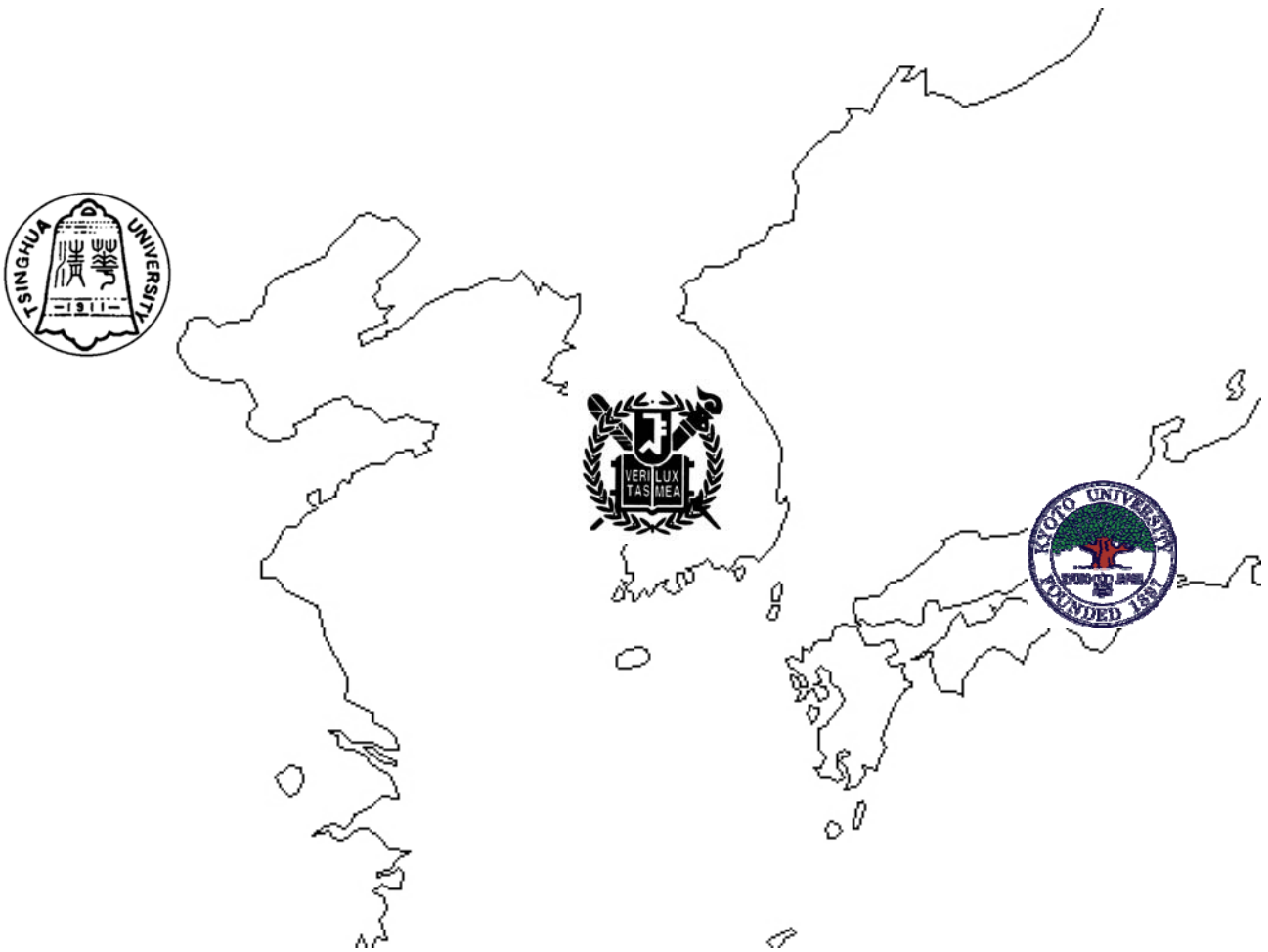


The 18th Kyoto - Tsinghua - Seoul National University Thermal Engineering Conference



November 2 - 3, 2018
Kyoto University, Japan



<QR code for Three University Thermal Engineering Conference Official Website>

Conference Co-Chairpersons:

Yoshida, Hideo	Kyoto University
Liang, Xingang	Tsinghua University
Kim, Min Soo	Seoul National University

Conference officials:

Iwai, Hiroshi	Kyoto University
Tatsumi, Kazuya	Kyoto University

Program

November 2, Friday, 2018

KIHADA Hall, Uji Obaku Plaza, Uji Campus

09:30 - 09:50 **Registration**

09:50 - 10:00 **Opening & Introduction**

10:00 - 11:20 **Session 1 Heat and Fluid Flow 1: Chair/ Prof. Weigang Ma**

< Break >

11:30 - 12:30 **Session 2 Measurements: Chair/ Prof. Bingyang Cao**

< Lunch >

13:30 - 14:50 **Session 3 Micro-Nano Technologies:
Chair/ Prof. Kazuya Tatsumi**

< Break >

15:10 - 16:10 **Session 4 Optics and Imaging: Chair/ Prof. Seung Hwan Ko**

16:10 – 17:30 **Laboratory Tour**

18:30 - 20:30 **Conference Dinner**

Program

November 3, Saturday, 2018

KIHADA Hall, Uji Obaku Plaza, Uji Campus

09:00 - 10:20 **Session 5 Energy Systems: Chair/ Prof. Suk Won Cha**

< Break >

10:40 - 12:00 **Session 6 Heat and Fluid Flow 2: Chair/ Prof. Kei Ito**

12:00 - 12:10 **Closing**

List of Participants from Kyoto University

Kyoto 615-8540, Japan

Ding, Changsheng (丁 常勝), Postdoctoral Researcher

Department of Aeronautics and Astronautics

Phone & Fax: +81-75-383-3652

E-mail: ding.changsheng.7s@kyoto-u.ac.jp

Ito, Daisuke (伊藤 大介), Assistant Professor

Institute for Integrated Radiation and Nuclear Science

Phone: +81-72-451-2373

E-mail: itod@rri.kyoto-u.ac.jp

Ito, Kei (伊藤 啓), Associate Professor

Institute for Integrated Radiation and Nuclear Science

Phone: +81-72-451-2382

E-mail: k-ito@rri.kyoto-u.ac.jp

Iwai, Hiroshi (岩井 裕), Associate Professor

Department of Aeronautics and Astronautics

Phone & Fax: +81-75-383-3651, +81-75-383-3652

E-mail: iwai.hiroshi.4x@kyoto-u.ac.jp

Kai, Reo (甲斐 玲央), Graduate Student (M2)

Department of Mechanical Engineering and Science

Phone: +81-75-383-3657

E-mail: kai.leo.43e@st.kyoto-u.ac.jp

Kishimoto, Masashi (岸本 将史), Assistant Professor

Department of Aeronautics and Astronautics

Phone & Fax: +81-75-383-3652

E-mail: kishimoto.masashi.3m@kyoto-u.ac.jp

Kunugi, Tomoaki (功刀 資彰), Professor

Department of Nuclear Engineering

Phone: +81-75-383-3921

E-mail: kunugi@nucleng.kyoto-u.ac.jp

Kuriyama, Reiko (栗山 怜子), Assistant Professor

Department of Mechanical Engineering and Science

Phone & Fax: +81-75-383-3608

E-mail: kuriyama@me.kyoto-u.ac.jp

Kurose, Ryoichi (黒瀬 良一), Professor

Department of Mechanical Engineering and Science

Phone: +81-75-383-3654

E-mail: kurose@mech.kyoto-u.ac.jp

Makino, Toshiro (牧野 俊郎), Professor Emeritus

Phone: +81-80-3111-6076

E-mail: toshiro.makino.52s@st.kyoto-u.ac.jp

Nakanishi, Akihiro (中西 顕大), Graduate Student (M2)

Department of Mechanical Engineering and Science

Phone & Fax: +81-75-383-3657

E-mail: nakanishi.akihiro.45x@st.kyoto-u.ac.jp

Okino, Shinya (沖野 真也), Assistant Professor

Department of Mechanical Engineering and Science

Phone & Fax: +81-75-383-3823

E-mail: okino@me.kyoto-u.ac.jp

Saito, Motohiro (齋藤 元浩), Assistant Professor

Department of Aeronautics and Astronautics

Phone & Fax: +81-75-383-3652

E-mail: msaito@mech.kyoto-u.ac.jp

Saito, Yasushi (齋藤 泰司), Professor,

Institute for Integrated Radiation and Nuclear Science

Phone: +81-72-451-2374

E-mail: ysaito@rri.kyoto-u.ac.jp

Seo, Haewon (徐 海元), Doctoral Student

Department of Aeronautics and Astronautics

Phone & Fax: +81-75-383-3652

E-mail: haewon5158@gmail.com

Takeyama, Mao (竹山 真央), Doctoral Student

Department of Nuclear Engineering

Phone: +81-75-383-3924

E-mail: takeyama.mao.25x@st.kyoto-u.ac.jp

Tan, Wee Choon (陳 偉存), Doctoral Student (untill the end of November, 2018)

School of Mechatronic Engineering, Universiti Malaysia Perlis

Phone: +60-12-551-5918

E-mail: tweechoon@unimap.edu.my

Tatsumi, Kazuya (巽 和也), Associate Professor

Department of Mechanical Engineering and Science

Phone & Fax: +81-75-383-3606, +81-75-383-3608

E-mail: tatsumi@me.kyoto-u.ac.jp

Wen, Jian (温 健), Doctoral Student

Department of Mechanical Engineering and Science

Phone & Fax: +81-75-383-3657

E-mail: wen.jen.66m@st.kyoto-u.ac.jp

Yokomine, Takehiko (横峯 健彦), Professor

Department of Nuclear Engineering

Phone: +81-75-383-3922

E-mail: yokomine@nucleng.kyoto-u.ac.jp

Yoshida, Hideo (吉田 英生), Professor

Department of Aeronautics and Astronautics

Phone & Fax: +81-75-383-3650

E-mail: sakura@hideoyoshida.com

Zheng, Zhi-Ying (郑 智颖), Visting Researcher

Department of Nuclear Engineering

Phone: +81-75-383-3924

E-mail: zhengzhy@hit.edu.cn

School of Energy Science and Engineering

Harbin Institute of Technology

List of Participants from Tsinghua University

Beijing 100084, China

- Cao, Bingyang (曹炳阳), Professor
School of Aerospace Engineering
Phone: +86-15801051668
E-mail: caoby@tsinghua.edu.cn
- Gao, Wuhuan (高武焕), Doctoral Student
School of Aerospace Engineering
Phone: 15201521804; Fax: +86-10-62788702
E-mail: gaowh2015@163.com
- Gou, Xing (苟星), Doctoral Student
Department of Engineering Mechanics
Phone: +86-18811370187
E-mail: gx18811370187@163.com
- Hua, Yuchao (华钰超), Postdoctoral Researcher
School of Aerospace Engineering
Phone: +86-15210591701
E-mail: huayuchao19@163.com
- Liang, Xingang (梁新刚), Professor
School of Aerospace Engineering
Phone & Fax: +86-10-62788702
E-mail: liangxg@tsinghua.edu.cn
- Ma, Weigang (马维刚), Associate Professor
School of Aerospace Engineering
Phone: +86-13811987258
E-mail: maweigang@tsinghua.edu.cn
- Ran, Xin (冉鑫), Doctoral Student
School of Aerospace Engineering
Phone: +86-17710610613
E-mail: ranx16@mails.tsinghua.edu.cn
- Song, Yu (宋昱), Ph.D., Assistant Researcher
Department of Energy and Power Engineering
Phone: +86-10-62781236
E-mail: ysong@tsinghua.edu.cn
- Wei, Zhiyuan (魏志远), Doctoral Student
Department of Building Science
Phone: +86-10-6277-2518; Fax: +86-10-62773461
E-mail: 784692842@qq.com
- Zhang, Kai (张凯), Postdoctoral Researcher
Department Energy and Power Engineering
Phone & Fax: +86-10-62789488
E-mail: zhangkai156@mail.tsinghua.edu.cn

List of Participants from Seoul National University

Seoul 151-742, Korea

Cha, Suk Won (車碩源), Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-1700, +82-2-883-1513

E-mail: swcha@snu.ac.kr

Do, Hyungrok (都炯錄), Associate Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-1597, +82-2-883-1513

E-mail: hyungrok@snu.ac.kr

Hwang, Wontae (黃元泰), Assistant Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-1723, +82-2-883-1513

E-mail: wthwang@snu.ac.kr

Kim, Min Soo (金民洙), Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-8362, +82-2-883-2178

E-mail: minskim@snu.ac.kr

Ko, Seung Hwan (高承煥), Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-7114, +82-2-880-8302

E-mail: maxko@snu.ac.kr

Lee, Yun Seog (李允錫), Assistant Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-7113, +82-2-883-1513

E-mail: leeyunseog@snu.ac.kr

Park, Hyung Gyu (朴亨圭), Professor

Mechanical & Process Eng. ETH Zurich

Tannenstrasse 3, Zurich CH-8092, Switzerland

Phone: +41-79-679-12-73

E-mail: parkh@ethz.ch

Shin, Yongdae (申容大), Assistant Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-7388, +82-2-883-1513

E-mail: ydshin@snu.ac.kr

Song, Han Ho (宋漢虎), Associate Professor

Department of Mechanical & Aerospace Engineering

Phone & Fax: +82-2-880-1651, +82-2-880-1651

E-mail: hhsong@snu.ac.kr



Contents

*: Presenter

Session 1 / Heat and Fluid Flow 1

- Hydrodynamic Characteristics of Rotational Cavitation in Water at Different Temperatures..... 1
* Zhi-Ying Zheng, Feng-Chen Li, Tomoaki Kunugi
- Temporally Resolved Behavior of Laser Induced Plasma and Its Application in Reacting Flows..... 7
Sungkyun Oh, Sangeun Bae, * Hyungrok Do
- Heat Transfer of Nitrogen for Very Low Temperature Applications 11
* Yu Song, Peixue Jiang
- Freely Decaying Turbulence in a Salt-Stratified Fluid..... 15
* Shinya Okino, Hideshi Hanazaki

Session 2 / Measurements

- Direct Observation of Ultrafast Carrier Dynamics in Monolayer Graphene/Copper System 19
* Weigang Ma, Cheng Dong, Xing Zhang
- Phase Detection Aided Thermometry and Its Application to Temperature Measurement of Subcooled Boiling Flow
..... 27
* Mao Takeyama, Tomoaki Kunugi, Zensaku Kawara, Takehiko Yokomine
- Cylindrical Acoustic Gas Thermometry for Measurement of the Thermodynamic Temperature 31
* Kai Zhang, Zhen Yang, Yuanyuan Duan

Session 3 / Micro-Nano Technologies

- Interfacial Phonon Transport within Heterogeneous Materials with Frequency-dependent Transmissivity by Monte Carlo Simulation 39
* Xin Ran, Yangyu Guo, Moran Wang
- Anisotropic Transparent (or Color-changing) Electro-Thermal Actuator 47
* Seung Hwan Ko
- Thermal Spreading Resistance in Ballistic-Diffusive Regime in HEMT 53
* Yuchao Hua, Bingyang Cao
- Micro/Nano Structure Control of Anode for Thin Film Electrolyte in Solid Oxide Fuel Cells..... 57
Sanghoon Lee, Wonjong Yu, Changsheng Ding, Masashi Kishimoto, * Hiroshi Iwai, * Suk Won Cha

Contents

Session 4 / Optics and Imaging

- Measurement of Fluid Viscosity Distribution in Microchannel Flow Using Fluorescence Polarization..... 63
* Reiko Kuriyama, Tomotaka Nakagawa, Kazuya Tatsumi, Kazuyoshi Nakabe
- Shining a Light on Condensation of Living Matters. 67
* Yongdae Shin
- High Speed Neutron Imaging for Multiphase Flow Dynamics 73
* Daisuke Ito, Kei Ito, Yasushi Saito

Session 5 / Energy Systems

- Defect Engineering of Evaporated Thin-film Kesterite Solar Cells towards Terawatt Scale Deployment..... 77
* Yun Seog Lee
- Fundamental Study on Micro-extrusion Printing for Enlarging Electrode-electrolyte Interface in Anode-supported Solid Oxide Fuel Cells 83
* Haewon Seo, Hiroshi Iwai, Masashi Kishimoto, Motohiro Saito, Hideo Yoshida
- Modeling and Operation Optimization of a Grid-connected Integrated Energy System Based on Heat Transfer Analysis 89
* Xing Gou, Qun Chen, Huan Ma
- Development of Solid Oxide Fuel Cell and Internal Combustion Engine Hybrid System..... 97
Wonjae Choi, Jaehyun Kim, Yongtae Kim, * Han Ho Song,

Session 6 / Heat and Fluid Flow 2

- Numerical Investigation of Liquid Jet Atomization in Crossflow..... 107
* Jen Wen, Akihiro Nakanishi, Ryoichi Kurose
- Large Eddy Simulation (LES) of Gas Turbine Blade Cooling Flow 113
Sangjoon Lee, Seungchan Baek, * Wontae Hwang
- Ideal Mass Transfer Cycle: The Method of Determination and its Application in Optimization for Liquid Desiccant Dehumidification System 121
* Zhiyuan Wei, Xin Wang, Qun Chen, Yinping Zhang
- Pore-scale Simulation of Flow and Heat Transfer in Open-cell Metal Foam Mini-Channels 127
* Wuhuan Gao, Xianghua Xu, Xingang Liang