

The 34th International Symposium on Transport Phenomenon

November 10-14,

2024

Taoyuan Convention and Exhibition Center, Taoyuan, Taiwan

Conference Program Book

National Central University, Taiwan Pacific Center of Thermal-Fluids Engineering



Preface

Transport phenomena, including the heat and mass transfer and fluid flow which can be found in the various kind of science and engineering fields. It covers from nanoscale to macroscale, from single-phase to multiphase, from non-reactive to reacting flows, and for applications from on the ground to in space. Further improvement of conventional technologies or development of breakthrough new technologies is highly demanded under the global slogan of SDGs (Sustainable Development Goals).

International Symposium on Transport Phenomena is a series of meetings sponsored by the Pacific Center of Thermal-Fluids Engineering. The previous ISTP meetings have been held in various countries in the past thirty-four years from the first ISTP in 1985 to the 30th ISTP in 2019. The ISTP-31 and ISTP-32 in 2020 and 2022, were conducted by a way of virtual style (online symposium) due to COVID-19. The ISTP-33 came back to a face-to-face event again in Kumamoto after the COVID-19 pandemic in September 2023.

The 34th ISTP will be held on November 10-14, 2024 in the Taoyuan Convention and Exhibition Center, Taoyuan, Taiwan. It will provide an opportunity for researchers, scientists, engineers, and students from all over the world engaging in the studies of transport phenomena to get together and to stimulate each other. The organizing committee members are looking forward to seeing you in Taiwan at the ISTP-34, in November 2024.

Scopes

Papers dealing with any aspect of transport phenomena and thermal-fluids engineering from fundamental sciences to applications in engineering systems and nature are solicited. Topics include but are not restricted to the following areas:

- 1. Experimental/Computational Fluid Dynamics,
- 2. Industrial Aerodynamics
- 3. Electronics Packaging and Thermal Management
- 4. Boiling and Multi-Phase Flow
- 5. Micro- and Nano-Scale Transport, MEMS
- 6. Transport phenomena in solid mechanics and fluid-structure
- 7. Turbulence and Flow Instabilities
- 8. Sustainable & Renewable Energy
- 9. Heat and Mass Transfer
- 10. Combustion and Reacting Flows
- 11. Bioengineering and Bio-thermal Fluid Dynamics
- 12. Fuel Cells and Battery Technology
- 13. Air-Condition and Refrigeration

- 14. Other aspects of Transport Phenomena
- 15. Interdisciplinary

Committee

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Masaru Ishizuka, President, PCTFE. Sadanari Mochizuki, Ex. President, PCTFE Kazuhisa Yuki, ISTP Coordinator, PCTFE

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- S. H. Winoto, National University of Singapore
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Shenqyang Shy, National Central University Koji Takahashi, Kyushu University Yuying Yan, Nottingham University Yasuyuki Yokono, University of Tokyo

Invited Speakers

Plenary speakers



Prof. Satish G. Kandlikar

Gleason Professor of Mechanical Engineering, Distinguished Professor, Rochester Institute of Technology, USA **Title:** From Invention to Innovation – Journey of a High Heat Flux Cooler Enabled with Boiling



Prof. Yasuyuki Takata

International Institute for Carbon-Neutral Energy Research (I2CNER), Kyushu University, Japan **Title:** On the Quenching Temperature in Spray Cooling



Prof. John Thome

Prof. Emeritus EPFL, Technical Director, JJ Cooling Innovation, Switzerland **Title:** Passive Two-Phase Cooling of Electronics: Loop Thermosyphons and Pulsating Heat Pipes

Keynote speakers



Prof. Chun Yang

School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore **Title:** Microfluidic Linear and non-Linear Electrokinetic Transport Phenomena



Prof. Wei Li
Professor and Fellow ASME in Department of Energy Engineering,
Zhejiang University, China
Title: Potential Fluctuation of Interface in Two-Phase Flow and Flow Instability



Prof. Deanna A. Lacoste

Department of mechanical engineering, King Abdullah University of Science and Engineering (KAUST), Saudi Arabia **Title:** Control of Combustion Dynamics by Plasma: The Importance of Transport Phenomena



Prof. Huasheng Wang

Professor of Thermofluids Engineering, School of Engineering and Materials Science, Queen Mary University of London **Title:** Condensation heat transfer in microchannels



Prof. Liang-Han Chien

Dean, College of Mechanical and Electrical Engineering, National Taipei University of Technology, Taiwan **Title:** Heat Transfer of Low GWP Refrigerants



Dr. Chia-Wei Chen

General Manager, Advanced Thermal Solutions, Supermicro Computer Inc. **Title:** Green Computing for Next Generation Data Centers

Conference Venue

Taoyuan Convention and Exhibition Center is situated next to MRT Airport Line Station, Taoyuan Sports Park (A19). The conference will be held on the 3rd floor of the Taoyuan Convention and Exhibition Center. Registration, the welcome reception, lunch breaks, and coffee breaks will all take place in the lobby area on this floor. Plenary lectures are scheduled in Conference Hall 301a, while parallel sessions will be conducted in conference rooms 302, 303, 304a, and 304b. These rooms are highlighted with red rectangles on the following page for easy reference.



The banquet of the ISTP-34 will be held on November 12 at Shing Chiang Hui restaurant, a shuttle bus to the banquet venue will be provided, with departure times at 17:10, 17:20, 17:30, and 17:40. If you happen to miss the shuttle, you can reach the banquet venue via the MRT Airport Line. Simply take the MRT from Taoyuan Sports Park (A19) to Huanbei Station (A21). The logo of the banquet site is shown in the following figure.



For further assistance with MRT routes from the conference venue to the banquet site, please scan the QR code located in the bottom right corner of this page.





Presentation Guideline

Each general presentation has 15 minutes (including 12 minute presentation and 3 minute Q&A). Please bring your own laptop for the presentation, and note that the projector supports HDMI and DisplayPort (DP) connections. A laser pointer will also be available at the venue.

To help everything run smoothly, we recommend arriving at your designated conference room at least 15 minutes before your session begins. Use this time to test your presentation, familiarize yourself with the podium setup, meet your session chairperson, and address any technical requirements with the on-site staff or technician.

Special Issue of Journal Publications

Selected papers with high-quality from ISTP-34 proceedings will be further reviewed and published in special issues of the "Journal of Enhanced Heat Transfer" and "Applied Thermal Engineering".

Paper Copyright

ISTP does not collect copyrights from authors, so authors can submit their work to journals after the conference, with the exception of ATE selections.

Program Overview

November 10, Sunday

Place	3rd Floor Lobby
16:00~19:00	Registration
17:00~19:00	Welcome Reception

November 11, Monday

Place	Room 301a				
08:00~17:00		Regist	ration		
08:40~09:10		Ope	ning		
09:10~10:00	Plenary Lecture 1 From Invention to Innovation – Journey of a High Heat Flux Cooler Enabled with Boiling Prof. Satish G. Kandlikar, Rochester Institute of Technology, USA Chair: Prof. Chien-Yuh Yang, National Central University				
10:00~10:20	Tea Break				
10:20~11:10	Plenary Lecture 2 On the Quenching Temperature in Spray Cooling Prof. Yasuyuki Takata, Kyushu University, Japan Chair: Prof. Liang-Han Chien, National Taipei University of Technology				
11:10~12:00	Plenary Lecture 3 <u>Passive Two-Phase Cooling of Electronics: Loop Thermosyphons and Pulsating Heat Pipes</u> Prof. John Thome, Prof. Emeritus EPFL, JJ Cooling Innovation, Switzerland Chair: Dr. L. Winston Zhang, Novark Technologies, Inc.				
12:00~13:30		Lur	nch		
Place	Room 302	Room 303	Room 304a	Room 304b	
13:30~15:00	Experimental and Numerical Heat Transfer I	Thermal Management I Chair: Edward Kung	Heat Pipe and Thermosyphon I Chair: Winston Zhang	Combustion and Reacting Flows I Chair: Shenqyang Shy	

	Chair: Rei-Yu Chein			
13:30	Evaluating the Efficiency of PINNs in Simulating NACA 4 Series Airfoils MY. Chang [*] , HC. Chang and WH. Wang	Keynote Lecture Green Computing for Next Generation Data Centers Dr. Chia-Wei Chen, General Manager, Advanced Thermal Solutions, Supermicro Computer Inc.	Enhancing Passive Cooling with Dual Evaporator Loop Heat Pipes: A Visualization Study Using Neutron Radiography A. M. Fathoni, P. A. Hendrayanto , R. S. Ramadhan, Sholahuddin, and N. Putra*	Keynote Lecture Control of Combustion Dynamics by Plasma: the Importance of Transport Phenomena Prof. Deanna A. Lacoste, King Abdullah University of Science and Engineering, Saudi Arabia
13:45	Study on Flow Control around a Rectangular Cylinder by Adding Periodic Fluctuation A. Hada and Y. Kozato [*]		Study on a New Ultra-Thin Loop Heat Pipe with a Thickness of 0.3 mm for Thin Electronic Devices J. Sasaki [*] , N. Watanabe, S. Aso, K. Sadakata, S. Tanabe and H. Nagano	
14:00	Numerical Analysis of Effects of Anisotropy and Nonuniformity on the Aerodynamic Forces on a Porous Cylinder in High Reynolds Number Flow E. Kurihara [*] , J. Gotoh and H. Hamakawa	The Effects of Non-condensable Gases on the Condensation Heat Transfer of HFE7100 in Immersion Cooling Systems LH. Chien [*] , CH. Lin, CW. Hsu and SH. Cai	Effect of Channel Size on Operational Characteristics of a Horizontally- Oriented Polymer Pulsating Heat Pipe Z. Pei , Y. Akahoshi and Y. Koito [*]	Pyrolysis Behavior of Wood Containing Oxidants T. Kinugasa , T. Daitoku [*] and T. Tsuruda
14:15	Linear Stability Analysis of Three- Dimensional Natural Convection at Various Low Prandtl Number in an Annular Enclosure Using a Non- Uniform Grid T. Imai , T. Masuda and T. Tagawa [*]	Investigation Regarding Heat Transfer Characteristics of Brushless DC Motors K. Nishi *	Fundamental Experiments on Evaporation Heat Transfer Characteristics of Wick Structures: Comparison between Rectangular and Trapezoidal Shapes G. Sun , R. Matsumura and Y. Koito [*]	Stabilization of Non-premixed Hydrogen-Rich Gas Flame in Hot Air Coflow HT. Lin, SR. Chen , FH. Wu [*] , GB. Chen
14:30	Numerical Study of Two-Dimensional Flow Past a Square Cylinder Rotating at a Constant Angular Velocity M. Watanabe [*] , H. Satake and T. Tagawa	A Study on the Cooling Performance of Phase Change Material with Heat Sink Design Applied to Electronic Components J. S. Huang [*] and Y. H. Chu	Design, Fabrication and Testing of a Thin Ammonia Loop Heat Pipe Using Metal Additive Manufacturing K. Hayashi [*] , M. Kamata, N. Watanabe, K. Nakazawa, T. Tsuru and H. Nagano	Measurement of Transient Local Unburned Gas Temperatures in Engines Using Inexpensive Two-Color Inorganic Fluorescent Tracer C. Kondo [*] and R. Osumi
14:45	Influence of Atmospheric Stabilities on Wind-Turbine Wakes T. Uchida [*]	Simultaneous Measurement of Figure of Merit and Power Generation Efficiency of Thermoelectric Modules Based on Optical Heating and Non- contact Temperature Detection	Start-up Performance of a Loop Heat Pipe with Dual Heat Sources for Battery Thermal Management System: Influence of Filling Ratio P. A. Hendrayanto , A. M. Fathoni, A.	High-Pressure Turbulent Burning Velocity Measurements and General Correlations of Spherical NH ₃ /H ₂ /Air Flames in Isotropic Turbulence WC. Shen, SY. Shy [*] , V. T. Mai and

		Methods	Zaki, and N. Putra [*]	HY. Hsieh
		N. Nakamura [*] , A. Alasli, F. Ando, K.		
		Uchida and H. Nagano		
15:00~15:20		Tea I	Break	
	Experimental and Numerical Heat	Thermal Management II	Heat Pipe and Thermosyphon II	Combustion and Reacting Flows II
15:20~16:50	Transfer II	Chair: Edward Kung	Chair: Winston Zhang	Chair: Shenqyang Shy
	Chair: Rei-Yu Chein			
	Numerical Study on Physical	Numerical Study of Thermo-Hydraulic	Effect of Inclined Angle on the Heat	Consideration of a New Combustion
	Mechanism of Ionic Wind Direction	Characteristics in Geometrically	Transfer Performance of Grooved	Model Combining a Simplified Three-
15.20	Inversion in Annular-Type PA	Modified Manifold Microchannel	Aluminum-Ammonia Heat Pipes	reaction Model and a Hyperbolic
15:20	I. Fukumori [*] , S. Ōtomo and H.	Heat Sink	CC. Wang, YJ. Lin , MH. Chen, TH.	Tangent Approximation Model
	Nishida	S. K. Samal [*] and C. C. Wang	Yu and CY. Yang [*]	G. Hamada [*] , D. Iwamoto, K. Takao
				and F. Akagi
	Investigation of the Near-Wake Flow	Critical Heat Flux of Shear-driven	Experimental Investigation of	Analysis of Unsteady Behavior of
	of a Circular Cylinder Using	Liquid Film Flow on a Horizontal	Operating Characteristics of a	Lean Premixed Flame in a Circular
15:35	Experimental and Numerical	Heating Surface	Variable Path Oscillating Heat Pipe	Tube Using Variable Angle Swirl Vanes
	Approaches	T. Hirokawa *, T. Nakano, and O.	C. Dang [*] , K. Sasaki and S. Hong	M. Komiyama [*] , T. Kumazaki, T.
	KC. Chang* and DV. Dong	Kawanami		Narukawa and S. Nishida
	Impact of Environmental Factors on	Advanced Passive Cooling for Battery	An Experimental Study of a Flat Plate	Micro-mixing Combustion Technology
	Solar Photovoltaic Thermal	Systems Using Integrated Heat Pipes,	Pulsating Heat Pipe (PHP) with an Air-	for Clean Hydrogen Gas Turbines: A
15.50	Distributions: A Combined	PCM, and Heat Sinks	Cooled Fin Pack	Parametric Optimization Approach
15.50	Experimental and Numerical Study	B. Suhendra, M. S. Aliefiansyah, K.	M. Bialocur, J. R. Thome [*] , J. B.	A. Kumar, WC. Huang, TC. Li, JH.
	I. Hussain*, U. Sajjad and WM. Yan	Rezqi, G. J.P. Putra, A. M. Fathoni and	Marcinichen, L. W. Zhang	Lin, S. Yang [*]
		N. Putra*		
	Thermocline Behavior of a Packed	Machine Learning Enables Precise	Design and Performance Test for a	A Low No _x Porous Radiant Burner
	Bed Thermal Energy Storage System	Analysis of Nucleated Bubbles in Two-	Novel Ultra-Thin Vapor Chamber	Using Lean Methane/Hydrogen/Air
16.05	S. Bellan [*] , K. Matsubara, and T.	Phase Immersion Cooling	Module for the Thermal Solution of a	Mixtures and Its Application to a
10.05	Kodama	CA. Feng [*] and CL. Sun	Block Up-Converter with GaN Chips	Novel Hot Water Boiler
			SC. Wong [*] , TY. Kuo , CY. Fu, LQ.	H.Y. Hsieh, S.S. Shy*, W.W. Wang and
			Huang, CC. Hsu and CY. Lu	C.Y. Yang
	Experimental Evaluation of the	Heat Transfer Performance of	Design and Evaluation of Remote	A Numerical Investigation into
	Characteristics of Three-Dimensional	Copper-Water Heat Pipe under	Loop Thermosyphon for High Heat	Employing Reduced Mechanism to
16.20	Convective Flow in a Single-Sided	Freezing-Thawing Cyclic Test	Flux Applications	Predict Hydrogen-Rich Gas
10.20	Heated Rectangular Channel Flow in	CC. Wang, F. Utomo , MH. Chen, T	A. M. Zamanifard, M. Gholampour,	Combustion Characteristics in the
	Horizontal Configuration	H. Yu, CY. Yang [*]	and CC. Wang [*]	Raceway Region of Blast Furnace
	T. Hasegawa and K. Shirai [*]			DQ. Vo , JH. Huang, SY. Hsu [*] , CH.

				Tsai, BJ. Lin, TY. Huang
	Experimental and Numerical Analysis	Experimentation and Analysis of a	Heat and Mass Transfer Enhancement	High-Pressure Turbulent Burning
	of Temperature Field in the	Manifold Microchannel Liquid	Mechanism of a Tall Fin with Cycloid	Velocity Measurements and General
16:35	Dielectrophoretic Cell-Separation	Cooling Plate for Chip Cooling	Thermosyphon Loop	Correlations of Spherical NH ₃ /H ₂ /Air
	Device Subject to Joule Heating	Y. Luo and S. Wang [*]	ZT. Tan, B. Zhang, WX. Chu [*] and Q	Flames in Isotropic Turbulence
	Y. Seki [*] and S. Tada		W. Wang	WC. Shen, SY. Shy [*] , V. T. Mai, and
				HY. Hsieh

November 12, Tuesday

Place	Room 302	Room 303	Room 304a	Room 304b
09:00~10:30	Boiling and Condensation I Chair: Akiko Kaneko	Thermal Management III Chair: Kazuyoshi Fushinobu	Air-Condition and Refrigeration I Chair: Yean-Der Kuan	Heat and Mass Transfer I Chair: Hironori Saitoh
09:00	Keynote Lecture Condensation Heat Transfer in Microchannels Prof. Huasheng Wang, Queen Mary	Effects of Fin-Cuts of Heat Sinks on Nature Convection LH. Chien [*] , SK. Wen and YH. Wang	Keynote Lecture Heat Transfer of Low GWP Refrigerants Prof. Liang-Han Chien, National	Numerical Evaluation of Heat Leakage and Boil-off Gas in Cryogenic LH ₂ Storage Tanks A. A. Awais , D. Kim, K. C. Kim [*]
09:15	University of London, UK	Augmentation of Air-Cooling Performance Utilizing Breathing Phenomenon Induced by Corrugated Lotus Copper Fins R. Kubota [*] , K. Yuki, K. Yuki, T. Ogushi, M. Murakami, T. Numata and T. Ide	Taipei University of Technology, Taipei, Taiwan	Near-infrared Imaging-Based Diffusion Coefficient Mapping for HCI–KOH Reaction N. Kakuta [*] , G. G. Carandang and Y. Abe
09:30	Effect of Fluid-Surface Contact Angle for Condensation Heat Transfer on Integral-Fin Tubes S. K. Sari and CY. Yang [*]	System-Level Analysis of Two-Phase Immersion Cooling for Effective Heat Dissipation in HPC Applications TY. Chang*	Application of Evaporative Cooling in Water Curtain YC. Liu [*] , HQ. Huang, WJ. Chen	A Simulation Study into Thermal- hydraulic Performance of a Heat Exchanger with a Gyroid Structure for Heat Transfer Enhancement M. Špiláček, L. Klimeš [*] , M. Zálešák, J. Kůdela and P. Charvát
09:45	An Attempt to Enhance Heat Transfer and Stabilize Liquid Film of Falling Film Evaporation by a Nucleate Boiling Heat Transfer Surface K. Hirai [*] and H. Asano	Numerical and Experimental Investigation on the Solar Radiation and Thermal Response of Electronic Components R. Yasui and K. Fushinobu [*]	Performance Evaluation and the Flow Field of Two-Stage Centrifugal Compressors Using CFD – Comparative Study of Separate and Simultaneous Analysis Methods KS. Hung, YJ. Lai , YC. Li, JM. Huang and YD. Kuan [*]	Research on the Influence of Heat Sink Fin Design on Heat Transfer Performance and Pressure Drop TB. Chang [*] , H. Chen and YC. Lo
10:00	Experimental Study on Condensation Heat Transfer of Refrigerants R-134a and R-1234yf in Plate Heat Exchangers KT. Chen [*] and TC. Ma	Evaluation of Measurement Accuracy Focusing on Heat Losses in Steady- State Thermal Contact Resistance Measurement U. Akram [*] , T. Hatakeyama, R.Kibushi, and M. Ishizuka	Thermal Performance Analysis of a Closed Loop Pulsating Heat Pipe Under Low Inclination Angles for Energy Conservation in Buildings I. I. Hakim [*] , N. Putra , E. Aviadamaputra	Mixing of Viscoelastic Fluids in Static Mixers YL. Liao, HH. Lai, YH. Bai, KT. Lai, C. F. Chen and U. Lei*
10:15	Experimental Investigation of Condensation Heat Transfer of HFC-	Novel Thermophysical Property Analysis Technique by Using	Application of Large Language Models (LLM) in Energy Management	Instability Patterns of Thermal Marangoni Flow in a Rectangular

	245fa and HFO-1233zd(E) on Integral-	Combined Electrical-Pump	Systems	Hole
	Fin Tubes	Thermoreflectance Method and	C. M. Lu, W.Y. Zhuang and W. S. Lee	J. Zhang , P. Zhu and L. Wang [*]
	S. K. Sari and CY. Yang [*]	Structure Function	_	
		A. Mitani, S. Watanabe, D. Higuma, K.		
		Fushinobu [*] and H. Aoki		
10:30~10:50		Tea I	Break	
10.50~12.20	Boiling and Condensation II	Fuel Cells and Battery Technology	Air-Condition and Refrigeration II	Heat and Mass Transfer II
10.30 12.20	Chair: Akiko Kaneko	Chair: Kimihiko Sugiura	Chair: Yean-Der Kuan	Chair: Hironori Saitoh
	Microbubble Emission Boiling; How	Effect of HF-DCFC Operation	Performance of Air Curtain Applied in	Effect of Control Parameters on
	can MEB Provide Us the Higher Heat	Condition on Gasification	Front Opening Unified Pod (FOUP)	Oscillation-Controlled Impinging Jets
10:50	Flux than CHF?	Characteristics of Wood Pellet	T. Lin, SC. Hu, A. X. Andrade and O.	by DNS
	N. Unno [*] , K. Suzuki, K. Yuki, S. Satake	J.Tobita [*] and K.Sugiura	A. Zargar [*]	T. Masuda , K. Tsujimoto*, T. Ando, M.
	and C. Hong			Takahashi
	Mesoscopic Study of Bubble	Performance Evaluation of DCFC with	Application of Evaporative Cooling in	Computational Analysis of Thermal
	Nucleation on a Boiling Surface based	Organic Fuels	Cooling Pad	and Flow Characteristics of
11:05	on the Lattice Boltzmann Method	T. Yoshida and K. Sugiura	YC. Liu [*] , HQ. Huang, WJ. Chen	Emergency Shut-off Valves for
	J. Wang [*] , B. Shen and A. Kaneko			Cryogenic Liquid Hydrogen Tanks
				F. Ashraf, J. Kim, K. C. Kim*
	Relationship between the Structure	Development of 2D Catalyst Layer for	Comparison of Heat Dissipation in the	DNS of Multiple Intermittent Jets
	of Metal Porous Bodies and Critical	PEFC Using Inkjet Printer	Vapor Chamber Liquid Cooling to	with Different Frequency
11:20	Heat Flux in Saturated Pool Boiling	A. Tasaki and K. Sugiura [*]	Temperature and Flow Rate of Cold-	S. Murai , T. Tanoue, K. Tsujimoto*, T.
	Y. Hayashida, Y. Umehara, A. Etoh,		Water Supply Differences	Ando, and M Takahashi
	and S. Mori [*]		N. Fitria , YD. Kuan [*]	
	Numerical Simulation of Three	Design and Development of Lab Scale	Long-term Evaluation of Thermal	Radiative and Convective Heat
	Dimensional Pool Boiling Including	Solar Simulator for Solar Thermal	Insulation Performance of RC Building	Transfer from Thermally Activated
	Nucleation Sites Using Diffuse	Applications	Covered with Wooden Exterior	Wall Panels - Lab-Scale Experiments
11:35	Interface Model	M. Kambayashi, A. Z. Rizal, K.	Materials in Cold Region by Field	M. Zálešák *, P. Charvát, L. Klimeš, O.
	K. Sumida , K. Tsujimoto [*] , T. Ando and	Matsubara, T. Kodama and S. Bellan [*]	Measurements	Pech, And M. Ostrý
	M. Takahashi		A. Yoshida [*] , S. Shoho, S. Naito and S.	
			Kinoshita	
	Change of Critical Heat Flux of	Optimizing Porous Electrode	Development of a Free-Piston Stirling	Hybrid Analysis of Fluid Dynamics and
	Evaporation around a Cylinder	Architecture: Leveraging Pore	Combined Cooling, Heating, and	Two-Temperature Model for
11.50	Mounted in a Rectangular Duct under	Network Modeling to Enhance Flow	Power Cogenerator	Predicting Ultrashort Laser Processing
11.50	Flow Pulsation Condition	Battery Performance	H.S. Yang [*] and Y.T. Lin	F. Sha *, B. Kim and K. Fushinobu
	K. Matsuura , T. Fukue [*] , H. Shirakawa,	M. Alizadeh [*] , J. Gostick, T. Suzuki and		
	J. Hatakeyama and Y. Koito	S. Tsushima		

12:05	The Motion of Single Large Bubbles Rising in Hydrophobically Modified Alkali-Soluble Associative Polymer Solutions A. Kato , M. Ohta [*] , E. Jimenez and S. Iwata	Impact of Skywalk Designs on Wind Environment Around High-Rise Buildings V. A. Aspriyanti, WY. Chen and YH. Juan [*]	Characterization of Solid-Solid PCM Linear Polyurethane 2000 (PUL-2K) with Double-Glazed Windows for Energy Conservation in Buildings I. I. Hakim [*] , N. Putra , A. H. Widjaja	Heat Transfer Performance of Plate Heat Exchanger with Horizontal Distributor in Inlet Header FC. Lin, MT. Hsieh and CY. Yang [*]
12:20~13:30		Lui	nch	
13:30~15:00	Two-Phase Flow I Chair: Biao Shen	Experimental and Computational Fluid Dynamics I Chair: Chih-Ang Chung	Air-Condition and Refrigeration III Chair: Shih-Cheng Hu	Heat and Mass Transfer III Chair: Tong-Bou Chang
13:30	Keynote Lecture Potential Fluctuation of Interface in Two-Phase Flow and Flow Instability Prof. Wei Li, Zhejiang University, China	Keynote Lecture Microfluidic Linear and non-Linear Electrokinetic Transport Phenomena Prof. Chun Yang, Nanyang Technological University, Singapore	Large Scale PIV to Investigate the Effects of Ceiling Returns on the Flow Recirculation in an Operating Room SC. Hu, A. X. Andrade, T. Lin and O. A. Zargar [*]	Experimental Study of High Heat Flux Cooling Channel Design Based on Characteristics of Fluid Disturbance M. J. Hung *, J. C. Sun, M. J. Yang, K. S. Hung
13:45			The Hybrid Ventilation of a Room at High Extraction Flow Rates A. Lird and Y.J.P. Lin*	Numerical Analysis on the Performance of Microchannel Heat Sinks with Fluidic Oscillator MJ. Youh, RH. Hsieh, HC. Chiu, J H. Jang [*] and CH. Lin
14:00	Experimental Analysis of Bubble Terminal Velocity in the Presence of Fibers in Aqueous Solutions R. Komine , R. F. Neumeister, N. A. B. Ariffin, R. Kurimoto [*] , G. Ribatski and K. Hayashi	Transition to Turbulence in Natural Convection: A Study on Large Circular Heated Plates HC. Chang [*] and WH. Wang	Techno Economy Analysis Solid-Solid PCM Linear Polyurethane 2000 (PUL- 2K) with Double Glazed Windows for Building Energy Conservation I. I. Hakim*, N. Putra , F. N. Jassin	Heat Transfer Characteristics on the Flat Plate Installed in a Pulsating Duct Flow with Non-uniform Velocity Distribution at the Inlet -Relationship Between the Variation of the Velocity Profile Along the Flow Direction and the Time-Averaged Local Heat Transfer Coefficients R. Katoh and H. Saitoh [*]
14:15	Analysis of a Single Bubble Breakup Dynamics in a Venturi Tube Using Experimental and Numerical Methods H. Siddiqi [*] and A. Kaneko	Study on the Optimal Design Method for very Low Specific Speed Pumps with Downward-Sloping Head Flowrate Curve Y. Geng, S. Hatanaka, T. Kitahora [*] and M. Hattori	Temperature-controlled Air Flow Design of Operating Room Ventilation to Reduce Infection F. S. Arison , A. S. Yatim [*] , K. Y. Wong	Natural Convection Along Vertical Duct Under a Locally-intensive Magnetic Force M. Kaneda [*] , K. Urabe, K. Suga and C.A. Lin
14:30	Effects of Surfactant on Shape of Taylor bubble in a Square	Research and Development of Analytical Model of Food Soil	Utilization of Closed Loop Pulsating Heat Pipe Using De-Ionized (DI)	Compressible Effect Due to Large Temperature Difference on Natural

	Microchannel	Cleaning Process by CFD	Water – Methanol Binary Fluid for	Convection in a Square Enclosure
	R. Igarashi, R. Hachikubo, R. Kurimoto	K. Sasaki [*] , N. Watanabe, S. Kono, M.	Building Energy Conservation	H. Satake [*] and T. Tagawa
	and K. Hayashi*	Kon, Y. Tobari, S. Kanai and K. Masuda	I. I. Hakim*, N. Putra , F. F. Wibisana	
	Numerical Simulations of Drop	Influence of Flow Disturbance on the	Enhancing Indoor Thermal Comfort:	Evaluation of the Influence of Flow
	Breakup in a Strong Linear Shear Flow	Behavior of Jet Sheets	Evaluating Natural Fiber Cooling Pads	Conditions on Mass Transfer in a Gas-
14.45	Induced by a Driven Top Wall and a	K. Suzuki [*] and K. Sato	and Finned Heat Pipe in Indirect	liquid Oscillatory Baffled Reactor
14:45	Stationary Bottom Wall		Evaporative Cooling Systems	A. Masuda, E. Okita, M. Yasuda and T.
	F. Yuhang, M. Ohta*, E. Jimenez and		M. F. Ramadhan, A. M. Fathoni and	Horie [*]
	M. Sussman		N. Putra*	
15:00~15:20		Tea I	Break	
	Two-Phase Flow II	Experimental and Computational	Air-Condition and Refrigeration IV	Heat and Mass Transfer IV
15:20~16:50	Chair: Biao Shen	Fluid Dynamics II	Chair: Shih-Cheng Hu	Chair: Tong-Bou Chang
		Chair: Chih-Ang Chung		
	Numerical Simulations of Drop	Investigation of CFD Analysis	An Overview of Oil Transport	Visualization of Mass Transfer in TBAB
	Deformation and Breakup in Linear	Methods for Evaluation of the Flight	Phenomenon in Refrigeration and Air	Aqueous Solution Using Redox
15.20	Shear Flows Made Up of Shear-	Capabilities of Giant Pterosaur	Conditioning Systems	Reactions by Applying Voltage
15:20	Thinning Fluids	Quetzalcoatlus	A. Kumar [*]	Y. Umesawa, T. Daitoku [*] , and T.
	A. Kato , M. Ohta [*] , E. Jimenez and M.	Y. Kamiya [*] , K. Yuki and K. Yuki		Tsuruda
	Sussman			
	Molecular Dynamics Study on	Indirect Computational Fluid	Observation of the Frost Formation	Heat Transfer Controlling the
	Influence of Quantum Nature on	Dynamics Analysis on Evaporator-	Characteristics on the Flocked Surface	Temperature of Human Forehead
	Liquid-Vapor Interfacial Properties	Condenser Distance in Vapor-	Coated with Hydrophobic Agent and	During Walking
15:35	T. Mori [*] , H. Nagashima, T. Tokumasu,	Compression Heat Pump Dryer	Natural Dehydration After Defrosting	R. Fukasawa , M. Asai [*] and T. Matsui
	S. Watanabe and S. Tsuda	D. Biksono [*] , L. O. Nelwan, R. Yusriski,	X. Qin and Y. Hamamoto [*]	
		R. Hakim, W. Hidayat, A. P. Prakoso,		
		and M. F. Hasan		
	Fully-Contaminated State of Single	Liquid Properties Evaluation and	Optimization of Thermodynamic	Investigation of Technique for
	Bubbles in Surfactant-Laden Water at	Jetting Mechanism Analysis of	Performance in Active Magnetic	Simultaneous Measurement of
15.50	Concentration beyond CMC	Urethane Resins	Refrigeration Using Wavy Sinusoidal	Thermophysical Properties of Liquids
15.50	Y. Iwai, R. Kurimoto, K. Hayashi [*] , D.	T. Ogura , Y. Harada, M. Kadonaga, K.	Structures	by Photoacoustic Method
	Legendre and S. Hosokawa	Fushinobu and K. Kato [*]	T. A Nguyen [*] , R. Takata, K. Uchida	A. Yoshida [*] , S. Kinoshita and K.
			and H. Nagano	Kagata
	Visualization and Measurement of Air	Pockels Measurement-based	Fundamental Study on Prevention of	Experimental Evaluation of Cooling
	Films on a Micro-Structured	Investigation of Surface Potential and	Adhesion Phenomenon to Solid	Effect in Forced Convection Heat
16:05	Hydrophobic Surface in Horizontal	Its Effect on Mechanical	Interfaces by Adding Emulsifiers to	Transfer with Plasma Actuator
	Channel Flows	Characteristics of Vortex-Generator-	Ice Slurry for Food Refrigeration	A. Nishizawa [*] , N. Omori, A.
	S. Kubo and A. Kitagawa [*]	Type Plasma Actuator	M. Chiwata [*] , R. Okada, T. Ogawa and	Hatamoto, S. Ōtomo and H. Nishida

		Y. Ishii [*] , Y. Kaneko, A. Komuro, S. Ōtomo and H. Nishida	K. Matsumoto	
16:20	Air Bubble Transport in Horizontal Channel Flows Using Multiple Hydrophobic Strips K. Sato , S. Iwashita and A. Kitagawa [*]	The Indoor Airflow Characteristics of a Room with a Hybrid Extraction Ventilation System H. N. Fauzi and Y. J. P. Lin [*]	Mixing Behaviors of Refrigeration Oil and Zeotropic Refrigerant W. Rakpakdee [*] , M. Fukuta and M. Motozawa	Investigation of the Effect of Surfactant and Applied Voltage on the Degree of Supercooling in the Anionic pH Range J. Takeuchi [*] , K. Ito, Y. Makino and K. Matsumoto
16:35	Interface-Resolved Direct Numerical Simulation of Droplet Evaporation in Turbulence C. Shao *	Performance and Unstable Flow Investigation of Axial-flow Fan with Porous Material Disk on the Exhaust- side S. Tsunekuni [*] , K. Nishibe and K. Sato	Enhancing Energy Efficiency in FMCG Beverage Filling Processes Through the Utilization of U-Shaped Heat Pipe Heat Exchanger in HVAC Systems I. I. Hakim [*] , N. Putra , I. Zidny	Development of a Moisture Diffusion Model into Paper Fibers in the Hygroexpansion of Paper Media K. Yamazaki [*] , K. Pan, R. Kawano, K. Kato, S. Kuramoto and K. Fushinobu

November 13, Wednesday

Place Time	Room 302	Room 303	Room 304a	Room 304b
09:00~10:30	Micro- and Nano-Scale Transport I Chair: Chia-Wen Tsao	Experimental and Computational Fluid Dynamics III Chair: Katsuaki Shirai	Bioengineering and Bio-thermal Fluid Dynamics Chair: Atsuki Komiya	Sustainable & Renewable Energy I Chair: Tomohiro Nozaki
09:00	Molecular Dynamic Study on the Effects of Cuboid Nanostructure on the Distribution of Local Thermal Resistance at a Solid-Liquid Interface T. Omori [*] , K. Fujiwara and M. Shibahara	Influence of Distance Between Two Slots on Interaction of Synthetic Jets M. Takano [*] , K. Orihara, K. Nishibe and K. Sato	Exploring Shark Olfaction: Integrating Morphological Analysis and Fluid Dynamics YH. Lin, KJ. Chi, YY. Chiang and W H. Wang [*]	Optimization of Operational Parameters of a Liquid Desiccant System Integrated with a Heat Recovery Unit YJ. Chou, B. Zhou, SC. Hu, A. Shiue [*] , T. Lin, A. Wang, CL. Hsiao, G. Leggett
09:15	A Study of Changes in Ice Adhesion Forces on Different Types of Test Plates in a Nanoscale Field. R. Okada [*] , M. Chiwata, T. Ogawa and K. Matsumoto	Control of Pulsating Jet Flow Characteristics Using Adjacent Synthetic Jets K. Orihara [*] , M. Takano, K. Nishibe and K. Sato	On the Transport of Fibrous Particles in the Respiratory Tract F. Prinz [*] , F. Lizal, O. Cejpek, O. Hajek and M. Jicha	Effect of Operating Variables on Performance of an Absorption Chiller Driven by Heat from Municipal Solid Waste Incineration A. Shiue [*] , SC. Hu, KH. Chiang
09:30	Viscoelastic Effects on Pressure Change of Non-Newtonian Fluids Through a Sudden Expansion Part in Microchannels Y. Yamahata* , Y. Yonemoto and A. Kawahara	Jet Flow Control Using a Circular Cylinder with Double Jet Sheets R. Naito [*] , K. Nishibe, D. Kang and K. Sato	Formation Mechanism of Vibration Induced Circulating Flow for Minimally Invasive Mass Culture of Cells T. Kagiya and H. Obara [*]	Study of Stall Control and Prediction of Its Broadband Noise Generated from a Horizontal Axis Wind Turbine S. Sasaki [*] and H. Suganuma
09:45	Measurement of Water Contact Angle on 2D Transition Metal Dichalcogenide Heterostructures Using Environmental Scanning Electron Microscopy R. Yamashita , QY. Li [*] , J. Pu, P. Yu, Y. Miyata and K. Takahashi	Fundamental Flow Characteristics of Liquid Synthetic Jets Generated in Rectangular Tank D. Iwaya [*] , R. Inoue, K. Nishibe, A. Kiyama, D. Kang and K. Sato	Evaluation of a Minimally Invasive Prototype Fiber Optic Probe for Breast Cancer Treatment A. Obonai , T. Kogawa, Y. Kanda, T. Kodama and A. Komiya	Study on Output Performance of a Regenerative Organic Rankine Cycle Unit Based on Machine Learning S. Sasaki [*] and Y. Okuno
10:00	Time-Series Prediction of Molecular Trajectories Using Generative AI for Estimating Molecular Properties S. Tanaka [*] , M. Shibahara and K. Fujiwara Heat Transport in Nanometer-sized	Translational Motion of Two- dimensional Bubble Near Various Boundaries R. Inoue [*] , D. Iwaya, A. Kiyama, D. Kang and K. Sato Effect of Swirl Velocity on the	Visualization Technique for Water Vapor in Air Atmosphere Using Near- Infrared Light Y. Abe , K. Fujiwara, F. Yazawa, R. Matsubara and N. Kakuta [*] Relationshin Between Flow Condition	Optimizing the Shape of the Wind Piezo Electric Energy Harvesting to Enhance Its Behavior A. R. Shahsavari , A. Afsharfard and K. C. Kim*

	Thin Film Considering Phonon	Diffusion Characteristics of Coaxial	and Swimming Positions in	Suppression by Water Mist with the
	Scattering Boundary	Swirl Jets.	Rectangular Flume in the Case of	Effect of Spray Angle and Nozzle
	Y. C. Lee, C. Y. Ho [*] , Y. H. Tsai, C. C. Ho	S. Yamashita [*] , D. Iwamoto, F. Akagi	Spinecheek Anemonefish	Layout in Aircraft Cargo
	and B. C. Chen	and K. Takao	T. Fukue [*] and N. Kimura	Compartment
				P. Zhu [*] , Z.H. Xu and J.G. Zhang
10:30~10:50		Tea I	Break	
	Micro- and Nano-Scale Transport II	Experimental and Computational	Turbulence and Flow Instabilities	Sustainable & Renewable Energy II
10:50~12:20	Chair: Chia-Wen Tsao	Fluid Dynamics IV	Chair: Jiunn-Chi Wu	Chair: Tomohiro Nozaki
		Chair: Katsuaki Shirai		
	Estimation of Thermal Conductivity	Particle Behaviors in Hele-Shaw Flow	Consideration of Factors That Causes	Study on the Formation Reaction of
	Profile in Depth Direction Using	of Concentrated Particle Suspensions	Heat Transfer Enhancement by	Cyclopentane CO ₂ Hydrate Under
10.50	Machine Learning in Frequency	T. Koshiba [*] and T. Yamamoto	Swirling the In-Pipe Flow in the	Unstirred Conditions
10.50	Domain Thermoreflectance		Transition Regime (Consideration	M. Kawai [*]
	Y. Ikeda, Y. Akura, M. Shimofuri, A.		from Thermal Convection Pattern)	
	Banerjee, T. Tsuchiya, and J. Hirotani [*]		H. Nakamura [*]	
	Development of a High-Precision	Experiments on Compensation of	Solenoidal and Dilatational Velocity	Performance of Photovoltaic/Thermal
	Fluid Slip Measurement Method	Frequency Response of Constant-	Statistics for a Planar Shock Wave	Module with Bio-Inspired Absorber
11:05	Using Atomic Force Microscope	Current Hot-Wire Anemometry	Propagating in Turbulence	Channel
	H. Ishida, H. Teshima*, QY. Li and K.	T. Goto and A. Inasawa [*]	A. Kusuhata [*] , K. Tanaka, T. Watanabe,	L.R Shiue, T.W Fan, P.C Yeh and K.H
	Takahashi		K. Nagata and A. Sasoh	Lin [*]
	Flexible Three-Omega Sensors	Quantitative Analysis of Planar	Local Dissipation Scaling in	Exploring an Ocean Wave Energy
	Fabricated on Parylene Substrates	Velocity Profiles in Axial	Temporally Developing Grid	Harvester Utilizing Combined Heave
11.20	R. Yamasaki, Y. Matsunaga, M.	Measurement Planes of a	Turbulence	and Roll Motions of a Buoy
11.20	Shimofuri, A. Banerjee, T. Tsuchiya	Transparent Non Axi-Symmetric Co-	Y. Nishimoto [*] , T. Watanabe and K.	A. Afsharfard [*] and K.C.Kim
	and J. Hirotani [*]	Rotating System	Nagata	
		I. A. Masud [*] , T. Ueno and K. Shirai		
	Investigation in Wetting Behavior of	Jet Vectoring Using Secondary	Study of the Effects of Control	A Study on Extension of Heating Time
	Sessile Water Droplets on	Coanda Synthetic Jets near a Flat	Frequency and Phase Difference on	at Night of Water Circulation Type
11.25	Heterogeneous SAM-Modified	Plane Boundary	the Flow Characteristics in Multiple	Agricultural Air Conditioning System
11.55	Surfaces: A Molecular Dynamics	K. Yabu [*] , Y. Kato, K. Nishibe, D. Kang	Intermittent Jets Using DNS	I. Ichiei and K. Toriyama [*]
	Study	and K. Sato	T. Tanoue [*] , S. Murai, K. Tsujimoto, T.	
	Z. Zhao , H. Kusudo and G. Kikugawa [*]		Ando and M. Takahashi	
	Development of a Printed	Laminar Mixing Performance	Evaluation of Eddy Viscosity at Les	Influence of the Pico Scale Breastshot
11.50	Thermoelectric Film of Cobalt	Evaluation in an Oscillatory Baffled	Sub-Grid Scale Using Shell Model	Water Wheel's Bucket Bend Angle
11.50	Antimonide	Reactor with Numerical Study and	R. Masuda, S. Ohgi, H. Mizuguchi, F.	and Position on Its Performance
	K. Miyazaki [*] , K. Iyo, K. Watanabe and	Experimental Method	Akagi, S. Inage and K. Takao	J. P. Panjaitan, R. Irwansyah [*] , Warjito,

	K. Hasikuni	R. Murotani , W. Saiki, Y. Komoda, N. Ohmura, S. Fujioka, E. Okita, M. Yasuda and T. Horie [*]		Budiarso, Nurhadid, M. Mizan and A. P. Prakoso
12:05	Synthesis of Manganese Substituted Zeolite with Na-P1 Framework Y. Shingai [*] , S. Nomura, S. Mukasa and J. Nakajima	Examination of Three-Dimensional Flow Structures Reconstructed from Planar Velocity Fields Measured in an Enclosed Rotating Flow Driven by Corotating Disks T. Ueno, I. A. Masud and K. Shirai [*]	Effects of Temperature on Energy Transfer of Electron-Phonon Interaction for Semiconductors C. Y. Ho [*] , Y. H. Tsai, Y. C. Lee, B.C. Chen, and C. C. Ho	Enhancing Turgo Turbine Efficiency with Degradable Coconut Shell Blades: A Sustainable Solution for Pico Hydro Power in Indonesia M. Mizan , Warjito [*] , Budiarso, R. Irwansyah, And C. C. Rusli
12:20~13:30	Lunch			
13:30~15:00	Micro- and Nano-Scale Transport III Chair: Masaaki Motozawa	Experimental and Computational Fluid Dynamics V Chair: Wei-Keng Lin	Other Aspects of Transport Phenomena Chair: Jiunn-Chi Wu	Sustainable & Renewable Energy III and Other Aspects of Transport Phenomena Chair: Aref Afsharfard
13:30	Flow and Heat Transfer Characteristics of Al ₂ O ₃ /Water Nanofluids in Microchannels YR. Liao , YT. Lee [*] , AS. Yang	Flow Separation Control Over Cetacean-Inspired and Bird/Insect Wing-Inspired Airfoils DU 06 W 200 A. X. Andrade , O. A. Zargar [*] , SC. Hu and T. Lin	Flow Properties in a Leidenfrost Droplet on a Heated Plate K. Kotera , I. Ota, H. Masuda, Y. Komoda and N. Ohmura [*]	Enhancing PV Efficiency and Food Production: Agrivoltaic Systems in Tropical Climates F. P. Faiz , P. A. Hendrayanto, A. M. Fathoni, N. Putra [*]
13:45	Effect of Gravity Settling of Nanoparticles on Convective Heat Transfer in a Rectangular Channel AC. Ruo [*] , TF. Yang and WK. Li	Flow Separation Control Over Shark Skin-Inspired and Hybrid Blade Airfoils DU 06 W 200 O. A. Zargar [*] , A. X. Andrade, SC. Hu and T. Lin	Flow and Mixing Characteristics in a Droplet on a Vibrating Plate Y. Morita, I. Ota, Y. Komoda and N. Ohmura [*]	High-Pressure Oxygen Production by Cryogenic Air Separation Integrated with Liquid Hydrogen Cold Energy S. Kawabata , S. Komori, S. Doi, A. Morita and T. Nozaki [*]
14:00	A Study of Heat and Mass Transfer for Nanofluid Flow Through a Porous Medium J.S. Huang [*] , X.W. Wang	A Novel Heat Dissipation Technology to Improve the Efficiency of Lithium Battery Energy Storage Packs YJ. Chu, CJ. Tien, PJ. Wang, WK. Lin [*] and MH. Hsiao	Numerical Study of Recuperator Performance in a Supercritical Carbon Dioxide Brayton Cycle Y. C. Huang , H. L. Ma and R. Y. Chein [*]	Experimental Study on Thermochemical CO ₂ Splitting and System Analysis for Demonstration and Commercial Plant Y. Koyama [*] , K. Sasaki, T. Shimonaka, T. Ishikawa, M. Suzuki, M. Nakakura and K. Matsubara
14:15	Experimental Investigation of Magneto-Acoustic Heat Transfer Augmentation of Magnetic Nanofluid Flow in Rectangular Duct N. Chuenboonma , M. Motozawa [*] , M. Fukuta, W. Rakpakdee and W.	Coanda Effect of Two-dimensional Jets Near Flat Plates K. Ishiwata [*] and K. Sato	Evaluation of Differences in Narrow- Band Wavelengths of the Irradiation Light Sources Suitable for Surface Temperature Measurement Method Using the Scattered Light Intensity from Thermochromic Liquid Crystals	Aerodynamic Characteristics of Multi- Copter Covered Partially by Upper Wall N. Wada [*] , D. Hashiba and K.Nishibe

	Chaiworapuek		CW. Huang [*] , K. Toriyama, S. Tada, S.	
			Funatani and K. Ichimiya	
14:30	Behavior of Dispersed Carbon	Development and Evaluation of	Numerical Study of Influence of	Regional Control of Suction Flow
	Nanotube in Latent Heat Storage	Cryogenic Turbopump Testing	Applied Magnetic Field Strength on	Using Excited Jets
	Material During Natural Convection	Apparatus: Integrated Pump	System Performance of	K. Nakamori [*] , K. Fukawa, K. Nishibe
	Melting in a Rectangular Heat Storage	Performance Measurement and	Magnetocaloric Heat Pump	and K. Sato
	Tank	Cavitation Visualization in Liquid	H. Kamijo , T. Kawanami*	
	T. Saito , S. Morita [*] , M. Kawai, K.	Nitrogen Pump with Inducer		
	Takai, Y. Hayamizu and N. Haruki	K. Sakai [*] , N. Oba and K. Miyagawa		
14:30	Experimental Study of Aerodynamic	Aeroacoustic Simulation of an Open	Near-Infrared Microscopic Imaging of	Study on the Molten Salt Carnot
	Performance on a Wing with Self-	Cavity with a Rear-Wall Protrusion	Electrolyte Flow and Concentration	Battery Energy Storage Coupled with
14:45	Actuated Flaps	Using Lattice Boltzmann Method	Distribution Within the Formation of	a Coal-Fired Power Plant
	LC. Hsu [*] and CY. Pan	R. Yanagi [*] and K. Kusano	Zinc Dendrites	B. Li , W. Qian, H. Wei, X. Xi and X. Du [*]
			F.N. Fattah [*] , Y. Abe and N. Kakuta	
15:00~15:20	Tea Break			
15:20~16:50	Closing			



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 - 產業通訊:此為會員專屬之季刊,每期4-5篇以上,介紹技術及市場發展
 等專題報導資訊,免費提供會員。
 - 研討會及國際交流活動:定期為會員舉辦熱管理產業相關之研討會,針 對會員感興趣及熱門之課題,邀請國内外講師進行研討,會員參加皆享 有優惠,實際收費得視每場次成本斟酌調整。

團體會員、個人會員及非會員參加各項活動費用如下所示:

服務項目	團體會員	個人會員	非會員
研討會(3場/年)	2人冤費	1,500元/人場	3,000元/人場
國際交流活動(1~2場/年)	3,500元/人場	3,500元/人場	5,500元/人場
即時熱管理電子訊息			_
產業通訊(4期/年)			_
台灣熱管理網站資訊下載		_	_
	20,000元/年	3,000元/年	

註:團體會員加入第一年,需繳納入會費一萬元整。

協會網站:www.thermal.org.tw(可線上申請入會) 協會聯絡人:劉小姐 電話:03-5918269 傳真:03-5820207 E-mail:TTMA@itri.org.tw

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Research Center of Energy, **Conservation for New Generation** of Residential, Commercial, and Industrial Sectors





Introduction

This center will promote energy conservation technology to resolve the energy deficiency problem, to achieve safe and stable electricity generation, to assist industry innovation and to anchor fundamental technology.

Mission

The following critical technologies will be developed, including:

- Innovative energy conservative facility.
- Near zero energy consumption design.
- Advanced energy conservation management.
- Fore-sight industrial energy conservation.



■ In-line with 5 SDGs :

Key Facilities

Independent R&D:

Mobile integrated largescale environmental wind speed measurement and infrared thermal imaging instrument building temperature field measurement



Contact

- Large area PIV particle velocity measuring instrument (Technology transferred)
- Clean room technology **R&D** laboratory

Laboratories : Data center experimental system



Rapid demand control ice storage air conditioning experimental system



Multispectral system









+ 886-2-8772-9927



No. 1, Sec. 3, Zhongxiao E. Rd., Da'an Dist., Taipei City 106344, Taiwan (R.O.C.)







Cross-cutting Res<u>earch</u>



Energy storage and low-temperature heat transfer technology

Smart control technology

Technology

Development

- Edge to cloud technology for non-intrusive load monitoring
- Smart lighting & environmental energy management system
- Digital Twin Technology & Applications in HVAC Systems



Energy storage and low-temperature heat transfer technology

- Intelligent rapid demand control ice storage air conditioning system energy-saving technology
- Smart cold chain energy storage & control technology
- High-efficiency small ice storage tank, ice melting & low-temperature heat exchange technology



Energy-saving technology for industrial airconditioning

Building energy saving and net zero emission technology



Technology

Application

ology

Energy-saving technology for industrial air-conditioning

- Energy-saving technology of data center
- Energy-saving technology of advanced semiconductor manufacturing facilities



Building energy saving and net zero emission technology

- Analysis of urban microenvironment & building heat load
- Full-scale environmental wind field & urban updraft numerical analysis technology
- Near-zero carbon emission building design & building energy-saving management technology



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