



**The 5th International Symposium on
Multiscale Simulations of Thermophysics**
第五届热物理多尺度模拟国际会议

CONFERENCE GUIDE

Hefei, China
September 26–28, 2025



WELCOME

We hereby sincerely welcome you to join the 5th International Symposium on Multiscale Simulations of Thermophysics (MSTP-2025) in Hefei from September 26th to 28th, 2025. The event is jointly organized by the Youth Working Committee of the Heat and Mass Transfer Branch of the Chinese Society of Engineering Thermophysics, the University of Science and Technology of China (USTC) and the Energy Research Society of Anhui Province.

This symposium originated from the International Symposium on Numerical Methods in Heat and Mass Transfer (ISNMHMT), which was previously held in Hangzhou (2019) and Ningbo (2020). Following the COVID-19 pandemic, the third and fourth editions were successfully hosted in Shenzhen (2023) and Beijing (2024).

MSTP-2025 welcomes not only breakthroughs in computational modeling, but also actively encourages the presentation of recent developments in theory and experimental discovery. We have organized ten tracks in total to cover a wide range of topics in thermophysics:

Track 1. Micro/Nanoscale Heat Transfer

Track 2. Thermal Radiation

Track 3. Combustion

Track 4. Multiphase Flow

Track 5. Advanced Thermal Management

Track 6. New Energy Technology

Track 7. Thermal Functional Materials and Devices

Track 8. AI for Thermophysics

Track 9. Thermophysics for Aerospace Applications

Track 10. Biomedical Heat and Mass Transfer

Chinese Society of Engineering Thermophysics

University of Science and Technology of China (USTC)

Energy Research Society of Anhui Province





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CONFERENCE ORGANIZATION

ORGANIZER

Youth Working Committee of Heat and Mass Transfer Branch of Chinese Society of Engineering Thermophysics

CO-ORGANIZER

University of Science and Technology of China
Anhui Province Energy Research Society

• ACADEMIC CHAIRS



Tianshou Zhao

Southern University of Science and Technology



Jiujun Zhang

Fuzhou University

• CONFERENCE CHAIRS



Bingyang Cao

Tsinghua University



Gang Pei

University of Science and Technology of China



Hua Tian

University of Science and
Technology of China



Hao Ma

University of Science and
Technology of China

•General Secretaries

Li, Man	University of Science and Technology of China
Long, Linshuang	University of Science and Technology of China
Pan, Zhiliang	University of Science and Technology of China
Dong, Yuan	Hangzhou Dianzi University
Chen, Kai	Beihang University
Dong, Ruoyu	South China University of Technology

•Conference Organizers

Peng Tan	Xiaoyuan Zhang	Guiqiang Li	Lingfeng Shi
Fei He	Bin Xu	Cheng Wang	Bin Zhao
Xianhui Chen	Hua Chen	Qing Ni	Lili Gong
Xu Xiao	Xuanang Zhang	Yuqing Wang	Xin Tang
Hongxin Yao	Zhimiao Song	Yunfei Xu	Yisheng Huang
Yongjun Sang	Zhongxi Zhao	Zhanshi Ni	Ken Chen
Xingni Chen	Ben Wang	Zhuojun Zhang	Haikuan Xie
Yonghao Zhang	Xianrong Cao		



PROGRAM OVERVIEW

Date	Morning	Afternoon	Evening
Sep.26 th	Check-in		Reception
Sep.27 th	Plenary Lectures	Sessions	Banquet
Sep.28 th	Sessions	Visiting Labs	Departure
Friday, Sep 26 th			
12:00-21:30	Onsite Registration		The Lobby of Yongle Half Mountain Hotel
18:00-21:00	Reception Buffet		1 st Floor Dining Hall
Saturday, Sep 27 th			
8:30-12:00	Opening Ceremony and Plenary Lectures		Banquet Hall 2&3
12:00-13:30	Lunch Buffet		1 st Floor Dining Hall
13:30-18:00	Track 1: Micro/Nanoscale Heat Transfer		Ballroom Jiuhuashan
	Track 5: Advanced Thermal Management		Ballroom Huangshan
	Track 8: AI for Thermophysics		
	Track 6: New Energy Technology		Ballroom Chaohu&Huaihe
	Track 3: Combustion		VIP Ballroom
	Track 9: Thermophysics for Aerospace Applications		
17:45-18:30	Poster Discussion		Exhibition Area
18:30-21:00	Dinner		Banquet Hall 2&3
Sunday, Sep 28 th			
8:30-12:00	Track 1: Micro/Nanoscale Heat Transfer		Ballroom Jiuhuashan
	Track 10: Biomedical Heat and Mass Transfer		
	Track 4: Multiphase Flow		Ballroom Huangshan
	Track 7: Thermal Functional Materials and Devices		Ballroom Chaohu&Huaihe
	Track 2: Thermal Radiation		VIP Ballroom
12:00-13:30	Lunch Buffet		1 st Floor Dining Hall
14:00-17:00	Visiting Labs		
After 17:00	Departure		



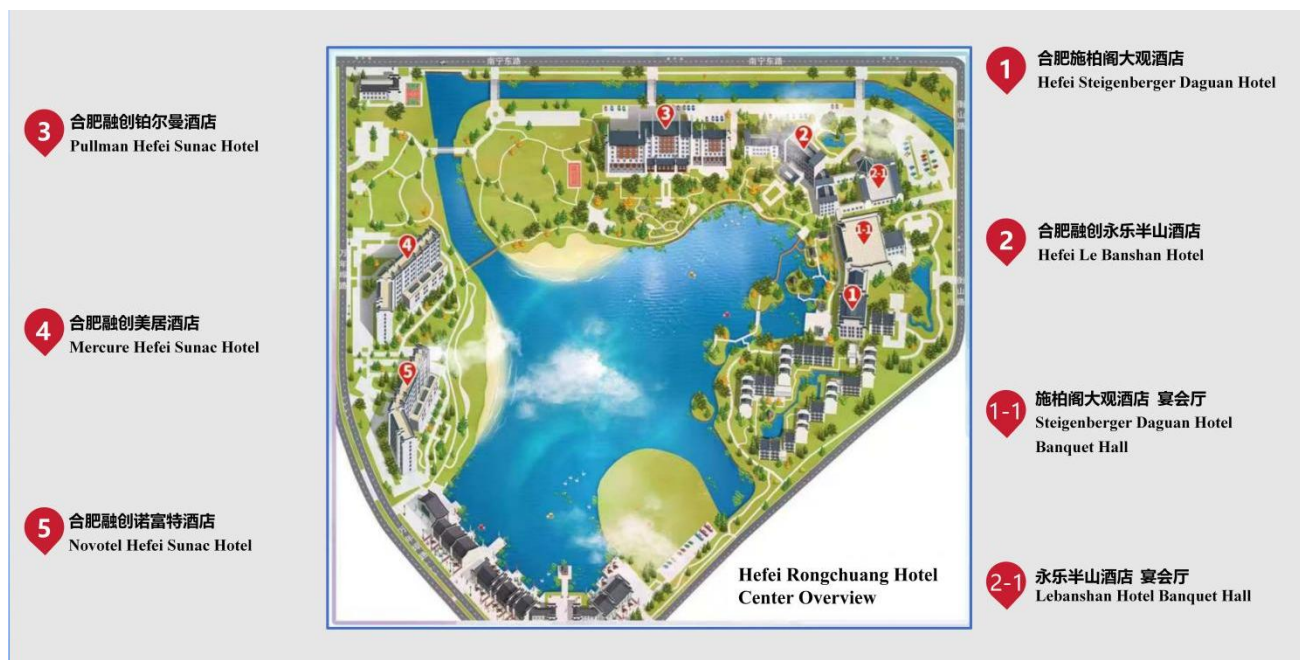
September 27th 8:30-12:00

Steigenberger Icon Hotel Main Venue: Banquet Hall 2&3

08:30-08:45	Welcome Remarks from the Chinese Society of Engineering Thermophysics		Conference Chair: Gang Pei
08:45-08:53	Welcome Remarks from the Academic Chair		
08:53-09:00	Welcome Remarks from the Host University		
09:00-09:40	Plenary Talk 1: Advancing Elastocaloric Green Cooling Technology	Shuhuai Yao, Hong Kong University of Science and Technology, Hong Kong	Conference Chair: Bingyang Cao
09:40-10:20	Plenary Talk 2: Accelerated High fidelity simulations of combustion for sustainable power and transportation	Hong G. Im, King Abdullah University of Science and Technology, Saudi Arabia	
10:20-10:40	Group Photographing and Coffee Break		
10:40-11:20	Plenary Talk 3: Understanding ion rejection and a one-step freeze desalination method	Zhigang Li, Hong Kong University of Science and Technology, Hong Kong	Conference Chair: Hao Ma
11:20-12:00	Plenary Talk 4: Advancing solar-driven thermochemical fuel production via multi-scale modeling	Yong Shuai, Harbin Institute of Technology, China	

	Ballroom Jiuhuashan	Ballroom Huangshan	Ballroom Chaohu&Huaihe	VIP Ballroom
Sep. 27 Afternoon	Track 1	Track 5 + 8	Track 6	Track 3 + 9
Coffee break	15:25-15:40	15:15-15:35	15:15-15:35	15:15-15:30
End Time	18:00	18:25	17:40	18:05
Sep. 28 Morning	Track 1+ 10	Track 4	Track 7	Track 2
Coffee break	10:05-10:25	10:10-10:25	10:00-10:20	10:10-10:30
End Time	12:15	12:25	11:30	11:50

VENUE MAP



DETAILED PROGRAM

Track 1: Micro/Nanoscale Heat Transfer (Sep. 27th Afternoon, Ballroom Jiuhuashan)

Chair: Jian Zeng (Hong Kong University of Science and Technology (Guangzhou))

Time	Author	Title
13:30-13:55	Yanguang Zhou (Keynote) The Hong Kong University of Science and Technology	Energy transport in superionic crystals
13:55-14:20	Qiye Zheng (Keynote) The Hong Kong University of Science and Technology	Significant suppression in thermal transport of β -Ga ₂ O ₃ induced by inhomogeneous strain
14:20-14:40	Yifan Li (Invited) Shanghai Polytechnic University	Quantitative measurements in scanning thermal microscopy: Theoretical models, calibration technique, and integrated instrument
14:40-14:55	Renjie Hua Hangzhou Dianzi University	Seebeck-Peltier coupling model in thermoelectric composites for merit enhancement
14:55-15:10	Chunye Ma The Hong Kong University of Science and Technology	Microscopic kinetics of water adsorption in metal-organic frameworks
15:10-15:25	Yongqi Wang Shanghai Jiao Tong University	Influence of GDL structure and reaction parameters on water and heat transfer in PEMFCs using mesoscale simulation
15:25-15:40	Coffee Break	
Chair: Yanguang Zhou (Hong Kong University of Science and Technology)		
15:40-16:05	Jie Chen (Keynote) Tongji University	Non-Fourier heat conduction in low-dimensional materials
16:05-16:25	Yixin Xu (Invited) The Hong Kong University of Science and Technology	Thermal transport spectroscopy across interfaces
16:25-16:45	Jian Zeng The Hong Kong University of Science and Technology (Guangzhou) (Invited)	Non-contact operando diagnostic of reactive and high-temperature flow
16:45-17:00	Yizhe Liu Tsinghua University	Boundary conditions dictate frequency dependence of thermal conductivity in silicon
17:00-17:15	Lingyi Guo The Hong Kong University of Science and Technology	An effective boundary condition in pseudopotential LBM simulations for modeling the flow boiling
17:15-17:30	Daosheng Tang Soochow University	Digital Twin Modelling of the 3 ω Method and Its Variations for Thermal Property Measurement in Thin Film Structures
17:30-17:45	Yinjie Shen Shandong University	Interlayer surface modification modulating thermal transport at Si/Gr/HEA heterostructure interfaces
17:45-18:00	Huikun Hu Huazhong University of Science and Technology	Prediction of the thermal transport in graphite and diamond using machine learning-based potential fields

**Track 1: Micro/Nanoscale Heat Transfer
(Sep. 28th Morning, Ballroom Jiuhuashan)**

Chair: Qiye Zheng (Hong Kong University of Science and Technology)

Time	Author	Title
08:30-08:55	Hua Bao (Keynote) Shanghai Jiao Tong University	Micro/Nanoscale heat transfer in advanced transistors and interconnects
08:55-09:15	Zhen Tong (Invited) Sun Yat-sen University	Glassy thermal transport in crystal solids
09:15-09:30	Jing Sun University of Science and Technology of China	Investigation of thermo-fluidic characteristics in conformal PCHE with divergent curved channels

**Track 10: Biomedical Heat and Mass Transfer
(Sep. 28th Morning, Ballroom Jiuhuashan)**

Chair: Wei Rao (Technical Institute of Physics and Chemistry, CAS)

Time	Author	Title
09:30-09:50	Meng Shi (Invited) Xi'an Jiaotong University	Enhanced boiling heat transfer of liquid nitrogen with hierarchical surface structures
09:50-10:05	Shangsheng Feng (Invited) Xi'an Jiaotong University	Heat transfer and amplification performance of magnetocaloric ultrafast PCR
10:05-10:25	Coffee Break	
10:25-10:50	Gang Zhao (Keynote) University of Science and Technology of China	Osmotic mass transfer in microdroplets for protein crystallization
Chair: Yang Yang (Chongqing University)		
10:50-11:15	Chaozhong Qin (Keynote) Chongqing University	Flow and transport in multiscale pore structures: model development and simulations
11:15-11:35	Dawei Wang (Invited) Guizhou University	Bio-thermophysical mechanism research of flexible and deformable gallium-based liquid metal photosensitizers in tumor treatment
11:35-11:55	Yun Huang (Invited) Chongqing University	Multiphase flow and transformation intensification during the process of CO ₂ fixation by biological photosynthesis
11:55-12:15	Dong Li (Invited) Xi'an Jiaotong University	Experimental and theoretical investigations on the opto-thermo-acoustic-mechanical coupling effect during multi-particle manipulation by photoacoustic tweezers

**Track 5: Advanced Thermal Management
(Sep. 27th Afternoon, Ballroom Huangshan)**

Chair: Yongjia Wu (Wuhan University of Technology)

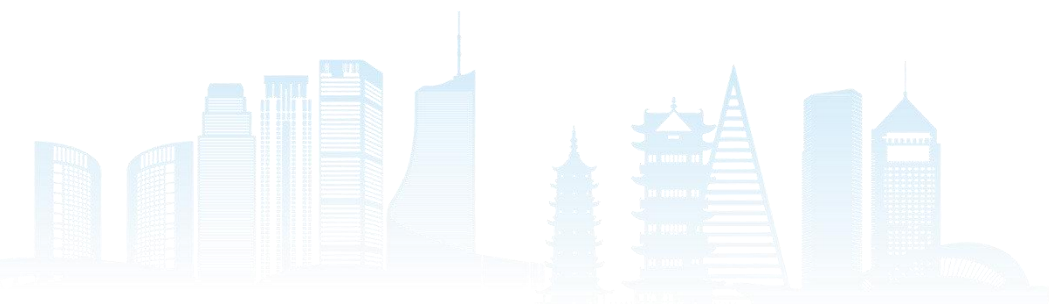
Time	Author	Title
13:30-13:55	Nuo Yang (Keynote) National University of Defense Technology	Research progress on studies of phonon engineering—Targeted phonon excitation to modulate thermal conductivity
13:55-14:20	Hyejin Jang (Keynote) Seoul National University	Multiscale thermal transport in thermal interface materials
14:20-14:40	Kang Liu (Invited) Wuhan University	Water evaporation in hydrogels and its applications in thermal management
Chair: Kang Liu (Wuhan University)		
14:40-15:00	Yongjia Wu (Invited) Wuhan University of Technology	Multi-scale simulations of the chip temperature field based on a coupled LBM-FVM method
15:00-15:15	Yifan Lei Huazhong University of Science and Technology	Integrated thermoelectric cooler with embedded microchannel for enhanced steady-state and dynamic thermal management of hotspot
15:15-15:35	Coffee Break	
15:35-16:00	Joonsang Kang (Keynote) Korea Advanced Institute of Science and Technology	High thermal conductivity materials for thermal management



**Track 8: AI for Thermophysics
(Sep. 27th Afternoon, Ballroom Huangshan)**

Chair: Guangzhao Qin (Hunan University)

Time	Author	Title
16:00-16:25	Yongqing Cai (Keynote) University of Macau	Machine learning potential for molecular dynamics and lattice dynamics of complex system
16:25-16:50	Shiyun Xiong (Keynote) Guangdong University of Technology	Development of machine learning potentials and nanoscale phonon transport engineering
16:50-17:15	Yuzhi Zhang (Keynote) DP Technology	MatMaster: a general-purpose scientific agent for materials R&D
17:15-17:35	Shenghong Ju (Invited) Shanghai Jiao Tong University	AI-assisted design of self-assembled monolayers for interfacial thermal transport
17:35-17:55	Ke Xu (Invited) Bohai University	Revolution in molecular dynamics driven by machine learning and GPU acceleration
17:55-18:10	Xiang Huang China University of Mining and Technology	Accelerating design of synthesizable thermally conductive polymers using atomic interaction-embedded deep learning
18:10-18:25	Jing Wu Huazhong University of Science and Technology	Bonding transition-induced suppression of phonon transport in N-doped β -Ga ₂ O ₃



Track 4: Multiphase Flow
(Sep. 28th Morning, Ballroom Huangshan)

Chair: Zhuo Zhang (Dalian University of Technology)

Time	Author	Title
08:30-08:55	Haihu Liu (Keynote) (Sep. 28th Morning, Ballroom Huangshan)	Numerical modeling of coalescence of two particle-coated droplets
08:55-09:15	Xiaobin Li (Invited) Tianjin University	Modulation and manipulation of boiling by surface acoustic wave and surfactant
09:15-09:35	Qinghua Yu (Invited) Wuhan University of Technology	Investigation of electrode and flow field in thermally regenerative ammonia-based flow batteries for waste-heat recovery
09:35-09:55	Zhicheng Yuan (Invited) Tongji University	Challenges of multiphase flow in immersion lithography
09:55-10:10	Taotao Zhou Hefei University of Technology	VLES - VOF - DPM based simulation of transverse jet atomization
10:10-10:25	Coffee Break	
Chair: Lei Zhao (Dalian University of Technology)		
10:25-10:45	Zhuo Zhang (Invited) Dalian University of Technology	Liquid nitrogen enabled direct freeze concentration
10:45-11:05	Yuanhe Yue (Invited) Hebei University of Technology	Scale-up and application study of spouted fluidized bed
11:05-11:25	Qinyi Li (Invited) Kyushu University	Wetting and flow on nanocarbon surfaces
11:25-11:40	Shuai Li Chongqing University	Three-dimensional numerical simulation of droplet impact on structured walls based on multi-relaxation lattice Boltzmann method
11:40-11:55	Xin Chen Jiangsu University	Numerical simulation of the dynamics of a bubble lying between a free particle and a solid horizontal surface: spreading and detachment
11:55-12:10	Ningwei Yang Chongqing University	CFD-based simulation reveals adhesion mechanism of bacteria and microalgae under dynamic flow condition
12:10-12:25	Zilong Zhong Jingdezhen Ceramic University	Study on compound-choking characteristics and performance effects in two-phase ejector

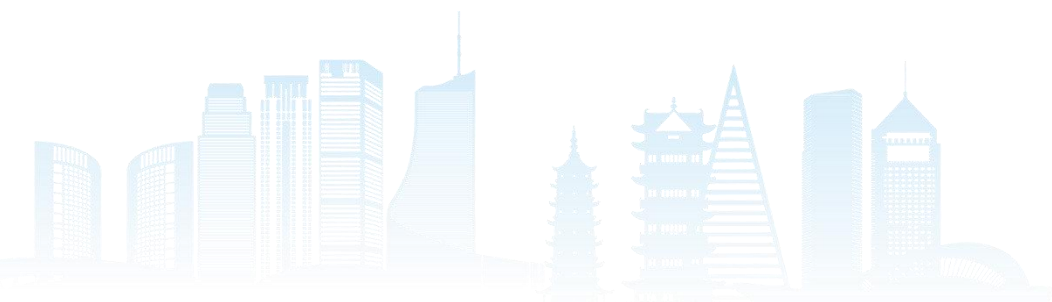
Track 6: New Energy Technology
(Sep. 27th Afternoon, Ballroom Chaohu&Huaihe)

Chair: Ronghui Qi (South China University of Technology)

Time	Author	Title
13:30-13:55	Siqi Shi (Keynote) Shanghai University	Creation and evaluation of electrochemical energy storage materials empowered by mutual reinforcement among algorithms, data and knowledge
13:55-14:15	Xiaohui Yan (Invited) Shanghai Jiao Tong University	Bubble evolution and transport in PEM water electrolyzer
14:15-14:35	Bin Chen (Invited) Shenzhen University	Cation size modulation for enhancing air electrode of PSOC/SOC
14:35-14:55	Yuqing Wang (Invited) Beijing Institute of Technology	Mechanism studies and stack integration of tubular solid oxide fuel cells
14:55-15:15	Xuelong Wang (Invited) Institute of Physics, CAS	Battery multi-scale simulation and data acquisition
15:15-15:35	Coffee Break	

Chair: Xiaohui Yan (Shanghai Jiao Tong University)

15:35-16:00	Zhouhang Li (Keynote) Kunming University of Science and Technology	A novel decoupled porous medium approach for multiscale thermohydraulic modelling of printed circuit heat exchangers
16:00-16:20	Zhengyi Mao (Invited) City University of Hong Kong	Regulating heat and mass transfer in porous materials enabling sustainable electricity–water cogeneration
16:20-16:40	Qian Xu (Invited) Jiangsu University	Multi-scale simulation for redox flow batteries with assistance of AI--From sub-micro scale to system
16:40-16:55	Chenyue Guo Southeast University	Self-sustained moisture-electric generator enabled by asymmetric hygroscopic design and radiative cooling
16:55-17:10	Tong Wu Beijing Institute of Technology	Simulation study on the synergistic degradation mechanism of carbon deposition and sulfur poisoning in solid oxide fuel cells
17:10-17:25	Zheng Li The Hong Kong Polytechnic University	Modelling study on the interactions among various working parameters on the protonic ceramic electrolyser
17:25-17:40	Sheng Xu Jiangsu University	Nanoscale process of solid ice phase transition and growth on a single particle surface in catalyst layer of proton exchange membrane fuel cells during direct cold start



**Track 7: Thermal Functional Materials and Devices
(Sep. 28th Morning, Ballroom Chaohu&Huaihe)**

Chair: Shangchao Lin (Shanghai Jiao Tong University)

Time	Author	Title
08:30-08:55	Dongyan Xu (Keynote) The Chinese University of Hong Kong	High-thermopower polarized electrolytes and ionic thermoelectric hydrogels for low-grade heat harvesting and thermal sensing
08:55-09:20	Weigang Ma (Keynote) Tsinghua University	Ionic-skin: Tri-modal sensing of temperature, humidity, and force
09:20-09:40	Liang Guo (Invited) Southern University of Science and Technology	Measurement of anisotropic mechanical properties of Mo-Si superlattice by transient thermal grating
09:40-10:00	Boxiang Wang (Invited) Shanghai Institute of Microsystem and Information Technology, CAS	Dynamic control of light and thermal radiation based on nanophotonic cavities and reversible metal electrodeposition
10:00-10:20	Coffee Break	
Chair: Zhen Chen (Southeast University)		
10:20-10:45	Shangchao Lin (Keynote) Shanghai Jiao Tong University	Green and scalable solid-state cooling based on colossal barocaloric plastic crystals
10:45-11:10	Haidong Wang (Keynote) Tsinghua University	Manipulation of phonon transport in twisted 2D materials
11:10-11:30	Xianrong Cao (Invited) University of Science and Technology of China	Multifunctional electro-thermal metamaterials





Track 3: Combustion
(Sep. 27th Afternoon, VIP Ballroom)

Chair: Xu Wen (University of Science and Technology of China)

Time	Author	Title
13:30-13:55	Zhuyin Ren (Keynote) Tsinghua University	Analysis of super-adiabatic flame temperature and its impact on NOx emissions in hydrogen flames
13:55-14:20	Zheng Chen (Keynote) Peking University	Adaptive simulation of detonation processes
14:20-14:40	Zhi Chen (Invited) Peking University	Recent progress of DeepFlame towards GPU-accelerated, AI-driven, and agent-enabled combustion CFD
14:40-15:00	Leilei Xu (Invited) Shanghai Jiao Tong University	Stabilization and emission control strategies for ammonia-based double-swirl flames
15:00-15:15	Lei Liu University of Science and Technology of China	Modeling and analysis of the differential diffusion in lean laminar premixed hydrogen-air flames
Chair: Huahua Xiao (University of Science and Technology of China)		
15:30-15:55	Yuyang Li (Keynote) Shanghai Jiao Tong University	Ammonia as a promising carbon-free fuel: road to future
15:55-16:15	Junjun Guo (Invited) King Abdullah University of Science and Technology	High-fidelity soot modeling in sustainable fuel production and utilization systems



**Track 9: Thermophysics for Aerospace Applications
(Sep. 27th Afternoon, VIP Ballroom)**

Chair: Yue Huang (Xiamen University)

Time	Author	Title
16:15-16:40	Yu Rao (Keynote) Shanghai Jiao Tong University	Improving gas turbine blade cooling through topology-optimized TPMS lattice structures
16:40-17:00	Xingjian Wang (Invited) Tsinghua University	Real-fluid effects on wall-bounded turbulence and heat transfer at supercritical pressures
17:00-17:20	Tao Ding (Invited) Tsinghua University	Research on geometric modeling methodology and pore-scale flow simulation for 2D plain-woven SiC _f /SiC ceramic matrix composites during the transpiration cooling process
17:20-17:35	Tianle Feng University of Science and Technology of China	Three-Dimensional numerical investigation on the Influence of angle of attack on transpiration cooling with phase change
17:35-17:50	Jie Ji University of Science and Technology of China	Numerical investigation of thermal performance of gravity-assisted thermosyphons for aerospace applications
17:50-18:05	Hongxin Yao University of Science and Technology of China	Scanning electron beam-based methods for the generation of extreme thermal environments: Recent advances

**Track 2: Thermal Radiation
(Sep. 28th Morning, VIP Ballroom)**

Chair: Dongliang Zhao (Southeast University)

Time	Author	Title
08:30-08:55	Fuqiang Wang/Ziming Cheng (Keynote) Harbin Institute of Technology	Mechanism of radiative property regulation and research on radiative cooling for large-scale applications
08:55-09:15	Bin Zhao (Invited) University of Science and Technology of China	Thermal radiation modulation and passive cooling/heating
09:15-09:35	Jiebin Peng (Invited) Guangdong University of Technology	Twist-tunable topological radiative heat transfer in non-equilibrium hyperbolic metamaterials
09:35-09:55	Kezhang Shi (Invited) Zhejiang University	Nonreciprocal thermal radiation based on magneto-optical, phase-change materials, and beyond
09:55-10:10	Huimin Zhu Shanxi University	Enhancing far-field thermal radiation by Floquet engineering
10:10-10:30	Coffee Break	
Chair: Ziming Cheng (Harbin Institute of Technology)		
10:30-10:55	Yaoguang Ma (Keynote) Zhejiang University	Photothermal radiation regulation and its applications
10:55-11:15	Xiao Zhou (Invited) Shanghai Jiao Tong University	Prediction of optical properties in particulate media using optimized Monte Carlo Method
11:15-11:35	Hongbo Xu (Invited) Harbin Institute of Technology	Flexible ceramic radiative cooling membranes with high reflectivity in solar spectrum, excellent UV and fire resistance
11:35-11:50	Haofeng Guo Harbin Institute of Technology	Metal-insulator transition and optical property in $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ ($0 < x < 1$) : A first principles study





POSTER PRESENTATION

Sep. 27th Afternoon 17:45-18:30, Exhibition Area

NO.	Author	Title
P1	Yue Yang Shanghai Institute of Satellite Engineering	Analysis of heat dissipation performance and topology optimization of large array radiator system based on node network method
P2	Xinran Zhang University of Science and Technology of China	Engineering intrachain geometry and interchain configuration to boost thermal conductivity in crystalline polymers
P3	Shuo Wang University of Science and Technology of China	Phase-change-triggered thermal-switch flexible composites for adaptive cooling in plug-and-play modular electronics
P4	Yinglong Hu University of Science and Technology of China	High through-thickness thermal conductivity in an edge-on two-dimensional polyamide thin Film
P5	Ke Li University of Science and Technology of China	Decoding the thermal conductivity of ionic covalent organic frameworks: Optical phonons as key determinants revealed by neuroevolution potential
P6	Jian Luo University of Science and Technology of China	Unveiling the microscopic origin of anomalous thermal conductivity in amorphous carbon
P7	Ziyan Qing The Hong Kong University of Science and Technology	Tailoring thermal transport in (Sc,Yb)AlN thin films to the glassy Limit
P8	Mingqi Sun Harbin University of Science and Technology	Onionskin-inspired construction of dual-continuous networks in cellulose for Janus composite films with excellent thermal conductivity, EMI SE and electrical insulation
P9	Zequan Lin University of Science and Technology of China	Solar vs. conventional hybrids: annual charging demand reduction in urban EV mode
P10	Jamile Mohammadi Moradian University of Science and Technology of China	Sensors for enhanced thermal management in lithium-ion batteries



POSTER PRESENTATION

Sep. 27th Afternoon 17:45-18:30, Exhibition Area

NO.	Author	Title
P11	Mu Li University of Science and Technology of China	Numerical investigation on curved channel manifold microchannels
P12	Hongyu Tao University of Science and Technology of China	Numerical investigation on the synergistic influence of wall roughness and porosity on liquid film cooling performance
P13	Yatong Zhao University of Science and Technology of China	Multi-objective optimization of porous structure with non-uniform pore distribution for transpiration cooling with phase change
P14	Yuanxun Ding Tianjin University	Experimental and numerical investigation of soot deposition in exhaust heat exchanger
P15	Ping Yuan Tianjin University	Heat transfer short-circuiting in CO ₂ recuperators with multi-bend microchannels and its suppression methods
P16	Xiansheng Li University of Science and Technology of China	VO ₂ -based mid-infrared emissivity control for thermal management
P17	Zhaoran Li University of Science and Technology of China	Dynamic Tunable Infrared Emissivity via Reconfigurable Materials
P18	Xinyu Xie University of Science and Technology of China	Color-changing Artificial Leaves Mimicking Solar Reflectance of Natural Vegetation
P19	Yufei Gao University of Science and Technology of China	Infrared camouflage design compatible with visible camouflage
P20	Weijian Xu Nanjing University of Aeronautics and Astronautics	Research on flow field characteristics of a center-inlet multi-outlet rotor-stator cavity

PLENARY SPEAKERS



Shuhuai Yao

Hong Kong University of Science and Technology

Biography

Prof. Shuhuai YAO is a Professor in the Department of Mechanical and Aerospace Engineering and a joint faculty member in the Department of Chemical and Biological Engineering at the Hong Kong University of Science and Technology.

Prof Yao's research focuses on the exploration of micro-/nano-scale fluid dynamics and heat transfer phenomena, with a particular interest in integrating theory and experiments to develop innovative technologies for instrumentation. Prof. Yao has published more than 100 scientific publications in peer-reviewed journals including top journals of her research fields such as Nature, Nature Energy, Nature Physics, Nature Communications, Sci. Adv., Joule, etc. She holds ten granted patents and has filed more than forty patent applications, three of which have been licensed to HKUST spin-off startups. In addition, Prof. Yao co-founded two startup companies based on her patented microfluidic technologies developed at HKUST.

Lecture title: Advancing Elastocaloric Green Cooling Technology

Abstract

A significant portion of global carbon emissions comes from refrigerators, air-conditioners, and heat pumps which utilize vapor-compression-based cooling technology. Hydrofluorocarbons refrigerants, which are used in conventional vapor compression systems, contribute significantly to global warming. The direct emission of refrigerant leakage accounts for 37% of total air conditioning carbon emissions, making it a significant environmental threat. In contrast, solid-state elastocaloric refrigeration, leveraging latent heat during the phase transition in shape memory alloys (SMAs), provides an environmentally friendly alternative with characteristics that are greenhouse gas-free, 100% recyclable, and energy-efficient. While much research has focused on the thermomechanical cycles and material properties of the SMAs, less attention has been given to the overall heat transfer performance. We conducted modeling and simulations to evaluate design parameters and analyze heat loss. Guided by our numerical model, we developed multiple generations of elastocaloric cooling devices. Our compression-based systems, characterized by a microchannel structural design and cascade multicell architecture, enhance the system heat transfer and lifetime, boosting the cooling performance to the kilowatt scale. Our bending-loaded systems, featured with shuttle-coiling of thin wires and direct air cooling, provide greater compactness and a higher coefficient of performance (COP). Our work represents a significant advancement toward eco-friendly cooling solutions for large-scale applications of elastocaloric cooling technology in air conditioning and dehumidification.

PLENARY SPEAKERS



Hong G. Im

King Abdullah University of Science and Technology

Biography

Hong G. Im received his B.S. and M.S. in from Seoul National University, and Ph.D. from Princeton University. After postdoctoral researcher appointments at the Center for Turbulence Research, Stanford University, and at the Hong G. Im received his B.S. and M.S. in from Seoul National University, and Ph.D. from Princeton University. After postdoctoral researcher appointments at the Center for Turbulence Research, Stanford University, and at the Combustion Research Facility, Sandia National Laboratories, he held assistant/associate/full professor positions at the University of Michigan. He joined KAUST in 2013 as a Professor of Mechanical Engineering and currently serves as Deputy Chair of the Clean Energy Research Platform. He is a recipient of the NSF CAREER Award and SAE Ralph R. Teetor Educational Award, and has been inducted as an International Member of the National Academy of Engineering of Korea, a Fellow of the Combustion Institute and American Society of Mechanical Engineers (ASME) and an Associate Fellow of American Institute of Aeronautics and Astronautics (AIAA). He has also served as an Associate Editor for the Proceedings of the Combustion Institute, and currently on the Editorial Board for Energy and AI and International Journal of Engine Research. Professor Im's research and teaching interests are primarily fundamental and practical aspects of combustion and power generation devices using high-fidelity computational modeling. Current research activities include direct numerical simulation of turbulent combustion at extreme conditions, large eddy simulations of turbulent flames at high pressure, combustion of hydrogen and e-fuels, spray and combustion modeling in advanced internal combustion engines, advanced models for pollutant formation, plasma-assisted combustion, and reduced order models for accelerated computing.

Lecture title: Accelerated High Fidelity Simulations of Combustion for Sustainable Power and Transportation

Abstract

Combustion of conventional and renewable fuels is expected to be a critical enabler towards zero-carbon sustainable energy. Recent advances in high performance computing have enabled predictive simulations of turbulent reacting flows with complex chemistry, but such simulations at practical device level remains a challenge due to the wide spectrum of physical and temporal scales, even within the continuum formulation. This presentation will provide an overview of various computational approaches to achieve high fidelity predictive simulations with a significant reduction of dimensional and temporal scales. First, building on the traditional large eddy simulation formulation, additional reduction in the number of reactive scalars is achieved by the data-based principal component analysis. In addition, the compression of temporal scales is made by the construction of slow invariant manifolds using computational singular perturbation, allowing an acceleration of time integration by orders of magnitude. Some recent developments of data-based latent space time integration using the autoencoder and neural ODE (AE-NODE) will be discussed as a new paradigm of deep neural network (DNN) application.



PLENARY SPEAKERS



Zhigang Li

Hong Kong University of Science and Technology

Biography

Dr. Li is currently a professor in the Department of Mechanical and Aerospace Engineering at the Hong Kong University of Science and Technology (HKUST). He received his B.S. from Harbin Engineering University in 1996, M.Eng. from Tsinghua

University in 1999, and Ph.D. from the University of Delaware in 2005. Before joining HKUST in 2007, he was a post-doctoral research associate in the Department of Chemical & Biomolecular Engineering at Johns Hopkins University. His research interest covers several areas, including nanoscale transport phenomena, interfacial science, ice nucleation and freeze desalination. Dr. Li was elected ASME fellow in 2023.

Lecture title: Understanding ion rejection and a one-step freeze desalination method

Abstract

Freeze desalination is an emerging desalination method. It removes salt by freezing seawater. It is superior to many traditional desalination methods, such as reverse osmosis and thermal methods, in certain ways (e.g., energy consumption and maintenance). Freeze desalination takes advantage of the phenomenon known as ion rejection, i.e., ions tend to be expelled by ice and remain in the aqueous solution (brine). To obtain drinking water through freeze desalination, the ion rejection rate, which is the percentage of ions in the liquid phase, should be higher than 98.2%, which is challenging. In this talk, I will explain the ion rejection mechanisms and show that the ion rejection phenomenon is governed by the competition between two factors: ice growth and ion diffusion, which can be described by two characteristic timescales, τ_{ice} and τ_{ion} , respectively. To enhance the ion rejection rate, the ratio, τ_{ice}/τ_{ion} , should be increased. Based on this criterion, a novel freeze desalination method by freezing flowing seawater is proposed, where τ_{ion} is reduced due to the enhancement of the ion diffusivity caused by flow shear, to obtain potable water through a single cycle of seawater freezing with the ion rejection rate exceeding 98.2%. With additional temperature control, the productivity of drinking water can be further improved. The proposed freeze desalination method shows great potential for commercialization.

PLENARY SPEAKERS



Yong Shuai

Harbin Institute of Technology

Biography

Prof. Yong SHUAI is a National High - Level Talent, Professor at Harbin Institute of Technology (HIT), Director of the China - Russia Belt and Road Joint Laboratory for Advanced Energy and Power Technology, and Director of the National Energy Storage

Industry - Education Integration Innovation Platform. His research centers on low - carbon energy, advanced energy storage technologies, thermal management and analysis of energy systems, measurement of materials' photothermal radiative properties, and related instrument development. With over 50 authorized national invention patents and 200 + SCI - indexed papers, he authored Thermal Radiation Measurement Technology, and won 3 First - Class Prizes of Heilongjiang Provincial Science and Technology Award and 1 Second - Class Prize of National Defense Technology Invention Award. He serves as Associate Editor of Solar Energy and on the Editorial Boards of Science China: Technological Sciences, Carbon Neutrality, etc. He has led projects such as the NSFC Major Scientific Instrument Development Program, key tasks of the National Key R&D Program, and National Science and Technology Major Projects.

Lecture title: Advancing Solar-Driven Thermochemical Fuel Production via Multi-Scale Modeling

Abstract

Solar thermochemistry offers a promising route to sustainable fuel production, supporting decarbonization goals. This work presents our multi-scale modeling efforts to advance solar-driven thermochemical processes for CO-rich gaseous fuel synthesis, covering CO₂ catalytic conversion, chemical-looping splitting, and solid waste pyrolysis/gasification.

At the atomic scale, we use density functional theory (DFT) and molecular dynamics (MD) to design and optimize novel 2D materials (e.g., MXenes, Ti-doped h-BN) for enhanced CO₂ capture and solar-driven catalytic conversion. At the reactor scale, we investigate heat/mass transfer phenomena to address key challenges, focusing on synergistic enhancement of transport processes and reaction kinetics through novel reactor designs and operating parameter optimization to maximize efficiency and fuel yield. At the system level, we explore integration strategies and intelligent management approaches, including photothermal-electric coupling reactors and hybrid physics-data models for performance prediction under dynamic meteorological conditions.

Collectively, this multi-scale approach demonstrates improved energy efficiency, operational durability, and solar-to-fuel conversion efficiency, providing a viable path toward scalable solar fuel production.





CONFERENCE AT A GLANCE

CONFERENCE VENUE

Lebanshan Hotel

ADDRESS : No. 301, Nanning East Road, Baohe District, Hefei

TELEPHONE : +86-551-62939999

ONSITE REGISTRATION

Registration hours:

12:00-21:30, Friday, September 26th

08:30-20:00, Saturday, September 27th

7:30-12:00, Sunday, September 28th

Location: The Lobby of Friendship Palace

PRESENTATION TYPES

Plenary Lecture: 40 minutes

Keynote Speech : 25 minutes (including questions)

Invited Talk: 20 minutes (including questions)

Oral Presentation(Regular): 15 minutes (including questions)

AUDIOVISUAL SERVICES

Each room will be equipped with only one projector with VGA/HDMI connector. We strongly recommend that you check the compatibility of your computer with the provided projector well before the start of your session. Presenters are encouraged to use the computers provided in the conference session rooms.

DINING ARRANGEMENT

DateDate	Time	Meal	Location
Friday, September 26 th	18:00-21:00	Dinner Buffet	Yongle Banshan Western Restaurant (1 st Floor Dining Hall)
Saturday, September 27 th	12:00-13:00	Lunch Buffet	Yongle Banshan Western Restaurant (1 st Floor Dining Hall)
Saturday, September 27 th	18:30-21:00	Dinner	Steigenberger Icon Hotel Banquet Hall 2&3
Sunday, September 28 th	12:00-13:00	Lunch Buffet	Yongle Banshan Western Restaurant (1 st Floor Dining Hall)

ARRIVAL INFORMATION



CONFERENCE VENUE : Lebanshan Hotel

ADDRESS : No. 301, Nanning East Road, Baohe District, Hefei

TELEPHONE : +86-551-62939999



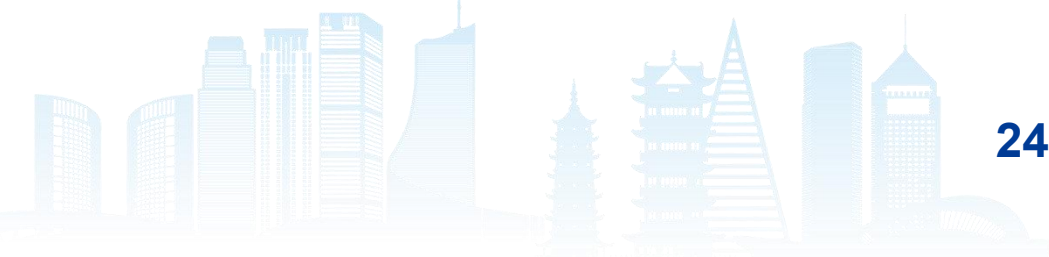


ARRIVAL INFORMATION

From Hefei Xinqiao International Airport		
	By Subway	By Taxi
Duration	~1h54min	~50min
Route	Airport Express Bus Line 3 (Gate 3, 1st Floor) → Subway Line 1 (transfer at Hefei South Railway Station) → Exit A at Wandalongcheng Station → Walk approx. 1.3 km to hotel	/
Fare	~ 28 CNY	~ 145 CNY
Operating hours	Approx. 6:07~22:47	24 h

From Hefei South Railway Station		
	By Subway	By Taxi
Duration	~43min	~21min
Route	Subway Line 1 (board at Hefei South Railway Station) → Wandalongcheng Station (Exit A) → Walk approx. 1.3 km to hotel.	/
Fare	~ 3 CNY	~35 CNY
Operating hours	Approx. 6:07~22:47	24 h

From Hefei Railway Station		
	By Subway	By Taxi
Duration	~1h4min	~35min
Route	Subway Line 1 (Board at Hefei Railway Station) → Wandalongcheng Station (Exit A) → Walk approx. 1.3 km to hotel.	/
Fare	~5 CNY	~59 CNY
Operating hours	Approx. 6:07~22:47	24 h





WEATHER INFORMATION

26-Sep
(FRI.)

25°C/20°C



CLOUDY

27-Sep
(SAT.)

26°C/20°C



LIGHT RAIN

28-Sep
(SUN.)

23°C/20°C



LIGHT RAIN

For reference only, the specific situation may vary





INTRODUCTION OF ORGANIZER

University of Science and Technology of China

The University of Science and Technology of China (USTC) is a renowned science and engineering university under the Chinese Academy of Sciences, focusing on cutting-edge science and high-tech while also encompassing medicine, distinctive management disciplines, and humanities. The university comprises 34 schools, including 8 schools established through the integration of education and research. It has established several institutes, such as the Suzhou Institute for Advanced Study, the Shanghai Institute, the Beijing Institute, the Institute of Advanced Technology, the International Institute of Finance, and the First Affiliated Hospital (Anhui Provincial Hospital).

USTC was founded in Beijing in September 1958, with Guo Moruo serving as its first president. Established by the Communist Party of China to support the "Two Bombs, One Satellite" project, its founding is regarded as "a significant event in the history of Chinese education and science." From its inception, the Chinese Academy of Sciences implemented the guiding principle of "the entire Academy supports the university, and departments integrate with institutes," aiming to cultivate top-tier talent in emerging, interdisciplinary, and frontier fields from a high starting point and with a broad perspective. The university gathered a group of distinguished scientists, including Yan Jici, Hua Luogeng, Qian Xuesen, Zhao Zhongyao, Guo Yonghuai, Zhao Jiuzhang, and Bei Shizhang. In its second year, USTC was designated as a national key university.

In early 1970, the university relocated to Hefei City, Anhui Province. Since 1978, USTC has pursued bold reforms and innovations, pioneering a series of forward-thinking educational measures in China. These initiatives included establishing the first gifted young student program (the "School of the Gifted Young"), creating the first graduate school in China, constructing national major science and technology infrastructure, and promoting international collaboration. USTC has become a vital base for high-quality talent cultivation and high-level scientific research in China. It was among the first universities included in both the "985 Project" and "211 Project." In September 2017 and February 2022, USTC was selected for the national "Double First-Class" Initiative, with 11 disciplines included in the list of world-class disciplines to be developed.

Over its 67-year history, USTC has upheld its motto of "Redness and Expertise, Integrating Theory with Practice," fostering a spirit of pioneering and innovation. It has cultivated large numbers of outstanding talents who possess both moral integrity and professional competence, achieved a series of remarkable scientific research results, and made significant contributions to the development of the Party and the country.





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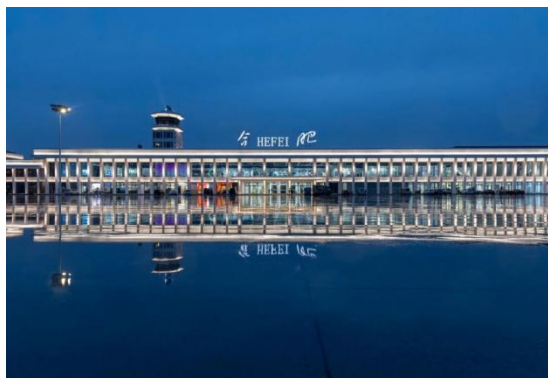
Beijing ChinaHPC Technology Co.,Ltd



Sugon Smart Computing Information Technology



TOURISM INFORMATION



01 • Luogang Central Park

Luogang Central Park is located in Baohe District, Hefei City, Anhui Province, and is the largest urban central park in the province. The project covers a total planned area of approximately 15.3 million square meters (15.3 square kilometers), including about 7.83 million square meters (7.83 square kilometers or 11,750 mu) of landscaped green space. With a total investment of approximately 12.4 billion yuan, the park is 2.3 times the size of Central Park in Manhattan, New York (3.41 square kilometers or 5,120 mu). It integrates multiple functions such as ecological conservation, urban recreation, cultural tourism, and sports activities.



02 • Sanhe Ancient Town

Sanhe Ancient Town is situated in the southern part of Feixi County, Hefei City, Anhui Province, at the junction of Feixi, Lujiang, and Shucheng counties. It is recognized as a National AAAAA Tourist Attraction and a Famous Historical and Cultural Town of China. The town derives its name from the convergence of the Fengle River, Hangbu River, and Xiaonan River. Covering an area of approximately 2.9 square kilometers, it boasts a history spanning over 2,500 years.

The town's origins can be traced back to the Spring and Autumn and Warring States periods when it was known as "Que'an" and served as a strategic location in the conflicts between the Wu and Chu states. In 1858, the Taiping Army achieved a significant victory here, known as the "Battle of Sanhe," leaving behind numerous historical relics. Nestled on the western shore of Lake Chaohu, Sanhe Ancient Town is surrounded by three rivers and interconnected with lakes and waterways. This unique layout forms a distinctive pattern described as "encircled by two riverbanks, with three isles standing in the middle."



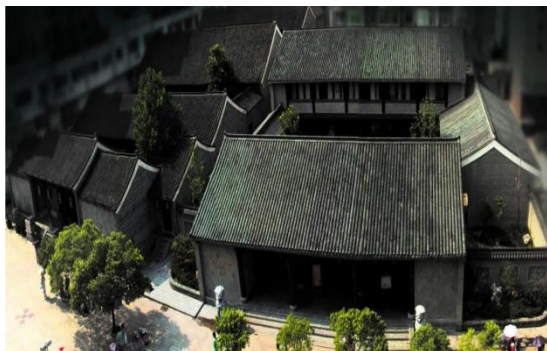
03 • Lord Bao's Memorial

Lord Bao's Memorial Hall is located within Lord Bao Park at 72 Wuhu Road, Baohe District, Hefei City. The park covers an area of 34.5 hectares, including 15 hectares of water surface, and is an open urban park. The Memorial Hall, together with Lord Bao's Tomb, the Breeze Pavilion, and Floating Village (Fu Zhuang), forms the Lord Bao Cultural Park, which is designated as a National 4A-level Tourist Attraction and a national base for integrity education. The Memorial Hall is also known as "Lord Bao Xiaosu's Memorial Hall." "Xiaosu" was the posthumous title

Conferred upon Lord Bao by Emperor Renzong of the Song Dynasty after his death, highly acknowledging his lifelong loyalty and filial piety. Throughout his life, Bao Zheng was known for his integrity, impartiality, and refusal to curry favor with the powerful, earning him the popular title "Bao Qingtian" (Bao the Clear Sky).

Lord Bao's reputation for incorruptibility has been passed down through stories, publications, operas, and legends across generations, establishing him as the archetype of a good and honest official in the hearts of the common people.

TOURISM INFORMATION



05 • Li Hongzhang's Former Residence

Li Hongzhang's Former Residence is located in the middle section of the bustling Huaihe Road Pedestrian Street in Hefei. It is a typical example of residential architecture from the Jianghuai region during the late Qing Dynasty. Li Hongzhang was born in Hefei and became a prominent military and political official in the late Qing court. His five brothers also held high-ranking positions, and their family compound was once so extensive that it was said "the Li residence occupied half the street." Unfortunately, only a few rooms remain today, covering less than one-twelfth of the original area. The exquisite wooden carvings within the residence are truly admirable, while the exhibitions in various halls vividly portray Li Hongzhang's controversial legacy, prompting reflection on his complex and multifaceted life.



06 • Chaohu Scenic Area

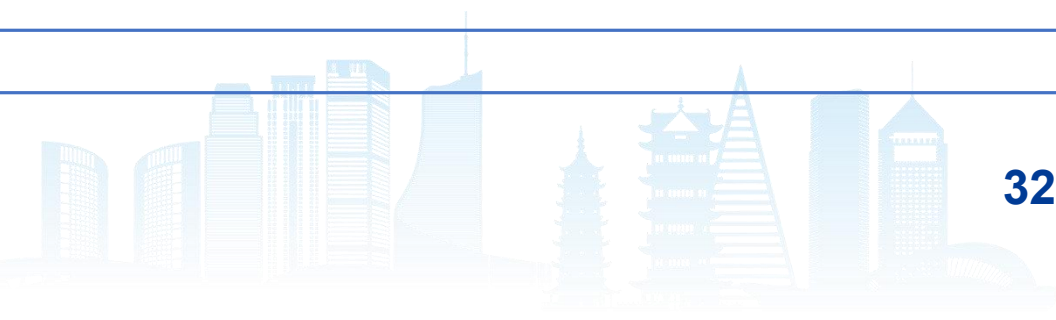
Nestled in central Anhui and administered by Hefei City, Chaohu Lake connects the Huai River and the Yangtze River. Stretching 55 kilometers from east to west and 22 kilometers from north to south, it covers a permanent water area of approximately 760 square kilometers, ranking among China's five largest freshwater lakes. Like a precious mirror embedded in the Jianghuai landscape, it has been poetically described as the "eight-hundred-li lake and sky," forming the core of the Chaohu National Scenic Area. As a vital ecological foundation for the Yangtze River Delta world-class urban cluster, the scenic area leverages the vast

expanse of Chaohu Lake as its centerpiece. It features a relatively pristine Lakeshore environment, natural landscapes including islands, wooded hills, and bays, alongside cultural elements such as the distinctive Chao culture and characteristic polder farmland scenery. Functioning as a comprehensive, large-scale national park, it integrates scenic tourism, environmental conservation, sports and recreation, scientific research, wellness retreats, and vacation facilities into a unified experience.





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Host :

主办单位:

Chinese Society of Engineering Thermophysics

中国工程热物理学会

Executive Organizer :

承办单位:

University of Science and Technology of China

中国科学技术大学

Energy Research Society of Anhui Province

安徽省能源研究会

