K-08 FUNDAMENTALS OF BOILING/CONDENSATION INCLUDING MICRO/NANO-SCALE EFFECTS I [INCLUDES MOLECULAR LEVEL SIMULATION OF PHASE CHANGE]

8:30AM–10:10AM INDIA C

Chair: Amitabh Narain - Michigan Technological University
Chair: Diana-Andra Borca-Tasciuc - Rensselaer Polytech Institute
Co-Chair: Van P. Carey - University of California, Berkeley
Co-Chair: Dong Liu - University of Houston

Parameters of Micro-Nano Structured Surface on Condensation Heat Transfer Performance of Steam With Various Amounts of Non-Condensable Gas: A Theoretical Analysis

Technical Paper Publication: SHTC2022-81679
Benli Peng - Dalian Maritime University, Wenlong Sheng - Dalian Maritime University, Yong Zhou - Dalian Maritime University, Meizhuting Qiu - Dalian Maritime University, Zhengyu He - Dalian Maritime University

Comparison of Micro Fin Array Configurations for Heat Transfer Enhancement in Microchannels

Technical Paper Publication: SHTC2022-85752
Colton Frear - Florida Polytechnic University, Gerardo Carbajal - Florida Polytechnic University, Edwar Romero-Ramirez - Florida Polytechnic University

Data-Driven Modeling of Liquid-Vapor Interface Dynamics During Pool Boiling

Technical Paper Publication: SHTC2022-85582
Christy Dunlap - University of Arkansas, Hari Pandey - University of Arkansas, Han Hu - University of Arkansas

Heat Transfer Rate Predictions of the Air-Cooled Condenser With Machine Learning Algorithm Based on the Operating Big Data of the Power Plant

Technical Paper Publication: SHTC2022-83767

Water Thermodynamic Behavior Under Influence of Electric Field: A Molecular Dynamics Study

Technical Paper Publication: SHTC2022-83813
Malcolm Porterfield - Rensselaer Polytechnic Institute, Diana-Andra Borca-Tasciuc - Rensselaer Polytechnic Institute

K-09 NANOSCALE RADIATIVE THERMAL DEVICES/SYSTEMS

8:30AM–10:10AM FREEDOM E

Chair: Richard Zhang - University of North Texas

Self-Thermal Regulating VO2-Fabry-Perot Cavity Coating for Passive Radiative Cooling Device

Technical Presentation Only: SHTC2022-80428
Ken Araki - University of North Texas, Richard Zhang - University of North Texas

Dynamic Emissivity Control Mediated by Breaking of Inversion Symmetry: Dark Mode to Bright Mode Conversion

Technical Presentation Only: SHTC2022-83960
Alok Ghanekar - University of Southern California, Michelle Povinelli - University of Southern California

Active Directional Control of Emissivity With Quasi-Localized Guided Modes

Technical Presentation Only: SHTC2022-84370
Alok Ghanekar - University of Southern California, Michelle Povinelli - University of Southern California

Magnetic Resonance Imaging for 3D Thermometry

Technical Presentation Only: SHTC2022-97599
Darshan Darshan - University of Illinois at Urbana-Champaign, David Cahill - University of Illinois at Urbana-Champaign

Development of a Numerical Model to Assess Sensitivity for Fiber-Based Frequency-Domain Thermoreflectance Measurements

Technical Paper Publication: SHTC2022-80540
Ronald Warzoha - United States Naval Academy
Technical Sessions

### K-16 HEAT TRANSFER IN ELECTRONIC EQUIPMENT
8:30AM–10:10AM  PARLOR B

Chair: Ronald Warzoha - United States Naval Academy  
Co-Chair: Raffaele Luca Amalfi - Seguente, LLC  
Co-Chair: Solomon Adera - University of Michigan  
Co-Chair: Filippo Cataldo - Wieland Provides Srl

**A Loop Heat Pipe for Vehicle CPU Cooling: Peak Performance and Partial Flooding and Dryout Regimes**  
Technical Paper Publication: SHTC2022-83836  
Julio Ferreira - University of Michigan, Massoud Kaviany - University of Michigan, Vincent Dupont - Calyos AS, Olivier De Laet - Calyos AS, Thomas Nicolle - Calyos AS, Erik Yen - GM R&D Center

**Optimal Design of Additively Manufactured Metal Lattice Heat Sinks for Electronics Cooling**  
Technical Paper Publication: SHTC2022-85400  
Bharath Bharadwaj - Virginia Tech, Prashant Singh - Mississippi State University, Roop Mahajan - Virginia Tech

**Hybrid Thermal Management System Combining Vapor Chamber and Composite Phase Change Heat Sink for High Heat Flux Electronic Devices**  
Technical Presentation Only: SHTC2022-88232  
Junjie He - Xi'an Jiaotong University, Shihong Ma - Xi'an Jiaotong University, Qiuwang Wang - Xi'an Jiaotong University, Wenxiao Chu - Xi'an Jiaotong University

**Heat Transfer Enhancement in Microchannel Heat Sink With Transverse Tesla Valve-Shaped Ribs for Cooling of High-Power Density Electronics**  
Technical Presentation Only: SHTC2022-88245  
Jian-Fei Zhang - Xi'an Jiaotong University, Xing Xu - Xi'an Jiaotong University, Wei Gao - Xi'an Jiaotong University, Zhiguo Qu - Xi'an Jiaotong University, Zhiyuan Jiang - Xi'an Jiaotong University

**Improved Femtosecond 3D Light Field Lithography With a Phase-Controlled Spatial Light Modulator**  
Technical Paper Publication: SHTC2022-85681  
Aravind Jakkinapalli - Texas A&M University, Sy-Bor Wen - TAMU

### K-10 HEAT TRANSFER EQUIPMENT I
8:30AM–10:10AM  INDIA D

Chair: Kashif Nawaz - Oak Ridge National Laboratory  
Co-Chair: Prashant Singh - North Carolina State University

**Effect of Hydraulic Diameter and Surface Roughness on Additively Manufactured Offset Strip Fin Heat Exchanger Performance**  
Technical Paper Publication: SHTC2022-80416  
Teri Baker - The Pennsylvania State University, Michael Manahan - The Pennsylvania State University, Stephen Lynch - The Pennsylvania State University, Edward Reutzel - The Pennsylvania State University

**Heat Transfer Enhancement in Spirally Corrugated Tube and V-Spirally Corrugated Tube: Computational and Numerical Study**  
Technical Paper Publication: SHTC2022-81790  

**Diffusion Bonded Compact Heat Exchanger in 740H for High Temperature and High Pressure Applications**  
Technical Paper Publication: SHTC2022-81837  
Zhijun Jia - CompRex LLC, Tom Parlow - CompRex, LLC, Dane Kuhr - University of Wisconsin-Madison, Mark Anderson - University of Wisconsin-Madison, Brian Baker - Special Metals
Numerical Study on the Influence of Fin Parameters on the Flow and Heat Transfer Characteristics for 3-D Finned Flat Tube

Technical Presentation Only: SHTC2022-88238

Yudong Ding - Chongqing University, Yuheng Gu - Chongqing University, Xiang Yang - Chongqing University, Zhehao Zhang - Chongqing University, Xun Zhu - Chongqing University, Hong Wang - Chongqing University, Min Cheng - Chongqing University, Qiang Liao - Chongqing University

Flow and Heat Transfer Characteristics of Supercritical Rp-3 Kerosene in an Inclined Rectangular Channel Heated on One Side

Technical Presentation Only: SHTC2022-86203

Lie-Bin Jiang - Chongqing University, Gu-Yuan Li - Chongqing University, Jin Yu - Chongqing Jiaotong University, Bin-Bin Yu - Army Logistical Academy, Jia Jia Yu - Chongqing University

Enhancing Data Center Efficiency by a Novel Phase-Change Heat Sink Architecture

Technical Presentation Only: SHTC2022-80216

Suhas Tamvada - University of Florida, Saeed Moghaddam - University of Florida

The Effect of Real Gas Radiation on Laminar Natural Convection on a Vertical Plate

Technical Presentation Only: SHTC2022-88078

Nathan Hale - Brigham Young University, Brent Webb - Brigham Young University

Determining Micro Droplet Profiles Using Reflection Interference Fringe (RIF) Technique

Technical Presentation Only: SHTC2022-90374

Iltai (Isaac) Kim - Texas A&M University-Corpus Christi, Yang Lie - Texas A&M University-Corpus Christi, Jasesung Park - Texas A&M University, Hyun-Joong Kim - CEKO, Hong-Chul Kim - CEKO

CaCO3 Crystallization in Droplet Evaporation on Surfaces With Microstructure

Technical Presentation Only: SHTC2022-84351

Hong-Qing Jin - University of Illinois at Urbana-Champaign, Sophie Wang - University of Illinois at Urbana-Champaign

Adiabatic Section Flow Resistance of Axial-Groove Heat Pipes for Slowly-Varying Meniscus Curvature

Technical Presentation Only: SHTC2022-94816

Marc Hodes - Tufts University, Andrew Daetz - Tufts University, Toby Kirk - Oxford University


Technical Presentation Only: SHTC2022-81625

Amitabh Narain - Michigan Technological University, Divya Pandya - Michigan Technological University, Noah Agata - Michigan Technological University, Logan Canull - Michigan Technological University, Vibhu Vivek - Vivek Technologies LLC, Soroush Sepahy - Michigan Technological University, Atharva Rahane - Michigan Technological University
Technical Sessions

**K-20 COMPUTATIONAL METHODS FOR MATERIALS DEVELOPMENT AND MANUFACTURING I**

2:00PM–3:40PM  FREEDOM G

Chair: Aaron Wemhoff - Villanova University
Chair: Mohamed Abdelhady - National Research Council Canada
Chair: Aaron Wemhoff - Villanova University
Chair: Hamidreza Najafi - Florida Institute of Technology
Chair: Shima Hajimirza - Stevens Institute of Technology
Chair: Cheng-xian Lin - Florida International University
Co-Chair: Like Li - Mississippi State University
Co-Chair: Leitao Chen - Tennessee State University

Heat Transfer Enhancement in V-Spirally Corrugated Tube: Computational and Numerical Study

Technical Presentation Only: SHTC2022-88041

Jin-Yuan Qian - Zhejiang University, Xin-Ji Chen - Zhejiang University, Feng-Lei Wang - Zhejiang University, Chen Yang - Zhejiang University

Adjoint-Based Shape Optimization of Mini-Channel Radiator Tubes Using a CAD-Based Parametrization

Technical Presentation Only: SHTC2022-90554

Praharsh Pai Raikar - VITO, Nitish Anand - VITO, Carlo De Servi - VITO, Matteo Pini - Technische Universitat Delft

Heat Pipe-Based Enhanced Dehumidification System Modeling and Comparison

Technical Presentation Only: SHTC2022-96488

Tara Housen - Villanova University, Aaron Wemhoff - Villanova University

Calculating Radiation View Factors Using Hybrid GRU-LSTM Recurrent Neural Networks

Technical Presentation Only: SHTC2022-97760

Alireza Kianimoqadam - University of Maine, Justin Lapp - University of Maine

**K-19 ENVIRONMENTAL HEAT TRANSFER**

2:00PM–3:40PM  FREEDOM E

Chair: S.A. Sherif - University of Florida
Co-Chair: Kashif Nawaz - Oak Ridge National Laboratory
Co-Chair: Michael Pate - Texas A&M University

A Numerical Study on the Effect of Physical Changes of Air Distribution Setup on the Heating Performance of a Forced Air Circulation System

Technical Paper Publication SHTC2022-84389

Vincent Akula - Idaho State University, Anish Sebastian - Idaho State University

Heat Transfer Enhancement in V-Spirally Corrugated Tube: Computational and Numerical Study

Technical Presentation Only: SHTC2022-97667


Use of Genetic Algorithms to Extract Fundamental Heat Transfer Performance Parameters From Evaporative Cooler Test Data

Technical Paper Publication SHTC2022-86172

Samuel Cabrera - University of California, Berkeley, Van P. Carey - University of California, Berkeley

Application of Particle Image Velocimetry to Molten Chloride Salts

Technical Presentation Only: SHTC2022-81525

Noah LeFrancois - McGill University, Valerie Lamenta - McGill University, Jovan Nedic - McGill University, Melanie Tetreault-Friend - McGill University
Technical Sessions

Growth of Zeolite Crystals on Surface
Technical Presentation Only: SHTC2022-93659
Ashok Thapa - Syracuse University, Shalabh C. Maroo - Syracuse University

Non-Equilibrium Energy Transport During Ultrafast Laser Sintering of Nanoparticles for Nanoscale Metal Printing
Technical Presentation Only: SHTC2022-81490
Chinmoy Podder - Texas A&M University, Heng Pan - Texas A&M University

Pool Boiling Heat Transfer Enhancement of Dielectric Fluids on Round Tubes Using Open-Cell Metal Foams
Technical Presentation Only: SHTC2022-87805
Cheng-Min Yang - Oak Ridge National Laboratory, Kashif Nawaz - Oak Ridge National Laboratory

HVAC Systems Improvement for Environment Control to Minimize the Covid 19 Infection Spreads
Technical Presentation Only: SHTC2022-88524
Nazia Afrin - St. Mary's University

Analysis of the Heat Transfer and Criterion of Freezing of Molten Salt Startup Flow in Relatively Cold Pipes
Technical Paper Publication: SHTC2022-81902
Ye Zhang - University of Arizona, Peiwen Li - University of Arizona

Evaluation of Printed Circuit Heat Exchanger Performance Using Experimental and Numerical Approaches
Technical Paper Publication: SHTC2022-91451

Implementing a Model Predictive Control Strategy to Regulate Temperature Inside a Plug-Flow Solar Reactor With Counter-Current Flow
Technical Paper Publication: SHTC2022-85609
Assaad Alsahlani - Purdue University Northwest, Kelvin Randhir - Michigan State University, Michael Hayes - Michigan State University, Philipp Schimmels - Michigan State University, Nesrin Ozalp - Purdue University Northwest, James Klausner - Michigan State University

Numerical Investigation on Shell and Tube Latent Thermal Energy Storage Partially Filled With Metal Foam and Corrugated Internal Tube
Technical Paper Publication: SHTC2022-81806

Analysis of the Dominant Condensation Mechanism in Cross-Flow Transport
Technical Paper Publication: SHTC2022-81884
Saja Al-Rifai - Florida International University, Cheng-xian Lin - Florida International University

Implementation of a Model Predictive Control Strategy to Regulate Temperature Inside a Plug-Flow Solar Reactor With Counter-Current Flow
Technical Paper Publication: SHTC2022-85609
Assaad Alsahlani - Purdue University Northwest, Kelvin Randhir - Michigan State University, Michael Hayes - Michigan State University, Philipp Schimmels - Michigan State University, Nesrin Ozalp - Purdue University Northwest, James Klausner - Michigan State University

Analysis of the Heat Transfer and Criterion of Freezing of Molten Salt Startup Flow in Relatively Cold Pipes
Technical Paper Publication: SHTC2022-81902
Ye Zhang - University of Arizona, Peiwen Li - University of Arizona

A Numerical Study of the Dominant Condensation Mechanism in Cross-Flow Transport
Technical Paper Publication: SHTC2022-81884
Saja Al-Rifai - Florida International University, Cheng-xian Lin - Florida International University
Technical Sessions

Convective Heat Transfer Potential of Particles/Airflow Through Single Cell Thick Additively Manufactured Octet-Shaped Lattice Frame Material
Technical Paper Publication: SHTC2022-81856
Youssef Aider - Mississippi State University, Heejin Cho - Mississippi State University, Prashant Singh - Mississippi State University

Design and Analysis of a Modular High-Temperature Recuperator for Multi-Method Additive Manufacturing
Technical Presentation Only: SHTC2022-81886
Jacob Bryan - Utah State University, Aiden Meek - Utah State University, Hailei Wang - Utah State University

Designing Porous Polymers for Passive Daytime Radiative Cooling
Technical Presentation Only: SHTC2022-96695
Yuan Yang - Columbia University

K-09 CHARACTERIZATIONS OF NANOSCALE THERMAL TRANSPORT
4:00PM–5:40PM FREEDOM E
Chair: Jun Liu - North Carolina State University

A Revisit to the First-Principles Prediction of Interfacial Thermal Conductance of Layered Materials Using Diffuse Mismatch Model
Technical Paper Publication: SHTC2022-78001
Jixiong He - North Carolina State University, Jun Liu - North Carolina State University

Heat Diffusion Process in the Nonlinear Dynamics in Quasi One-Dimensional Molecules
Technical Paper Publication: SHTC2022-83352
Heeyuen Koh - Seoul National University, Maruyama Shigeo - University of Tokyo

Non-Intrusive Cooling System Fault Detection and Diagnostics Using Deep Learning of Acoustic Emission
Technical Paper Publication: SHTC2022-85429
Hari Pandey - University of Arkansas, Weston Waldo - University of Arkansas, Han Hu - University of Arkansas

Technical Paper Publication: SHTC2022-78044
Ramala Sinha - Applied Engineering Consultants

Contact Thermal Resistance Between Boron Nitride Nanotubes With and Without a Polymer Interlayer
Technical Presentation Only: SHTC2022-81528
Zhiliang Pan - Vanderbilt University, Yi Tao - Southeast University, Matthew Fitzgerald - Vanderbilt University, Deyu Li - Vanderbilt University

Thermal Transport via Gas Conduction Within Nanoconfinement
Technical Presentation Only: SHTC2022-81599
Greg Acosta - University of Nebraska-Lincoln, Mohammad Ghashami - University of Nebraska-Lincoln

K-13 CONDENSATION
4:00PM–5:40PM FREEDOM F
Chair: Vinod Srinivasan - University of Minnesota
Co-Chair: Jovica Riznic - Canadian Nuclear Safety Commission

Experimental and Modelling Analysis of a Large-Scale Two-Phase Loop Thermosyphon
Technical Paper Publication: SHTC2022-78822
Debraliz Isaac Aragones - Purdue University, Chien-Hua Chen - Advanced Cooling Technologies, Justin Weibel - Purdue University, David Warsinger - Purdue University, Richard Bonner - Advanced Cooling Technologies

Numerical Simulation on the Flow and Heat Transfer Characteristics of the Condenser Shell Side in a 3rd Generation Nuclear Power Plant
Technical Paper Publication: SHTC2022-85131
Dong Yan - Shandong Nuclear Power Company, Lin Chen - Shandong Nuclear Power Company, Yingpei Xia - Shandong Nuclear Power Company, Yueheng Sun - Shandong Nuclear Power Company
Condensation Heat Transfer Characteristics of Binary Vapor Mixtures of Immiscible Liquids
Technical Presentation Only: SHTC2022-88091
Qiang Liao - Chongqing University, Yuheng Gu - Chongqing University, Jinkui Jia - Chongqing University, Yudong Ding - Chongqing University, Hong Wang - Chongqing University, Min Cheng - Chongqing University, Xun Zhu - Chongqing University

Condensation Heat Transfer Characteristics of Binary Vapor Mixtures of Immiscible Liquids
Technical Presentation Only: SHTC2022-87444
Qiang Liao - Chongqing University, Yuheng Gu - Chongqing University, Jinkui Jia - Chongqing University, Yudong Ding - Chongqing University, Hong Wang - Chongqing University, Min Cheng - Chongqing University, Xun Zhu - Chongqing University

Prediction of Condensation Freezing Droplet Size on Nano-Textured Superhydrophobic Surfaces
Technical Presentation Only: SHTC2022-84381
Yuchen Shen - University of Illinois at Urbana-Champaign, Sophie Wang - University of Illinois at Urbana-Champaign

A Computational Model to Predict the Transient Performance of a Thermal Energy Storage Unit Coupled With an Air Pre-Cooler for a Novel Dry-Cooling System for Power Plants
Technical Presentation Only: SHTC2022-84247
Rituja Kulkarni - University of Cincinnati, Milind Jog - University of Cincinnati, Raj Manglik - University of Cincinnati

Modeling of Local Heating in Thick Fiber Reinforced Thermoplastic Composites
Technical Presentation Only: SHTC2022-97756
James Gayton - University of Maine, Justin Lapp - University of Maine

Thermal Performance Tests for Foam-Based Microevaporator Cold Plates
Technical Presentation Only: SHTC2022-81813
Lucas Arrivo - Villanova University, Steven Schon - QuantaCool Corporation, Aaron Wemhoff - Villanova University

K-20 COMPUTATIONAL METHODS FOR MATERIALS DEVELOPMENT AND MANUFACTURING II
4:00PM–5:40PM FREEDOM G

Chair: Mohamed Abdelhady - National Research Council Canada
Chair: Aaron Wemhoff - Villanova University
Chair: Hamidreza Najafi - Florida Institute of Technology
Chair: Shima Hajimirza - Stevens Institute of Technology
Chair: Cheng-xian Lin - Florida International University
Co-Chair: Like Li - Mississippi State University
Co-Chair: Leitao Chen - Tennessee State University

Analysis of the Thermal-Moisture Induced Stresses in a Drying of a Cylindrical Log
Technical Presentation Only: SHTC2022-78119
Enayat Mahajerin - Saginaw Valley State University

Extension of Cylindrical Inclusion Percolation Theory Towards Non-Uniform Distributions
Technical Presentation Only: SHTC2022-81811
Anh Trinh - Villanova University, Aaron Wemhoff - Villanova University
Exploring the Effects of Minichannel Wall Distance on Falling Film Condensation: A Numerical Study

Technical Presentation Only: SHTC2022-85717
Shitiz Sehgal - Texas A&M University, Jorge Alvarado - Texas A&M University, Ibrahim Hassan - Texas A&M University-Qatar

Modeling Heat Transfer Including Radiation in Gravity-Driven Granular Flows Using Discrete Element Method

Technical Presentation Only: SHTC2022-87817
Bingjia Li - University of Michigan, Zijie Chen - University of Michigan, Rohini Bala Chandran - University of Michigan

Data-Driven Techniques to Obtain Radiative View Factor Correlations in Particulate Media

Technical Presentation Only: SHTC2022-87818
Zijie Chen - University of Michigan-Ann Arbor, Rohini Bala Chandran - University of Michigan-Ann Arbor

TUESDAY, JULY 12, 2022

K-09 FIRST-PRINCIPLES PREDICTION OF PHONON AND ELECTRON THERMAL TRANSPORT I
8:30AM–10:10AM FREEDOM E

Interface Thermal Resistance Between Monolayer WSe2 and SiO2: Raman Probing With Consideration of Optical-Acoustic Phonon Nonequilibrium

Technical Presentation Only: SHTC2022-85268
Nick Hunter - Iowa State University

Computational Discovery of Ultralow Thermal Conductivity Ternary Semiconductors

Technical Presentation Only: SHTC2022-86070
Ankit Jain – Indian Institute of Technology Bombay


Technical Presentation Only: SHTC2022-87733
Hamidreza Zobeiri - Iowa State University

K-13 EVAPORATION/BOILING I
8:30AM–10:10AM FREEDOM F

Experimental Results of Simulation of a Combined Flash Evaporation and Phase Separation System for Desalination of Sea Water

Technical Paper Publication: SHTC2022-81203
Vasudevan Chandramouli - University of California, Los Angeles, Jin Jen - University of California, Los Angeles, Vijay Dhir - University of California, Los Angeles

Heat Transfer Measurements in Neutrally Buoyant Suspensions in the Inertial Regime

Technical Paper Publication: SHTC2022-85241
Merin A P - University of Minnesota, Vinod Srinivasan - University of Minnesota
Nucleate Pool Boiling of Water on a Heater of the Size of a Capillary Length

Technical Paper Publication: SHTC2022-84337

Julia Reed - University of California, Los Angeles, Vijay Dhir - University of California, Los Angeles

The Effect of Bubble Nucleation on the Performance of a Wickless Heat Pipe in Microgravity

Technical Presentation Only: SHTC2022-B1765

Joel Plassky - Rensselaer Polytechnic Institute, Jiaheng Yu - Rensselaer Polytechnic Institute, Anisha Pawar - Rensselaer Polytechnic Institute

K-20 HEAT TRANSFER ENHANCEMENT
8:30AM–10:10AM FREEDOM G

Chair: Mohamed Abdelhady - National Research Council Canada
Chair: Aaron Wemhoff - Villanova University
Chair: Hamidreza Najafi - Florida Institute of Technology
Chair: Shima Hajimirza - Stevens Institute of Technology
Chair: Cheng-xian Lin - Florida International University
Co-Chair: Like Li - Mississippi State University
Co-Chair: Leitao Chen - Tennessee State University

Investigations on Improving the Performance of Solid Desiccant Cooling Systems With Passive Radiative Sky Cooling Modules

Technical Paper Publication: SHTC2022-81659

Aiqiang Pan - City University of Hong Kong, Siru Chen - City University of Hong Kong, Tsz Chung Ho - City University of Hong Kong, Hau Him Lee - City University of Hong Kong, Chi Yan Tso - City University of Hong Kong

A New Battery Thermal Management System With Integrated Phase Change Materials and Cold Plate: A Numerical Study

Technical Paper Publication: SHTC2022-B1860

Xinrui Xiang - Northeastern University, Ruibo Yang - Northeastern University, Ramaswamy Nagarajan - University of Massachusetts Lowell, Hongwei Sun - Northeastern University

Topology Optimization Design and Heat Transfer Performance of Cooling Channel Based on Fluid-Solid Coupling

Technical Paper Publication: SHTC2022-85175

Zhijian Duan - Northwestern Polytechnical University, Gongnan Xie - Northwestern Polytechnical University, Xinrong Ma - Xianyang Normal University

Effects of FiV on Forced Convection Heat Transfer From Two Tandem Cylinders of Unequal Diameters

Technical Paper Publication: SHTC2022-85589

Hamid Khan - Khalifa University of Science and Technology, Md. Islam - Khalifa University of Science & Technology, Yap Fatt - Khalifa University of Science and Technology, Isam Janajreh - Khalifa University of Science and Technology

Effects of Flow-Induced Vibration on Heat Transfer From a Circular and Square Cylinder With Different Attack Angle

Technical Paper Publication: SHTC2022-85599

Yuvraj Sarout - Khalifa University of Science & Technology, Md. Islam - Khalifa University of Science & Technology, Yap Fatt - Khalifa University of Science & Technology, Isam Janajreh - Khalifa University of Science & Technology

K-07 THERMOPHYSICAL PROPERTIES
8:30AM–10:10AM INDIA D

Chair: Xinwei Wang - Iowa State University
Co-Chair: Troy Munro - Brigham Young University

Tunable Hydraulic and Thermal Properties via 3-D Printing

Technical Presentation Only: SHTC2022-84363

Shilpa Vijay - University of Southern California, Taylor Mclaughlin - University of Southern California, Bryce Heitner - University of Southern California, Stara Shinsato - University of California, Berkeley, Mitul Luhar - University of Southern California

Thermo-Physical Properties of Drying Process of Dioscorea Alata

Technical Presentation Only: SHTC2022-97334

Emmanuel Nwadike - Nnamdi Azikiwe University, Andrew Azaka - Nnamdi Azikiwe University, Mathew Abonyi - Nnamdi Azikiwe University

The Effect of Real Gas Radiation on Laminar Developing Flow in a Channel

Technical Presentation Only: SHTC2022-88060

Kyle Pulsipher - Brigham Young University, Brent Webb - Brigham Young University
**Technical Sessions**

**Natural Convection in a Square Enclosure With Radiatively Participating Real Gases**

Brennen Clark - Brigham Young University, Brent Webb - Brigham Young University, Vladimir Solovjov - Brigham Young University

**Effect of Phase Change Material Container Design on Hybrid Thermal Management System for a Battery Module**

İsmail Gurkan Demirkiran - Izmir Institute of Technology, Erdal Cetkin - Izmir Institute of Technology

**Design of a Thermal Energy Storage System for Heating a Sumaq Wasi House in Ayaviri, Puno (Peru) Using Combustion Gases From a Domestic Stove**

Luz Estrada Torvisco - Universidad de Ingeniería y Tecnología, Carlos Rios Perez - Universidad de Ingeniería y Tecnología

**PCM Based Heat Sinks for Transient Passive Cooling of an Electronic Device With Localized Power Generation – Numerical and Parametric Study**

Elad Koronio - Ben-Gurion University, Gennady Ziskind - Ben-Gurion University

---

**K-06 THERMAL STORAGE IN ENERGY SYSTEMS**

**8:30AM–10:10AM INDIA C**

Chair: Leitao Chen - Tennessee State University

**Machine Learning Based Control of Multi-Temperature PCM Thermal Storage Assemblies – A Comparison of On/Off Versus Fully Modulating Valve Control**

Technical Paper Publication: SHTC2022-86174

Alanna Cooney - University of California, Berkeley, Van Carey - University of California, Berkeley

**Parametric Modelling Study of a High-Temperature Thermal Energy Storage System for Application in Solar Fuel Redox Cycles**

Technical Presentation Only: SHTC2022-89249

Alon Lidor - ETH Zurich, Ewald Kleefstra - ETH Zurich, Aldo Steinfeld - ETH Zurich

**Experimental Investigation of PCM Melting in a Vertical Capsule**

Technical Presentation Only: SHTC2022-90460

Tomer Shockner - Ben-Gurion University, Gennady Ziskind - Ben-Gurion University

---

**K-06 HEAT AND MASS TRANSFER IN HEATING, COOLING, AND POWER SYSTEMS**

**4:00PM–5:40PM INDIA C**

Chair: Leitao Chen - Tennessee State University

**A Novel Dynamic Spacecraft Radiator Design With Annular Geometry and Varied Thickness Profiles for CubeSat Applications**

Technical Paper Publication: SHTC2022-84329

Nicholas Debortolli - University of Dayton, Natalie Douglass - University of Dayton, David Warburton - University of Dayton, Jeremy Price - University of Dayton, Josh Cannon - Brigham Young University, Brian Iverson - Brigham Young University, Rydge Mulford - University of Dayton

**Experimental Investigation and Heat Transfer Analysis of Innovative Thermal Mechanical Refrigeration System Compared to Electric Compressor**

Technical Paper Publication: SHTC2022-85194

Ahmad Sleiti - Qatar University, Wahib Al-Ammari - Qatar University, Mohammed Al-Khawaja - Qatar University

**Buoyancy-Driven Convection in Additively Manufactured Cubic Lattice: Effect of Lattice Aspect Ratio and Heating Orientation**

Technical Paper Publication: SHTC2022-85740

Prashant Singh - Mississippi State University, Mantha S. Phanikumar - Michigan State University, Roop Mahajan - Virginia Tech

---

**Buoyancy-Driven Convection in Additively Manufactured Cubic Lattice: Effect of Lattice Aspect Ratio and Heating Orientation**

Technical Paper Publication: SHTC2022-85740

Prashant Singh - Mississippi State University, Mantha S. Phanikumar - Michigan State University, Roop Mahajan - Virginia Tech
Uncertainty Analysis of Vapor Transport Measurement in a Hollow Fiber Membrane Module for Membrane Humidifier

Technical Paper Publication: SHTC2022-81761
Xuan Linh Nguyen - Chungnam National University, Sangseok Yu - Chungnam National University

Modeling and Simulation of Whole Air Supply System for Proton Exchange Membrane Fuel Cell Under Dynamic Operating Conditions

Technical Paper Publication: SHTC2022-81691
Hoang Nghia Vu - Chungnam National University, Sangseok Yu - Chungnam National University

Investigation of Passive Radiative Cooling Using Bio-Polymers

Technical Presentation Only: SHTC2022-97683
Zahra Kamali Khanghah - University of Nebraska-Lincoln, Mohammad Ghashami - University of Nebraska-Lincoln

Anisotropy of Flow and Heat Transfer of Gaseous MHD Flows in a Circular Tube Under the Control of Transverse Magnetic Field: A Preliminary Study

Technical Paper Publication: SHTC2022-83763
Qijin Zhao - Army Academy of Armored Forces, Baoquan Mao - Army Academy of Armored Forces, Xianghua Bai - Army Academy of Armored Forces, Jintao Guo - Troop No. 96901 of PLA, Chunlin Chen - Army Academy of Armored Forces

Finite Element Conjugate Heat Transfer Strategy for Self and Applied Magnetoplasmodynamic (MPD) Thrusters

Technical Paper Publication: SHTC2022-85788
K. Joel Berry - Kettering University

Large Eddy Simulation of Random Pebble Bed Using the Spectral Element Method

Technical Paper Publication: SHTC2022-87117
Tri Nguyen - Penn State University, Elia Merzari - Penn State University, Haomin Yuan - Argonne National Laboratory, Dezhi Dai - Argonne National Laboratory, Brian Jackson - Kairos Power

Prediction and Validation of Fluid Flow Properties in Additively Manufactured Porous Lattice Structures

Technical Presentation Only: SHTC2022-78222
Ashreet Mishra - Mississippi State University, David Korba - Mississippi State University, Inderjot Kaur - Mississippi State University, Youssef Aider - Mississippi State University, Prashant Singh - Mississippi State University, Like Li - Mississippi State University

Structural Design of Thermoelectric Power Generation System Based on Phase Transfer Materials

Technical Presentation Only: SHTC2022-87597
Ning Zhuang - Xi'an Jiaotong University, Peiqin Wu - Xi'an Jiaotong University, Qiuwang Wang - Xi'an Jiaotong University, Ting Ma - Xi'an Jiaotong University
Cold Model Experiments of Ash Deposition Characteristics of Flue Gas Across 3-D Finned Tubes

Technical Presentation Only: SHTC2022-88125
Yudong Ding - Chongqing University, Changshen Lu - Chongqing University, Junnan Zhang - Chongqing University, Xun Zhu - Chongqing University, Hong Wang - Chongqing University, Min Cheng - Chongqing University, Qiang Liao - Chongqing University.

Temperature Discretized Design Method for Heat Exchangers With Trans- and Super-Critical Hydrogen

Technical Presentation Only: SHTC2022-88244
Chenglong Yang - Xi’an Jiaotong University, Zetian Tang - Xi’an Jiaotong University, Zhiquo Qu - Xi’an Jiaotong University, Jianfei Zhang - Xi’an Jiaotong University, Zhiyuan Jiang - Xi’an Jiaotong University.

Modeling the Influence of Heat Transfer on Gas Hydrate Formation

Technical Paper Publication: SHTC2022-79744
Aritra Kar - The University of Texas Austin, Palash Acharya - The University of Texas at Austin, Arjang Shahriari - The University of Texas at Austin, Ashish Mhahdeshwar - ExxonMobil, Timothy A. Barckholtz - ExxonMobil, Vaibhav Bahadur - The University of Texas at Austin.

Boundary Conditions for Modeling of a Lead Reverberatory Furnace

Technical Paper Publication: SHTC2022-81206
Nicholas Walla - Purdue University Northwest, Vitalis Anisiuba - Purdue University Northwest, Armin Silaen - Purdue University Northwest, Alexandra Anderson - Gopher Resource, Joseph Grogan - Gopher Resource, Chenn Zhou - Purdue University Northwest.

High Phonon Scattering Rates Suppress Thermal Conductivity in Hyperstoichiometric Uranium Dioxide

Technical Presentation Only: SHTC2022-94546
Hao Ma - Oak Ridge National Laboratory, Matt Bryan - Oak Ridge National Laboratory, Judy Pang - Oak Ridge National Laboratory, Douglas Abernathy - Oak Ridge National Laboratory, Daniel Antonio - Idaho National Laboratory, Krzysztof Gofryk - Idaho National Laboratory, Michael Manley - Oak Ridge National Laboratory.

K-13 EVAPORATION/BOILING II
4:00PM–5:40PM FREEDOM F
Chair: Vinod Srinivasan - University of Minnesota
Co-Chair: Jovica Riznic - Canadian Nuclear Safety Commission

Effects of Tube Geometry and Wettability on Liquid Flow and Evaporation Heat Transfer in Falling Film Flow

Technical Presentation Only: SHTC2022-83830
Hong-Qing Jin - University of Illinois at Urbana-Champaign, Sophie Wang - University of Illinois at Urbana Champaign.

Porous Nanochannel Wicks Based Solar Vapor Generation Device

Technical Presentation Only: SHTC2022-96668
Durgesh Ranjan - Syracuse University, Shalabh Maroo - Syracuse University, An Zou - Syracuse University.

Structural-Material-Operational-Performance Relationship for Enhanced Pool Boiling Surfaces Using Neural Network Model

Technical Presentation Only: SHTC2022-91012
Sadaf Mehdi - Wichita State University, Gisuk Hwang - Wichita State University.

K-06 THERMAL MANAGEMENT OF BATTERY SYSTEMS
8:30AM–10:10AM INDIA C
Chair: Leitao Chen - Tennessee State University

Validation of Vented Gas Characteristics From Thermal Runaway of Lithium-Ion Batteries Using LIM1TR

Technical Paper Publication: SHTC2022-79560
Ala’ Qatramez - The University of Memphis, Andrew Kurzawski - Sandia National Laboratories, John Hewson - Sandia National Laboratories, Michael Parker - The University of Memphis, Daniel Foti - The University of Memphis, Alexander Headley - The University of Memphis.
### Experimental Validation of Condensation Modeling for H2 Drying in Space-Based Electrolysis

**Technical Presentation Only:** SHTC2022-87908


### Non-Uniform Heat Generation Model for a Li-Ion Battery Cell to Decrease Numerical Cost

**Technical Presentation Only:** SHTC2022-89088

Sinan Gocmen - Izmir Institute of Technology, Erdal Cetkin - Izmir Institute of Technology

### Thermal Metrology for Measuring Lithium Concentration Gradients in Lithium-Ion Batteries (LIBs)

**Technical Presentation Only:** SHTC2022-97653

Yuqiang Zeng - Lawrence Berkeley National Laboratory, Divya Chalise - Lawrence Berkeley National Laboratory, Yanbao Fu - Lawrence Berkeley National Laboratory, Joseph Schaadt - Lawrence Berkeley National Laboratory, Sumanjeet Kaur - Lawrence Berkeley National Laboratory, Vince Battaglia - Lawrence Berkeley National Laboratory, Sean Lubner - Lawrence Berkeley National Laboratory, Ravi Prasher - Lawrence Berkeley National Laboratory

### An Experimental Investigation of Flow Boiling Characteristics in Interconnected Microchannels With Different Slot Arrangement

**Technical Paper Publication:** SHTC2022-81624

Yun Li - Shanghai Jiao Tong University, Huiying Wu - Shanghai Jiao Tong University

### Numerical Simulation of Multiple Bubble Interaction During Flow Boiling in Micro-Channels

**Technical Paper Publication:** SHTC2022-81866

Dewan Rahman - California State University, Northridge, Abhijit Mukherjee - California State University, Northridge

### Anomalous Adverse Effect of Mass Velocity on Convective Flow Boiling in Microfin Tubes: Literature Review and Mechanistic Analysis

**Technical Paper Publication:** SHTC2022-82761

Lingnan Lin - National Institute of Standards and Technology, Mark Kedzierski - National Institute of Standards and Technology

### Review of Datasets and Correlations for Two-Phase Flow Boiling Heat Transfer of Pure Ethanol and Ethanol/Water Binary Mixtures

**Technical Paper Publication:** SHTC2022-84340

Mohamed Elfaham - University of North Dakota, Clement Tang - University of North Dakota

### A Two-Dimensional Numerical Study on Air/Mist Sweeping Jet Impingement Cooling

**Technical Paper Publication:** SHTC2022-81664

Ting Wang - University of New Orleans, Ramy Abdelmaksoud - University of New Orleans

### Effects of Wettability, Porosity, and Subsequent Hydraulic Linkage on Convective Drying of Water From Porous Media

**Technical Presentation Only:** SHTC2022-81810

Partha P. Chakraborty - Kansas State University, Melanie Derby - Kansas State University

---

**K-13 MULTIPHASE FLOW**

**8:30AM–10:10AM**

**FREEDOM F**

Chair: Vinod Srinivasan - University of Minnesota

Co-Chair: Jovica Riznic - Canadian Nuclear Safety Commission
Technical Sessions

K-12 AEROSPACE HEAT TRANSFER
8:30AM–10:10AM FREEDOM G

Chair: Ashwani Gupta - University of Maryland
Co-Chair: Ryo Amano – University of Wisconsin-Milwaukee

Europa Lander Terminal Sterilization Subsystem (TSS) Thermal Model Verification, Validation, and Uncertainty Quantification (VVUQ) Processes
Technical Paper Publication: SHTC2022-81162
Kevin Irick - Sandia National Laboratories, Tyler Voskuilen - Sandia National Laboratories, Philip Sakievich - Sandia National Laboratories

Heat Transfer on Fuel Injector Surface With Backward Facing Stepped Scramjet Flame Holder
Technical Paper Publication: SHTC2022-83853
Hyung Mo Bae - Yonsei University, Jihyuk Kim - Yonsei University, Juyeong Nam - Yonsei University, Injoong Chang - Yonsei University, Hee Koo Moon - Yonsei University, Hyung Hee Cho - Yonsei University

Thermal Fluid Assessment of Bluff Versus Streamlined Bodies With a Slot for Aligned Flow
Technical Paper Publication: SHTC2022-80024
Sultan Alshareef - University of Utah, Todd Harman - University of Utah, Timothy Ameel - University of Utah

An Experimental Study on Heat Transfer Performance of Jet Impingement Arrays
Technical Paper Publication: SHTC2022-81617
Jiahong Fu - Zhejiang University City College, Bengt Sundén - Lund University, Zhen Cao - Lund University

RESEARCH FUNDING OPPORTUNITIES PANEL: NSF AND DOE
10:30AM – 12:10PM LIBERTY A

Chair: Satwinder S. Sadhal, University of Southern California
Co-Chair: Milind A. Jog, University of Cincinnati
Co-Chair: Mark Kedzierski, National Institute of Standards and Technology

Panelists:
Dr. Ying Sun, Program Director, Thermal Transport Processes Program National Science Foundation
Dr. Avi Shultz, Program Manager, Concentrating Solar-Thermal Power (CSP) Program, U.S. Department of Energy’s Solar Energy Technologies Office (SETO)