Research school on cross-disciplinary science in the Arctic and collaboration with local communities

Time and place: 2 – 7 December 2018 at UNIS, Longyearbyen, Svalbard

The research school is organised by the Nansen Environmental and Remote Sensing Center under the project **Useful Arctic Knowledge: partnership for research and education (UAK)** funded by the INTPART programme 2018-2020. INTPART (International partnerships for excellent education, research and innovation) is funded by the Research Council of Norway and the Norwegian Centre for International Cooperation in Education. The project, which includes partners from Norway, USA and Canada, brings together leading researchers, educators and young scientists working on Arctic science topics described below. These include natural and human-made hazards, ocean acoustics, community-based monitoring and cross-disciplinary data management. The research school is also a contribution to the education and training activities in the H2020 project INTAROS – Integrated Arctic Observation System (http://intaros.eu, and http://intaros.nersc.no).

Topics for the research school include:

 (1) Studies of natural and human-made hazards with focus on earthquakes, slope failures and fuel-spills. The studies include physical processes and causes behind the hazards, how they may be influenced by climatic changes, how they can be monitored and how risks can be minimized and impact mitigated.

(2) Status and change of the ocean acoustic environment, which is affected by increased shipping, tourism and exploitation of resources in the Arctic regions, will be investigated. UAK will support workshop and training course on the impacts of acoustic pollution of the environment in the different regions, which is important for developing mitigation plans for protection of marine life.

(3) Cross-disciplinary data management and building knowledge from the increasing amount of data in the Arctic, especially from satellites, is important. The research school and follow-up workshops will provide training of scientists and data managers in development and use of integrated observing systems.

(4) Community based monitoring evolves as an important contribution to an integrated Arctic Observing System, with focus on collaboration and communication between academic research and local communities.

The research school consists of lectures, group work and exercises with data and analysis tools.
The participants will work on small projects or tasks connected to the topics. They will also work on these tasks after the research school. Results of this work will be presented at follow-up workshop(s) in 2019).

Lecturers

Stein Sandven, Hanne Sagen, Torill Hamre, Lisbeth Iversen from Nansen Environmental and Remote Sensing Center (NERSC): Stein is the leader of the UAK proposal and the coordinator of the INTAROS project. The NERSC team provides expertise in Arctic research, ocean acoustics, data integration and management, and in communication between research and local communities.

Mathilde Sørensen, University of Bergen. Department of Earth Science (UIB-GEO). Mathilde has a leading role and provides education in earthquake seismology, seismic hazard, tsunami hazard and seismo-tectonics.

Øystein Godøy, Norwegian Meteorological Institute (MET Norway). Øystein is engaged in several Arctic data management activities. Among these are WMO Global Cryosphere Watch, WMO Year of Polar Prediction and Svalbard Integrated Arctic Earth Observing System.

Kjell Eivind Frøysa, Western Norway University of Applied Sciences (HVL). Kjell Eivind has expertise and provides education in underwater and subsea instrumentation as well as ocean acoustics at HVL.

Søren Rysgaard and Odile Crabeck, University of Manitoba (UM). Søren and Ogile have expertise in cross-disciplinary Arctic research and will contribute to education in community-based observing, human and natural hazards, and data integration.

Maribeth Murray, Arctic Institute of North America, University of Calgary (AINA/UC). Maribeth has broad expertise in Arctic research and education. She will contribute to education in natural and human hazards, ocean acoustics and community-based observing.

Peter Pulsifer, National Snow and Ice Center, University of Colorado, Boulder (UCB). Peter will contribute with expertise and education in data management and integration as well as in community-based observing. Peter has a key role in coordination with SAON and other international initiatives within the establishment of an integrated Arctic Observing System.

Ann Christin Auestad, University Centre in Svalbard (UNIS). Ann Christin will give a presentation of the newly established Arctic Safety Centre at UNIS. The centre offers a Master programme in Arctic Safety, practical safety courses for industry, academia, residents of Longyearbyen, as well as new knowledge, theory and models (https://www.unis.no/resources/arctic-safety-centre/).

Børge Damsgård, UNIS. Børge is professor in marine biology, Vice Dean of Research and the departmental leader of the UNIS Arctic Biology department. Børge will give a presentation of a project on "citizen science" in Svalbard which he is leading.

Application to participate in the research school:

Students and young and early career scientists working in one of these topics are invited to submit application to participate in the research school. Successful applicants will have their travel and subsistence costs covered by the project. The criteria for applications are:
- Scientific background related to one of the topics (1) to (4)
- Current position: PhD, postdoc, data manager, or similar
- Background in data processing, data management and experience with some data analysis tools
- Plan for a small project/task to be conducted by the applicant during and after the research school. The task should be connected to topics (1) to (4) and be relevant for the applicant's current work (PhD, postdoc, scientific data processing)

Application deadline is 01 October. Reply to the applicants by 15 October.

Daily programme

Sunday 02 December

Around 1500: Arrival in Longyearbyen and check-in at the Guest House
1700 – ca. 1900:
Introduction to Svalbard and UNIS, by Harald Ellingsen, director of UNIS
Introduction to the research school, by S. Sandven, coordinator of INTAROS and UAK projects

Monday 03 December, 0900 - 1700: Topic – Natural hazards in the Arctic

1. Long Lecture: General overview of natural hazards in the Arctic; more detailed information on techniques, approaches and subject area of focus, by Mathilde Sørensen, UiB.

2. Lecture: Data collection, bringing data into a management systems, use of data, data limitations, etc. (the data life cycle), by Peter Pulsifer, University of Colorado and Torill Hamre, NERSC.

3. Lecture: Presentation of Arctic Safety Centre, by Ann Christin Auestad, UNIS.

4. Practical exercise: learn how to collect and read data from seismometers; in advance acquire data for analysis (See Action Items); groups of students can work on different events and compare.

5. Excursion to areas where there have been landslides, avalanches, etc. (contingent upon weather, etc.)

Tuesday 04 December, 0900 - 1700: Topic – Anthropogenically-caused hazards in the Arctic

1. Lecture: Marine Hazards – a general overview and then a focus on certain marine accidents, such as ship accidents in ice, by Stein Sandven, NERSC, and Søren Rysgaard/Odile Crabeck, University of Manitoba.

2. Short Lecture: Using data for operational purposes, how is it collected, brought into a data management system, used, what are the limitations, by Peter Pulsifer, University of Colorado, and Øystein Godøy, Met.no

3. Practical Exercise: Identify what kind of data is needed to understand marine accidents (satellite, etc.), perhaps a scenario building exercise where students identify risk situations or examine a well-documented incident or incidents – deconstruction of specific accidents; mapping of high risk areas

Wednesday 05 December, 0900 - 1700: Topic – The Ocean Acoustic environment

1. Sound in the Ocean - general issues, how are acoustics used by marine life and people, acoustics as an observing tool, by Hanne Sagen, NERSC and Maribeth Murray, University of Calgary

2. Practical Exercise: hand on use of instrumentation - excursion to pool, use of hydrophone, collect data, download, listen and look at it, then work with existing data from an array somewhere – sources of data? Use of sound library to help identify sounds, species, by Kjell Eivind Frøysa, HVL, and Espen Storheim, NERSC

3. Data component – what are we going to do with the data – how do you bring in into the system, manage, use, limitations, analyse etc. (data life cycle), by Torill Hamre

Thursday 06 December: Topic – Multi-directional communication

1. Lecture - Working with and knowledge exchange among types of experts and representatives from the Longyearbyen community, by Lisbeth Iversen, NERSC

2. Lecture - Communication and knowledge transfer to end users of information – types of communication media, cautionary use of certain media types, dealing with sensitive topics, by Maribeth Murray, University of Calgary

3. Practical Exercise: (from Day 1 students should have been thinking/working on this): students will develop different kind of communications – video, briefs, different types of media, verbal, video recaps, social media to convey information about the project

4. Evening lecture – public lecture (and some hands-on activity for the audience ?)

Friday 07 December: 0900-1200: Wrap-up of the research school

1. Discussion about activities for future workshops and internships.

2. Discussion of potential tools people might use in the future.

3. Report on assignments if needed.

4. Wrap-up discussion about the use of multi-disciplinary approaches and diverse data sets; perspectives on using unfamiliar data.

5. Evaluation.

1300: Departure to airport (for the SAS flight, ca 2 hours earlier for the Norwegian flight)

Logistics

Accommodation will be in the UNIS Guest House and in the student apartments.

Flights to and from Longyearbyen:

From Oslo to Longyearbyen				
Date	Airline	Departure from Oslo	Arrival in Longyearbyen	
Friday 30 Nov	Norwegian	0845	1145	Non-stop
Friday 30 Nov	SAS	1115	1410	Non-stop
Sunday 02 Dec	SAS	1000	1410	Via Tromsø
Monday 03 Dec	Norwegian	0950	1250	Non-stop
Monday 03 Dec	SAS	1125	1420	Non-stop

From Longyearbyen to Oslo				
Date	Airline	Departure from Longyearbyen	Arrival in Oslo	
Friday 07 Dec	Norwegian	1230	1530	Non-stop
Friday 07 Dec	SAS	1455	1750	Non-stop
Sunday 09 Dec	SAS	1455	1910	Via Tromsø
Monday 10 Dec	Norwegian	1335	1635	Non-stop
Monday 10 Dec	SAS	1505	1800	Non-stop

(SAS has also flights on Tuesday and Thursday. There are no flights on Wednesday and Saturday)

Participants should book their own tickets and will be reimbursed afterwards