

# NORDROCS 2016

*10th anniversary*

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

Sponsors:



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Program  
Short Papers  
Abstracts

5-8 September, Aalto-University, Espoo, Finland



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Peter Harms-Ringdahl, M.Sc., Environmental Consultant, Orbicon AB

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Paul S. Cappelen, NGI

Johanna Jalonen, Ramboll Finland

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Håkan Rosqvist, Ph.D., Head of Department & Innovation manager, Department Geo-  
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Paul S. Cappelen, M.Sc., Section Head, Environmental Engineering department, Norwegian  
Geotechnical Institute (NGI), Norway

Morten Jartun, Ph.D., Norwegian Institute for Water Research (NIVA), Norway

Kim Yrjälä, Adjunct Professor, Department of Biosciences, University of Helsinki, board member  
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NORDROCS 2016 is arranged by:



[www.mutku.fi](http://www.mutku.fi)

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[info@mutku.fi](mailto:info@mutku.fi)

**ATV JORD OG GRUNDEVAND**

[www.atv-jord-grundvand.dk](http://www.atv-jord-grundvand.dk)

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[www.miljoringen.no](http://www.miljoringen.no)

VENUE: Aalto University, Espoo

## PROGRAM

# Monday, September 5, 2016

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**WORKSHOPS at Aalto University, Otakaari 1, Espoo**

**11.00 – 15.00 Workshop: Investigation and risk assessment of vapor intrusion, Room M233**

**12.00 – 12.30 Light lunch (Workshop: vapor intrusion)**

**10.00 – 16.00 Workshop: Geoprobe platform for investigations at contaminated sites, Room M205**

**11.30 – 12.30 Lunch (Workshop: Geoprobe platform)**

**18.00 – Bus from hotel Radisson Blu Espoo**

**19.00 – Welcome reception with buffet at Haltia Nature Center, hosted by the City of Espoo**

# Tuesday, September 6, 2016

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**09.00 – 09.45 Registration and coffee**

**09.45– 11.45 OPENING SESSION Lecture Hall A**

*9:45 Welcome from Aalto University: Retuperän WPK*

*Chair: Raakel Jaloniemi, Lassila & Tikanoja, chair of MUTKU, opening of the conference*

*10:00 Kimmo Tiilikainen, Minister of Agriculture and Environment*

*10:20 Riina Antikainen, Research coordinator, Finnish Environment Institute*

*10:40 Representatives of Nordic EPAs – Current national level actions to support circular economy or risk assessment as part of it - Jussi Reinikainen (Finnish Environment Institute), Magdalena Gleisner (Swedish EPA), Thomas Hartnik (Norwegian Environment Agency), Ole Küllerich (Danish EPA)*

*Jaana Sorvari, coordinator of NORDROCS 2016, Assoc. Prof., Aalto University – practical information*

**11.45 – 13.10 Lunch, exhibition, and poster session I (from 12.15, Hall B)**

*to be continued*

Program Tuesday, continued

**13.10 – 14.30 SESSION A Hall A**

**Circular Economy**

Chair: *Håkan Rosqvist, Innovation Manager, Tyréns, Sweden*

Keynote Speaker: Circular economy – "When others see an end, we see a beginning!" - *Pär Larshans, Chief sustainability officer, Ragn - Sells, Sweden*

Eco-innovative SMEs as facilitators in circular economy transitions towards sustainable mitigation of contaminated sites risks - *Jarno Laitinen, Pirkanmaa ELY-Center, Finland*

Implementing the concept of circular economy by long term land use planning in West-Harbour, Finland - *Kimmo Järvinen, Ramboll, Finland*

**SESSION B Hall B**

**PFAS**

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

The remediation of PFAS contaminated airport soils - *Paul Cappelen, Norwegian Geotechnical Institute, Norway*

From point sources to the Baltic Sea - fate of perfluoroalkyl acids in the aquatic environment with a focus on mass balance studies  
*Marko Filipovic, NIRAS, Sweden*

Lessons Learned and Challenges Encountered after Characterizing >100 Poly-and Perfluoroalkyl Substances Impacted Sites - *Dave Woodward, Aecom, USA*

Mapping of PFAS contamination beyond firefighting sites - *Katerina Tsitonaki, Orbicon, Denmark*

**14.30 – 15.10 Coffee break and Exhibition**

**15.10 – 16.40 SESSION C Hall A**

**Circular Economy - Sustainable Remediation**

Chair: *Jenny Norrman, Ass. Prof., Chalmers University of Technology, Sweden*

Keynote Speaker: Approaches for assessing sustainable remediation – *Gitte Lemming Søndergaard, Senior Researcher, DTU Environment, Technical University of Denmark (DTU), Denmark*

INSURE a cross border project in the central baltic region about sustainable remediation – *Jenny Hultgren and Magnus Kviele, County Administrative Board of Östergötland, Sweden*

Beneficial re-use of contaminated harbor sediments – massive Scale application in the port of Klaipeda, Lithuania – *Markus Wilke, Huesker Synthetic, Germany*

**SESSION D Hall B**

**Remediation Technologies - PART I**

Chair: *Kim Yrjälä, Adj.Prof, Department of Biosciences, University of Helsinki, Finland*

Thermal experiences in Denmark - *Thomas Larsen, Orbicon, Denmark*

Thermal remediation of 5-CAT, DCB, TCE and VC using a combination of steam and conductive heating adjacent to a commercial railroad track - *Niels Ploug, Krüger, Denmark*

Pilot study of electrokinetically delivered thermally activated persulfate in clayey till - *Lærke Nedergaard, Capital Region, Denmark*

Long-term evaluation of micro-scale ZVI and organic carbon reactivity in a permeable reactive barrier application - *Josephine Molin, PeroxyC, USA*

**18.30– 01.00 Dinner, Kalastajatorppa 19.30 (boat leaves 18.45 from the pier opposite hotel Radisson Blu Espoo, boarding time 18.30)**

**Shuttle bus transportation back to the hotel between 22.30-01.00**

# Wednesday, September 7, 2016

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## 08.30 – 10.00 SESSION E Hall A

### Methods for Site Studies PART I

Chair: *Mette Broholm, Assoc. Prof., DTU Environment, Technical University of Denmark, Denmark*

Keynote Speaker: For Better Site Assessments, and Fate Studies in the Environment: The Benefit of Multielement Compound-Specific Isotope Analysis - *Dr. Martin Elsner, PhD, Group Leader, Helmholtz Zentrum München, Institute of Groundwater Ecology, Germany*

Assessing sources and sinks of hexachlorocyclohexane (hch) isomers within a contaminated aquifer using compound-specific stable carbon isotope analysis (CSIA) - *Anko Fischer, Isodetect GmbH, Germany*

Soileffect: uptake and ahr-mediated effects of hydrophobic organic compounds into polyoxymethylene of different soil types - *Monika Lam, University of Örebro, Sweden*

Measurement techniques for detection of groundwater flows in bedrock and soil - *Jere Komulainen, Pöyry Finland Oy, Finland*

## SESSION F Hall B

### Remediation of Sediments

Chair: *Vesa Isokauppila, Project Manager, SITO, Finland*

Keynote Speaker: Hotspots that make us worry from Mercury and PCB, via PFAS, to Microplastics - How did we get here? - *Per Erik Schultze, Marine Biologist, Norges Naturvernforbund, James Cook University, University of Oslo, Norway*

Trondheim harbour remediation project - *Bart Van Renterghem, Envisan, Norway*

Carbon amendment technology for in-situ sediment remediation: the good and the dark side of the force - *Jarkko Akkanen, University of Eastern Finland, Finland*

Design considerations for long-term sediment cap performance - *Rebecca Gardner, Anchor QEA, Norway*

## 10.00 – 10.50 Coffee break and poster session II (from 10.10, Hall B)

### 10.50 – 11.50 SESSION G, Hall A

#### Military Areas

Chair: *Paul S. Cappelen, Head of Department, Norwegian Geotechnical Institute, Norway*

A project to improve environmental protection on heavy weapons ranges – *Terhi Svanström, Defence Command in Finland, Finland*

Mobility and transport of lead (Pb), copper (Cu) and antimony (Sb) in a peat land contaminated by shooting activities – *Gudny Okkenhaug, Norwegian Geotechnical Institute, Norway*

Immobilization of Pb and Sb in shooting range soil: column experiment with industrial waste iron-based sorbent – *Hilmar Sværsson, Lindum, Norway*

### SESSION H, Hall B

#### Indoor Air

Chair: *Mette Christophersen, Head of Department, Ramboll, Denmark*

Sewerage measurements in connection with intrusion pathways for contamination to indoor air - *Louise Clausen, NIRAS, Denmark*

New possibilities to assess risk of exposure in indoor climates - *Nicklas Larsson, NIRAS, Sweden*

CFD simulation of passive compartment ventilation to avoid vapor intrusion - *Tage V. Bote, COWI, Denmark*

### SESSION I, Hall C

#### State of the Art - Risk Assessment

Chair: *Ida Holm Olesen, M.Sc., Head of Section, Region of Southern Denmark*

Future proofing contamination risks - *Matthew Pannett, Ramboll, United Kingdom*

Variations in bioavailability and risk of hydrophobic organic contaminants between anthropogenic impacted vs. pristine environments – *Dorothea Gilbert, Norwegian Geotechnical Institute, Norway*

Categorizing the robustness of risk assessments at contaminated sites to climate changes – *Sandra Roost, Orbicon, Denmark*

**11.50 – 13.10 Lunch and Match Making**

**13.10 – 14.30 SESSION J Hall A  
Methods for Site Studies, PART II**

Chair: *Peter Harms-Ringdahl, Business Manager, Orbicon, Sweden*

Comparison study of different methods for estimation of mass discharge in aquifers - *Nina Tuxen, Capital Region, Denmark*

Interactive 3D-tool for better communication in contaminated soil remediation projects - *Håkan Rosqvist, Tyréns, Sweden*

Effective use of geostatistical tools - how to optimize target volumes for contaminant source reduction - *Niels Doessing Overheu, Capital Region, Denmark*

Long sediment cores from the Helsinki sea area diminish previous estimates of contamination - *Arto Itkonen, FCG, Finland*

**SESSION K Hall B  
Specific Types of Contaminated Sites**

Chair: *Jussi Kuusola, Environmental Specialist, Awillas Oy, Finland*

Baseline Studies of Methane Emissions from Landfills Before Establishment of Biocovers - *Lessons Learned - Anders Christensen, NIRAS, Denmark*

Solving the acid mine water challenge after nearly 400 years of copper mine activity at Løkken Grube, Norway - *Arve Misund, COWI, Norway*

A new method for identifying and characterizing black shales for safe disposal: a case study from a large construction project in Norway - *Erlend Soermo, Norwegian Geotechnical Institute, Norway*

Impact of chlorinated compounds in groundwater on streams - a study on 30 + contaminated sites in Denmark - *Sanne Skov Nielsen, Orbicon, Denmark*

**SESSION L Hall C  
Remediation Technologies, PART II**

Chair: *Steinar Sæland, Environmental geologist, Multiconsult ASA, Norway*

Full scale ek-bio treatment of PCE DNAPL in clay till - results and perspectives after 3 years of operation - *Ida Damgaard, Capital Region, Denmark*

In-situ bioremediation of chlorophenol contaminated aquifer - *Jukka Ikäheimo, Pöyry, Finland*

Phytoremediation as a sustainable method for clean-up of hydrocarbon polluted soil in the boreal climate - *Kim Yrjälä, Adj.Prof, Department of Biosciences, University of Helsinki, Finland*

Case study: Cleaning-up the Mountainside; in situ remediation of a large petroleum hydrocarbon plume at a former military base in Sweden - *Jonny Bergman, RGS90, S and Gareth Leonard, REGENESIS, United Kingdom*

**14.30 – 15.10 Coffee break and Exhibition**

**15.10 – 16.10 CLOSING SESSION Hall A**

**Wrap up**

Chair: *Jaana Sorvari, coordinator of NORDROCS 2016, Assoc.Prof., Aalto University*

Impressions: *Chairs of the Boards of MUTKU ry - Raakel Jaloniemi, ATV Soil and Groundwater - Ida Holm Olesen, Renare Mark - Ulrika Larson, Miljøringen - Morten Jartun*

*Musical farewell (Philomela choir)*

## Thursday, September 8, 2016

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**09.00 – 13.30 Excursion to an old harbour area and gas plant**

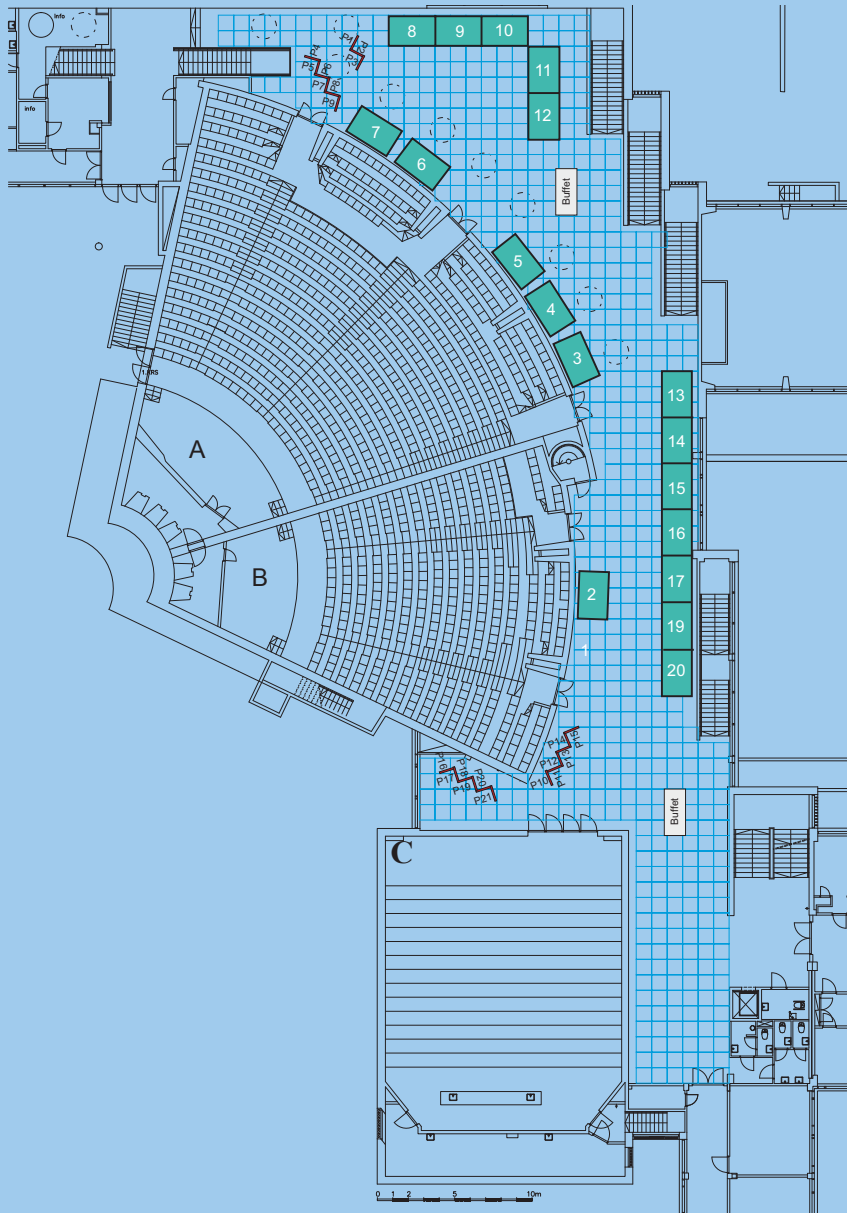
**Bus leaves from Radisson Blu Espoo 09.00 and returns via Helsinki downtown to Radisson Blu Espoo around 14.45**

Kalasadama is an old harbour area located some three kilometers from the Helsinki City Center, and it is currently being built as a residential area. The remediation of contaminated soil is risk-based. A gas plant operated in the Suvilahti area during 1910-1973. Currently, mainly different cultural activities are organized in the buildings and in the area. At the moment a circus, restaurant, small brewery and a photo shop are working in the old buildings.

The excursion ends with a lunch at the gas plant area, at restaurant "Lämpö".

## CONFERENCE FACILITIES

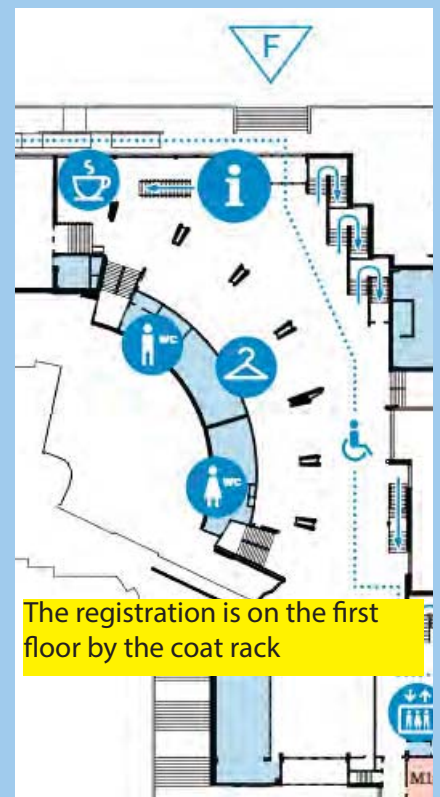
You find the exhibition area and posters on the second floor of Otakaari 1. The sessions are located on the second floor in hall A, B and in hall C.



### Second floor

The lunches and coffee are served in the exhibition area on the second floor

### First floor - main entrance



WS-EXPO GROUP OY

## SOCIAL PROGRAM

Welcome reception in Haltia Nature Center

Monday, September 5 at 19.00 (Buses leave from Hotel Radisson Blu Espoo at 18.00, and leave back to the hotel at 21.30)

Tuesday September 6th at 19.30

Conference Dinner in restaurant Kalastajatorppa  
Dancing after dinner with the "Funkable Five"

Before dinner we arrange a short boat cruise, which leaves across the road 150 m from the Radisson Hotel. Please, check the map below.

We kindly ask everybody to be on the pier at 18.30 for boarding.  
Shuttle bus transportation back to the hotel between 22.30-01.00.



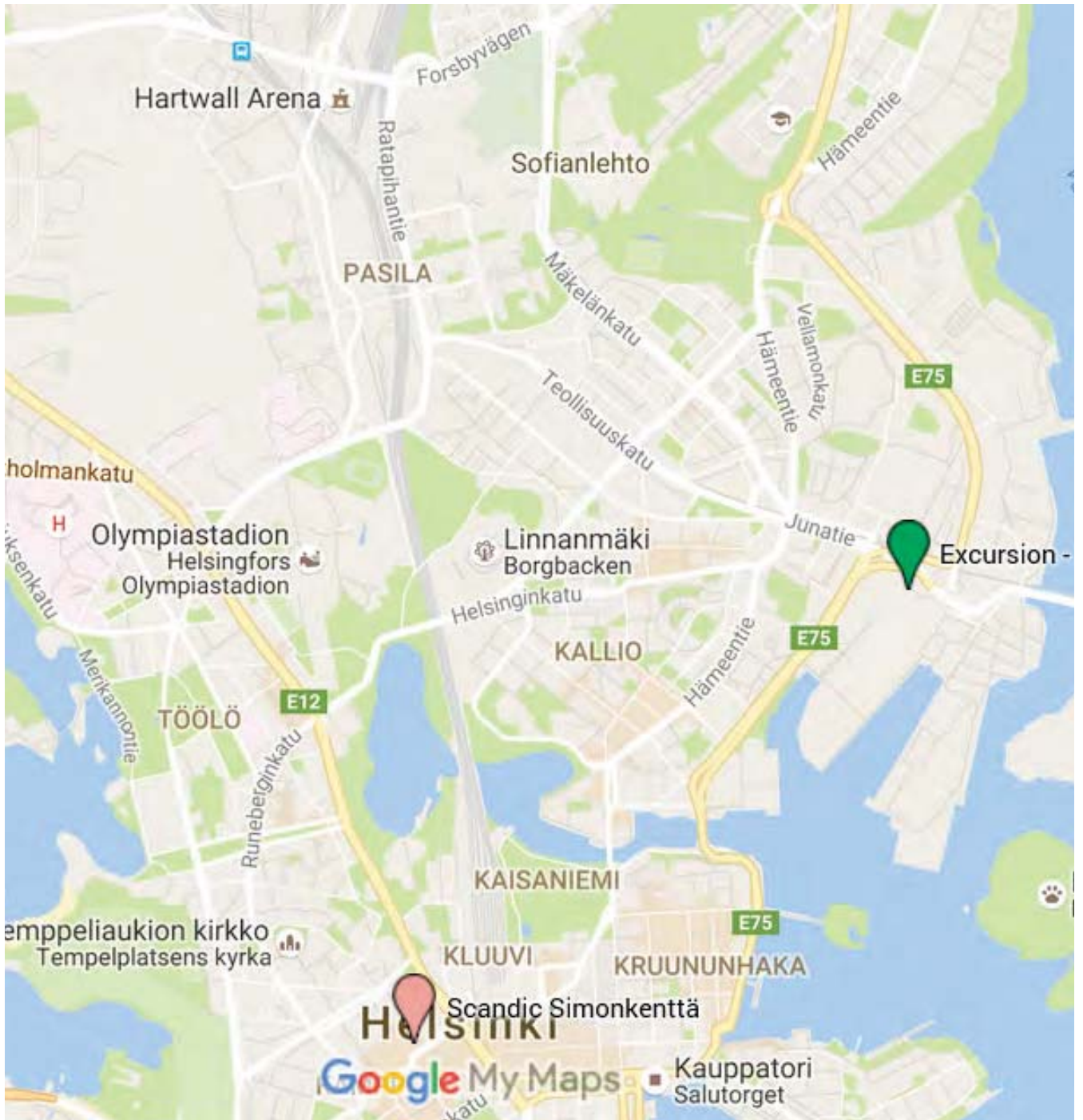
# Event locations

-  Aalto University (1)
-  Dinner - Helsinki Kalastajator... (1)
-  Excursion - Suvilahti and Kal... (1)
-  Radisson Blu Hotel, Espoo (1)
-  Scandic Simonkenttä (1)

Base map















# Otaniemen *kampuskartta* Otnäs *campuskarta* Otaniemi *campus map*



- 41 Aalto Inn
- 22 Aalto-yliopiston johto  
*Universitetets ledning*  
*University management*
- 32 ACE Aalto Center for Entrepreneurship
- 22 ACRE Aalto University  
*Campus & Real Estate*
- 6 ADDLab
- 27 Arkkitehtuurityöpaja  
*Architecture Workshop*
- 37 AScl Aalto Science Institute
- 37 AVP Aalto Ventures Program
- 38 AYY Aalto-yliopiston ylioppilaskunta  
*AUS Aalto-universitetets studentkår*  
*AYY Aalto University Student Union*
- 38 AYY asuntotoimisto  
*AUS Bostadskontoret*  
*AYY Housing Office*
- 20 A:Space Exhibition Space
- 29 Biofilia
- 66 Conversation Room
- 25 Design Factory
- 59 Diacor
- 19 Dipoli\*
- 32 EIT Digital
- 5 Energy Garage
- 14 Haukilahden lukio
- 32 HIIT Helsinki Institute for  
*Information Technology*
- 34 Ice Tank
- 1 Kandidaattikeskus    
*Kandidatcentret*  
*Undergraduate Centre*
- 43 Kappeli / Kapell / Chapel
- 1 Kirjaamo / Registratur / Registry
- 15 Kirjasto / Bibliotek / Library   
*(Learning Centre aukeaa*  
*/ öppnas / opens 31.10.2016)*
- 10 KY
- 29 LUMA-keskus / Luma Centre
- 17 Maarintalo / Maari Building  
- 36 Micronova
- 36 Nanofab
- 9 Nanotalo
- 32 OIH Open Innovation House 
- 65 Oppimiskeskus beta  
*Lärcentret beta / Learning Centre beta*  
*(sulkeutuu / stängs / closes 31.10.2016)*
- 20 Ostoskeskus        
*Köpcentrum / Shopping centre*
- 28 Otahalli
- 56 Radisson Blue Hotel 

- 45 Rantasauna
- 18 Saha KY's Festival Hall
- 44 Servin Mökki
- 32 Simlab
- 1 Starting Point
- 26 Startup Sauna
- 23 Taiteiden talo / Aalto Art House
- 35 Technopolis Innopoli 3
- 40 TF Teknologföreningen
- 30 Tietotekniikan talo / T-Building 
- 37 TUAS-talo / TUAS Building 
- 65 Unigrafia noutopiste  
*avhämtningsplats / pick-up point*
- 28 Unisport
- 26 Urban Mill
- 34 Vesilaboratorio  
*Water Laboratory*
- 42 YTHS / SHVS / FSHS

## *Opiskelijaravintolat* *Studentrestauranger* *Student restaurants*

- 1 Alvari
- 58 Campus
- 12 Kasper
- 8 Konetekniikka
- 3 Kvarkki
- 30 Subway
- 4 Sähkötekniikka
- 30 Tietotekniikan talo
- 37 TUAS-talo
- 40 Täffä
- 59 Valimo
- 57 VM5





















## *Ravintolat* *Restauranger* *Restaurants*

- 60 Antell Maari
- 22 Antell Calori
- 61 Fazer Laurea
- 11 MAU-KAS
- 56 Ravintola Ranta
- 63 X-burger

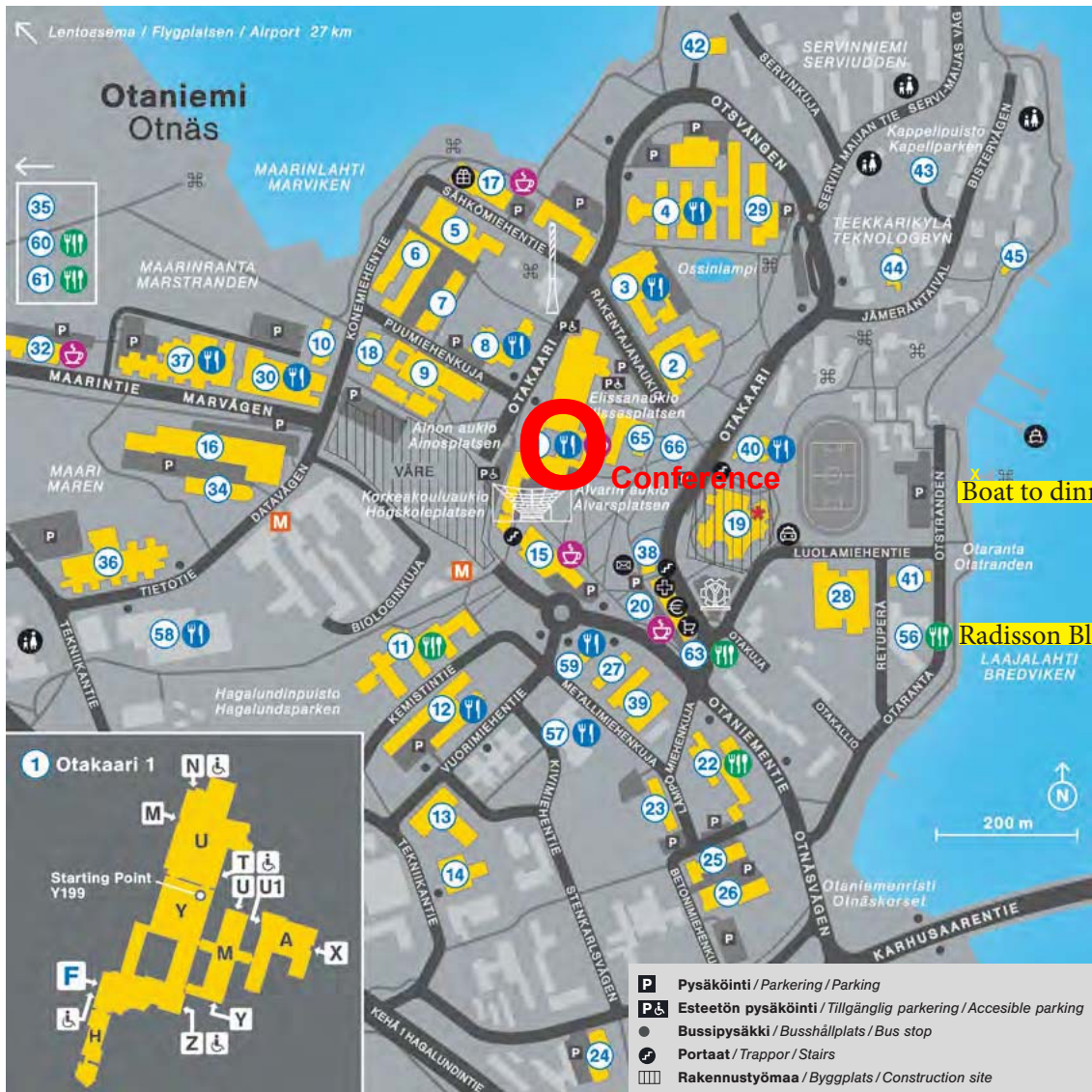
## *Kahvilat* *Kaféer / Cafés*

- 1 Aino
- 20 Brooklyn Cafe
- 1 Elissa
- 32 OIH
- 15,17 Robert's Coffee

## *Katuosoitteet* *Gatuadresser* *Street addresses*

- 26 Betonimiehenkuja 3
- 25 Betonimiehenkuja 5
- 44 Jämeräntaival 4
- 43 Jämeräntaival 8
- 11 Kemistintie 1 
- 18 Konemiehentie 1
- 30 Konemiehentie 2 
- 10 Konemiehentie 4
- 22 Lämpömiehenkuja 2 
- 23 Lämpömiehenkuja 3
- 32 Maarintie 6 
- 37 Maarintie 8 
- 59 Metallimiehenkuja 2 
- 27 Metallimiehenkuja 4
- 39 Metallimiehenkuja 10
- 61 Metsänpojankuja 3 
- 24 Miestentie 3
- 1 Otakaari 1  
- 3 Otakaari 3 
- 8 Otakaari 4 
- 4 Otakaari 5 
- 29 Otakaari 7
- 38 Otakaari 11
- 42 Otakaari 12
- 40 Otakaari 22 
- 19 Otakaari 24\*
- 56 Otaranta 2 
- 41 Otaranta 4
- 9 Puumiehenkuja 2
- 7 Puumiehenkuja 3
- 6 Puumiehenkuja 5
- 2 Rakentajanaukio 4
- 17 Sähkömiehentie 3  
- 5 Sähkömiehentie 4
- 14 Tekniikantie 3
- 16 Tietotie 1 A
- 34 Tietotie 1 E
- 36 Tietotie 3
- 58 Tietotie 6 
- 60 Vaisalantie 4 
- 35 Vaisalantie 8
- 13 Vuorimiehentie 1
- 12 Vuorimiehentie 2 
- 57 Vuorimiehentie 5 

\* *Rakennustyömaa*  
*Byggplats*  
*Under construction*



- Opiskelijaravintola / Studentrestaurang / Student restaurant**
- Ravintola / Restaurang / Restaurant**
- Kahvila / Kafé / Café**
- Apteekki / Apotek / Pharmacy**
- Postilaatikko / Brevlåda / Letter Box**
- Pankkiautomaatti / Bankautomat / ATM**
- Pakettiautomaatti / Paketautomat / Parcel pickup point**

- Ostokeskus, R-kioski & HSL / Köpcentrum, R-kiosk & HRT / Shopping centre, R-kiosk & HSL**
- Taksiasema / Taxistation / Taxi stand**
- Metro\* / Metro (Check the opening from hsl.fi)**
- Nähtävyyt / Attraktion / Sight**
- Lautta / Färja / Ferry**
- Päiväkoti / Daghem / Kindergarten**





Venue - Aalto University, Otakaari 1, Espoo

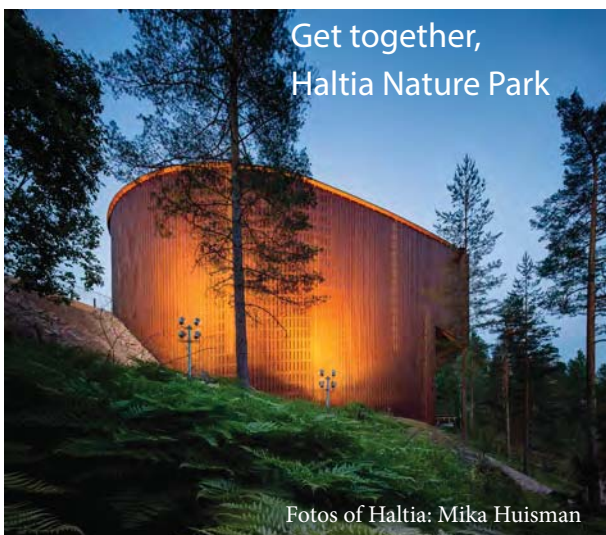
[www.aalto.fi/en](http://www.aalto.fi/en)

Foto: Mikko Raskinen, Aalto

Conference dinner and dance, Kalastajatorppa Beach Hotel, Round room, Kalastajatorpantie 1, Helsinki



Foto:Hilton Kalastajatorppa



Get together,  
Haltia Nature Park

Fotos of Haltia: Mika Huisman



[www.http://www.haltia.com/en/haltia-the-finnish-nature-centre](http://www.haltia.com/en/haltia-the-finnish-nature-centre)