

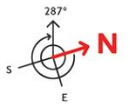
Micro Flow and Interfacial Phenomena
μFIP 2024 Conference
20-24 June 2024

Program Book



Main Campus 本部校園
11 Yuk Choi Rd, Hung Hom, Kln, HK
香港九龍紅磡荷李道 11 號

Hotel ICON 唯港薈
17 Sai Museum Rd, E. Tsim Sha Tsui, Kln, HK
香港九龍尖沙咀東科學館道 17 號



Campus Map 校園地圖

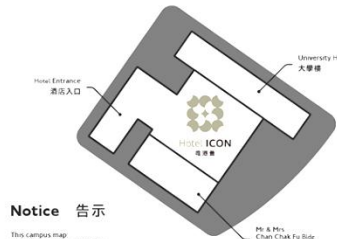
Key to Campus Map 校園地圖索引

- | | | |
|--|---|-----------------------------|
| A Core 核心 | L Block 樓座 | Toilet 洗手間 |
| G Chung Sze Yuen Bldg 鍾士元樓 | W Wing 翼 | Toilet for Disabled 殘疾人士洗手間 |
| Security Control Centre (Rm P111) 保安控制中心 (P111 室) | Bank / ATM (Bk VA) 銀行 / 自動櫃員機 (VA 座) | Bus Stop 巴士站 |
| University Health Service (Rm A001) 大學醫療保健處 (A001 室) | Gate (Granted Access to Cardholders) 閘機 (持證者獲准入閘) | Restricted Access 限制通行 |
| Convenience Store (Rm VA206) 便利店 (VA206 室) | | |
| Canteen / Restaurant / Cafe 餐廳 / 酒樓 / 咖啡室 | | |

Off-Campus Venues 校外場所

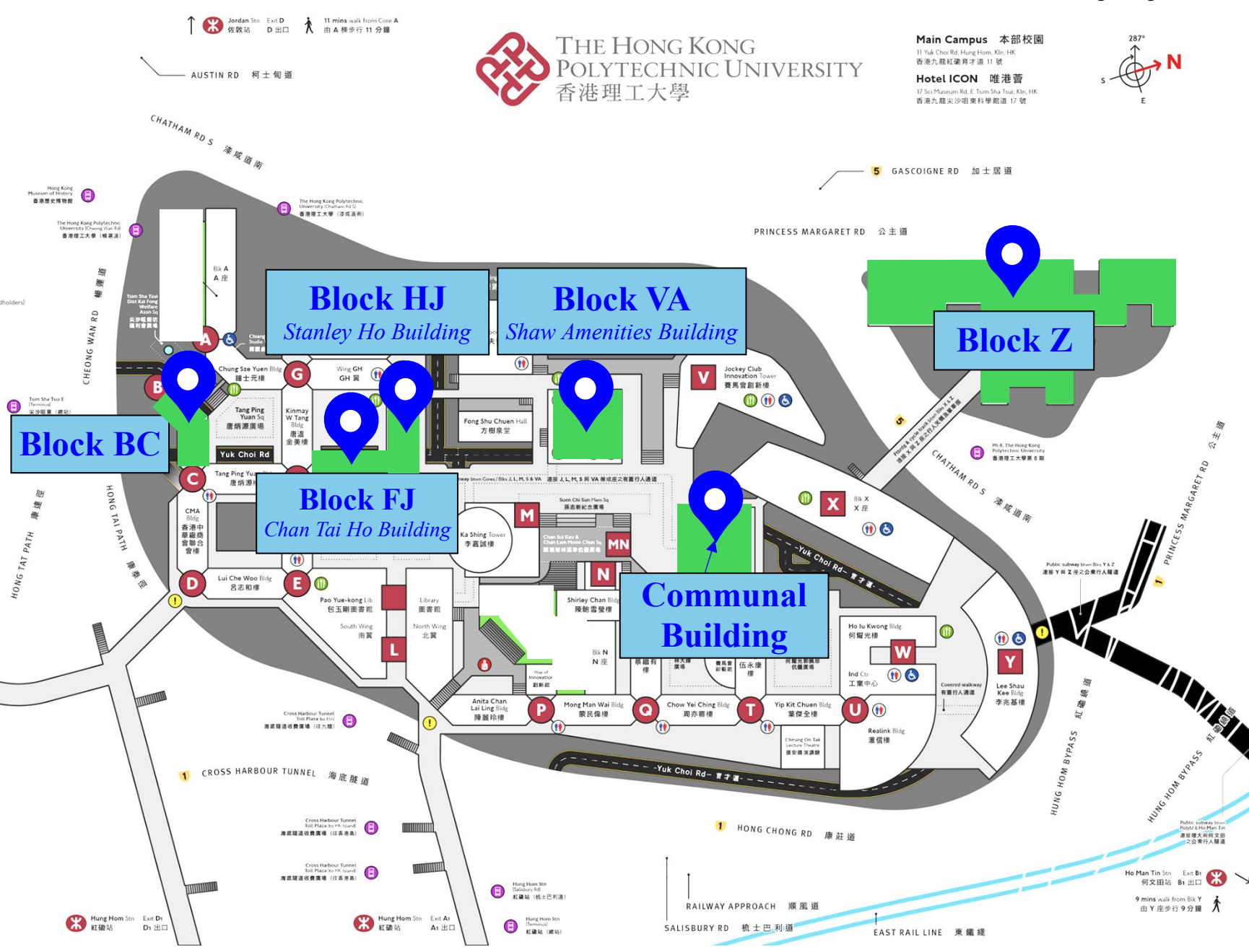
- | | |
|--|--|
| 1 Student Halls of Residence (Hung Hom) 學生宿舍 (紅磡) | 1 Hung Lai Rd, Hung Hom, Kln, HK 香港九龍紅磡紅道 1 號 |
| 2 Student Halls of Residence (Ho Man Tin) 學生宿舍 (何文田) | 15 Fat Kwong St, Ho Man Tin, Kln, HK 香港九龍何文田佛光街 15 號 |
| 3 PolyU Hung Hom Bay Campus 香港理工大學紅磡灣校園 | 8 Hung Lok Rd, Hung Hom, Kln, HK 香港九龍紅磡紅道 8 號 |
| 4 PolyU West Kowloon Campus 香港理工大學西九龍校園 | 9 Hoi Tong Rd, Yau Ma Tei, Kln, HK 香港九龍油麻地海庭道 9 號 |
| 5 Off-Campus Housing - The Grand Blossom 校外宿舍 - 一品薈 | 123 Bukalee St, Hung Hom, Kln, HK 香港九龍紅磡實其利街 123 號 |
| 6 Off-Campus Housing - Hillwood Rd 校外宿舍 - 山林道 | 1 Hillwood Rd, Tsim Sha Tsui, Kln, HK 香港九龍尖沙咀山林道 1 號 |

East Tsim Sha Tsui / Tsim Sha Tsui Stns 尖東 / 尖沙咀站
Exit P2 出口
12 mins walk from Core D 由 D 樓步行 12 分鐘



Notice 告示

- This campus map is not necessarily drawn to scale.
On this campus, CCTV cameras are installed in some locations for security purpose (covering is prohibited).
本校地圖不按比例繪製。
本校園內，部分地點已裝設保安攝影監察系統 (攝影受限制)。



Ho Man Tin Stn 何文田站
Exit B1 出口
9 mins walk from Bk Y 由 Y 座步行 9 分鐘

Welcome

Dear μ FIP Attendees,

Greetings and welcome to Hong Kong for μ FIP 2024 – the 4th Annual Micro Flow & Interfacial Phenomena Conference! As this is our first ever μ FIP conference at an international locale, we hope that you take this opportunity to build new relationships and community in addition to re-connecting with old colleagues. As in past years, our goal is to provide a friendly forum for the exchange of ideas to spur innovation in interdisciplinary topic areas related to micro/nano-scale surfaces, flow phenomena, and heat transfer.


Given the unprecedented array of Plenary, Keynote, and Invited speakers on slate for μ FIP 2024, the conference format has been updated from previous years. On June 21st, we will all be together to enjoy talks from seven esteemed Plenary speakers, including Sir Andre Geim (Nobel Prize in Physics, 2010) and seven members of the National Academy of Sciences (NAS) or Chinese Academy of Sciences (CAS). Please join us in the evening for a banquet and award ceremony, where we announce this year's winners of the Outstanding Early Career, Leadership, and Prominent Research awards. Subsequently, on June 22nd and 23rd, a mixture of Keynote, Invited, and Oral presentations will be held across six parallel sessions. These sessions are divided by the six track areas for μ FIP 2024:

- Track 1 - Droplets, Bubbles, and Wetting;
- Track 2 - Micro/Nano-Fluidics, Biochemical/Biomedical;
- Track 3 - Nature-Inspired Surfaces and Materials;
- Track 4 - Heat Transfer;
- Track 5 - Energy or Water Harvesting;
- Track 6 - Simulations and Machine Learning;

with the evening of the 23rd culminating in the Best Student Presentation awards and closing remarks. Finally, the morning of June 24th will include lab tours at Hong Kong Polytechnic University for those who are available.

This conference would not have been possible without the generous support of our sponsors: the Chemical and Biological Microsystems Society (CBMS), The Hong Kong Polytechnic University (PolyU), and the PolyU Academy for Interdisciplinary Research (PAIR). We are also thankful to all the Conference Chairs, Track Chairs, Conference Officials from PolyU and PAIR, and Sara Stearns and Shirley Galloway at PMMI, whose tireless planning and collective effort made this the biggest and best μ FIP yet. A special thanks to Prof. Zuankai Wang, whose service as lead Program Chair was pivotal to hosting the conference in Hong Kong at PolyU and assembling the stellar lineup of speakers. We hope that you find μ FIP 2024 enjoyable and fruitful, while also making time to enjoy the beauty cityscape of Hong Kong!

Sincerely,



Jonathan Boreyko

Conference Chair

Objective

This conference is the successor of the "International Conference on Microchannels and Minichannels" (ICMM), held since 2003 and the "International Conference on Nanochannels, Microchannels and Minichannels" (ICNMM). The inaugural μ FIP conference was held virtually in 2021 and in person at UC Irvine in 2022, and at Northwestern University in 2023. Given the importance of climate change and the water-energy nexus, the scientific objective of μ FIP is to bring together the phase change and single-phase heat transfer, multi-phase flow, bio-chemical and bio-medical engineering, and micro flow process communities with an emphasis on energy applications having components exhibiting microchannel flow or microscale surface phenomena (e.g., droplets, thin films, bubbles, etc.).

Our program provides a unique opportunity for researchers in interdisciplinary topic areas to exchange ideas and discuss future directions. Both fundamental and applied sciences are disseminated. The μ FIP conferences are intended to provide an active platform for the exchange of information and identification of research needs in this emerging area across multiple length and time scales.

Conference Chairs

Jonathan Boreyko, Virginia Tech, USA
Kyoo-Chul Kenneth Park, Northwestern University, USA
Zuankai Wang, Hong Kong Polytechnic University, CHINA
Xianming (Simon) Dai, University of Texas, Dallas, USA

Local Chairs

Wanghui Xu, Hong Kong Polytechnic University, CHINA
Jing Li, City University of Hong Kong, CHINA

Session Tracks

Track Title
<p>Track 1 - Droplets, Bubbles, and Wetting</p> <p>Track Chairs</p> <ul style="list-style-type: none">• Steven Wang, <i>City University of Hong Kong</i> (steven.wang@cityu.edu.hk)• Fei Duan, <i>Nanyang Technological University</i> (feiduan@ntu.edu.sg)
<p>Track 2 - Micro/Nano-Fluidics, Biochemical/Biomedical</p> <p>Track Chairs</p> <ul style="list-style-type: none">• Chia Hung Chen, <i>City University of Hong Kong</i> (chiachen@cityu.edu.hk)• Yi Zhang, <i>University of Electronic Science and Technology</i> (yi_zhang@uestc.edu.cn)
<p>Track 3 - Nature-Inspired Surfaces and Materials</p> <p>Track Chairs</p> <ul style="list-style-type: none">• Huizeng Li, <i>University of Chinese Academy of Sciences</i> (lih@iccas.ac.cn)• Ling Li, <i>University of Pennsylvania</i> (lzli@seas.upenn.edu)
<p>Track 4 - Heat Transfer</p> <p>Track Chairs</p> <ul style="list-style-type: none">• Shuang Cui, <i>University of Texas, Dallas</i> (Shuang.Cui@UTDallas.edu)• Zhenyuan Xu, <i>Shanghai Jiao Tong University</i> (xuzhy@sjtu.edu.cn)• Yangying Zhu, <i>University of California, Santa Barbara</i> (yangying@ucsb.edu)
<p>Track 5 - Energy or Water Harvesting</p> <p>Track Chairs</p> <ul style="list-style-type: none">• Bei Fan, <i>Michigan State University</i> (fanbei1@msu.edu)• Wanghuai Xu, <i>The Hong Kong Polytechnic University</i> (wanghuai.xu@polyu.edu.hk)
<p>Track 6 - Simulations and Machine Learning</p> <p>Track Chairs</p> <ul style="list-style-type: none">• Li Chen, <i>Xi'an Jiaotong University</i> (lichennht08@mail.xjtu.edu.cn)• Lin Fu, <i>Hong Kong University of Science and Technology</i> (linfu@ust.hk)• Yoonjin Won, <i>University of California, Irvine</i> (won@uci.edu)• Yanguang Zhou, <i>Hong Kong University of Science and Technology</i> (maeygzhou@ust.hk)

Preparing Travel to Hong Kong

- **Visa**

Nationals of about 170 countries and territories may visit Hong Kong without a visa/entry permit for a period ranging from 7 days to 180 days. For more information on visa/entry permit requirements for visitors to the HKSAR, please refer to the website of the Immigration Department www.immd.gov.hk.

- **Insurance**

The organiser does not accept responsibility for accidents that might occur. Participants are strongly encouraged to arrange travel insurance prior to their departure from their home countries. An insurance plan covering accidental loss of belongings, medical costs of injury and illness, and other possible risks related to international travel are recommended.

- **Latest Updates for Inbound Travellers**

Please refer to the HKSAR announcements www.info.gov.hk/gia/general/today.htm for the latest arrangements for inbound travellers.

- **Currency**

The legal tender in Hong Kong is the Hong Kong dollar (HKD), which is pegged to the US dollar at a rate of about HKD 7.80 to USD 1, although exchange rates may fluctuate slightly.

Foreign currencies can be exchanged at airports, banks, hotels and currency exchange stores. All major credit cards are widely accepted in Hong Kong.

- **Time Zone**

Local Hong Kong time is Greenwich Mean Time +8 hours.

- **Power and Electricity**

The standard electrical voltage in Hong Kong is 220 volts AC, 50 Hz (British three-pin rectangular blade plug).

- **Lost Passport**

To make a “lost report”, please approach the nearest police station and/or call the Police Hotline (+852 2527 7177) for further information, and contact your consulate to have your passport replaced.

- **Lost or Stolen Wallet**

If your wallet or valuables are lost during the Conference, please notify the Conference organizer immediately. For wallet or valuables lost outside PolyU campus, please notify your hotel immediately and report the theft to police.

Hong Kong Local Transportation

- **Octopus Card**

The Octopus card is a multi-usage smart card charging for the public transportation in Hong Kong, making it easy to enjoy Hong Kong's public transportation system. You can loan an Octopus at any MTR customer service centre with a refundable deposit of HK\$50. Please refer to the MTR Octopus Card website www.mtr.com.hk/en/customer/tickets/about_octopus.html for details.

- **Conference Venue**

The Hong Kong Polytechnic University (PolyU) is located at the centre of Kowloon Peninsula. The venue is nearby and is easily accessible via various transportation.

By MTR: The nearest MTR station is Hung Hom Station and a footbridge at Exit A1 or D1 leads you to the campus.

By Bus: Two major bus stops around campus are Hung Hom Station and Cross Harbour Tunnel Toll Plaza (Kowloon side).

By Taxi: Three types of taxis are operating in Hong Kong: Urban red taxi, New Territories green taxi, and Lantau Island blue taxi. All three types of taxis serve Hong Kong International Airport, but only urban red taxis go to PolyU. Additional charges occur for large baggage. The tunnel tolls are both payable by a passenger for cross-harbour hiring.

From the Airport to PolyU

By Train: Take Airport Express from Hong Kong International Airport to Kowloon Station. Then take taxi to PolyU. This is cheaper than taking a taxi directly from the airport to PolyU.

By Bus: The cheapest is to take Cityflyer route A21 from Airport (Ground Transportation Centre) Bus Terminus to Hung Hom Station. Take the footbridge at Hung Hom Station Exit D1 or A1 that leads you to the campus. It takes around 75 mins for the ride and costs HK\$33.

From Inland China and Macau to PolyU

By High Speed Rail: The High-Speed Rail (Hong Kong Section) runs from Hong Kong West Kowloon Station, connecting Hong Kong with Inland China's national high-speed rail network. Please refer to the MTR High Speed Rail website www.highspeed.mtr.com.hk for details.

Via Hong Kong-Zhuhai--Macau Bridge: The Hong Kong-Zhuhai-Macau Bridge operates 24 hours a day and puts major cities in the Pearl River Delta within a three hours' commute from Hong Kong.

Campus Accessibility

Most buildings on campus are accessible via ramps or lifts. Connections between campus and Hung Hom Station as well as bus stop Cross Harbour Tunnel Toll Plaza (most platforms) are accessible via ramps and lifts.

Dining Facilities on and off Campus

- **On Campus**

	Name of Outlets	Location
1.	Theatre Lounge	<i>G/F, Chung Sze Yuen Building</i>
2.	H Café	<i>P/F, Block FGHJ Courtyard</i>
3.	LibCafe*	<i>P/F, Pao Yue-kong Library</i>
4.	Lawn Café	<i>G/F & 1/F, Block N</i>
5.	VA Student Canteen	<i>G/F, Shaw Amenities Building</i>
6.	VA Staff Canteen	<i>G/F, Shaw Amenities Building</i>
7.	VA Kiosk	<i>P/F, Block VA</i>
8.	Communal Student Canteen	<i>3/F, Communal Building</i>
9.	Communal Staff Restaurant	<i>4/F, Communal Building</i>
10.	Communal Student Restaurant	<i>4/F, Communal Building</i>
11.	Gourmet Shop	<i>G/F, Shaw Amenities Building</i>
12.	V Café	<i>P/F, Jockey Club Innovation Tower</i>
13.	W Kiosk	<i>P/F, Block W</i>
14.	X Café	<i>P/F, Block X</i>
15.	Z Restaurant- Z Canteen	<i>2/F, Block Z</i>
	Z Restaurant- Coffee Bar	<i>2/F, Block Z</i>

- **Off Campus**

There are a few hundreds of restaurants in the east Tsim Sha Tsui area that is a short walk from the PolyU campus. Take the exit in Core D area on campus and use the footbridge to go to Tsim Sha Tsui.

Conference Support

Conference Sponsor



Co-Sponsored by



Plenary Speaker Benefactor



Keynote Speaker Benefactor



i2Cool Prominent Research & Leadership Award Benefactor



Hangzhou Regenovo Biotechnology Co., Ltd Outstanding Early Career Award



Best Paper Awards Benefactor



Faculty Awards Benefactor

ADVANCED FUNCTIONAL MATERIALS

Instructions for Presenters

- **Plenary Lectures**

30 minutes in total (25 minutes for presentation, 4 minutes for questions, and 1 minute for introduction/transition).

- **Keynote Lectures**

20 minutes in total (15 minutes for presentation, 4 minutes for questions, and 1 minute for introduction/transition).

- **Invited Lectures**

15 minutes in total (12 minutes for presentation, 2 minutes for questions, and 1 minute for introduction/transition).

- **Oral Presentations**

12 minutes in total (10 minutes for presentation, 1 minute for a question, and 1 minute for introduction/transition).

Speakers are required to enter the room 15 minutes before the session starts for a connection test!

Conference Services

- **Registration:**

registration@microfip.org

- **Program:**

Wanghuai Xu, Email: wanghuai.xu@polyu.edu.hk

Jing Li, Email: jingli76@cityu.edu.hk

- **Sponsorship**

Baoping Zhang, Email: baoping.zhang@polyu.edu.hk

- **Visa**

Yi Wang, Email: wangiiupc93@gmail.com

PAIR *Distinguished*
LECTURE SERIES

Exploring 2D Empty Space

Sir Andre GEIM

Regius Professor at the University of Manchester, United Kingdom

Abstract

It is now possible to create angstrom-scale channels that can be viewed as if one or a few atomic planes are pulled out of a bulk crystal leaving behind a two-dimensional space. I shall overview our recent work on this subject, which covers the properties of gases, liquids and ions under the extreme confinement.

Biography

Sir Andre Geim is Regius Professor at the University of Manchester, United Kingdom. He was awarded the 2010 Nobel Prize for his groundbreaking research on graphene, a one-atom-thick material made of carbon. He also received numerous international awards and distinctions, including medals from the Royal Society and the US National Academy of Sciences, and holds honorary doctorates and professorships from many countries and universities. Sir Andre is a member of the British, Chinese and American academies of science, among others.



Thomson-Reuters repeatedly named Geim among the world's most active scientists and attributed to him three new research fronts – diamagnetic levitation, gecko tape and graphene. More than 40 of his papers were cited >1,000 times with nine of them >10,000 times. Two of the latter are among 100 most cited research papers in human history, according to journal Nature. He was also awarded the 2000 Ig Nobel prize for his work on levitation, becoming the first and only recipient of both Nobel and Ig Nobel Prizes. Sir Andre was knighted twice, by Dutch and British monarchs.

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LECTURE SERIES

Some Puzzles and Flow Research Opportunities in Soft Matter Science

Steve Granick

Robert K. Barrett Endowed Chair of Polymer Science and Engineering, Chemical Engineering, Biomedical Engineering, Chemistry, and Physics University of Massachusetts, USA

Abstract

A fundamental challenge of modern physical science is to form a structure that is not frozen in place but instead reconfigures internally driven by energy throughput and adapts to its environment robustly. With catalytic enzymes, we find problems of mechanobiology. With chemical reactions, we find problems of active matter. Exploring the potential of liquid-phase TEM to image individual molecules and their mutual interactions, we analyze failed and successful encounters of polymers and proteins, and visualize enzyme conformational changes in real time. A picture emerges in which simple experiments, performed at single-particle and single-molecule resolution, can dissect macroscopic phenomena in ways that surprise.

Biography

Steve Granick is a member of the U.S. National Academy of Sciences and American Academy of Arts and Sciences. Among his other major awards are the Paris-Sciences Medal, APS Polymer Physics Prize, and ACS Colloid and Surface Chemistry Prize.

He worked at the University of Illinois at Urbana-Champaign (30 years) and as Director of the IBS Center for Soft and Living Matter, which is the Korean version of a Max-Planck Institute (8 years). In 2023, he joined the University of Massachusetts.





Super-wettability and Beyond

— Quantum-confined Superfluid: Biological Energy Conversion, Chemical Reaction and Information Transfer

Lei Jiang

Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, No. 29 Zhongguancun East Road, Beijing 100190

Abstract

Life system presents an ultralow energy consumption in high-efficiency energy conversion, information transmission and bio-synthesis. The total energy intake of human body is about 2000 kcal/day to maintain all our activities, which is comparable to a power of ~ 100 W. The energy required for brain to work is equivalent to ~ 20 W, while the rest energy (~ 80 W) is used for other activities. All in vivo bio-syntheses take place only at body temperature, which is much lower than that of in vitro reactions. To achieve these ultralow energy-consumption processes, there should be a kind of ultralow-resistivity matter transport in nanochannels (e.g., ionic, molecular channels), in which the directional collective motion of ions or molecules is a necessary condition, rather than the traditional Newton diffusion. Directional collective motion of ions and molecules are considered as ionic/molecular superfluid. The research of ionic/molecular superfluid will promote the development of neuroscience and brain science, develop quantum ionic technology, construct future chemical reactors with high flux, high selectivity and low energy consumption, and produce a series of disruptive technologies.

Reference

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Biography

Lei Jiang is a Professor at the Technical Institute of Physics and Chemistry, Chinese Academy of Sciences (TIPC). He is an academician of the Chinese Academy of Sciences, Academy of Sciences for the Developing World, National Academy of Engineering (USA), Australian Academy of Science and Academia Europaea. He received his Bachelor's and Master's degrees from Jilin University, and PhD from the University of Tokyo. He worked as a post-doctoral fellow with Prof. Akira Fujishima and then as a senior researcher in the Kanagawa Academy of Sciences and Technology. In 1999, he joined Institute of Chemistry, Chinese Academy of Sciences. In 2015, he and his group moved to TIPC. His scientific interests focus on bio-inspired, smart, multi-scale interfacial materials with superwettability. Prof. Lei Jiang has discovered and established the basic principle of the interfacial material systems with superwettability and extended them to successful innovative applications. His work has been followed by more than 1,400 research institutions in 94 countries around the world. He is the most original and influential scientist in the field of material science in China. Due to his contribution to the development of superwettability, he won the "TWAS Prize in Chemistry" in 2011, the Advanced Science and Technology Award of "THE HO LEUNG HO LEE FUNDATION" in 2013 and the "Outstanding Achievement Award" of the Chinese Academy of Sciences in 2014. In 2016, he won the "UNESCO Medals" for contributions to the development of nanoscience and nanotechnologies, and the "Nikkei Asia Prize". In 2017, he won the "Humboldt Research Award" in Germany. In 2018, he was awarded the "Qiu Shi Outstanding Scientist Award" and "Nano Research Award". In 2020, he won the "ACS Nano Lectureship Award". In 2022, he won Tan Kah Kee Science Award.



PAIR *Distinguished*
LECTURE SERIES

AI for turbulence modelling and computational fluid dynamics

Shiyi Chen

Eastern Institute of Technology, Ningbo, China

Abstract

In this talk, I will briefly present some recent developments of AI for turbulence modeling and computational fluid dynamics. In particular, I will show some new AI applications for fluid mechanics, including AI models for large eddy simulation, using resolved scale information to obtain smaller scale dynamics in fluid turbulence and PINN for turbulence. I will also discuss some possible research directions on tackling complex engineering problems via combining CFD and AI mythologies.

Biography

Chen Shiyi, President of Eastern Institute of Technology, Ningbo (tentative name), holds a doctoral degree in Science from Peking University and is a member of the Chinese Academy of Sciences as well as the Academy of Sciences for the Developing World (Third World Academy of Sciences). He is an internationally renowned scholar in mechanics and an eminent educator with extensive experience in university administration. After China's reform and opening up, he was the first mainland Chinese scholar to be elected as a fellow of the American Physical Society. He was also selected as one of the "40 Returnees in 40 Years of China's Reform and Opening Up".



His main research areas include turbulence theory and computational fluid dynamics, and industrial software. He is one of the pioneers of the lattice Boltzmann method in numerical methods, and has made a series of outstanding contributions in the fields of turbulence, large eddy simulation, and subgrid-scale models.

He has served as the Chair of the Department of Mechanical Engineering at Johns Hopkins University, the Founding Dean of the School of Engineering at Peking University, and the Vice President and Dean of Graduate School at Peking University. In 2015, he served as the President of the Southern University of Science and Technology, leading the university to enter China's "Double First-Class" initiative and achieving remarkable results. In 2021, he was invited to return to Zhejiang Province and appointed as the Director of the Ningbo University of Technology Research Institute, leading the establishment of Ningbo University of Technology.

PAIR *Distinguished*
LECTURE SERIES

Hydrovoltaics: from green energy to intelligence

Wanlin Guo

*Institute for Frontier Science, Nanjing University of Aeronautics and Astronautics. Nanjing,
210016, China*

Abstract

Since the beginning of this century, the development trend of information technology to intelligent technology is increasing, the sustainable development problems, such as climate, green energy and how to understand human brain, become increasingly urgent. This trend makes scientists face the challenge of multi-phase media, multi-scale strong nonlinear coupling, especially the force-electric-magnetic-light-thermal coupling at the solid-liquid interface.

Water is not only the essence of life, but also the largest energy carrier on the earth as it covers about 70% of the earth's surface, absorbing 70% of the solar energy arriving the earth. In contrast to conventional technologies that harvest solar energy by directly converting the energy of light into electrical energy through the photovoltaic effect and kinetic energy of water by mechanical systems, **hydrovoltaic effects** generate electricity from the direct interaction of materials with water, using the solar energy arriving the Earth indirectly¹. Through a variety of scientific principles, such as running water driven wheel, steam locomotives, water driven generator as well as the electrokinetic effects, the potential energy or kinetic energy of water can be converted into useful mechanical motion and electrical energy according to the principles of classical mechanics and electromagnetic dynamics². In the recent decade, novel hydrovoltaic effects include waving potential³, drawing potential⁴, evaporation-induced electric potential⁵ or evaporating potential⁶ have been found. With the hydrovoltaic effects, energy from flowing, waving, dropping, condensing, as well as evaporating water can now be harvested, significantly extending our capability in harvesting environmental energy, leading to the **emerging hydrovoltaic technology**⁷ and **hydrovoltaics: New ways of harvesting electricity from water**^{8,9}.

Here, we will review the recent advances in hydrovoltaics for harvesting environmental energy^{10,11}, serving as a potential **Negative thermal emission energy technology**¹², and briefly discuss the role of confined water in our brain and envision the hydrovoltaic intelligence.

Especially, the multi-field coupling effect at the solid-liquid interfaces of nanomaterials and water, especially the recent advances in hydrovoltaic effects will be discussed; the sustainable development challenges, the basic scientific questions of hydrovoltaic energy, ecology, and intelligence will finally be outlined.

References

1. 郭万林, 水伏科学与技术的曙光, 中国科学院第十九次院士大会第六届学术年会学术报告汇编, 2018, 608-618
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Biography

Dr. Wanlin GUO, Academician of Chinese Academy of Sciences, Chair Professor in mechanics and nanoscience, founder and director of the Key Laboratory of Intelligent Nano Materials and Devices of Ministry of Education and the Institute of Nanoscience of Nanjing University of Aeronautics and Astronautics. His current research focuses on intelligent nano materials and devices, novel conception and technology for efficient energy conversion, molecular physical mechanics for neuronal signaling and molecular biomimics, as well as strength and safety of aircraft and engine. He has published more than 400 peer-reviewed journal papers on *Nature* series, *Phys. Rev. Lett.*, *J. Am. Chem. Soc.*, *Adv. Mater.*, *J. Mech. Phys. Solids*, *Nano Lett.*, etc. He received the National Science Foundation of China for Distinguished Young Scholars in 1996 and the honor of Cheung Kong Scholars in 1999. In 2012, he obtained the National Nature Science Prize of China.



PAIR *Distinguished*
LECTURE SERIES

Photomolecular Evaporation from Hydrogels and Pure Water

Gang Chen

*Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA
02139*

Abstract

In recent years, experiments from different groups have reported that evaporation under sunlight from hydrogels and other porous materials can exceed the thermal evaporation limit by several times, i.e., super-thermal. Although possible reduction of latent heat in hydrogels was widely used as an explanation for the high evaporation rate, our experiments and modeling do not support this interpretation. We hypothesize that photons can directly cleave off water clusters at the liquid-vapor interface in a way similar to the photoelectric effect, which we call the photomolecular effect. We carried out over 20 different experiments on both hydrogel and a water-air interface to demonstrate this effect. Some key experiments include: (1) partially wet hydrogels become absorbing despite their constituent materials are transparent; (2) super-thermal evaporation; (3) polarization, angle-of-incidence, and wavelength dependences of optical responses at a single air-water interface to visible-light where bulk water does not absorb; (4) cooling of air under visible light irradiation; and (5) Raman and IR signatures of water clusters in the air. We also demonstrate that visible light heats up a thin layer of fog, with temperature rise peaking at the green wavelength where water is least absorbing. Our work provides a possible explanation for an 80-year puzzle in atmospheric science: experiments reported more cloud absorption than theory could predicts. Progress in theoretical description of the photomolecular effect will also be summarized. Our study suggests that the photomolecular effect should happen widely in nature, from clouds to fogs, ocean to soil surfaces, and plant transpiration, and can also lead to new applications in energy and clear water.

Biography

Gang Chen is the Carl Richard Soderberg Professor of Power Engineering at Massachusetts Institute of Technology (MIT). He served as the Department Head of the Department of Mechanical Engineering at MIT from 2013 to 2018. He obtained his PhD degree from the Mechanical Engineering Department at UC Berkeley. He was a faculty member at Duke University and UCLA, before joining MIT in 2001. He received an NSF Young Investigator Award, an R&D 100 award, an ASME Heat Transfer Memorial Award, an ASME Frank Kreith Award in Energy, a Nukiyama Memorial Award by the Japan Heat Transfer Society, a World Technology Network Award in Energy, an Eringen medal from the Society of Engineering Science, and the Capers and Marion McDonald Award for Excellences in Mentoring and Advising from MIT. He is a fellow of American Association for the Advancement of Science, the



American Physical Society, The American Society of Mechanical Engineers, and the Guggenheim Foundation. He is an academician of Academy Sinica, a fellow of the American Academy of Arts and Sciences, a member of the US National Academy of Engineering and the US National Academy of Sciences.

PAIR *Distinguished*
LECTURE SERIES

Interfacial Flow Over Hierarchically Structured Surface: Slip Boundary, Flow Separation Control, and Drag Reduction

Huiling Duan

Boya Chair Professor, Dean, College of Engineering, Peking University

Abstract

Interfacial flow is involved in varieties of natural phenomena and plays important roles in industrial applications. Boundary slippage provides a promising method to regulate interfacial flow and even complex bulk fluid transport by controlling the development of boundary layers, changing the near-wall flow structures, and reducing the viscous drag. Underwater superhydrophobicity provides a convenient way to realize slip boundary. However, the fundamental understanding of slip mechanism is still not clear, and the metastability of entrapped liquid-gas interfaces largely limits the practical applications. Besides, there still lacks of a versatile method to achieve flow control through managing interfacial slippage. In this talk, a systematic study is presented on the fundamental model, stability, and flow control of slip boundary over hierarchically structured surfaces. Multi-scale homogenization approach is developed to theoretically formulate the effective slip boundary over hierarchically structured surface. Nonlinear behaviors of slip boundary are revealed by establishing fundamental framework of slip boundary. Basic physical laws underlying the dynamic evolution of the metastable states are revealed, enabling the prediction of plastron longevity and the realization of ultimate stable state. Slip boundary is finally implemented to regulate flow separation and reduce drag in turbulent boundary layer flow. The current work paves the way for practical applications of Navier-slip boundary in flow control.

Biography

Prof. Huiling Duan is a Boya Chair Professor at Peking University, a member of the Chinese Academy of Sciences, and the Dean of the College of Engineering at Peking University. Prof. Duan's main research interests lie in interface mechanics and fluid-structure interaction mechanics. She has received prestigious awards including the second prize of the State Natural Science Award (2020), Alexander von Humboldt Research Award in Germany (2023), National Outstanding Young Scholar of China (2015), and National Outstanding Young Female Scientist of China (2014), etc. She serves as Member of the International Union of Theoretical and Applied Mechanics (IUTAM) Symposia Panel for Solid Mechanics, Executive Member of Global Engineering Deans Council. She was elected a Fellow of the American Society of Mechanical Engineers (ASME) in 2020.



CONFERENCE PROGRAM

20 June 2024 (Thursday)

15:00-18:00	Registration <i>(Venue: HJ202, Stanley Ho Building)</i>
17:00-19:00	Welcome Reception <i>(Venue: BC203, BC Building, or HJ202, Stanley Ho Building)</i>

21 June 2024 (Friday)

Opening Ceremony <i>(Venue: Z209, Block Z)</i>		
8:00-9:00	Registration <i>(Venue: outside Z209)</i>	
9:00-9:20	Opening speech : Prof. Jinguang Teng President The Hong Kong Polytechnic University; Prof. Qingyan Chen, Director of PAIR, The Hong Kong Polytechnic University; Prof. Jonathan Boreyko, Conference Chair, Virginia Tech and Prof. Zuankai Wang, Conference Chair, The Hong Kong Polytechnic University;	
9:20-9:30	Souvenir presentation and Group photo	
Plenary Session 1 <i>(Venue: Z209)</i>		Session Chairs: Anderson Shum, Xuehua Zhang
9:30-10:00	Some Puzzles and Flow Research Opportunities in Soft Matter Science	Steve Granick NAS <i>University of Massachusetts,</i> <i>USA</i>
10:00-10:30	Super-Wettability and Beyond - Quantum- Confined Superfluid: Biological Energy Conversion, Chemical Reaction and Information Transfer	Lei Jiang CAS, NAE <i>Technical Institute of Physics</i> <i>and Chemistry, Chinese</i> <i>Academy of Sciences, CHINA</i>
10:30-11:00	Coffee Break and conference photo <i>(Venue: Z208 or Z210)</i>	
Plenary Session 2 <i>(Venue: Z209)</i>		Session Chairs: Qiuwang Wang, Steven Wang
11:00-11:30	AI for Turbulence Modelling and Computational Fluid Dynamics	Shiyi Chen CAS

21 June 2024 (Friday)

		<i>Eastern Institute of Technology, Ningbo, CHINA</i>
11:30-12:00	Hydrovoltaics: From Green Energy to Intelligence	Wanlin Guo CAS <i>Nanjing University of Aeronautics and Astronautics, CHINA</i>
12:00-13:30	Lunch Break <i>(Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)</i>	
Plenary Session 3 <i>(Venue: Z209)</i>		Session Chairs: Liqu Wang, Tadd Truscott
13:30-14:00	Photomolecular Evaporation from Hydrogels and Pure Water	Gang Chen NAS, NAE <i>Massachusetts Institute of Technology, USA</i>
14:00-14:30	Interfacial Flow over Hierarchically Structured Surface: Slip Boundary, Flow Separation Control, and Drag Reduction	Huiling Duan CAS <i>Peking University, CHINA</i>
14:30-15:00	Coffee Break <i>(Venue: Z208 or Z210)</i>	
Plenary Session 4 <i>(Venue: Z209)</i>		Session Chair: Xiao Cheng Zeng
15:00-16:00	Exploring 2D Empty Space	Sir Andre Geim Nobel Prize Winner <i>University of Manchester, UK</i>
16:00-17:00	Panel Discussion: Prof. Steve Granick (<i>PNAS</i>), Dr. Huan Wang (<i>Wiley</i>), Dr. Yuen Yiu (<i>Cell Press</i>), Dr. Yaoqing Zhang (<i>NPG</i>)	Moderators: Jonathan Boreyko, Xianming (Simon) Dai
17:00-18:00	Break	
18:00-20:30	Banquet and Award Ceremony <i>(Venue: Hotel ICON, Silverbox Ballroom, Level 1)</i>	

22 June 2024 (Saturday)

8:00-9:00	Registration <i>(Venue: HJ202, Stanley Ho Building)</i>
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TRACK 1- DROPLETS, BUBBLES, AND WETTING

Session 1a: Bubbles <i>(Venue: FJ301, Chan Tai Ho Building)</i>			Session Chair: Timothée Mouterde
8:45-9:05	Hydrogen Micro/Nanobubbles in Interfacial Gas Evolution Reaction	Keynote	Xuehua Zhang <i>University of Alberta</i>
9:05-9:20	Dynamics of Bubble Bursting Jet at a Complex Liquid Surface	Invited	Bingqiang Ji <i>Beihang University</i>
9:20-9:32	PIV Analysis of Bubble Necking on Hydrophobic and Superhydrophobic Surfaces	Oral	Jianxun Huang <i>The University of British Columbia</i>
9:32-9:47	Single Bubble Rising in a Hele-Shaw Cell	Invited	Zhen Jian <i>Xi'an Jiaotong University</i>
9:47-10:07	Self-Lifting Droplet and Dancing Bubble	Keynote	Daosheng Deng <i>Fudan University</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 2a: Droplet Repellency and Jumping <i>(Venue: FJ301, Chan Tai Ho Building)</i>			Session Chair: Daosheng Deng
10:30-10:50	Hot Water Repellencies	Keynote	Timothée Mouterde <i>The University of Tokyo</i>
10:50-11:05	Pancake Jumping of Sessile Droplet	Invited	Xuemei Chen <i>Nanjing University of Science and Technology</i>
11:05-11:17	Low-Pressure Pancake Bouncing on Superhydrophobic Surfaces	Oral	Zunru Fu <i>Beihang University</i>
11:17-11:29	Understanding the Dynamics of Self-Cleaning by Coalescence-Induced Jumping Droplet on a Superhydrophobic Surface	Oral	Seokhyun Noh <i>University of Hanyang</i>
11:29-11:41	Dancing Drops on Lubricated Surfaces	Oral	Marcus Lin <i>King Abdullah University of Science and Technology</i>
11:41-11:56	Exploding Drops on Lubricated Surfaces	Invited	Dan Daniel <i>King Abdullah University of Science and Technology</i>

22 June 2024 (Saturday)

12:00-13:30		Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)	
Session 3a: Surface Wettability (Venue: FJ301, Chan Tai Ho Building)			Session Chair: Dan Daniel
13:30-13:50	Nano Green Printing and Manufacturing Technology	Keynote	Yanlin Song <i>Institute of Chemistry Chinese Academy of Sciences</i>
13:50-14:05	Flexible Liquid Marbles for Non-Wetting Droplet Manipulation	Invited	Jing Jin <i>Harbin Institute of Technology, Shenzhen</i>
14:05-14:17	High Throughput Modifiable Hydrogel Screen of Secretary Phenotypes Applied to Synthetic Biology	Oral	Wenxin Jiang <i>City University of Hong Kong</i>
14:17-14:32	Experimental Investigation of Droplet Gravitational Shedding on Inclined Functional Surfaces	Invited	Ahmet Alperen Günay <i>Bilkent University</i>
14:32-14:44	Thickness of Nano-Scale Poly(Dimethylsiloxane) Layers Affects the Motion Of Sliding Drops	Oral	Xiaoteng Zhou <i>Max Planck Institute for Polymer Research</i>
14:44-14:59	How a Macro-Ridge Suppresses Droplet Penetration through Meshes	Invited	Youhua Jiang <i>Guangdong Technion - Israel Institute of Technology</i>
15:20-15:45		Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)	
Session 4a: Droplet Dynamics (Venue: FJ301, Chan Tai Ho Building)			Session Chair: Yanlin Song
15:45-16:05	Femto-to-Attoliter Charged Droplets in Complex Gas Flows	Keynote	Andrei Fedorov <i>Georgia Institute of Technology</i>
16:05-16:17	Evaporation of Polymer Sessile Droplets and Formation of Diverse Deposit Structures	Oral	Feiyu An <i>Southern University of Science and Technology</i>
16:17-16:32	Non-Contact Fluid-Substrate Effect for Super-Lubricated Transportation	Invited	Steven Wang <i>City University of Hong Kong</i>
16:32-16:44	Freezing or Evaporation: Two Fates for Droplets During Condensation Frosting Governed by the Gradient Droplet Distribution	Oral	Chenguang Lu <i>Dalian University of Technology</i>
16:44-16:59	Mass Transport Mechanism in Droplet Dynamics	Invited	Erqiang Li <i>University of Science and Technology of China</i>

22 June 2024 (Saturday)

16:59-17:14	Rebound Suppression by Bubble-Encapsulated Hollow Droplets	Invited	Pingan Zhu <i>City University of Hong Kong</i>
17:14-17:29	Droplet-Droplet Collision of Hypergolic Propellants	Invited	Peng Zhang <i>City University of Hong Kong</i>

TRACK 2 - MICRO/NANO-FLUIDICS, BIOCHEMICAL/BIOMEDICAL

Session 1b: Micro-Systems for Bio-Analysis <i>(Venue: FJ302, Chan Tai Ho Building)</i>			Session Chair: Minami Yoda
08:45-09:05	Precision Processing of Micro/Nano-Liter Fluids	Keynote	Liqu Wang <i>The Hong Kong Polytechnic University</i>
09:05-09:20	Printhead on a Chip: Empowering Droplet Bioprinting with Microfluidics	Invited	Pengfei Zhang <i>Beihang University</i>
09:20-09:35	Open Millifluidics Based on Liquid Shaping	Invited	Xiaoguang Li <i>Northwestern Polytechnical University</i>
09:35-09:50	Spontaneous and Electrocapillary Imbibition Dynamics in Nanoporous Media	Invited	Bin Pan <i>University of Science and Technology Beijing</i>
09:50-10:10	Droplets-From-Eye: A Digital Microfluidic Device for Intraocular Pressure Management	Keynote	Tingrui Pan <i>University of Science and Technology of China</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 2b: Liquid Interfaces and Assembly <i>(Venue: FJ302, Chan Tai Ho Building)</i>			Session Chair: Liqu Wang
10:30-10:50	Colloidal Dynamics and Assembly in Combined Poiseuille and Electroosmotic Flow	Keynote	Minami Yoda <i>Michigan State University</i>
10:50-11:05	Plasmonic Microbubbles and their Applications in Micro/Nanofluidics	Invited	Yuliang Wang <i>Beihang University</i>
11:05-11:17	Dynamics of Three-Phase Contact Line when Crossing Micro-Patterns	Oral	Zhicheng Yuan <i>Tongji University</i>
11:17-11:32	Cross-Sectional Effects on Nanorod Diffusion in Polymer Melts	Invited	Ruoyu Dong <i>Beihang University</i>
11:32-11:52	Acoustofluidics: Sound Waves Meet Fluid Interfaces	Keynote	Ashis Sen <i>IIT Madras</i>
12:00-13:30	Lunch Break <i>(Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)</i>		

22 June 2024 (Saturday)

Session 3b: Fluidic Manipulations for Bio-Analysis (Venue: FJ302, Chan Tai Ho Building)			Session Chair: Chuanhua Duan
13:30-13:50	DCAS9-Mediated PCR-Free Detection of Oncogenic Mutation by Non-Equilibrium Nanoelectrokinetic Selective Preconcentration	Keynote	Sung Jae Kim <i>Seoul National University</i>
13:50-14:02	Step-By-Step DNA Analysis on Digital Microfluidics	Oral	Ren Shen <i>Hong Kong Polytechnic University</i>
14:02-14:14	High-Throughput and Low-Cost Orthogonal Electrode Matrix Digital Microfluidics Chip	Oral	Yufan WANG <i>University of Macau</i>
14:14-14:26	Shape Optimization of Density-Length Matching Nanochannels for Realistic Osmotic Energy Conversion Enhancement	Oral	Xu Zhang <i>Xi'an Jiaotong University</i>
14:26-14:38	Size Analysis of Single DNA Molecules Using Nanoslit Channels and Evaluation of Its Resolution	Oral	Hongdong Yi <i>Nagoya University</i>
14:38-14:53	Intelligent Magnetic Soft Millirobots for Droplet Manipulation	Invited	Yi Zhang <i>University of Electronic Science and Technology of China</i>
14:53-15:13	Light Manipulation of Levitated/Suspended Droplet/Bubble via Localized Photothermal Effect	Keynote	Rong Chen <i>Chongqing University</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 4b: Nanofluidics and Nanotechnology (Venue: FJ302, Chan Tai Ho Building)			Session Chair: Sung Jae Kim
15:45-16:05	Exploring Unconventional Nanofluidics: From Nanoparticle-Blocked Nanopores to Confinement-Dependent Wet Etching in Nanochannels	Keynote	Chuanhua Duan <i>Boston University</i>
16:05-16:20	Nanoscale Thermal-Driven Flows and Potential Inspirations	Invited	Yakang Jin <i>University of Electronic Science and Technology of China</i>
16:20-16:35	Nanoconfined Structural Design and Transport Modulation in Graphene Nanopores	Invited	Luda Wang <i>Peking University</i>
16:35-16:47	Three-Dimensional Structures and Dynamics of Multiphase Fluids Confined in Nanotubes	Oral	Qin-Yi Li <i>Kyushu University</i>
16:47-17:02	Combined Pressure-Driven and Electroosmotic Flow for Ion Transport in Nanofluidic Devices	Invited	Long Li <i>Fudan University</i>

22 June 2024 (Saturday)

17:02-17:22	High-Throughput Manipulation of Nanoparticles by Controlling Fluidic Electro-Elasticity and Joule Heating in Microchannels	Keynote	Guoqing Hu <i>Zhejiang University</i>
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TRACK 3 - NATURE-INSPIRED SURFACES AND MATERIALS

Session 1c: Surface Engineering <i>(Venue: FJ304, Chan Tai Ho Building)</i>			Session Chair: Ben Xu
08:45-09:05	Forms and Functions of Slippery Liquid-Infused Surfaces	Keynote (Virtual)	Tak Sing Wong <i>Penn State</i>
09:05-09:20	Control of Water Slipperiness using Heterogeneous Self-Assembled Monolayer Surface	Invited	Yaerim Lee <i>The University of Tokyo</i>
09:20-09:32	Hierarchical Nanoporous Self-Assembled Surfaces with Enhanced Durability of Infused Lubricant	Oral	Joowom Lim <i>Hanyang University</i>
09:32-09:47	Asymmetric Deposition on High-Speed Moving Superhydrophobic Surfaces	Invited	Meirong Song <i>Henan Agricultural University</i>
09:47-10:07	Liquid Droplets on Liquidlike Surfaces	Keynote	Kevin Golovin <i>University of Toronto</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 2c: Functional Materials <i>(Venue: FJ304, Chan Tai Ho Building)</i>			Session Chair: Kevin Golovin
10:30-10:50	Bioinspired Two-Dimensional Carbon-Based Nanocomposites	Keynote	Qunfeng Cheng <i>Beihang University</i>
10:50-11:05	Preparation and Application of Porous Composite Materials with Special Surface Wettability	Invited	Yang Wang <i>Jilin University</i>
11:05-11:17	Overcoming the Adhesion Paradox and Switchability Conflict on Rough Surfaces with Shape Memory Polymers	Oral	Changhong LINGHU <i>Nanyang Technological University</i>
11:17-11:37	Hierarchical Cu Foam-Enabled High Performance Interfacial Evaporation for Future Water Sustainability	Keynote	Ben Bin Xu <i>Northumbria University</i>
11:37-11:57	Bioinspired Optical Metamaterials	Keynote	Mingzhu Li <i>Technical Institute of Physics and Chemistry, Chinese Academy of Sciences</i>

22 June 2024 (Saturday)

12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		
Session 3c: Multiphase Interfaces 1 (Venue: FJ304, Chan Tai Ho Building)			Session Chair: Kangning Ren
13:30-13:50	Mechanism and Engineering Application of Fluid-Electromagnetic Coupling Suspension Micropump without Grooves	Keynote	Xiaobing Luo <i>Huazhong University of Science and Technology</i>
13:50-14:05	Bionic Manipulation of Droplets and Bubbles to Address Bottleneck Issues of Trans-Media Vehicles	Invited	Chengchun Zhang <i>Jilin University</i>
14:05-14:20	A Bionic Decoupled Spontaneous Transport Surface Resistant to Temperature Gradient	Invited	Xiuqing Hao <i>Nanjing University of Aeronautics and Astronautics</i>
14:20-14:35	Droplet Manipulation: From Design to Application	Invited	Jie Ju <i>Henan University</i>
14:35-14:50	Liquid Manipulation using Heterogeneous Wettability Surfaces	Invited	Huizeng Li <i>Institute of Chemistry, Chinese Academy of Sciences</i>
14:50-15:05	Oil-on-Water Droplets Sculpted by Vortex Halos	Invited	Yitan Li <i>Shandong University</i>
15:05-15:20	Light-Induced Charged Surfaces for Droplet Manipulation	Invited	Xuemin Du <i>Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 4c: Multiphase Interfaces 2 (Venue: FJ304, Chan Tai Ho Building)			Session Chair: Xuemin Du
15:45-16:05	Bioinspired Multi-Scale Pore/Channel	Keynote (Virtual)	Xu Hou <i>Xiamen University</i>
16:05-16:20	Cost-Effective Mass Production of True-3D Microstructures for Bioinspired Surfaces with Multipronged Durability	Invited	Kangning Ren <i>Hong Kong Baptist University</i>
16:20-16:35	Liquid Manipulation Induced by The Surface Asymmetry	Invited	Shile Feng <i>Dalian University of Technology</i>
16:35-16:50	Selective Fluid Flow Steering of Arch Shape Microstructures	Invited	Hui Zhang <i>Xi'an Jiaotong University</i>
16:50-17:05	Design and Applications of Superamphiphobic Materials	Invited	Yanan Li <i>Sun Yat-sen University</i>

22 June 2024 (Saturday)

17:05-17:20	Bioinspired Structured Adhesive Surfaces	Invited	Longjian Xue <i>Wuhan University</i>
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TRACK 4 - HEAT TRANSFER

Session 1d: Energy Conversion and Storage <i>(Venue: HJ302, Stanley Ho Building)</i>			Session Chair: Matteo Bucci
8:45-9:05	Nano/Microscale Heat Transfer and Energy Storage - A Research Group Overview	Keynote	Changying Zhao <i>Shanghai Jiao Tong University</i>
9:05-9:25	Thermal Coupled PV-EC Integrated Solar Hydrogen Production Based on Field-Flow Synergy Design	Keynote	Dengwei Jing <i>Xi'an Jiaotong University</i>
9:25-9:37	Passive Interfacial Cooling-Induced Sustainable Electricity-Water Cogeneration	Oral	Zhengyi Mao <i>City University of Hong Kong</i>
9:37-9:57	Potential Fluctuation in Micro Two-Phase Flow and its Interfacial Phenomena	Keynote	Wei Li <i>Zhejiang University</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 2d: Boiling <i>(Venue: HJ302, Stanley Ho Building)</i>			Session Chair: Wei Li
10:30-10:50	New Analysis Methodology for Precise Design and Optimization of Heat Transfer Processes: Conduction-Advection Thermal Resistance in Parallel	Keynote	Qiuwang Wang <i>Xi'an Jiaotong University</i>
10:50-11:02	Potential of Soluble Molecular Additives in Boiling-Based Thermal Management Systems	Oral	Avinash Upadhyay <i>Indian Institute of Technology Patna</i>
11:02-11:22	High Resolution Investigations of Boiling Heat Transfer, from Cryogenic Fluids to High-Pressure Water	Keynote	Matteo Bucci <i>Massachusetts Institute of Technology</i>
11:22-11:34	Chances in Boiling Performance Modified by Charged Surfactants with Different Chain Lengths	Oral	Mario Mata <i>University of Nevada, Las Vegas</i>
11:34-11:54	Acoustic Bubbles: Decoding the Physics of Sound Generation and Propagation in Multiphase Flow and Heat Transfer Applications	Keynote	Rishi Raj <i>Indian Institute of Technology Patna</i>
12:00-13:30	Lunch Break <i>(Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)</i>		

22 June 2024 (Saturday)

Session 3d: Boiling, Evaporation, and Melting (Venue: HJ302, Stanley Ho Building)			Session Chair: Wei Wu
13:30-13:50	Hydrodynamic Limits of Critical Heat Flux and its Ultimate Evaporation Momentum Limit	Keynote	Saeed Moghaddam <i>University of Florida</i>
13:50-14:05	The Role of Century-Old Design of Tesla Valves in Microchannel Flow Boiling	Invited	Wenming Li <i>Southeast University</i>
14:05-14:17	Self-Propelled Ice on a Herringbone Ratchets	Oral	Jack Tapocik <i>Virginia Tech</i>
14:17-14:32	Modeling of Liquid-Vapor Phase Change Heat Transfer: From Nanoscale to Macroscale	Invited	Shuai Gong <i>Shanghai Jiaotong University</i>
14:32-14:52	High-Speed Microdroplet Impact on Heated Surfaces	Keynote	Yoshiyuki Tagawa <i>Tokyo University of Agriculture and Technology</i>
14:52-15:12	Dynamic Characteristics of Droplets on Micro/Nanostructured Surfaces During Phase Transition	Keynote	Zhichun Liu <i>Huazhong University of Science and Technology</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 4d: Thermal Management (Venue: HJ302, Stanley Ho Building)			Session Chair: Saeed Moghaddam
15:45-16:05	Nanochannel-Based Ion Transport and Osmotic Energy Conversion with Thermal Enhancement	Keynote	Zhiguo Qu <i>Xi'an Jiaotong University</i>
16:05-16:20	Ultra-Thin Vapor Chambers for Efficient Thermal Management	Invited	Shiwei Zhang <i>South China University of Technology</i>
16:20-16:40	Functional Silicone Oil Grafted Surfaces for Wetting and Phase-Change	Keynote	Daniel Orejon <i>University of Edinburgh</i>
16:40-16:55	Advanced Absorption Thermal Storage and Thermal Management	Invited	Wei Wu <i>City University of Hong Kong</i>
16:55-17:10	Performance Analysis of Ultra-Thin Vapor Chamber and its Application in Battery Thermal Management System	Invited	Yunhua Gan <i>South China University of Technology</i>
17:10-17:30	Smart Thermal Managements Using Thermal Smart Materials of Nanoparticle Suspensions with Tunable Thermal Conductivity	Keynote	Binyang Cao <i>Tsinghua University</i>

22 June 2024 (Saturday)

TRACK 5 - ENERGY OR WATER HARVESTING

Session 1e: Water and Energy Sustainability (Venue: HJ303, Stanley Ho Building)			Session Chair: Wenshuai Chen
8:45-9:05	Promising Membraneless Microfluidic Fuel Cells: Challenges, Solutions, and Applications	Keynote	Xun Zhu <i>Chongqing University</i>
9:05-9:20	Jumping-Droplets Gap Membrane Distillation: A Novel Configuration with Enhanced Energy Efficiency	Invited	Youmin Hou <i>Wuhan University, Max Planck Gesellschaft</i>
9:20-9:35	Engineered Surfaces for a Sustainable Future	Invited	Bei Fan <i>Michigan State University</i>
9:35-9:55	Electricity-Free Heating and Cooling Strategies for Water and Energy Sustainability	Keynote	Qiaoqiang Gan <i>King Abdullah University of Sci & Tech</i>
10:10-10:30	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 2e: Water Harvesting 1 (Venue: HJ303, Stanley Ho Building)			Session Chair: Guang Feng
10:30-10:50	Biopolymer Nanofibers for Sustainable Water Harvesting	Keynote	Wenshuai Chen <i>Northeast Forestry University</i>
10:50-11:02	Enhanced Fog Harvesting Techniques	Oral	Jimmy Kaindu <i>virginia polytechnic institute and state university</i>
11:02-11:22	Theoretical Analysis of Daytime Dew-Harvesting	Keynote	Zhen Chen <i>Southeast University of China</i>
11:22-11:37	Obtaining Freshwater by Regulating Functionalized Solid-Liquid Interfaces	Invited	Zhongqiang Zhang <i>Jiangsu University</i>
11:37-11:57	The Splash Lab: Skipping Spheres to The Water Collection of Desert Moss	Keynote	Tadd Truscott <i>KAUST</i>
12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		

22 June 2024 (Saturday)

Session 3e: Flow Energy Harvesting and Electronics (Venue: HJ303, Stanley Ho Building)			Session Chair: Qiaoqiang Gan
13:30-13:50	Interfacial Structure, Ion Transport and Heat Generation in Electrical Double Layers	Keynote	Guang Feng <i>Huazhong University of Science and Technology</i>
13:50-14:05	Interfacial Design for Flexible Sensors	Invited	Hao Wu <i>Huazhong University of Science and Technology</i>
14:05-14:20	Microfluidic Energy Harvesting for Batteryless Biomedical Systems	Invited	Zhiran Yi <i>Shanghai Jiao Tong University</i>
14:20-14:32	Chill-And-Charge: A Synergistic Integration for Future Compact Electronics	Oral	Muxing Zhang <i>Nanjing University of Science and Technology</i>
14:32-14:47	Neuro-Inspired Ionic Energy and Computing Devices	Invited	Kai Xiao <i>Southern university of science and technology</i>
14:47-15:02	Engineering Cellulose Fiber Matrix for the Analytical Lab on Paper	Invited	Junfei Tian <i>South China University of Technology</i>
15:02-15:17	Control of Charge Flow by Nanoconfined Iontronics	Invited	Di Wei <i>Beijing Institute of Nanoenergy and Nanosystem</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 4e: Triboelectric Charges and Energy Harvesting (Venue: HJ303, Stanley Ho Building)			Session Chair: Di Wei
15:45-16:05	Highly Efficient Thermal Management Materials and Devices Based on Electrocaloric Effect	Keynote	Rujun Ma <i>Nankai University</i>
16:05-16:20	Triboelectric Nanogenerator Fabrics for Intellisense and Artificial Intelligence Perception	Invited	Shengjie Ling <i>Shanghaitech university</i>
16:20-16:35	Nanogenerators Based on the Water/Solid Interface	Invited	Hao Wu <i>South China University of Technology</i>
16:35-16:50	Triboelectric Polymer and Energy Generation on Solid-Liquid Interface	Invited	Xiangyu Chen <i>Beijing Institute of Nanoenergy and Nanosystems</i>

22 June 2024 (Saturday)

16:50-17:05	Leveraging Surface and Interfacial Phenomena for Applications-Sensing, Droplet Manipulation, and Energy Harvesting	Keynote	Chengkuo Lee <i>National University of Singapore</i>
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TRACK 6 - SIMULATIONS AND MACHINE LEARNING

Session 1f: Wetting and Multiphase Flow <i>(Venue: HJ304, Stanley Ho Building)</i>			Session Chair: Hang Ding
8:45-9:05	Theory of Wetting and Capillarity on the Nanoscale	Keynote	Fengchao Wang <i>University of Science and Technology of China</i>
9:05-9:20	Enhancing the Turbulent Transport by Oscillating Boundary Deformation	Invited	Yantao Yang <i>Peking University</i>
9:20-9:35	Tapping Atmospheric Rivers as Future Freshwater Reserves	Invited	Mengqian Lu <i>HKUST</i>
9:35-9:50	Inhibiting the Leidenfrost Effect by Using Structured Thermal Pillars: A 3D Lattice Boltzmann Study	Invited	Penghao Duan <i>City University of Hong Kong</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 2f: Droplets and Interfaces <i>(Venue: HJ304, Stanley Ho Building)</i>			Session Chair: Fengchao Wang
10:30-10:50	Dynamics of Compound Droplets: Simulations and Modelling	Keynote	Hang Ding <i>University of Science and Technology of China</i>
10:50-11:05	Thermodynamics and Dynamics of Thin Brine Films Confined between Oil and Rock Interfaces	Invited	Chao Fang <i>The Hong Kong University of Science and Technology (Guangzhou)</i>
11:05-11:20	Predicting The Performance of Proton Exchange Membrane Fuel Cell Stacks: From Computational Fluid Dynamic to Digital Twin	Invited	Fan Bai <i>Xi'an Jiaotong University</i>
11:20-11:32	Surface Wettability's Impact on Interfacial Heat Transfer in Liquid Hydrogen Boiling: A Molecular Dynamics Simulation	Oral	Heyin Chen <i>Sun Yat-sen University</i>
11:32-11:47	Effects of Wall Wettability on Two-Phase Flow in A CO2 Ejector	Invited	Fang Liu <i>Shanghai University of Electric Power</i>
11:47-12:02	Enhancement of Interfacial Thermal Transport between Epoxy Resin and Silicon Filler	Invited	Fangyuan Sun

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			<i>University of Science and Technology Beijing</i>
12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		
Session 3f: Transport and Interfaces (Venue: HJ304, Stanley Ho Building)			Session Chair: Li Chen
13:30-13:50	Phonon Transport Physics in Two-Dimensional Systems	Keynote	Jie Chen <i>Tongji University</i>
13:50-14:05	3D Numerical Modeling of Laser-Droplet Interactions	Invited	Shucheng Pan <i>Northwestern Polytechnical University</i>
14:05-14:20	Deep-Potential Enabled Multiscale Simulation of Interfacial Thermal Transport in Boron Arsenide Heterostructures	Invited	Guangzhao Qin <i>Hunan University</i>
14:20-14:35	Phonon Transport in Defective Crystals	Invited	Ruiqiang Guo <i>Shandong Institute of Advanced Technology</i>
14:35-14:47	Numerical Investigation of Thermal and Hydraulic Characteristics of Aviation Heat Exchanger Based on The Minimal Surface of Schwartz-D Structure	Oral	Ting Dai <i>southeast university</i>
14:47-15:02	Completely Passive Capture of Carbon Dioxide from Air Using Solar Energy	Invited	Jian Zeng <i>Hong Kong University of Science and Technology (Guangzhou)</i>
15:02-15:17	Prolate Spheroids Settling in a Quiescent Fluid: Clustering, Microstructures and Collisions	Invited	Lihao Zhao <i>Tsinghua University</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 4f: Transport and Machine Learning (Venue: HJ304, Stanley Ho Building)			Session Chair: Jie Chen
15:45-16:05	A Novel Model for Reactive Transport Processes in Catalyst Layer of PEM Fuel Cells	Keynote	Li Chen <i>Xi'an Jiaotong University</i>
16:05-16:20	AI-Assisted Exploration and Active Design of Polymers with High Intrinsic Thermal Conductivity	Invited	Shenghong Ju <i>Shanghai Jiao Tong University</i>
16:20-16:35	Scanning Thermal Microscopy Characterization and Enhancement Mechanism Analysis of Local High Thermal	Invited	Lin Qiu <i>University of Science and Technology Beijing</i>

22 June 2024 (Saturday)

	Conductivity of Composite Phase Change Materials		
16:35-16:50	Effect of the Tilt Angle on the Melting Process of PCM in a Tilted Square Cavity	Invited	Zhenhua Xia <i>Zhejiang University</i>
16:50-17:02	The Reverse Catch Light Method: A Novel and Robust Approach for Complete Droplet Reconstruction in Three-Dimensional Space	Oral	Isaac Berk <i>University of Nevada, Las Vegas</i>
17:02-17:17	A Multi-Physics Pore-Scale Network Modelling Tool for The Design of Transport in Device-Scale Porous Media	Invited	Qingyang Lin <i>Zhejiang University</i>

23 June 2024 (Sunday)

8:00-9:00	Registration <i>(Venue: HJ202, Stanley Ho Building)</i>
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TRACK 1: DROPLETS, BUBBLES, AND WETTING

Session 5a: Intra-Droplet Flows <i>(Venue: FJ 301, Chan Tai Ho Building)</i>			Session Chair: Jonathan Boreyko
08:45-9:05	Effect of Interfacial Flow on Mass and Energy Transfer in Droplet Evaporation	Keynote	Fei Duan <i>Nanyang Technological University</i>
09:05-9:20	Flow Structure and Spreading Law • from Oil to Flash-Evaporating Liquids	Invited	Zhenying Wang <i>Kyushu University</i>
09:20-9:35	Self-Propelling Multicomponent Droplets and Marangoni Interfacial Flow Induced by Transverse Solute Transfer	Invited	Huanshu Tan <i>Southern University of Science and Technology</i>
09:35-9:50	Enhanced Droplet Dynamics: Harnessing Surface Interactions for Improved Fluid Transport	Invited	Chonglei Hao <i>Harbin Institute of Technology, Shenzhen</i>
09:50-10:05	How a Salty Droplet Freezes and Sprouts Ice Crystals from its Top	Invited	Fuqiang Chu <i>University of Science and Technology, Beijing</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 6a: Jetting Effects <i>(Venue: FJ 301, Chan Tai Ho Building)</i>			Session Chair: Fei Duan
10:30-10:45	Droplet Impact Regulation Via Liquid Properties Control and Fin-Stripe Structure	Invited	Xing Han <i>Sun Yat-Sen University</i>
10:45-10:57	Mechanism of Singular Jetting from Drop-Impact Craters	Oral	Yuansi Tian <i>University of Science and Technology of China</i>
10:57-11:12	Singular Jets Produced During the Impact of Compound Droplets on Lyophilic Surfaces	Invited	Jianwei Guo <i>Southwest Jiaotong University</i>
11:12-11:27	Dynamics of Impinging Droplets on Superhydrophobic Surfaces: Rebound Behaviors and Singular Jets	Invited	Longquan Chen <i>University of Electronic Science</i>

23 June 2024 (Sunday)

			<i>and Technology of China</i>
12:00-13:30	Lunch Break <i>(Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)</i>		
Session 7a: Surface Wettability 2 <i>(Venue: FJ 301, Chan Tai Ho Building)</i>			Session Chair: Longquan Chen
13:30-13:45	Mechanism and Function of Interfacial Dynamic Spreading	Invited	Ye Tian <i>Technical Institute of Physics and Chemistry, Chinese Academy of Sciences</i>
13:45-14:00	Explore Wetting Dynamics at Micro and Nano Scales by Long-Needle AFM	Invited	Dongshi Guan <i>Institute of Mechanics, Chinese Academy of Sciences</i>
14:00-14:12	Coalescence Dynamics of Microdroplets and Partially Filled Microgrooves	Oral	Raushan Kumar <i>IIT Ropar Punjab</i>
14:12-14:27	Nanotextures-Mediated Droplet Splash on Hot Surfaces	Invited	Ran Tao <i>University of Electronic Science and Technology of China</i>
14:27-14:39	The Glugging Phenomena of a Gluggle Jug	Oral	Barclay Jumet <i>Rice University</i>
14:39-14:51	Experimental Study on Contact Electrification Near a Three-Phase Contact Line Using Kelvin Probe Force Microscopy	Oral	Yuki Ishihara <i>Kyushu University</i>
14:51-15:03	Research on Double Layer Multiple Liquid Columns Formation Based on Spatial Electric Field Distribution	Oral	Shangru Zhou <i>Changsha University</i>
15:03-15:18	Efficient Droplet Transport on Superwetting Surfaces	Invited	Yahua Liu <i>Dalian University of Technology</i>
15:20-15:45	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		

23 June 2024 (Sunday)

Session 8a: Droplet-Substrate Interactions <i>(Venue: FJ 301, Chan Tai Ho Building)</i>			Session Chair: Ye Tian
15:45-16:00	Furcated Droplet Self-Propulsion on Crystalline Surfaces	Invited	Xin Tang <i>Southern University of Science and Technology</i>
16:00-16:12	Bouncing Water Droplets on Curved Soap Films	Oral	Xurui Zhang <i>Xi'an Jiaotong University</i>
16:12-16:24	Dynamics of Successively Bouncing Droplets on Superhydrophobic Surfaces	Oral	Yile Wang <i>University of Electronic Science and Technology of China</i>
16:24-16:36	Oblique Droplet Impact on Superhydrophobic Surfaces	Oral	Youquan Jia <i>University of Electronic Science and Technology of China</i>
Best Student Presentation Awards and Closing Remarks <i>(Venue: Z209)</i>			
17:30-18:00			

23 June 2024 (Sunday)

TRACK 2 - MICRO/NANO-FLUIDICS, BIOCHEMICAL/BIOMEDICAL

Session 5b: Label-Free Sensing and Sorting Technology <i>(Venue: FJ 302, Chan Tai Ho Building)</i>			Session Chair: Jiangtao Cheng
08:45-09:05	When Two-Phase Flows Emerge from Porous Media	Keynote (Virtual)	Sungyon Lee <i>University of Minnesota</i>
09:05-09:20	Label-Free Microfluidics Technologies for Extracellular Vesicles Isolation	Invited	Han Wei Hou <i>Nanyang Technological University</i>
09:20-09:32	Single-Cell Electric Impedance Sensor Based on Integrated Circuit Chip	Oral	Wenhao Hui <i>University of Macau</i>
09:32-09:47	The Liquid Ring Sealed Air Bearing	Invited	Jun Wen <i>Northwestern Polytechnical University</i>
09:47-10:07	Label-Free Targeted Single-Cell Feedback-Controlled High Efficiency Electroporation Using Focused Electric Fields in a Microsystem	Keynote	Aniruddh Sarkar <i>Georgia Institute of Technology</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 6b - Smart Droplets for Bio-Analysis <i>(Venue: FJ 302, Chan Tai Ho Building)</i>			Session Chair: Han Wei Hou
10:30-10:50	3.5D Organoid Engineering Strategy	Keynote	Henry Yu <i>National University of Singapore</i>
10:50-11:05	Droplet Trapping, Oscillating, and Releasing in Viscoelastic Fluids	Invited	Chiyu Xie <i>Beihang University</i>
11:05-11:20	Light-Responsive Surfactants for Droplet Manipulation	Invited	Yi-Ping (Megan) Ho <i>The Chinese University of Hong Kong</i>
11:20-11:32	Deep Droplet Digital Lamp (DDDLamp) by Omni-Directional Ejection on Digital Microfluidics	Oral	Aman Lyu <i>University of Macau</i>
11:32-11:47	Living Metasurface Biosensors for Immune Functional Profiling	Invited	Chia Hung Chen <i>City University of Hong Kong</i>
12:00-13:30	Lunch Break <i>(Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)</i>		

23 June 2024 (Sunday)

Session 7b: Fluid Interfaces and Bio-Mems (Venue: FJ 302, Chan Tai Ho Building)			Session Chair: Yi-Ping (Megan) Ho
13:30-13:50	Explore Surface Thermodynamics using a Smart Droplet Technique	Keynote	Yi Zuo <i>University of Hawaii at Manoa</i>
13:50-14:02	Regulation of Biomolecular Phase Separation by Microfluidics	Oral	Xinyi Lian <i>Institute of Mechanics, Chinese Academy of Sciences</i>
14:02-14:17	Nanofluidic Control by Electrostatic Gating	Invited	Yahui Xue <i>Southern University of Science and Technology</i>
14:17-14:29	Investigation of Wave-Solid-Fluid Interaction in Reconfigurable Acoustofluidic System	Oral	Jeongeun Park <i>Chonnam National University</i>
14:29-14:41	Visualizing the Miscibility Interface: Experimental Determination of MMP for CO ₂ and Shale Oil in Nanoporous	Oral	Haowei Lu <i>Tsinghua University</i>
14:41-15:01	All-Aqueous Interfacial Phenomena	Keynote	Anderson Shum <i>University of Hong Kong</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 8b: Microfluidics and Cell Analysis (Venue: FJ 302, Chan Tai Ho Building)			Session Chair: Anderson Shum
15:45-16:00	Microfluidic Manipulation of Multiphase Liquid-Liquid Phase-Separated (LLPS) Systems for in Vitro Models	Invited	Tiantian Kong <i>Shenzhen University</i>
16:00-16:12	Rapid and Selective Cell Lysis Achieved with a Chemical-Free Piezoelectric Actuator Preserving Cytoplasmic Integrity	Oral (Virtual)	Sushama Agarwalla <i>Indian Institute of Technology Hyderabad</i>
16:12-16:24	Marangoni-Flow-Assisted Assembly of Single-Walled Carbon Nanotube Films for Sensors	Oral	Zilong Qiu <i>Peking University</i>
16:24-16:36	Stage Divisions of Droplet Generation Regimes in a T-Junction Microchannel	Oral	Yufei Xie <i>Huazhong University of Science and Technology</i>
16:36-16:48	Membrane-Anchored Immunosorbent Assay Based on Cholesterol-Linked Antibody Technology for High Throughput Single Cell Multiplexed Analysis	Oral	Ying Xu <i>City University of Hong Kong</i>

23 June 2024 (Sunday)

16:48-17:00	Biomimetic Emulsion-Templated Surface Engineering for Active Microdroplet Harvesting	Oral	Yi Wang <i>The Hong Kong Polytechnic University</i>
17:00-17:12	Acoustofluidic Separation of Bacteria from Platelets Using Acoustic Radiation Force	Oral	Song Ha Lee <i>Chonnam National University</i>
17:12-17:27	Molecular Transport Through Angstromporous 2D Crystals	Invited	Pengzhan Sun <i>University of Macau</i>
17:30-18:00	Best Student Presentation Awards and Closing Remarks <i>(Venue: Z209)</i>		

23 June 2024 (Sunday)

TRACK 3 - NATURE-INSPIRED SURFACES AND MATERIALS

Session 5c: Surface Engineering 2 <i>(Venue: FJ 304, Chan Tai Ho Building)</i>			Session Chair: Longjian Xue
08:45-9:05	Multi-Dimensional Manipulation of Solid-Liquid Interaction	Keynote	Xu Deng <i>University of Electronic Science and Technology of China</i>
09:05-9:20	Design of Adaptive Water-Repellent Surfaces with Stable and Mobile Water/Air Contact Line	Invited	Jinlong Yang <i>University of Electronic Science and Technology of China</i>
09:20-9:32	Controlling the Morphologies of Perovskite Materials Based on Fluid Flows and Interfacial Properties	Oral	Yanzhao Liu <i>Peking University</i>
09:32-9:47	Bioinspired Design of Multifunctional Solid-Repellent Coatings	Invited	Jing Wang <i>Shanghai Jiao Tong University</i>
09:47-10:07	De-Railing Scaling: From Fundamentals of Crystallization Fouling on Nanomaterials to Rational Design of Scalephobic Surfaces	Keynote	Thomas Schutzius <i>University of California, Berkeley</i>
10:10-10:30	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
Session 6c - Functional Materials 2 <i>(Venue: FJ 304, Chan Tai Ho Building)</i>			Session Chair: Thomas Schutzius
10:30-10:50	Bio-Inspired Controllable Liquid Transfer: Towards High-Performance Printable Optoelectronic Devices	Keynote (Virtual)	Huan Liu <i>Beihang university</i>
10:50-11:05	Bionic Functional Devices for Low Carbon Applications	Invited	Zhaolong Wang <i>Harbin Institute of Technology</i>
11:05-11:20	Bioinspired Micro/Nano-Confined Solid-Liquid Composite Materials	Invited	Zhizhi Sheng <i>Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences</i>
11:20-11:32	Enhancing the Treatment of Gastroesophageal Reflux Disease with An Innovative Ultrastable Recombinant Protein-Based Adhesive Hydrogel	Oral	Xiao Yang <i>Hong Kong Centre for Cerebro-Cardiovascular Health Engineering</i>
11:32-11:47	Self-Assembly of Soft Matter at The Liquid-Liquid Interface	Invited	Yu Chai <i>City University of Hong Kong</i>

23 June 2024 (Sunday)

11:47-12:02	Nature-Inspired Multiscale Manufacturing Strategy for Strong and Tough Soft Materials	Invited	Wei Zhai <i>National University of Singapore</i>
12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		
Session 7c - Bio-Materials and Adhesion (Venue: FJ 304, Chan Tai Ho Building)			Session Chair: Huawei Chen
13:30-13:50	Bio-Inspired Ice Binding Materials for Cryopreservation of Cells and Tissues	Keynote	Jianjun Wang <i>Technical Institute of Physics and Chemistry of the Chinese Academy of Sciences</i>
13:50-14:05	Filter Feeding Techniques Inspired by Fan Worms: Theoretical Framework and Robotic Applications	Invited	Jianing Wu <i>Sun Yat-sen University</i>
14:05-14:25	Bioinspired Material Engineering in Health Management	Keynote	Xi Yao <i>City University of Hong Kong</i>
14:25-14:40	Electrically-Switched Underwater Capillary Adhesion	Invited	Huanxi Zheng <i>Dalian University of Technology</i>
14:40-15:00	Controllable Adhesion on The Bioinspired Surface	Keynote	Huawei Chen <i>Beihang University</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
17:30-18:00	Best Student Presentation Awards and Closing Remarks (Venue: Z209)		

23 June 2024 (Sunday)

TRACK 4 - HEAT TRANSFER

Session 5d: Condensation and Water Harvesting (Venue: HJ302, Stanley Ho Building)			Session Chair: Daniel Orejon
8:45-9:00	Exploring the Upper Boundaries of Dropwise Condensation Through Controlled Microdroplet Shedding	Invited	Xiao Yan <i>Chongqing University</i>
9:00-9:12	Scalable and Sustainable Janus Mesh for Efficient Fog Harvesting and Purification	Oral	Jiayu Song <i>Hong Kong University of Science and Technology</i>
9:12-9:27	High-Performance Solar-Driven Hypersaline Brine Treatment	Invited	Zhenyuan Xu <i>Shanghai Jiao Tong University</i>
9:27-9:42	Enhanced Condensation Heat Transfer on Superhydrophobic Microporous and Multiscale Structured Surfaces	Invited	Liwu Fan <i>Zhejiang University</i>
9:42-9:57	Ammonia Crossover in Direct Ammonia Fuel Cells	Invited	Zhefei Pan <i>Chongqing University</i>
10:10-10:30	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 6d: Heat Transfer in Novel Materials (Venue: HJ302, Stanley Ho Building)			Session Chair: Liwu Fan
10:30-10:50	Electrocaloric Regenerators with Enhanced Heat Transfer Structures	Keynote	Shuhuai Yao <i>The Hong Kong Univ of Sci and Tech</i>
10:50-11:05	Phase-Transition Thermophysics in Cryobiomedicine	Invited	Wei Rao <i>Technical Institute of Physics and Chemistry of the Chinese Academy of Sciences</i>
11:05-11:25	Thermal Transport in Twisted Graphite	Keynote	Bai Song <i>Peking University</i>
11:25-11:45	Phononic Friction	Keynote	Yunfei Chen <i>Southeast University</i>
12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		

23 June 2024 (Sunday)

Session 7d: Heat Transfer on Micro/Nano-Structures (Venue: HJ302, Stanley Ho Building)			Session Chair: Xuehu Ma
13:30-13:50	Micro/Nanostructures for Enhanced Phase-Change Heat Transfer	Keynote	Ming-Chang Lu National Taiwan University
13:50-14:05	Spontaneously Grown Boehmite Nanostructures Enhancing Phase Change Heat Transfer on Aluminium Surfaces	Invited	Guang Yang Shanghai Jiao Tong University
14:05-14:25	Optimization of Heat and Mass Transfer via Nano/Micro-Structured Surfaces: Utilizing Energy Barriers between States and "Semi-Dimensional Reduction"	Keynote	Wei Ding Helmholtz Zentrum Dresden Rossendorf and Tu Dresden
14:25-14:45	Investigating the Temperature Effects on Additively Manufactured Alloy	Keynote	Yangying Zhu University of California, Santa Barbara
14:45-15:05	Ultra-Thin Film Evaporation On V-Grooved Nanowire Bundles Surfaces	Keynote	Xuehu Ma Dalian University of Technology
15:05-15:20	Suppressing the Leidenfrost Effect above 1000°C for Efficient Thermal Cooling	Invited	Mengnan Jiang Dalian University of Technology
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 8d: Droplets and Wetting (Venue: HJ302, Stanley Ho Building)			Session Chair: Daniel Preston
15:45-16:05	Phase Change-Induced Liquid Droplet Actuations on Structured Surfaces: Applications in Colloidal Manipulations	Keynote	Jiangtao Cheng Virginia Tech
16:05-16:17	Thermal Responses of Surface Nanobubbles and Micropancakes	Oral	Hideaki Teshima Kyushu University
16:17-16:29	Leidenfrost Phenomenon on Superhydrophilic Copper Foams	Oral	Bo Xu Southeast University
16:29-16:44	Janus Vitrification of Droplet via Cold Leidenfrost Phenomenon	Invited	Meng Shi Xi'an Jiaotong University
16:44-17:04	Scalable Hot-Water-Repellent Superhydrophobicity	Keynote	Daniel Preston Rice University
17:30-18:00	Best Student Presentation Awards and Closing Remarks (Venue: Z209)		

23 June 2024 (Sunday)

TRACK 5 - ENERGY OR WATER HARVESTING

Session 5e: Energy Conversion and Applications (Venue: HJ303, Stanley Ho Building)			Session Chair: Ho-Young Kim
8:45-9:05	Tea-Leaf-Dancing Inspired Device for Energy Conversion Application	Keynote	Feng Shi <i>Beijing University of Chemical Technology</i>
9:05-9:20	Biomimetic Infrared Radiative Regulation Mechanism and Research Progress in Radiative Cooling	Invited	Fuqiang Wang <i>Harbin Institute of Technology</i>
9:20-9:35	Electrochemical Li ⁺ Intercalation in 2D TMDs and Their Interfacial Study via In-Situ Liquid Phase TEM	Invited	Zhiyuan Zeng <i>City University of Hong Kong</i>
9:35-9:50	Electricity from Moving Boundaries of Electrical Double Layer	Invited	Jun Yin <i>Nanjing University of Aeronautics and Astronautics</i>
10:10-10:30	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 6e: Water Harvesting 2 (Venue: HJ303, Stanley Ho Building)			Session Chair: Ya Yang
10:30-10:50	Soil Water Harvest Inspired by Desert Horned Lizards	Keynote	Ho-Young Kim <i>Seoul National University</i>
10:50-11:05	Bionic Strategy Optimized 3D Fog Harvesting System	Invited	Shangzhen Xie <i>Hubei University</i>
11:05-11:17	Thermofluidic Optimization of Hydrogel-Based Water Harvesting Devices	Oral	Chad Wilson <i>Massachusetts Institute of Technology</i>
11:17-11:29	The Influence of Condensation on Sorbent-Based Atmospheric Water Harvesting Device Performance	Oral	Natasha Stamler <i>Massachusetts Institute of Technology</i>
11:29-11:44	Super-Stable Hygroscopic Hydrogels for Household-Scale Atmospheric Water	Invited	Chang Liu <i>The Hong Kong University of Science and Technology (Guangzhou)</i>
12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		

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Session 7e: Energy Harvesting at Interfaces <i>(Venue: HJ303, Stanley Ho Building)</i>			Session Chair: Bei Fan
13:30-13:50	Hybridized and Coupled Nanogenerators	Keynote	Ya Yang <i>Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences</i>
13:50-14:05	Bioinspired Regulation of Two-Dimensional Ion Transport	Invited	Zhen Zhang <i>University of Science and Technology of China</i>
14:05-14:20	Construction of Biomimetic Nanofluidic Channels for Ion Sieving and Wastewater Power Generation	Invited (Virtual)	Jun Gao <i>Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences</i>
14:20-14:35	Kinetic Photovoltage from Moving Boundaries of Electrical Double Layer and its Modulation	Invited	Jidong Li <i>Nanjing University of Aeronautics and Astronautics</i>
14:35-14:50	Wick-Free Solar Evaporator Enabled by Density-Driven Natural Convection with High Energy Efficiency and Salt Rejection	Invited	Xiangyu Li <i>University of Tennessee Knoxville</i>
14:50-15:02	An Investigation into the Fundamentals of Salt Creeping on Vertical Flat Surfaces	Oral	Joseph Mooney <i>MIT / University of Limerick</i>
15:02-15:17	Efficient Solar Interfacial Evaporation: from Interface Properties to Large-Scale Devices	Invited	Meng Lin <i>Southern University of Science and Technology</i>
15:20-15:45	Coffee Break <i>(Venue: BC203 BC Building, or HJ202, Stanley Ho Building)</i>		
17:30-18:00	Best Student Presentation Awards and Closing Remarks <i>(Venue: Z209)</i>		

23 June 2024 (Sunday)

TRACK 6 - SIMULATIONS AND MACHINE LEARNING

Session 5f: Interfaces and Surfaces (Venue: HJ304, Stanley Ho Building)			Session Chair: Bolin Liao
08:45-09:05	Numerical Study of Anti-Frosting (Anti-Icing) Mechanisms on Superhydrophobic Surface	Keynote	Li-Zhi Zhang <i>South China University of Technology</i>
09:05-09:20	Interfacial Welding Engineering of Carbon Networks	Invited	Qingbin Zheng <i>The Chinese University of Hong Kong, Shenzhen</i>
09:20-09:35	Numerical Development on Coupled Moisture Transfer and Electrochemical Reaction within Porous Catalyst Layer of PEM Electrolyte Dehumidifier/Vapor Electrolyzers	Invited	Ronghui Qi <i>South China University of Technology</i>
09:35-09:50	Hydrogen Production of Steam-Reforming using Nuclear Energy from High Temperature Gas-Cooled Reactor: A Fundamental View over the Steam-Reforming Tube Heated by Helium Gas	Invited	Huang Zhang <i>Tsinghua University</i>
09:50-10:10	Theoretical Study of Reversing Coffee-Ring Effect Using Local Heating	Keynote	Tao Wei <i>University of South Carolina</i>
10:10-10:30	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 6f: Modeling and Transport (Venue: HJ304, Stanley Ho Building)			Session Chair: Tao Wei
10:30-10:50	A High-Order Scheme for the Navier-Stokes Type Equations and Saint Andrew's Cross	Keynote	Zhan Wang <i>Institute of Mechanics, Chinese Academy of Sciences</i>
10:50-11:05	Efficient Numerical Model for Multicomponent Reacting Flows	Invited	Yu Lv <i>Institute of Mechanics, Chinese Academy of Sciences</i>
11:05-11:20	Wall Roughness Effects on Compressible Turbulent Boundary Layers	Invited	Zhenxun Gao <i>Beihang University</i>
11:20-11:35	Numerical Investigation of Plunging Jet	Invited	Zixuan Yang <i>Institute of Mechanics, Chinese Academy of Sciences</i>
11:35-11:55	Modeling Electron-Phonon Interaction and Spin-Lattice Coupling in Energy Materials	Keynote	Bolin Liao

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			<i>University of California, Santa Barbara</i>
12:00-13:30	Lunch Break (Venue: Ju Yin House Seafood Restaurant, 4/F, Communal Building, or VA canteen, G/F, Shaw Amenities Building)		
Session 7f: Bubble Dynamics, Flow, and Atomistic Simulations (Venue: HJ304, Stanley Ho Building)			Session Chair: Tengfei Luo
13:30-13:50	Data Assimilation of Turbulent Flows	Keynote	Ying Zheng Liu <i>Shanghai Jiao Tong University</i>
13:50-14:05	Coupled Fluid-Structure-Electric Modeling of a Piezohydroelastic Flag for Energy Harvesting	Invited	Hui Tang <i>The Hong Kong Polytechnic University</i>
14:05-14:20	Experimental Investigation on Rising Bubbles With/Without Liquid Crossflow	Invited	Yang Xu <i>Beihang University</i>
14:20-14:32	Molecular Understanding of In-Situ Lubricant Infused Surface Formation by Adding Aroma Molecules in The Vapor Phase	Oral	Tonmoy Sharma <i>IIT Patna</i>
14:32-14:47	Thermal Transport Spectroscopy Across Interfaces: Algorithm and Applications	Invited	Yanguang Zhou <i>The Hong Kong University of Science and Technology</i>
14:47-14:59	Mechanisms of Bubble Nucleation on Hydrophilic-Hydrophobic Surfaces: Molecular Dynamics Perspective	Oral	Xiaojia Li <i>Sun Yat-sen University</i>
14:59-15:19	Molecular Dynamics Simulation of Ion Concentration Polarization in Microfluidic Systems	Keynote	Yong-Ak Song <i>NYU Abu Dhabi</i>
15:20-15:45	Coffee Break (Venue: BC203 BC Building, or HJ202, Stanley Ho Building)		
Session 8f: Machine Learning and Simulations (Venue: HJ304, Stanley Ho Building)			Session Chair: Yong-Ak Song
15:45-16:05	Machine Learning for Nanoscale Thermal Transport	Keynote	Tengfei Luo <i>University of Notre Dame</i>
16:05-16:20	Pore-Scale Study of Multiphase Flows and Evaporation	Invited	Feifei Qin <i>Northwestern Polytechnical University</i>
16:20-16:32	Direct Numerical Simulation of Liquid Ammonia Near-Wall Inhomogeneous Nucleation Phenomenon in The Transitional Atomisation Regime	Oral	Shijie Xu <i>Shanghai Jiao Tong University</i>

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16:32-16:47	Multiscale Modelling of Non-Equilibrium Transport Phenomena	Invited	Wei Su <i>The Hong Kong University of Science and Technology</i>
16:47-17:02	High-Order Numerical Methods for Compressible Multiphase Flows	Invited	Lin Fu <i>The Hong Kong University of Science and Technology</i>
17:02-17:17	Deep Learning Potential for Magnetic Materials	Invited	Ben Xu <i>Graduate School of China Academy of Engineering Physics</i>
17:30-18:00	Best Student Presentation Awards and Closing Remarks <i>(Venue: Z209)</i>		