

Sunday 12 June

19:30	Welcome reception at Rockheim (by the sea front)
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Monday 13 June

08:00	Registration			
08:30	Trygve M. Eikevik (Chair of Organising Committee), Conference opening Didier Coulomb (Director IIR) IIR conference address Alexandra Bech Gjørv (Director SINTEF), and Anne Borg (Rector NTNU), Welcome address Petter Nekså (Chair of Scientific Committee), Life and work of Gustav Lorentzen			
09:15	Klaas Visser, 200, Applying CO2 refrigeration to the cooling and heating of buildings world wide to achieve reductions in energy and cooling water consumptions, and emissions			
09:45	Coffee break			
10:10	1A: Hydrocarbon systems	1B: CO2 systems	1C: Ammonia systems	1D: Thermal Energy Storage
10:10	Daniel Colbourne 250, Hydrocarbon refrigerants through the ages	M. Prakash Maiya / Pramod Kumar 252, Future of natural refrigerants in India	Alexander Pachai / Risto Ciconkov 253, Application of natural refrigerants in the industrial refrigeration and heat pumps in the future	Peter Tomlein 254, Phasedown of high-GWP refrigerants accompanied by natural refrigerants on the rise
10:40	93, EcoPac – isobutane heat pump acting as economizer, <i>Bjørn Palm</i>	129, CO2-heat pump in a high temperature district heating plant, <i>Geir Eggen</i>	116, High efficient large ammonia systems with very low refrigerant charge, <i>Niels Vestergaard</i>	34, Energy flow analysis of ammonia refrigeration system and potential for a cold thermal energy storage, <i>Kristina N. Widell</i>
11:00	10, AIR-AIR split AC with minimum charge of propane, <i>Klas Andersson</i>	64, Alternative CO2 blends for transcritical refrigeration systems, <i>Daniel Sánchez García-Vacas</i>	12, Ammonia heat pumps are key to global decarbonization, <i>Kenneth Hoffmann</i>	136, Demand side management through latent thermal storage in HVAC systems coupled with commercial refrigeration units, <i>Giovanni Cortella</i>
11:20	199, Performance Evaluation of a Domestic Freezer with R600a and Zeotropic Mixtures of R600a/R290, <i>Muhammed Emin Polat</i>	242, Life-Cycle-Cost-Analysis of the Supermarkets, Hotel chillers and Marine applications in India, <i>Simarpreet Singh (TBC)</i>	33, Measurements on ammonia fin and tube air evaporators for lowering the charge in industrial ammonia systems, <i>Jóhannes Kristófersson</i>	48, Validation of a Modelica numerical model for pillow plate heat exchangers using phase change material, <i>Håkon Selvnes</i>
11:40	148, The experimental analysis of ejector-based R290 heat pump system for domestic applications, <i>Rafal Piotr Fingas</i>	91, Integration of gravity-fed evaporators in CO2 based refrigeration systems, <i>Mihir Mouchum Hazarika (TBC)</i>	40, Further TTRC and TWRC methods research applied for mechanical vapour compression refrigeration cycle effectiveness improvement, <i>Mihail-Dan Niculae Staicovici</i>	120, A new and energy efficient Method for Ice Slurry Production, <i>Sebastian Gund (TBC)</i>
12:00	Lunch			
13:00	2A: Hydrocarbon systems	2B: CO2 systems	2C: Ejector	2D: Thermal Energy Storage
13:00	152, Simulation and experimental analysis of a low-charge ground-source heat pump using propane as refrigerant, <i>Luis Sánchez-Moreno Giner</i>	70, The use of ejectors in industrial heat pumps, <i>Oliver Javerschek</i>	25, Feasibility study of dedicated R744 ejector for compressor oil return, <i>Stefan Elbel</i>	105, Evaluation of cold thermal energy storage in fishing vessels, <i>Erling Vingelsgård</i>
13:20		197, Investigation of non-equilibrium effects during the depressurization of CO2, <i>Alexandra Metallinou Log</i>	55, Critical comparison between single-phase ejector and two-phase ejector by simulated CO2 transcritical commercial cooling system, <i>Ana Maria Páez</i>	53, Integrated CO2 refrigeration and heat pump systems for dairies, <i>Håkon Selvnes</i>
13:40	201, Dual source (air-solar) heat pump: thermo-economic analysis of sizing factors depending on climate conditions, <i>Francesco Pelella</i>	153, Modelling natural refrigerant mixtures for residential heat pump applications with Python, <i>Matteo Caramaschi (TBC)</i>	202, Solar driven ejector cooling system employing natural refrigerants: thermo-economic analysis and optimization strategy, <i>Giovanni Napoli</i>	36, Self-sufficient Propane-CO2 cascade with two-phase thermosiphon, <i>Oliver Schmid</i>
14:00	128, Development of a modular refrigeration cycle to classify the performance of flammable refrigerants, <i>Tim Klebig</i>	188, Reversible CO2 Heat pump with ejectors for efficient heating and air conditioning, <i>Jonas Schönenberger</i>	126, Comparative analysis of solar-driven air conditioning units based on vapour compression and ejector cycles, <i>Roger Padullés Solé</i>	119, Improvements for the Ice Slurry Production with the Supercooling Method, <i>Sebastian Gund</i>
14:20	50 Planning, design and construction of a multi-purpose high-temperature heat pump test bench for hydrocarbons, <i>Stefan Henninger</i>	45 Process cooling CO2 chillers: field experience and performance-cost comparisons with other natural refrigerants and HFC/Os, <i>Giacomo Pisano</i>	219 CFD simulation of supercritical carbon dioxide in a converging diverging nozzle, <i>Shyam Sundar Yadav</i>	63 200-kWh latent heat storage unit using a pillow-plate heat exchanger: demonstration in an office building, <i>Alexis Sevault</i>
15:00	Coffee break			
15:30	Technical visit	Technical visit	Technical visit	Technical visit
18:30	Student network	Commission meetings		

Tuesday 14 June

08:00	Registration			
08:30	3A: Energy efficiency and environment	3B: Heat exchangers	3C: Heat to power	3D: Refrigeration for Food processing and transport
08:30	Marc Chasserot 255, Natural refrigerants, solutions for clean HVACRef and key barriers	Stefano Fillipini 37, Design optimization of NH3 evaporators for heat pumps in district heating	Trond Andresen 256, Heat to power cycles, possibilities for natural refrigerants	Silvia Minetto 257, Natural working fluids in transport refrigeration
09:00	240, Business considerations for refrigerant selection in regards to sustainability and the significance of climate legislation and litigation, <i>Christine Lützkendorf</i>	146, Investigation of Shape Optimized Non-Round Tubes for CO2 Gas Coolers, <i>Vikrant Aute</i>	108, Case study of an Organic Rankine Cycle for waste heat recovery on a cruise ship, <i>Magnus Kyrre Windfeldt</i>	190, Assessment of benefits of employing natural refrigerants in seafood cold chain in India, <i>Santosh Kumar Saini</i>
09:20	68, Pathway to Net-Zero: Cooling Product List, <i>Sophie Geoghegan</i>	161, Refrigerant Charge Estimation in Brazed Plate Heat Exchangers – Experimental Results, <i>Torsten Will</i>	175, Techno-economical study of a pilot plant for energy production and long-duration storage using pumped-hydro and carbon dioxide transcritical cycles, <i>François Faraldo</i>	141, Experimental development and investigation of a CO2 based air-to-air heat pump for food drying, <i>Martin Ryhl Kærn</i>
09:40	101, Ways and means for the RACHP Sector to create efficient pathways to reaching net-zero, <i>Natasha Kochova/ Asbjørn Vonsild</i> , (TBC)	194, Falling film evaporation heat transfer of ammonia/oil mixtures on a horizontal smooth tube, <i>Ikuro Akada</i>	122, Topside cycles for enhanced geothermal systems with CO2 and hydrocarbons as working fluids, <i>Han Deng</i>	83, Reduction of specific energy and carbon emission from salami production, <i>Erlend Indergård</i>
10:00	94, Energy efficiency of an integrated CO2 refrigeration and air-conditioning system using test and site measurements, <i>Nishant Karve</i>	47, A numerical model for solid-gas two-phase flow of CO2 with sublimation in pipes, <i>Yixia Xu</i>	106, Dynamic analysis of a furnace off-gas energy recovery system integrating heat from batch-wise metal casting, <i>Magnus K. Windfeldt</i>	157, Development of the natural working fluid-based refrigeration system for domestic scale freeze-dryer, <i>Edyta Piechnik</i> (TBC)
10:20	Coffee break			
10:40	4A: Energy efficiency and environment	4B: Heat exchangers	4C: Operation and system control	4D: CO2
10:40	139, Influence of cooling load profile on the prediction of energy use in commercial refrigeration plants, <i>Giovanni Cortella</i>	75, Experimental and numerical study of flooded PV-T evaporator working in a CO2 solar-assisted heat pump, <i>Marco Azzolin</i>	204, Low charge detection method for supermarket refrigeration systems, <i>Torben Green</i>	232, Performance relationship between the CO2 gas cooler and condenser, <i>Geert Doornbos</i>
11:10	192, Predicting specific energy consumption in the southern Hemisphere, <i>Andy Pearson</i>	164, Overall surface fin efficiency and dry angle for ammonia finned tube evaporators, <i>Martin R. Kærn</i>	96, Integration of dynamic model and classification algorithms for fault detection and diagnosis in a vapour compression system, <i>Jose Joaquin Aguilera</i>	185, Performance improvements of supermarket R744 systems by pivoting compressor arrangements, <i>Luca Contiero</i>
11:30	27, A Thermo-economic Analysis of Working Fluid and Cycle Combinations for Industrial Heat Pump Applications, <i>Gustavo Jose Otero Rodriguez</i>	215, Comparative analysis on performance of microchannel heat exchangers with symmetric and asymmetric louver fins, <i>Haorui Yuan</i>	143 Development and Experimental Validation of Model-Based Superheat Control Strategies for Air-to-Water Heat Pumps, <i>Stephan Göbel</i>	183, R744 Heat pump performance for bus HVAC applications, <i>Stephen A. Kujak</i>
11:50	208 Assessing the energy efficiency of a low temperature refrigerating system with indirect methods, <i>Stefan Hudjetz</i>	224, Design optimization of a novel heat exchanger concept with varying channel geometry, <i>Trond Andresen</i>	117, Evaluation of machine learning methods for optimizing the defrosting process of air-to-water heat pumps, <i>Jonas Klingebiel</i>	211, Experimental evaluation of a cascade refrigeration system with the natural refrigerants R290/CO2, R1270/CO2 and R600a/CO2, <i>Alejandro Andreu Nácher</i>
12:10	100, Application of state-of-the-art heat pumping systems with natural refrigerants in Norway, <i>Jørn Stene</i>	111, Numerical modelling of the multi-tubular finned reactor with various fin configurations, <i>Ankush Srivastava</i>	46 Correlation Analysis of evaporation pressure readings in CO2 supermarket refrigeration systems, <i>Andreas Schulte</i>	237, Experimental investigation on integrated two-stage evaporators for CO2 heat-pump chillers, <i>Armin Hafner</i>
12:30	Lunch			

13:30	Holger König, 260, Sustainable Refrigeration. What is sustainability and how to determine?			
14:00	Minister Espen Barth Eide, Norwegian minister of climate and environment			
14:30	Lambert Kuijpers, 248, Net zero, renewables and natural refrigerants			
15:00	Coffee break			
	5A: Hydrocarbon systems and safety	5B: R718/water systems	5C: Ultra-low temperature systems	5D: CO2 systems
15:20	171, Experimental analysis of various refrigerant circuit component combinations for 150g low charge propane heat pumps, <i>Hannes Fugmann / Lena Schnabel</i>	31, Heat-driven snow production applying ejector and natural refrigerant, <i>Cecilia Gabriellii</i>	88, Ultra-low Temperature Refrigeration System of CO2 using Cyclone Separator/ Evaporator, <i>Hiroshi Yamaguchi</i>	79, Experimental analysis of refrigeration CO2 systems using an additional compressor to enhance energy performance, <i>Laura Nebot-andres</i>
15:40	6, Concentrations of hydrocarbon refrigerant exiting from RACHP equipment enclosures Part I: measurements, <i>Daniel Colbourne</i>	233, The potential of water as a refrigerant - past, present and future approaches, Vivien Klein	132, Experimental investigation on the performance of a low-temperature refrigeration cycle using R170/R290 and R1150/R600a mixtures, <i>Guillem Monrós Andreu</i>	207, Innovative refrigeration concept for passenger ships - combining CO2 refrigerant, cold recovery and cold storage, <i>Cecilia Gabriellii</i>
16:00	196, Safe Use of Flammable Refrigerants in Cooling/Heating Cycles, <i>Christian Sonner</i>	244, Innovative refrigeration cycle with R718 vapor using mechanical compression, <i>Mohammed Youbi Idrissi</i>	23, R744 modular refrigeration technology at -50 °C and 100m elevation, <i>Stefanie Blust</i> (TBC)	246, Comparative Analysis of Transcritical CO2 Combined Cooling and Heating Systems with Split Cooling, <i>Xin-Rong (Ron.) Zhang</i> (TBC)
16:20	9, Refrigerant egression to connected spaces in relation to hydrocarbon charge limits, <i>Daniel Colbourne</i>	158, Experiment and comparison of two novel R718 refrigeration cycles in medium temperature chiller, <i>Karino Kang</i>	203, Krypton, applied as refrigerant for cooling of silicon detector trackers, <i>Luca Contiero</i>	163, Simulation and control strategy of a CO2 loop for building thermal management in heating mode, <i>Sepehr Gholamrezaie</i>
16:40	39 Residential heat pump for indoor installation operating with R-290 and ice-slurry heat-source, <i>Raphael Gerber</i>	11 Dual Source Heat Exchanger as Evaporator/Condenser in a R290 Heat Pump: Design and Experimental Validation, <i>Xabier Pena</i> (TBC)	238, Novel integrated system for cryogenic CO2 capture and liquefaction of natural gas rich in ethane using natural refrigerants, <i>Ting He</i>	78 Summer performance comparison of transcritical R744 condensing units based on experimental data and several climates, <i>Paride Gullo</i>
18:15	Concert			
19:30	Dinner			

Wednesday 15 June

08:30	Registration			
09:00	6A: Gas cycles and sorption systems	6B: Ejectors	6C: Compressors	6D: High temperature heat pumps
09:00	Roberto Peixoto 258, Current status and trends of natural refrigerants in South America	Stefan Elbel 259, The Use of Natural Refrigerants in North America – Current Trends and Future Opportunities	Marek Zgliczynski 251, The evolution of compressors and related applications in household and light commercial refrigeration with natural refrigerants,	Ruzhu Wang 249, High temperature heat pumps for industrial heating processes using water as refrigerant
09:30		84, Thermodynamic analysis of a steam ejector chiller with ice storage, <i>Adriano Milazzo</i>	140, Expanding Lubricant Options for Natural Refrigerants – What are the Limitations? <i>Joe Karnaz</i>	74, Large-temperature-lift heat pumps for simultaneous heating and cooling applications in the dairy industry, <i>Dereje S. Ayou</i>
09:50	60, Thermodynamic analysis of an ejector assisted compression-absorption-resorption refrigeration system with multiple refrigerating effects, <i>Anil Kumar</i>	24, Experimental Study of Hybrid Ejector System with R290 Driven by Low-grade Waste Heat, <i>Tokitaka Yoshida</i>		124, Development and analysis of a high-temperature heat pump for steam generation using hydrocarbons as refrigerants, <i>Emilio Navarro-Peris</i> (TBC)
10:10	169, Computational Analysis of a Thermoelectric Subcooler Included in Vapour Compression Cycles with Natural Refrigerants, <i>Patricia Aranguren</i>	123, Evaluation of the potential of using ejector system in autocasade systems for ultralow temperature refrigerators, <i>Emilio Navarro-Peris</i> (TBC)	155, Coupled Fluid-Solid Modelling of the Valve Dynamics in Reciprocating Compressors, <i>Åsmund Ervik</i> (TBC)	107, Performance analysis of high temperature heat pumps and thermal energy storages for a dairy, <i>Marcel Ulrich Ahrens</i>
10:30	Coffee break			
10:50	7A: Gas cycles and sorption systems	7B: Ejectors	7C: Compressors	7D: High temperature heat pumps
10:50	151, Experimentally-based modelling of a gas-fired absorption heat pump with a refrigerant-cooled flue gas heat exchanger, <i>Philipp Wagner</i>	98, Experimental evaluation of the performance of an ejector for a single compression multi-temperature CO2 refrigeration unit, <i>Francesco Fabris</i>	137, Modeling and simulation of oil-free liquid-injected screw compressors using ammonia-water mixture as working fluid, <i>Marcel Ulrich Ahrens</i>	20, Natural refrigerants versus synthetic refrigerants for steam-generating heat pumps, <i>Elias Vieren</i>
11:10	38, Storage and Production of Cold & Heat by a solid-gas ammonia sorption system, <i>David Tadiotto</i>	130, Simultaneous implementation of rotary pressure exchanger and ejectors for CO2 refrigeration system, <i>Muhammad Zahid Saeed</i>	149, CO2 Scroll Compressor with Dynamic Vapor Injection integrated into transcritical refrigeration systems, <i>Rémi Dickes</i>	160, Experimental and model-based analysis of a R600 high-temperature heat pump at sub-critical and transcritical operation, <i>Manuel Verdnik</i>
11:30	181, Assessment of partial wetting characteristics in horizontal tube falling film absorbers using fluorescent uranine, <i>Ryohei Okamoto</i>	62, Ejector for the World: simplified ejector-supported CO2 refrigeration systems for all climates, <i>Ángel Á. Pardiñas</i>	239, Novel Compressor Concept for R718 Chillers, <i>Thomas Werner Moesch</i>	99, Thermodynamic analysis of vapour compression heat pump cycles for high-temperature applications, <i>Martin Pihl Andersen</i>
11:50	223 Natural Working Fluids for Absorption Refrigeration, <i>Yohann Coulier</i>	56, Novel Rotary Pressure Exchanger for Highly Efficient Trans-Critical CO2 Refrigeration Cycle, <i>Azam Thatte</i>	109 Effect of subcooling using expander-compressor unit in transcritical CO2, <i>A.M. Guruchethan</i>	166, Industrial high temperature heat pump for simultaneous production of ice water and process heat, <i>Christian Schlemminger</i> (TBC)
11:50	Lunch			
13:00	8A: Gas cycles and sorption systems	8B: Ejectors	8C: Hydrocarbon systems	8D: High temperature heat pumps
13:00	145, Development of a gas driven zeolite-water adsorption heat pump for multi-family homes, <i>Gerrit Földner</i>	138, Comparison and validation of one-dimensional models of ejector expansion transcritical carbon dioxide refrigeration cycle, <i>Cong You</i>	92, EcoPac – High temperature low charge Isobutane heat pump, <i>Viktor Ölen</i>	49 Efficient steam generation in industry – Combined heat pump cycle with mechanical vapor recompression, <i>Cordin Arpagaus</i>
13:20	82, Analysis and optimization of the absorber of a diffusion absorption chiller, <i>Johannes Brunder</i>	121, Numerical simulations of a vortex tube working with subcritical carbon dioxide, <i>Raphaël Oberti</i>	81, Experimental Study of a Packaged R-290 Cold Climate Heat Pump with External Flow Reversal, <i>Changkuan Liang</i>	154 Analysis of application areas for steam compressors in high-temperature heat pump applications, <i>Hans Madsbøll</i> (TBC)
13:40	89, A comprehensive comparison of correlations for the evaluation of desiccant coated heat exchangers, <i>V.R. Abishraj</i>		113, Hot water heat pump with low charge propane refrigerant, <i>Frederik Ploug Winthereik</i>	213 100°C Hot Water Supplied by CO2 Transcritical Heat Pump with Optimized Tube-in-tube Heat Exchanger, <i>Rui Huang</i> (TBC)
14:00	Closing session			
14:30	End of day 3			

Virtual Poster presentations program

- 4, Double stage transcritical CO₂ monoblock refrigeration unit: design and experimental validation, *Xabier Peña*
- 16, Theoretical study of R-717 for air-conditioning applications with variable frequency drive motor , *Pranab Hajra*
- 18, Monobloc vs. Split-Design of Heat Pumps: Fluid Selection and Thermodynamic Analysis, *Christoph Höges*
- 19, Potential applications of CO₂ systems in developing countries with warm climates, *Ina Colombo*
- 28, Experimental study of R600a mass flow rate in non-equilibrium subcooled two-phase state, *Hasan Md Rakibul*
- 29, Techno-economic analysis of steam generating heat pumps for integration into distillation processes, *Cordin Arpagaus*
- 95, Development of energy efficient sales freezers by using new compressors, hydrocarbon and low emissivity glass, *Per Henrik Pedersen*
- 97, Search of new A2 refrigerant mixtures. Possibilities of reducing hydrocarbons flammability via mixtures., *Daniel Calleja-Anta*
- 131, Recycling of lithium bromide solutions from absorption refrigeration plants, *Steffen Feja*
- 133, Modelling and Simulation of a CO₂-based Combined Heating and Cooling System, *Enrico Sisti*
- 156, Desiccant enhanced ejector-based transcritical CO₂ heat pump technology for high-efficiency space cooling., *Sandeep Koundinya*
- 162, R22 Plant Retrofit for Refrigerated Storage Using A Photovoltaic-Driven R290 Chiller – A Case Study , *Paul Kohlenbach*
- 165, Integration of Solar-Assisted Cooling and Freezing Into A Micro-Brewery Process Using A Hybrid Vapour-Compression/Sorption System, *Uli Jakob*
- 167, Variable speed compressors with HCs refrigerants for integral commercial appliances for sustainability optimization., *Marino Bassi*
- 168, Design and experimental validation of a R-290 dual-source heat pump, *Xabier Peña*
- 170, Gas cooler optimal pressure revisited, *Christian Heerup*
- 179, A Simultaneous Heating and Cooling System for Ice-Making and Food Dehydration with R290 as the Refrigerant, *Haotian Liu*
- 182, Experimental wetting performance assessment of water on a surface-treated aluminum fin-tube substrate, *Richard Jayson Varela*
- 205, Cooperation for heat recovery from a supermarket's CO₂ refrigeration system, *Daniel Kristoffer Steuer*
- 210, Experimental investigation of a transcritical CO₂ air conditioning system for an electric bus, *Xia Song*
- 222, Low temperature subcritical refrigeration cycles working with CO₂ mixtures, *Michał Sobieraj*
- 226, Performance analysis of high temperature heat pump based on the hybrid compression of water medium, *Di Wu*
- 243, Performance comparison of low GWP refrigerant alternatives in a commercial refrigeration application, *Marek Zgliczynski*
- 247, Thermodynamic performance and heat transfer characteristics numerical study of mixture refrigerants with low GWP as alternatives to replace R410A, *Min-Qiang Zeng*
- 13, Energy saving using water as the refrigerant, *Gunnar Minds (TBC)*
- 41, Cooling cycles of multi-effect hybrid compression vector type, *Mihail-Dan Niculae Staicovici (TBC)*
- 52, Numerical investigation on two-stage Stirling cooler with independent displacer, *Kim Bokeum (TBC)*
- 72, Experimental study on the effect of the bubble pump configuration on the diffusion absorption cycle using R600a, *Choi Hyung Won (TBC)*
- 103, Results from measurements at heat pump for district heating using ambient air as heat source, *Svenn Hansen (TBC)*
- 184, Hydrocarbon refrigerant safety considerations and implications for air conditioning system design, *Stephen Anthony Kujak (TBC)*
- 214, Natural working fluids in retail applications in Jordan & Mena regions, *Mohammed Abdin (TBC)*
- 220, Dynamic model and performance evaluation of a thermochemical storage system for residential heat demand, *Kermani Nasrin Arjomand (TBC)*
- 221, Analysis and selection on low-GWP refrigerants in cascade heat pump system, *Hongzhi Yan (TBC)*