COMPRESSOR CONFERENCE

MONDAY SESSIONS

C-1: Compressor Valves I
Room 310    Monday, July 12 - 12:30 p.m. – 2:30 p.m.
Chairperson:

1308 Impact Fatigue Characteristics of Valve Leaves for Small Hermetic Reciprocating Compressors: Abdullah Can Altunlu and Ismail Lazoglu, KOC University, Turkey; Emre Oguz and Serkan Kara; Arcelik A.S., Turkey

1273 Analysis of Dynamic Behavior of Suction Valve Using Strain Gauge in Reciprocating Compressor: Shuhei Nagata, Tsutomu Nozaki, Mechanical Engineering Research Laboratory, Hitachi, Ltd., Japan; Takehiro Akizawa, Refrigerator Design Department, Hitachi Appliances, Inc., Japan

1359 A Theoretical Account of the Piston Influence on Effective Flow and Force Areas of Reciprocating Compressor Valves: Evandro L.L. Pereira and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil

1321 Surface of Flow and Force Effective Areas Applied to Development of Reciprocating Compressors: Eric H. Murakami and Rodrigo Link, Embraco, Brazil; Francisco Lajus Jr., Federal University of Santa Catarina, Brazil

1319 Numerical Analysis of Transient Effects on Effective Flow and Force Areas of Compressor Valves: Rodrigo Link, Embraco, Brazil; César José Deschamps, Federal University of Santa Catarina, Brazil

C-2: Compressor Modeling I
Room 322    Monday, July 12 - 12:30 p.m. – 2:30 p.m.
Chairperson:

1125 Pressure Fatigue Testing of Compressor Enclosures: Titus Broek, Emerson Climate Technologies, USA

1141 Dynamic Transfer Stiffness of Suspension Springs and Discharge Tubes in Hermetic Reciprocating Compressors: Christian Svendsen, Jan Thomsen and Sven Eric Nielsen, Danfoss Compressors GmbH, Germany

1244 Stresses in Reciprocating Compressor Discharge Tubes During Starting: James R. Lenz, Tecumseh Products Company, USA

1281 Simple Modeling and Modal Analysis of Reciprocating Compressor Crankshaft System: Binyan Yu, Xiaoling Yu and Quanke Feng, Xi’an Jiaotong University, P. R. of China

1298 Fatigue Analysis of Helical Suspension Springs for Reciprocating Compressors: Marcos G. D. de Bortoli, Raul Bosco, Jr. and Rinaldo Puff, Embraco, Brazil

C-3: Compressor Valves II
Room 310    Monday, July 12 – 3:00 p.m. – 5:00 p.m.
Chairperson:

1295 Analysis of the Flow in Hermetic Compressor Valves Using the Immersed Boundary Method: Jonatas Lacerda, Tecumseh do Brasil, LTDA, Brazil; José Luis Gasche, UNESP - Ilha Solteira, Brazil

1328 Flow Simulation Through Moving Hermetic Compressor Valves Using the Immersed Boundary Method: Tadeu Tonheiro Rodrigues and José Luiz Gasche, UNESP-Ilha Solteira, Brazil; Júlio Militzer, Dalhouse University, Canada

1256 Study of CFD Considering Valve Behavior in Reciprocating Compressor: Kenji Kinjo, Akira Nakano and Takumi Hikichi, Panasonic Corporation, Japan; Koji Morinishi, Kyoto Institute of Technology, Japan

1360 Investigation on Ring Valve Motion and Impact Stress in Reciprocating Compressors: Yu Wang, Jianmei Feng, Yuefei Wang and Xueyuan Peng, Xi’an Jiaotong University, P. R. of China

1343 A Study of Flapper Valve Motion in a Variable Speed Compressor: James R. Lenz and Douglas Andrew Collings, Tecumseh Products Company, USA
C-4: Compressor Modeling II
Room 322  Monday, July 12 – 3:00 p.m. – 5:00 p.m.
Chairperson:

1460  Consistent Initialization of System of Differential-Algebraic Equations for Dynamic Simulation of Centrifugal Chillers: Pengfei Li and Yaoyu Li, University of Wisconsin-Milwaukee, USA; John E. Seem; Johnson Controls Inc., USA

1486  An Algebraic Model for Transient Simulation of Reciprocating Compressors: Cezar O. R. Negrao, Raul H. Erthal, Diogo E. V. Andrade, Federal University of Technology-Paraná, Brazil; Luciana W. Silva, Embraco, Brazil

1383  Full Numerical Simulation of an Object Oriented Program for Hermetic Reciprocating Compressors: Numerical Verification and Experimental Validation: Oriol Lehmkuhl, Termo Fluids, S.L., Spain & Universitat Politècnica de Catalunya (UPC), Spain; Rashmin Damle, Joaquim Rigola and Joan López, Universitat Politècnica de Catalunya (UPC), Spain

1382  Introduction of CFD&HT Analysis Into an Object Oriented One Dimensional and Transient Program for Numerically Simulate Hermetic Refrigeration Compressors: Joan López, Joaquim Rigola and Assensi Oliva, Universitat Politècnica de Catalunya (UPC), Spain; Oriol Lehmkuhl, Termo Fluids, S.L., Spain & Universitat Politècnica de Catalunya (UPC), Spain

1230  Application of Computational Fluid Dynamics for the Thermodynamic Development of a New Generation of Hermetic Reciprocating Compressor: Raimund Almbauer, Wolfgang Lang, Erwin Berger and Daniel Nagy, Graz University of Technology, Austria

C-5: Noise Reduction Technologies I
Room 310  Tuesday, July 13 – 9:45 – 11:45 a.m.
Chairperson:

1138  An Analytical Model for Calculating Transmission Loss of Compressor's Mufflers Based on the Modal Series Expansion Method: Lin, Xu Zhang, Yun Li and Guangxu Cheng, Xi'an Jiaotong University, P. R. of China

1162  Investigation on Multi-Helmholtz Resonator in the Discharge System of Rotary Compressor: Rongting Zhang, Huanhuan Gu, Yusheng Hu and Sihai Xia, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

1392  The Diagnosis and Optimization of Scroll Compressor Noise Based on the Theory of Near-Field Acoustical Holography: Zhigang Huang, Hong Guo, Binsheng Zhu and Canyu Qian, Guangdong Meizhi Compressor Company, Ltd., P. R. of China

1390  Effects of Sound Radiation Direction in Faulty Hermetic Compressors: Emin Germen, Anadolu University, Turkey; Atilla Kaya and Ümit Unlü, Arcelik, Turkey

1331  Experimental Characterization of Noise Source in the Suction Chamber of a Reciprocating Hermetic Compressor: Marcelo Alexandre Real, Ana Lucia Libardi de Marqui, Eduardo Augusto Gomes Pereira, Tecumseh do Brazil, Brazil; Maria Alzira de Araujo Nunea, Federal University of Brasilia at Gama, Brazil

C-6: Compressor Modeling III
Room 322  Tuesday, July 13 – 9:45 a.m. – 11:45 a.m.
Chairperson:

1302  Numerical Simulation of Transient Heat Transfer During Welding Process: Celso Kenzo Takemori and Moises Alves de Oliveira, Embraco, Brazil; Daniel Tiago Muller, Santa Catarina State University, Brazil

1224  CFD Analysis of Discharge Gas Flow in Rotary Compressor for OCR Reduction: Kamal Sharma, V. Koteswara Rao, M N S V Kiran and Anil Gopinathan, Tecumseh Product India Pvt Limited, India

1225  Using PV Diagram Synchronized With the Valve Functioning to Increase the Efficiency on the Reciprocating Hermetic Compressors: Marcelo Alexandre Real and Eduardo Augusto Gomes Pereira, Tecumseh Company, Brazil

1114  Analytical and Experimental Study of Discharge Flow Behavior Provided by Electronically Controlled Valves in Hermetic Compressors: Sidnei Jose Oliveira and Marcelo Alexandre Real, Tecumseh do Brasil, Brazil

1292  Efficient Cooling in Cylinder Heads for Air Brake Compressors: Andreas Brandl, Hoerbiger Ventilwerke GmbH & Co. KG, Austria
C-7: New Compressor Concepts
Room 310       Tuesday, July 13 – 1:30 p.m. – 3:30 p.m.
Chairperson:


1394 Development of High Efficiency Swing Type Compressor Using New Interior Permanent Magnet Synchronous Motor: Hiroki Kamiishida, Naoto Tomioka, Kazuo Ida, Kenichi Yuasa and Yoshihiro Kataoka, Daikin Industries. Ltd., Japan; Akio Yamagiwa and Keiji Aota, Daikin Industries. Ltd., Japan

1389 Evaluation of a Prototype Rotating Spool Compressor in Liquid Flooded Operation: Gregory T. Kemp and Leonard Elwood, TORAD Engineering, USA; Eckhard A. Groll, Purdue University, USA

1284 Development of a High Efficiency Duel Compressor for Air Conditioner: Koji Hirano, Shogo Shida, Takeshi Tominaga and Shoichiro Kitaichi, Toshiba Carrier Corporation, Japan

1275 Analysis and Development of a Turbivo Compressor for MVR Applications: Elias Boulawz Ksayer and Denis Clodic, Ecole des Mines de Paris, France

C-8: Compressor Thermal Management
Room 322       Tuesday, July 13 – 1:30 p.m. – 3:30 p.m.
Chairperson:

1238 Influence of the Heat Transfer on the Pressure Field in Radial Difusers Flows: Franco Barbi, Iara de Souza Barbosa and José Luiz Gasche, UNESP-Ilha Solteira, Brazil

1307 Thermal Analysis of a Small Hermetic Reciprocating Compressor: Serkan Kara and Emre Oguz, Arcelik A. S., Turkey

1310 Numerical Analysis of Heat Transfer Inside the Cylinder of Reciprocating Compressors in the Presence of Suction and Discharge Processes: Evandro L.L. Pereira and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil; Fernando A. Ribas Jr., Embraco, Brazil

1346 Experimental Investigation of Heat Transfer in Components of a Hermetic Reciprocating Compressor: Thiago Dutra and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil

1347 An Assessment of Experimental Techniques for Measuring Fast Temperature Transients in Compressors: André Morriesen and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil

C-9: Compressor Efficiency Enhancements
Room 310       Tuesday, July 13 – 4:00 p.m. – 6:00 p.m.
Chairperson:

1446 Numerical Investigation of the Influence of the Transient Flow Inside the Suction and Discharge Chamber on Heat Transfer of a Small Reciprocating Compressor: Stephan Lehr, Technische Universitaet Dresden, Germany

1522 A Hybrid Approach of Calculating Gas Pulsations in the Suction Manifold of a Reciprocating Compressor: Nasir Bilal and Douglas E. Adams, Purdue University, USA; Keith Novak and Jack Sauls, Trane - Ingersoll Rand, USA

1348 Theoretical Analysis of the Volumetric Efficiency Reduction in Reciprocating Compressors Due to In-Cylinder Thermodynamics: João Ernesto Schreiner, Jader R. Barbosa Jr. and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil

1358 Fundamental Optimal Performance Design Guidelines for Off-Set Type Reciprocating Compressors to Maximize Mechanical Efficiency: Takuma Tsuji and Noriaki Ishii, Osaka Electro-Communication University, Japan; Keiko Anami, Ashikaga Institute of Technology, Japan; Kiyoshi Sawai, Akira Hiwata, Takashi Morimoto and Kiyoshi Sano, Panasonic Corporation, Japan; Charles Knisely, Bucknell University, USA

1425 High Efficiency Development of a Reciprocating Compressor by Clarification of Loss Generation in Bearings: Masaru Matsui, Yoko Kitsunai and Ko Inagaki, Panasonic Corporation, Japan
C-10: Alternative Refrigerant Compressors  
Room 322          Tuesday, July 13 – 4:00 p.m. – 6:00 p.m.  
Chairperson: 

1351  A Proposed Centrifugal Refrigeration Compressor Rating Method:  Joost J. Brasz, Danfoss Turbocor Compressors, USA

1349  The Part-Load Efficiency Benefit of Oil-Free, High-Speed, Direct-Drive Centrifugal Compressors:  Jose Alvares, Danfoss Turbocor Compressors, USA

1448  Experimental Performance of a Semi-Hermetic Reciprocating Compressor Working With Propane:  Enrico Da Riva, Davide Del Col and Alberto Cavallini, University of Padova, Italy

1405  Modeling and Control of a High Speed Three-Lobe Compressor for Fuel Cell System:  Jéremié M’Boua, Benjamin Blunier and Abdellatif Miraoui, University of Technology of Belfort-Montbéliard, France;  Marcelo Godoy Simoes, Colorado School of Mines, USA

1229  Comparative Study of Two Different Equations of State for Modelling a Reciprocating Compressor for the Refrigerant R600a:  Wolfgang Lang, Raimund A. Almbauer, Erwin Berger and Daniel Nagy, Graz University of Technology, Austria

WEDNESDAY SESSIONS

C-11: Linear Compressors  
Room 310          Wednesday, July 14 – 9:45 a.m. – 11:45 a.m.  
Chairperson: 

1259  A Comprehensive Model of a Miniature-Scale Linear Compressor for Electronics Cooling:  Craig R. Bradshaw, Eckhard A. Groll and Suresh V. Garimella, Purdue University, USA

1272  New Capacity Modulation Algorithm for Linear Compressor:  Jaeyoo Yoo, Sungho Park, Hyuk Lee and Sangsub Jeong, LG Electronics, Korea

1269  The Characteristics of LGE Linear Oscillating Motor:  Sangsub Jeong, Wonsik Oh, Sungman Cho, Hyuk Lee, Jaeyoo Yoo and Hyuk Lee, LG Electronics, Korea

1218  Performance Evaluation of the Energy Efficiency of Crank-Driven Compressor and Linear Compressor for a Household Refrigerator:  Boncheol Ku, Junghoon Park, Yujin Hwang and Jaekeun Lee, Pusan National University, Korea

1288  Characteristic of a Miniature Linear Compressor:  Wen Wang and Xiaoliang Tai, Shanghai Jiao Tong University, P. R. of China

C-12: Rotary Compressors I  
Room 322          Wednesday, July 14 – 9:45 a.m. – 11:45 a.m.  
Chairperson: 

1164  Investigation of Refrigerant Flow Simulation and Experiment of Rolling Piston Compressors:  Shebing Liang, Xiaoli Kang, Qiang Liu, Peng Zhou, Sihai Xia, Yusheng Hu, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

1165  Research on the Effect of Nano-Materials Used in Rotary Compressor:  Yin Zhu, Sihai Xia and Zhengliang Shi, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

1408  Experimental Study on Reduction of Oil Circulation Rate in Rotary Compressor:  Bo Huang, Min Ma, Wei Geng, Shanghai Hitachi Electrical Appliances Co., Ltd., P. R. of China

1134  Study of the Endface Friction of the Revolving Vane Mechanism:  Alison Subiantoro and Kim Tiow Ooi, Nanyang Technological University, Singapore

1132  Analysis of the Vane Contact Force and the Vane Side Friction Loss of the Various Revolving Vane Expander Designs:  Alison Subiantoro and Kim Tiow Ooi, Nanyang Technological University, Singapore
C-13: Lubrication/Tribology  
Room 310  Wednesday, July 14 – 1:00 p.m. – 3:00 p.m.  
Chairperson:  

1467  Tribological Behavior of PTFE, PEEK and Fluorocarbon-Based Polymeric Coatings Used in Air-Conditioning and Refrigeration Compressors:  Emerson Escobar Nunez, Seung Min Yeo and Andreas A. Polycarpou, University of Illinois at Urbana-Champaign, USA  

1445  Effect of Surface Texture on Compressor Piston Lubrication:  Bilgin Hacioglu, Arcelik A.S, Turkey; Zafer Dursunkaya, Middle East Technical University, Turkey  

1393  Wear Characteristics of Ductile Cast Iron Crankshaft Coating:  Ruihong Kong, Chunhui Liu, Xiaowei Liang, Qingchun Zheng and Le Xu, Shanghai Hitachi Electrical Appliances Co., Ltd., P. R. of China  

1207  Lubricating Condition Between Swashplate and Shoe in Swashplate Compressor:  Mitsuhiro Fukuta Yasuhiko Nakahara, Naoya Tanabashi and Tadashi Yanagisawa, Shizuoka University, Japan; Hisashi Suzuki, Sanden Corporation, Japan  

1255  A Simplified Analysis of Lubrication of a Wristpin:  Hubert Bukac, Little Dynamics, Inc., USA  

C-14: Scroll Compressors I  
Room 322  Wednesday, July 14 – 1:00 – 3:00 p.m.  
Chairperson:  

1357  On the Development of Optimal Efficient Compact Scroll Compressors for Refrigerators:  Takuma Tsuji and Noriaki Ishii, Osaka Electro-Communication University, Japan; Kiyoshi Sawai, Akira Hiwata, Takashi Morimoto and Kiyoshi Sano, Panasonic Corporation, Japan; Keiko Anami, Ashikaga Institute of Technology, Japan; Charles Knisely, Bucknell University, USA  

1105  Development of 3D Scroll Compressor and Its Application:  Hajime Sato and Makoto Takeuchi, Mitsubishi Heavy Industries, Ltd., Nagoya Research and Development Center, Japan; Hiroyuki Kobayashi, Tetsuzo Ukai and Hisao Mizuno, Mitsubishi Heavy Industries, Ltd., Japan  

1489  Update on Scroll Compressor Geometry:  Ian H. Bell, Eckhard A. Groll, James E. Braun and Galen King, Purdue University, USA  

1490  Fatigue Design for Scroll Compressor Wraps:  Dominique Gross, Christophe Ancel and Lionel Guglielmi, Danfoss Commercial Compressors, France  

1180  Static and Dynamic Analysis on R410A Scroll Compressor Components:  Yaubin Yang, Yuehju Tang, Yuchoung Chang, Industrial Technology Research Institute, Taiwan, Republic of China  

C-15: Lubrication in Scroll & Other Compressors  
Room 310  Wednesday, July 14 – 3:20 p.m. – 5:20 p.m.  
Chairperson:  

1196  A Study of a New Oil Injection to Compression Chambers on Scroll Compressors:  Kiyoshi Sawai, Akira Hiwata, Atsushi Sakuda, Noboru Iida and Takashi Morimoto, Panasonic Corporation, Japan; Noriaki Ishii, Osaka Electro-Communication University, Japan  

1412  Development of High-Side Shell Scroll Compressor With Novel Oil Return Mechanism:  Cheolhwan Kim, Seheon Choi, Yanghee Cho, Byeongchul Lee, Junbo Yun, Samchul Ha, Air Conditioning Research Laboratory, LG Electronics Inc., Korea; Kwangnoh Eom and Sungchoon Kim, Air Conditioning Company, LG Electronics Inc., Korea  

1181  A Study on Contact Force Between Wraps of Scroll Compressor for CO2 Refrigerant:  Akira Hiwata, Kiyoshi Sawai, Atsushi Sakuda and Takashi Morimoto, Panasonic Corporation, Japan; Mitsuhiro Fukuta and Tadashi Yanagisawa, Shizuoka University, Japan  

1239  Oil-Refrigerant R134a Mixture Non-Isothermal Two-Phase Flow Through the Radial Clearance of Rolling Piston Compressors:  José Luiz Gasche and Andriano Domingos Ferreira, Sao Paulo State University, Brazil  

1326  Fluid Flow in a Screw Pump Oil Supply System for Reciprocating Compressors:  Marcus V. C. Alves, Jader R. Barbosa Jr., Alvaro T. Prata, Federal University of Santa Catarina, Brazil; Fernando A. Ribas Jr., Embraco, Brazil  

1168  Analysis of Oil Pumping in the Hermetic Reciprocating Compressor for Household Refrigerators:  Weifeng Wu, Jian Li and Quanke Feng, Xi’an Jiaotong University, P. R. of China; Longquan Lu, Jiaxipera Compressor Co., Ltd., P. R. of China
C-16: Rotary Compressors II  
Room 322  Wednesday, July 14 – 3:20 p.m. – 5:20 p.m.  
Chairperson:

1352 A Lumped Thermodynamic Model for Scroll Compressors With Special Attention to the Geometric Characterization During the Discharge Process: Evandro L.L. Pereira and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil

1139 Noise Reduction Technology for Inverter Controlled Rotary Compressor: Jianping Huang, Yusheng Hu, Sihai Xia and Jia Xu, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

1217 Numerical Analysis for Rotating Motion of a Rolling Piston in Rotary Compressors – Effective Factors on Characteristics of Rotating Motion of a Rolling Piston—: Yasutaka Ito, Hitoshi Hattori, Toshiba Corporation, Japan; Kazuhiko Miura, Toshiba Carrier Corporation, Japan

1276 High Efficiency Development of a Rotary Compressor by Clarification of Its Shaft Dynamic Motion: Yoko Kitsunai, Panasonic Corporation Living Environment Development Center, Japan; Masaru Matsui and Singo Oyagi, Panasonic Corporation Appliances Development Center, Japan

1140 Dynamic Balance Technology of Inverter Controller Rotary Compressor: Jianping Huang, Yusheng Hu, Sihai Xia and Liping Ren, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

THURSDAY SESSIONS

C-17: CO2 Compressors  
Room 310  Thursday, July 15 – 10:00 a.m. – 12:00 p.m.  
Chairperson:

1525 Experimental Performance of a Prototype Carbon Dioxide Compressor: Seth Holloway, W. Travis Horton and Eckhard A. Groll, Purdue University, USA; Dan Sherman and Marc Albertin, EcoThermics Corp., USA

1411 Development of a Two-Cylinder Rolling Piston CO2 Expander: Jun Yang, Shanghai Jiaotong University & Shanghai Hitachi Electrical Appliances Co., Ltd., P. R. of China; Long Zhang, Li Zhang and Hao Yuan Li, Shanghai Hitachi Electrical Appliances Co., Ltd., P. R. of China

1157 Development of a Scroll Expander for the CO2 Refrigeration Cycle: Hideaki Nagata, Masayuki Kakuda, Shin Sekiya, Mihoko Shimoji and Toshihide Koda, Mitsubishi Electric Corporation, Japan

1429 Analysis of the Journal Bearing Performance in a CO2 Reciprocating Compressor: Bin Yang, Liansheng Li, Yuanyang Zhao, Xi'an Jiaotong University, P. R. of China

1286 A Simplified Thermal Model for a CO2 Compressor: Gustavo C. Weber, Fernando A. Ribas Jr. and José Nilton Fonseca Jr., Embraco, Brazil; Francisco Lajus Jr., Federal University of Santa Catarina, Brazil

1253 Simulation and Development of Trans-Critical CO2 Rolling Piston Compressor: Yunfeng Chang, Bin He and Xin Yang, Xi'an Jiaotong University, P. R. of China; Youngchan Ma, Ingersoll Rand Climate Solutions/Thermo King, USA

C-18: Lubrication/Oils  
Room 322  Thursday, July 15 – 10:00 a.m. – 12:00 p.m.  
Chairperson:

1398 Numerical Investigation of Oil Flow in a Hermetic Reciprocating Compressor: Husnu Kerpicci and Emre Oguz, Arcelik A.S., Turkey; Seyhan Onbasioglu and Alper Yagci, ITU Mechanical Faculty, Turkey

1306 Investigation of Pressure Distribution and Frictional Heat on Self-Lubricated Piston Rings in Reciprocating Compressors: Dianbo Xin, Jianmei Feng, Yanjing Xu and Xueyuan Peng, Xi'an Jiaotong University, P. R. of China

1305 Absorption of Isobutane (R-600a) in Lubricant Oil: Moises A. Marcelino Neto and Jader R. Barbosa Jr., Federal University of Santa Catarina, Brazil

1291 Cooling of a Reciprocating Compressor Through Oil Atomization in the Cylinder: Rodrigo Kremer, Federal University of Santa Catarina & Embraco, Brazil; Jader R. Barbosa Jr. and Cesar J. Deschamps, Federal University of Santa Catarina, Brazil
Tribology Characteristics of HFO and HC Refrigerants With Immiscible Oils - Effect of Refrigerant With Unsaturated Bond:
Tatsuya Sasaki, Hideto Nakao and Kota Mizuno, Mitsubishi Electric Corporation, Japan; Hideaki Maeyama, Mitsubishi Electric Corporation, Shizuoka Works, Japan

C-19: Screw Compressors
Room 310    Thursday, July 15 – 1:00 p.m. – 3:00 p.m.
Chairperson:

1413 Analysis of Oil Film Force in Single Screw Compressor:  Shuo Sun, Weifeng Wu, Xiaoling Yu and Quanke Feng, Xi’an Jiaotong University, P. R. of China

1243 Advanced Design Environment for Screw Machines:  Elvedin Mujic, Ahmed Kovacevic, Nikola Stosic and Ian Smith, City University London, United Kingdom

1214 Comparative Experimental Study on Wear Resistance of Different Types of Star Wheels in the Single Screw Compressor:  Jian Li, Xiaoling Yu, Bo Hu and Quanke Feng, Xi'an Jiaotong University, P. R. of China

1158 Advances in Numerical Modelling of Helical Screw Machines:  Ahmed Kovacevic, Nikola Stosic, Elvedin Mujic and Ian K. Smith, City University London, United Kingdom

1116 Three Decades of Modern Practice in Screw Compressors:  Nikola Stosic, Ahmed Kovacevic and Elvedin Mujic and Ian K Smith, City University London, United Kingdom
# Refrigeration and Air Conditioning Conference

## MONDAY SESSIONS

### R-1: Transportation Air Conditioning Equipment

**Room 214A&B**  
**Monday, July 12 - 12:30 p.m. – 2:30 p.m.**

**Chairperson:**

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<td>2309</td>
<td>Air-Conditioning of Parked Aircraft by Ground-Based Equipment</td>
<td>Evgenia Sikorski, Offenburg University, Germany</td>
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<td>2234</td>
<td>Inherently Safe Looped Thermosyphon Cooling System for Aircraft Applications Using Dielectric Fluid H-Galden</td>
<td>Ekkehard Lohse and Gerhard Schmitz, Hamburg University of Technology, Germany</td>
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<tr>
<td>2226</td>
<td>Reducing the Fuel Consumption by Optimizing the Air Conditioning System</td>
<td>Rico Baumgart and Peter Tenberge, Chemnitz University of Technology, Germany</td>
</tr>
<tr>
<td>2205</td>
<td>Design, Build-Up, and Performance Investigation of a 35 kW (10 Ton) Military Environmental Control Unit Using Transcritical R744 Technology</td>
<td>Stefan Elbel, Creative Thermal Solutions, USA; Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA</td>
</tr>
<tr>
<td>2107</td>
<td>Experimental Techniques to Determine Oil Distribution in Automotive A/C Systems</td>
<td>Steffen Peuker and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA</td>
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### R-2: Heat Pumps for Space Heating

**Room 214C&D**  
**Monday, July 12 - 12:30 p.m. – 2:30 p.m.**

**Chairperson:**

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<td>2434</td>
<td>Thermal Performances of Three Types of Ground Heat Exchangers in Short-Time Period of Operation</td>
<td>Jalaluddin, Akio Miyara, Koutaro Tsubaki and Kentaro Yoshida, Saga University, Japan</td>
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<tr>
<td>2209</td>
<td>Performance Evaluation Under the Actual Operation Condition of a Ground Source Multi-Heat Pump System</td>
<td>Youngman Jeong and Jaekeun Lee, Pusan National University, Korea; Donghyuk Lee and Inkyu Kim, LG Electronics, Korea</td>
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<tr>
<td>2202</td>
<td>Research on Ground Source Heat Pump Design</td>
<td>Amanda Jo Pertzborn, Gregory Nellis and Sanford Klein, University of Wisconsin Madison, USA</td>
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<tr>
<td>2106</td>
<td>An Experimental Study on the Defrosting Performance of a PCM-Based Reverse-Cycle Defrosting Method for Air Source Heat Pumps</td>
<td>Minglu Qu and Shiming Deng, The Hong Kong Polytechnic University, P. R. of China; Yiqiang Jiang, Harbin Institute of Technology, P. R. of China</td>
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<tr>
<td>2435</td>
<td>Performance Characteristics and Mapping for a Variable-Speed Ductless Heat Pump</td>
<td>Howard Cheung and James E. Braun, Purdue University, USA</td>
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<tr>
<td>2496</td>
<td>Payback Period Estimation of Ground-Source and Air-Source Multi Heat Pumps in Korea Based on Yearly Running Cost Simulation</td>
<td>Noma Park, Seunghyun Jung, Heewoong Park, Hwanjong Choi and Simon Chin, LG Electronics, Korea; Hoon Jung, Korea Electric Power Corporation (KEPCO), Korea</td>
</tr>
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### R-3: Heat & Mass Transfer Enhancements

**Room 218A&B**  
**Monday, July 12 - 12:30 p.m. – 2:30 p.m.**

**Chairperson:**

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<td>2502</td>
<td>Experimental Studies to Evaluate the Use of Metal Foams in Highly Compact Air-Cooling Heat Exchangers</td>
<td>Kashif Nawaz, Jassie Bock and Anthony Jacobi, University of Illinois at Urbana Champaign, USA; Zhengshu Dai, Zhejiang University, P. R. of China</td>
</tr>
<tr>
<td>2484</td>
<td>Air-Side Heat Transfer Enhancement by a V-Formation Delta-Winglet Array in A Developing Channel Flow</td>
<td>Jing He and Anthony Jacobi, University of Illinois, USA</td>
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<tr>
<td>2423</td>
<td>Modeling of Silica Gel Dehydration Assisted by Power Ultrasonic</td>
<td>Ye Yao, Shanghai Jiao Tong University, P. R. of China and National Air Transportation Center of Excellence for Research in the Intermodal Transport Environment (RITE), Purdue University, USA; Weijiang Zhang, Yinbo Peng, Lirui Wang, Yifeng Liu and Binbin Chen, Shanghai Jiao Tong University, P. R. of China</td>
</tr>
<tr>
<td>2400</td>
<td>Experimental Study on Heat Transfer Enhancement of Water-Water Shell-and-Tube Heat Exchanger Assisted by Power Ultrasonic</td>
<td>Ye Yao, Shanghai Jiao Tong University, P. R. of China and National Air Transportation Center of Excellence Research in the Intermodal Transport Environment, Purdue University, USA; Xingyu Zhang and Yiyong Guo, Shanghai Jiao Tong University, P. R. of China</td>
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<td>R-4</td>
<td>Designing Energy-Efficient Heat Exchangers—Creating Micro-Channels on the Aluminum Fin Surface</td>
<td>Jia Ying, Khalid F. Eid and Andrew Sommers, Miami University, USA</td>
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<td>R-4: Fault Detection &amp; Diagnostics</td>
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<td>2474</td>
<td>Electrical Determination of Reciprocating Compressor Instantaneous Angular Speed</td>
<td>Christopher Schantz, Zack Remscrim and Steven B. Leeb, Massachusetts Institute of Technology, USA</td>
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<td>2432</td>
<td>Evaluation of a Virtual Refrigerant Charge Sensor</td>
<td>Woohyun Kim and James E. Braun, Purdue University, USA</td>
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<td>2433</td>
<td>Impacts of Refrigerant Charge on Air Conditioner and Heat Pump Performance</td>
<td>Woohyun Kim and James E. Braun, Purdue University, USA</td>
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<td>2381</td>
<td>Residential Heat Pump Heating Performance With Single Faults Imposed</td>
<td>Seok Ho Yoon, Korea Institute of Machinery and Materials, Korea; William Vance Payne and Piotr A. Domanski, National Institute of Standards and Technology, USA;</td>
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<td>2227</td>
<td>Innovative Method for Performance Inspections Used to Optimise Existing Refrigeration and Air-Conditioning Plants</td>
<td>Klas Berglöf, ClimaCheck Sweden AB, Sweden</td>
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<td>2223</td>
<td>Design Method of Steady State Detector for Multi-Evaporator Heat Pump System With Decomposition Analysis Technique</td>
<td>Chul Woo Roh, Haksoo Kim and Minsoo Kim, Seoul National University, Korea; Minsung Kim, Korea Institute of Energy Research, Korea</td>
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<td>R-5: Power &amp; Co-Generation Systems</td>
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<td>2517</td>
<td>Low-Grade Waste Heat Recovery for Power Production Using an Absorption-Rankine Cycle</td>
<td>Thomas Robbins and Srinivas Garimella, Georgia Institute of Technology, USA</td>
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<td>2512</td>
<td>Design and Experimental Investigation of a Small-Scale Organic Rankine Cycle Using a Scroll Expander</td>
<td>Sebastian Declaye, Sylvain Quoilin and Vincent Lemort, University of Liège, Belgium</td>
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<td>2462</td>
<td>Performance Benefits for Organic Rankine Cycles With Flooded Expanders and Internal Regeneration</td>
<td>Brandon Jay Woodland, James E. Braun, Eckhard A. Groll, and W. Travis Horton, Purdue University, USA</td>
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<td>2263</td>
<td>A Steam Expander for a Waste Heat Recovery Cycle</td>
<td>Hyunjin Kim, Hyunjae Kim and Youchan Kim, University of Incheon, Korea</td>
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<td>R-6: Refrigerant Assessments I</td>
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<td>2500</td>
<td>Low Global Warming Alternative Refrigerants for Stationary AC&amp;R Applications</td>
<td>Samuel F. Yana Motta, Mark W. Spatz and Elizabeth D. Vera Becerra, Honeywell, USA - PRESENTED IN CONFERENCE – NOT IN CD ROM</td>
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<td>2404</td>
<td>Ammonia as a Replacement for Medium Sized Modular R-22 Systems</td>
<td>Andy Pearson, Star Refrigeration, United Kingdom</td>
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<td>2403</td>
<td>High Pressure Ammonia Systems – New Opportunities</td>
<td>Andy Pearson, Star Refrigeration, United Kingdom</td>
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<td>2514</td>
<td>Drop-in Experiments on Heat Pump Cycle Using HFO-1234ze(E) and Its Mixtures With HFC-32</td>
<td>Shigeru Koyama, Nobuo Takada and Shou Fukuda, Kyushu University, Japan</td>
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<td>2160</td>
<td>New High Performance, Low GWP Refrigerants for Stationary AC and Refrigeration</td>
<td>Thomas Joseph Leck, DuPont Fluorochemicals, USA</td>
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<td>2142</td>
<td>A Non-Flammable, Reduced GWP, HFC-134a Replacement in Centrifugal Chillers: DR-11</td>
<td>Konstantinos Kontomaris, Thomas J. Leck and Joshua Hughes, DuPont Fluorochemicals, USA</td>
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TUESDAY SESSIONS

R-7: Industrial Refrigeration
Room 214A&B Tuesday, July 13 - 9:45 a.m. - 11:45 a.m.
Chairperson:

2492 Experimental Investigation and Optimization of a Cascade Cycle: Giovanni Di Nicola, Cristiano Di Nicola, Matteo Moglie and Giulio Santori, Università Politecnica delle Marche, Italy

2453 Energy Saving Opportunities in an Air Separation Process: Liwei Yan, Yunsong Yu, Yun Li and Zaoxiao Zhang, Xi’an Jiaotong University, P. R. of China

2266 Theoretical and Experiment Research on a Multi-Temperature Quasi-Cascade Refrigerating System: Yuhui Liang, Hongqi Li, Di Wang and Xinte Wang, Beijing University of Technology, P. R. of China; Zhigang Zhao, Chinese Academy of Science, P. R. of China

2265 Development and Performance Analysis of a Multi-Temperature Quasi-Cascade Refrigerating System: Yuhui Liang, Hongqi Li, Di Wang and Xinte Wang, Beijing University of Technology, P. R. of China; Zhigang Zhao, Chinese Academy of Science, P. R. of China

R-8: Refrigerant Injection for Vapor Compression Systems
Room 214C&D Tuesday, July 13 - 9:45 a.m. - 11:45 a.m.
Chairperson:

2475 Performance of Air-to-Water Heat Pump Using 2 Stage Vapor Injection: Younghwan Ko, Simon Jin and Samchul Ha, LG Electronics, Korea; Jaekeun Lee, Pusan National University, Korea

2477 Effects of Flash and Vapor Injection on the Air-to-Air Heat Pump System: Yonghee Jang, Eungyeol Lee, Simon Chin and Samchul Ha, LG Electronics, Korea

2267 A Novel Capacity Regulation Technology for Heat Pump System With Scroll Compressors: Baolong Wang, Linjun Han, Wenxing Shi and Xianting Li, Tsinghua University, P. R. of China

2249 Control Strategy of Vapor Injection Cycle: Xing Xu, Yunho Hwang, and Reinhard Radermacher, University of Maryland, USA; Hung Pham, Emerson Climate Technologies, USA

2171 Performance Limit for Economized Cycles With Continuous Refrigerant Injection: Margaret M. Mathison, James E. Braun and Eckhard A. Groll, Purdue University, USA

R-9: Heat Exchanger Modeling & Design
Room 218A&B Tuesday, July 13 - 9:45 a.m. - 11:45 a.m.
Chairperson:

2169 Analysis of Segment-By-Segment e-NTU Modelling of a Minichannel CO₂ Gas Cooler: Santiago Martínez-Ballester, José-M. Corberán, José González-Maciá, Universidad Politecnica de Valencia, Spain; Piotr A. Domanski, National Institute of Standards and Technology, USA

2495 A Numerical Study on the Application of Nanofluids in Refrigeration Systems: Juan Carlos Valdez Loaiza, Frank Chaviano Pruzaesky and Jose Alberto Reis Parise, Pontifical Catholic University of Rio de Janeiro, Brazil

2498 Plate-Fin and Tube Heat Exchangers Refrigerant Circuiting Optimization in Vapor Compression Refrigeration Systems: Luis Carlos Castillo Martinez, Universidad Tecnologica del Peru, Peru; Jose Alberto Reis Parise, Pontifical Catholic University of Rio de Janeiro, Brazil; Samuel Fortunato Yana Motta and Elizabet del Carmen Vera Becerra, Honeywell, USA

2313 Optimization of Fin Density for Air Cooled Heat Exchangers: Hongtao Qiao, Varun Singh, Vikrant Aute and Reinhard Radermacher, University of Maryland, USA

2312 Microchannel Approximation Assisted Design Optimization and CFD Verification: Khaled Saleh, Omar Abdelaziz, Vikrant Aute, Reinhard Radermacher and Shapour Azarm, University of Maryland, USA

2152 Capacity and Acoustic Optimization on a Fan/Heat Exchanger Unit: Sophie Colmek, Tecumseh Europe, France
R-10: Dynamic Modeling
Room 214A&B       Tuesday, July 13 - 1:30 p.m. - 3:30 p.m.
Chairperson:

2278  A State Space Approach for the Dynamic Analysis of Automotive Air Conditioning System: Arul Selvan Subramaniyan and Seethalakshmi Pandian, Anna University, India

2316  Modelica Based Dynamic Modeling of Water-Cooled Centrifugal Chillers: Pengfei Li and Yaoyu Li, University of Wisconsin-Milwaukee, USA; John E. Seem, Johnson Controls Inc., USA

2103  Measurement and Simulation of Startup and Shut Down of Heat Pumps: Michael Uhlmann and Stefan S. Bertsch, Interstate University of Applied Sciences, Buchs, Switzerland

2340  Hardware-in-the-Loop Load Emulation for Air-Conditioning and Refrigeration Systems: Richard Otten, Bin Li and Andrew Alleyne, University of Illinois at Urbana-Champaign, USA

2317  Refrigerant Migration Modeling During Shut-Down and Start-Up Cycling Transients: Bin Li, Steffen Peuker, Andrew Alleyne and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA

2310  Dynamic Modeling of Mechanical Draft Counter-Flow Wet Cooling Tower With Modelica: Xiao Li and Yaoyu Li, University of Wisconsin Milwaukee, USA; John E Seem, Johnson Controls, Inc. USA

R-11: Air-to-Water Heat Pumps
Room 214C&D       Tuesday, July 13 - 1:30 p.m. - 3:30 p.m.
Chairperson:

2228  HSPF Determination With Field-Test Results: Sami Barbouchi, Gilles Dejardins, Didier Roland and Bernard Horber, EDF, France

2518  Transcritical Carbon Dioxide Microchannel Heat Pump Water Heaters: Part I - Validated Component Simulation Modules: Christopher Goodman, United Technologies Research Center, USA; Brian Fronk and Srinivas Garimella, Georgia Institute of Technology, USA

2519  Transcritical Carbon Dioxide Microchannel Heat Pump Water Heaters: Part II - System Simulation and Optimization: Christopher Goodman, United Technologies Research Center, USA; Brian Fronk and Srinivas Garimella, Georgia Institute of Technology, USA

2497  On the Optimal Water Discharge Temperature of Air-to-Water Heat Pump for Space Heating and Domestic Hot Water: Noma Park, Hyoungsuk Woo, Jongchul Ha, Donghyuk Lee and Simon Chin, LG Electronics, Korea

2279  New Methodology of Characterization of Seasonal Performance Factor of an Air-To-Water Heat Pump: Chantal Maatouk, Assaad Zoughaib and Denis Clodic, Ecole de Mines ParisTech. Center for Energy and Processes, France

2213  Experimental Investigation On The Two-Stage Compression Heat Pump Water Heater System With Refrigerant Injection: Fei Liu, Jianming Tan and Jiangxiong Xiong, Gree Electric Appliances, P. R. of China

R-12: Refrigerant & Oil Properties
Room 218A&B       Tuesday, July 13 - 1:30 p.m. - 3:30 p.m.
Chairperson:

2450  Critical Review of the Latest Thermodynamic and Transport Property Data and Models, and Equations of State for R-1234yf: J. Steven Brown, The Catholic University of America, USA; Claudio Zilio and Alberto Cavallini, University of Padova, Italy

2444  Refrigerants of the Methane, Ethane and Propane Series: Thermal Conductivity Calculation Along the Saturation Line: Giovanni Latini and Marco Sotte, Università Politecnica delle Marche, Italy

2439  Thermodynamic Property Model for the Mixtures of Difluoromethane (HFC-32) + Isobutane and Difluoromethane + Trans-1,3,3,3-Tetrafluoropropene (HFO-1234ze(E)): Ryo Akasaka, Kyushu Sangyo University, Japan

2277  Properties of Polyvinylether (PVE) as a Lubricant for Air Conditioning Systems With HFC Refrigerants: Data Update: Tomoya Matsumoto, Masato Kaneko and Masaki Tamano, Idemitsu Kosan Co., Ltd., Japan

2189  Thermodynamic Properties of Trans-1,3,3,3-Tetrafluoropropene-[R1234ze(E)]: Measurements of Density and Vapor Pressure and a Comprehensive Equation of State: Mark O. McLinden, Monika Thol and Eric W. Lemmon, National Institute of Standards and Technology, USA
R-13: Refrigerant Throttles & Expanders
Room 214A&B Tuesday, July 13 - 4:00 p.m. - 6:00 p.m.
Chairperson:

2430 Simulation on Starting Procedure of Scroll Expander Driven by Compressed Air: Guangbin Liu, Yuanyang Zhao, Liangsheng Li and Pengcheng Shu, Xian Jiaotong University, P. R. of China

2274 Characterization of Friction Loss in Pelton Turbine: Yannick Beucher, Elias Boulawz Ksayer and Denis Clodic, Ecole des Mines de Paris, France

2508 Capacity Measurement and Characterization of CO₂ Electronic Expansion Valves for Supermarket Refrigeration: Joseph Poland, Hill Phoenix, USA; Tobias Sienel and Oliver Finckh, Carrier Commercial Refrigeration, Germany

2387 Control of an Electronic Expansion Valve Using an Adaptive PID Controller: Antônio Augusto Torres Maia, Marconi de Assis Silva, Ricardo Nicolau Nassar Koury, Luiz Machado and Alexandre Carlos Eduardo, Federal University of Minas Gerais, Brazil

R-14: Domestic Refrigerators I
Room 214C&D Tuesday, July 13 – 4:00 p.m. - 6:00 p.m.
Chairperson:

2379 Analysis of Fin-and-Tube Evaporators in No-Frost Domestic Refrigerators: Carles Oliet, Carlos D. Pérez-Segarra, Joaquim Rigola and Assensi Oliva, Universitat Politecnica de Catalunya (UPC), Spain

2378 Numerical Study of Air Inside Refrigerating Compartment of Frost-Free Domestic Refrigerators: Julian E. Jaramillo, Universitat Politecnica de Catalunya (UPC), Spain and University of Groningen, The Netherlands; Joaquim Rigola, Carlos D. Pérez-Segarra and Carles Oliet, Universitat Politecnica de Catalunya (UPC), Spain

2296 COP-Based Performance Evaluation of Domestic Refrigerators Using Accelerated Flow Evaporators: Paulo Waltrich, Jader R. Barbosa, Jr., Federal University of Santa Catarina, Brazil; Christian J. L. Hermes, Federal University of Paraná, Brazil

2190 An Experimental Study on the Performance of a Two-Circuit Cycle With Parallel Evaporators for a Domestic Refrigerator-Freezers: Wonjae Yoon, Haewon Jung, Hyun joon Chung and Yongchan Kim, Korea University, Korea

2111 Numerical Assessment of Frosting and Defrosting of ‘No-Frost’ Evaporators: Fernando T. Knabben, and Claudio Melo, Federal University of Santa Catarina, Brazil; Christian J. L. Hermes, Federal University of Paraná, Brazil

2122 Transient Simulation of Household Refrigerators: A Semi-Empirical, Quasi-Steady Approach: Bruno N. Borges and Claudio Melo, Federal University of Santa Catarina, Brazil; Christian J.L. Hermes, Federal University of Paraná, Brazil; Joaquim M. Goncalves, Federal Institute of Technological Education of Santa Catarina, Brazil

R-15: Micro-Channel Heat Exchangers
Room 218A&B Tuesday, July 13 - 4:00 p.m. - 6:00 p.m.
Chairperson:

2147 Experimental Comparison of the Impact of Air-Side Particulate Fouling on the Thermo-Hydraulic Performance of Microchannel and Plate-Fin Heat Exchangers: Ian H. Bell and Eckhard A. Groll, Purdue University, USA

2523 Simulation of Condensation in a Circular Minichannel: Application of VOF Method and Turbulence Model: Enrico Da Riva, David Del Col and Alberto Cavallini, University of Padova, Italy; Suresh V. Garimella, Purdue University, USA

2487 Prediction of Two-Phase Heat Transfer in Horizontal Multi-Port Microchannels Using Probabilistic Flow Regime Maps: Emad W. Jassim, University of Illinois at Urbana-Champaign, USA; Ty Newell and Benjamin E. Newell, Newell Instruments Inc., USA

2406 Transport Phenomena Involved in Controlled Atmosphere Brazing of Microchannel Aluminum Heat Exchanger: Hui Zhao, Stefan Elbel and Predrag S. Hrnjak, Creative Thermal Solutions, Inc., USA

2290 Experiments of Condensation Heat Transfer in Micro Channel Heat Exchanger: Wen Wang and Xun Wang, Shanghai Jiao Tong University, P. R. of China

2117 Quantification of Refrigerant Distribution and Effectiveness in Microchannel Heat Exchangers Using Infrared Thermography: Chad D. Bowers, Creative Thermal Solutions, USA; Scott S. Wujek and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA
WEDNESDAY SESSIONS

R-16: AC Equipment Characterization & Enhancement
Room 214A&B  Wednesday, July 14 - 9:45 a.m. - 11:45 a.m.
Chairperson:

2221 Development of the Performance Evaluation Method for a Split Air Conditioning System Using the Compressor Characteristic Curve: Takuya Wakahara and Shigeki Kametani, Tokyo University of Marine Science and Technology, Japan; Takehito Imanari, Tokyo Gas Co., Ltd., Japan; Tatsuo Nobe, Kogakuin University, Japan

2268 Performance Domain of Multiple-Split Air Conditioning System: Wenxing Shi, Wei Zhao, Baolong Wang and Xianting Li, Tsinghua University, P. R. of China

2184 Linear Matrix Inequalities Based on Linear Quadratic Regulator for the H2/Hinf Control of the Inverter Split Air Conditioner Temperature: Yaobin Yang, Minder Wu and Yuchoung Chang, Industrial Technology Research Institute, Taiwan, Republic of China

2156 The Research of Water Evaporating-Cooling Humidifier’s Application in Air Conditioner: Deling Xiao and Qi Yuan, Refrigeration Institute of Gree Electric Appliances, P. R. of China

2155 Experimental Investigation of Purification Function of Air Conditioner: Qi Yuan, Haiying Li and Deling Xiao, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

2151 Analysis on the Performance Degradation for Residential Air-Conditioner: Bo Zheng and Xiangfei Liang, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

R-17: Heat-Driven Refrigeration Systems
Room 214C&D  Wednesday, July 14 - 9:45 a.m. - 11:45 a.m.
Chairperson:

2336 An Adsorption Air-Conditioning System to Reduce Engine Emissions and Fuel Consumption for Heavy-Duty Vehicles: Yongfang Zhong, Pennsylvania State University, USA; Kevin L. Wert, Thermacore Inc., USA; Tiegang Fang, North Carolina State University, USA

2516 A Microscale Monolithic Absorption Heat Pump: Matthew Determan and Srinivas Garimella, Georgia Institute of Technology, USA

2254 Theoretical Investigation of Solar Energy High Temperature Heat Storage Technology Based on Metal Hydrides: Xiangyu Meng, Zewei Bao, Fusheng Yang and Zaoxiao Zhang, Xi'an Jiaotong University, P. R. of China


2191 Numerical Studies on Vertical Tubular Generator in Vapour Absorption Refrigeration System: Balamurugan Pasupathy and Mani Annamalai, Indian Institute of Technology Madras, India

2128 Heat and Mass Transfer Studies on Plate Heat Exchangers in R134a/DMF Based Vapour Absorption Refrigeration System: Suresh Mariappan and Mani Annamalai, Indian Institute of Technology Madras, India

R-18: Refrigerant Assessments II
Room 218A&B  Wednesday, July 14 - 9:45 a.m. - 11:45 a.m.
Chairperson:

2422 HFO-1234yf Performance in a Beverage Cooler: Barbara Minor, DuPont Fluoroproducts, USA; Carlos Montoya and Francisco Sandoval Kasa, Femsa, Mexico

2121 Exploring the Performance Characteristics of CO2 Cycles in a Breadboard-Type Test Facility: Gustavo Portella Montagner and Claudio Melo, Federal University of Santa Catarina, Brazil

2499 Analysis of LGWP Alternatives for Small Refrigeration (Plugin) Applications: Samuel F. Yana Motta, Elizabet D. Vera Becerra and Mark W. Spatz, Honeywell, USA

2325 Performance of R-438A in R-22 Refrigeration and Air Conditioning Systems: Dr. Charles C. Allgood and C. Curtis Lawson, DuPont Fluorochemicals, USA
2300 Refrigerant R1234yf Performance Comparison Investigation: Pamela Reasor, Vikrant Aute and Reinhard Radermacher, University of Maryland, USA

2208 Evaluation of Cycle Performance of Room Air Conditioner Using HFO1234yf as Refrigerant: Kazuhiro Endoh, Hiroaki Matsushima and Shoji Takaku, Hitachi, Ltd., Japan

R-19: Ejectors
Room 214A&B Wednesday, July 14 - 1:00 p.m. - 3:00 p.m.
Chairperson:

2210 Ejector-Based Air Conditioner Utilizing Natural Refrigerants: Dariusz Butrymowicz, Kamil Smierciew and Jaroslaw Karwacki, Polish Academy of Sciences, Poland; Mark J. Bergander, Magnetic Development, Inc., USA

2473 Experimental Investigation of an R410A Vapor Compression System Working With an Ejector: Gustavo Pottkee and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA; Bei Guo, University of Xi'an Jiaotong, P. R. of China

2362 1-D Modeling of Supersonic Carbon Dioxide Two-Phase Flow Through Ejector Motive Nozzle: Wojciech Angielczyk, Jean-Marie Seynhaeve and Yann Bartosiewicz, Université Catholique de Louvain, Belgium; Dariusz Butrymowicz, Institute of Fluid-Flow Machinery of Polish Academy of Sciences, Poland

2212 Computational and Thermodynamic Investigation of Condensing Injector Theory and Applications: Thomas W. Furlong, Michael F. Colarossi and David P. Schmidt, University of Massachusetts, USA; Mark J Bergander, Magnetic Development, Inc., USA

2211 Refrigeration Cycle With an Ejector for Second Step Compression: Mark J Bergander, Magnetic Development, Inc. USA; Dariusz Butrymowicz, Kamil Smierciew and Jaroslaw Karwacki, Polish Academy of Sciences, Poland

R-20: Alternative Cooling Technologies
Room 214C&D Wednesday, July 14 - 1:00 p.m. - 3:00 p.m.
Chairperson:

2251 Enhancement of the Separate Sensible and Latent Cooling Air-Conditioning Systems: Jiazhen Ling, Yunho Hwang, and Reinhard Radermacher, University of Maryland, USA; Osamu Kuwabara, Sanyo Electronics, Japan

2250 Experimental Evaluation of Separate Sensible and Latent Cooling Air-Conditioning System Integrated With Desiccant Wheel: Osamu Kuwabara, Sanyo Electronics, Japan; Jiazhen Ling, Yunho Hwang, and Reinhard Radermacher, University of Maryland, USA

2335 Optimization of Cylindrical Halbach Permanent Magnet Array Dimensions for Magnetic Refrigeration: Mehmet H. Kural, Serdar Celik and Sainath Nageshwaran, Southern Illinois University, USA

2334 Experimental Analysis of a Stirling Refrigerator Employing Jet-Impingement Heat Exchanger and Nanofluids: Serdar Celik, Sainath Nageshwaran and Karthik Bachu, Southern Illinois University, USA

R-21: Air-Side HX Characterization & Performance
Room 218A&B Wednesday, July 14 - 1:00 p.m. - 3:00 p.m.
Chairperson:

2416 Experimental Investigation of Frost Growth on Microchannel Heat Exchangers: Ehsan Moalleh, Lorenzo Cremaschi and Daniel E. Fisher, Oklahoma State University, USA

2419 Incorporating a Frost Model With Segment by Segment by Segment Heat Exchanger Simulation: - Application to Microchannel Heat Exchanger: Sankaranarayanan Padmanabhan, Daniel Fisher and Lorenzo Cremaschi, Oklahoma State University, USA

2143 CFD Simulation and Experimental Study on Air-Side Performance for MCHX: Xiaoping Tu, Huahe Lin and Xiangfei Liang, Gree Electric Appliances, P. R. of China


2185 Dry and Wet Air-Side Performance of a Louver-Finned Heat Exchanger Having Flat Tubes: Nachyun Kim, Soohwan Kim, Howon Byun and Euljong Lee, University of Incheon, Korea

R-22: Commercial Refrigeration
Room 214A&B       Wednesday, July 14 - 3:20 p.m. - 5:20 p.m.
Chairperson:

2513 Energy Use of Doored and Open Vertical Refrigerated Display Cases: Brian Fricke and Bryan Becker, University of Missouri - Kansas City, USA

2507 Energy Consumption and Performance of Supermarket Refrigeration Systems: Joseph Poland, Hill Phoenix, USA; Eckhard A Groll and W. Travis Horton, Purdue University, USA

2245 A Comparison of LED Lighting Performance for Supermarket Vertical Refrigerated Display Cases: Yoelit Hiebert, Sai Prakash Putti, Dennis Wagner, Hussmann Corporation, Ingersoll Rand, USA; Sesa Madireddi, Nurtuenergy

2110 Experimental Study of Frost Accumulation on Fan-Supplied Tube-Fin Evaporators: Diogo L. da Silva and Claudio Melo, Federal University of Santa Catarina, Brazil; Christian J.L. Hermes, Federal University of Paraná, Brazil

2109 Design and Optimization of Refrigeration Cassettes for Light Commercial Applications: Maicon Waltrich and Claudio Melo, Federal University of Santa Catarina, Brazil; Christian J. L. Hermes, Federal University of Paraná, Brazil

R-23: Vapor Compression Cycle Improvements
Room 214C&D       Wednesday, July 14 - 3:20 p.m. - 5:20 p.m.
Chairperson:

2148 Impact of Oil Solubility and Refrigerant Flashing on the Performance of Transcritical CO₂ Vapor Compression Systems With Oil Flooding and Regeneration: Ian H. Bell, Eckhard A. Groll, James E. Braun, W. Travis Horton, Purdue University, USA

2426 The Effect of Refrigerant Flowrate Control of Outdoor Heat Exchanger: Hanchoon Lee, Hongseong Kim, Yongcheol Sa, Saikoo Oh, Baikyoung Chung and Samchul Ha, LG Electronics, Korea

2241 Experimental Analysis of a Variable Capacity Heat Pump System Focusing on the Compressor and Inverter Loss Behavior: Hatef Madani, Navid Ahmadi, Joachim Claesson and Per Lundqvist, Royal Institute of Technology, KTH, Sweden

2236 Booster Vapor-Compression Refrigerating Systems: Dmytro Buyadgie, Wilson Ltd, Ukraine; Vitaliy Sechenyh and Sergii Nichenko, Wilson Ltd, Ukraine and Odessa State Academy of Refrigeration, Ukraine

2102 Experimental Investigation of Closed Loop Oscillating Heat Pipe as the Condenser for Vapor Compression Refrigeration: Pracha Yeunyongkul and Phrut Sakulchangsatjatai, Chiang Mai University, Thailand; Afshin J. Ghajar, Oklahoma State University, USA

2479 Heating Performance With a Volume Ratio on 2-Stage Compressor: Younghwan Ko, Sangkyyoung Park, Byoungjin Ryu and Simon Chin, LG Electronics, Korea

R-24: Lubricant Characterization & Design
Room 218A&B       Wednesday, July 14 - 3:20 p.m. - 5:20 p.m.
Chairperson:

2488 Experimental Measurement of Oil Hold-Up During Refrigerant Condensation and Evaporation in Two Phase Flow: Matthew Alonso, Emad W. Jassim and Ty A. Newell, University of Illinois at Urbana-Champaign, USA

2327 Oil Retention and Pressure Drop in Horizontal and Vertical Suction Lines With R410A/POE: Kurt F. Zoellick and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA

2195 New Demands for Refrigeration Oil Extreme Low Viscosity Oil: Tomonari Matsumoto and Takashi Kaimai, Japan Energy Corporation, Japan

2175 A Comparative Study of Traditional and Non-Traditional Polyol Ester Lubricants for Carbon Dioxide (R-744) Applications: Edward T. Hessell, Dale Carr, Richard Kelley, Chemtura Corporation, USA; Christopher Seeton, Seeton C&P, USA

2174 Method for Quantitatively Analyzing Flow Phenomena in Annular-Mist Two-Phase Flows: Scott S. Wujek and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA

2173 Method for Measuring Oil Contained in Air-Conditioning Components: Scott S. Wujek, Steffen Peuker, Helena Mai, Joseph Bower, Matthias Koffler and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA
THURSDAY SESSIONS

R-25: Industrial & Heat Recovery Heat Pumps
Room 214A&B     Thursday, July 15 - 10:00 a.m. - 12:00 p.m.
Chairperson:

2372 Improvements of High-Temperature Drying Heat Pumps: Vasile Minea, Hydro-Quebec Research Institute, Canada

2311 Experimental Simulation of a Heat Recovery Heat Pump System in Food Industries: Khattar Assaf, EDF R&D, France and MINES ParisTech, France; Assaad Zoughaib and Denis Clodic, MINES ParisTech, France; Eugenio Sapora and Jean-Louis Peureux, EDF R&D, France

2282 Status And Outlook: Industrial Heat Pumps: Rainer Jakobs, Information Centre on Heat Pumps and Refrigeration e.V., Germany and University of Cooperative Education, Germany; Dominik Cibis, University of Cooperative Education, Germany; Hans-Juergen Laue, Information Centre on Heat Pumps and Refrigeration e.V., Germany

2277 Energy Efficiency of Air-to-Air Mini Heat Pump: Sorina Mortada, Assaad Zoughaib, Christine Arzano-Daurelle and Denis Clodic, Center of Energy & Process, Ecole des Mines de Paris/ EDF R&D, France

R-26: Transport & Domestic Refrigeration
Room 214C&D     Thursday, July 15 - 10:00 a.m. - 12:00 p.m.
Chairperson:

2137 Reintroduction of Cryogenic Refrigeration for Cold Transport: Howard Pedolsky, Ukram Industries, USA; Ray La Bau, Air Liquide Industrial U.S., USA

2324 Performance Evaluation of an Economised Indirect Multi-Temperature Transport Refrigeration System: Shane Smyth, Donal P. Finn and Barry Brophy, University College Dublin, Ireland

2320 A Real Time Control Strategy for Optimisation of an Economised Indirect Multi-Temperature Transport Refrigeration System: Shane Smyth, Donal P. Finn and Barry Brophy, University College Dublin, Republic of Ireland

2192 Phase Change Materials for Domestic Refrigerators to Improve Food Quality and Prolong Compressor Off Time: Pradip Subramaniam, Chetan Tulapurkar, G. Thagamani and Ramasamy Thiyagarajan, GE India Technology Center, India and GE Appliances, USA

2115 Uncertainty Study in Freezer/Refrigerators Consumption Tests: Sidnei Jose Oliveira, Tecumseh do Brasil, Brazil

R-27: Refrigerant Heat Transfer & Pressure Drop
Room 218A&B     Thursday, July 15 - 10:00 a.m. - 12:00 p.m.
Chairperson:

2491 Study on Flow and Heat Transfer Characteristics of Supercritical Carbon Dioxide Cooled With Different Types of Lubricating Oil: Chaobin Dang, Keitaro Hoshika and Eiji Hihara, The University of Tokyo, Japan; Masato Kaneko, Idemitsu Cooperation, Japan

2459 R744 Flow Boiling Heat Transfer With and Without Oil at Low Temperatures in 11.2 mm Horizontal Smooth Tube: Seongho Kim, Nur Pehlivanoglu, Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA

2438 Effect of Oil on Heat Transfer and Pressure Drop of R744 in 6.1 mm Horizontal Smooth Tube: Nur Pehlivanoglu, Seongho Kim and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA

2424 Heat Rejection from R744 Near the Critical Point: Chieko Kondou and Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA

2293 Determination of Void Fraction in Separated Two-Phase Flows Using Optical Techniques: Chad D. Bowers, Predrag S. Hrnjak, Creative Thermal Solutions, USA and University of Illinois at Urbana-Champaign, USA

2104 HC-290 (Propane) Vaporisation Inside a Brazed Plate Heat Exchanger: Giovanni A. Longo, University of Padova, Italy
R-28: Heat Exchanger Performance Characterization
Room 214A&B        Thursday, July 15 - 1:00 p.m. - 3:00 p.m.
Chairperson:

2461 Flow Patterns and Mode Transitions for Falling-Films on Flat Tubes: Xiaofei Wang, Xi'an Jiaotong University, P. R. of China and University of Illinois at Urbana-Champaign, USA; Predrag S. Hrnjak, University of Illinois at Urbana-Champaign, USA and Creative Thermal Solutions, USA; Stefan Elbel, Creative Thermal Solutions, USA; Anthony Jacobi, University of Illinois at Urbana-Champaign, USA; Maogang He, Xi'an Jiaotong University, P. R. of China

2197 Heat Transfer Research on a Special Cryogenic Heat Exchanger-a Neutron Moderator Cell (NMC): Xiaoling Yu, Jian Li and Quanke Feng, Xi'an Jiaotong University, P. R. of China

2193 Experimental Studies on Porous Wick Flat Plate Heat Pipe: Somasundaram Dhanabal and Mani Annamalai, Indian Institute of Technology Madras, India

2176 Experimental Determination of Flow and Heat Transfer Correlations for Passive Regenerators: Stefanie Knauf, Gregory Nellis and Sandord Klein, University of Wisconsin-Madison, USA

2150 Experimental Investigation on Condensation Performance of Fin-and-Flat-Tube Heat Exchanger: Xiangfei Liang, Shumin Xing, Rong Zhuang and Bo Zheng, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

2149 Experimental Investigation on Condensation Performance of Brazed Type Parallel Flow Condensers: Xiangfei Liang, Shumin Xing, Huawe Lin and Rong Zhuang, Gree Electric Appliances, Inc. of Zhuhai, P. R. of China

R-29: Modeling of Air Conditioning & Refrigeration Systems
Room 214C&D        Thursday, July 15 - 1:00 p.m. - 3:00 p.m.
Chairperson:

2315 A Review for Numerical Simulation of Vapor Compression Systems: Hongtao Qiao, Reinhard Radermacher and Vikrant Aute, University of Maryland, USA

2442 Dynamic Modeling of CO₂ Supermarket Refrigeration System: Runfu Shi and Degang Fu, United Technologies Research Center (China), Ltd., P. R. of China; Yinshan Feng, James Fan, Stevo Mijanovic, Thomas Radcliff, United Technologies Research Center, USA

2449 Transient Lumped Parameter Modeling for Vapour Compression Cycle Based Refrigerator: Chetan Tulapurkar and Richa Khandelwal, GE Global Research, India

2130 An Adaptive Neuro-Fuzzy Inference System (ANFIS) Modelling of Oil Retention in a Carbon Dioxide Air-Conditioning System: Mehdi Mehrabi and Seyed Mehdi Pesteii, Urmia University, Iran
B-1: Net Zero Energy Buildings
Room 218C&D  Monday, July 12 - 12:30 p.m. – 2:30 p.m.
Chairperson: Thanos Tzempelikos, Purdue University, USA

3373 Simplified Linear Models for Predictive Control of Advanced Solar Homes With Passive and Active Thermal Storage: José A. Candanedo and Andreas K. Athienitis, Concordia University, Canada

3353 Residential Housing Photovoltaic System Performance in a Northern Climate: Chanikarn Yimprayoon and Mojtaba Navvab, University of Michigan, USA

3232 Utilizing Heat Dump Capacity of a Small Pond Attached to Infloor Slab of a Net-Zero Energy House: Toktam Saeid and Alan Fung, Ryerson University, Canada; Hessam Taherian, Texas A&M University, USA

3199 Net-Zero Energy Within Budget: The First Net-Zero Energy Public Library in Indiana: Daniel J. Overbey and Nicholas D. Worden, Browning Day Mullins Dierdorf Architects, USA; William M. Brown, Indiana University, USA

3342 Experimental Study of Mixed Convection Heat Transfer in Building Integrated Photovoltaic/Thermal Systems: Luis Candanedo and Andreas Athienitis, Concordia University, Canada

3345 WILL NOT BE PRESENTED – PAPER IS IN CD ROM
Compact Integrated HVAC System for a Net-Positive Energy House for a Northern Climate - An Entry into the US D.O.E. 2009 Solar Decathlon: Toktam Saeid, Aya Dembo, Humphrey Tse and Alan Fung, Ryerson University, Canada; Andrew Marston, Sebastien Brideau and Mike Collins, University of Waterloo, Canada

3247 WILL NOT BE PRESENTED – PAPER IS IN CD ROM
The Archetype Sustainable House: Investigating its Potentials to Achieving the Net-Zero Energy Status Based on the Results of a Detailed Energy Audit: Aya Dembo, Ka Long Ringo Ng, Agatha Pyrka and Alan Fung, Ryerson University, Canada

B-2: Case Studies & Integrated Building Design
Room 218C&D  Monday, July 12 - 3:00 p.m. - 5:00 p.m.
Chairperson: Miljana Horvat, Ryerson University, Canada

3415 Life-Cycle Performance Framework for Building Sustainability: Integration Beyond Building Science: Rodrigo Mora, University of Miami, USA; Girma Bitsuamlak, Florida International University, USA; Miljana Horvat, Ryerson University, Canada

3505 High-Performance Building at Extreme Climate Locations - Comparative Analysis of Exterior Wall Assemblies Coupled With Thermal Mass at Case Study Buildings in Greenland and in Arizona: Vidar Lerum, University of Illinois at Urbana-Champaign, USA

3511 Energy Efficient Housing for the Lower Income Demographic: An Optimization Study: Nate Cooper and W. Travis Horton, Purdue University, USA

3200 How Building Analysis Software Promoted Educated Design Decisions for the International Studies Building at Indiana University: Daniel J. Overbey and Nicholas D. Worden, Browning Day Mullins Dierdorf Architects, USA; William M. Brown, Indiana University, USA

3338 The Benefits of Component Based Architecture Through the Example of the North House: Chloe Doesburg, University of Waterloo, Canada

3481 WILL NOT BE PRESENTED – PAPER IS IN CD ROM
Analysis of Energy Performance of the Sustainable Archetype House at Kortright Centre: Rupayan Barua, Dahai Zhang and Alan S. Fung, Ryerson University, Canada

3482 WILL NOT BE PRESENTED – PAPER IS IN CD ROM
Development of Monitoring System for the Sustainable Archetype House at Kortright Centre: Dahai Zhang, Rupayan Barua and Alan S. Fung, Ryerson University, Canada
TUESDAY SESSIONS

B-3: Radiant Systems & Thermal Controls
Room 218C&D    Tuesday, July 13 - 9:45 a.m. - 11:45 a.m.
Chairperson: Robert Cox, Purdue University, USA

3123 Dynamic Modeling and Validation of Radiant Ceiling Systems Coupled to its Environment: Néstor Fonseca, Universidad Tecnológica de Pereira, Colombia; Cristian Cuevas, Universidad de Concepción, Chile; Vincent Lemort, University of Liège Belgium, Belgium

3124 Experimental Analysis of Radiant Ceiling Systems Coupled to its Environment: Néstor Fonseca, Universidad Tecnológica de Pereira, Colombia; Cristian Cuevas, Universidad de Concepción, Chile; Vincent Lemort, University of Liège Belgium, Belgium

3299 Savings Potential With Thermo-Active Ceilings & Free Cooling: Mark Allen Murphy, SINTEF Building and Infrastructure, Norway

3407 Development of an Advanced Radiation System Module for Use in Simulation of Spaces with Radiant Systems: Devin M. Rohan, Athanasios Tzempelikos and W. Travis Horton, Purdue University, USA

3440 Review of Modern Spacecraft Thermal Control Technologies and Their Application to Next-Generation Buildings: Derek W. Hengeveld, James E. Braun and Eckhard A. Groll, Purdue University, USA; Andrew D. Williams, Air Force Research Laboratory, Kirtland Air Force Base, USA

B-4: HVAC Systems & Controls
Room 218C&D    Tuesday, July 13 - 1:30 p.m. - 3:30 p.m.
Chairperson: William Murphy, University of Kentucky, USA


3262 Optimal Supervisory HVAC Control: Experiences in Australia: Glenn Platt, John Ward and, Josh Wall CSIRO Energy Technology, Australia

3170 Assessment and Optimization of Pumping Systems in Commercial Buildings: Gregory Scott Towsley, Grundfos Pumps Corporation, USA

3457 Air Handling Unit Design for High Performance Buildings: J. Michael Carson, Purdue University, USA

B-5: Building Envelopes, Facades & Lighting
Room 218C&D    Tuesday, July 13 - 4:00 p.m. - 6:00 p.m.
Chairperson: Steven Treado, Pennyslvania State University, USA

3455 Simulation Study of Building Envelope Performance Using Microclimatic Meteorological Data: Wai Ki Wu and Miljana Horvat, Ryerson University, Canada

3330 Influence of Windows Performance Parameters Changes on Building Energy Consumption: Zhengquan Liu and Haibo Liu , China Building Material Test & Certification Center, P. R. of China; Yiwang Bao, China Building Materials Academy, P. R. of China

3384 The Impact of Manual Light Switching on Lighting Energy Consumption for a Typical Office Building: Athanasios Tzempelikos, Purdue University, USA

3397 The Impact of Exterior Overhangs on the Daylighting Performance of Office Spaces: Sagar Rao and Athanasios Tzempelikos, Purdue University, USA

3454 High Performance Façades for Heating and Cooling in Northern Climates: Ivan Yun Tong Lee and Christopher Black and Bartosz A. Lomanowski, University of Waterloo, Canada
WEDNESDAY SESSIONS

B-6: Innovative Building Materials & Geothermal
Room 218C&D Wednesday, July 14 – 9:45 a.m. – 11:45 a.m.
Chairperson: Karim Amran, AHRI, USA


3464 Model-Based Performance Analysis of a Single Borehole in Ground Heat Exchanger: Wei Ruan and W. Travis Horton, Purdue University, USA

3463 Literature Review on the Calculation of Vertical Ground Heat Exchangers for Geothermal Heat Pump Systems: Wei Ruan and W. Travis Horton, Purdue University, USA

3520 Modelling of Phase Change Material Implemented Into Cold Storage Application: Benjamin Gin, Mohammed Mehdi Farid and Pradeep K. Bansal, The University of Auckland, New Zealand

3178 Energy Storage for Efficient Energy Utilization in Buildings: Mohammed Mehdi Farid and Sam Behzadi, The University of Auckland, New Zealand

3470 WILL NOT BE PRESENTED – PAPER IS IN CD ROM
Investigation of Multilayered Phase-Change-Material Modeling in ESP-R: Fabio Almeida, Dahai Zhang, Alan S. Fung, Wey H. Leong, Ryerson University, Canada

B-7: Airflow, Ventilation & IAQ
Room 218C&D Wednesday, July 14 – 1:00 p.m. – 3:00 p.m.
Chairperson: Panagiota Karava, Purdue University, USA

3380 Large Eddy Simulation of Airflow in a Single Family House: Rashmin Damle, Manel Soria and Assensi Oliva, University Politecnica de Catalunya, Spain; Oriol Lehmkuhl and Guillem Colomer, Termo Fluids, S.L., Spain

3409 Simulation-Based Hybrid Ventilation System Design and Evaluation: Bing Dong, Yuebin Yu and Yang Hu, Carnegie Mellon University, USA

3414 Estimating a Building Airflow Network Using CO2 Measurements from a Distributed Sensor Network: Y. Lisa Chen and Jin Wen, Drexel University, USA

3257 Influence of Window Types on Natural Ventilation of Residential Buildings in Hong Kong: Caifeng Gao and Wailing Lee, The Hong Kong Polytechnic University, P. R. of China

3524 Prediction of Spatial and Temporal Distribution of Expiratory Droplets in an Aircraft Cabin: Jitendra K. Gupta and Qingyan Chen, Purdue University, USA; Chaohsien Lin, Boeing Commercial Airplanes, USA

B-8: Solar Energy Utilization in Buildings
Room 218C&D Wednesday, July 14 - 3:20 p.m. - 5:20 p.m.
Chairperson: Weimin Wang, Pacific Northwest National Laboratory, Washington, USA


3231 Solar-Assisted Space Heating of a Highly Insulated Energy Efficient House: Toktam Saeid, Humphrey Tse, and Alan S. Fung, Ryerson University, Canada; Hessam Taherian, Texas A&M University, USA

3329 Development of a Residential Hot Water Heating System Using Passive Heating Method: Colin Usher and Adeel Khalid, Southern Polytechnic State University, USA

3452 Analysis of the Solar Radiation Distribution and Passive Thermal Response of an Attached Solarium/Greenhouse: Diane Bastien and Andreas K. Athenitis, Concordia University, Canada

3472 The Impact of Hot and Cold Storages on a Solar Absorption Cooling System for an Office Building: Yin Hang and Ming Qu, Purdue University, USA

3126 Performance of HVAC System With Solar Reheat: William Hutzel, Scott Wilson and Jacob Faiola, Purdue University, USA
THURSDAY SESSIONS

B-9: Building Simulation & Modeling
Room 218C&D    Thursday, July 15 - 10:00 a.m. - 12:00 p.m.
Chairperson:  Rodrigo Mora, University of Miami, USA

3188  Evaluating Energy Performance and Improvement Potential of China Office Buildings in the Hot Humid Climate Against US Reference Buildings:  Lesley Herrmann and Michael Deru, National Renewable Energy Laboratory, USA; John Zhai, University of Colorado at Boulder, USA

3342  Agent-Based Approaches for Adaptive Building HVAC System Control:  Stephen Treado and Payam Delgoshaei, Pennsylvania State University, USA

3410  A Parametric Analysis for the Impact of Façade Design Options on the Daylighting Performance of Office Spaces:  Hui Shen and Athanasios Tzemelikos, Purdue University, USA

3503  Building-Integrated Photovoltaic/Thermal Systems – Numerical Prediction of Exterior Convective Heat Transfer Coefficients and Parametric Analysis:  Chowdhury Mohammad Jubayer and Eric Savory, University of Western Ontario, Canada; Panagiota Karava, Purdue University, USA

3187  Advanced Dehumidification Analysis on Building America Homes Using EnergyPlus:  Xia Fang, Jon Winkler  and Dane Christensen, National Renewable Energy Laboratory, USA

B-10: Sustainable & Green Building Technologies
Room 218C&D    Thursday, July 15 - 1:00 p.m. - 3:00 p.m.
Chairperson:  Jin Wen, Drexel University, USA

3101  Fire Safety Concern on Well-Sealed Green Buildings With Low OTTVs:  Cheuklun Chow, University of Cambridge, UK; Wanki Chow, The Hong Kong Polytechnic University, P. R. of China

3264  Feasibility Study of Indoor Light Energy Harvesting for Intelligent Building Environment Management:  Qian Huang, Chao Lu and Mark Shaurette, Purdue University, USA

3420  Sustainable Design-Build as a Teaching Tool:  Edgar Stach, James Rose and Amy Howard, The University of Tennessee USA

3339  Evaluation of Energy Savings for Buildings With Green Roofs Having Different Vegetation:  Serdar Celik, William A. Retzlaff and Susan Morgan, Southern Illinois University Edwardsville, USA

3246  Design, Implementation, and Monitoring of Purdue University's First Green Roof:  Heather E. Gall, Daniel Schuster, Chad Jafvert and William Rhoads, Purdue University, USA