ICFFTS 2024

Proceedings of the 5th International Conference on Fluid Flow and Thermal Science (ICFFTS 2024)

November 21 - 23, 2024 | Lisbon, Portugal

ISBN: 978-1-990800-48-1| ISSN: 2563-5301

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WELCOME MESSAGE FROM THE CONFERENCE CHAIR

On behalf of the International Academy of Science, Engineering and Technology (International ASET Inc.), the organizing committee would like to welcome you to the 5th International Conference on Fluid Flow and Thermal Science (ICFFTS 2024).

The goal of ICFFTS 2024 is to provide a space for scholars from all over the world to present advances in the relevant fields and to foster an environment conducive to exchanging ideas and information. This conference will also provide an ideal environment to develop new collaborations and meet experts on the fundamentals, applications, and products of the mentioned fields.

In the fifth meeting of this conference, two plenary speakers and two keynote speakers will share their expertise with the aim of exposing participants to a wide spectrum of applications, and to foster crosspollination of ideas and develop new research interests. In addition, approximately 32 papers will be presented from professors, students, and researchers across the world.

We thank you for your participation and contribution to the 5th International Conference on Fluid Flow and Thermal Science (ICFFTS 2024). We wish you a very successful and enjoyable experience.

Dr. Sohel Murshed
University of Lisbon, Portugal
Conference Chair
ICFFTS 2024

Dr. Wael H. Ahmed
University of Guelph, Canada
Conference Chair
ICFFTS 2024

Dr. Boguslaw Kruczek
University of Ottawa, Canada
Conference Chair
ICFFTS 2024

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ABOUT ICFFTS 2024

The 5th International Conference on Fluid Flow and Thermal Science (ICFFTS 2024) aims to become the leading conference in fields related to fluid flow and heat transfer. The goal of ICFFTS 2024 is to gather scholars from all over the world to present advances in the relevant fields and to foster an environment conducive to exchanging ideas and information. This conference will also provide an ideal environment to develop new collaborations and meet experts on the fundamentals, applications, and products of the mentioned fields.

ICFFTS 2024 is an international conference will be held yearly. This conference focus on all aspects Fluid Flow and Thermal Science. ICFFTS 2024 Will be held this year as a vrirtual conference

ICFFTS 2024 is an acronym for **I**nternational **C**onference, on **F**luid **F**low and **H**eat **T**ransfer.

- The proceedings are published in Ottawa, Canada.
- All papers were peer-reviewed
- The conference proceedings is published under an ISSN and ISBN number
- Each paper is assigned a unique DOI number by Crossref
- The conference proceedings is indexed by Google Scholar
- The proceedings is permanently archived in Portico (one of the largest community-supported digital archives in the world)

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SCIENTIFIC COMMITTEE

We would like to thank the following for accepting to act as a member of the Scientific Committee for the ICFFTS 2024 Conference:

Dr. Sohel Murshed
University of Lisbon, Portugal
Conference Chair

Dr. Wael H. Ahmed
University of Guelph, Canada
Conference Chair

Dr. Boguslaw Kruczek

University of Ottawa, Canada
Conference Chair

Scientific Committee Members

- **Dr. Mohamed I Hassan Ali,** Khalifa University of Science and Technology, UAE
- **Dr. Chamil Abeykoon,** The University of Manchester, UK
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- **Dr. Sanjeeva Witharana,** University of Moratuwa, Sri Lanka

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PLENARY/KEYNOTE SPEAKERS

The keynote information for the 5th International Conference on Fluid Flow and Thermal Science (ICFFTS 2024) is as follows:

Plenary Speakers

Dr. Majid Bahrami
Simon Fraser University, Canada

Dr. Gretar Tryggvason
Johns Hopkins University, USA

Keynote Speakers

Dr. Thomas Adams
Rose-Hulman Institute of Technology, USA

Dr. Guillermo Paniagua
Purdue University, USA

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PLENARY LECTURE

Title: Waste Heat and Sorption Technology: A Pathway to Decarbonize District Energy

Dr. Majid Bahrami, Simon Fraser University, Canada

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Dr. Bahrami is a Professor of Mechanical Engineering and Tier 1 Canada Research Chair in Alternative Energy Conversion Systems at SFU. He is a Fellow of the Canadian Academy of Engineers (FCAE) and the American Society of Mechanical Engineers (FASME). Bahrami championed interdisciplinary, collaborative research in multitudes of sustainable clean energy systems, including: harvesting and transforming low-grade heat for sustainable air conditioning, thermal energy storage, atmospheric water harvesting, heat pump systems and dehumidification for applications in automotive, agri-food, sustainable city, and hybrid thermal electric microgrids. He has a strong track record in successful collaboration with national and international research institutes and industry. He formed 2 start-ups; won national and international research and innovation awards; published 12 patents and 350 publications; and supervised 180+ highly qualified personnel, including 8 professors.

PLENARY LECTURE

Title: Numerical Simulations of Complex Multiphase Flows

Dr. Gretar Tryggvason, Johns Hopkins University, USA

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Gretar Tryggvason is the Charles A. Miller, Jr. Distinguished Professor at the Johns Hopkins University and the head of the Department of Mechanical Engineering. He received his PhD from Brown University in 1985 and was on the faculty of the University of Michigan in Ann Arbor until 2000, when he moved to Worcester Polytechnic Institute as the head of the Department of Mechanical Engineering. Between 2010 and 2017 he was the Viola D. Hank professor at the University of Notre Dame and the chair of the Department of Aerospace and Mechanical Engineering. Professor Tryggvason is well known for his contributions to computational fluid dynamics; particularly the development of methods for computations of multiphase flows and for pioneering direct numerical simulations of such flows. He served as the editor-in-chief of the Journal of Computational Physics 2002-2015, is a fellow of APS, ASME and AAAS, and the recipient of several awards, including the 2012 ASME Fluids Engineering Award and the 2019 ASTFE Award.

KEYNOTE LECTURE

Title: Challenging Reductionism—The Truth is Up Here!

Dr. Thomas Adams, Rose-Hulman Institute of Technology, USA

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Thom Adams is Professor Emeritus of Mechanical Engineering at Rose-Hulman Institute of Technology, USA. He earned his BS from Rose-Hulman Institute of Technology, and his MS and PhD from Georgia Institute of Technology, all in Mechanical Engineering. He is the only faculty member in the history of Rose-Hulman to have received all three of the institute's highest honors, including winning the Outstanding Scholar Award and the Outstanding Teaching Award, and being appointed the Herman A. Moench Distinguished Professor. His early work in single-phase and two-phase heat transfer in microchannels represents some of the seminal work in the field. He later became a leading educator in the field of micro-electro-mechanical systems (MEMS) and authored a first of its kind textbook on the subject aimed at an audience of undergraduate technical majors regardless of specific discipline. His current research focuses on what he calls "generalist scholarship," in which physical systems and processes are purposely modeled using the most fundamental concepts and methods available in order to ascertain physical trends and correlations that often go unnoticed when relying solely on the techniques of modern specialized research. His work has received international acclaim, receiving multiple best paper awards for his work in technical research as well as engineering education.

KEYNOTE LECTURE

Title: Advanced Turbine Research for Sustainable Propulsion and Power

Dr. Guillermo Paniagua, Purdue University, USA

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Prof. Paniagua's team specializes in turbines, measurement techniques, and propulsion, focusing on aerodynamics and heat transfer of high-speed internal flows. The central theme of Paniagua's research is to expand the traditional limits of fluid machinery. Prof. Paniagua's team aims to pioneer the transition to a world where all propulsion and power generation is clean through creative and rigorous research in high-speed internal flows. The team combines expertise in Measurement techniques, Experimental testing procedures, Theoretical calculations, and Computational analysis with a focus on research and development for turbines and novel thermal-based cycles.

LIST OF PAPERS

The following papers were presented at the 5th International Conference on Fluid Flow and Thermal Science (ICFFTS 2024)

CFD

Numerical and Experimental Study on the Transitional Heat Transfer of a Vertical Tall Square Aluminum Tube
Authors: Cheng-Pu Yang, Shwin-Chung Wong

Development of Centrifugal Pump for Transportation of Liquefied Hydrogen
Authors: Jeong-Eui Yun, Harsito Cartur, Jae-Min Kim, JoonYoung Sin, Won-Sik Kim, Sang-Seon Lee

Piecewise Viscous Drag Coefficient Calibration Methodology for Floating Platform Heave Free Decay Test in FullScale CFD Simulation
Authors: Miguel Gil, Javier Armañanzas, Juan Pablo Fuertes, Alexia Torres, Javier Leon

Numerical Investigation of Laminar Forced Convection through a dual Orifice for Shear-Thinning Fluids
Authors: Niharika Dutt, Tarak Monal, Swati A. Patel

Spiral Structure of Cylindrical Batteries and its Importance in Modeling of Heat Transfer
Authors: Jiri Hvozda, Jan Bohacek, Alexander Vakhrushev, Ebrahim Karimi-Sibaki

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Two and Multiphase Flow and Heat Transfer

Thermal Characterisation of a Wire Mesh Wick Vapor Chamber for Various Orientations
Authors: Wee Jian Ng, Vanessa Egan, Jeff Punch

Thermal Runaway Mitigation Assessment by Passive Hybrid Thermal Management System with Phase Change Material and HFE-7000 Dielectric Liquid
Authors: Ivan Torrano, Jon Martín-Ortiz, Alvaro Herrán, Artem Nikulin, Daniel Bielsa

Laminar Heat Transfer in a Horizontal Circular Tube with Phase Change Emulsions of Methyl Myristate – An Experimental Study
Authors: David Cabaleiro, Takashi Morimoto, Yu Fukuda, Carolina Hermida-Merino, Hiroyuki Kumano

Influence of Air Parameters on a Liquid Droplet Thermal State in Phase Transformation Mode Cycle
Authors: Kristina Biknienė, Linas Paukštaitis, Gintautas Miliauskas

Heat Transfer between a Pool Fire and Water Mist Droplets in a Compartment
Authors: Robinet Antonin, Chetehouna Khaled, Sellami Ilyas, Hamidouche Souria, Oger Antoine

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Poster Session

The effect of roughness by laser textured surfaces on boiling heat transfer
Authors: Chin Chi Hsu, Tzu-Chi Lin

Drag Reduction of Microchannels with Large Shear-Free Menisci on Opposing Partially Substrateless Walls
Authors: Ellen Bold, Helena Gutheil, Egbert Oesterschulze

Numerical Prediction of the Aerodynamic Forces by Applying a New Turbulence Model
Authors: Yaser H Alahmadi

Heat Transfer Enhancement Passive Methods

Experimental Analysis Of A Newly Developed "Dado Cut" Square Pin-Fin Heat Sink For Avionics Cooling
Authors: Mayank Maroliya, Sandip K. Saha

Solid-Solid Phase Change Material Composite Based Cylindrical Heat Sink For Transient Cooling
Authors: Midhun V C, Sandip K Saha

Optimal Heat Transfer Coefficients for Sustained PCM Functionality in High-Rate Discharge Cycle of Lithium-Ion Battery
Authors: Vanita A. Wagh, Sandip K. Saha

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Heat Transfer Enhancement Passive Methods

Real-time performance prediction of air source heat pumps using deep learning-based model
Authors: Youngjun Kim, Jeongwoo Roh, Changho Han, Yongchan Kim

Experimental Study on the Defrosting Performance of Air Source Heat Pumps According to Control Variables
Authors: Jaeho Choi, Jinyoung Kim, Yongchan Kim

Influence of the Temperature on the Cycling Performance of Polymer-Based Solid-State Batteries
Authors: J. Martín-Ortiz, Ivan Torrano, M. C. Morant-Miñana, J. Rodríguez-Aseguinolaza

Influence of Gas/Solid Surface Fraction on Drag Reduction of Partially Substrateless Microchannels
Authors: Ellen Bold, Sebastian Zimmermann, Clarissa Schönecker, Egbert Oesterschulze

Experimental Investigation on flame stability of Ammonia-LPG Flames
Authors: Arnav Banerjee, D Shanmugasundaram, Vasudevan Raghavan

Innovative Oil Cooling Solutions: Polymeric Hollow Fiber Heat Exchanger
Authors: Erik Bartuli, Filip Lang, Jiri Hvozda, Tereza Kroulikova Martin Beran, Jiri Kucera

Comparative Evaluation of Membrane Contactor and Stripping Device for Ammonia Separation
Authors: Katerina Mayerova, Jiří Lindovský, Josef Kalivoda, Ondřej Krištof

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Heat Transfer Enhancement Passive Methods

Experimental Investigation on Flow and Thermal Characteristics of a Pool Fire in an Engine Compartment
Authors: Ilyas Sellami, Khaled Chetehouna, Antonin Robinet, Souria Hamidouche, Antoine Oger

Convective Heat Transfer Performance of SiO2/BN Hybrid Nanofluids in Minichannel
Authors: Tiago Monjardino, S M Sohel Murshed

Flow structure and impinging interactions of two confined turbulent converging jets in crossflow
Authors: David Eli Morales Matuz, Cesar treviño, Faustino, Perez Flores, Cesar Sandoval, Lorenzo Alberto, Martínez Suástegui

Influence of a Maxwell fluid on the mechanic response of a poroelastic soil induced by long water waves and in presence of a uniform current
Authors: Martha Alejandra Barbosa López, Eric Bautista, Federico Mendez

Application of Coupled CFD-PBM in Optimization and Scaling-Up of Liquid-Liquid Stirred Tank Reactors for Petrochemical Technologies
Authors: Albert Iakhin

Fluid Flow, Heat and Mass Transfer

Coalescence of Droplets Rising in a Quiescent Fluid Confined in a Vertical Cylindrical Tube in Stokes Regime
Authors: Masahiro Muraoka, Tsubasa Takamizawa

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Fluid Flow, Heat and Mass Transfer

Gradient Weighted Embedded Error Estimator for Mesh Adaptation
Authors: Kunal Ghosh

Preliminary Evaluation of Drag Reduction Performance for Functional Surfaces with 60-degree Riblets Subjected to Taylor-Couette Flows
Authors: William B. Gordon, Evgueni V. Bordatchev, O. Remus Tutunea-Fatan, Naiheng Song, Lucy Li

Graphical and Statistical Analysis of Nonlinear Internal Wave Dynamics Using Spatio-Temporal Array Observations: Preliminary Results
Authors: Nicholas V. Scott, Jeffrey W. Book, and Katherine Seery

Manifold Learning and Graphical Statistical Characterization of Ocean Thermal-Momentum Structure Using Array Observations
Authors: Nicholas V. Scott, Jeffrey W. Book, and Katherine Seery

Time-Periodic Mechanisms of Shock Interactions for High Enthalpy Reacting Flow over Double Wedges at Mach 7
Authors: Ladin Nil Uluakan, Davut Vatansever, Bayram Celik

Energy Conversion and Storage

Performance Analysis of Polymer Electrolyte Membrane Fuel Cell with Magneto-aerodynamic Effects

Authors: Seong Su Park, Jun Yeob Chung, Yongchan Kim

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SPONSORS

International ASET Inc. would like to thank the following sponsors for their support of ICFFTS 2024:

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ICFFTS 2025

The 6th International Conference on Fluid Flow and Thermal Science (ICFFTS 2025) will be held on October 29 - 31, 2025 in Barcelona, Spain.

For inquiries and to obtain further information on the congress, please visit the website

You can also email info@icffts.com or call us at:

+1-613-834-9999

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JOURNAL PUBLICATION

Selected articles from the coference will be published in the **Journal of Fluid Flow, Heat and Mass Transfer (JFFHMT)** after a secondary review process.

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

All published papers of JFFHMT will be submitted to Google Scholar and be indexed in Scopus. 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.

Please visit the following websites for the respected journals: **JFFHMT:** https://jffhmt.avestia.com

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ETHICS & MALPRACTICE

At International ASET Inc., we take matters that relate to ethics in publishing very seriously. We believe that the peer-review publication process is a vital building block of academia, and its integrity must be maintained at all costs, which is why every article will be peer-reviewed by several experts in the field. Under peer-review, experts in the related fields are required to provide opinions and comments on the improvements of the submissions.

We are proud of our efforts towards abiding by the guidelines of ethics, integrity, and high standards in publishing.

Following are the ethics guidelines set by the organizers for the authors and the reviewers of the conference:

Scientific Committees

Scientific committees consisting of experts in the fields are established. The committees oversee the peer-review and publication process. To see the scientific committee members, please follow the link: Scientific Committee

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ETHICS & MALPRACTICE

Reviewers

Contribution to Decisions
In order for final decisions to be made regarding acceptance or rejection of papers, we rely on peer-review. Peer-review is the process of experts in the field reading, understanding, and objectively commenting on submitted papers. Through peer-review, scholars give back to the academic and scientific community by helping the chair(s) make decisions regarding manuscripts.

Promptness
Reviewers should promptly notify the chair(s) if they are unable or unqualified to carry out their reviewing duties. Reviewers should do their best to provide the reviews to the chair(s) as promptly as possible, and within the designated time-frame.

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Authorship

Only persons who have significantly contributed to the work and the manuscript can be named authors on a paper. These contributions include the idea/concept, design, experiments, evaluation, analysis, drafting or revision of the manuscript, and others. Authors must all have agreed to be named as such and for the manuscript to be submitted. Anyone who has contributed based on the above, but the level of contribution is not significant, may appear in the acknowledgement section of the manuscript.

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Acknowledgement to other's work being used in the paper must be given at all times. Authors of the paper should give comprehensive credit where it is necessary, by citing the work, they use for supporting their own research.

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ETHICS & MALPRACTICE

Publisher

Errata and Retractions

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Schedule:

This conference proceeding accompanies the conference, meaning a new proceedings will be published every year for the corresponding annual conference of this series.

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