

## **Monday August 21<sup>st</sup>, 2023: Salon C**

### *Passive Thermal Presentation Session #1*

09:00 to 09:30: Intermediate Temperature Oscillating Heat Pipe Radiators for Lunar Fission Surface Power

09:30 to 10:00: Methane Cryogenic Oscillating Heat Pipe Thermal Strap

### *Passive Thermal Presentation Session #2*

10:15 to 10:45: Novel Methods for Modeling Thermochromic Variable Emissivity Surfaces

10:45 to 11:15: Enhancing Heat Transfer for Thermal Management Via Electrostatic Resonance

11:15 to 11:45: Design and Qualification of a High Temperature Multi-Layer Insulation Blanket for the Europa Clipper Mission

11:45 to 12:15: TARDIS: Accelerating TVAC Transitions

### *Passive Thermal Presentation Session #3*

13:30 to 14:00: Advances in Thermal Technologies Using Pyrolytic Graphite Sheet

14:00 to 14:30: Thermal Interface Material Selection for Large Electronics Boxes

14:30 to 15:00: Experimental Comparison of Two-Phase Heat Spreaders for Space Modular Electronics

15:00 to 15:30: CFD Analysis and Optimization of CH<sub>4</sub> Pyrolysis in Commercial Hot Wall Chemical Vapor Deposition Reactor

### *Passive Thermal Presentation Session #4*

15:45 to 16:15: Design and Testing of Thermal Ground Support Equipment for Calibration of HARP2

16:15 to 16:45: DAVINCI EDU Descent Sphere Thermal Insulation Test Results and Model Correlation

16:45 to 17:15: Development of Flight Demonstration Hot Reservoir Variable Conductance Heat Pipes for Microgravity Testing and Future Lunar Landers and Surface Systems

## Monday August 21<sup>st</sup>, 2023: Salon D

### *Interdisciplinary Presentation Session #1*

- 09:00 to 09:30: From Manual to Automated: Optimizing Spacecraft Thermal Modelling Processes with AI
- 09:30 to 10:00: Fast GPU based ray tracing methods for radiation calculations: Applications to thermal analysis for space systems

### *Interdisciplinary Presentation Session #2*

- 10:15 to 10:45: MSR-ERO Thermal design and analysis using SYSTEMA
- 10:45 to 11:15: Thermal Simulation integrations with Other Disciplines
- 11:15 to 11:45: Penumbra Heating using Thermal Software System (TSS) v17
- 11:45 to 12:15: Thermomechanical deformation analysis of a tubular solid oxide steam electrolysis cell

### *Interdisciplinary Presentation Session #3*

- 13:30 to 14:00: Experimental and numerical investigation of a passive filtration device for spacecraft pumped fluid loops
- 14:00 to 14:30: Ionization of Sublimated Water Vapor for Lunar Cold Trap
- 14:30 to 15:00: Component Technology Challenges and Development Required for Lunar Regenerative Fuel Cell Systems
- 15:00 to 15:30: Multi-physics modeling of 3D bioprinting of PCL scaffolds for in-Space additive manufacturing

### *Interdisciplinary Presentation Session #4*

- 15:45 to 16:15: Thermal Challenges from GSFC Planetary Missions
- 16:15 to 16:45: Lunar Environment Monitoring Station TRL-6 Thermal Vacuum Test and Results

## Tuesday August 22<sup>nd</sup>, 2023: Salon C

### *Passive Thermal Presentation Session #5*

- 08:00 to 08:30: Passive thermal control of spacecraft utilizing temperature dependent magnetic forces
- 08:30 to 09:00: Propylene Loop Heat Pipe Design and Thermal Performance
- 09:00 to 09:30: Integration of a Sodium Heat Pipe and Stirling Engine for Fission Surface Power
- 09:30 to 10:00: Frequency response measurements of an oscillating heat pipe using strain gauges

### *Passive Thermal Presentation Session #6*

- 10:15 to 10:45: Thermal Vacuum Testing of a Miniature Propylene Loop Heat Pipe
- 10:45 to 11:15: Moon Rover Thermal and Power Analysis for Night and PSR Survival
- 11:15 to 11:45: Additively Manufactured Ceramics for High-Temperature Heat Rejection in Nuclear Electric Propulsion Systems
- 11:45 to 12:15: Autonomous Melting Probe for Icy Worlds Exploration

### *Passive Thermal Presentation Session #7*

- 13:30 to 14:00: Radiative heat transfer capability implemented in OpenNCC for conjugate heat transfer applications
- 14:00 to 14:30: Two-Phase Thermal Switch for Lunar Rover Thermal Management and Lunar Night Survival
- 14:30 to 15:00: Rigorous Freeze/Thaw Qualification Testing for Copper/Water Heat Pipes in Space Applications
- 15:00 to 15:30: Low-alpha, variable emissivity radiator (LAVeR) panels for passive thermal regulation of spacecraft

### *Passive Thermal Presentation Session #8*

- 15:45 to 16:15: Star-shaped, Titanium-water Vapor Chamber for Temperature Management of the Carbon Dioxide Removal Assembly
- 16:15 to 16:45: Thermal balance testing and mathematical model validation of Juventas Cubesat STIM
- 16:45 to 17:15: Thermal Analysis of Orbiting Sample for Sample Return Lander

## Tuesday August 22<sup>nd</sup>, 2023: Salon D

### *Active Thermal Presentation Session #1*

- 08:00 to 08:30: The Flow Boiling and Condensation Experiment (FBCE) Flight Testing and Capabilities
- 08:30 to 09:00: Flow Boiling and Condensation Experiment: Flow Boiling in a Rectangular Channel with Subcooled Inlet Conditions in Microgravity
- 09:00 to 09:30: ELECTRICALLY DRIVEN LIQUID FILM Flow BOILING: A TWO-PHASE HEAT TRANSPORT DEVICE DRIVEN BY ELECTRIC CONDUCTION MECHANISM
- 09:30 to 10:00: Numerical Study of effect of gravity on Pool Boiling Curve in a Temperature Controlled Mode

### *Active Thermal Presentation Session #2*

- 10:15 to 10:45: Development of a Novel Direct-to-Chip Evaporator using Hollow Micropillars for Thermal Management in High Heat Flux Applications
- 10:45 to 11:15: Computational Study of 3-Phase Contact Line: Effect of Oscillations on Heat Transfer
- 11:15 to 11:45: Analysis of Dynamical System Behaviors of Loop Heat Pipes
- 11:45 to 12:15: Freeze-Thaw Tolerant Direct Condensation Radiator for Two-Phase Fluid Loops

### *Cryogenics Presentation Session #1*

- 13:30 to 14:00: Emissivity of black coatings from ambient to cryogenic temperatures: How spectrally flat black coatings can enhance performance of space systems
- 14:00 to 14:30: Prediction of Cryogenic Propellant Tank Active Pressure Control by Jet Induced Mixing
- 14:30 to 15:00: A multi-fidelity modelling approach for cryogenic propellant management of VEGA-E upper stage
- 15:00 to 15:30: Review of Cryogenic Loop Heat Pipe Technology Development by NASA/GSFC for Space Applications

### *Cryogenics Presentation Session #2*

- 15:45 to 16:15: Results and lessons from cryogenic phase change experiments with LH2 and LCH4
- 16:15 to 16:45: Thermal Analysis and Testing of a Conductively-Cooled High Temperature Superconducting Rotor for a 1.4 MW Electric Machine
- 16:45 to 17:15: Analytical evaluation of advanced Cryogenic Fluid Management (CFM) Technology Development Tool for NASA's Exploration Vision

## **Wednesday August 23<sup>rd</sup>, 2023: Salon C**

### *Passive Thermal Presentation Session #9*

- 08:00 to 08:30: Power and Propulsion Element Passive Thermal Summary
- 08:30 to 09:00: Mars Sample Recovery Helicopter Thermal System Design
- 09:00 to 09:30: Using Thermal Desktop to Model Effects of Plume Heating on MLI
- 09:30 to 10:00: Europa Clipper System TVAC Planning

### *Passive Thermal Presentation Session #10*

- 13:30 to 14:00: Flame Deflector Ablation Analysis based on Artemis 1 Launch Environment
- 14:00 to 14:30: Passive, Radially Deployed Radiator Panels for CubeSat Thermal Control
- 14:30 to 15:00: Experimental Characterization of Cryogenic Heat Pipe Evaporator for Lunar Ice Collection
- 15:00 to 15:30: Aluminum-Ammonia Heat Spreader for Lunar Surface Applications

### *Passive Thermal Presentation Session #11*

- 15:45 to 16:15: Design Considerations and Analysis of Experimental Test Structures used in Thermal Vacuum Testing
- 16:15 to 16:45: Thermal Radiative Modeling of Spacecraft Windows in Future Human-Rated Spacecraft

## Wednesday August 23<sup>rd</sup>, 2023: Salon D

### *Active Thermal Presentation Session #3*

- 08:00 to 08:30: Title: Analysis, Design, Implementation, and Testing of Mechanically Pumped Fluid Loops (MPFL) for Spacecraft Thermal Control system.
- 08:30 to 09:00: HYBRID NANOFLUIDS HEAT TRANSFER IN METAL FOAM AND COMPARISON TO ORDINARY NANOFLUIDS
- 09:00 to 09:30: High Speed Twin Helical Screw Compressor for Enabling a Sub-Ambient Thermal Control System for Manned Spacecraft

### *Active Thermal Presentation Session #4*

- 14:30 to 15:00: Digital Twin of an Industrial Condenser for Lunar In-Situ Resource Utilization
- 15:00 to 15:30: Thermal Design of the Landing Gear and its Actuator on the Mars Sample Retrieval Lander

### *Active Thermal Presentation Session #5*

- 15:45 to 16:15: Dragonfly: Lander Thermal Controller Design
- 16:15 to 16:45: Dragonfly Lander Conjugate Heat Transfer Thermal Analysis: Computational Fluid Dynamics (CFD) Correlation of the Development Thermal Module (DTM) Thermal Test
- 16:45 to 17:15: Thermal Testing Strategy of Development Thermal Module for Dragonfly Lander

## Thursday August 24<sup>th</sup>, 2023: Salon C

### *Passive Thermal Presentation Session #12*

None

### *Passive Thermal Presentation Session #13*

10:15 to 10:45: 3D Printed Wick Development for Loop Heat Pipes

10:45 to 11:15: Design and Testing of a Device for Moon Dust Deposition on Radiative Surfaces

11:15 to 11:45: Analytical Methods Used in the Design of Thermal Toolbox Elements for Extreme Environments

### *Passive Thermal Presentation Session #14*

13:30 to 14:00: Surviving Night at the Lunar South Pole: Exploring Viability of Radioisotope Power Systems for a Crewed Rover

14:00 to 14:30: Experimental Investigation of Capillary Performance of Additively-Manufactured Lattice Structures for Fluid Wicking Applications

## Thursday August 24<sup>th</sup>, 2023: Salon D

### *Aerosciences Presentation Session #1*

- 10:15 to 10:45: The SCIFLI Airborne Multispectral Imager (SAMI) Payload: New scientific instrument for spatial and radiometric testing of space vehicles with a VIS-NIR-SWIR-MWIR full motion video camera system
- 10:45 to 11:15: The SCIFLI Artemis 1 Observation Imaging Campaign
- 11:15 to 11:45: CFD simulations of the Effects of Thermo-Chemical Non-Equilibrium on Two Hypersonic re-Entry cases
- 11:45 to 12:15: Improving Aerodynamic Predictions of Mars Entry Vehicles Using Hybrid RANS/LES

### *Aerosciences Presentation Session #2*

- 13:30 to 14:00: Fabrication and Evaluation of A Five-hole Pitot tube
- 14:00 to 14:30: Computation of Approximate Stagnation Point Heat Flux in Hypersonic Flow at Any Mach Number and Altitude: A Python-Based Numerical Approach
- 14:30 to 15:00: ArcjetCV: a new machine learning application for extracting time-resolved recession measurements from arc jet test videos

### *Aerosciences Presentation Session #3*

- 15:45 to 16:15: Behavioural Analysis of Alumina-based Silicon Carbide as a Thermal Barrier Coating in Jet Engine
- 16:15 to 16:45: Hydrodynamics of Two-Phase Flows through Porous Media in Microgravity: Packed Bed Reactor Experiment onboard of the International Space Station
- 16:45 to 17:15: Examining Rapid Depressurization of Honeycomb Panels Using Computational Fluid Dynamics Through Anisotropic Porous Modeling
- 17:15 to 17:45: Aerodynamic Parameters of Aerofoils