recruited	1	
Number of non-Nordic Post Docs recruited	1	

Specify the number of PhD degrees achieved at the Centre in reporting period.

	Female	Male
Number of PhD degree achieved	0	0

The REXSAC PhD school progressed as planned in 2018. The main activity was the PhD course “Arctic communities in transition: Resources and post-extractive futures”, which took place in Alta, Norway, from October 25 to 29, 2018. The course particularly addressed the REXSAC research problem on transitions to post-extraction futures in the Arctic, by focusing on communities that are undergoing change in terms of economy, identity, culture and environment. It dealt with transitions from existences based on extractive industries to post-extraction, from reindeer herding to hydro-power, from fisheries to oil and gas. The course explored a variety of such transitions in the past and the present, and how stakeholders and local communities dealt with and shaped these changes – through engagement and resistance as well as remediation and heritagization – and discussed what lessons can be learned from such processes for the future. The course consisted of lectures based both on campus at Norway’s Arctic University campus Alta, and in different locations in the Alta region where communities undergo or have undergone major changes – the Alta hydrodam, the Repparfjorden mine and the Snøhvit gas extraction field at Hammerfest – as well as seminar discussions and different group assignments. In this way the course used this part of northernmost Norway as a lens for studying processes of change influencing many communities across the Arctic, in the past and the present.

The objective of the course was for PhD students to gain a thorough understanding of transition processes in the Arctic – why they take place, what social, cultural and environmental consequences result and how stakeholders in the Arctic have addressed these challenges. REXSAC has also started the work to design its final PhD courses. The first of these – Arctic mining and local communities in comparison – will take place in Quebec and Labrador in Canada from May 26 to June 2, 2019. The main objective of this course is to explore and explain differences and similarities between Canada and the Nordic countries in terms of relations and interactions between extractive industries and Indigenous/local communities, state-indigenous/local community relations, socio-technical-ecological systems for mining and governance, as well as the implications of these differences for defining best practice. The course

is being developed in collaboration with the MinERAL network, based in Canada, and is open to PhD students from both MinERAL and REXSAC, as well as to PhD students interested in its thematic content.

A second course in the planning stage is ‘Cumulative impacts on Arctic environments and societies’, which will take place October 23-27, 2019. The aim of this course is for PhD students to gain knowledge of how to identify the cumulative effects of climate change and various forms of land uses, past and present, on environments and communities in the Arctic. The course will also train students how to use this knowledge in order to assess current practices in planning and permission-giving processes for extractive industries. This topic is highly relevant for fulfilling the main objective of REXSAC, to contribute to practices and processes that ensure the sustainability of Arctic communities in a rapidly changing social, political, cultural, and ecological environment.

In addition to the PhD school, the doctoral students have taken part in obligatory PhD courses at their home departments, and have progressed significantly on their individual theses projects. For more information on individual progress, please see the summary below.

PhD students funded by NordForsk

Jean-Sébastien Boutet and **Camilla Winqvist** at KTH have started to implement their dissertation plans, working in depth on case studies and have been heavily engaged in PhD course work. They have also contributed to the organization of REXSAC activities. In 2018, Boutet won a Social Sciences and Humanities Research Council doctoral award from Canada, valid for 3 years; and he published a paper with colleagues for the edited collection ‘Resources and Sustainable Development in the Arctic’. Winqvist has worked in parallel on three studies for her PhD theses, dealing with the afterlife of the abandoned Nautanen mining town in Norrbotten Sweden with focus on heritagization, re-economization and environmental remediation. Winqvist has conducted archival research as well as interviews and archaeological documentation.

At Stockholm University, REXSAC PhD students **Sandra Fischer** and **Anna-Maria Fjellström** have progressed on their dissertation projects. Fischer has attended PhD courses, REXSAC courses and others, conducted 4 field measurement trips in Norrbotten (at Nautanen) and Northwestern Russia (Khibiny Research station, Kola Peninsula). Most of the collected material has been analyzed in the laboratory. The field results will be used for several papers and currently she is working on her first manuscript. The field work in Russia was made possible through collaboration with Sergey Chalov from Moscow State University and allowed her to study contaminant spreading from active apatite mining. Anna Maria Fjellström has finished her dissertation plan and presented it at the higher seminar. Since January 2018, she has been on parental leave.

At SLU **Christian Fohringer** has completed most coursework and his halftime-seminar, and is now finalizing the first manuscript of his PhD thesis. In 2018, he completed data compilation for all thesis manuscripts and first analysis and drafting of manuscripts III, IV and V are underway. Moreover, he has successfully completed all field work and has done extensive lab work.

At U of Oulu **Jasmiini Pykkänen** has completed a first REXSAC PhD student rotation at the Department of Sociology at the University of Alberta, and organized and completed her PhD fieldwork in Rankin Inlet, Nunavut, Canada. She is now analyzing fieldwork data collected during her trip. Jasmiini added a new co-supervisor to her project in 2018, Prof. Kenneth Caine of the University of Alberta. Her thesis project focuses on women's perspectives and approaches to fairness in the context of mining developments.

REXSAC affiliated PhD students funded by other sources

Patrik Andersson at the University of Aalborg has published the first of his four thesis articles in 2018, completed a draft of his second thesis article and plan for remaining articles and kappa. Andersson has collected data from Chinese-language textual databases and has carried out fieldwork in Greenland and China. In Nuuk he discussed his project with a wide range of stakeholders, including Greenlandic and Danish civil servants and politicians, academics, mining companies, consultancies and NGOs. In China, he conducted interviews with geologists and resource managers.

Caitlynn Beckett, Dept of Geography at Memorial University in St. John's, Newfoundland, Canada focuses her work on the remediation of contaminated mining landscapes in Northern Canada. She argues that without a community objectives based approach to remediation, such projects risk continuing colonial systems of environmental violence that allowed for such destruction to happen in the first place. This research includes work at the Giant Mine in Yellowknife (on the territory of the Yellowknives Dene First Nations), the Faro Mine in Yukon (on the territory of the Ross River Dena First Nations) and the Raglan Mine in Nunavik, Québec (on the territory of the Nunavik, Inuit).

At the University of Oulu Teresa Komu, Alix Varnajot and Mari Partanen have worked according to plan on their theses. **Teresa Komu** published a third paper of her PhD study in 2018 and a fourth paper is currently under review. A synopsis of her work will be written in spring 2019 and she will complete her PhD pre-examination in summer 2019. **Mari Partanen** began her PhD work in the fall 2018 and is part of the Geography Research Unit at the University of Oulu. Partanen studies Arctic tourism under the working title "Community-led Social Innovations for Sustainable Arctic Tourism Development in Kemi, Finland". **Alix Varnajot** published two articles for his PhD thesis, a third is under revision and a fourth in preparation. A pre-examination of his thesis will be held during summer or early autumn 2019. In parallel, he took part in side articles, including one recently accepted for publication.

At Stockholm University, **Carl Österlin** has finished much of his PhD theses and will defend it during the fall of 2019. Österlin investigates changes in land use pressures on reindeer husbandry (e.g. mining and wind power), using northern Sweden as a case study area. The research questions are studied using a combination of GIS-analysis of land use change, coupled with a series of workshops and interviews with reindeer herding communities.

Finally, at KTH **Corinna Röver** has finalized all of her coursework as well as most of the chapters for her PhD theses (monograph). She will finish her final chapter, dealing with pressures from the radioactive fallout on Sami reindeer husbandry after the 1986 Chernobyl accident, and the conclusion chapter in 2019. **Dmitry Arzyutov** has finalized two articles for his

dissertation (a compilation thesis) in 2018, one of which has been submitted to the Polar Record journal. He also has conducted field work in the Russian Arctic on the Kolguev island, where he shot a short visual anthropology film on modern practices of seal hunting entitled Look in the Eyes of the Seal (Nenets: Nyak' sewhāta syr'', Russian: Smotri nerpe v glaza) [13 min].

To conclude, the REXSAC PhD school is developing in a highly satisfactory manner. With the experiences we have drawn so far, we have reason to have high expectations for the final PhD courses that we organize in 2019. An important task which REXSAC will begin this year is to collect and formulate our insights from the large and complex undertaking of constructing a multidisciplinary PhD program on Arctic sustainability, bringing together competences from a wide range of university departments across the Nordic countries. This will be one of the legacies of the REXSAC program.

4. MEETINGS AND NETWORKING

REXSAC working mode has been built around frequent field based and problem focused collaborations, including PhD training courses and NCoE wide scientific meetings. Important parts of the networking are linked to these activities, i.e. they are integrated into the everyday work of the NCoE. For example, during the PhD course/scientific meeting in Alta, Norway in late October REXSAC engaged with numerous local and regional stakeholders. As we have been planning for a field research and training activity in southern Greenland, originally planned for the fall of 2018 but now planned for August 2019, we have entered into collaboration with the Danish military and with local communities. The same is true for work we do in preparation for the collaborative field course and workshop to be held in Fermont, Québec in May 2019.

The *integrative mode of networking* is also manifested by work REXSAC scholars involved in collaborations with the Nordic Museum in Stockholm in preparation for its major Arctic exhibition opening in September 2019. As examples below will show, we have also worked in policy related activities, in cultural and outreach projects, and taken part in multiple exchanges with both local communities and mining companies. We could perhaps call this a 'velcro effect' that comes with large research efforts and consortia. They are large enough to attract numerous partners and build networks that are essential to the impact of the research. In fact, this is how impact takes place; impact is not a separate item that is solved only through a separate conference or special publication, although these kinds of formats can have their merit, too. The meetings and networking activities that are listed below are therefore more than a(n incomplete) list, they are *real life varieties of REXSAC's societal impacts*. Another aspect of this is the leverage effect that is brought by *hanging on to platforms, vehicles, and fora created by others*, which has largely enhanced both the inward and the outreach capacities of REXSAC.

Organized by the NCoE

REXSAC film screening 'Guardians of Eternity' and 'Can environmental assessments protect the Sami rights?' (Stockholm Nordic Museum, March 28th, 2018)

REXSAC organized two film screenings for the public that relate to issues of significance to the NCoE. 'Guardians of Eternity' is a startling film that documents the impact of arsenic pollution

from an abandoned gold mine in Canada's Northwest Territories on adjacent Yellowknives Dene First Nations communities. After the film, Niila Inga, reindeer herder and chairman of the Laevas Sami village in northern Sweden, together with Rasmus Kløcker Larsen from the Stockholm Environment Institute, showed the shorter film, "Can environmental assessments protect the Sami rights?"

Workshop on "Challenges and opportunities of supplementary feeding in reindeer husbandry" (March 22-23rd 2018)

On March 22-23rd, a workshop on "Challenges and opportunities of supplementary feeding in reindeer husbandry" was held in Kiruna, Sweden. The workshop was a joint action of the REXSAC, ReiGN and CLINF Nordic Centres of Excellence and was led by Élise Lépy (REXSAC), Tim Horstkotte (ReiGN) and Camilla Risvoll (CLINF). It brought together 24 reindeer herders from Norway, Sweden and Finland and 20 researchers from various disciplines to discuss:

- which factors are taken into consideration when deciding on practices and application of supplementary feeding;
- what might be the potential consequences of supplementary feeding practices on the future of reindeer husbandry; and
- what can we learn from experiences in neighbouring countries?

REXSAC program-wide meeting Alta, Norway – NEW REXSAC partner welcomed – UiT Tromsø (October 29-November 1, 2019)

The second annual program-wide meeting was held in Alta, Norway at the end of October. The meeting was hosted by the Arctic University of Norway, Alta campus. See the program here. At the meeting, REXSAC, took the opportunity to welcome a new partner: the Arctic University of Norway, Tromsø under the lead of Prof. Britt Kramvig, Department for Tourism and Northern Studies.

Proceeding the meeting, the PhD course within the framework of REXSAC – 'Arctic communities in transition: Resources and post-extractive futures' was held. This course focused on Arctic communities that are undergoing transitions, in terms of economy, identity, culture and environment.

REXSAC Co-Sponsor of Crosscuts Film festival

At the Crosscuts Film festival, organized by KTH, REXSAC helped lead a breakfast session on *Arktis, gruvdrift, historia och kultur* 25 November, 2018. The session featured films and discussions about mining in the Arctic where REXSAC researchers participated in the panel. REXSAC was also a co-sponsor of the event.

REXSAC researchers serving as expert advisors for exhibit at the Nordic museum

In September 2019, the Nordic museum in Stockholm will open its exhibit *Arktis - medan isen smälter*. REXSAC researchers have been involved from the very beginning of the project as expert advisers providing substantial input and comments on both concepts and details. REXSAC researchers (Avango, Nilsson, Rosqvist) are also authoring chapters for a forthcoming catalogue of the exhibit that will be published in both Swedish and English and aimed at a broad audience.

Other networking opportunities

REXSAC researchers appointed members of The Norwegian Scientific Academy for Polar Research

Britt Kramvig, from The Arctic University of Norway, and Annika Nilsson, KTH, have been appointed as members of The Norwegian Scientific Academy for Polar Research (NVP). NVP strategies toward 2020 aim to advance knowledge of the earth – how its elements, forces and species interact, promote collaboration across scientific disciplines, and broaden cooperation across national boundaries. In addition, the NVP promotes research and education and is strategically recruiting outstanding scientists within core polar research areas that aim at exploring the great unknown.

REXSAC researchers attended PDAC (Prospectors and Developers Association of Canada) in Toronto (March 4-7th 2018)

PDAC International Convention, Trade Show & Investors Exchange is the world's premier mining investment convention for people, companies and organizations in, or connected with, mineral exploration. REXSAC researchers, Lill Rastad Bjørst, at Aalborg University and Frank Sejersen, at the University of Copenhagen attended with special focus on the Aboriginal Program and the Greenland Day.

REXSAC researchers presented at SSR (Svenska Samernas Riksförbund) congress (May 30, 2019)

REXSAC researcher, Ninis Rosqvist, together with Niila Inga, Laevas Sameby, presented and participated in discussion at the Climate seminar on the afternoon of May 30th - "Arctic climate in change: Impact on Indigenous people, the reindeer and reindeer husbandry".

REXSAC researcher takes the stage as Keynote speaker in Davos (June 19-23, 2019)

REXSAC researcher, Peder Roberts, gave a keynote speech during the POLAR 2018 SCAR/IASC Open Science Conference. Peder's focus was on "The Emerging Importance of the Humanities and Social Sciences in Polar Research". Many of REXSAC's researchers were in Davos to participate in conversations and networking opportunities during this busy week.

Sverker Sörlin and Thierry Rodon led sessions at the second UArctic Congress (September 3-7 2018)

UArctic Congress 2018 began in Oulu, September 3-6 and concluded in Helsinki on September 7. It brought together key UArctic meetings and a science conference into one single gathering. REXSAC researchers led sessions on "Current research on extractive industries and the sustainability in the Arctic" on Thursday 6 September.

Sörlin keynote speaker at the first Arctic Resilience Forum in Rovaniemi (10-11 September, 2018)

The aim of the first Arctic Resilience Forum was to showcase Arctic best practices. REXSAC researcher, Sverker Sörlin, delivered the first keynote presentation on the 10th for an audience made up of resilience experts and practitioners together with key policy-makers and stakeholders

from Arctic countries and various sectors of society. Sörlin's presentation focused on the mining legacies in post-extraction communities, adding faces to the study of the changing ice.

Dag Avango represented REXSAC at the bi-annual congress of ACHS - The Association for Critical Heritage Studies, Huangzhou, China (30 August-8 September, 2018)

REXSAC managing director and researcher Dag Avango, presented REXSAC at the ACHS congress, in a session on heritagization of historical remains in the Polar Areas. The presentation focused on the motives of different actors for engaging with remains of extraction sites, defining them as cultural heritage.

Dag Avango represented REXSAC at the tri-annual congress of TICCIH - The International Committee for the Conservation of Industrial Heritage in Santiago, Chile (11-15 September, 2018)

Dag Avango, also board member of TICCIH, presented the NCoE and its work in a session on mining legacies at the congress. Attending participants consisted of scholars and practitioners in the field of industrial legacies and heritage, from all over the world. The participants took a keen interest in REXSAC. Dialogue on possible future collaborations on the post-industrial history on mining legacies took place.

Nilsson represented REXSAC at the Arctic Circle Assembly (19-21 October, 2018)

REXSAC researcher, Annika E. Nilsson appeared as a panelist for the Breakout Session, "Future of the Arctic Council: Form and function", organized by the UArctic Thematic Network on Geopolitics and Security, together with The Arctic Yearbook. Her presentation was titled "Sustainable Development and Extractive Industries: Contradiction or Opportunity in Times of Rapid Change?"

Kløcker Larsen represented REXSAC and the CO-LAND (financed by Naturvårdsverket, Sweden) project at the Almedalen Political Event (1-8 July, 2018)

REXSAC researcher, Rasmus Kløcker Larsen participated as a speaker and panelist for the session, "Indigenous people's land use - a success factor for biodiversity also in Sweden?" organized by the Swedish Society for Nature Conservation (SSNC) and Civil Rights Defenders.

5. INFRASTRUCTURE AND DATA POLICY

Use of infrastructure

A wide range of data sources are used by REXSAC researchers, illustrating the cross-disciplinary approach of the Centre. We use university archives, libraries and information provided by various Nordic government agencies. Data sought from these sources can include open GIS data on land use, information on past, current and future mining activities, and weather data, among others. The Geological Survey's, Statistics Finland and Sweden, Environmental Protection Agency's, Swedish Meteorological and Hydrological Institute, National Land Surveys, Swedish Transport Agency, Swedish Forest Agency, Swedish Armed Forces and the National Heritage Board are all agencies REXSAC researchers have sourced data from in the

past. We also use information provided by the Sami Parliaments and several Indigenous organizations, in addition to mining companies, county boards, municipalities and tourist associations. Information stored in museum archives, collections kept in national and provincial museums and archaeological laboratories provide a wealth of information for REXSAC researchers, as do internet homepages, public speeches, documentaries, contracts, law material, and art work. Weather data used for the impact study on reindeer husbandry are provided by Tarfala Research Station, Stockholm University, and the Swedish Infrastructure for Ecosystem Science (SITES) (<https://data.fieldsites.se/portal> and <https://bolin.su.se/data/>). We use data from GPS tracking of reindeers provided by Sami communities and by Tannak International. Moose GPS-data are provided by the Umeå Center for Wireless Remote Animal Monitoring (WRAM).

REXSAC scientists benefit from the International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT) transnational access program. Laboratories at the Department of Geological Sciences and Environmental Science and Analytical Chemistry at Stockholm University are used for preparation and analysis of water and soil samples. Laboratories at the Department of Wildlife, Fish and Environmental Studies, SLU, Umeå, the NMR Centre at Umeå University (within the SciLifeLab) and the genetics laboratory at the Department of Integrative Biology and Evolution, University of Veterinary Medicine Vienna, Austria, were used for preparation and analysis of animal samples.

Data production

REXAC produces new data during field-campaigns using different measurement, sampling, interviews, focus groups and scenario workshops. Site specific data are described in field-notes, presented as drawings, films and photographs - the latter two are captured using handheld cameras and drones. Positional data are gathered in GPS-units. Analysis of biogeochemical composition of water and soil samples provide water quality data from mining sites.

REXSAC scientists gather data from archives, reviewing excerpts, making copies and taking digital photos of documents. Archaeological data including material objects and other imprints of human activity in the Arctic are recorded along with their geographical positions. We often use film and photographs to document data. Data are also produced during semi-structured interviews, participant observation and participant action research. Recorded interviews are saved as sound files are often transcribed into text files. Data output from workshops consist of notes and photographed 'post-its' and flip chart notes. All matters regarding data security and privacy follow GDPR regulations and ethical recommendations. Ethical guidelines are followed within applied and granted permit protocols to conduct animal research. Data generated with or for local communities are only made public with their permission.

Data sharing and storage

Metadata from the Centre will be catalogued on the REXSAC webpage and will also include links to observational, raw and analyzed data after findings have been published. Ethnographic field materials and interview transcriptions will only be shared when informed consent is given by participating persons. REXSAC scientists internally share non-confidential data using the online file storage service "Box". Generally, data availability is dependent on research agreements with project partners and the consent of interviewed persons.

In addition to the ‘metadata’ catalogue made available through the REXSAC homepage (noted above), our ultimate goal is to follow recommendations by KTH and SU and use the Swedish National Data Service (<https://snd.gu.se/sv>) to store REXSAC data. Water quality data will be stored at the Bolin Centre database at Stockholm University (<https://bolin.su.se/data/>).

Publishing

PhD students present their findings in thesis articles or chapters of their monograph. REXSAC scientists publish in peer reviewed journals and when relevant and appropriate detailed data are provided within the publications as supplements. We aim to publish our data with a Creative Commons Attribution license, which enables the re-use and new use of data materials.

6. GOVERNANCE

The overarching decision making about planning and coordination of the NCoE is carried out in a consortium wide Coordination Board. It has one representative from each consortium member/partner and is chaired by the Program Director. This community overlaps to a large extent with that of Research Task leaders and to the extent it does not, RT leaders are also included in the Co-ordination Board (as described in the main contract). Each member institution names its representative. The Coordination Board has an overseeing responsibility and serves as a forum for reviewing progress in relation to the NCoE goals and research and communication plans and advises the Director and Co-director on more significant adjustments as needs appear. The Coordination Board meets in annual Centre wide meetings and in the context of regular scientific activities, or in virtual meetings, minimum twice per year. In 2018 the Board had a virtual meeting in March, and a face to face meeting in October in Alta, Norway in conjunction with the PhD course “Arctic communities in transition: Resources and post-extractive futures”.

The day by day activities of REXSAC, such as the PhD school, the planning of upcoming meetings and financial issues, are dealt with by a smaller Executive Committee which meets approximately once a month. Rasmus Kløcker Larsen continues to represent the Stockholm Environment Institute to the Coordination Board, though is no longer an adjunct member of the Executive Committee as that role is filled by REXSAC’s Communications Coordinator, Andrea Norgren. In 2018, Annika Nilsson (co-lead of RT1 and RT9) returned to the Executive Committee after her brief departure that began December 1, 2017. Dag Avango, leader of RT 7 and responsible for REXSAC’s PhD program, continues to serve as Managing Director for REXSAC and together with co--PIs, Sörlin and Rosqvist, comprise the overarching leadership of the Centre. The administration of REXSAC continues to draw on the capacity of the KTH hosting Division of History. To support these efforts, in August 2018, a small administrative position (25%) was added to the team, filled by Christina Goldhar.

7. OUTPUT AND DISSEMINATION OF RESEARCH

Peer-reviewed Publications / of which Open Access	62 / 9
Non-peer-reviewed Publications / of which Open Access	1 / 1
Reports	1 / 1
Invited conference presentations	17
Conference presentations, oral / poster	65 / 4
Number of appearances in media	16
Outreach and dissemination to the public	14

8. PROGRESS PLAN FOR THE COMING YEAR

In the middle phase of REXSAC we can note that the central building blocks of the NCoE are installed, working, and delivering results. That is true for the Research Tasks and for the PhD training and their related activities, including the publishing of results. Work mode is turning gradually more and more towards writing up and publishing, but still in 2019 significant field and archival research remains, although major new directions will be increasingly hard to implement beyond 2019 as the NCoE will wind up in the spring of 2021.

Being at the cusp of this five year arc of the programme we can see how a range of activities that have been started now need nurturing and finishing. We will further cultivate our Key Findings and make the most out of them in our publishing, policy and outreach activities. We will tend to our Cornerstone Papers and shepherd these forward toward the review and publication phases, and then make sure they get the attention they deserve through our communication activities. We will continue our PhD program with course work in northern Finland in October. We will also open up new and significant REXSAC wide field activities in Québec in May and in Greenland in June, in addition to the several continuing RT-based field and archival research sites. Part of the work in 2019 and onwards will also consist of ground-truthing and refining the Key Findings, adding empirical detail and turning them into compellingly told Insight Narratives with a potential to catch on and stay in public policy and memory.

REXSAC work in 2019 has already starting to make it possible to see, how the itemizable activities of REXSAC are part of a larger whole and how the progress plan builds continuously towards results and impacts. This will be further developed in 2020 and 2021 with an even more intensified focus on bringing insights and ideas into conversation with relevant communities and stakeholders, above and beyond what is going on already. Work in 2019 will in that respect also build towards the next program wide scientific meeting to be held in the spring of 2020, where we will also invite guests from stakeholder and policy making communities to share and test insights of REXSAC and help bring these ideas out in the world to the users.

A central task for REXSAC in 2019 will be the organisation of a large international multi-network conference on extractive industries and society in the Arctic. The conference will be organized jointly by REXSAC, Mineral, University of the Arctic network for extractive industries and - if funded - the SISARD project (building on Resda). The objective of the conference is to communicate main findings and conclusions from the research programs and networks organizing the event, but will be open for all scholars and stakeholders who are interested. The conference will take place in Montréal in 2020. A long term ambition is to make it a recurring academic event, on a bi- och tri-annual basis.

Important outreach events will also take place during 2019, one significant example is in connection with the Nordic Museum Arctic exhibition in Stockholm, which is in itself a Nordic event, planned over a three year period with REXSAC scholars in significant roles. PhD training will continue at high intensity; see the PhD training section above.

We have asked a sample of individual REXSAC researchers to present brief items of their own activities during 2019, to give flavour rather than to provide any complete coverage of all research plans. They are collected in Appendix III.

9. SUCCESS STORIES AND UNEXPECTED RESULTS

It is not easy to say what a success story is and perhaps others should define them for us; what ‘success’ is may seem different from inside a Center of Excellence than it does from the outside. Also, as has become increasingly documented in work on ‘research quality’, this concept is defined quite differently depending on what relation you have to the work in question, for example if you are a funding agency, if you are a scholar engaged in basic disciplinary research, or if your perspective stems from industry or a societal sector. Just as ‘quality’ has multiple dimensions, success can be diverse as well. We say this just to point out that we see good progress and high quality in many individual REXSAC research projects and good work by PhD students and their supervisors. Perhaps some of this will lead to real success stories in their own right. However, below we will mention a few more major areas of REXSAC research where we can already see that we are providing results and knowledge that stand a good chance of making a difference in a wider sense, on how certain issues and phenomena are perceived and perhaps on how policy is discussed and pursued.

In this regard we would like to emphasize our collaboration with the Nordic Museum as a success story. In this comprehensive collaboration it has become clear that REXSAC and its scholars stand out as ‘the expert to go to’. Our particular set up of competencies and research directions has provided a base of competence and a reputation that have proven useful. This is of course, as always, a matter of individual scholars who have particular skills and exceptional qualities. But it is more than that, it is also a matter of collective thought leadership that makes a long standing and reliable partner. REXSAC has been able to provide not only what we may call ‘Arctic intellectual capital’, but also social capital, organizational capital, network and goodwill. It is hard to conceive that this would have been possible with a group of temporary consultants; we can provide these skills within an environment of plural knowledge and competencies.

The Multiple pressures RT and its connected research in other RTs has done excellent work and been much exposed in the media, and perhaps so far the most tangible success story that

REXSAC can report. It has been part of transforming the perception of climate change in northern Scandinavia and also provided new dimensions to the understanding of life conditions for Sami communities, thus linking climate change in the physical sense with climate change as a social and cultural phenomenon. The media coverage of this work has been considerable, and remarkably true to what we try to convey. Over the long term it has considerable policy implications as well that may mean even more. REXSAC here provides tangible evidence that while individual infringements on Sami communities and their livelihoods could be justified under current legislation, the entire combined assemblage of pressures from climate through to tourism and individual clear cuttings or infrastructural building proves too much for sustainability of reindeer herding livelihoods. This work in REXSAC deeply questions existing policies and regulation.

A third example of a success story in the making is the REXSAC research on ‘affective economies’. This comprises different kinds of knowledge which constitute a new area and provides new framings of conditions of life and livelihoods in Arctic communities and with potential for similar conditions in other parts of the world. It basically tries to get to the inner workings of economies on the local scale where conventional economics don’t work very well and models of efficiency and rationality tend to break down. Potentially affective economies can be turned into planning tools and speak to one of the central ambitions of REXSAC to present new ideas on possible future ‘best practices’ toward sustainability. A recognition of affective economies might be a step on that way. A special issue of a journal will be published by REXSAC scholars from several partners in Norway, Denmark, Sweden, and Greenland based on the conference, “Uchronotopia”, in Oslo in November 2017.

A fourth and final example is about the emerging awareness of the afterlife of mines which is a major feature of REXSAC. We have launched several film shows in Sweden, Canada and Norway and participated in conferences and we already can see a reframing in progress about *uncertainty* as a feature of life in extraction sites and communities. This supplements the necessary understanding of environmental impacts with wider and sometimes more subtle social and emotional impacts that also are significant when it comes to extractive industries and which are essential for understanding the long-term sustainability of mining, especially in a context of rapid environmental and social change. REXSAC has provided defining inputs to this process, contributing to the issue now becoming increasingly a public issue and a matter of concern for mining companies and policy. Concrete research efforts that corroborate this point are represented across REXSAC RTs but could be summarized by this quote:

“I provided social impact evidence for the NSW Minister for Planning, Australia in a major landmark coal-mining case in the Land and Environment Court, to support the rejection of the coal mine on the basis of social impacts. My research in this field was a key part of my evidence.” **Rebecca Lawrence**

10. STAKEHOLDER INVOLVEMENT

REXSAC is engaged with three groups of stakeholders: Indigenous peoples, the mining industry, and policy processes.

Indigenous peoples: Sami reindeer herders are not only stakeholders but also rights holders in relation to decision processes that affect them. REXSAC is engaged with Sami as REXSAC researchers leading some of our work (RT 8. Co-existences: Recoding natural resources for future livelihoods) and as active partners in REXSAC research (RT2. Impacts of multiple pressures on Arctic landscapes and societies). We also work directly with Sami organizations, such as Svenska Samernas Riksförbund (SSR), in planning research activities to ensure Sami priorities are part of the process at an early stage.

Indigenous peoples and other local actors are also key participants when conducting workshops, such as the ‘Challenges and opportunities of supplementary feeding in reindeer husbandry’ workshop held in Kiruna and completed in partnership with the ReiGN and CLINF Nordic Centres of Excellence (March 2018) and the scenario workshop held in Ilulissat (April 2018).

Mining industry: In September 2018, several members of REXSAC’s Excom met with representatives of SveMin (the Swedish industry association of mines, mineral and metal producers), to discuss how we could work together and keep each other informed of on-going activities. REXSAC researchers and PhD students also attended the annual conference of Svemin November 26, taking part in discussions on future challenges of the mining industry in Sweden and internationally.

Policy processes: Following our engagement in 2017 with Arctic Council activities related to the project ‘Good Practice Recommendations for Environmental Impact Assessment and Public Participation in the Arctic (Arctic EIA)’, REXSAC has contributed to the development of the project report. We view this as an effective way of ensuring REXSAC insights are included within circumpolar policy discussions.

Stakeholder engagement plans for the remainder of REXSAC include continued joint fieldwork with Sami reindeer herders - an activity that provides learning opportunities for both researchers and active herders. These collaborative efforts have helped increase our understanding of the effects of multiple pressures (i.e. the combined effects of societal activities and climate change) on Sami lands and reindeer herding. Our research has helped support the capacity of Sami groups to argue for flexible approaches to land use planning, among other adaptation and mitigation efforts. A further opportunity for stakeholder involvement and learning includes a major scenario workshop to be held in northern Sweden in the fall of 2019 as a joint effort between several RTs and involving multiple stakeholder groups. REXSAC researchers are also engaged as advisors in policy-relevant processes, e.g. to the Sami Parliament in Norway regarding tourism.

REXSAC has not yet created a formal process to evaluate stakeholder involvement, though on-site evaluations are often performed in connection with workshops. Future plans include conducting interviews with key stakeholder representatives to gather feedback that will be used to design outreach activities during the final years of the program.

Ethical norms around research involving Indigenous peoples have shifted substantially over the last ten years and now more fully recognize Indigenous rights and the need to ensure respectful research relations. Research should include the active participation of Indigenous peoples as partners, thus allowing the co-production of knowledge. It is also becoming increasingly common for Indigenous scholars to lead research involving Indigenous peoples. In addition to adhering to international guidelines regarding ethical conduct in research, such as the research principles formulated by the International Arctic Social Sciences Association (IASSA), several REXSAC researchers are active in contributing to dialogue around how to move Arctic research forward in a manner that is respectful of individual integrities, cultures, and quests for Indigenous self-determination.

11. RELEVANCE FOR SOCIETY

The transition to a low-carbon future and need for growth of renewable energy is putting new pressures on land use in the Arctic. It includes expanding wind power as well as increasing demand for minerals needed in batteries and other key technologies. Controversies around the use of landscapes and seascapes are already common in the Fennoscandian north. Tensions between different groups may increase further unless appropriate processes are in place for discussing conflicting interests related to sustainable development in a constructive manner. A key input into such discussions is a better understanding of the long-term environmental, social and technological impacts of extractive industries, which is directly in line with REXSAC's research on the dynamics of opening, operation, and closing of mines. In addition to this overarching relevance, REXSAC research help build capacity to interpret the combined impacts of climate change and other pressures on reindeer herding, which is essential for Sami communities but also in relation to political commitments regarding national priorities ('riksintressen'). Furthermore, the focus on analyzing the notion of sustainability from a community perspective will help build capacity for the implementation of the global Sustainable Development Goals, including the management of perceived conflicts between different goals.

12. LONG-TERM EFFECTS ON POLICY

REXSAC's ambition is to contribute to more appropriate processes for evaluating the long-term social, ecological and technological impacts of extractive industries in the Arctic, with a focus on system dynamics and multiple pressures on landscapes, in contrast to the current policy focus on project-by project evaluations. We do so by conducting original research into areas where knowledge is lacking and by engaging in relevant policy processes as expert advisors. As highlighted in the key findings under '1. Progress and Research Results', we have already outlined aspects of mining that have previously lacked sufficient attention, such as the role of emotions, the importance of assessing multiple pressures/cumulative impacts, and the need for long-term perspectives looking both to the past and to the future. REXSAC is furthermore engaged in analysing how to 'translate' the global Sustainable Development Goals into Arctic-relevant indicators that could support the development of better decision-making processes and strategic planning in ways that focus on local and regional sustainability. As for all research, the long-term impacts of REXSAC are very difficult to predict. As highlighted in research on resilience and on adaptation, knowledge and learning processes are key to navigating rapid social and environmental change, where they serve as a source of innovation when new needs arise. In

addition to specific potential impacts, REXSAC is an effort to develop new knowledge and learning processes related to sustainability and extractive industries, especially in its work on innovative knowledge co-production across different fields of expertise and with different groups in society, including Indigenous peoples.

13. PROGRAMME EVALUATION

REXSAC is one of four Centres of Excellence established under the Nordforsk programme: Responsible Development of the Arctic - Opportunities and Challenges - Pathways to Action. The programme was well staked out in the Noria-NET Arctic’s Programme memorandum (with the same title), published in 2014. It is an ambitious programme with a forward looking approach. In REXSAC we share the ambitions laid out for the programme, and we also believe it is important to nurture the programme and reflect on its progress and its impact, taken as a whole as much as in consideration of its different parts.

In completing the third annual report we recognize the increasing value of strategic planning within the programme that supports, encourages and facilitates greater collaboration across the NCoEs. Collaborative work should be regarded as a valuable project in its own right, with appropriate funding and support from Nordforsk as these efforts effectively advance the broad project aims of the organization and of the collective NCoEs. In addition, planning for Nordforsk meetings, such as the annual program to be held in Reykjavik, Iceland, and other meetings and networking opportunities would benefit from longer time horizons to allow earlier communication to the Centres to ensure participation.

As noted in our second report, from the point of view of REXSAC, the programme has worked without incident. There is however a growing curiosity about how Nordforsk considers the use of dialogue towards the common good. This may also concern communications and visibility. We were under the impression initially that some capacity was designated for the Arctic NCoEs in that regard. Visibility is key and this is clearly a responsibility for the individual NCoEs but again, if a common communications effort on behalf of the programme is to get momentum during the funding period initiatives need to be taken soon. These are processes that require considerable time and preparation, and they should only be attempted if impact and success are likely, which is why an organized conversation is important.

14. APPENDIX I- Academic Output

Title	Author(s)	Journal/Conference/ Publisher	Publication type	Open Access
PUBLISHED CONTRIBUTIONS				
Chinese mining in Greenland: Arctic access or access to minerals?	Andersson, P, Zeuthen, J., and Kalvig P.	2018. Arctic Yearbook: Special Section on China and the Arctic, 1-15.	Journal article	https://arcticyearbook.com/image/yearbook/2018/China-and-the-

				Arctic/7_AY2018_Andersson.pdf
Kina i Arktis - intressen och strategier	Andersson, P.	2018. Föreningen FokusKinas Tidskrift, 4, 34-38.	Journal article	
Gradmålingsstasjon en i Sorgfjorden: en kulturhistorisk dokumentasjon.	Arlov, T.B., Avango, D., and Reymert, P.K.	2018. Trondheim- Tromsø-Stockholm: NTNU - KTH.	Report	
Extracting the future in Svalbard. In <i>Competing Arctic futures: Historical and contemporary perspective</i>	Avango, D.	2018. Nina Wormbs (Ed), Cham: Palgrave Macmillan, 47-71.	Book chapter	
Historical sites and heritage in the polar regions. In <i>The routledge handbook of the polar regions</i>	Avango, D.	2018. Nuttal, M., Christensen, T.R., and Siegert, M. (Eds), London: Routledge, 116-133.	Book chapter	
Opp og ned i 100 år: Sveagruva 1917-2017.	Avango, D., and Brugmans, P.J.	2018. Lien, H. (Ed). Longyearbyen: Svalbard Museum.	Book chapter	
Industrial heritage and Arctic mining sites: Material remains as resources for the present – and the future. In <i>Heritage and change in the Arctic</i>	Avango, D., and Roberts, P.	2017. Thomsen, R.C., and Bjørst, L.J. (Eds), Aalborg: Aalborg University Press, 127- 157.	Book chapter	
Heritage, conservation, and the geopolitics of Svalbard: Writing	Avango, D., and Roberts, P.	2017. Körber, L.A., MacKenzie, S. and Westerståhl Stenport, A. (Eds). New York:	Book chapter	

the history of Arctic environments. In <i>Arctic environmental modernities: From the age of polar exploration to the era of the Anthropocene</i>		Palgrave Macmillan, 125-143.		
Rethinking remediation: Mine reclamation, environmental justice, and relations of care	Beckett, C., and Keeling, A.	2019. <i>Local Environment</i> 24,3: 216-230.	Journal article	
Relationship building and partnership in mining: Stories, emotions and the quest for stable relationships in the Greenlandic mining sector	Bjørst, L.R.	2018. (submitted). Special issue of Polar Record, University of Cambridge	Journal article	
Co-evolution and resilient regions: Moving towards sustainable tourism development. In <i>Resilient destinations: Governance strategies in the transition towards sustainability in tourism</i>	Brouder, P. and Saarinen, J.	2019. Saarinen, J. and Gill, A.M. (Eds) London, Routledge, 67-76.	Book chapter	
Chapter 8: Tourism: . <i>I Adaptation actions for a changing Arctic: Baffin Bay & Davis Strait regional</i>	Dawson, J., Kaae, B., Johnston, M., Bjørst, L. R., and Pizzolato, L.	2018. Arctic monitoring and assessment programme, Oslo.	Report	http://vbn.aau.dk/da/publications/chapter-8-tourism(7ac3d71e-7fce-471b-8787-

<i>assessment</i> (s. 223-242)				02b8ef9fb4d7).html
Form and function: The future of the Arctic Council	Exner-Pirot, H., Ackrén, M., Loukacheva, N., Nicol, H., Nilsson A.E., and Spence, J.	2019 (February 5), <i>Arctic Institute</i>	Journal article	https://www.thearcticinstitute.org/form-function-future-arctic-council/
Conclusions: Challenges and opportunities in the transition towards sustainability in resilient destinations, governance strategies. In <i>The transition towards sustainability in tourism</i>	Gill, A.M. and Saarinen, J.	2019. Saarinen, J. and Gill, A.M. (Eds). London, Routledge, 189-196.	Book chapter	
Evidence of the impacts of metal mining and the effectiveness of mining mitigation measures on social-ecological systems in Arctic and boreal regions: A systematic map protocol	Haddaway, N.R., Cooke, S.J., Lesser, P., Macura, B., Nilsson, A.E., Taylor, J.J., and Raito, K.	2019. <i>Environmental Evidence</i> , 8(1)	Journal article	https://doi.org/10.1186/s13750-019-0152-8
Indigenous peoples' relationships to large-scale mining in post/colonial contexts: Toward multidisciplinary comparative perspectives	Horowitz, L., Keeling, A., Lévesque, F., Rodon, T., Schott, S., Thériault, S.	2018. <i>The Extractive Industries and Society</i> 5,3: 404-414.	Journal article	

Accumulating minerals and dispossessing Indigenous Australians: Native title recognition as settler-colonialism	Howlett, C., and Lawrence, R.	2019. <i>Antipode</i>	Journal article	
Knowledge, sustainability, and the environmental legacies of resource development in northern Canada. In <i>Resources and sustainable development in the Arctic</i>	Keeling, A., Sandlos, J., Boutet, J.S., Longley, H., and Dance, A.	2019. Southcott, C., Abele, F., Natcher, D., and Parlee, B. (Eds), London: Routledge.	Book chapter	
Ghost towns and zombie mines: Historical dimensions of mine abandonment, reclamation and redevelopment in the Canadian North. In <i>Ice Blink: Navigating northern environmental history</i>	Keeling, A., and Sandlos, J.	2017. Martin, B. and Bocking, S. (Eds), University of Calgary Press, Calgary, 377-420.	Book chapter	
Manoeuvring conflict: Industrial land use projects and ‘refusal to resist’ among reindeer herding communities in northern Fennoscandia	Komu, T.	2019. <i>Ethnos</i> DOI:10.1080/00141844.2019.1580304	Journal article	
Reconciliation in the everyday - when dreams become real:	Kramvig, B.	2018. Copenhagen: Hurricane, 56-66	Book chapter	

Speaking of a different reality. In <i>BAT: Bridging Art + Text</i>				
Relevansen av det nære	Kramvig, B.	2018. <i>Ottar</i> 319(1):49-54	Journal article	
Doing indigenous methodologies: Towards a practice of the 'careful partial participant'	Kramvig, B., Brattland, C. and Verran, H.	2018. <i>ab-Original: Journal of indigenous studies and First Nations' and First Peoples' cultures</i> . 2, 74-95.	Journal article	
Turbulent indigenous objects – controversies around cultural appropriation and recognition of difference	Kramvig, B. and Flemmen, A.B.	<i>Journal of Material Culture</i> , 1–19 DOI: 10.1177/1359183518782719	Journal article	
Stories of hope: The dark ecology journeys co-creating tourism research. In <i>Towards collaborative ways of knowing</i>	Kramvig, B. and Methi, H.	2018. van der Dun, R., Ren, C. and Johannesson, G.T. (Eds.) Routledge, 162-179.	Book chapter	
Responding to climate change: Studies In <i>Intellectual, political, and lived history</i>	Lane, M., Sörlin, S., Socolow, R.H., and McNeill, J.R.	2018. <i>Climatic Change</i> , 151:1, 1-78.	Edited special issue	https://link.springer.com/journal/10584/151/1/page/1 ISSN: 0165-0009 (Print) 1573-1480 (Online).
Arctic economies and trade.	Larsen, J. N.	2019. Nuttall, M (Ed.), Routledge Handbook series. (in preparation)	Book chapter	

Sustainable Economies in the Arctic. In <i>Arctic Sustainability: A Synthesis of Knowledge</i>	Larsen, J.N. and Huskey, L.	2019. (in review) Routledge	Book chapter	
Arctic social indicators and arctic youth perspectives.	Larsen, J.N., Ingimundarson, J.H., Jungsberg, L., and Schweitzer, P.	2019. (in preparation) <i>Polar Geography</i> .	Journal article	
Arctic youth and sustainable futures.	Larsen J.N., Ingimundarson, J.H., and Hirschberg, D. (Eds.)	TeamNord. Nordic Council of Ministers, Copenhagen. (in preparation)	Edited volume	
Do voluntary corporate actions improve cumulative effects assessment? Mining companies' performance on Sami lands.	Larsen, R.K., Österlin, C., Guia, L.	2018. <i>The Extractive Industries and Society</i> . 5(3) doi:10.1016/j.exis.2018.04.003	Journal article	
Participatory meaning-making of environmental and cultural changes in reindeer herding in the northernmost border area of Sweden and Finland	Lépy, É., Heikkinen, H.I., Komu, T. and Sarkki, S.	2018. <i>International Journal of Business and Globalisation</i> , 20(2), 203-221.	Journal article	https://doi.org/10.1504/IJBG.2018.089868
‘Sprickor i tillvaron: öppningar för framtiden. In Arktis - medan isen smälter	Nilsson, A.E.	2019. Gustasson-Reinius L., (Ed.). (forthcoming)	Book chapter	

Promises, challenges, and ways forward for participatory scenario methodologies in the Arctic	Nilsson A.E., Carson, M., Cost, D., Forbes, B.C. Haavisto, R., Karlsdottir, A. Larsen, J N., Paasche, Ø, Sarkki, S., Larsen, S V, and Pelyasov, A.	2019. <i>Polar Geography</i> (in review)	Journal article	
Regional futures nested in global structures. In <i>The politics of arctic resources: Change and continuity in the “Old North” of northern Europe</i>	Nilsson, A. E., Eklund, N., Jürisoo, M., Klimenko, E., and van der Watt, L.M.	2019. Keskitalo, E.C. (Ed.), Routledge. (forthcoming)	Book chapter	
Svalbard	Norum, R. and Proctor, J.	2018. London: Bradt.	Book	
The anthropocenic imaginary: Political ecologies of tourism in a geological epoch	Norum, R. and Mostafanezhad, M.	2019. <i>Journal of Sustainable Tourism</i> .	Journal article	
Mine closure on the aboriginal estate	O’Faircheallaigh, C., and Lawrence, R.	2019. <i>Australian Aboriginal studies</i>	Journal article	
Cruising the marginal ice zone: Climate change and Arctic tourism	Palma, D., Varnajot, A., Dalen, K., Basaran, I.K., Brunette,	2019. <i>Polar Geography</i> , (in press)	Journal article	

	C., Bystrowska, M., Korablina, A.D., Nowicki, R. C., Ronge, T.A.			
Jos löytyis joku juttu, mis kaikki vois olla riittävän voittajia": ympäristöjärjestöjen näkökulma Lapin ympäristömuutoksen kulttuurisen riskiteorian kautta	Partanen, M.	Cultural Anthropology, Faculty of Humanities, University of Oulu.	Masters thesis	http://jultika.oulu.fi/Record/nbnfio:oulu-201802081174
Economic development in the Arctic. In <i>Handbook on arctic politics and policy</i>	Petrov, A. and Larsen, J.N.	2019. Coates, K. and Holroyd, C. (Eds.). Palgrave Handbook. (in preparation)	Book chapter	
Migrantes	Reig, A. and Norum, R.	Barcelona: Ekaré (in press).	Book	
Branding on the Nordic margins: Greenland brand configurations. In <i>The Nordic wave in place branding - Constructions, appropriations, and articulations.</i>	Ren, C., Gad, U.P. and Bjørst, L. R.	2018. (accepted for publication). London: Edward Elgar	Book chapter	
Increasing pressures on reindeer land use from climate warming	Rosqvist, G. N., Inga, N., Eriksson, P	2019 (submitted to <i>Ambio</i>)	Journal article	
Multiple pressures from climate and	Rosqvist, G.N.,	in preparation	Journal article	

land use change on reindeer husbandry	Österlin, C., Inga, N., Fohringer, C., et al.			
Beyond growth thinking: The need to revisit sustainable development in tourism	Saarinen, J.	2018. <i>Tourism Geographies</i> 20(2): 337-340.	Journal article	
What are wilderness areas for? Tourism and political ecologies of wilderness uses and management in the anthropocene	Saarinen, J.	(2018). <i>Journal of Sustainable Tourism</i> (in press)	Journal article	https://doi.org/10.1080/09669582.2018.1456543
Communities and sustainable tourism development: Community impacts and local benefit creation tourism. In <i>A research agenda for sustainable tourism</i> .	Saarinen, J.	2019. McCool, S.F. and Bosak, K. (Eds) Cheltenham: Edward Elgar Publishing (in press).	Book chapter	
Tourism, resilience and governance strategies in the transition towards sustainability. In <i>Resilient destinations: Governance strategies in the transition towards sustainability in tourism</i>	Saarinen, J. and Gill, A.M.	2019. Saarinen, J. and Gill, A.M. (Eds). London, Routledge, 15-33.	Book chapter	
Introduction: Placing resilience in the sustainability	Saarinen, J. and Gill A.M.	2019. Saarinen, J. and Gill, A.M. (Eds).	Book chapter	

frame. In <i>Resilient destinations: Governance strategies in the transition towards sustainability in tourism</i>		London, Routledge, 3-12.		
The Arctic in tourism: Complementing and contesting perspectives on tourism in the Arctic	Saarinen, J. and Varnajot, A.	2019. <i>Polar Geography</i> , (accepted)	Journal article	https://doi.org/10.1080/1088937X.2019.1578287
The Giant Mine's long shadow: Arsenic pollution and native people in Yellowknife, NWT. In <i>Mining North America: An environmental history, 1522-2012</i>	Sandlos, J., and Keeling, A.	2017. Vrtis, G. and McNeill, J. (Eds), Berkeley: University of California Press, 280-312.	Book chapter	
Toxic legacies, slow violence, and environmental injustice at Giant Mine, NWT	Sandlos, J., and Keeling, A.	2016. <i>Northern Review</i> 42: 7-21	Journal article	
Myths on local use of natural resources and social equity of land use governance: Reindeer herding in Finland	Sarkki, S., Heikkinen, H.I., Herva, V.P. and Saarinen, J.	2018. <i>Land Use Policy</i> (77), 322–331.	Journal article	https://www.sciencedirect.com/science/article/pii/S0264837718303831
Anthropocene Arctic: Reductionist imaginaries of a 'New North'. In <i>Competing Arctic futures: Historical and contemporary perspectives</i>	Sörlin, S.	2018. Wormbs, N. (Ed). New York: Palgrave Macmillan, 243-269.	Book chapter	

A microgeography of authority: Glaciology and climate change at the Tarfala Station, 1945–1980. In <i>Understanding field science institutions</i>	Sörlin, S.	2018. Ekerholm, H., Grandin, K., Nordlund, C. and Schel, P.A. (Eds.) Sagamore Beach, MA: Science History Publications, 255-285.	Book chapter	
Cryo-history: Exploring ice and snow in the Cold War. In <i>Snow and ice in the Cold War – histories of extreme climatic environments</i>	Sörlin, S.	2018. Herzberg, J., Kehrt, C. and Torma, F. (Eds.) New York and Oxford: Berghahn Books, 20-45.	Book chapter	
Historicizing climate change – engaging new approaches to climate and history	Sörlin, S. and Lane, M.	2018. <i>Climatic Change</i> , 151:1, 1-13.	Journal article	https://doi.org/10.1007/s10584-018-2285-0
Costs and benefits of environmental change: Tourism industry's responses in Arctic Finland.	Tervo-Kankare, K., Kajan, E., and Saarinen, J.	2018. <i>Tourism Geographies</i> 20(1): 202-203.	Journal article	
Emotions, finances and independence: Uranium as a “happy object” in the Greenlandic debate on secession from Denmark	Thisted, K.	2019. <i>Polar Record</i> (accepted)	Journal article	
Walk the line: An ethnographic study of the ritual of crossing the Arctic Circle – Case Rovaniemi	Varnajot, A.	2019. <i>Tourist Studies</i>	Journal article	

CONFERENCE PRESENTATIONS AND INVITED TALKS				
Chinese Arctic mineral interests – investigating institutional and political reach	Andersson, P.	2018 (January 25-26) Workshop on Arctic-Chinese Cooperation, Aalborg, Denmark	Workshop presentation	
Chinese mining in Greenland: Arctic access or access to minerals?	Andersson, P.	2018 (November 5-7) 'Asia on the Move': 11th Annual Nordic NIAS Council Conference, Tromsø, Norway	Conference presentation	
China in the Arctic: Mining and geopolitics	Andersson, P.	2018 (December 6) Polarforskerdagen 2018: Fremtidens polarforskning, Copenhagen, Denmark	Conference presentation	
Constructing the pasts of Arctic mining sites	Avango, D.	2018 (June 20) Polar 2018 IASC/SCAR Open Science Conference, Davos.	Conference presentation	
Mining settlements in transition	Avango, D., Paglia, E. and Pashkevich, A.	2018 (June 20) Polar2018 IASC/SCAR Open Science Conference, Davos.	Conference presentation	
Constructing the pasts of polar futures	Avango, D.	2018 (September 2) Association of Critical Heritage Studies bi-annual congress in Hangzhou, China.	Conference presentation	
Constructing cultural heritage in the Arctic and Antarctic	Avango, D.	2018 (September 12) Pontificia Universidad Católica de Valparaíso, Chile.	Conference presentation	
Resource extraction and sustainable Arctic communities:	Avango, D.	2018 (September 14) TICCIH Congress, Santiago, Chile.	Conference presentation	

Heritage processes and environmental remediation in the north				
Sustainable communities and the legacies of mining in the Nordic Arctic	Avango, D.	2018 (October 8) RES-LINK: Workshop on Resources and Urbanization in the Arctic, Luleå Tekniska Universitet.	Workshop presentation	
Exellenscentret REXSAC – resource extraction and sustainable Arctic communities	Avango, D.	2018 (October 10) Jernkontoret, Stockholm.	Conference presentation	
How to become, find and keep a good partner? The quest of stable relationships in the mining sector	Bjørst, L.	2018 (January). Arctic-Chinese Cooperation, Aalborg University, Aalborg, Denmark	Conference presentation	
What is Arctic sustainability? Three ways of producing knowledge about sustainable futures	Bjørst, L.	2018 (February). Relationship building and partnership in mining: Stories, emotions and the quest for stable relationships in the Greenlandic mining sector, Scott Polar Research Institute University of Cambridge, UK	Invited presentation	
Transnational companies, indigenous peoples and the politics of Arctic mining.	Boutet, J.S.	2018 (October 31). REXSAC program wide conference and coordination board meeting. Alta, Norway.	Conference presentation	

Where are the wild things: Human perceptions of wild spaces and species in dynamic Arctic landscapes	Carruthers-Jones, J., Norum, R., Hartikainen, H., Nevala, E., Lépy, É., Heikkinen H.I., Sarkki, S.	2018 (November 20-21). ARKTIKO final seminar, Helsinki, Finland	Poster presentation	
	Fohringer, C.	2018 (October 31). REXSAC program wide conference and coordination board meeting. Alta, Norway.	Conference presentation	
Kuinka korvata arvot, joita ei voi korvata? (How to repay values that cannot be repaid?)	Heikkinen, H.I.	2019 (October 1). Tieteen päivät – Helsinki Science days.	Invited presentation	
Challenges and potentials with the initiative to develop Nordic Online Mining Atlas and Data base (NOMAD).	Heikkinen, H.I., Avango, D., Norum, R., and Lépy, É.	2018 (August 20-23). Extractive industries and indigenous livelihoods (NOS-HS Workshops), Oslo, Norway.	Conference presentation and co-organizing of workshop	
Lapin kaivostoiminnan maankäyttökiistat ja niiden hallinta	Herva, V.-P. (et al.)	2018 (November 20-21). The Academy of Finland Arctic Programme final conference, ARKTIKO final seminar, Helsinki, Finland.	Conference presentation	
Workshop on challenges and opportunities in supplementary feeding	Horstkotte, T., Lépy, É., and Risvoll, C.	2018 (March 22-23), Kiruna Sweden.	Workshop	

Evolution of the hydro-climate system and mining impact in the Lake Baikal basin and the Arctic	Jarsjö, J.	2018 (January 23-25). BaseNet meeting, Lomonosov Moscow State University, Faculty of Geography, Moscow, Russia.	Invited presentation	
Mitigating large-scale impacts of mining operations in the Selenga River basin	Jarsjö, J.	2018 (August 31-September 2). GMIT Symposium on Environmental Science and Engineering, Nalaikh, Mongolia.	Conference presentation	
Indigenous knowledge and environmental remediation in extractive development	Keeling, A.	2017 (June). International Congress of Arctic Social Sciences, Umeå, Sweden	Conference presentation	
Remediation, reconciliation, and redress: Repairing mining landscapes and healing relationships	Keeling, A.	2017 (October). Challenging Canada 150: Settler Colonialism and Critical Environmental Science, workshop hosted by Nipissing University, North Bay, Canada	Invited presentation	
Remediation, reconciliation, and redress: Repairing mining landscapes and healing relationships in northern Canada	Keeling, A.	2018 (March). Higher Seminar. Division of History of Science, Technology and Environment, KTH Royal Institute of Technology and Stockholm University Department of Geography, Stockholm, Sweden	Invited presentation	
Remediation, reconciliation, and	Keeling, A.	2018 (March). University of	Invited presentation	

redress: Repairing mining landscapes and healing relationships		Aberdeen Department of Law Energy Seminar Series, Aberdeen, Scotland		
Remediation, reconciliation, and redress: Repairing mining landscapes in a settler colonial context	Keeling, A.	2018 (April). American Association of Geographers Annual Meeting, New Orleans, United States of America	Conference presentation	
Dreams and the extractive industries in northern Fennoscandia	Komu, T.	2018 (November 20-21). ARKTIKO final seminar, Helsinki, Finland	Conference presentation	
Postkoloniale urfolksstudier og mangslungen likestilling. Samisk forskning og kjønnsforskning – på samme parti?	Kramvig, B.	2018. University of Oslo, Samefolkets dag, Oslo	Conference presentation	
Sustainable and responsible travelling in the Arctic	Kramvig, B.	2018 (April 30). 8th High Level dialog on SDG in the Arctic, University of Tromsø	Conference presentation	
Epistemic practices of storytelling	Kramvig, B.	2018 (March 22-23). Comparative Studies of Equality and Sustainability in Northern Spheres	Conference presentation	
Feministisk postkolonial tilnærming til forskning i nord	Kramvig, B.	2018 (22-23 March) Det kjønnede Arktiske landskapet, Komparative studier av likestilling og bærekraft i nordlige rom; UiTs Senter for kvinne- og	Conference presentation	

		kjønnsforskning og Umeå Centrum för Genusstudier (UCGS) Tromsø		
Turisme i de Arktiske områder	Kramvig, B.	2018 (June 25). Nordisk Råd's sommermøte, Tromsø	Conference presentation	
Hvordan lytter vi oss inn i landskapet?	Kramvig, B.	2018 (June 24) dialog Katarina Pirak Sikku, Margrethe Pettersen, Britt Kramvig og Hanna Guttorm; Galleri Nord FINN	Workshop presentation	
Stemmer fra fortiden: Helbrederen Knut Lundes virke	Kramvig, B.	2018 (June 23) dialog Britt Kramvig & Randi Sørliie Galleri Nord FINN	Workshop presentation	
Landskap, drømmer og samiske ontologier	Kramvig, B.	2018 (June 25) med Katarina Pirak Sikku, Margrethe Pettersen og Britt Kramvig; Galleri Nord FINN	Workshop presentation	
Walking in darkness	Kramvig, B.	2018 (June 26) med Hanna Guttorm og Britt Kramvig; Galleri Nord FINN	Workshop presentation	
The cosmopolitical of indigenous artistic intervention	Kramvig, B.	2018 (August 29) Society for Science and Technology Studies (4S), Sydney	Conference presentation	
Turbulent indigenous objects - controversies around cultural	Kramvig, B.	2018 (25 September) 27th Nordic Symposium on Tourism and	Invited keynote presentation	

appropriation and tourist activity		Hospitality Research - Tourism Implications and Dilemmas, Alta, Norway		
Reisen som en arena for læring	Kramvig, B.	2018 (October 3). Båter, tradisjon og innovasjon, University of Tromsø	Conference presentation	
Co-existences in Arctic waters: Recoding natural resources for future livelihoods	Kramvig, B.	2018 (October 29) REXSAC program wide conference, Alta	Conference presentation	
Samisk næringsutvikling, innovasjon og entreprenørskap – hvor går vi?	Kramvig, B.	2018 (8-9 November). Troms Fylkeskommunes Samekonferanse Tromsø	Conference presentation	
How to use indigenous research methods? Recognition of indigenous methodologies and/in writing	Kramvig, B., Guttorm, H.E., Kantonen, L.	2018 (November 20) Workshop with PhD students	Workshop	
The politics of injustice and the cosmopolitical of artistic intervention.	Kramvig, B. and Pettersen, M,	2018 (November 21). Track 15 Tid til bio/cirkulær økonomi	Conference presentation	
Recognition of multiple knowledges and practices in writing	Kramvig, B., Kantonen, L., Guttorm, H.E.	2018 (20-21 November) Re-searching Indigenous Methodologies and Engaging Communities, Inari, Finland	Conference presentation	

Permafrost thaw and socio-economic impacts in the Disco Bay region, West Greenland: Youth voices and local stakeholders in developing adaptation and mitigation strategies	Larsen, J.N.	2018. (December 10-14). American Geophysical Union, Fall Meeting, Washington D.C., USA	Invited conference presentation	
Young people in the Arctic: Current challenges and future Aspirations, an overview and highlights from Greenland and the Nordic countries	Larsen, J.N.	2018 (October 18-20) Arctic Circle conference, Reykjavik, Iceland	Conference presentation	
Presentation in Session 2 - Roundtable on the future outlook for the circumpolar region	Larsen, J.N.	2018 (October 17) The Northern Vantage Point: Arctic Changes – Current & Future Outlook, pre-event of the 2018 Arctic Circle Assembly. Akureyri, Iceland.	Invited conference presentation	
Community-based research in West and South Greenland: Global change impacts, community consultations, and early scoping results	Larsen, J.N.	2018 (Sept. 18-22) NSF Arctic-FROST Annual Network Meeting and Early Career Scholars Workshop. Juneau, Alaska, USA	Conference presentation	
Socio-economic impacts of permafrost thaw in the coastal	Larsen, J.N.	2018 (September 12-13) CIRC Autumn Research Symposium. Abisko Climate	Invited conference presentation	

region of West Greenland: Working with local stakeholders to develop adaptation and mitigation strategies		Research Centre. Abisko Scientific Research Station. Abisko, Sweden.		
Some practical and methodological issues in measuring and addressing socio-economic gaps and economic inequality in the Arctic: Experience from fieldwork in West and South Greenland	Larsen, J.N.	2018 (August 23-24) Constructing Justice: Environment, Society & Territory of the Arctic. Uppsala University, Uppsala.	Invited workshop presentation	
Shared experiences of supplementary feeding in reindeer husbandry – a collaborative approach across Fennoscandia	Lépy, É., Risvoll, C., Horstkotte, T., Eilertsen, S.V., Landauer, M., Sarkki, S., Heikkinen, H.I., Hovelsrud, G.	2018 (September 3-7) UArctic Congress, Oulu, Finland	Conference presentation	
Challenges and opportunities of supplementary feeding in reindeer husbandry. A joint workshop by three Nordic Centres of Excellence	Lépy, É., Horstkotte, T., Risvoll, C., Eilertsen, S. M., Heikkinen, H.I., (presented	2018. (April 4-5) ARKTIKO annual seminar, Lammi, Finland	Poster presentation	

	by Pykkänen, J.)			
Collaboration about climate and multiple pressures	Niila, I., and Rosqvist, G.N.	2018 (October 16). Fjellforum i foreningen Grensefjell i samarbeid. Trondheim, Norway.	Workshop presentation	
Navigating a new landscape amidst contested knowledges, politics, and futures	Nilsson A.E.	2018 (November). 4 th Post Normal Science Symposium, Barcelona, Spain	Invited keynote presentation	
Sustainable development and extractive industries: Contradiction or opportunity in times of rapid change?	Nilsson, A.E.	2018 (October). Arctic Circle 2018 session The Future of the Arctic Council: Form and function. Reykjavik, Iceland	Conference presentation	
Scalar politics at the intersection between global narratives and local needs	Nilsson, A.E.	2018 (October). Arctic Circle 2018 session Contentious years in Arctic politics: Lasting impacts of fleeting troubles. Reykjavik, Iceland	Conference presentation	
Science, politics and business: Mutual benefits or trio of tensions	Nilsson, A.E.	2018 (October). Arctic Circle 2018 session Developing Arctic standards, protocol, services & technologies.	Conference presentation	
Materially silenced: Bio-acoustic pollution and the re-wilding debate along an Arctic mountain transect	Norum, R.	2018 (November 14-18) Political Ecologies of Silence panel, 117th American Anthropological Association Annual Meeting – Change in	Conference presentation	

		the Anthropological Imagination: Resistance, Resilience, and Adaptation. San Jose.		
Squirrels gone wild: Bio-acoustic pollution and the idea of wilderness along an Arctic mountain transect	Norum, R.	2018 (September 18-21) The Association of Social Anthropologists of the UK and Commonwealth's 2018 conference – Sociality, matter, and the imagination: re-creating Anthropology, Oxford.	Conference presentation	
Post-normal science in a post-truthiness world: Epistemological violence in mining conflicts	Norum R.	(2018) June 19-22. Biennial Conference of the Political Ecology Network (POLLEN) – Political Ecology, the Green Economy, and Alternative Sustainabilities, Oslo, Norway.	Conference presentation	
Born to be wild: Participatory mapping in Swedish Lapland	Norum, R. and Carruthers-Jones, J.	2018 (June 12-15) European Conference of Conservation Biology – Planetary Wellbeing, Jyväskylä, Finland	Poster presentation	
Mapping the wild: Integrating cartography, ethnography and ecoacoustics in the Arctic	Norum, R. and Carruthers-Jones, J.	2018 (June 12-15) European Conference of Conservation Biology – Planetary Wellbeing, Jyväskylä, Finland	Conference presentation	
Silence and sensibility: An affective	Norum R. and Cooke, T.	2018 (March 15-16)X Ethnology Days, Sense and Sensibility	Conference presentation	

anthropology of absence?		– Ethnology of Affect, Pori University Center, Finland		
Dirty stories: Towards a narrativist anthropology of pollution	Norum, R. and Mostafanezhad, M.	2018. Association of Social Anthropologists of the UK and Commonwealth's 2018 conference, Oxford	Conference panel	
The workings of green economies on the ground – impacts for social and environmental justice panel	Norum, R. and Fischer, K.	2018. POLLEN Political Ecology Network Conference, Oslo, Norway	Conference panel	
Mines in transculturation	Nurmi, R., Lépy, É., Herva, V.P. (presented by Pylkkänen, J.)	2018 (April 4-5), ARKTIKO annual seminar, Lammi, Finland	Poster presentation	
Kenttätyökuulumisi a Nunavutista Kanadasta	Pylkkänen, J.	2018 (October 5). Archeology and Cultural Anthropology, at the University of Oulu	Seminar series	
The emerging importance of the humanities and social sciences in polar research	Roberts, P.	2018 (June). POLAR 2018 SCAR-IASC Conference, Davos, Switzerland	Keynote lecture	
Renskötsel i ett förändrat klimat	Rosqvist, G.N., and Laevas Sami community (Inga, N.)	2018 (May 30). Svenska Samernas Riksförbund (SSR) Klimatseminarium, Östersund, Sweden	Invited presentation	

Samverkan mellan forskning och praktik: Klimatförändringar som exempel.	Rosqvist, G.N., Niila, I.	2018 (April 23). Naturvårdsverket, Slutkonferens Storslagen fjällmiljö, Stockholm, Sweden	Invited presentation	https://www.stor-slagnafjall.se/Moten/storslagen-fjallmiljo-2018/
Effects from climate warming, increasing weather variability and land use change on reindeer husbandry in Swedish Sápmi	Rosqvist, G.N.	2018 (November 21) Stockholm University Bolin Center Annual Meeting, stockholm, Sweden	Conference presentation	
Transforming destinations and sustainability: Tourism, governance and localities in change	Saarinen, J.	2018 (September 26-29) ATLAS Annual Conference 2018: Destination Dynamics, Copenhagen, Denmark	Invited keynote presentation	
Tourism for sustainable development? Communities in tourism-development nexus	Saarinen, J.	2017 (April) American Association of Geographers (AAG), Annual Meeting, New Orleans, USA	Conference presentation	
Tourism for sustainable (local) development? Critical geographies of tourism development in Finnish Lapland	Saarinen, J.	2018 (July) Global Congress of Economic Geography. Cologne, Germany	Conference presentation	
Destination communities, resilience and sustainability: Governing localities in change	Saarinen, J.	2018 (October) Nordic Tourism and Hospitality Research Symposium, Alta, Norway	Conference presentation	
The impact of major mining	Schott, S., Belayneh,	2018 (13 December) ArcticNet Annual	Conference presentation	

projects on Inuit employment and residency in the eastern Canadian subarctic	A., Boutet, J.S., and Rodon, T.	Scientific Meeting, Ottawa (ON), Canada		
The impact of major mining projects on Inuit business development, employment and migration in the Canadian subarctic	Schott, S., Belayneh, A., Rodon, T, and Boutet, J.S.	2018 (3 June) Canadian Economics Association Annual Conference, Montréal (QC) Delivered by first author.	Conference presentation	
Resilience and new directions for Arctic development	Sörlin, S.	2018 (10-11 September) The Arctic Resilience Forum, Rovaniemi, Finland	Invited keynote speaker	https://mes.events.fi/event/arctic-resilience2018/pages/programme
Current research on extractive industries and the sustainability in the Arctic	Sörlin, S. and Rodon, T.	2018 (3-7 September) UArctic Congress, Oulu and Helsinki, Finland	Session leaders	https://congress.uarctic.org/program/science-section/sessions/5-other/session-36087/
Greenlandic exceptionalisms	Thisted, K.	2018 (29-30 August) Northern Political Economy Symposium, Arctic Centre, University of Lapland, Rovaniemi.	Conference presentation	
“Walk the line”: Seasonality and border crossings at Arctic Circle landmarks, an ethnographic study of tourists’ practices – Case Rovaniemi	Varnajot, A.	2018 (September) 27 th Nordic Symposium on Tourism and Hospitality Research. Alta, Norway	Conference presentation	
“Tourists” practices at Arctic Circle	Varnajot, A.	2018 (September) UArctic Congress.	Conference presentation	

landmarks: An ethnographic approach – Case Rovaniemi		Oulu and Helsinki, Finland.		
“Walk the line”: Border-crossings and ethnography at the Arctic Circle, a study of tourists’ behaviors – Case Rovaniemi.	Varnajot, A.	2018 (June) 6 th International Polar Tourism Research Network conference and community tour. June 2018, Whitehorse and Dawson City, Yukon Territory, Canada.	Conference presentation	
MEDIA and OTHER OUTREACH				
Der er intet håb for Grønlands indlandsis	Bjørst, L.	2018 (December 12) interview i DR2 Dagen, TV, Lill Rastad Bjørst	TV Interview	
Partiet Siumut vinder det grønlandske valg	Bjørst, L.	2018 (April 25) interview P1 Radio, Ulrik Pram Gad & Lill Rastad Bjørst	Radio Interview	
Valg i Grønland	Bjørst, L.	2018 (April 24) DR2 Dagen TV, interview Lill Rastad Bjørst	TV Interview	
Grønland - stemmer om selvstændighed	Bjørst, L.	2018 (March 31) DR2 Deadline, TV, interview Lill Rastad Bjørst	TV Interview	
Feltarbejde i Grønland (I) + Analyse: Diskursanalyse og ANT (II)	Bjørst, L.	2018 (September). Teaching at Ph.D.-kursus i etnografisk metode og kvalitativ analyse i Arktis ved Ilisimatusarfik/ University of Greenland, Nuuk, Greenland	PhD. course	

‘Puhumatta paras?’ (‘Is silence best?’)	Cooke, T., and Norum, R.	2018 (May 4) Antroblogi	Blog post	https://antroblogi.fi/2018/05/puhumatta-paras(2018).
Kunst og kolonialitet	Danbolt, M., and Kramvig, B.	2018 (October 22). Litteraturhuset. Kunsthistorisk Forening og Kunst og Kultur; Oslo.	Kunstnerisk og museal presentasjon	
Dreamland	Kramvig, B.	2018 (November 25). Crosscuts – Stockholm Environmental Humanities Festival for Film and Text. Stockholm	Film screening	
Pågår det en kolonialisering av samer i Norge?	Kramvig, B.	2018 (June 11). HUMAN	Public debate	
Ikke la lyset over byen vår slukne!	Kramvig, B.	2018 (September 12) Bladet Nordlys. s. 3-	Online article	https://nordnorskdebatt.no/article/ikke-la-lyset-over-byen-var
Er fornorskingen virkelig et tilbakelegt kapittel? Regjeringen ofret den unge reindriftssamen. Er det gått prestisje i saken?	Kramvig, B., Ragnhild Freng, D., Boine, M., Øyen, V., Elin, M.	2018 (December 27) Aftenposten	Online article	https://www.aftenposten.no/meninger/debatt/i/ingen4x/Er-fornorskingen-virkelig-et-tilbakelegt-kapittel
Weaving heritage in a globalized world: A case study of Wayuu and Wounan Colombian indigenous craft	Kramvig, B.	2018 (February 7) IKOS PhD Midway- seminar, University of Oslo	PhD seminar	

Mining companies: Sami rights are not necessary	Lawrence, R.	2018 (June 15) (<i>Gruvbolagen: Rättigheter för samer behövs inte</i>) Svenska Dagbladet, (National Swedish Newspaper)	Newspaper interview	https://www.svd.se/norska-renagare-farmiljoner-av-staten/om/striden-om-sameland
Utfodring av ren - mer än att bara ge renarna mat	Lépy, É., Risvoll, C. and Horstkotte, T.	2018 (March 27) Sameradion & SVT Sápmi	Radio interview	http://sverigesradio.se/sida/artikel.aspx?programid=2327&artikel=6919644
Arctic session	Nilsson, A.E.	2018 (November 25) Panel member in Arctic session of The Crosscuts Stockholm Environmental Film Festival, Stockholm, Sweden	Panel member	
The Arctic Council: Indispensable international regime?	Nilsson, A.E.	2019 (February 6) Podcast interview Polar Geopolitics	Podcast interview	http://www.polargeopolitics.com/e/the-arctic-council-indispensable-international-regime/
Arctic Council's ambivalent engagement with climate change	Nilsson, A.E.	2018 (November 1) Podcast interview Polar Geopolitics	Podcast interview	http://www.polargeopolitics.com/e/arctic-councils-ambivalent-engagement-with-climate-change/
Arktis - medan isen smälter	Nilsson, A.E.	2019 (opening September) Member of advisory board for the exhibit Arktis - medan isen smälter at the Nordic Museum in Stockholm, Sweden	Advisory board member	

Why should we care about the Arctic?	Nilsson, A.E.	2018 (May 18) Invited blog post for World Policy Institute Arctic in Context.	Invited blog post	https://worldpolicy.org/2018/05/08/why-should-we-care-about-the-arctic/
Amidst social and environmental dynamic in Ilulissat	Nilsson A.E.	Blog post for REXSAC website	Blog post	https://www.rexsac.org/blog/amidst-social-environmental-dynamic-ilulissat/
Forskning i Abisko: Kan mänsklig kunskap påverka en kartas utseende?	Norum, R.	2018 (July 15) SVT Nyheter, by Marja Påve	Television program	https://www.svt.se/nyheter/lokalt/norbotten/forskning-i-abisko-kan-mansklig-kunskap-paverka-en-kartas-utseende .
‘Förödande’ – konflikten paralyserar regeringen	Österlin, C.	2018 (June 14) Interview for article published in SvD Näingsliv by Jonas Fröberg and Joel Dahlberg	Newspaper interview	https://www.svd.se/har-ar-kansliga-fragan-regeringen-vagrartai
Mining, social justice, culture and environmental risk in the Kivalliq region, Nunavut: Women’s approaches and perspectives to fairness	Pykkänen, J.	2018 (September 10) Research Proposal presentation to the Hamlet Council of Rankin Inlet, Nunavut, Canada. Hamlet council meeting,	Public presentation	
Kirjeitä kentältä: Arktinen tutkimus ja heittäytymisen taito.	Pykkänen, J.	2018 (July 6) AntroBlogi.	Blog post	https://antroblogi.fi/2018/06/arktinen-tutkimus/
Researcher profile	Pykkänen, J.	2019 (March) Women in the Arctic and Antarctic	online article	https://womeninthehearctic.ca/women-in-the-arctic-

				profiles/profiles-march-2019/jasmiini-pylkkanen/
Mining in Finland	Pykkänen, J.	2019 (January 28). Presentation and fieldwork update at the Rankin Inlet Hamlet Council meeting.	Public presentation	
Reindeer in Sweden usually migrate in November. But there is still no snow	Rosqvist, G.N.	2018 (December 5) NBC News by Linda Givetash	Interview	https://www.nbcnews.com/news/world/reindeer-sweden-usually-migrate-november-there-s-still-no-snow-n942096
Sweden's tallest peak shrinks in record heat	Rosqvist, G.N.	2018 (August 2) New York Times by Christina Anderson	Newspaper interview	https://www.nytimes.com/2018/08/02/world/europe/sweden-kebnekaise-heat-wave.html
Människorna och berget, om livet vid foten av Kebnekaise	Rosqvist, G.N.	2018 (June 6) Sveriges Radio	Radio interview	https://sverigesradio.se/sida/avsnitt/1086988?programid=2702
Kestävä matkailu, vastuu ja ympäristömuutos	Saarinen, J.	2018. Matkailuparlamentti, marraskuu 2018, Oulu.	Dissemination seminar	

15. APPENDIX II - Additional Relevant Funding

Researcher(s)	Project title	Funding Agency	Amount	Timeline
Successful applications				
Patrik Andersson	Travel grant	North2North	€1,500 (15,630 SEK)	2018
	Travel grant	Fonden Erik Hoffmeyers Rejselegat	50,000 DKK (69,818 SEK)	2018
Jean-Sébastien Boutet	Doctoral Fellowship	Social Sciences and Humanities Research Council of Canada (SSHRC)	\$60,000 CAD (418,233 SEK)	2018-2021
Sandra Fischer	Fieldwork and laboratory costs	Svenska Sällskapet för Antropologi och Geografi (SSAG)	50,000 SEK	February 2018
	Fieldwork and laboratory costs	Göran Gustafssons Stiftelse för natur och miljö i Lappland (GGS)	50,000 SEK	March 2018
Christian Fohringer	Travel grant	Seth M Kempe grant stipend fund	17,633 SEK	May 29, 2018
	Fund covering laboratory consumables	Helge Ax:son Johnsons Stiftelse	80,000 SEK	June 20, 2018
PI: Hannu Heikkinen (Élise Lépy and Roger Norum, co-investigators)	Where are the wild things: Research pilot study on human perceptions of wild Spaces and	Academy of Finland profiling funding	€57,082 (59,910,417 SEK)	September-December 2018

	species in dynamic Arctic landscapes			
PI: J. Gould (Hannu Heikkinen, co-investigator)	Mineral extraction and indigenous livelihoods	Vetenskapsrådet (NOS-HS Workshops 2017)	2018 (142,152 SEK) 2019 (266,662 SEK)	2018 and 2019
Jerker Jarsjö	Hydro-climatic change and Arctic mining impacts: Linking field observations with model interpretations (Hydro-AM)	INTERACT Transnational Access to the Khibiny Educational and Scientific Station (Russia)	30,000 SEK	January 2018
PI: Arn Keeling (with 3 co-investigators)	Comparing consultation, consent and negotiated agreements in Arctic extractive industries	MinErAL sub-project grant	\$136,065 CAD (848,447.89 SEK)	2017-19
PI: Thierry Rodon (Arn Keeling, co-investigator)	Knowledge network on mining encounters and indigenous sustainable livelihoods: Cross-perspectives from the Circumpolar North and Melanesia/Australia (MinErAL)	Social Sciences and Humanities Research Council (SSHRC) Partnership Grant	\$2,500,000 CAD (17,426,375 SEK)	2016–22
PI: David Blowes (Arn	Towards environmentally responsible	Natural Sciences and Engineering Research	\$6,000,000 (CDN)	2016–21

Keeling, co-investigator)	resource extraction network (NSERC-TERRE-NET)	Council (NSERC) Strategic Partnership Grant for Networks	(41,823,300 SEK)	
Mathias Danbolt, Britt Kramvig, Hanna Guttorm, and Christine Hætta	Okta: Kunst og friksjonsfylte fellesskap i Sápmi	Norsk kulturråd/Nordisk kulturfond		2019-2020
PI: Else Grete Broderstad (Rebecca Lawrence, Camilla Brattland, Vera Hausner, Cathy Howlett, Rasmus Kløcker Larsen,) co-applicants	Indigenous knowledge systems, planning and environmental decision making: The role of community-based impact assessments	The Norwegian Research Council	5,700,000 NOK (6,185,264 SEK)	2019-2022
Élise Lépy, Tim Horstkotte and Camilla Risvoll	Challenges and opportunities of supplementary feeding in reindeer husbandry, Kiruna, Sweden	Nordforsk	226,900 NOK (245,845 SEK)	November 13, 2017
PI: Tim Horskotte (Élise Lépy co-Applicant)	Writing seminar for workshop report	SLU Swedish University of Agricultural Sciences	43,300 SEK	2018
PI: Neil Haddaway (Annika Nilsson co-Applicant)	Mapping the impacts of Mining using Multiple Knowledges	Formas Open Call Grant	3,000,000 SEK	2017
Carl Österlin	Travel/workshop /conference grant	Göran Gustafssons Stiftelse för	13,000 SEK	2018

		natur och miljö i Lappland		
	Field work in northern/arctic Sweden	Swedish Society for Anthropology and Geography	56,000 SEK	2018
	Conference grant	Letterstedska föreningen	5,000 SEK	2018
Jasmiini Pykkänen	Travel Grant for research visit and fieldwork	University of Oulu Graduate School (Uniogs)	€ 3,460 (36,292 SEK)	
PI: Audun Rikartsen (Britt Kramvig co-Applicant)	WhaleFeast - Ecological, commercial and social challenges of the recent extreme winter arrivals of whales in Northern Norway	the Research Council of Norway (NFR)		2019-2022
Peder Roberts	Greening the Poles: Science, the environment, and the creation of the modern Arctic and Antarctic (project no. 716211)	ERC starting grant	€ 1,800,000 (18,779,672 SEK)	February 1, 2017- January 31, 2022
PI: SMHI (Gunhild Ninis Rosqvist co-Applicant)	BioDiv-Support: Scenario-based decision support for policy planning and adaptation to future changes in biodiversity and	ERA-Net Cofund Biodiversa + Belmont forum (EU)	300,000 SEK	2019

	ecosystem service			
Gunhild Ninis Rosqvist with Erik Kjellström	Multiple pressures from changes in climate and land use on Northern Landscapes	Bolin Center (SU) RA7	1,500,000 SEK	January 1, 2019
Outcome pending				
PI: Dag Avango (Ninis Rosqvist, Hannu Heikkinen, Grete Hovelsrud, Britt Kramvig, Rasmus Klöcker Larsen, Joan Nymand Larsen, Jenny Wik Karlsson, Göran Ericsson, Mark Nuttall, Geir Jørgensen, Saara Tervaniemi, Sirpa Aalto, Ellinor Guttorm Utsi, Thierry Rodon, Arn Keeling, co-applicants)	PATHWAYS to Arctic sustainability: Navigating cumulative impacts, climate change, and competing interests	Horizon 2020 (EU)	€ 6,000,000 (62,678,539 SEK)	submitted February 2019
Lill Rastad Bjørst and Frank Sejersen	Mining Greenland: Societal implications of imagined futures	Danmark's Frie Forskningsråd	1,219,057 DKK (1,710,533 SEK)	October 4, 2018
PI: K. Bischof (Lill Bjørst and Annika Nilsson, co-applicants)	FACE-IT: The future of Arctic coastal ecosystems – Identifying transitions in	Horizon 2020, EU	€ 6,000,000 (62,814,461 SEK)	submitted February 15, 2019

	fjord systems and adjacent coastal areas			
Britt Kramvig	Forskning med og for innovasjon i samisk reiseliv og kreative næringer	Regional kvalifiseringsstøtte samiske prosjekter Forprosjekt Čatnat	1,000,000 NOK (1,083,802 SEK)	
	Dialogues and ruptures: Generational experiences of media spaces and indigenous futures	NORFACE (EU, Horizon 2020)	9,000,000 NOK (9,751,751 SEK)	
Mathias Danbolt, Britt Kramvig, Hanna Guttorm, and Christina Hætta	Okta: Kunst og friksjonsfylte fellesskap i Sápmi	Norsk kulturråd/Nordisk kulturfond	1,200,000 NOK (1,300,487 SEK)	2019-2020
Joan Nymand Larsen (co-investigator)	JUST NORTH: Toward Just, Ethical and Sustainable Arctic Economies, Environments & Societies	Horizon 2020 (EU)		submitted February 15, 2019
Élise Lépy	Paths to empathy: Wayfaring together through contested spaces to promote human wellbeing and improve sustainable environmental relations (EMPATHS)	Academy of Finland	€ 498,794 (5,236,431.92 SEK)	2018

PI: V.P. Herva (Élise Lépy Co-Applicant)	Mining beyond the rational: Extractive industries, subterranean worlds and treasures in northernmost Europe in a deep-time perspective	Academy of Finland	€ 491,795 (5161356.07 SEK)	submitted September 2018
PI: Sarkki S. (Élise Lépy Co-Applicant)	Matching social innovations to their contexts for enhancing rural well-being in Europe and Canada (MATCH)	Trans-Atlantic Platform – “Social Innovation”	€ 971 178 (10,187,227.31 SEK)	applied February 2019
Unsuccessful applications				
PI: Dag Avango (Élise Lépy, Roger Norum, Hannu I. Heikkinen, Andrea Norgren co-applicants)	The Nordic online mining atlas and database (NOMAD)	FORMAS, Sweden	2,945,921 SEK	September 3, 2018
Lill Rastad Bjørst	Mining Greenland, research stay at Scott Polar Research Institute (SPRI) and field trip to Nunavut	Carlsberg Foundation	114,869 DKK	November 2019

16. APPENDIX III- Select Individual Progress Plans for 2019

Patrik Andersson

In 2019, I will continue work on my PhD project, titled “Chinese Arctic Mineral Interests: Investigating Institutional and Political Reach”. The project studies the various economic and political drivers behind Chinese investments in the Arctic mining sector.

I am now in the second year of my PhD program at Aalborg University and the Geological Survey of Denmark and Greenland (GEUS). In 2019, I will work on developing the overarching methodology and theory for my article-based thesis. I also aim to produce a draft of the third article.

Dag Avango

The research on post-extraction transitions in RT 6 and 7 in 2019 will focus on three themes: 1) environmental remediation, 2) re-purposing and re-economization, and 3) heritagization. The research will involve data collection (interviews and survey-documentation) at former mining areas in Labrador and Quebec in Canada, in southern Greenland and in Norrbotten in Sweden. This research will be analyzed and prepared for publication in three different journal articles and in a book. In addition, researchers in task 6 & 7 will publish a cornerstone article entitled ‘Extraction legacies as heritage’ (Authors: Dag Avango, Hannu Heikkinen, Arn Keeling, Carl-Gösta Ojala [+ potentially Inge Seiding & Ulf Gustafsson]).

Lill Rastad Bjørst

Fieldwork in Canada (May 2019) and Greenland (August 2019)

Publication: one article to Arctic Yearbook + cornerstone article to special issue (RT 1+5) + develop book-project with Frank Sejersen

Sandra Fischer and Jerker Jarsjö

Submit first article on Nautanen and then continue working with field sample results and manuscripts for the following papers on contaminant transport processes at the Swedish and Russian case study areas.

Chris Fohringer

Passing half-time seminar (performed 19-02-15).

Submit and publish paper I.

Submit paper III and IV.

Draft paper II.

Extend research network and collaboration beyond home department.

Rotation/Research visit abroad (1 semester).

Coursework:

Arctic mining communities in change: field-based PhD course and research workshop: 7.5 ECTS (REXSAC PhD course; Quebec and Labrador, Canada planned; 19-05-27 – 19-06-03)

Teaching in higher education (step two): 3 ECTS (SLU, Uppsala, 19-09-26 -19-11-19)

Conferences:

Species on the Move 2019 (Skukuza, South Africa, 19-07-22 – 19-07-26; oral presentation)
Arctic Ungulate Conference 2019 (Jokkmokk, Sweden, 19-08-12 – 19-08-16; oral presentation)

Workshops:

“Integrating animal migration and population ecology across the annual cycle” (Center for Macroecology, Evolution and Climate, University of Copenhagen, 19-04-04 – 19-04-05)

Teaching:

“Sustainable use of natural resources”, SLU Summer Course (Vindelälven, Sweden, 19-07-17 – 19-07-18)

Planned outreach activities:

Extending collaboration with reindeer herders.

Presentation of REXSAC and first manuscript results at Vaartoe-Centre for Sami research (Umeå University)

Presentation of REXSAC and my thesis progress as well as meetings and lab visits with the Caribou Ungava research group at Université Laval (Département de biologie, Québec City, Canada, 19-06-05 – 10-06-06). [MinerAI is involved in their research; <https://www.caribou-ungava.ulaval.ca/en/accueil/>]

Foreseen challenges:

Organize rotation (semester abroad).

Allocate sufficient funds to enable research visits or work-related travel.

First paper submissions and presentation of first research outputs to international audiences independently.

Gain trust among the reindeer herding community and raise awareness of our project.

Joan Nymand Larsen

Continuation of research to develop a set of sustainability indicators, taking ASI (2010, 2014) as a point of departure, with the Arctic coastal region as a case study.

Continuation of work to engage local voices in scenario-building exercises.

Preparation of journal articles and book chapters, including one cornerstone article.

Participation in fieldwork in South Greenland in August 2019

Rebecca Lawrence

Continued fieldwork at Ranger Uranium Mine. New fieldwork in NSW regarding land-use planning and Aboriginal land.

Have received funding via FORMAS to co-ordinate a delegation of 4 Swedish Scholars (including Ninis Roskvist and Rasmus Larsen from REXSAC) along with 8 Sami scholars and community representatives (including Anna-Maria Fjällström, PhD student from REXSAC) to attend the International Association of Impact Assessments conference Brisbane, Australia, May 2019 and participate in a special panel on impact assessments and Indigenous rights. After the conference the delegation will have a 3 day workshop on Stradbroke Island to meet with the

Indigenous Quondamooka people and discuss their experiences of the closure of the Stradbroke sand mine and their transition to a post-mining economy with tourism as a main enterprise.

Articles in progress:

Lawrence, R. “Rehabilitating Ranger Uranium Mine: Scientific Uncertainty, Deep Time and the Regulatory Abyss”.

Raitio, C., Allard, C., & Lawrence, R. “The Absent State: The Swedish Mining Industry and Sami rights in Sweden”.

Élise Lépy

-Pre-examination and public defence of PhD Students Teresa Komu and Alix Varnajot.

-Co-organising of REXSAC PhD course “Mining, communities, and sustainable development” in October 2019.

-Participation in three REXSAC flagship articles, including:

Pashkevich, A., Herva, V.-P. and Jørgensen, D. in prep., Beyond extraction – tourism in post-industrial mining communities (working title)

-Also: Herva, V.-P, Varnajot, A., Pashkevich, A. in prep., Bad Santa: tourism as an extractive industry in northern Finland (working title)

Annika Nilsson

Continued focus on engaging local voices in the co-constructing of scenarios as a tool to analyze potential Arctic futures and designing sustainable development indicators. Specific activities:

- focus group interview in southern Greenland, August 2019

- scenario workshop in northern Sweden, November 2019.

- analyze how global SDGs relate to other ways of assessing the impacts and consequences of Arctic change and could contribute to improved environmental and social impact assessment

- analyses and writing for the REXSAC flagship article “An extensive hole in the ground: Assessing impacts of mining across scales” and contributing to a flagship article on sustainability

- Contribution to article (led by JNL) about using scenarios for identifying indicators (partly based on 2018 workshop in Ilulissat).

Carl Österlin

- Funded application from BBCC for a joint project with SMHI, developing high-resolution climate predictions for Arctic Sweden and translating together with Sami communities how future climatic conditions will change land use needs. Additionally, pressure from current and future land use change will be analyzed to provide improved decision making in land use planning.

Peder Roberts

Progress on history of mining in Greenland, most effort devoted to broader histories of science and environment in the Arctic — monograph with Lize-Marié van der Watt on the Arctic Institute of North America and changing ideas of northern development expected to be finished early 2020. This work will touch on Greenlandic mining.

Gunhild Ninis Rosqvist

-Publish two papers co-written with Sami colleagues, one on weather and climate impact (submitted) and one on the combined effect of climate change and cumulative impacts.

-Attend International Association of Impact Assessments conference Brisbane, Australia, May 2019 to present two papers:

Session: Integrating Indigenous rights and knowledges into impact assessment

Title: Using Sami knowledge to improve impact assessments

Presenter: Niila Inga

Co-authors: Rosqvist, G.N., Eriksson, P.

Session: The cumulative dimensions of resource regions

Title: Multiple pressures on reindeer husbandry in Sápmi

Presenter: Gunhild Ninis Rosqvist

Co-authors: Niila Inga, Carl Österlin, Christian Fohringer