

# The Nordic Master in Cold Climate Engineering

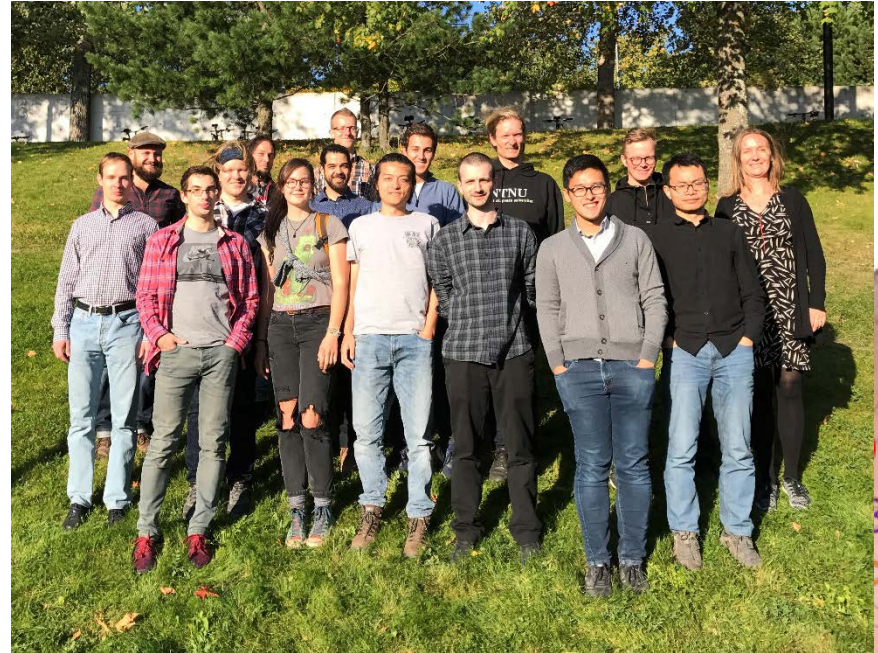
**Gunvor M. Kirkelund**

Head of Studies &

Programme coordinator

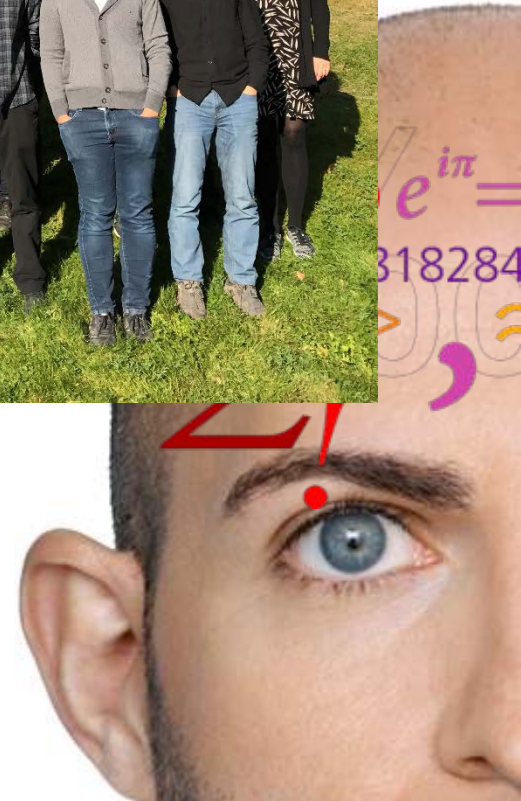
Department of Civil Engineering

Technical University of Denmark



## Cold Climate Engineering

<http://www.coldclimate-master.org/>



*The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.*

## N5T alliance

- The Nordic Five Tech (N5T) is a strategic alliance between the five strongest technical universities in the Nordic region.
  - Technical University of Denmark (DTU), Lyngby, Denmark
  - Aalto University, Helsinki, Finland
  - Norwegian University of Science and Technology (NTNU), Trondheim, Norway
  - Chalmers University of Technology, Gothenburg, Sweden
  - KTH Royal Institute of Technology, Stockholm, Sweden
- 5 joint master programs – Cold Climate Engineering start 2016
- 13 joint projects: Arctic Collaboration
- <http://www.nordicfivetech.org/>

# N5T double degree master programs

- Two year program at two different universities, 60 ECTS at each
- Course transfer to the other university
- Candidates receive two diplomas from two universities
- Based on already existing courses
- Thesis supervision by two universities

# The Cold Climate Consortium

- DTU: Associate Professor Gunvor Marie Kirkelund (lead)
- NTNU: Professor Knut Høyland
- Aalto: Professor Jukka Tuhkuri, 2017-2018: Assistant professor Arttu Polojärvi



**Cold Climate  
Engineering**



# The N5T Cold Climate partners



Unis, Longyearbyen,  
Svalbard



DTU Campus, ARTEK-house,  
Sisimiut, Greenland





# Why a MSc in Cold Climate Engineering



No full MSc programmes within Arctic / Cold Climate



**Cold Climate  
Engineering**

# Responsibilities of the consortium

- Admission of students – annual admission days at N5T university
- Academic content of the programme and make revisions
- Be the contact person at each university
- Arrange common events for the students
- Programme coordinator is responsible to follow all students from admission to graduation
- Reporting to the N5T secretariat and N5T committee (deans & vice presidents)

# The Cold Climate Consortium

- Applied Nordic Council of Ministers for funding in 2013
- 1.1 million DKK granted in 2014, one of three successful applications out of 11
- Launch event 19th of May 2015 at DTU
- Currently 12 students in the programme, 5 students 2nd year and 7 students 1st year

Intake	No of eligible applications	Students admitted	Students commencing studies	No of graduates
2016	16	11	7	5 (summer 2018)
2017	20	12	7	-
2018	23	18	?	

- 2nd year students: 3 Land track, 1 Sea track, 1 Space track
- 1st year students: 3 Land track, 3 Sea track, 1 Space track

## Land track: DTU and NTNU

Semester	Arctic Geoengineering
1	DTU
2	DTU (Arctic Semester, Greenland)
3	NTNU (UNIS)
4	NTNU (UNIS)/thesis

Arctic  
studies  
on  
land

- Admission: Similar to BSc Civil Engineering
- Students are preferred to take the 3rd semester at UNIS
- MSc Civil Engineering (DTU)
- MSc Cold Climate Engineering (NTNU)



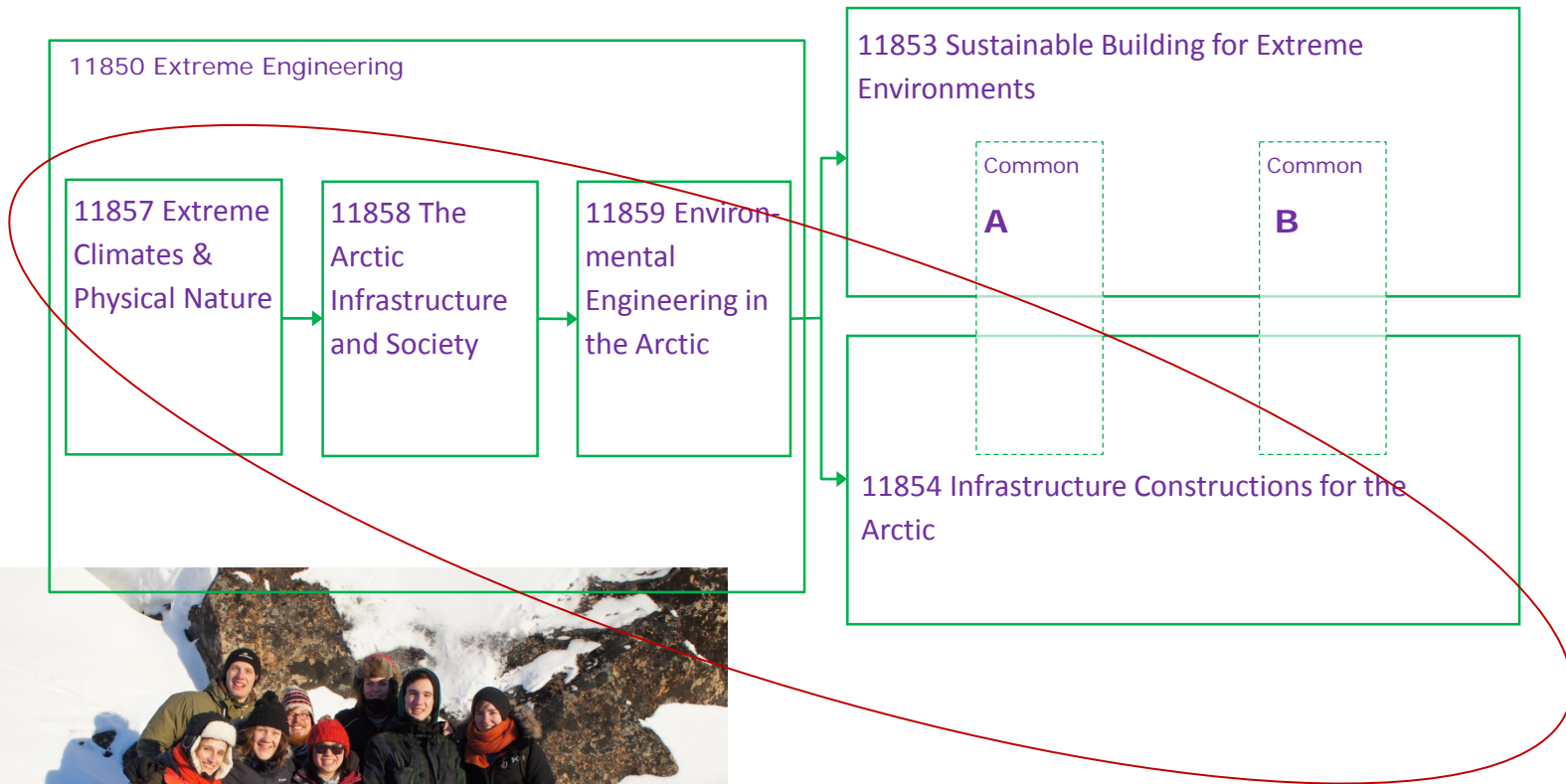
# First semester at DTU - Lynaby

	Monday	Tuesday	Wednesday	Thursday	Friday
	E1A	E3A	E5A	E2B	E4B
8-12		11374 Seismic and Wind Engineering	11563 Concrete Technology	11464 Advanced Soil Mechanics	
	E2A	E4A	E5B	E1B	E3B
13-17			11430 Advanced engineering geology		11374 Seismic and Wind Engineering

+ one elective course

- a) General Competence courses (at least 30 ECTS)
  - b) Technological specialization courses (at least 30 ECTS)
  - c) Elective courses

# The Arctic Semester, DTU campus Sisimiut



## Second year- NTNU

	Semester 3	Semester 4
UNIS option	<p>AT-301 Arctic Infrastructures in a Changing Climate (10 ECTS)</p> <p>AT-314 Advanced Rock Mechanics and Engineering Geology (10 ECTS)</p> <p><i>Plus 1 elective course from below:</i></p> <p>TBA4511 Geotechnical Engineering, Specialization Project (10 ECTS)</p> <p>TGA4500 Engineering Geology and Rock Mechanics, Specialization Project (10 ECTS)</p>	<p>TBA4900 - Geotechnical Engineering, Master's Thesis (30 ECTS)</p> <p><b>OR</b></p> <p>TGB4930 - Engineering Geology and Rock Mechanics, Master's Thesis (30 ECTS)</p>
NTNU option	<p>TBA4116 - Geotechnical Engineering, Advanced Course (7.5 ECTS)</p> <p>TBA4510 - Geotechnical Engineering, Specialization Project (7.5 ECTS)</p> <p>Elective course: Technical course to supplement the project work (7.5 ECTS)</p> <p>TBA5150 Geohazards and Risk Analysis ( 7.5 ECTS)</p>	<p>TBA4900 - Geotechnical Engineering, Master's Thesis (30 ECTS)</p> <p><b>OR</b></p> <p>TGB4930 - Engineering Geology and Rock Mechanics, Master's Thesis (30 ECTS)</p>

### MSc degrees:

- MSc in Civil Engineering (DTU)
- Master of Science in Cold Climate Engineering (NTNU)



**Cold Climate  
Engineering**

## Sea track: NTNU and Aalto

Semester	University 1	University 2
1	Aalto	NTNU
2	Aalto	NTNU (UNIS)
3	NTNU (UNIS)	Aalto
4	NTNU/thesis	Aalto/thesis

Arctic  
studies  
at  
sea



- Admission: Similar to BSc Marine Technology
- Aalto's main focus is on Arctic Ships
- NTNU's main focus is Arctic Offshore Structures
- MSc Cold Climate Engineering (NTNU)
- MSc (Technology) (Aalto)



Cold Climate  
Engineering

# Space track: DTU and Aalto

Semester	University 1	University 2
1	Aalto	DTU
2	Aalto	DTU
3	DTU	Aalto
4	DTU/thesis	Aalto/thesis

Arctic  
studies  
from  
space

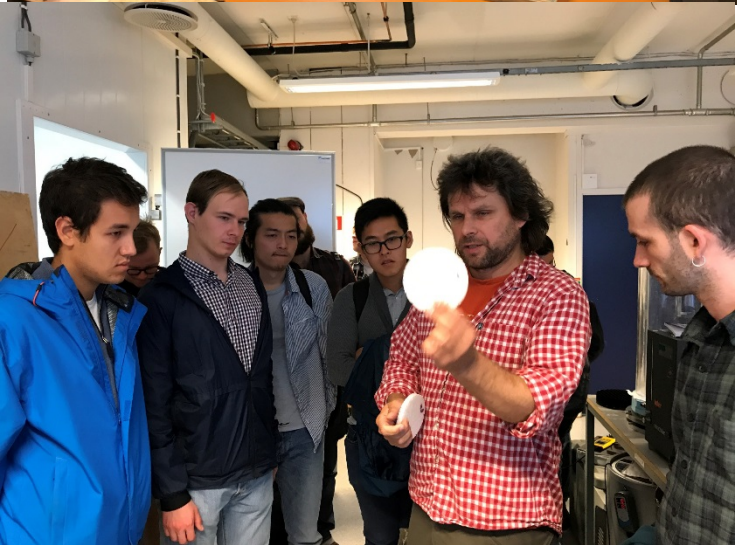


- Admission: Similar to BSc Electrical Engineering
- Two specialisations:
  - Mapping and Navigation
  - Earth Observation Techniques
- MSc (Technology) (Aalto)
- MSc in Earth and Space Physics and Engineering (DTU)

# Social weekend



- Presentations of research and by industry
- Lab visits
- Social events



- NTNU 2017
- Aalto 2018
- DTU 2019



# Graduates – career -recruitment

## “Leaving Your Comfort Zone is Valuable”

- Per Olav Moslet, Senior Principal Engineer, DNV GL A/S



## “Graduates with Arctic Experience are in Demand”

- Niels Strufe, Arctic Group Leader, Golder Associates Denmark



## “If you can work as an engineer in the Arctic you can engineer anywhere in the world”

- Ander Bjarklev, President DTU
- [https://www.youtube.com/watch?v=p\\_-afSGc0BA&t=63s](https://www.youtube.com/watch?v=p_-afSGc0BA&t=63s)



**Cold Climate  
Engineering**



Cold Climate  
Engineering

