Information for the Summer School:

Water Management in Cold regions
THT312 - 2019

Co-convenors: Petter D. Jenssen; Harsha Ratnaweera & Roland Kallenborn (Norwegian University of Life Sciences), Pernille Erland Jensen (The technical University of Denmark / https://www.uarctic.org/organization/thematic-networks/arctic-wash/). *In collaboration with the International Joint Research Centre for Arctic Ecosystem and Environment (IJRC-EAA) at the Harbin Institute of Technology (HIT) - Yifan Li, in China*

Motivation: Globally, circumpolar regions are seeing the most dramatic climate change related impacts, which particularly impact High North communities. Changes include retreat of sea- and land fast ice coverage, increased erosion at coast-lines, loss of permafrost damaging buildings and piped infrastructure as well as ecosystem changes. However, these changes will also make the region increasingly accessible for economic development, e.g., resource extraction and tourism. Thus, the local communities and municipalities in the circum-Arctic regions are facing tremendous challenges when it comes to adjustments in infrastructure and planning of new technological solutions on restricted budget frames. While often not critically evaluated for alternatives, drinking water and sanitation installations and sewage handling procedures are central to community level infrastructure development plans along with the ever-increasing demand on energy for industrial developments.

Today, drinking- and wastewater treatment systems in Arctic regions are under serious pressure. The wastewater treatment range from the application of mechanical treatment plants to passive treatment systems consisting of waste stabilization ponds (WSPs), natural or engineered wetlands, and composting or bucket toilets. In many of the poorer communities' human excreta/wastewater receives no treatment. Melting permafrost zones add increasing vulnerability to physical structures and community-based water services, which are compounding problems resulting from sociological changes in the High-North. Poor sanitary conditions often combined with inadequate water supply give rise to (enteric, skin and respiratory) health problems that compound with Arctic environmental health issues. Hence, rural water and sanitation is one of the identified health-related priorities also acknowledged by the Arctic Council (http://www.arcticcouncil.org/index.php/en/documents).

Discharge of wastewater into the vulnerable ecosystems in the Arctic may also require different technologies or system designs than those used in warmer climates. Currently, limited information exists about water handling facilities in the Arctic, resulting in considerable uncertainties about the performance and environmental sustainability of existing or potentially different future systems. Changing paradigms aspiring to closed-loop systems and economies also need to be considered for water and sanitation services, such as resource recovery for energy, nutrients and water – yet many institutional and governance barriers inhibit this change.

This summer school invites graduate level students and regulatory experts alike who intend to achieve relevant scientific and administrative knowledge for the sound development of suitable solutions for water treatment technologies under the harsh climate conditions of the Arctic.

Location: This years summer school is located in Gibostad on the Island **Senja south of Tromsø**. The course starts in Tromsø Friday June 28th where we will visit some of the treatment facilities before we travel by a coastal speed boat to Senja where we will conduct the rest of the course. The course terminates Friday July 5th where a bus will take you back to Tromsø. During the week there will be a one day excursion by bus to see treatment facilities and experience the beautiful nature of the inner part of Troms county. The course location is close to the sea and fishing and kayaking may be possible if time and weather permits.

About the course: The teachers come from Alaska, Canada, Denmark(Greenland), Russia, China and Norway. You will also meet students from these countries as well as a number of students coming from . The teaching will cosist of a combination of classroom lectures and teamwork solving relevant exercises and cases. At the end or the week you will ave a multiple choice exam that counts 50%. The remaining 50% of your grade will be based on a term paper that you have to submit by November 15. The course is exploring some new didactical methods and a digital database supporting the course is under development (https://sswm.info/perspective/arctic-water-sanitation-and-health-arctic-wash). This webpage will be further developed and include new material generated to support this years course.

Registration deadline: April 12.

Scholarships: A limited number of sholarships is available. The scholarship covers travel from Oslo to Tromsø as well as room and board while attending the course. To obtain a scholarship you have to write your motivation for the course (max ½ page). In addition the application must contain:

- Your full name as it appears in your passport

- Your private home adress
- Date of birth
- Sex M/F
- E-mail address
- Food preferences
- Student number (only Norwegian applicants)

Send the application by email to Petter Jenssen: petter.jenssen@nmbu.no with a copy to Harsha Ratnaweera: harsha.ratnaweera@nmbu.no, Espen Arestøl: espen.arestol@nmbu.no and Pernille Erland Jenssen: pej@byg.dtu.dk. by April 12th.

Self financed attendance: If you do not obtain a scholar ship it is possible to attend the course on a self finance basis. The cost for self finance is 5600 NOK for room and board. The flight Oslo/Tromsø and return costs 1788 NOK if our group booking is not filled up. If you are self financed you should still write a motivation letter because we have an upper limit for attendance.

Planned flights: 28th June 08:55 Oslo to Tromsø and 5th July 11:20 from Tromsø to Oslo;
Accomdation: shared full board at Gibostad https://www.embracelife.no/

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