FROM THE CONFERENCE CHAIRS

Dear Colleagues,

On behalf of the ASME Heat Transfer Division, it is our pleasure to welcome you to the ASME 2022 Summer Heat Transfer Conference held during July 11–13, 2022, at the downtown Sheraton Hotel in Philadelphia, PA. We are delighted to note that this year the conference is in person after two years of virtual meetings. The conference is a premier event that offers excellent opportunities to disseminate your research and network with the international heat transfer community. The technical content of the conference is broad in scope and will provide a forum for presentation of state-of-the-art research. It is co-sponsored by the AIChE and is co-located with the ASME 16th International Conference on Energy Sustainability.

The conference offers a vibrant program with several technical sessions, plenary talks, and a panel discussion. The plenary sessions include presentations from John Bischof (University of Minnesota) and the Donald Q. Kern Award winner John Lienhard V (MIT), as well as a talk by Michael Modest (UC-Merced), who is the winner of the Max Jakob Memorial Award. One hundred and seventy papers and presentations are scheduled. A special forum to discuss funding opportunities has been organized with representatives from the National Science Foundation and the U.S. Department of Energy. Special events at the conference are the Welcome Reception, the Awards Lunch, and a technical tour of the Boeing Helicopter Plant in Ridley Park, PA.

The contributions of all the track, topic, and session chairs, authors, reviewers, and ASME staff have been invaluable in organizing this conference. We would like to specifically acknowledge ASME staff Mary Jakubowski, Laraine Lee, and April Tone. We also thank track and session organizers for supporting the conference technical program, overseeing the reviews of the technical papers, and helping maintain high standards. We are grateful to representatives from the AIChE together with the ASME Advanced Energy Systems and the Solar Energy Divisions for the cooperative spirit in bringing together this jointly sponsored co-located event. Most importantly, we thank you, the participants, for giving strength to the conference with your presence and by participating in the important task of the review process and the ongoing technical engagement.

We hope you enjoy this meeting and the opportunity to reconnect with your colleagues once again in person.

Satwindar S. Sadhal, Conference Chair University of Southern California

Milind A. Jog, Conference Co-Chair University of Cincinnati

Mark A. Kedzierski, Technical Program Chair National Institute of Standards and Technology
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AUDIOVISUAL EQUIPMENT IN SESSION ROOMS
All technical sessions are equipped with one LCD projector and one screen. Laptops will NOT be provided in the sessions. Presenters MUST bring their own or make arrangements in advance with the session chairs to share theirs. Please bring your presentation on a thumb drive 15 minutes prior to the session start time. A speaker ready room is available starting on Monday from 7:00AM–5:00PM and Wednesday until 12:00PM in the Franklin Room located on the Mezzanine Level.

BADGE REQUIRED FOR ADMISSION
All conference attendees must wear the official ASME 2022 SHTC badge at all times in order to gain admission to technical sessions, exhibits, and other conference events. Without a badge, you will NOT be allowed to attend any conference activities.

CONFERENCE AWARDS LUNCH
The Awards Luncheon will take place during the conference to recognize and celebrate a select group of individuals for their contributions and achievements in heat transfer engineering. The schedule is as follows:
Heat Transfer Division Awards Luncheon
Tuesday, July 12, 12:15PM–1:45PM in Liberty B, on the Ballroom Level

CONFERENCE LUNCHES
Conference lunches will be held from 12:15PM to 1:45PM on Monday and Tuesday in Liberty B located on the Ballroom Level. On Wednesday you will be on your own. Please join your fellow attendees for a good meal and a great networking opportunity.

CONFERENCE APP
SHTC/ES 2022 is utilizing a mobile event app in place of a printed program to enhance the conference experience for all attendees. You will be able to:
• Connect with Attendees
• View Speaker Profiles
• Access Session Information
• Watch On-Demand Content
• Download Final Papers
• And More!
*All features may not be available at all events.

CONFERENCE PROCEEDINGS
Each attendee will receive an email with a unique code to access digital copies of all the papers accepted for presentation at the conference. The official conference archival proceedings will be published after the conference and will not include accepted papers that were not presented at the conference. The official conference proceedings are registered with the Library of Congress and are submitted for abstracting and indexing. The proceedings are published on the ASME Digital Library. You will be provided with an individual link to the online papers via email. In the event you do not receive the email, send a request to conferencepubs@asme.org.
CONFERENCE REFRESHMENT BREAKS
Morning and afternoon breaks will be provided in the Liberty Foyer, Ballroom Level. Come and meet our exhibitors and join your fellow attendees for a few minutes of networking and discussion. The schedule is as follows:

- Monday - Tuesday, July 11–12
  10:10AM–10:30AM and 03:40PM–04:00PM
- Wednesday, July 13
  10:10AM – 10:30AM

TECHNICAL TOUR*
Wednesday, July 13
08:00AM–12:00PM
$35.00 for Members and Non-Members
Tickets Required – Maximum of 30 participants
https://www.boeing.com/company/key-orgs/boeing-testing-services/wind-tunnels-and-propulsion.page#/speed

*U.S. Citizens or Green Card Holders only

Proof of Citizenship/Permanent Residence will be required upon arrival at Boeing.

Closed-Toed Shoes Required.

Safety Glasses will be supplied, but if you have your own, please bring them with you.

Please meet at the main lobby by 17th street entrance sign. The buses will load on 17th between Race and Vine.

BOEING TECHNOLOGIES
The low-speed Boeing Vertical/Short Takeoff and Landing Wind Tunnel (BVWT), located in Philadelphia, has a large, versatile test section that is useful for testing fixed- and rotary-wing aircraft and non-aeronautical vehicles and structures. BVWT is a closed-circuit single-return tunnel and has a 20-by-20-foot, variable-configuration test section. The tunnel is capable of speeds of hover to 0.3 Mach, with a dynamic pressure range of 0 to 160 pounds per square foot.

It includes a fully automated test-model positioning system and airspeed controller, state-of-the-art data collection and instrumentation, and stainless steel honeycomb to improve flow quality. Touch-screen function control panels can display 30 monitored parameters. With the data updated every half second, these monitors provide for near-real-time display of multiple parameters.

The wind tunnel staff is experienced in all forms of force, pressure, flight control, vibratory, and dynamic testing of powered and unpowered fixed- and rotary-wing aircraft and other test articles in and out of ground effect.

OPENING RECEPTION
Sunday, July 10
06:30PM–08:00PM
Liberty B, Ballroom Level

EMERGENCY INFORMATION
If you are experiencing a health emergency, please dial 911. If you are able or someone else is able, please dial zero and inform the operator so that the hotel can be on the alert for the emergency response team. The hotel also has 24-hour security and officers trained in first aid, CPR, & AED service.

INTERNET ACCESS
Complimentary basic internet is provided in sleeping rooms if you are staying at the Sheraton and in the hotel’s public space. Internet in the meeting space will be limited.

MEMBERSHIP TO ASME (4 MONTHS FREE)
Registrants who paid the non-member conference registration fees will receive a four-month complimentary ASME Membership. ASME will automatically activate this complimentary membership for qualified attendees. Please allow approximately four weeks after the conclusion of the conference for your membership to become active. Visit www.asme.org/membership for more information about the benefits of ASME Membership.

PRESENTER ATTENDANCE POLICY
According to ASME’s Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper also will not be published in the ASME Digital Collection and may not be cited as a published paper.
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<td>Registration</td>
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<tr>
<td>01:00PM–03:00PM</td>
<td>HTD Executive Committee Meeting (Closed Meeting)</td>
<td>India A</td>
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<tr>
<td>03:30PM–05:30PM</td>
<td>HTD EC &amp; K-Committee Leadership Open Meeting</td>
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<td>06:30PM–08:00PM</td>
<td>Opening Reception</td>
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<td>07:00AM–05:30PM</td>
<td>Registration</td>
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<td>Speaker Ready Room</td>
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<td>08:30AM–10:10AM</td>
<td>K-09 - Nanoscale Radiative Thermal Devices/Systems</td>
<td>Freedom E</td>
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<td>08:30AM–10:10AM</td>
<td>K-08 - Fundamentals of Boiling/Condensation including Micro/Nano-Scale Effects I [Includes Molecular Level Simulation of Phase Change]</td>
<td>India C</td>
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<td>08:30AM–10:10AM</td>
<td>K-10 - Heat Transfer Equipment-I</td>
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<td>10:00AM–04:00PM</td>
<td>Boeing Exhibit</td>
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<td>10:30AM–12:10PM</td>
<td>D. Q. Kern Award Lecture &quot;Thermal Systems Engineering for Desalination and Ion Separations&quot;</td>
<td>Liberty A</td>
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<td>12:15PM–01:45PM</td>
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<td>HTC Strategic Planning Meeting (Closed Meeting)</td>
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<td>K-08 - Fundamentals of Boiling/Condensation including Micro/Nano-Scale Effects II [Includes Molecular Level Simulation of Phase Change]</td>
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<td>02:00PM–03:40PM</td>
<td>K-20 - Computational Methods for Materials Development and Manufacturing-I</td>
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<td>03:40PM–04:00PM</td>
<td>PM Coffee Break</td>
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<tr>
<td>04:00PM–05:40PM</td>
<td>K-06 - Heat and Mass Transfer in Renewable Energy Systems</td>
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<tr>
<td>04:00PM–05:40PM</td>
<td>K-10 - Heat Transfer Equipment-III</td>
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<td>04:00PM–05:40PM</td>
<td>K-09 - Characterizations of Nanoscale Thermal Transport</td>
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<td>04:00PM–05:40PM</td>
<td>K-13 - Condensation</td>
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<tr>
<td>04:00PM–05:40PM</td>
<td>K-20 - Computational Methods for Materials Development and Manufacturing-II</td>
<td>Freedom G</td>
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<tr>
<td>07:00PM–05:30PM</td>
<td>Registration</td>
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<td>07:00AM–05:00PM</td>
<td>Speaker Ready Room</td>
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<td>08:30AM–10:10AM</td>
<td>K-06 - Thermal Storage in Energy Systems</td>
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<td>08:30AM–10:10AM</td>
<td>K-13 - Evaporation/Boiling - I</td>
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<td>08:30AM–10:10AM</td>
<td>K-09 - First-Principles Prediction of Phonon and Electron Thermal Transport-I</td>
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<td>08:30AM–10:10AM</td>
<td>K-07 - Thermophysical Properties</td>
<td>India D</td>
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<td>K-20 - Heat Transfer Enhancement</td>
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<td>Liberty Foyer</td>
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<td>10:30AM–12:10PM</td>
<td>Max Jakob Memorial Lecture “Interaction of Turbulence, Chemistry and Radiation In Combustion Systems” - Michael Modest</td>
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<td>12:15PM–01:45PM</td>
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<td>02:00PM–03:40PM</td>
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<td>K-20 - Applications of CHT</td>
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<td>04:00PM–05:40PM</td>
<td>K-18 - Heat Transfer under Extreme Conditions</td>
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<tr>
<td>04:00PM–05:40PM</td>
<td>K-06 - Heat and Mass Transfer in Heating, Cooling, and Power Systems</td>
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<td>04:00PM–05:40PM</td>
<td>K-13 - Evaporation/Boiling-II</td>
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<td>K-19 - Environmental Heat Transfer Committee Meeting, Chair: Kashif Nawaz</td>
<td>India A</td>
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<tr>
<td>06:00PM–08:00PM</td>
<td>K-08 - Theory &amp; Fundamental Research Committee Meeting, Chair: Diana Borca-Tascuc</td>
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<td>06:00PM–08:00PM</td>
<td>K-10 - Heat Transfer Equipment Committee Meeting, Chair: Kashif Nawaz</td>
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<td>06:00PM–08:00PM</td>
<td>K-13 - Heat Transfer in Multiphase Flow Committee Meeting, Chairs: Vinod Srinivasan &amp; Chanwook Park</td>
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<td>06:00PM–08:00PM</td>
<td>K-15 - Transport Phenomena in Manufacturing &amp; Materials Processing Committee Meeting, Chair: Stephen Akwabo</td>
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<td>K-20 - Computational Heat Transfer Committee Meeting, Chair: Shima Hajimirza</td>
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<td>06:00PM–08:00PM</td>
<td>K-23 - Diversity, Equity, and Inclusiveness Committee Meeting, Chair: Leslie Phinney</td>
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**WEDNESDAY, JULY 13, 2022**

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<tr>
<td>08:00AM–12:00PM</td>
<td>Boeing Tour</td>
<td>Bus will board at 8:00AM Sharp!</td>
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<tr>
<td>08:30AM–10:10AM</td>
<td>K-06 - Thermal Management of Battery Systems</td>
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<td>08:30AM–10:10AM</td>
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<td>10:30AM–12:10PM</td>
<td>Panel on Research Funding Opportunities: NSF and DOE</td>
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<td>12:15PM</td>
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<tr>
<td>K-8 - Theory &amp; Fundamental Research, Chair: Diana Borca-Tascuic</td>
<td>Tuesday</td>
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<tr>
<td>K-10 - Heat Transfer Equipment, Chair: Kashif Nawaz</td>
<td>Tuesday</td>
<td>12-Jul</td>
<td>06:00PM</td>
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<td>India C</td>
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<tr>
<td>K-13 - Heat Transfer in Multiphase Flow Committee Meeting - SHTC, Chairs: Vinod Srinivasan/Chanwook Park</td>
<td>Tuesday</td>
<td>12-Jul</td>
<td>06:00PM</td>
<td>08:00PM</td>
<td>India D</td>
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<tr>
<td>K-15 - Transport Phenomena in Manufacturing &amp; Materials Processing, Chair: Stephen Akwaboa</td>
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<tr>
<td>K-20 - Computational Heat Transfer, Chair: Shima Hajimirza</td>
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<tr>
<td>K-23 - Diversity, Equity, and Inclusiveness, Chair: Leslie Phinney</td>
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### KEYNOTE LECTURES

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<tr>
<td>D. Q. Kern Award Lecture &quot;Thermal Systems Engineering for Desalination and Ion Separations&quot; - John Lienhard</td>
<td>Monday</td>
<td>11-Jul</td>
<td>10:30AM</td>
<td>12:10PM</td>
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<tr>
<td>Max Jakob Memorial Lecture &quot;Interaction of Turbulence, Chemistry and Radiation In Combustion Systems&quot; - Michael Modest</td>
<td>Tuesday</td>
<td>12-Jul</td>
<td>10:30AM</td>
<td>12:10PM</td>
<td>Liberty A</td>
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<tr>
<td>Keynote: &quot;Nanowarming for Regenerative Medicine&quot; John Bischof</td>
<td>Tuesday</td>
<td>12-Jul</td>
<td>02:00PM</td>
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Thermal Systems Engineering for Desalination and Ion Separations

ABSTRACT: The world’s renewable fresh water supply, from net precipitation, has become much more variable as our climate changes. Further, world population has risen steeply in the last century, and the water demands of growing economies continue to rise. As a result, water scarcity is a growing worldwide problem, with water shortages impacting both human populations and ecosystems. Desalination has been deployed worldwide to expand the supply of freshwater, especially for coastal populations, and its use has increased rapidly, with more than 100 billion L/day of capacity now installed. The cost and lifetime of plants has also improved steadily. Nonetheless, desalination processes need greater sustainability and circularity, including energy efficiency and resource recovery. In this talk, I will discuss our research on energy inefficiency in desalination, selective recovery of chemical and mineral resources from saline water, and the application of concepts from thermal systems engineering to improve the performance of both thermal and membrane desalination systems. Examples will be drawn from reverse osmosis, humidification-dehumidification, membrane distillation, solvent extraction, lithium capture, and brine valorization.

BIOGRAPHY: John H. Lienhard V is the Abdul Latif Jameel Professor and the founding Director of the Abdul Latif Jameel Water and Food Systems Lab at MIT (J-WAFS). During more than three decades on the MIT faculty, Lienhard’s research and educational efforts have focused on heat and mass transfer, water purification and desalination, and thermodynamics. He has also filled a number of administrative roles at MIT.

Lienhard’s research on water purification has spanned a wide range of technologies for desalination and waste brine management, with a focus on energy efficiency and environmental protection. Lienhard has directly supervised 100 graduate theses and postdoctoral associates and is author of more than 300 peer-reviewed publications. He has been issued 38 U.S. patents, most of which have been commercialized through start-up companies.

Lienhard is a Fellow of the American Society of Mechanical Engineers (ASME), a Fellow of the American Association for the Advancement of Science (AAAS), and a Fellow of the American Society of Thermal and Fluid Engineers (ASTFE). He is a recipient of the 1988 National Science Foundation Presidential Young Investigator Award, the 1992 SAE Teetor Award, a 1997 R&D 100 Award, the 2012 ASME Technical Communities Globalization Medal, the 2015 ASME Heat Transfer Memorial Award, the 2019 ASME Edward F. Obert Award, and the 2021 AIChE Donald Q. Kern Award.

Radiative Heat Transfer in Combustion Systems

ABSTRACT: In many important combustion applications, heat transfer is dominated by thermal radiation from combustion gases and soot. Thermal radiation from combustion gases is extremely complicated, and accurate and efficient predictions are only now becoming possible with the use of accurate global methods, such as full-spectrum k-distributions, and with state-of-the-art line-by-line accurate Monte Carlo methods. The coupling between turbulence and radiation can more than double the radiative loss from a flame. Radiative properties and computational methods will be briefly discussed, and several examples of turbulent reacting flows, an oxy-fuel furnace, high pressure laminar flames and high-pressure fuel spray in combustion engines will be presented. Thermal radiation can also be used as an optical diagnostic tool to determine temperature and concentration distributions, which will be briefly discussed.

BIOGRAPHY: Dr. Michael Modest received his Dipl.-Ing. degree from the Technical University in Munich (1968), and in 1972 obtained his M.S. and Ph.D. in Mechanical Engineering from the University of California at Berkeley. For several years he taught at Rensselaer Polytechnic Institute and the University of Southern California, followed by 24 years as a Professor of Mechanical Engineering at the Pennsylvania State University, from which he retired in 2009 with the title of Distinguished Professor Emeritus. He then served as Shaffer and George Professor of Engineering at the University of California, Merced, from which he retired in 2018 as Distinguished Professor Emeritus.

During his career Dr. Modest has made many seminal contributions in all areas of radiative heat transfer, as well as in the field of laser processing of materials. He is perhaps best known for his work on thermal radiation in combustion systems and is the author of “Radiative Heat Transfer” (presently in its 4th ed). He has over 370 refereed publications, including 2 books, 10 book chapters. He is an ASME Honorary Member and was recipient of many national and international honors, including the ASME Heat Transfer Memorial Award, the AIAA Thermophysics Award, and the Humboldt Research Award.
Nanowarming for Regenerative Medicine

ABSTRACT: This talk will introduce a new Gen-4 NSF Engineering Research Center entitled Advanced Technologies for the Preservation of Biological Systems (ATP-Bio). This ERC focuses on cryopreservation of living biological systems to improve human and eco-system health. The talk will also introduce several new technologies which focus on rapid rewarming technologies to improve cryopreservation. In one important example, gold and iron oxide nanoparticles are used to transduce optical or radiofrequency electromagnetic fields to affect heating of biomaterials at multiple scales (1 µL droplets to L systems). This application of “nanowarming” allows both rapid and uniform rewarming of vitrified (i.e., cryopreserved) biomaterials back from the cryogenic state, thereby avoiding crystallization and cracking failures. This and other new techniques allow rewarming at predictable and controllable rates from 10’s to 10,000,000’s of °C/min, thereby addressing a key technology bottleneck for larger (e.g., tissues and organs) and smaller vitrified systems (e.g., embryos and oocytes). These new rates now allow improved cell, tissue, and organ cryopreservation, including the first robust drosophila and zebrafish embryo cryopreservation methods yielding live and reproducing young. In summary, this talk demonstrates the growing opportunities for cryopreservation in regenerative medicine and biodiversity.

BIOGRAPHY: Bischof works in the area of thermal bioengineering with a focus on biopreservation, thermal therapy, and nanomedicine. His awards include the ASME Van Mow Medal and Fellowships in societies including Cryobiology, JSPS, ASME, IAMBE, and AIMBE. He has served as the President of the Society for Cryobiology and Chair of the Bioengineering Division of the ASME. Bischof obtained a B.S. in Bioengineering from U.C. Berkeley (UCB) in 1987, an M.S. from UCB and U.C. San Francisco in 1989, and a Ph.D. in Mechanical Engineering from UCB in 1992. After a Postdoctoral Fellowship at Harvard in the Center for Engineering in Medicine, he joined the faculty of the University of Minnesota in 1993. Bischof is now a Distinguished McKnight University Professor and Kuhrmeyer Chair in the Departments of Mechanical and Biomedical Engineering, the Medtronic-Bakken Endowed Chair and Director of the Institute for Engineering in Medicine at the University of Minnesota, and Director of the new NSF Engineering Research Center ATP-Bio.
AWARDS AND RECOGNITIONS

ASME Honorary Member
Dr. Pamela M. Norris
University of Virginia

ASME Honorary Member
John B. Kitto, Jr., P.E.

2022 Donald Q Kern Award Winner
Dr. John H. Lienhard V
MIT

2022 Max Jakob Memorial Award Winner
Dr. Michael Modest
Dr. Ying Sun
National Science Foundation

Dr. Avi Shultz
U.S. Department of Energy’s Solar Energy Technologies Office (SETO)

BIOGRAPHY: Dr. Ying Sun is Program Director of the Thermal Transport Processes Program in the Directorate for Engineering at the National Science Foundation. The program supports fundamental research in thermodynamics, and heat and mass transfer, including thermal solutions to climate change and quantum-thermal interface. Dr. Sun is also Hess Family Endowed Chair Professor in the Department of Mechanical Engineering and Mechanics at Drexel University. Her research interests include multiphase flows and heat/mass transfer, complex fluids and interfacial phenomena, machine learning and data-driven methods, and multi-scale modeling with applications in energy systems and advanced manufacturing. Dr. Sun is an ASME Fellow and a recipient of the NSF CAREER Award, AFOSR Summer Faculty Fellowship, French CNRS Visiting Professorship, and Drexel College of Engineering Research Achievement Award. She serves as an Associate Editor for Journal of Electrochemical Energy Conversion and Storage and was an ELATE Leadership Fellow and a visiting professor at Princeton University, Ecole Polytechnique, and Tsinghua University.

BIOGRAPHY: Dr. Avi Shultz is the program manager for Concentrating Solar-Thermal Power (CSP) for the U.S. Department of Energy’s Solar Energy Technologies Office (SETO), which supports research, development, and demonstration of solar-thermal components and systems that can enable wide-spread deployment of low-cost CSP with thermal energy storage. Dr. Shultz has been with SETO since 2013, where he started as a science and technology policy fellow, supporting the CSP program on a wide variety of topics. Before joining SETO, Dr. Shultz was a post-doctoral fellow at the University of Amsterdam, after getting his Bachelor and Doctoral degrees in Chemistry, from Columbia University and Northwestern University, respectively.
MONDAY, JULY 11, 2022

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 Polytech 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
K-16 HEAT TRANSFER IN ELECTRONIC EQUIPMENT
8:30AM–10:10AM
INDEPENDENCE A

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 - Xian Jiaotong University, Shihong Ma - Xian Jiaotong University, Qiwang Wang - Xian Jiaotong University, Wenxiao Chu - Xian 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 - Xian Jiaotong University, Xing Xu - Xian Jiaotong University, Wei Gao - Xian Jiaotong University, Zhiguo Gu - Xian Jiaotong University, Zhiyuan Jiang - Xian 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

Design and Development of a Hybrid Thermal Management System for Electromechanical Actuator for Aircraft
Technical Presentation Only: SHTC2022-89150

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

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

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

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

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

2:00PM–3:40PM INDIA C

Chair: Diana-Andra Borca-Tasciuc - Rensselaer Polytech Institute
Chair: Amitabh Narain, Michigan Technological University
Co-Chair: An Zou, Syracuse University
Co-Chair: Navdeep Dhillon, California State University – Long Beach
Co-Chair: Ming-chang Lu, National Taiwan 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 Sepahyar - Michigan Technological University, Atharva Rahane - Michigan Technological University
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
Prahars 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

Forward and Inverse Design of Spectral Emissivity Using Common Machine-Learning Models
Technical Presentation Only: SHTC2022-97667

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

Effects of Air Flow and Micro-Dust Layer on the Onset of Condensation for Solar Glass Applications
Technical Presentation Only: SHTC2022-97554
Mayameen Naser Reda - Chair of Thermodynamics, H.H. Al-Kayiem - Universiti Teknologi PETRONAS

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
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

K-10 HEAT TRANSFER EQUIPMENT II
2:00PM–3:40PM  INDIA D

Chair: Kashif Nawaz - Oak Ridge National Laboratory
Co-Chair: Prashant Singh - North Carolina State University
Co-Chair: Sandra Boetcher - Embry Riddle Aeronautical University
Co-Chair: Ravi Annapradagga - Carrier Corporation

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

K-06 HEAT AND MASS TRANSFER IN RENEWABLE ENERGY SYSTEMS
4:00PM–5:40PM  INDIA C

Chair: Leitao Chen - Tennessee State University
Co-Chair: Hohyun Lee - Santa Clara 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
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


Technical Paper Publication: SHTC2022-78044

Ramala Sinha - Applied Engineering Consultants

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

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

Designing Porous Polymers for Passive Daytime Radiative Cooling

Technical Presentation Only: SHTC2022-96695

Yuan Yang - Columbia 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-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

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

K-13 CONDENSATION
4:00PM–5:40PM FREEDOM F

Chair: Vinod Srinivasan - University of Minnesota
Co-Chair: Jovica Riznic - Canadian Nuclear Safety Commission

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

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 Sessions

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

K-10 HEAT TRANSFER EQUIPMENT III
4:00PM–5:40PM INDIA D
Chair: Prashant Singh - North Carolina State University
Co-Chair: Kashif Nawaz - Oak Ridge National Laboratory
Co-Chair: Sandra Boetcher - Embry Riddle Aeronautical University
Co-Chair: Arun Muley - Boeing

Polymers for Composite Heat Transfer Surfaces in Highly Corrosive Application
Technical Presentation Only: SHTC2022-83809
Abisolom Goitom - Technoform Tailored Solutions Holding GmbH, Nicolas Schiffer - Technoform Tailored Solutions Holding GmbH

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

Thermal Transport in Partially Porous Channel Flow
Technical Presentation Only: SHTC2022-83883
Shilpa Vijay - University of Southern California, Mitul Luhar - University of Southern California

Extension of Cylindrical Inclusion Percolation Theory Towards Non-Uniform Distributions
Technical Presentation Only: SHTC2022-81811
Anh Trinh - Villanova University, Aaron Wemhoff - Villanova University
Technical Sessions

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: SHTC2022-81765

Joel Plawsky - 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

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

Technical Paper Publication: SHTC2022-81860

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

Topography 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

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
Natural Convection in a Square Enclosure With Radiatively Participating Real Gases

Technical Presentation Only: SHTC2022-87822

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

Technical Presentation Only: SHTC2022-90463

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

K-06 THERMAL STORAGE IN ENERGY SYSTEMS
8:30AM–10:10AM  INDIA C

Chair: Leitao Chen - Tennessee State University

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

Technical Presentation Only: SHTC2022-81883

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

Technical Presentation Only: SHTC2022-89849

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

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

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 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

Experimental Investigation of PCM Melting in a Vertical Capsule

Technical Presentation Only: SHTC2022-90460

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

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

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

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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

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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

K-20 APPLICATIONS OF CHT
4:00PM–5:40PM  FREEDOM G

Chair: Mohamed Abdelhady - National Research Council Canada
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

Physics Assisted Long-Short-Term-Memory Network for Forecasting Fouling in Regenerative Air Preheater

Technical Paper Publication: SHTC2022-80475
Ashit Gupta - Tata Consultancy Services, Vishal Jadhav - Tata Consultancy Services, Anirudh Deodhar - Tata Consultancy Services, Venkataramana Runkana - Tata Consultancy Services

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

K-18 HEAT TRANSFER UNDER EXTREME CONDITIONS
4:00PM–5:40PM  INDIA D

Chair: Qiang Liao - Chongqing University
Co-Chair: Calvin Li - Villanova University
Co-Chair: Zhiguo Qu - Xi’an Jiaotong University
Co-Chair: Junjun Wu - Chongqing 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
**Technical Sessions**

**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, Zhiguo 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, Doug Abernathy - Oak Ridge National Laboratory, Daniel Antonio - Idaho National Laboratory, Krzysztof Gofryk - Idaho National Laboratory, Michael Manley - Oak Ridge National Laboratory

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**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

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**WEDNESDAY, JULY 13, 2022**

**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 Schaad - 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

Thermal Wave Sensing of Electrochemical Information

Technical Presentation Only: SHTC2022-97590
Divya Chalise - Lawrence Berkeley National Laboratory and University of California, Berkeley, Sean Lubner - Lawrence Berkeley National Laboratory and Massachusetts Institute of Technology, Yuqiang Zeng - Lawrence Berkeley National Laboratory, Sumanjeet Kaur - Lawrence Berkeley National Laboratory, Venkat Srinivasan - Argonne National Laboratory, Rob Jonson - Lawrence Berkeley National Laboratory, Joseph Schaad - Stanford University and University of California, Berkeley, Akshey Dhar - Lawrence Berkeley National Laboratory and University of California, Berkeley, Mike Tucker - Lawrence Berkeley National Laboratory, Ravi Prasher - Lawrence Berkeley National Laboratory and University of California, Berkeley

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


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
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

A Review on Film Cooling Research: Historical Developments in Hole Shapes, Measurement Techniques, Effects of Operating Conditions and Impact of Additive Manufacturing

Technical Paper Publication: SHTC2022-81803

Inderjot Kaur - Mississippi State University, Sandip Dutta - Clemson University, Prashant Singh - Mississippi State University

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

Chair: Richard Zhang - University of North Texas

Modeling Phonon Backscattering in Axially Modulated Nanowires

Technical Presentation Only: SHTC2022-84231

Yingru Song - Rice University, Geoff Wehmeyer - Rice University

Analytical Development of Phononic Energy Propagation Between Thermal and Acoustic Waves

Technical Presentation Only: SHTC2022-84360

Rajib Mahamud - Texas A&M University, Hossain Ahmed - Georgia Southern University

Modeling the High-Frequency Periodic Heating of a Line-Heater-on-Substrate Structure: Towards a Ballistic 3ω Method

Technical Presentation Only: SHTC2022-85125

Tao Li - Southeast University, Zhen Chen - Southeast University

Modeling Frequency-Dependent Rectification in Heterojunction Thermal Diodes, (SHTC2022-84234)

Technical Presentation Only

Trevor Shimokusu - Rice University, Qing Zhu - Rice University, Natan Rivera - Rice University, Geoff Wehmeyer - Rice 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)
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<td>Heat Transfer Measurements in Neutrally Buoyant Suspensions in the Inertial Regime</td>
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<td>Abrecht</td>
<td>Kevin</td>
<td>91451</td>
<td>Evaluation of Printed Circuit Heat Exchanger Performance Using Experimental and Numerical Approaches</td>
<td>Track K-10 Heat Transfer Equipment II</td>
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<td>Acosta</td>
<td>Greg</td>
<td>81599</td>
<td>Thermal Transport via Gas Conduction Within Nanoconfinement</td>
<td>K-09 Characterizations of Nanoscale Thermal Transport</td>
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<td>Afrin</td>
<td>Nazia</td>
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<td>HVAC Systems Improvement for Environment Control to Minimize the Covid 19 Infection Spreads</td>
<td>K-10 Heat Transfer Equipment II</td>
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<td>Thermal Fluid Assessment of Bluff Versus Streamlined Bodies With a Slot for Aligned Flow</td>
<td>K-12 Aerospace Heat Transfer</td>
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<td>Alvarado</td>
<td>Jorge</td>
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<td>Exploring the Effects of Minichannel Wall Distance on Failing Film Condensation: A Numerical Study</td>
<td>K-20 Computational Methods for Materials Development and Manufacturing II</td>
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<td>Ken</td>
<td>80428</td>
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<td>K-09 Nanoscale Radiative Thermal Devices/Systems</td>
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<td>K-12 Aerospace Heat Transfer</td>
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<td>Bahadur</td>
<td>Vaibhav</td>
<td>79744</td>
<td>Modeling the Influence of Heat Transfer on Gas Hydrate Formation</td>
<td>K-18 Heat Transfer under Extreme Conditions</td>
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<td>Berry</td>
<td>K. Joel</td>
<td>85788</td>
<td>Finite Element Conjugate Heat Transfer Strategy for Self and Applied Magnetoplasmdynamic (MPD) Thrusters</td>
<td>K-20 Applications of CHT</td>
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