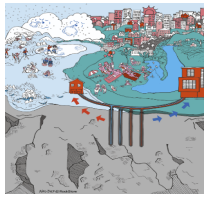
Research Conference and Seminar Program

September 18-21th, 2018

A collaboration between:
KTH Royal Institute of Technology
The International Ground Source Heat Pump Association (IGSHPA)
The Swedish Avanti Drillers Association
Research program TERMISKA ENERGILAGER, by Energiforsk
Research program ROCKSTORE, by Christian Michelsen Research



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Program of the 2nd IGSHPA Research Track 2018 (DAY 1)

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Day	Room	Start	End	Presenter	Title and authors	Session name	Chair
Day 1: Tuesday Sept 18th		7:30 AM	8:30 AM		Registration	-	-
	common area	8:30 AM	8:59 AM	PL, BP, EP, MA, DR, JA	The 2nd IGSHPA Research Track	Welcome session	José Acuña
		9:00 AM	9:44 AM	Johan Claesson and Palne Mogensen	**The roots of research on borehole heat exchangers**	Keynote 1	Jeffrey Spitler
	common area	**9:45 AM**	**10:09 AM**		**Coffee and refreshments, room change**		
	U21	10:10 AM	10:34 AM	Zhaohong Fang	Thermal Analysis Models of Deep Borehole Heat Exchangers. *Liang Fang, Nairen Diao, Zhukun Shao, Ke Zhu and Zhaohong Fang*	Modeling and simulation of GHE (1)	Simon Rees
		10:35 AM	10:59 AM	Antonio Cazorla-Marín	Upgrade of the B2G dynamic geothermal heat exchanger model: optimal location of the ground nodes. *Antonio Cazorla-Marín, Carla Montagud, Jose M. Corberan, Francesco Tinti and Sara Focaccia*		
		11:00 AM	11:24 AM	Davide Rolando	Extending the Ashrae Tp8 method for vertical borefield design to type III boundary conditions. *Davide Rolando, Marco Fossa and Antonella Priarone*		
		11:25 AM	11:49 AM	Peter Bayer	On the role of vertical ground heat flux for analytical simulation of borehole heat exchangers. *Peter Bayer, Jaime A. Rivera and Philipp Blum*		
		11:50 AM	12:14 PM	Yves Brussieux	A hybrid model for generating short-time g-functions. *Yves Brussieux and Michel Bernier*		
	U31	10:10 AM	10:34 AM	Sondre Gjengeda	Video inspection of wells in open loop ground source heat pump systems in Norway. *Sondre Gjengedal, Randi Kalskin Ramstad, Bjørn Frengstad and Bernt Olav Hilmo*	Groundwater flow: open & closed systems	José Acuña
		10:35 AM	10:59 AM	Gabrielle Beaudry	Hydrogeothermal Characterization and Modelling of a Standing Column Well Experimental Installation. *Gabrielle Beaudry, Philippe Pasquier and Denis Marcotte*		
		11:00 AM	11:24 AM	Mohammad Abuasbeh	First Measurement of Aquifer Thermal Energy Storage (ATES) System Monitoring Project Using Distributed Temperature Sensing (DTS). *Mohammad Abuasbeh and Jose Acuna*		
		11:25 AM	11:49 AM	Yutaka Shoji	A Design and Simulation Tool for Ground Source Heat Pump System Considering Ground Water Advection. *Takao Katsura, Takashi Hitashitani, Katsunori Nagano, Yoshitaka Sakata and Yutaka Shoji*		
		11:50 AM	12:14 PM	Shanshan Cai	A full-scale model to predict borehole fluid temperature with groundwater advection. *Tengfei Cui, Shanshan Cai, Haijin Guo and Ting Huang*		
	common area	**12:15 PM**	**1:09 PM**		**Golden sponsor presentation and Lunch**	-	
	U21	1:10 PM	1:34 PM	Giorgia Dalla Santa	Ground thermal conductivity from early heating and recovery temperature TRT logs using an active hybrid optic fibre system. *Antonio Galgaro, Philippe Pasquier, Luca Schenato, Matteo Cultrera and Giorgia Dalla Santa*	TRT & Ground Properties (1)	Michel Bernier
		1:35 PM	1:59 PM	Henrik Holmberg	Temperature profile measurements – easy, cheap and informative. *Henrik Holmberg, Randi Kalskin Ramstad and Mari Helen Riise*		
		2:00 PM	2:24 PM	Shanshan Cai	A Randomly Fractal Approach to Calculate the Thermal Conductivity of Moist Soil. *Shanshan Cai, Boxiong Zhang, Tengfei Cui, Haijin Guo and Ting Huang*		
		2:25 PM	2:49 PM	Malin Malmberg	Development of a thermal conductivity map of Stockholm, Sweden. *Malin Malmberg, Jasmin Raymond, Lorenzo Perozzi, Erwan Gloaguen, Claes Mellqvist, Gerhard Schwarz and José Acuña*		
	U31	1:10 PM	1:34 PM	Nicolò Giordano	Underground thermal energy storage in subarctic climates: a feasibility study conducted in Kuujjuaq (QC, Canada). *Nicolò Giordano, Inès Kanzari, Mafalda Miranda, Chrystel Dezayes and Jasmin Raymond*	Case and feasibility studies (1)	Signhild Gehlin
		1:35 PM	1:59 PM	Mazyar Karampour	Geothermal Storage Integration into Supermarket's CO2 Refrigeration System. *Mazyar Karampour, Samer Sawalha, Carlos Mateu-Royo and Jörgen Rogstam*		
		2:00 PM	2:24 PM	Gregorius Riyan Aditya	Financial Assessment of Ground Source Heat Pump Systems against Other Selected Heating and Cooling Systems for Australian Conditions. *Gregorius Riyan Aditya, Olga Mikhaylova, Guillermo Narsilio and Ian Johnston*		
		2:25 PM	2:49 PM	Antonio Cazorla-Marín	Seasonal performance assessment of a Dual Source Heat Pump system for the production of heating, cooling and domestic hot water. *Antonio Cazorla-Marín, Carla Montagud, Jose M. Corberán and Javier Marchante-Avellaneda*		
	common area	**2:50 PM**	**3:10 PM**		**Coffee and refreshments, room change**	-	
	U21	3:15 PM	3:39 PM	Lu Xing	Comparison of Two Simplified Approaches for Ground Temperature Estimations in Australia. *Lu Xing, Cuncun Mao, Zhou Yu, Olga Mikhaylova and Pingfang Hu*	TRT & Ground Properties (2)	Zhaohong Fang
		3:40 PM	4:04 PM	Michel Bernier	A virtual borehole for thermal response test unit calibration: Test facility and concept development. *Parham Eslami Nejad, Messaoud Badache, Alexia Corcoran and Michel Bernier*		
		4:05 PM	4:29 PM	Willem Mazzotti	A Newton-Raphson algorithm for Thermal Response Tests. *Willem Mazzotti, Husni Firmansyah, José Acuna, Milan Stokuca and Björn Palm*		
		4:30 PM	4:54 PM	Marco Fossa	Pulsated Thermal Response Test experiments and modeling for ground thermal property estimation. *Marco Fossa, Davide Rolando and Philippe Pasquier*		
	U31	3:15 PM	3:39 PM	Carlos Naranjo-Mendoza	Are shallow boreholes a suitable option for inter-seasonal ground heat storage for the small housing sector?. *Carlos Naranjo-Mendoza, Andrew J. Wright and Richard M. Greenough*	Performance of alternative GHE designs	Saqib Javed
		3:40 PM	4:04 PM	Hwan-Hui Lim	Thermal performance evaluation of horizontal spiral coil-type ground heat exchangers. *Min-Jun Kim, Seung-Rae Lee, Jun-Seo Jeon, Min-Seop Kim and Hwan-Hui Lim*		
		4:05 PM	4:29 PM	Hiep Nguyen	Performance Analysis of a Single Underground Thermal Storage Borehole Using Phase Change Material. *Ayman Bayomy, Hiep Nguyen, Jun Wang and Seth Dworkin*		
	R1	**5:00 PM**	**7:00 PM**		**Cocktail and Silver sponsor presentation at KTHs rock cavern**	-	

Program of the 2nd IGSHPA Research Track 2018 (DAY 2)

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Day	Room	Start	End	Presenter	Title and authors	Session name	Chair
Day 2: Wed Sept 19th	common area	8:50 AM	9:34 AM	Eric Granryd and Björn Palm	**Past and Future of Heat Pump Technology**	Keynote 2	Jeffrey Spitler
	U21	9:35 AM	9:59 AM	Massimo Cimmino	Evaluation of g-functions for bore fields with mixed parallel and series connections considering the axial fluid temperature variations in the boreholes. *Massimo Cimmino*	Modeling and simulation of GHE (2)	Michel Bernier
		10:00 AM	10:24 AM	Min Li	Understanding transient heat transfer in large-scale ground heat exchanger (GHE) matrices: Insights from high-resolution analytical solutions. *Min Li and Cheng Zhou*		
	U31	9:35 AM	9:59 AM	Messaoud Badache	Carbon dioxide evaporation process inside direct expansion geothermal boreholes. *Messaoud Badache, Parham Eslami Nejad, Arash Bastani, Zine Aidoun and Mohamed Ouzzane*	Multiphase convection heat transfer	Björn Palm
		10:00 AM	10:24 AM	Lennart Boese	Dynamic modeling of flow boiling within plate heat exchangers for heat pump and refrigeration applications. *Lennart Boese, Frank Opferkuch, Julian Becker and Michael Wensing*		
	common area	**10:25 AM**	**10:54 AM**		**Coffee and refreshments, room change**		
	U21	10:55 AM	11:19 AM	Alex Laferrière	Model predictive control applied to residential self-assisted ground source heat pumps. *Alex Laferrière and Massimo Cimmino*	Optimal design, control and operation	Saqib Javed
		11:20 AM	11:44 AM	Takao Katsura	Development of Control System for Heat Recovery Ground Source Heat Pump System and its Verification. *Takao Katsura, Yutaka Shoji, Yoshiki Miyashita, Katsunori Nagano and Yasushi Nakamura*		
		11:45 AM	12:09 PM	Yiwei Xie	Optimal parameters design of ground source heat pump system combined energy consumption and economic analysis using Taguchi method. *Yiwei Xie, Pingfang Hu, Fei Lei, Na Zhu and Lu Xing*		
	U31	10:55 AM	11:19 AM	Ida Shafagh	A Foundation Wall Heat Exchanger Model and Validation Study. *Ida Shafagh and Simon Rees*	Piles & Foundation HX	Philippe Pasquier
		11:20 AM	11:44 AM	Hikari Fujii	Numerical Simulation of Slinky-coil Ground Heat Exchangers Installed in Railway Tunnels. *Hikari Fujii, Satoko Taniguchi and Keisuke Ogai*		
		11:45 AM	12:09 PM	Marco Fossa	Thermal Response Test experiments and modeling of shallow geothermal piles with different geometry. *Marco Fossa, Fabio Minchio and Davide Rolando*		
	common area	**12:10 PM**	**1:09 PM**		**Golden sponsor presentation and Lunch**		
	U21	1:10 PM	1:34 PM	Teppo Arola	Pre - feasibility research for eight possible groundwater energy utilisation sites in Southern Finland. *Teppo Arola, Isa Witick, Joonas Kouvo and Jussi Kuusela*	Case and feasibility studies (2)	Signhild Gehlin
		1:35 PM	1:59 PM	Adam Alaica	The impact of a demand-side management strategy in operating a hybrid geo-district building energy system for a high-rise mixed-use residential building in Toronto, Canada. *Adam Alaica*		
		2:00 PM	2:24 PM	Malin Malmberg	High temperature borehole thermal energy storage – A case study. *Malin Malmberg, Willem Mazzotti, José Acuna, Henrik Lindståhl and Alberto Lazzarotto*		
		2:25 PM	2:49 PM	Angelo Zarrella	A double source heat pump: a case study. *Angelo Zarrella, Roberto Zecchin, Philippe Pasquier, Diego Guzzon, Michael Ciantia, Michele De Carli and Giuseppe Emmi*		
	U31	1:10 PM	1:34 PM	Willem Mazzotti	Design of a Laboratory Borehole Storage model. *Willem Mazzotti, Yifeng Jiang, Patricia Monzo, Alberto Lazzarotto, José Acuna and Björn Palm*	Laboratory scale systems & experiments	Björn Palm
		1:35 PM	1:59 PM	Antonio Galgaro	An experimental setup to measure the heat-exchange processes by controlling thermal and hydraulic conditions. *Paolo Scotton, Giorgia Dalla Santa, Daniele Rossi, Giordano Teza and Antonio Galgaro*		
		2:00 PM	2:24 PM	Kilian Hagel	Vertical Hydraulic Conductivity of Borehole Heat Exchanger Systems before and after Freeze-Thaw-Cycle Stress. *Alexander Kirschbaum, Jens Kuckelkorn and Kilian Hagel*		
		2:25 PM	2:49 PM	Byeong-Hak Park	Impacts of injection temperature on the relevant heat transport processes in groundwater heat pump (GWHP) systems. *Byeong-Hak Park and Kang-Kun Lee*		
	common area	**2:50 PM**	**3:14 PM**		**Coffee and room change**		
	U21	3:15 PM	3:39 PM	Maria Letizia Fascì	Relevance of heat load temporal resolution and uncertainty when evaluating the thermal influence of neighbouring ground source heat pump installations. *Maria Letizia Fascì, Alberto Lazzarotto, José Acuña and Joachim Claesson*	Modeling and simulation of GHE (3)	Zhaohong Fang
		3:40 PM	4:04 PM	Bernard Dusseault	Near-instant g-function Assessment with Artificial Neural Network. *Bernard Dusseault and Philippe Pasquier*		
		4:05 PM	4:29 PM	Miguel Hermanns	Application of matched asymptotic expansion techniques to the analysis of geothermal heat exchangers. *Miguel Hermanns and Santiago Ibáñez*		
	U31	3:15 PM	3:39 PM	Xiaobing Liu	Field Performance of a District Central Ground Source Heat Pump System in the US. Piljae Im, Xiaobing Liu and Hugh Henderson	Measured performance of GHE & GSHP systems (Full-scale)	José Acuña
		3:40 PM	4:04 PM	Kimmo Korhonen	Simulated temperature evolution of large BTES – case study from Finland. Kimmo Korhonen, Nina Leppäharju, Petri Hakala and Teppo Arola		
	common area	**4:30 PM**	**5:00 PM**		**Closing of the 2nd Research Track**	Closing session	J. Acuña, J. Spitler

Program DAY 3: New Research programs on Borehole Thermal Energy Storage & study visits

Termiska Energilager (SWEDEN) and ROCKSTORE (Norway)

BTES for tomorrows district heating (Borrhålslager för morgondagens fjärrvärme)

Day	Place	Start	End	Presenter	Title
Day 3: Thrusday Sept 20th	Learning Theater M235 (Brinellvägen 68)	8:30 AM	9:00 AM		Registration and coffee
		9:00 AM	9:40 AM	Fredrik Martinsson & Kirsti Midtomme	Welcome words and Introduction to research programs
					BLOCK 1: Design tools and simulations
		9:40 AM	10:00 AM	Max Hesselbrandt, Willem Mazzotti, Mohammad Abuasbeh, José Acuna	Project 1 (Sweden): Development of a tool for design and operation
		10:00 AM	10:20 AM	Hanne Kauko & Karoline Kvalsvik	Project 2 (Norway): Simulation of High Temperature Borehole Thermal Energy Storage
		10:20 AM	**10:40 AM**		**Coffee**
					BLOCK 2: Pilot projects
		10:40 AM	11:00 AM	Tony Jernström and José Acuña	Pressurized boreholes for high temperature bore fields
		11:00 AM	11:20 AM	Båsum Boring and Rock Energy	Deep boreholes
		11:20 AM	11:40 AM	Stefan Swartling	New Hybrid design for HT-BTES
		11:40 AM	12:00 PM	Claes Regander and Mutaz Alkiswani	HT-BTES project in Helsinborg, Southern Sweden
		12:00 PM	**1:00 PM**		**Lunch with short introduction to the Technical Tours**
		12:45 PM	2:45 PM	Mohammad Abuasbeh and Thomas Bergqvist	Tour 1: Aquifer Thermal Energy Storage. Bus departs outside Brinellvägen 68 at 12:45. Returns to KTH at about 14:45
	M235	1:00 PM	2:45 PM	Fredrik Martinsson	Internal workshop (Only for active project participants in Termiska Energilager and Rockstore)
		2:45 PM	4:30 PM	Alberto Lazzarotto, Mikael Nygren, Åke Annsberg	Tour 2: Borehole Thermal Energy Storage. Bus departs outside Brinellvägen 68 at 15:00 and returns to KTH at 16:45.
		2:45 PM	4:30 PM	Willem Mazzotti	Tour 3: KTH Live-in-lab (The tour starts with a short walk departing Brinellvägen 68 at 15:00)
		5:30 PM	**12:00 AM**		**Dinner**
		5:30 PM	11:30 PM		The buss departs from Brinellvägen 68 at 17:30. Comes back from the Wenngarn Castle at 23:30 and arrives at KTHs subway station at about midnight

Program DAY 4: Drillers day. EXPO and Seminars (almost all in Swedish)

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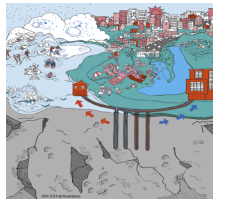
BRUNNSBORRARDAGEN

Day	Place	Start	End	Presenter	Title
Day 4: Friday Sept 21st	Wenngarn Castle	10:30 AM	11:00 AM	Göran Risberg - SGU	Torkan
		11:00 AM	11:30 AM	Göran Persson - HP Borrningar	Dimensionerande vattenförbrukning av grundvatten samt alternativa vattenkvaliteter
		11:30 AM	12:00 PM	Yacine Slamti – Swedish Standards Inst. Morgan Willis- SKVP Erik Elster - EPIROC	Vad är standardisering och nyttan med den?
		1:00 PM	1:30 PM	Einar Østhassel-MEF	Norske fagarbeider boreriggoperatør/"brunnsborrare, statens ansvar! (The skilled well drillers/recruitment, a governmental responsility)
		1:30 PM	2:00 PM	Marcus Tillman - RISE	P-märkta kollektorer
		2:00 PM	2:30 PM	Clas Regander - Sweco	Högtemperaturlager i Helsingborg
		2:30 PM	3:00 PM	Dom Durban D and R Drilling, Inc & Durban Geothermal, Inc	Grouting and practical experiences (på engelska/in english)

Energiforsk



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