

# NORDROCS 2018

Crossing borders

7<sup>th</sup> Joint Nordic Meeting on  
Remediation of Contaminated Sites



Program

September 3-6, 2018, Helsingør - a part of Greater Copenhagen, Denmark

**The Nordic countries hereby invite you to  
NORDROCS 2018,  
the 7<sup>th</sup> joint Nordic Meeting on Remediation of  
Contaminated Sites  
to be held in Helsingør,  
a part of greater Copenhagen, Denmark  
on September 3-6, 2018**

After six successful NORDROCS conferences in Malmö (2006), Helsinki (2008), Copenhagen (2010), Oslo (2012), Stockholm (2014) and Espoo (2016), we look forward to welcoming you in Denmark again.

**OBJECTIVE**

The objective of the NORDROCS conferences is to address issues on assessment and risk management of contaminated land and sediments in the context of Nordic conditions. The meeting intends to provide a forum for the exchange of information gathered through research and project experience. Target groups include scientists, regulators, consultants, contractors and other professionals working with contaminated sites and sediments in Nordic countries, countries in Northern Europe and around the Baltic Sea.



Photo: Thomas Rahbek

## KEYNOTE AND INVITED SPEAKERS

<b>Poul L. Bjerg</b>	Professor, DTU Environment, Technical University of Denmark
<b>Katrine Borgå</b>	Professor, Section for Aquatic Biology and Toxicology, University of Oslo
<b>Mette M. Broholm</b>	Associate Professor, DTU Environment, Technical University of Denmark
<b>John Frederick Devlin</b>	Professor, Geology Dept., University of Kansas, USA
<b>Upal Ghosh</b>	Professor, University of Maryland Baltimore County, USA
<b>Bodil Liedberg Jönsson</b>	Ph.D., Strategic Development Director, Oskarshamn Municipality
<b>Kristina Lindström</b>	Professor, University of Helsinki
<b>Paul Nathanail</b>	Professor, University of Nottingham, UK
<b>Martin Romantschuk</b>	Professor, University of Helsinki

Invited speakers from EPA in Sweden, Norway, Finland and Denmark.

## REVIEW COMMITTEE

<b>Paul S. Cappelen</b>	M.Sc., Norwegian Geotechnical Institute, Norway
<b>Mette Christophersen</b>	Head of Dept., Ph.D., Ramboll, Denmark
<b>Annika Fjordboege</b>	Ph.D., Researcher, DTU Environment, Denmark
<b>Patrick van Hees</b>	Associate Professor (Örebro Univ.) Eurofins Sweden
<b>Morten Jartun</b>	Ph.D., Norwegian Institute for Water Research, Norway
<b>Anne Krüger</b>	Environmental Scientist, City of Vesterås
<b>Marja Tuomela</b>	Ph.D., Co-op Bionautical and University of Helsinki
<b>Kim Yrjälä</b>	Associate Professor, University of Helsinki

## ORGANIZING COMMITTEE

<b>Arne Rokkjær</b>	M.Sc., The Capital Region of Denmark, Denmark/ATV Soil and Groundwater – chairman
<b>Paul S. Cappelen</b>	M.Sc, Norwegian Geotechnical Institute, Norway/ Miljøringen
<b>Peter Harms-Ringdal</b>	M.Sc., Environmental Consultant, EnviFix, Sweden/Renare Mark
<b>Jarno Laitinen</b>	M.Sc. (tech.), M.Sc.(econ), Project Manager, Pirkanmaa ELY-Centre, Finland/MUTKU

## ASSISTING ORGANIZING COMMITTEE

<b>Mette M. Broholm</b>	Associate Professor, DTU Environment (ATV Soil and Groundwater)
<b>Morten Jartun</b>	Ph.D., Norwegian Institute for Water Research (Miljøringen)
<b>Ulrika Larson</b>	Consultant, Empirikon (Renare Mark)
<b>Lisbeth Verner</b>	Head of Secretariat, ATV Soil and Groundwater

## **SOCIAL PROGRAM**

An informal get together in the evening on September 3 will be arranged. More information will follow on the conference webpage.

The conference dinner will take place in the evening on September 4. More information will follow on the conference webpage.

## **SHORT COURSES**

On September 3 short courses are available. Please see individual program on the conference webpage.

## **EXCURSION**

You are invited to join our excursions in the capital area on September 6. Please see individual program on the conference webpage.

## **REGISTRATION AND FEES**

The “Early Bird” conference fee is DKK 5.600 (~ € 750) if you register before May 15 2018.

After May 15, 2018 the fee will be DKK 6.300 (~ € 850).

## **SPONSORSHIPS AND/OR EXHIBITION**

Sponsorships are most welcome – min. DKK 10.000 (~ € 1.350). Sponsor logos will be presented on the web page, on the calls for abstracts, on the main screens during breaks and printed in the conference program/compendium.

For companies interested in presenting their activities at NORDROCS 2018 an exhibition area has been reserved. This area is also used for coffee breaks etc. and provides the exhibitors with an excellent opportunity to present their activities, products and/or other news to the delegates. An exhibition stand is available at DKK 6.000 (~ € 800) for two days and requires 1 registered and paying participant per stand.

Package deal, which include sponsorship, exhibition stand and participation fee (one person), will be available at DKK 19.000 (~ €2.550).

Please contact conference secretariat at Resia, [conference@resia.se](mailto:conference@resia.se), att. Ulrica Edström

*Alterations may occur*

# PROGRAM

## Monday, September 3

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- 11.00 – 16.00    **Short Course 1 – PFAS – meeting room B-24**
- Dynamic investigations with mobile lab at PFAS-impacted sites  
please see separate program in the compendium
- 13.00 – 16.00    **Short Course 2 – Geostatistics – meeting room B-21**
- An overview of Geostatistics for contaminated site characterization  
please see separate program in the compendium
- 18.00 – 18.30    Transportation to Welcome Reception by bus or walk
- 18.30              Welcome reception at Kulturværftet, Helsingør incl. a light serving and drinks  
Entertainment: Sct. Olai Vocal Ensemble

## Tuesday, September 4

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- 09.00 – 09.50    Registration and coffee/tea buffet
- 10.00 – 11.30    **Opening Session / Welcome  
Lecture hall Jorns**
- Ida Holm Olesen, Chairman, ATV Soil and Groundwater*  
*Arne Rokkjær, Coordinator of the NORDROCS 2018 Organizing Committee*

### **Key note presentation**

Risk assessment of contaminated sites to water resources:  
The role of the contaminant mass discharge approach?  
*Professor Poul L. Bjerg, DTU Environment, Denmark*

### **Key note presentation**

Sustainable remediation in practice  
*Professor Paul Nathanail, University of Nottingham, UK*

### 11.50 - 12.50    **Session A – lecture hall Øresund**

#### **EPA from the 4 Nordic countries Risk management - regulatory perspectives**

Risk assessment/risk management - leaning  
towards the more regulatory requirements with  
regard to Risk assessment and the regulatory  
challenges in risk - based decision making.

*Chair: Tom Heron, Senior Vice President,  
Environment, Energy, Water and Informatics,  
NIRAS Denmark*

*Senior Advisor Kine Martinsen, Norwegian  
Environment Agency  
Technical Advisor Preben Bruun, Danish EPA  
Senior Advisor Jussi Reinkainen, Finnish  
Environment Institute  
Senior Scientific Officer Magdalena Gleisner,  
Swedish EPA*

### **Session B – lecture hall Jorns**

#### **Remediation – of Soil and Groundwater Part I (B)**

*Chair: Marja Tuomela, Ph.D., Co-op Bionautical  
and University of Helsinki, Finland*

Environmental forensics. Searching for a major  
unknown PCE source in an industrial area using  
different tools, Birkerød, Denmark  
*M.Sc., Ph.D. Thomas Hauerberg Larsen,  
Orbicon, Denmark*

Development of an iron-based soil mixing  
remediation method for energyefficient  
treatment of chlorinated solvents  
*Ph.D. Per Lindh, Swedish Geotechnical Institut,  
Sweden*

Da Nang – an outstanding thermal remedy 5  
years later  
*Sales and Product Manager Niels Ploug,  
Krüger, Denmark*



12.50 – 13.40	Lunch, poster session and exhibition, matchmaking . Matchmaking arranged by <i>Danish Soil Partnership and Innovation Network for Environmental Technologies</i>	
13.40 – 14.10	Poster session, exhibition and matchmaking Matchmaking arranged by <i>Danish Soil Partnership and Innovation Network for Environmental Technologies</i>	
14.10 – 15.30	<p><b>Session C – lecture hall Øresund</b></p> <p><b>Sustainability and Reuse - Part I</b></p> <p><i>Chair: Jarno Laitinen, M.Sc., Project Manager, Pirkanmaa ELY-Centre, Finland</i></p> <p><b>Key note presentation:</b> A sustainability perspective on reuse and remediation <i>Professor Kristina Lindström, University of Helsinki, Finland</i></p> <p>Reuse of concrete and risk assessments related to the expansion of Oslo Airport Gardermoen <i>Project Manager Ida Kristine Buraas, Golder, Norway</i></p> <p>Efficient soil reuse – imperative for sustainable land management <i>Senior Advisor Jussi Reinikainen, Finnish Environment Institute, Finland</i></p>	<p><b>Session D – lecture hall Jorns</b></p> <p><b>Remediation – of Soil and Groundwater Part II</b></p> <p><i>Chair: Annika Sidelmann Fjordbøge, Researcher, Ph.D., DTU Environment, Denmark</i></p> <p><b>Key note presentation:</b> <i>In situ</i> bioremediation of contaminated soil; comparison and combination of different approaches <i>Professor Martin Romantschuk, University of Helsinki, Finland</i></p> <p>Multidisciplinary approach to characterize natural degradation of PCE <i>Ph.D.-student Sofia Aakesson, Lund University, Sweden</i></p> <p>Tools and concepts for quantifying in situ degradation rates at contaminated sites <i>Chief Consultant, Ph.D. Nina Tuxen, Capital Region of Denmark</i></p>
15.30 – 16.20	Poster session and exhibition, matchmaking, coffee/tea break Matchmaking arranged by <i>Danish Soil Partnership and Innovation Network for Environmental Technologies</i>	
16.20 - 17.40	<p><b>Session E – lecture hall Øresund</b></p> <p><b>Sustainability and Reuse - Part II</b></p> <p><i>Chair: Environmental expert Aura Nousiainen, Pöyry, Finland</i></p> <p>Sustainable remediation assessment: How to include the societal cost in the equation? <i>Managing Director Jan Haemers, Haemers Technologies, Belgium</i></p> <p>Strategic approach to climate protection and soil management to fulfill the Sustainable Development Goals (SDG 11, 12 and 13) <i>Joan Krogh, NIRAS, Denmark</i></p> <p>Remediation of PCB-polluted soil using biochar: the uptake of PCBs in earthworms, plants and passive samplers – a pot experiment <i>Sigurbjörg Hjartardóttir, NGI, Norway</i></p> <p>Sustainable and digital management in large infrastructure projects of acid producing rock and soil containing naturally high levels of heavy metals <i>M.Sc., Env.consultant Lars-André Erstad and Project Manager, Env.consultant Eva Aakre, Rambøll-Sweco ANS, Norway</i></p>	<p><b>Session F – lecture hall Jorns</b></p> <p><b>Risk Assessment of Soil and Groundwater</b></p> <p><i>Chair: Head of Dept., Ph.D. Mette Christophersen, Rambøll, Denmark</i></p> <p><b>Key note presentation:</b> Assessment of in-situ natural and enhanced chlorinated ethenes degradation by use of isotopic and molecular biology techniques <i>Associate professor Mette M. Broholm, DTU Environment, Technical University of Denmark</i></p> <p>Direct radiotracer rate measurements of groundwater contaminants in intact cores – method and first results on cis-DCE dechlorination <i>Senior Researcher, Ph.D. Rasmus Jakobsen, GEUS, Denmark</i></p> <p>Bacterial population dynamics in a groundwater plume from a heating oil spill quantified via 16 S rRNA gene amplicon sequencing <i>R&amp;D Project Manager Poul Larsen, DMR, Denmark</i></p>
19.00 – 19.30	Welcome drink and Polka Tesch – entertainment/music	
19.30 -	Conference dinner and dance. The Man – dance band	

8.30 – 09.50

## Session G – lecture hall Øresund

### Contaminated Sediments – Risk Assessment and Remediation - Part I

*Chair: M.Sc. Paul Cappelen, Geotechnical Institute, Norway*

**Key note presentation:** In-situ remediation of contaminated sediments: Combining strong sorption with microbial dechlorination *Professor Upal Ghosh, University of Maryland Baltimore County, USA*

The Norwegian Management System of Risk Assessment - Contaminated Sediments  
*M.Sc., Senior Adviser Hilde B. Keilen, Norwegian Environmental Agency, Norway*

Dispersal pathways of contaminants from organic-rich sediments – a field study of fibrous sediments in northern Sweden  
*Dr. Sarah Josefsson, SGU, Sweden*

## Session H – lecture hall Jorns

### Investigation and monitoring of Soil and Groundwater - Part I

*Chair: Associate Professor Mette Broholm, DTU Environment, Technical University of Denmark*

**Key note presentation:** How groundwater velocity measurements can strongly support aquifer characterisation studies  
*Professor John Frederick Devlin, University of Kansas, USA*

Multiple fluorescent dyes as a tool for understanding fate and transport for large scale plumes  
*Project Director Nicklas Larsson, NIRAS, Sweden*

Porewater sampling in the unsaturated zone – a novel technique for measuring seepage concentrations directly  
*R&D Project Manager Poul Larsen, DMR, Denmark*

9.50 – 10.20

Coffee/tea break

10.20 - 11.40

## Session I – lecture hall Øresund

### Contaminated Sediments – Risk Assessment and Remediation - Part II

*Chair: M.Sc., Environmental Consultant Peter Harms-Ringdahl, EnviFix, Sweden*

TREASURE: Novel and innovative methods used to characterize two of Sweden's contaminated fiberbank sediment sites  
*Professor Ian Snowball, Uppsala University, Sweden*

Remediation of Oskarshamn hamn: challenges and lessons learned from contractor point of view  
*Regional Manager Bart van Renterghem, Envisan, Belgium*

Quantification of microplastics in sediments from benthic and coastal environments  
*M.Sc. Heidi Knutsen, NGI, Norway*

Nontarget analysis of sediment samples from Copenhagen, Denmark  
*Ph.D.-student Josephine Lübeck, University of Copenhagen, Denmark*

## Session J – lecture hall Jorns

### Investigation and monitoring of Soil and Groundwater - Part II

*Chair: Associate Professor Patrick van Hees, Eurofins, Sweden*

High Resolution Site Characterization and 3D Geological Modelling – Tools for Interpretation of Plume Migration in a Complex Geology  
*M.Sc. Bo Tegner Bay, COWI, Denmark*

Development of an innovative methodology for monitoring of in situ remediation of chlorinated solvents – the MIRACHL-project  
*Ph.D. Haakan Rosqvist, Lund University and Tyréns, Sweden*

Use of geostatistical modelling in investigation of soil contamination - working toward a better definition of remedial mass and volume  
*R&D Manager, Ph.D. Per Loll, DMR, Denmark*

Do we as practitioners have a general challenge with leaking wells causing cross-contamination to deeper aquifers ? Swedish and Danish results and paths forward  
*Project Manager Maria Heisterberg Hansen, NIRAS, Denmark, and Environmental Consultant Filip Nilsson, NIRAS, Sweden*

11.40 - 12.40

Lunch, poster session and exhibition

12.40 – 13.10

Poster session and exhibition

13.10 – 14.30

## Session K – lecture hall Øresund

### Management

*Chair: Environmental Scientist Anna Kruger, City of Vestarås, Sweden*

**Key note presentation:** Strategic decisions, while planning and implementing the challenging remediation project in the heavily polluted harbor in Oskarshamn, Sweden – the municipal perspective

*Bodil Liedberg Jönsson, Strategic Development Manager, Municipality of Oskarshamn, Sweden*

Stakeholder engagement in strategic research agendas related to soil and land use management  
*Ph.D. Yvonne Ohlsson, Swedish Geotechnical Institute, Sweden*

The Finnish Clean Soil Program. A national state-funded program to investigate and remediate sustainably the significant risks to human health and the environment due to land contamination  
*M.Sc., Project Manager Jarno Laitinen, Centre for Economic Development-, Transport and the Environment, Finland*

14.30 – 15.10

Poster session and exhibition, coffee/tea break

15.10 – 16.30

## Session M – lecture hall Øresund

### Indoor Air

*Chair: R&D Manager Per Loll, DMR, Denmark*

A detection dog, man's best friend during indoor air investigations  
*Mette Algreen, Projectleader, Ph.D., Orbicon, Denmark*

Vapor Intrusion Gas Source Investigation by use of Stable Isotopes and Radiocarbon Dating  
*Environmental Engineer Katrine Moes Kristensen, NIRAS, Denmark*

Revisiting dry-cleaning sites -30 years of improving environmental investigations from the perspective of a public authority  
*Environmental Engineer, Ph.D. Sanne Skov Nielsen, Region of Southern Denmark*

Modelling of air flow in capillary break layers. A new approach to determine governing mechanisms in balanced ventilation systems preventing vapor intrusion of volatile pollutants  
*Project Manager Jakob Washington Skovsgaard, Ramboll, Denmark*

## Session L – lecture hall Jorns

### Surface Water - Interaction from Soil, Sediment and Groundwater

*Chair: Research Manager Marianne Olsen, Norwegian Institute for Water Research, Norway*

**Key note presentation:** Contaminant response in a multistress environment

*Professor Katrine Borgå, University of Oslo, Norway*

Bodø Airport – The story of PFAS' way from soil, through storm water to biota  
*Head of Section Marianne Kvinnås, NGI, Norway*

Using temperature to assess interaction between contaminated groundwater and surface water  
*Ph.D., Hydrogeologist Gro Lilbaek, NIRAS, Denmark*

## Session N – lecture hall Jorns

### PFAS

*Chair: Ph.D. Morten Jartun, Norwegian Institute for Water Research, Norway*

Immobilization of PFAS contaminated sandy soil from a Norwegian firefighting training facility  
*Director of Landfill and Contaminated Soil Hilmar T. Sævarsson, Lindum*

PFAS Handbook: What, how and where to look, what are the risks and can we be sure?  
*Senior Consultant Jacqueline Falkenberg, NIRAS, Denmark*

Mobility of PFAS: Do lysimeter results reflect concentrations monitored in a groundwater plume?  
*Regional Manager, M.Sc. Mikael Takala, Vahanen Environment Oy, Finland*

What is the total budget of PFAS in contaminated soil and how does total oxidizable precursor (TOP) assay help comprehend the picture?  
*Associate Professor Patrick van Hees, Eurofins, Sweden*



13.10 – 14.30

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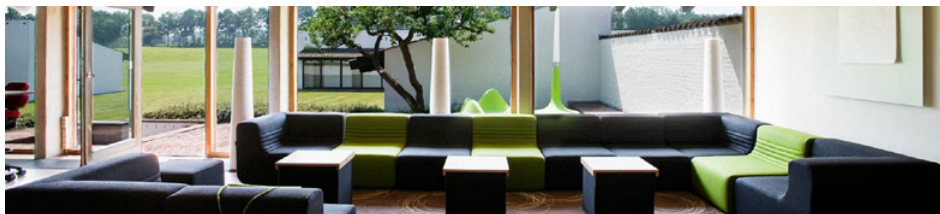
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NORDROCS 2018 is arranged by:

**ATV JORD OG GRUNDVAND**



Nätverket  
**Renare Mark**

See [www.nordrocs.org](http://www.nordrocs.org)

We look forward to exciting days in Helsingør