

# MHMT

## CONGRESS

# 8<sup>th</sup> WORLD CONGRESS ON MOMENTUM, HEAT, AND MASS TRANSFER



**March 26 - 28, 2023 | Lisbon, Portugal**

**Dr. Lixin Cheng**  
Sheffield Hallam University, UK

**Dr. Tassos G. Karayiannis**  
Brunel University London, UK

**Dr. Sohel Murshed**  
University of Lisbon, Portugal

CONGRESS CHAIR

CONGRESS CO-CHAIR

CONGRESS LOCAL CHAIR

# Sunday, March 26

10:00 AM  
to 12:00 PM

Registration

01:00 PM  
to 02:20 PM

Virtual Session - PAGES 1-2

# Monday, March 27

8:00 AM REGISTRATION

9:00 AM OFFICIAL OPENING OF THE CONGRESS

## PLENARY SESSION

9:15 AM ICMFHT PLENARY LECTURE - PAGE 3

10:10 AM COFFEE BREAK

## MORNING PARALLEL KEYNOTE SESSIONS

10:30 AM ENFHT KEYNOTE LECTURE - PAGE 4

10:30 AM ENFHT KEYNOTE LECTURE - PAGE 5

## MORNING PARALLEL SESSIONS

11:15 PM CFD I - PAGE 6

11:15 PM EXPERIMENTAL MEASUREMENTS - PAGE 7

12:15 PM GROUP PHOTO

12:20 PM LUNCH

## AFTERNOON PARALLEL KEYNOTE SESSIONS

1:20 PM ICMFHT KEYNOTE LECTURE - PAGE 8

1:20 PM ICMFHT KEYNOTE LECTURE - PAGE 9

## AFTERNOON PARALLEL SESSIONS I

2:05 PM CFD II - PAGES 10 - 11

2:05 PM HEAT TRANSFER ENHANCEMENT I  
PAGES 12-13

3:50 PM Coffee Break

## AFTERNOON PARALLEL SESSIONS II

4:05 PM BOILING AND CONDENSATION  
FUNDAMENTALS AND PROCESSES  
PAGE 14

4:05 PM HEAT TRANSFER ENHANCEMENT II  
PAGE 15

# Tuesday, March 28

## MORNING PARALLEL KEYNOTE SESSIONS

9:30 AM ICMFHT PLENARY LECTURE - PAGE 16

10:25 AM ENFHT PLENARY LECTURE - PAGE 17

11:20 AM COFFEE BREAK & POSTERS PRESENTATION  
PAGES 17-18

## AFTERNOON PARALLEL KEYNOTE SESSIONS I

12:00 PM CSP KEYNOTE LECTURE - PAGE 20

12:00 PM ENFHT KEYNOTE LECTURE - PAGE 21

12:45 PM LUNCH

## AFTERNOON PARALLEL KEYNOTE SESSIONS II

1:30 PM ENFHT KEYNOTE LECTURE - PAGE 22

1:30 PM ICMFHT KEYNOTE LECTURE - PAGE 23

2:15 PM COFFEE BREAK

## AFTERNOON PARALLEL SESSIONS II

2:30 PM ENVIRONMENTS AND HEAT TRANSFER -  
PAGE 24

2:30 PM FLOW AND HEAT TRANSFER IN  
POROUS MEDIA - PAGE 25

7:00 PM CRUISE TOUR - PAGE 25

# **8<sup>th</sup> WORLD CONGRESS ON MOMENTUM, HEAT, AND MASS TRANSFER**

MARCH 26 - 28, 2023 | Lisbon, Portugal

The Organizing and Scientific Committees would like to welcome you to the 8<sup>th</sup> World Congress on Momentum, Heat, and Mass Transfer (MHMT'23).

MHMT'23 consists of three conferences:

- 8<sup>th</sup> International Conference on Experimental and Numerical Flow and Heat Transfer (ENFHT'23)
- 8<sup>th</sup> International Conference on Multiphase Flow and Heat Transfer (ICMFHT'23)
- 8<sup>th</sup> International Conference on Combustion Science and Process (CSP'23)

The Congress aims to become one of the leading international annual events in the fields of momentum, heat and mass transfer. This Congress will provide excellent opportunities for scientists, researchers, and industrial specialists to present their research achievements and to develop new collaborations and partnerships with experts in the field.

In the eighth meeting of this Congress, three plenary and eight keynote speakers will share their expertise in a wide spectrum of fields and applications. In addition, approximately 56 papers will be presented by professors, students, and researchers from across the world.

The Congress is organized in Lisbon, Portugal. Lisbon, is capital of Portugal and it is the westernmost capital city in continental Europe and serves as the country's chief port, largest city, and commercial, political, and tourist centre in Portugal. We hope you will have time to enjoy the ambience and hospitality of this city.

We thank you for your participation and contribution to the 8<sup>th</sup> World Congress on Momentum, Heat, and Mass Transfer (MHMT'23).

We wish you a very successful and enjoyable experience.

***Dr. Lixin Cheng***  
***Sheffield Hallam University, UK***  
***Congress Chair***

***Dr. Tassos G. Karayiannis***  
***Brunel University London, UK***  
***Congress CO-Chair***

***Dr. Sohel Murshed***  
***University of Lisbon, Portugal***  
***Congress Local Chair***

# 8<sup>th</sup> International Conference on Experimental and Numerical Flow and Heat Transfer (ENFHT'23)

The Organizing Committee of the 8<sup>th</sup> International Conference on Experimental and Numerical Flow and Heat Transfer (ENFHT'23) would like to thank the following members for accepting to contribute to the conference.

Scientific Committee Members:

*Dr. Rayhaneh Akhavan*, University of Michigan, USA

*Dr. Raya Al-Dadah*, University of Birmingham, UK

*Dr. Jalel Azaiez*, University of Calgary, Canada

*Dr. Francesco Coletti*, Brunel University London, UK

*Dr. Longfei Chen*, Beihang University, China

*Dr. Yanping Du*, Shanghai Jiao Tong University, China

*Dr. Arend Dubbelboer*, Danone Nutricia Research, Netherlands

*Dr. Zhixiong Guo*, Rutgers University, USA

*Dr. Mohammad Hamdan*, American University of Sharjah,  
United Arab Emirates, UAE

*Dr. Mohammad Hojjat*, University of Isfahan, Iran

*Dr. Gamze Gediz Ilis*, Gebze Technical University, Turkey

*Dr. Zdeněk Jegla*, Brno University of Technology, Czech Republic

*Dr. Konstantinos Kontis*, University of Glasgow, UK

*Dr. Vahid Motevalli*, Penn State University, USA

*Dr. Sébastien Poncet*, Sherbrooke University, Canada

*Dr. Muhammad Bilal Riaz*, Lodz University of Technology, Poland

*Dr. Ziad Saghir*, Ryerson University, Canada

# 8<sup>th</sup> International Conference on Multiphase Flow and Heat Transfer (ICMFHT'23)

The Organizing Committee of the 8<sup>th</sup> International Conference on Multiphase Flow and Heat Transfer (ICMFHT'23) would like to thank the following members for accepting to contribute to the conference.

Scientific Committee Members:

*Dr. Bofeng Bai*, Xi'an Jiaotong University, China

*Dr. Vasilis Bontozoglu*, University of Thessaly, Greece

*Dr. Andrea Cioncolini*, University of Manchester, UK

*Dr. Sadegh Dabiri*, Purdue University, USA

*Dr. Gioia Falcone*, University of Glasgow, UK

*Dr. Kamiel Gabriel*, University of Ontario Institute of Technology, Canada

*Dr. Afshin J. Ghajar*, Oklahoma State University, USA

*Dr. Faik Hamad*, Teesside University, UK

*Dr. Marcello Iasiello*, Università degli Studi di Napoli Federico II, Italy

*Dr. Tassos Karayiannis*, Brunel University London, UK

*Dr. Gerardo Maria Mauro*, Università degli studi del Sannio, Italy

*Dr. Simone Mancin*, University of Padua, Italy

*Dr. Christos N. Markides*, Imperial College London, UK

*Dr. Peter Mineev*, University of Alberta, Canada

*Dr. João Miranda*, Faculdade de Engenharia da Universidade do Porto, Portugal

*Dr. Ali Ozel*, Heriot-Watt University, UK

*Dr. Huihe Qiu*, Hong Kong University of Science & Technology, Hong Kong

*Dr. Qinlong Ren*, Xi'an Jiaotong University, China

*Dr. Sergei Sazhin*, University of Brighton, UK

# 8<sup>th</sup> International Conference on Combustion Science and Process (CSP'23)

The Organizing Committee of the 8<sup>th</sup> International Conference on Combustion Science and Process (CSP'23) would like to thank the following members for accepting to contribute to the conference.

Scientific Committee Members:

*Dr. Pedro Jorge Martins Coelho*, National Technical University of Athens, Greece

*Dr. Young Choi*, Korea Institute of Machinery and Materials, South Korea

*Dr. Byungchul Choi*, Chonnam National University, South Korea

*Dr. Lin Ma*, The University of Sheffield, UK

*Dr. Maciej Mikulski*, University of Vaasa, Finland

*Dr. Amir H. Mohammadi*, University of KwaZulu-Natal, South Africa

*Dr. Vahid Motevalli*, Penn State University, USA

*Dr. Dimitrios C. Rakopoulos*, Center for Energy Research and Technology Hellas, Greece

*Dr. Constantine D. Rakopoulos*, National Technical University of Athens, Greece

*Dr. Guido Saccone*, CIRA – Italian Aerospace Research Centre, Italy

*Dr. Sergei Sazhin*, University of Brighton, UK

*Dr. Vanja Subotic*, Graz University of Technology, Austria



## Table of Content

Sunday, March 26, 2023

### VIRTUAL SESSION

VIRTUAL SESSION Pages 1-2

## Table of Content

Monday, March 27, 2023

OFFICIAL OPENING OF THE CONGRESS Page 3

### PLENARY SESSION

**ICMFHT PLENARY LECTURE**  
Dr. Christos Markides, Imperial College  
London, UK Page 3

### MORNING KEYNOTE PARALLEL SESSIONS

**ENFHT KEYNOTE VIRTUAL LECTURE**  
Dr. Mohamed Pourkashanian, The  
University of Sheffield, UK Page 4

**ENFHT KEYNOTE VIRTUAL LECTURE**  
Dr. Zhixiong (James) Guo, Rutgers  
University - New Brunswick, NJ, USA Page 5

### MORNING PARALLEL SESSIONS

CFD I Page 6

EXPERIMENTAL MEASUREMENTS Page 7

### AFTERNOON KEYNOTE PARALLEL SESSIONS

**ICMFHT KEYNOTE VIRTUAL LECTURE**  
Dr. Akio Tomiyama, Kobe University, Japan Page 8

**ICMFHT KEYNOTE LECTURE**  
Dr. Ali Kosar, Sabanci University, Turkey Page 9

### AFTERNOON PARALLEL SESSIONS I

CFD II Pages  
10-11

HEAT TRANSFER ENHANCEMENT I Pages  
12-13

### AFTERNOON PARALLEL SESSIONS II

**BOILING AND CONDENSATION  
FUNDAMENTALS AND PROCESSES** Page 14

HEAT TRANSFER ENHANCEMENT II Pages 15



# Table of Content

Tuesday, March 28, 2023

## MORNING PLENARY SESSIONS

### ICMFHT PLENARY LECTURE

Dr. Satish Kandlikar, Rochester Institute of Technology, USA Page 16

### ENFHT PLENARY LECTURE

Dr. Yulong Ding, University of Birmingham, UK Page 17

### POSTER SESSION

Pages  
18-19

## AFTERNOON KEYNOTE PARALLEL SESSIONS I

### CSP KEYNOTE LECTURE

Dr. Boo Cheong Khoo, National University of Singapore, Singapore Page 20

### ENFHT KEYNOTE VIRTUAL LECTURE

Dr. Sunny Ri Li, The University of British Columbia, Canada Page 21

## AFTERNOON KEYNOTE PARALLEL SESSIONS II

### ENFHT KEYNOTE VIRTUAL LECTURE

Dr. Yuying Yan, University of Nottingham, UK Pages 22

### ICMFHT KEYNOTE LECTURE

Dr. Matteo Bucci, Massachusetts Institute of Technology, USA Page 23

## AFTERNOON PARALLEL SESSIONS

**ENVIRONMENTS AND HEAT TRANSFER** Page 24

**FLOW AND HEAT TRANSFER IN POROUS MEDIA** Page 25

**Cruise Tour** Page 25



10:00 AM - 12:00 AM	<b>Registration</b>
VIRTUAL SESSION	
01:00 PM - 02:40 PM	<b>VIRTUAL SESSION</b>
SESSION CHAIR: Dr. Lixin Cheng, Sheffield Hallam University, UK	
ICMFHT 115 01:00 - 01:10	<b>CFD Modelling Of Compressible Two-Phase Flow With Phase Change Using Openfoam</b>  <i>Presenter:</i> Gokul Siddarth Mani Sakthi, University of Stuttgart, Germany  <i>Authors:</i> Gokul Siddarth Mani Sakthi, Laila Abu-Farah, Natalie Germann
ENFHT 170 01:10 - 01:20	<b>Thermochemical Energy Storage Using Radial Flow Annular Reactor for Attaining Lower Pressure Drop</b>  <i>Presenter:</i> Ankush Shankar Pujari, Indian Institute of Technology Bombay, India  <i>Authors:</i> Ankush Shankar Pujari, Rudrodip Majumdar, Sandip K. Saha
ENFHT 146 01:20 - 01:30	<b>Hydrodynamics and Mixing Characteristics of a Multiphase Coaxial Mixing Tank: Design and Scalability Study</b>  <i>Presenter:</i> Ali Rahimzadeh, Toronto Metropolitan University, Canada  <i>Authors:</i> Ali Rahimzadeh, Farhad Ein-Mozaffari, Ali Lohi
ENFHT 147 01:30 - 01:40	<b>Power Consumption Analysis for Gas Dispersion in a Dual Coaxial Mixer Containing Yield-Pseudoplastic Fluids via Experimental and Numerical Approaches</b>  <i>Presenter:</i> Forough Sharifi, Toronto Metropolitan University, Canada  <i>Authors:</i> Forough Sharifi, Ehsan Behzadfar, Farhad Ein-Mozaffari
ENFHT 145 01:40 - 01:50	<b>Fluid Flow Characterization of Gas Dispersion in a Yield-Pseudoplastic Biopolymer Using a Coaxial Mixer: Effect of Rotation Mode</b>  <i>Presenter:</i> Paloma Lins Barros, Toronto Metropolitan University, Canada  <i>Authors:</i> Paloma L. Barros, Farhad Ein-Mozaffari, Ali Lohi

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ENFHT 174 **Evaluating the effect of PCM insulation packaging design on the thermal protection performance**  
01:50 - 02:00

*Presenter:* Kasra Ghasemi, University of Guelph, Canada

*Authors:* Kasra Ghasemi, Mehran Bozorgi, Syeda Tasnim, Shohel Mahmud

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ICMFHT 140 **Modelling Of Subcooled Flow Boiling For Saline Solution Using New Bubble Dynamic Parameter Models**  
02:00 - 02:10

*Presenter:* Junping Gu, China Academy of Space Technology, China

*Authors:* Junping Gu, Qinggong Wang, Yuxin Wu

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ICMFHT 138 **Bubble Growth and Deformation Characteristics Under Non-Uniform Electric Field**  
02:10 - 02:20

*Presenter:* Wu Tianyi, Jiangsu University, China

*Authors:* Wu Tianyi, Junfeng Wang, Wei Zhang, Qiaoling Su

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ENFHT 168 **Cooking Performance Optimization with New Types of Fan Baffles in Domestic Built-in Ovens**  
02:20 - 02:30

*Presenter:* Fulya Bilen, Haier Europe, Research and Development Center, Turkey

*Authors:* Fulya Bilen, Vasif Can Yildiran, Ayberk Salim Mayıl, Oğuzhan Erbaş

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ICMFHT 103 **Dual Modal Imaging Of Two-Phase Flows Using Electromagnetic Flow Tomography And Electrical Tomography – State Estimation Approach**  
02:30 - 02:40

*Presenter:* Muhammad Ziaul Arif, University of Eastern Finland, Finland

*Authors:* Muhammad Ziaul Arif, Aku Seppänen, Marko Vauhkonen

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ICMFHT 128 **Surface Phosphor Thermometry behind a Water Film in a Rectangular Cooling Channel**  
02:40 - 02:45

*Presenter:* Sacha Hirsch, Université Paris Saclay, France

*Authors:* Sacha Hirsch, Nicolas Fdida, Cornelia Irimiea, Sylvain Petit, Baptiste Dejean, Philippe Reulet, Benoît Fond, Guillaume Pilla

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8:00 AM - 9:00 AM **Registration**

9:00 AM - 9:15 AM **Official Opening of the Congress**

*Dr. Sohel Murshed, University of Lisbon, Portugal*

**ICMFHT PLENARY SESSION**

**Plenary Lecture**

9:15 AM - 10:10 AM

**SESSION CHAIR:**

*Dr. Sohel Murshed, University of Lisbon, Portugal*



**Spatiotemporally-Resolved Multi-Field Measurements in Multiphase Flows with Phase Change**

*Dr. Christos Markides,*

*Imperial College London, UK*

Christos Markides is Professor of Clean Energy Technologies, Head of the Clean Energy Processes Laboratory, and leads the Experimental Multiphase Flow Laboratory, which is the largest experimental space of its kind at Imperial College London. He is also, amongst other, Editor-in-Chief of journal Applied Thermal Engineering, a member of the UK National Heat Transfer Committee, and on the Scientific Board of the UK Energy Storage SUPERGEN Hub. He specialises in applied thermodynamics and transport processes as applied to high-performance devices, technologies and systems for energy recovery, utilization, conversion or storage, and has an ongoing interest in advanced diagnostic techniques for the provision of detailed, spatiotemporally resolved information in turbulent, reacting and multiphase flows. He has published >300 journal papers and >350 conference papers on these topics.

He has won multiple awards, including IChemE's Global Award for "Best Research Project" for his work on hybrid PV-thermal technologies (2018). He also won IMechE's Donald Julius Groen outstanding paper prize (2016), the Engineers' Without Borders "Chill Challenge" (2020), as well as Imperial College London President's Awards for Teaching (2016) and for Research Excellence (2017).

10:10 AM - 10:30 AM **COFFEE BREAK**

MORNING KEYNOTE SESSION - ROOM 1

10:30 AM - 11:15 AM

**ENFHT Keynote Virtual Lecture**

SESSION CHAIR:

Dr. Sohel Murshed, University of Lisbon, Portugal

**Power to Liquid: Delivering a Sustainable Pathway for Jet Fuel Production and Utilisation***Dr. Mohamed Pourkashanian,*  
The University of Sheffield, UK

Professor Pourkashanian, OBE for services to Net Zero Research and to Innovation (2023) leads on the University Energy flagship Institute and Energy-2050 initiative. He holds a chair in Energy Engineering, is the General Secretary for the International Flame Research Foundation and is Managing Director of the Translational Energy Research Centre National Facilities and Sustainable Aviation Fuels Innovation Centre. He has completed numerous major research projects on clean energy technology, alternative aviation fuels production, characterisation and utilisation, receiving substantial grants from the EPSRC, EU, NATO and industry. He and his students have authored over 498 publications in refereed journals and conference proceedings and have co-authored a several books. Professor Pourkashanian has graduated over 87 Ph.D. candidates and supervised over 40 postdoctoral scholars and research associates. He is currently Chair of International Test Centre Network ([https://itcn\[1\]global.org/](https://itcn[1]global.org/)), member of the Industrial Strategy Challenge Fund (ISCF): Industrial Decarbonisation Advisory Group, Member of Jet Zero Council SAF Delivery Group, Fellow of the Energy Institute and Chartered Engineer.

**MORNING KEYNOTE SESSION - ROOM 2**

**ENFHT Keynote Virtual Lecture**

10:30 AM - 11:15 AM

**SESSION CHAIR:**

Dr. Marco A. Marcos, University of Lisbon, Portugal &  
Universidade de Vigo, Spain



**Interfacial Heat Transport in Semiconducting Heterostructures**

*Dr. Zhixiong (James) Guo,*

Rutgers University - New Brunswick, NJ, USA

Dr. Zhixiong “James” Guo is a Professor of Mechanical and Aerospace Engineering at Rutgers University-New Brunswick, NJ, USA. He received his B.S., M.S., and Doctorate, all in Engineering Physics, from Tsinghua University, Beijing in 1989, 1991, and 1995, respectively. Then he left China and worked as a Research Fellow in KAIST, South Korea, and a Research Associate in Tohoku University, Japan. From 1999 to 2001, he worked as a research staff member in NYU-Tandon School of Engineering, where he completed his Ph.D. in Mechanical Engineering in the same time period. He joined the faculty at Rutgers in July 2001. He is a recognized expert in heat transfer, with notable expertise in radiation transport, heat transfer enhancement, and nanoscale heat transfer. His discovery and solution for conserving scattered energy and scattering angle in radiation transfer modeling is of significant contribution to the advancement of radiative transfer computation. He is a pioneer in ultrafast laser radiation transport modeling and applications. He explored plasma-mediated ablation and developed it successfully to tissue grafting and decontamination. He conducted leading research on near-field radiation, addressing emerging technological applications such as MEMS/NEMS sensors, ultrafine measurement, and biological sensing at the molecular level. Nowadays he explores innovative utilization of renewable solar energy and investigates fundamentals in interfacial heat transfer and boiling mechanisms at the molecular level. He has supervised 17 PhD and 20 Master students and mentored 14 postdoctoral/visiting scholars. He received research funds from the NSF, NASA/NJSGC, USDA, ASEE/DOD, MTF, NIH, NJ Nanotechnology Consortium, Charles and Johanna Busch Memorial Funds, NNSFC, JSPS, and other sources. He also received a teaching award from Rutgers Vice President Office for Undergraduate Education in 2002. He is the author or co-author of over 260 articles/editorials in archival journals and conference proceedings. He is the Editor-in-Chief for Journal of Enhanced Heat Transfer and a Managing Editor for journal Heat Transfer Research, and an editorial board member for Applied Thermal Engineering and Frontiers in Energy. Dr. Guo is an elected Fellow of ASME and ASTFE. He was the K-18 technical committee Chair of Heat Transfer Division in ASME during 2009-2015. He was the Technical Program Chair for the 6th International Symposium on Advances in Computational Heat Transfer (CHT-15). He was a conference Co-Chair for 2011, 2013, and 2015 International Workshops on Heat Transfer Advances for Energy Conservation and Pollution Control. Among many distinctions, he was awarded a JSPS Invitation Fellowship, a K.C. Wong Education Foundation Fellowship, and Rutgers the Board of Trustee’s Award for Excellence in Research, the university’s highest honor for outstanding research contributions to a discipline or to society.

MORNING PARALLEL SESSION - ROOM 1

## CFD I

11:15 AM - 12:15 PM

**SESSION CHAIR:** Dr. Sohel Murshed, University of Lisbon, Portugal

ENFHT 135

11:15 - 11:30

### **Determination of Rate Coefficient for Para-Orthohydrogen Conversion in Cryogenic Vortex Tube**

*Presenter:* Konstantin I. Matveev, Washington State University, USA

*Authors:* Konstantin I. Matveev, Jacob W. Leachman

ENFHT 138

11:30 - 11:45

### **Sensitivity Analysis on the Performance of a Natural Draft Direct Dry Cooling System for a 50 MWe CSP Application**

*Presenter:* Wian Strydom, University of Stellenbosch, South Africa

*Authors:* Wian Strydom, Johannes Pretorius, Jaap Hoffmann

ENFHT 166

11:45 - 12:00

### **Numerical Simulation of Heat Transfer Performance in Novel Biomorphic Pin-Fin Heat Sinks**

*Presenter:* Mohammad Harris, University of Hertfordshire, UK

*Authors:* Mohammad Harris, Hongwei Wu

ICMFHT 112

12:00 - 12:15

### **Numerical Simulation of the Effect of Temperature on Binary Alkane Mixture Segregation using a Mass Transfer Cavitation Model**

*Presenter:* Philip Schwarz, Ruhr University Bochum, Germany

*Authors:* Philip Schwarz, Romuald Skoda

MORNING PARALLEL SESSION - ROOM 2

## Experimental Measurements

11:15 AM - 12:15 PM

**SESSION CHAIR:** Dr. Tassos G. Karayiannis, Brunel University London, UK

ICMFHT 130

### Experimental and Numerical Investigation of Particle Erosion on Squared T-Junctions

11:15 - 11:30

*Presenter:* Atila Freire, Federal University of Rio de Janeiro, Brazil

*Authors:* F. L. M. Reis, C. M. P. Rosero, E. R. David, D. A. Rodrigues and A. P. Silva Freire

ICMFHT 134

### Experimental Study of A LTES Made By a Finned Heat Exchanger Immersed In a Paraffinic PCM

11:30 - 11:45

*Presenter:* Giulia Martino, University of Bologna, Italy

*Authors:* Giulia Martino, Claudia Naldi, Matteo Dongellini, Gian Luca Morini

ICMFHT 139

### A Large-Scale Experiment for the Visualization of Near-Wall Structures in Turbulent Pipe Flow Using Stereoscopic PIV

11:45 - 12:00

*Presenter:* J. B. R. Loureiro, Federal University of Rio de Janeiro, Brazil

*Authors:* R. Jäckel, B. Owolabi, B. Magacho, L. Moriconi, D. J. C. Dennis, J. B. R. Loureiro

ICMFHT 109

### Airlift Pumps with Annulus Risers: An Experimental Investigation

12:00 - 12:15

*Presenter:* Shahriyar Ghazanfari Holagh, University of Guelph, Canada

*Authors:* Shahriyar G. Holagh, Dana Fadlalla, Marwan H. Taha, Alexander Doucette, Wael H. Ahmed

12:15 PM - 12:20 PM GROUP PHOTO

12:20 PM - 01:20 PM LUNCH

AFTERNOON KEYNOTE SESSION - ROOM 1

01:20 PM - 02:05 PM

## ICMFHT Keynote Virtual Lecture

SESSION CHAIR:

Dr. Lixin Cheng, Sheffield Hallam University, UK



## Mass Transfer from a Bubble in a Vertical Pipe

*Dr. Akio Tomiyama,*  
Kobe University, Japan

Akio Tomiyama is Professor at Kobe University since 2003. He obtained his PhD from Tokyo Institute of Technology. He was formerly a Researcher at the Energy Research Lab. at Hitachi Ltd. in 1984-1988, a research Associate (1988-1991) and associate professor (1991-2002) and Dean of Faculty of Engineering (2015-2019) at Kobe University. His main research areas are multi-scale CFD for multiphase flows, experiments and modeling of bubble dynamics and gas-liquid two-phase flows. He has received several best paper awards and outstanding achievement awards from Japan Society of Mechanical Engineers, Japanese Society of Multiphase Flows and Japan Atomic Energy Society. He is serving as the editor-in-chief of Multiphase Science and Technology and a member of editorial advisory board of Int. J. Heat and Fluid Flow, and had been an associate editor of Int. J. Multiphase Flow for 16 years. He has also served as the President of Japanese Society for Multiphase Flow and a Governing Board member of Int. Conf. Multiphase Flow.



AFTERNOON KEYNOTE SESSION - ROOM 2

**ICMFHT Keynote Lecture**

01:20 PM - 02:05 PM

**SESSION CHAIR:**

Dr. Tassos G. Karayiannis, Brunel University London, UK



**A Comprehensive Review of Pseudo-Slug Flow**

*Dr. Ali Kosar,*

Sabanci University, Turkey

Ali Koşar is a Distinguished Research Professor at Sabanci University. He earned his master's and doctoral degrees in Mechanical Engineering from Rensselaer Polytechnic Institute. He is focusing on the design and development of new generation micro heat sinks with functional surfaces and microfluidic devices including cavitation on chip devices. His research interests constitute a spectrum covering heat and fluid flow in micro/nano scale, condensation, boiling heat transfer, microfluidic systems, and cavitation. He co-authored over 150 research articles in top journals and 80 conference papers in prestigious international conferences. He has also a co-inventor on 7 granted patents and 7 pending patent applications. He received numerous national and international honors, including the  $\mu$ FIP Prominent Researcher Award" in the 2021 micro Flow and Interfacial Phenomena ( $\mu$ FIP) Conference, METU (Middle East Technical University) Prof. Mustafa N. Parlar Foundation Science Award (2021). He is currently leading a large research group consisting of members from various disciplines, graduate students and engineers and to bridge different disciplines (Energy, Nanotechnology, Applied Physics, Bioengineering, Biochemistry, Mechanical Engineering). He has been successful to secure funding for his research activities from a wide variety of national and international resources. He also serves as a reviewer in many prestigious journals and is a Subject Editor in the Applied Thermal Engineering journal. He is the Co-director of Center of Excellence for Functional Surfaces and Interfaces for Nano diagnostics (EFSUN) and a Distinguished Researcher of Sabanci University Nanotechnology and Application Center. He was recently elected as a Member of Turkish Academy of Sciences (TÜBA).

## AFTERNOON PARALLEL SESSION I - ROOM 1

02:05 PM - 06:50 PM

### CFD II

**SESSION CHAIR:** Dr. Lixin Cheng, Sheffield Hallam University, UK

ICMFHT 133

02:05 - 02:20

#### **Experimental and Numerical Study of a Cryogenic Ball Valve Using Liquid Nitrogen**

*Presenter:* Jorge Pinho, Von Karman Institute for fluid dynamics, Belgium

*Authors:* Maria Teresa Scelzo, Maria Faruoli, Hubert Lejeune, Sandra Varin, Jorge Pinho

ICMFHT 117

02:20 - 02:35

#### **Cavitation Erosion Modelling Using a Poly-Disperse Fluid Formulation**

*Presenter:* Fran Delić, University of Cambridge, UK

*Authors:* Fran Delić, Waleed Al-Sallami, William Anderson, Hrvoje Jasak

ICMFHT 121

02:35 - 02:50

#### **A Comparative Study of Transport Equation Models for Prediction of Cloud Cavitation in a Venturi**

*Presenter:* Naga Nitish Chamala, Virginia Polytechnic and State University, USA

*Authors:* Naga Nitish Chamala, Mingming Ge, Olivier Coutier-Delgosha

ICMFHT 122

02:50 - 03:05

#### **Simulating Cloud Cavitation Using Detached Eddy Simulation And Other Hybrid Turbulence Models**

*Presenter:* Dhruv Apte, Virginia Polytechnic Institute and State University, USA

*Authors:* Dhruv Apte, Mingming Ge, Olivier Coutier-Delgosha

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ICMFHT 127  
03:05 - 03:20

**Design and Analysis of a Cryogenic Unsteady Flow Experiment through a Propellant Assisted Valve**

*Presenter:* Jorge Pinho, Von Karman Institute for Fluid Dynamics, Belgium

*Authors:* Jorge Pinho, Arnaud Magette, Maria Teresa Scelzo, Jean-Baptiste Gouriet, Johan Steelant

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CSP 109  
03:20 - 03:35

**Insights into Multi-Stage Heat Release Phenomenon of Polyoxymethylene Dimethyl Ether 1 (PODE<sub>1</sub>)**

*Presenter:* Denis Buntin, Israel Institute of Technology, Israel

*Authors:* Denis Buntin, Leonid Tartakovsky

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ENFHT 180  
03:35 - 03:50

**Various Motorcycle Configurations And Their Influence On Aerodynamic Performance – A CFD Analysis.**

*Presenter:* Krzysztof Retych, Warsaw University of Technology, Poland

*Authors:* Krzysztof Retych, Krzysztof Balcerzak, Bartosz Potęga, Michał Remer

## AFTERNOON PARALLEL SESSION I - ROOM 2

### Heat Transfer Enhancement I

02:05 PM - 03:50 PM

**SESSION CHAIR:** Dr. Guido Saccone, Italian Aerospace Research Centre (CIRA), Italy & Dr. Osama Ibrahim, Kuwait University, Kuwait

ENFHT 149  
02:05 - 02:20

#### Performance Curve of a Patch Heater Fabricated by Silver Screen Printing for Satellite Applications

*Presenter:* Jaeyong Sung, Seoul National University of Science and Technology, Republic of Korea

*Authors:* Jinwoo Choi, Jaeyong Sung, Joon Hyun Kim

ENFHT 151  
02:20 - 02:35

#### Pool Boiling Heat Transfer Enhancement Of Hfe-7100 At Different System Pressures

*Presenter:* Mina Kerolos, Brunel University London, UK

*Authors:* Mina Kerolos, Atanas Ivanov, Tassos G. Karayiannis

ENFHT 165  
02:35 - 02:50

#### Comparison of 1D and 3D Electrochemical-Thermal Model of Lithium-Ion Battery

*Presenter:* Tuğçe GÜL, Gebze Technical University, Turkey

*Authors:* Yiğitalp GÖKMEN, Tuğçe GÜL, Gamze GEDİZ ILİS

ENFHT 179  
02:50 - 03:05

#### The Effect of Particle Collisions on Heat Transfer in a non-Isothermal Dilute Turbulent Gas-Particle Flow

*Presenter:* Hamid Reza Zandi Pour, Politecnico di Torino, Italy

*Authors:* Hamid Reza Zandi Pour, Michele Iovieno

ENFHT 173  
03:05 - 03:20

#### Multi-Objective Optimisation of Heat Transfer Elements within A Rotary Regenerative Heater

*Presenter:* Jordan White, University of Glasgow, UK

*Authors:* Jordan White, Marco Vezza

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ENFHT 178  
03:20 - 03:35 **On Saturated Flow Boiling Heat Transfer Of Deionized Water and Ferrofluid on Structured Surfaces With/ Without External Magnetic Field**

*Presenter:* Behnam Parizad Benam, Sabanci University, Sabanci University Nanotechnology and Application Center, Turkey

*Authors:* Behnam Parizad Benam, Mandana Mohammadlooe, Hyun Sun Park, Abdolali K Sadaghiani, Ali Kosar

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ENFHT 161  
03:35 - 03:50 **A Biomimetic Approach to Improve Convective Heat Transfer Using Fluid-Induced Vibrations from Self-Excited Flaps**

*Presenter:* Sahand Najafpour, Simon Fraser University, Canada

*Authors:* Sahand Najafpour and Majid Bahrami

03:50 PM - 04:05 PM **COFFEE BREAK**

## AFTERNOON PARALLEL SESSION II - ROOM 1

04:05 PM - 05:35 PM

**Boiling and Condensation Fundamentals and Processes****SESSION CHAIR:** Dr. Lixin Cheng, Sheffield Hallam University, UK

ICMFHT 126

04:05 - 04:20

**Natural Dropwise Condensation of Humid Air on an Inclined Flat Surface***Presenter:* Shahriyar Abedinnezhad, Simon Fraser University, Canada*Authors:* S. Abedinnezhad, M. Ashouri, M. Bahrami

ICMFHT 142

04:20 - 04:35

**Flow Boiling Heat Transfer Enhancement With Biphilic Surfaces At Subatmospheric Pressures***Presenter:* Vahid Ebrahimpour, Sabanci University, Turkey*Authors:* Vahid Ebrahimpour Ahmadi, Tayfun Guler, Ali Kosar

ICMFHT 132

04:35 - 04:50

**Numerical Analysis of Phase Change and Forced Convection in Moving Ship LNG Fuel Tanks***Presenter:* Woorim Lee, Korea Shipbuilding and Offshore Engineering, South Korea*Authors:* Woorim Lee, Sungwon Lee, Edward Richardson, Stephen Turnock, Dominic Hudson

ICMFHT 118

04:50 - 05:05

**Condensation Heat Transfer And Pressure Drop Characteristics Of R466A Inside A Micro-Fin Tube***Presenter:* Jinsung Choi, Korea University, Republic of Korea*Authors:* Jinsung Choi, Minwoo Lee, Yongchan Kim

ICMFHT 106

05:05 - 05:20

**Two-Phase Flow in an Unconsolidated Porous Medium: A Theoretical Derivation of a Macroscopic Model***Presenter:* Cyriaque Treol, LABORATOIRE EM2C CNRS CENTRALESUPELEC UNIVERSITE PARIS, France*Authors:* Cyriaque Treol, Rémi Clavier, Nathalie Seiler, Benoit Goyeau

ICMFHT 114

05:20 - 05:35

**Dynamic, Semi-Empirical Modelling and Experimental Validation of Pressure Drop in Capillary Tubes***Presenter:* Janina Deichl, Technische Universität Berlin, Germany*Authors:* Janina Deichl, Christian Hoffmann, Jens-Uwe Repke, Tommy Grunert

AFTERNOON PARALLEL SESSION II - ROOM 2

## Heat Transfer Enhancement II

04:05 PM - 05:05 PM

**SESSION CHAIR:** Dr. Guido Saccone, Italian Aerospace Research Centre (CIRA), Italy & Dr. Osama Ibrahim, Kuwait University, Kuwait

ENFHT 148  
04:05 - 04:20

### Heat Transfer and Fluid Flow of TiO<sup>2</sup> Nanofluids in a Compact Heat Exchanger

*Presenter:* Wagd Ajeeb, University of Lisbon, Portugal

*Authors:* W. Ajeeb, R. R. S. Thieleke da Silva, S M Sohel Murshed

ENFHT 157  
04:20 - 04:35

### Thermal Properties Of Sic and BN Nanofluids for Heat Transfer Applications

*Presenter:* Wagd Ajeeb, University of Lisbon, Portugal

*Authors:* Wagd Ajeeb and S M Sohel Murshed

ENFHT 155  
04:35 - 04:50

### Propylene Glycol-Water Based Titanium Carbonitride Nanofluids Designed For Heat Transfer Applications

*Presenter:* Marco A. Marcos, University of Lisbon, Portugal & Universidade de Vigo, Spain

*Authors:* Marco A. Marcos, Javier P. Vallejo, Wagd Ageeb, S.M. Sohel Murshed, Luis Lugo

ENFHT 134  
04:50 - 05:05

### Experimental and Numerical Study of Flow Dynamics in the Leakage Gaps of Oil-Free Positive Displacement Machines

*Presenter:* Brijeshkumar Patel, City university of London (SST), UK

*Authors:* Brijeshkumar Patel, Sham Rane, Ahmed Kovacevic

## ICMFHT PLENARY MORNING SESSION I - ROOM 1

9:30 AM - 10:25 AM

### Plenary Lecture

**SESSION CHAIR:** Dr. Sohel Murshed, University of Lisbon, Portugal



### Multiscale Enhancement Techniques in Pool Boiling

*Dr. Satish Kandlikar,*

Rochester Institute of Technology, USA

Satish Kandlikar is working in diverse areas including pool and flow boiling, water management in fuel cells and breast cancer detection. Innovation and creativity are the hallmarks of his team which has presented novel ways to improve performance in these fields. He has published over 400 research papers and graduated 15 PhD students and over 100 MS student in a career spanning over 40 years. The talk will is aimed at developing a new insight among the students and researchers to develop a highly productive innovative work environment. He has received numerous awards including the coveted ASME Heat Transfer Memorial Award.



## Plenary Lecture

10:25 AM - 11:20 AM

**SESSION CHAIR:** Dr. Sohel Murshed, University of Lisbon, Portugal



### **The Role of Heat Transfer and Fluid Flow in Thermal Energy Storage for Heating, Cooling and Mobility Decarbonisation**

*Dr. Yulong Ding,*  
University of Birmingham, UK

Professor Ding is founding Chamberlain Chair of Chemical Engineering and founding Director of University of Birmingham Centre for Energy Storage. His research has been on energy materials and processes. He has published 550+ technical papers with 450+ in peer-reviewed journals (GS H-Index ~80) and filed 100+ patents. He currently serves on Molten Salts Advisory Group of UK Department for Business, Energy and Industrial Strategy, Royal Society Net Zero Panel and IChemE Publication Medal Assessment Panel, and recently led a Royal Society briefing note on heating and cooling in Climate Change: Science and Solutions. Professor Ding invented liquid air energy storage technology and led the initial stage of technology developments (commercialised by Highview Power). He developed composite phase change materials for thermal energy storage and associated large-scale manufacture technologies, leading to large scale commercial applications with a total installation of >300MW / >1.5GWh so far (Jinhe Energy). His work on passively cooled container technology has been on large scale commercial demonstration for cold chain applications (CRRC). His work has been recognised by the election to Fellow of Royal Academy of Engineering (2020); IChemE Clean Energy Medal (2021); IChemE Global Awards in three categories of Energy, Research Project and Outstanding Achievement (2019); Distinguished Energy Storage Individual Award (Beijing International Energy Storage and Expo, 2018); and Energy & Environment Award and Technology and Innovation Grand Prix Award ('The Engineer', 2011). He currently serves as an associate editor of Energy Storage and Saving (Elsevier) and Discovery Energy (SpringerNature), and serves on editorial boards Journals of Energy Storage (Wiley), Thermal Science (Springer), and Particuology (Elsevier).

**11:20 AM - 12:00 AM COFFEE BREAK & POSTERS PRESENTATIONS**

## Poster Session

**11:20 AM - 12:00 AM** **SESSION CHAIR:** Dr. Marco A. Marcos, University of Lisbon, Portugal & Universidade de Vigo, Spain & Dr. Jorge Pinho, Von Karman Institute for fluid dynamics, Belgium

**ENFHT 172** **Computational Fluid Dynamics (CFD) Simulation on Gasification Performances of Coal.Biomass Blending and O<sub>2</sub>/Fuel Ratios in a 300 MW Entrained Flow Bed Gasifier**

*Presenter:* Sang Shin Park, Korea Institute of Energy Research, South Korea

*Authors:* Sang Shin Park

**ENFHT 162** **Limits of Contaminants Vapor Extraction from Soil by Hot Air Injection Based on Propanol Clean-up Analyses**

*Presenter:* Abraham Dayan, Tel Aviv University, Israel

*Authors:* Abraham Dayan

**ENFHT 164** **Development of a Lithium-Ion – Supercapacitor Hybrid Battery for Electric Forklifts**

*Presenter:* Muzaffer Anıl Özcan, Mutlu Battery, Turkey

*Authors:* Muzaffer Anıl Özcan, Cem Hakan Yılmaz, Ramazan Nejat Tuncay, Ömer Cihan Kıvanç

**ICMFHT 116** **A Python Based Approach for Drop Analysis in Micro-Fluidics Devices**

*Presenter:* Filippo Azzini, University of Bologna, Italy

*Authors:* Filippo Azzini , Beatrice Pulvirenti, Gian Luca Morini

**ICMFHT 135** **Flow Boiling Instabilities and Single-Phase Pressure Drop in Rectangular Microchannels with Different Inlet Restrictions**

*Presenter:* Mark Schepperle, University of Freiburg, Germany

*Authors:* Mark Schepperle, Aum Mandal, Peter Woias

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CSP 107 **Dual-Fuel Homogeneous Charge Compression Ignition Engine with Ethanol and 1-Octanol**

*Presenter:* Larissa Michaela Grundl, Universität der Bundeswehr, Germany

*Authors:* Larissa Michaela Grundl, Pravin Kumar Sundaram, Genny Anne Pang, Christian Thorsten Trapp

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ENFHT 177 **Parametric Analysis of Heat Source and Sink and Design of Heat Exchangers for Trilateral Flash Cycle (TFC)**

*Presenter:* Christina Antonopoulou, Chemical Process Engineering Research Institute, Greece

*Authors:* Christina Antonopoulou, Apostolos Gkountas, Konstantinos Atsonios, Panteleimon Bakalis, Anastasios Skiadopoulos, Panagiotis Grammelis, Dimitrios Manolakos

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## **Keynote Lecture**

**12:00 PM - 12:45 PM****SESSION CHAIR:** Dr. Sohel Murshed, University of Lisbon, Portugal

### **On the Shuttling Transverse Combustion (STC)**

***Dr. Boo Cheong Khoo,***

National University of Singapore, Singapore

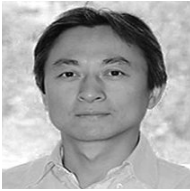
BC Khoo graduated from the University of Cambridge with a BA (Honours, 1st Class with Distinction). In 1984, he obtained his MEng from the NUS and followed by PhD from MIT in 1989. He joined NUS in 1989. From 1998 to 1999, he was seconded to the Institute of High Performance Computing (IHPC, Singapore) and served as the deputy Director and Director of Research. In 1999, BC returned to NUS and spent time at the SMA-I (Singapore MIT Alliance I) as the co-Chair of High Performance Computation for Engineered Systems Program till 2004. In the period 2005-2013, under the SMA-II, he was appointed as the co-Chair of Computational Engineering Program. In 2011-2012, BC was appointed the Director of Research, Temasek Laboratories, NUS. Since 2012, he has been the Director, Temasek Laboratories.

ENFHT KEYNOTE AFTERNOON PARALLEL VIRTUAL SESSION I - ROOM 2

## ENFHT Keynote Virtual Lecture

12:00 PM - 12:45 PM

**SESSION CHAIR:** Dr. Wagd Ajeeb, University of Lisbon,  
Portugal



### Applying Surface Engineering to Thermal Fluid Research and Applications

*Dr. Sunny Ri Li,*

The University of British Columbia, Canada

Dr. Sunny Ri Li is currently a professor at The University of British Columbia (UBC), Okanagan campus. He is the director of UBC Thermal Management and Multiphase Flows Lab, the Chair of CSME Heat Transfer Committee, and the Canadian Delegate on The Assembly for International Heat Transfer Conferences. His research around the fluid dynamics of multiphase flows and heat transfer involved in high-heat-flux cooling technologies and applications, with particular focus on the cooling and thermal management for microelectronics and power electronics. Before joining UBC, he was a research scientist in the Electronics Cooling Lab at the Global Research Center of General Electric, Schenectady, New York. He received his MASc and Ph.D. in mechanical engineering from University of Toronto in 2004 and 2008, respectively.

12:45 PM - 01:30 PM **LUNCH**

**ENFHT KEYNOTE AFTERNOON PARALLEL SESSION II - ROOM 1**

01:30 PM - 02:15 PM

**ENFHT keynote Virtual Lecture****SESSION CHAIR:** Dr. Tassos G. Karayiannis Brunel  
University London, UK**Advances in Using Nature Inspired Solutions to  
Enhance Heat Transfer and Thermal Energy Storage*****Dr. Yuying Yan,***  
University of Nottingham, UK

Yuying Yan (BSc, January 1982 from Jilin University of Technology, MSc, May 1986 in Thermal Science Engineering at Shanghai Institute of Mechanical Engineering) obtained his PhD in Mechanical Engineering at City, University of London in 1996. After taking research & academic positions at University of Surrey and Nottingham Trent University, respectively, he joined University of Nottingham in 2004, and was promoted to full Professor in 2011 as Chair in Thermal Fluids Engineering. His research covers widely ranged areas of thermofluids including heat transfer enhancement, applied thermodynamics, phase change, nanofluids and nature inspired solutions for energy efficiency and thermal management. He is member/director of UK national heat transfer committee, member of UK EPSRC peer review college, fellow of International Society of Bionic Engineering (ICBE). He was head of fluids &

ICMFHT KEYNOTE AFTERNOON PARALLEL SESSION II - ROOM 2

01:30 PM - 02:15 PM

## Keynote Lecture

**SESSION CHAIR:** Dr. Marco A. Marcos, University of Lisbon, Portugal & Universidade de Vigo, Spain



### The Percolative Scale-Free Nature of the Boiling Crisis

*Dr. Matteo Bucci,*  
Massachusetts Institute of Technology, USA

Dr. Matteo Bucci is Associate Professor of Nuclear Science and Engineering at MIT. He has joined the MIT faculty in 2016, where he teaches undergraduate and graduate courses in nuclear reactor engineering and design, and two-phase heat transfer. His thermal-hydraulics group at MIT focuses on two major research axes related to nuclear reactor safety and design: (1) New understanding of heat transfer mechanisms in nuclear reactors, (2) Engineered surfaces and coatings to enhance two-phase heat transfer. His group also develops and uses advanced diagnostics, such as high-speed infrared thermometry, and post-processing algorithms to perform unique heat transfer experiments. Matteo has published over 40 articles in the areas of two-phase flow and heat transfer, and surface engineering technology. For his research work and his teaching, he won several awards, among which the MIT Ruth and

02:15 PM - 02:30 PM **Coffee Break**

## AFTERNOON PARALLEL SESSION II - ROOM 1

### Environments and Heat Transfer

02:30 PM - 03:30 PM

**SESSION CHAIR:** Dr. Majid Bahrami, Simon Fraser University, Canada

ENFHT 133 **Fuzzy Control of a Toroidal Thermosyphon for Known Heat Flux Heating Conditions**

02:30 - 02:45

*Presenter:* Arturo Pacheco-Vega, California State University, USA

*Authors:* Daniel S. Lopez, Arturo Pacheco-Vega

ENFHT 137 **Performance Evaluation of Multi-Stage and Single-Stage Thermoelectric Coolers for Cooling Wearables**

02:45 - 03:00

*Presenter:* Peng Shu Ng, Singapore Institute of Technology, Singapore

*Authors:* Peng Shu Ng, Elisa Y.M. Ang, Chew Beng Soh, Peng Cheng Wang

ENFHT 167 **Optimization of the Operating Conditions for Tailored Syngas Generation from Biomass Gasification under Simulated Reactive Media**

03:00 - 03:15

*Presenter:* Shruti Vikram, Indian Institute of Technology Bombay, India

*Authors:* Shruti Vikram, Sandeep Kumar

CSP 105 **Assessment of the Ignition Delay Times Criteria for Hydrogen Combustion**

03:15 - 03:30

*Presenter:* Guido Saccone, CIRA (Italian Aerospace Research Centre), Italy

*Authors:* Guido Saccone, Christer Fureby, Marco Marini



AFTERNOON PARALLEL SESSION II - ROOM 2

**Flow and Heat Transfer in Porous Media**

02:30 PM - 3:30 PM **SESSION CHAIR:** Dr. Wagd Ajeeb, University of Lisbon, Portugal  
& Dr. Atila P S Freire, Federal University of Rio de Janeiro,  
Brazil

ICMFHT 119 **Experimental Study On The Frost Characteristics On  
02:30 - 02:45 Aluminum Flat Plate Under Various Environmental  
Parameter Conditions**

*Presenter:* Jeongwoo Roh

*Authors:* Jeongwoo Roh, Changho Han, Yongchan Kim

ICMFHT 123 **Studies On The Thermal Resistance Of Multi-  
02:45 - 03:00 Layer High Bulk Non-Woven Under Extreme Cold  
Temperatures**

*Presenter:* Vikrant Dupade, Indian Institute of Technology Delhi , India

*Authors:* Vikrant Dupade, B. Premachandran, R. S. Rengasamy, Prabal  
Talukdar

ICMFHT 129 **Development Of A Unified Numerical Model For  
03:00 - 03:15 Ceramic Foams**

*Presenter:* Sonika Sharma, Indian Institute of Technology, India

*Authors:* Sonika Sharma, Prabal Talukdar

ENFHT 171 **Effective Thermal Conductivity Of Porous Media: A  
03:15 - 03:30 New Semi-Empirical Correlation**

*Presenter:* Osama Ibrahim, Kuwait University, Kuwait

*Authors:* Osama M. Ibrahim, Ahmed H. Al-Saiafi, Abdullah Almutairi

**CRUISE TOUR**

07:00 PM - 10:00 PM **BOARDING ADDRESS:** Veltagus, Norte – Doca de Alcântara, Cais Rocha  
Conde de Óbidos, 1399-059 Lisboa, Portugal  
<http://www.veltagus.com/>



# 9<sup>th</sup> WORLD CONGRESS ON MOMENTUM, HEAT AND MASS TRANSFER

APRIL, 2024

Next year, the Congress will be held in April, 2024 and the location will be announced soon.

Please visit the website provided below for regular updates:

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For inquiries and to obtain further information on the congress please email us at:

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**+1-613-834-9999.**

## JOURNAL PUBLICATION

Selected articles from the Congress will be published in the following journal after a secondary review process:

- Journal of Fluid Flow, Heat and Mass Transfer (JFFHMT)

The publication fee will be waived for papers that win the Best Paper award.

This journal has adopted to the open-access model, meaning free access to the journal's articles and content with no need for subscription. This ensures a larger audience and therefore higher citations.

All published papers of JFFHMT will be indexed by scopus and submitted to Google Scholar . Additionally, they will be permanently archived in Portico (one of the largest community-supported digital archives in the world) and will be assigned unique DOIs.

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## 8<sup>th</sup> WORLD CONGRESS ON MOMENTUM, HEAT AND MASS TRANSFER

MARCH 26 - 28, 2023 | Lisbon, Portugal

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