



Arctic Division

2018 Arctic Science Meeting

Saskatoon, Saskatchewan

Sponsored by the School of Environment and Sustainability and Sustainable Futures North
www.usask.ca/SENS and www.sustainablefuturesnorth.org

Conference Chair and Division President: Philip A. Loring, University of Guelph
Executive Secretary, Arctic Division: Lawrence K. Duffy, University of Alaska Fairbanks



UNIVERSITY OF SASKATCHEWAN
School of Environment
and Sustainability
USASK.CA/SENS



Sustainable Futures North

Arctic Science Meeting: Schedule at a Glance

9 October 2018

Courtyard Room, Saskatoon Inn

8-8:30	Registration & Breakfast
8:30-8:45	Opening Remarks Philip Loring, President, AAAS Arctic Division Larry Duffy, Executive Secretary, AAAS Arctic Division
8:45-9:30	Plenary 1: Dr. Brett Favaro, Memorial University of Newfoundland
9:45-10:45	Community Futures 1
<i>10:45-11:00</i>	<i>Break</i>
11:00-12:00	Community Futures 2
12:00-1:00	Lunch
12:15-1:00	Lunch Plenary: Dr. Doug Clark, Centennial Chair in Human Dimensions of Environment and Sustainability
1:15-2:45	Arctic Health
<i>2:45-3:00</i>	<i>Break</i>
3:00-3:45	Plenary 3: Dr. David Natcher, University of Saskatchewan
4:00-5:40	Arctic Science & Education
5:40	Closing Remarks
6:00-8:00	Reception with Canadian Rural Revitalization Foundation Members

Plenaries

Plenary 1: Decarbonize everything: How Arctic leadership can topple climate change

Dr. Brett Favaro, Memorial University of Newfoundland

The ultimate solution to climate change is decarbonization, or the decoupling of energy consumption from greenhouse gas emissions. To achieve this, a mass buildout of renewable energy is necessary, as is the electrification of all technologies that currently consume fossil fuels. Canada is well-positioned to make the transition to an electrified economy because we have a large built capacity of renewable and carbon-free energy. But access to electricity is not equal across the country, and for 250 communities not connected to the broader energy grid, the only generation technology available has been diesel. This expensive and highly-polluting power source has many social and economic issues, but only recently has technology advanced to the point where clean energy could feasibly replace it. In this talk I will describe the concept of a renewable energy microgrid, and discuss the role these systems could play in decarbonization – not just of small communities, but ultimately, our electricity systems more broadly. And I will outline why microgrids in Arctic climates – while being technologically and financially challenging, at least at first – would not only benefit local communities, but would ultimately demonstrate a reproducible model for change that would accelerate decarbonization across the country and beyond.



Bio

Dr. Brett Favaro is the academic director of the Fisheries Science graduate programs at the Fisheries and Marine Institute of Memorial University. Dr. Favaro's team won the grand prize at the CanInfra Challenge, a national competition to solicit ideas for transformational infrastructure in Canada. Their pitch, entitled IceGrid, was to build renewable energy generation backed by utility-scale batteries in Canada's communities that depend on diesel generation for their electricity. Information on the pitch is available at www.icegrid.ca. As a researcher at the Marine Institute, Dr. Favaro's research focuses on designing and implementing sustainable fishing technology to reduce commercial fishing's impact on the world's oceans. Dr. Favaro received his Ph.D in biology from Simon Fraser University in 2013, and was a 2013 Liber Ero conservation fellow at the University of Victoria. He is the author of *The Carbon Code: How You Can Become a Climate Change Hero*, published by Johns Hopkins University Press.

Lunch Plenary: Rethinking northern prosperity and resilience in an era of accelerating change

Dr. Douglas A. Clark, University of Saskatchewan



The future of the north may not be what was once imagined. Much has changed since the era of the cold war, northern megaprojects, and relocated northern communities. Some changes have clearly benefited northerners, such as the movement towards Indigenous self-determination through land claims, but other changes, such as a warming Arctic climate, leave most observers unsettled. Moreover, the legacy from previous economic expansions in the north is a harmful one including aging infrastructure, widespread toxic sites, and economic instability in boom-bust cycles that leave northern communities with no-win choices between employment or their environment. Churchill, Manitoba offers a stark example of such cumulative, complex, and accelerating vulnerability. Their food and energy security, along with economic and social well-being, have been acutely impacted by the 2017 washout of the Hudson Bay Railway (built on discontinuous permafrost) and the subsequent, ongoing public-private sector battles over who's responsible for fixing it. This takes place in the context of a community that's long been disempowered in decisions about the social-ecological system they inhabit. Notably, the 1975 diversion of the Churchill River means that the community now faces insecurity across the entire food-water-energy nexus, and until the railway washed out Alberta politicians were agitating to purchase the Port of Churchill for an oil-by-rail export terminal. These challenges for the north will likely proliferate and grow more acute. Governance matters profoundly for the resilience of northern social-ecological systems, and northerners are world-leaders in governance innovation. However, the pace of biophysical change in the north now exceeds that of governance development, leaving an ingenuity gap that must urgently be solved. This gap means –among other things – that despite a proliferation of expert assessments of changes in the Arctic we've been surprised with alarming regularity, and most such surprises are not positive ones for northerners or their environment. For example the Arctic Resilience Assessment completely missed a trend now obvious with just two years' hindsight: the rise of populism & illiberal democracies among nation-states. If a wealthy liberal democracy like contemporary Canada can fail a community like Churchill, prospects for the north under populist regimes and growing economic inequality should be cause for serious concern.

Bio

Douglas Clark holds the Centennial Chair in Human Dimensions, and is adjunct faculty at Queen's University and Yukon College. He has 25 years of northern research and environmental management experience, with 1/3 of that time spent living in Arctic and Sub-Arctic communities. His interdisciplinary research program seeks to integrate environmental conservation with human dignity, and he specializes in training northern and Indigenous graduate students. He is the world-leading scientific authority on polar bear-human conflicts and most recently co-authored multiple chapters of the Arctic Council's Arctic Resilience Assessment.

Plenary 3: Leveling the Playing Field: Advancing the Social and Economic Prosperity of Aboriginal Communities in Canada

Dr. David Natcher, University of Saskatchewan

Having a sustainable, self-reliant economy is considered to be among the most important factors for improving the socio-economic circumstances of Aboriginal communities in Canada. Despite general agreement that economic development is the remedy for many of the social ills confronting Aboriginal communities, the development of local economies has been challenging to achieve. Drawing on his current research in Saskatchewan and Arctic Canada, Dr. Natcher will discuss some of the current challenges faced by Aboriginal communities to develop sustainable local economics and will offer potential pathways that may help to advance social and economic prosperity.

Bio

Trained as a cultural anthropologist, my research interests rest largely in environmental and economic anthropology. I hold graduate degrees from the University of Alaska Fairbanks (M.A. 1996) and the University of Alberta (1999) and have held faculty appointments at the University of Alaska Anchorage (Anthropology) and Memorial University of Newfoundland (Anthropology). While at Memorial University, I also held a Tier II Canada Research Chair in Aboriginal Studies. I am currently a Professor in the Department of Bioresource Policy, Business and Economics at the University of Saskatchewan where I also serve as a Senior Research Chair with the Global Institute for Food Security.



Contributed Presentation Schedule – AAAS Arctic, 9 October 2018

Community Futures 1 – 09:45-10:45

09:45-10:05

Drifting Knowledge

Authors:

George D. Harris

Iuliana Morar

Abstract:

Today's Arctic settlements are under an increasing development pressure as both Inuit and non-Inuit population is steadily growing. While in more southern regions the natural processes are perceived to happen in the background of our lives, in the Arctic these processes are an integral part and cannot be ignored. Over thousands of years of inhabiting the north, the Inuit have learned to adapt their way of life and incorporate them into their living, building a wealth of arctic-living knowledge. Initially modelled after southern principles of urban planning, current planning policies in Nunavut shifted recently to incorporate local social priorities and environmental knowledge of wind, snow, and re-vegetation, however, upon implementation, conflicting interests between policies call for hard design decisions. The research of Drifting Knowledge narrates the challenges encountered by a large-scale master-planning process in Iqaluit, Nunavut where the work revealed tensions in the planning policies between natural processes, social and economic realities. Through the analysis of a real-life project, this presentation explores the need for a holistic, site-specific, integrated planning process in the arctic that incorporates traditional Inuit knowledge along with scientific evidence and reflects the social logic of the people.

Keywords:

Social science,

Corresponding Author Information

George D. Harris

University of Calgary

1974 Cottonwood Cr. SE

Calgary, AB T2B 1P7

Canada

george.harris@ucalgary.ca

403369006

Community Futures

10:05-10:25 Self-Determination, Sustainability, and Wellbeing in an Alaska Native Community

Authors:

Heather Sauyaq Jean Gordon

Abstract:

Alaska Natives are a diverse group of people with different language groups and over 200 tribes. They have a history of colonization and are still a colonized people, but through all this, they still strive for wellness for their people. This project works with an Alaska Native community to explore how tribal members and nontribal members utilize self-determination, either individually and/or as a group, to achieve individual and/or tribal/community sustainability and wellbeing. This project uses the method of ethnographic futures research to conduct interviews about the future. The interviewee talks about their optimistic, pessimistic, and most likely futures, ultimately explaining how to get to the most optimistic future. Focus groups and a community meeting were conducted, following the interviews, to talk about the ideas identified in the interview optimistic scenarios and how to achieve those ideas. These results demonstrate to the tribe what tribal and nontribal members think the tribe can do to improve sustainability and wellbeing, and how to achieve those goals. The data speaks to other peoples, both Indigenous and non-Indigenous, demonstrating how utilizing futures research can engage community members in self-determining acts through planning, and potentially making changes, for an optimistic future.

Keywords:

Social science

Corresponding Author Information

Heather Sauyaq Jean Gordon
University of Alaska Fairbanks
163 Community Dr

Fall River, WI 53932
United States

gordon.heather.j@gmail.com
9072991029

Community Futures

10:25-10:45: Staying in place during times of stress: Case studies from Norton Sound, Alaska

Authors:

Glenna Gannon

Abstract:

In the Arctic, climate and the environment are undeniably changing. What this means is that the people who reside in Northern places are being forced to change and adapt to new conditions. In Norton Sound, as in much of rural Alaska, some of the demographic changes that might be anticipated- such as out migration- are not the case, and communities are in fact growing. This research is an investigation into two community case studies from Norton Sound, Alaska that seeks to better describe and understand what factors are driving and enabling people to stay, and what these changes mean for communities. Furthermore, this research helps identify policy opportunities that would enable communities to adapt to current and future environmental changes in ways that make sense regionally and culturally.

Keywords:

Social science

Corresponding Author Information

Glenna Gannon
University of Saskatchewan
319 McCormack Rd

Saskatoon, SK S7M 4T1
CAmada

glenna.gannon@usask.ca
907-322-3779

Community Futures 2 – 11:00-12:00

11:00-11:20 Defining the Role of Social Sanctuary in Arctic Community Development

Authors:

Vonique Romaine Mason-Edwards

Abstract:

Abstract Since post World War II the international community has adopted a strategy of global development as a means of preventing and alleviating human suffering. The Gross Domestic Product (GDP) method designed in the 1930's as a means of measuring the size of a country's economy, persisted until the 1990's when the Human Development Index (HDI) was introduced as a supplemental and in some instances, alternative means of measuring a country's development under the United Nations Development Programme. In the postmodern era, countries continue to be measured by their ability to provide socio-economically stable communities for their citizens. As northern countries pursue their international and domestic development mandates, it is increasingly important for policy makers at all governmental levels to be able to accurately measure how well they are providing for their citizens, and to determine with increasing accuracy which bundle of policies, programs and systems will be most useful to rural northern community development and rehabilitation. Developing a valid and reliable index for conducting multidimensional analyses of available data/statistics as a means of predicting with certainty the needs of Arctic communities and consequently improving the nation's capacity for crafting and implementing an effective development policy matrix for rural northern communities is invaluable. There is an undeniably complex dimension to this challenge, as a significant percentage of the population of the North is Inuit, and methods of measuring development must encapsulate indigenous cultural perspectives.

Keywords:

Social science,

Corresponding Author Information

Vonique Mason-Edwards
University of Saskatchewan
408-105 Cumberland Avenue South

Saskatoon, SK S7N 1L7
Canada

vonique.mason.edwards@gmail.com
2049011870

Community Futures 2

11:20-11:40: Entrepreneurship in Canada's North: Big Ideas for Small Towns:

Authors:

Prescott C. Ensign

Abstract:

If challenging conditions produce economic opportunities (necessity leads to invention), then cold, inhospitable places should produce some 'hot' ideas. For a number of years, scholars and policy makers have been searching for some generalizable truths, some universal advice to help young and old, male and female, Aboriginal and non-Aboriginal, poor and non-poor, etc. to participate in the market economy, make a productive contribution, and generate wealth. Small, isolated towns in Canada, can produce vibrant enterprises. But many ideas and inspirations are squelched by the same surrounding conditions. Is it the person or place that matters? Nature, nurture, and serendipity all might play a role in entrepreneurs launching and growing a business. If universal rules/theories from elsewhere often do not fit, what have we learned and what can we say and do? From successes (and failures) in commerce can we draw inferences and build for the future? In this presentation I will explore a constellation of anecdotal evidence of what is happening on the ground in Northern Canada and with audience help, perhaps draw some conclusions.

Keywords:

Social science, economic and community development

Corresponding Author Information

Prescott C. Ensign
Wilfrid Laurier University
Lazaridis School of Business & Economics
75 University Avenue West
Waterloo, ON N2T2K2
Canada

ensign@wlu.ca
2267486199

Community Futures 2

11:40-12:00: Developing an Arctic Urban Sustainability Index

Authors:

Robert Orttung, George Washington University

Abstract:

This presentation will summarize the efforts to develop an Arctic Urban Sustainability Index. The Index includes five categories (economic, environmental, social, governance, and planning) and targets approximately 50 Arctic cities with populations of 12,000 or over. The idea is to determine what works and what does not so that best practices can be transferred among cities. So far, the project has developed a set of 20 core indicators and is seeking feedback from Arctic stakeholders to better understand what is most important to them. The central hypothesis for the project is that citizen participation in all aspects of sustainability is crucial to success. While the level of participation varies from cities in Russia to those in Scandinavia, there are opportunities for citizen engagement in all contexts. We are working to figure out the best methods for identifying and measuring the most effective forms of participation.

Keywords:

Social science

Corresponding Author Information

Robert Orttung
George Washington University
1957 E Street NW Suite 412

Washington, DC 20052
United States

rorttung@gmail.com
7039894

Arctic Health – 1:15-2:45

1:45-2:05: Remote health systems and climate change in the North: A framework for conceptualizing the impact of climate change

Authors:

Paddy Enright, PhD Student - Department of Geography and Environmental Management, University of Waterloo

Abstract:

Remote communities, such as many of those found in North America's north, often face increased challenges in both maintaining and accessing health systems relative to communities in other regions. Despite the dedication of health professionals and decision-makers, issues related to remoteness and resource constraints (including financial, human and technological resources) often hamper the capacity of remote health systems to provide care. Climate change threatens to exacerbate these challenges by threatening the programs, people and facilities that comprise remote health systems. This paper reviews the anticipated impacts of climate change on remote health systems in the North and utilizes the findings of this review to present a framework to aide in conceptualizing how climate change may impact remote health systems. As complex adaptive systems, the boundaries of remote health systems are dynamic and may be influenced by environmental changes. The proposed framework incorporates considerations on how local characteristics (e.g. remoteness, regional climate fluctuations, etc..) influence both the structure and functionality of health systems. In the context of health policy this paper provides further support for locally developed adaptations aimed at enhancing the resilience of remote health systems.

Keywords:

Social science, Health science, Climate science

Corresponding Author Information

Paddy Enright
University of Waterloo
200 University Avenue West
Waterloo, ON N2L 3G1
Canada

pmenright@uwaterloo.ca
(613) 570-4004

Arctic Health

2:05-2:25: Sustainability, health and acceptance of water and sanitation systems in rural Alaska

Authors:

Kaitlin Mattos, University of Colorado

John Warren, Alaska Native Tribal Health Consortium

Jacqueline Schaeffer, Alaska Native Tribal Health Consortium

Korie Hickel, Alaska Native Tribal Health Consortium

Mia Heavener, Alaska Native Tribal Health Consortium

Abstract:

The Portable Alternative Sanitation System (PASS) is an innovative water system being evaluated for use in rural Alaska communities without piped water or sewer. The PASS treats self-hauled water onsite and makes use of a waterless urinal and urine-diverting dry toilet and ventilation system. PASS units are expected to improve health in the home by increasing the quality and quantity of water available in the home and decreasing the interactions that households have with waste (greywater, urine and feces). Further, PASS are revolutionary in rural communities because they are relatively inexpensive, non-permanent and mostly portable infrastructure that provide health benefits in the short-term without compromising investment in larger water and sanitation infrastructure. Although PASS provide a promising technical solution to rural water and sanitation issues, there is a growing acknowledgement that sound infrastructure is not sufficient for providing a long-term solution to water and sanitation service. This study examines sociocultural factors, economic support and operation and maintenance criteria that promote household acceptance and long-term sustainability of PASS units installed in five villages in rural Alaska. This analysis will be used to advise engineering and education/behavior change initiatives and inform management of a larger project PASS project in 2019.

Keywords:

Health science, Engineering, WASH

Corresponding Author Information

Kaitlin Mattos

Alaska Native Tribal Health Consortium, University of Colorado

4500 Diplomacy Drive

Anchorage, Alaska 99508

USA

kaitlin.mattos@colorado.edu

9077293724

Arctic Health

2:25-2:45: Telehealth Implementation in Northern Communities

Authors:

Heather Exner-Pirot, University of Saskatchewan

Abstract:

Introduction: Northern and Indigenous communities face well documented barriers to accessing health care service. Telehealth-the means of delivering health information and health care through the use of telecommunications technologies, promises to address some of these barriers. There is significant evidence confirming that telehealth provides consistently high quality care at a lower cost. Research demonstrates that telehealth outcomes and patient satisfaction rates are generally found to be equivalent or higher than in-person services. However, introducing new systems like telehealth in large and complex health service bureaucracies presents challenges. Methods: A one day Forum was held to discuss the opportunities and challenges to telehealth implementation in northern and Indigenous communities of Saskatchewan, Canada. Participants included Provincial and Federal Governments, health disciplines, First Nation Councils and Band leaders, administrators and public representatives Results: Telehealth use in most northern and Indigenous communities in Canada remains in an early adoption phase. The technology exists; but the processes and uptake are evolving slowly. Seven core recommendations resulted from the discussions. Issues such as network reliability in northern communities, confusion around payment for services and a redistribution of provision of health services at the point of care in an efforts to keep clients in their home community using telehealth. This presentation will describe a strategic approach to moving forward with a telehealth strategy inclusive of northern, Indigenous communities. Conclusions: For telehealth to be successful and sustainable, it will need to become part of “normal” operations. Post-secondary health sciences programs can be instrumental in normalizing telehealth.

Keywords:

Social science,Health science

Corresponding Author Information

Heather Exner-Pirot
University of Saskatchewan College of Nursing
104 Clinic Place

Saskatoon, SK S7N 5B4
Canada

heather.exner@usask.ca
306 966-5770

Arctic Science and Education – 4:20-5:20

4:00-4:20: Hidden Voices and Unheard Participants: Representation in Local and Traditional Knowledge Research

Authors:

Maaya Hitomi

Philip Loring

Abstract:

Local, lay, and traditional ecological knowledge (LTK) is widely discussed in academic research on climatic and environmental change. Here, we report on a systematic literature review that examines the role of such factors as gender, age, and scholarly networks in shaping LTK research. We focus on research in the circumpolar North, where LTK research has been active for at least four decades. We explore how recruitment approaches and research methods can circumscribe local expertise and find that much of the literature fails to adequately report sampling and participant demographics. There is an apparent bias towards male knowledge-holders, usually hunters and Elders, over women and youth. Studies are largely led by male authors, and male authors outnumber female authors 2:1. We also identify two ‘invisible colleges’ in the literature—communities of practice linked by one or a few authors. We discuss our findings through the lens of ‘intersectionality’, which captures how power differences at play within communities, whether around age or gender or some other social categorization, contribute to the creation of multiple kinds of knowledge. We conclude with a discussion of how we can improve this area of research by challenging assumptions and collaborating with a wider range of individuals.

Keywords:

Climate change, Gender, Youth, Local and traditional knowledge

Corresponding Author Information

Philip A. Loring

University of Guelph

Department of Geography, Environment, and Geomatics

Phil.loring@uoguelph.ca

@ConserveChange

Arctic Science and Education

4:20-4:40: New Horizons for IASSA: The State and the Future of Arctic Social Sciences

Authors:

Andrey N Petrov

Abstract:

This presentation by the President of the International Arctic Social Sciences Association will offer an overview of the Arctic Horizons report that outlines major milestones, trends and priorities in Arctic social sciences research. The report resulted from a series of workshops with primarily US researchers devoted to identifying strengths, weaknesses, emerging science questions and funding priorities for social sciences in the Arctic. These findings are placed in the broader international context from the positions of the International Arctic Social Sciences Association (IASSA).

Keywords:

Social science

Corresponding Author Information

Andrey N Petrov
International Arctic Social Sciences Association
348 ITTC UNI
University of Northern Iowa
Cedar Falls, Iowa 50614
United States

andrey.petrov@uni.edu
3192736245

Arctic Science & Education

4:40-5:00: Scientists in Residency Fellowships

Authors:

Lisa Busch
Victoria O'Connell
Jan Straley
Mary Lou Madden

Abstract:

The Polar Scientists in Residency Fellowship (SIRF) removes the obstacles that make it difficult for scientists to relay their research to students and citizens in rural Alaska. The National Science Foundation-funded SIRF at the Sitka Sound Science Center has improved science communication for scientists working in rural Alaskan communities and increased scientific literacy among rural community members. By providing facilitated outlets for community engagement, and one on one science communication training, SIRF is assisting Arctic scientists in relaying their research findings. A four week mini sabbatical for scientists allows researchers to work on a variety of areas including developing new research ideas, analyzing data, getting a paper ready for publication while learning to navigate in a small town. The Fellowship assists researchers in connecting with community members, leaders, and students in a way that is geographically, and culturally appropriate. It provides citizens time to get to know researchers and to learn about current Arctic research and scientific ideas. The outcomes of this fellowship are: an increase in state standardized test scores in Sitka, better communication from scientists and an expansion of career paths for rural students.

Keywords:

Education

Corresponding Author Information

Lisa Busch
Director
834 Lincoln Street
Sitka Sound Science Center
Sitka, AK 99835
United States

lbusch@sitkascience.org
9077478878

Arctic Science & Education

5:00-5:20: Rethinking Science and Environmental Education: An Indigenous Perspective

Authors:

Ranjan Datta

Abstract:

A challenge facing many Indigenous schools, especially those that serve culturally- diverse populations is the disconnection between schools and students' home communities. A key to environmental education is Indigenous knowledge-oriented science education. Despite their obvious significance, Indigenous knowledge-focused environmental education approaches remain relatively neglected in science education. The purposes of this paper are to help to address this gap based on a community-based science and environmental education program offered in the Dene First Nation community in Saskatchewan, Canada. Through this example, this Indigenous knowledge-oriented approach seeks a partnership between students' experiences of learning science in the community and school by synthesising critical and place-based learning. An Indigenous knowledge-oriented land-based learning of science and environmental challenges all educators to reflect on the relationship between the kind of education they pursue and the kind of places we inhabit and leave behind for future generations.

Keywords:

Social science, Education, Environmental science

Corresponding Author Information

Ranjan Datta
University of Saskatchewan
907-105 Cumberland Ave S

Saskatoon, Saskatchewan S7N 1L7
Canada

ranjan.datta@usask.ca
3062416798

Arctic Science & Education

5:20-5:40: Combining Chemistry With Knowledge of the Local Environment to Teach STEM Concepts

Authors:

Larry Duffy

Abstract:

Climate change and development are two challenges that impact Arctic communities. Resilience is the ability to positively respond to stress, and increasing community knowledge improves its resilience. Understanding of biogeochemical cycles with a place-based and cultural context is one approach to using the informal education of a summer STEM camp to illustrate the various forms of the elements. Teaching the carbon cycle as a core concept in a 2-week summer STEM program for High School students was used to examine the effects of climate change on the local landscape. Elders attended some sessions and shared their observations of the changing climate. Pre- and Post-assessments measured student's learning gains. Student's understanding of science concepts was enhanced and they were able to articulate the potential changes on their local environment caused by increased atmospheric and ocean warming.

Keywords:

Chemistry, Climate Change, Education

Corresponding Author Information

Lawrence Duffy
Department of Chemistry and Biochemistry
University of Alaska Fairbanks

lkduffy@alaska.edu