Conference Program

ASTFE

9TH THERMAL AND FLUIDS ENGINEERING CONFERENCE (HYBRID)

April 21-24, 2024

www.astfe.org/tfec2024/

Preface

The 2024 American Society of Thermal and Fluids Engineers (ASTFE) Conference (Hybrid) will be held on April 21-24, 2024 partially online virtual and in person at Oregon State University, Corvallis, OR, USA. ASTFE is the premier international society by and for professionals within the thermal and fluids science and engineering community. The 2024 ASTFE conference, TFEC 2024 provides an international forum for the dissemination of the latest research and knowledge in the thermal and fluid sciences.

Authors are invited to submit abstracts covering, but not limited to, the following areas:

- Advanced Energy Systems
- Aerospace Applications
- Atomization
- Combustion, Fire and Fuels
- Computational Methods/Tools in Thermal-Fluid Systems
- Cryogenics
- Electric, Magnetic, Flow and Thermal Phenomena in Micro and Nano-Scale Systems
- Electronics Cooling
- Energy and Sustainability
- Energy Storage Systems
- Energy-Water-Food Nexus
- Engineering Equipment and Environmental Systems
- Engineering Fundamentals and Methodology
- Experimental Methods/Tools and Instrumentation in Fluid Mechanics and Heat/Mass Transfer
- Flow and Heat Transfer in Biological Systems
- Flow and Heat Transfer in Materials Processing Science and Manufacturing
- Flow in Internal Multiphase Flows
- Flow Instability
- Fluid Flow and Heat Transfer in Industrial and Commercial Processes
- Fluid Flow and Heat Transfer Multiphase Phenomena
- Fluid Measurements and Instrumentation
- Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids
- Fuel Cells
- Fundamentals in Fluid Flow and Heat/Mass and Momentum Transfer
- Heat Exchangers: Compact, Novel, Networks
- Heat Pipes
- Heat Pumps
- Heat/Mass Transfer Enhancement Techniques
- Industry Problems: CO2 Capture
- Machine Learning and AI
- Material Issues, Ceramics, Low Thermal Conductivity
- Measurement and Modeling of Environmental Flows
- Multiphase Flows
- Nano and Micro Fluids Applications
- Natural and Built Environments
- Nuclear Energy and Systems
- Ocean and Climate Science
- Plasma Physics and Engineering
- Refrigeration, Air Conditioning Systems, and Refrigerants
- Solar Energy Equipment and Processes
- Thermo-economic Analysis of Energy Systems
- Thermo-Fluid Education
- Transportation
- Turbulent Flows
- Wind Turbines Aerodynamics and Control

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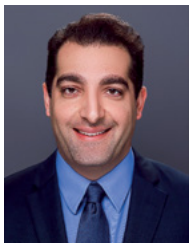

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About ASTFE

The American Society of Thermal and Fluids Engineers **(ASTFE)** was established in July 2014 to promote the science and applications of thermal and fluids engineering and related disciplines.

ASTFE aims at providing opportunities to promote the dissemination of information and knowledge regarding thermal and fluids engineering, both nationally and internationally. It aligns itself with globally collaborative activities in the traditional areas of heat transfer and fluids engineering, as well as, in emerging areas such as those related to energy, environmental sustainability, manufacturing, thermal management, and micro- and nano-scale transport phenomena.

ASTFE encourages the personal and professional development of young scientists and engineers, and promotes cooperation with other engineering and technical societies to enhance interactions with industry, government agencies and the public at large. Of particular interest to the Society is the organization of conferences and workshops that bring together diverse groups in these fields.

American Society of Thermal and Fluids Engineers **(ASTFE)** is the U.S. nonprofit organization based in New York operating on web 2.0 IT platform to arrange professional communications, support conferences and professional communities. The organization is supported by individual contributors, private foundations and other governmental bodies. All contributions and donations are tax deductible. **ASTFE** supports Open Access movement.

News

"Executive Committee" formed by ASTFE

April 2022 — The American Society of Thermal and Fluids Engineers **(ASTFE)** has formed an Executive Committee (EC) to assist in leading the Society forward. Reporting to the **ASTFE** Board of Directors, the EC serves in a significant leadership role and aims to develop innovative approaches to advance thermal and fluid scientist and engineer engagement within the **ASTFE** community. The EC will work with **ASTFE** members to appoint conference organization committees, technical committees, and working groups. EC members will also collaborate with other societies on conferences and workshops and focus on enhancing **ASTFE** membership outreach and communication.

The inaugural members of the EC were nominated by the **ASTFE** Board of Directors and include **Prof. Wilson Chiu** (University of Connecticut), **Prof. Lorenzo Cremaschi** (Auburn University, EC-chair), **Prof. Jon Longtin** (Stony Brook University), **Prof. Nesrin Ozalp** (Purdue University Northwest) and **Prof. Ting Wang** (University of New Orleans).

If you are interested in having more information, or if you would like to get involved with **ASTFE** activities, please contact **Dr. Lorenzo Cremaschi** (email: lorenzo.cremaschi@auburn.edu).

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Thermal Fluids Engineering Award

A Thermal and Fluids Engineering Award has been established to recognize substantial contributions to thermal and fluids engineering. This is the part of the honors bestowed by the society on its members for their contributions.

2024 TFEC AWARD WINNER

Ramesh Agarwal
Washington University in St. Louis

Fellowship

ELECTED ASTFE FELLOW 2024

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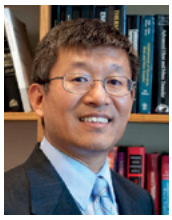


Yuwen Zhang
University of Missouri

Plenary Speakers

GANG CHEN

Affiliation: Massachusetts Institute of Technology

Title: Thermal and Optical Evaporation

Abstract: Evaporation is a ubiquitous phenomenon in nature, yet our understanding on evaporation is surprisingly insufficient. For example, large temperature discontinuities across liquid-vapor interfaces had been reported experimentally, which have defied modelling efforts so far. We established a set of interfacial conditions to determine the interfacial temperature, density, and pressure drop across a liquid-vapor interface, which lead to modeling results in reasonable agreement with experimental data. Our model shows when evaporation or condensation happens, an intrinsic temperature difference develops across the liquid-vapor interface, due to the mismatch of the enthalpy carried by vapor at the interface and the bulk region. We predict that when the liquid layer is very thin, most of the applied temperature difference between the solid wall and the vapor phase happens at the liquid-vapor interface, leading to saturation of the evaporation and the condensation rates and the corresponding heat transfer rate. This result contradicts current belief that the evaporation and condensation rates are inversely proportional to the liquid film thickness. Our approach also provides clear explanation for the paradoxical prediction by the kinetic theory the existence of an inverted vapor temperature profile for the problem of evaporation and condensation between two parallel plates. Along a different direction, our experiments, as well as by many others, have reported that evaporation under sunlight from hydrogel and other porous materials can exceed the thermal evaporation limit by several times. 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 use several independent experiments in porous hydrogels and at a single water-air interface to support this hypothesis.

Bio: Gang Chen is currently Carl Richard Soderberg Professor of Power Engineering at the Department of Mechanical Engineering at Massachusetts Institute of Technology (MIT). He attended Xiangfan No. 5 High School in China from 1978-1980. He received his bachelor and master degrees from the Power Engineering Department, Huazhong Institute of Technology (now Huazhong University of Science and Technology or HUST in short), China, in 1984 and 1987, respectively. He stayed at HUST as a lecturer from 1987-1989. In 1988, he was interviewed by Professor Chang-Lin Tien as a PhD candidate to receive a fellowship from the K.C. Wong Education Foundation in Hong Kong. He joined Professor Tien's group first at UC Irvine in 1989 and then at UC Berkeley in 1990 when Professor Tien rejoined Berkeley as its Chancellor. He obtained his PhD degree from the Mechanical Engineering Department, UC Berkeley in 1993, under Tien's supervision. He was an assistant professor at Duke University from 1993 to 1997, a tenured associate professor at University of California at Los Angeles, from 1997 to 2001. He joined MIT in 2001 as a tenured associate professor, and was promoted to full professor in 2004. He was named a Warren Faculty Scholar at Duke University (1996-1997), and he was the first holder of the Warren and Towneley Rohsenow Professorship at MIT (2006-2009) before assuming the Soderberg Professorship from MIT School of Engineering in 2009. He served as the Head of the MIT Department of Mechanical Engineering from July 2013 to June 2018.

Chen's research interests center on nanoscale transport and energy conversion phenomena, and their applications in energy storage, conversion, and utilization. He has made important contributions to the understanding of heat conduction in nanostructures beyond Fourier diffusion regime via both modeling and experimental studies. He and his collaborators invented ways to extract phonon mean free path distributions in solids by exploiting ballistic phonon transport processes and advanced first principles simulation tools to compute phonon thermal conductivity. His group, working with collaborators, discovered Anderson localization in heat conduction and phonon hydrodynamics in graphite. He and his collaborators exploited the unique nanoscale heat conduction physics to advance the field of thermoelectric materials and their applications in solar thermal and waste heat recovery. He and his collaborators also discovered a few materials with thermal conductivity just below diamond, including predicting and experimentally demonstrating that boron arsenide have simultaneously high electron and hole mobility in addition to experimentally proving its predicted high thermal conductivity. His group demonstrated that polymer nanofibers can be more thermally conductive than most metals, and explained mechanisms why additives to liquids might significantly improve their thermal conductivity. In addition to nanoscale heat conduction and thermal and thermoelectric materials, Chen's group also advanced the field of thermal radiation, including developing a method to measure radiation heat transfer between two surfaces down to tens nanometer separations and experimental demonstration that radiative heat transfer at such small spacings can exceed the prediction of the Planck blackbody radiation law by three orders of magnitude, photon trapping in solar photovoltaic cells, solar thermal and solar interfacial steam generation. In 2021, he discovered photomolecular effect: direct cleavage of large water molecular clusters from water-vapor interface by visible light. By exploring micro/nanoscale transport phenomena, Chen's group has advanced a wide range of technologies such as thermoelectric cooling and power generation, solar thermal and solar photovoltaics, desalination, and thermal interface materials. Two of Chen and his collaborators' inventions were selected by Scientific American as one of the annual top ten world changing ideas: one on directional solvent extraction technology for desalination and waste water treatment (2012) and one on using batteries to convert thermal energy into electricity (2014). He and his collaborators' work on cubic boron arsenide was selected by the Physics World as one of its top ten Breakthroughs of the Year in 2022. Chen authored a book entitled "Nanoscale Energy Transfer and Conversion: a parallel treatment of electrons, molecules, phonons, and photons" - the first textbook in the field and his lectures in videos are freely available online via the MIT Open Courseware program. He has published ~460 technical articles, 24 book chapters, and over 600 invited talks all over the world. Professor Chen has supervised ~90 MS and PhD students thesis and over 60 post-docs. More than 40 of his PhD students and post-docs are in academia. He is an inventor on ~50 granted and pending patents and co-founded two companies.

Monday — April 22, 2024
8:30 AM - 9:30 AM

Plenary Lecture at CH2M Hill Alumni Center, Cascade Ballroom

RAVI MAHAJAN

Affiliation: Intel Corporation

Title: Directions, Challenges and Opportunities in Heterogeneous Integration

Abstract: Heterogeneous Integration (HI) is a powerful and crucial enabler for the continued growth of computing and communication performance. Advanced packaging technologies are critical enablers of HI because of their importance as compact, power efficient platforms. This talk will focus on the tremendous opportunities in different application environments and focus on the projected evolution of advanced packaging architectures. Interest in HI research has picked up in recent years and this opens up greater collaboration opportunities between academia and industry. Specific examples, showing how product implementations take advantage of currently available HI technologies, to provide an unprecedented level of performance, will be used to describe the challenges and opportunities in developing robust, next generation advanced package architectures. A broad scope roadmap of the future generated as part of an industry-academic collaboration will be discussed in this context to highlight the opportunities generated by HI. The anticipated challenges and opportunities in the thermal management of HI based architectures will be discussed in detail.

Bio: Ravi Mahajan is an Intel Fellow responsible for Assembly and Packaging Technology Pathfinding for future silicon nodes. Ravi also represents Intel in academia through research advisory boards, conference leadership and participation in various student initiatives. He has led Pathfinding efforts to define Package Architectures, Technologies and Assembly Processes for multiple Intel silicon nodes including 90nm, 65nm, 45nm, 32nm, 22nm and 7nm silicon. Ravi joined Intel in 1992 after earning his Ph.D. in Mechanical Engineering from Lehigh University. He holds the original patents for silicon bridges that became the foundation for Intel's EMIB technology. His early insights have led to high-performance, cost-effective cooling solutions for high-end microprocessors and the proliferation of photo-mechanics techniques for thermo-mechanical stress model validation. His contributions during his Intel career have earned him numerous industry honors, including the SRC's 2015 Mahboob Khan Outstanding Industry Liaison Award, the 2016 THERMI Award from SEMITHERM, the 2016 Allan Kraus Thermal Management Medal & the 2018 InterPACK Achievement award from ASME, the 2019 "Outstanding Service and Leadership to the IEEE" Awards from IEEE Phoenix Section & Region 6 and most recently the 2020 Richard Chu ITherm Award and the 2020 ASME EPPD Excellence in Mechanics Award. He is one of the founding editors for the Intel Assembly and Test Technology Journal (IATTJ) and currently VP of Publications & Managing Editor-in-Chief of the IEEE Transactions of the CPMT. He has long been associated with ASME's InterPACK conference and was Conference Co-Chair of the 2017 Conference. Ravi is a Fellow of two leading societies, ASME and IEEE. He was elected to the National Academy of Engineering in 2022 for contributions to advanced microelectronics packaging architectures and their thermal management.

Tuesday — April 23, 2024
8:15 AM - 9:15 AM

Plenary Lecture at CH2M Hill Alumni Center, Cascade Ballroom

JOSÉ N. REYES

Affiliation: NuScale Power

Title: The Role of Thermal and Fluid Engineering in Meeting 21st Century Climate Goals

Abstract: Meeting global energy needs in a carbon-constrained world is driving energy innovation. An abundance of clean and resilient energy is needed to lift nearly six billion people out of energy poverty while simultaneously reducing carbon emissions. Energy innovations such as wind, wave, solar power, and small modular reactors (SMR) rely on thermal and fluid engineering to design, scale, optimize, and validate their clean energy systems. This presentation will provide insights from NuScale Power on how thermal and fluid engineering was used to develop its SMR and how they are currently being used to develop Integrated Energy Systems to meet 21st century climate goals..

Bio: Adela José N. Reyes, Ph.D., co-founded NuScale Power, LLC, co-designed the NuScale passively-cooled small nuclear reactor and has served as the company's Chief Technology Officer since 2007. Dr. Reyes is an internationally recognized expert on passive safety system design, testing and operations for nuclear power plants. He has served as a United Nations International Atomic Energy Agency technical expert on passive safety systems, is a co-inventor on more than 180 patents granted or pending in 20 countries and has received several national awards including the 2013 Nuclear Energy Advocate Award, the 2014 American Nuclear Society Thermal Hydraulic Division Technical Achievement Award, the 2017 Nuclear Infrastructure Council Trailblazer Award, the 2021 American Nuclear Society Walter H. Zinn Medal, and 2021 inductee into the University of Maryland Innovators Hall of Fame.

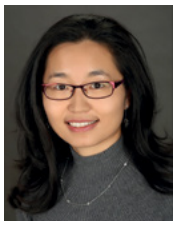
Dr. Reyes is a fellow of the American Nuclear Society (ANS), a NURETH fellow, and a member of the National Academy of Engineering. In the past, he has served as head of the Oregon State University (OSU) Department of Nuclear Engineering and Radiation Health Physics, directed the Advanced Thermal Hydraulic Research Laboratory and was the Co-Director of the Battelle Energy Alliance Academic Center of Excellence for Thermal Fluids and Reactor Safety in support of the Idaho National Laboratory mission.

Dr. Reyes currently serves as a Professor Emeritus in OSU's School of Nuclear Science and Engineering. He holds Ph.D. and Master of Science degrees in nuclear engineering from the University of Maryland and a Bachelor of Science degree in nuclear engineering from the University of Florida. He is the author of numerous journal articles and technical reports, and he has given lectures and keynote addresses to professional nuclear organizations in the United States, Europe and Asia. He is a licensed professional engineer in the state of Oregon.

Wednesday — April 24, 2024
8:15 AM - 9:15 AM

Plenary Lecture at CH2M Hill Alumni Center, Cascade Ballroom

Keynote Speakers



XINYU ZHAO

Affiliation: University of Connecticut

Title: Recent progress of radiation modeling in combustion environment

Abstract: Thermal radiation is an important heat transfer mechanism in combustion environment, such as in fire and gas turbine combustors. Emitted and absorbed by participating media such as CO2, H2O, CO and soot, thermal radiation can change temperature distribution, and subsequently impacts ignition and extinction of flames as well as pollutant emission. Thermal radiation that reaches the combustor enclosures contributes directly to local heat flux and can sometimes lead to increased thermal stress and eventual failure of the enclosing material. Modeling of radiation in combustion systems has always been a challenge, due to its complexity and potentially prohibitive computational cost. In this presentation, we present our recent efforts in applying Monte Carlo ray tracing solver with line-by-line spectral dataset to a series of flames, including laminar flames, a small heptane pool fire, and a gas-turbine combustor. Characteristics of radiation in combustion is delineated through these examples and a reduced-order model is proposed. Finally, our latest effort in developing a GPU-accelerated Monte Carlo ray tracing (MCRT) solver is presented. The computational cost is significantly reduced, making the solver a possible game-changer for modeling thermal radiation in combustion applications.

Bio: Prof. Xinyu Zhao is an associate professor at University of Connecticut. She joined the Mechanical Engineering Department in Spring 2015 as an assistant professor, and prior to that, she was a postdoctoral research fellow in Combustion Energy Frontier Research Center at Princeton (2014), co-sponsored by Sandia National Laboratory and Pennsylvania State University. She received her Ph. D. degree in Mechanical Engineering from Pennsylvania State University (2013), and she received her Bachelor's and Master's degrees in Thermal Engineering from Tsinghua University in 2006 and 2008, respectively. Prof. Zhao's research program is supported by NSF CISE, the American Chemical Society Petroleum Research Fund, NASA, NSF C-BET, AFOSR, and ONR. She has also been actively working with industrial partners such as FM Global and Raytheon Technologies Research Center. Prof. Zhao is the recipient of the AFOSR YIP award, NSF CAREER award, and Combustion institute's Irvin Glassman Young Investigator award. Her research interest includes detailed radiation modeling for multiphase combustion systems, turbulent combustion modelling, the interplay between experiments and computation, as well as high-performance computing.

Monday — April 22, 2024
2:15 PM - 3:00 PM

Keynote Session in Parallel at LaSells Stewart Center
Construction & Engineering Hall

BORIS KRAMER

Affiliation: University of California

Title: Data-driven Reduced-order Modeling for Large-scale Fluid Models

Abstract: Computational fluid mechanics produces high-dimensional discretizations of thermal fluid systems. The use of these computationally expensive simulations in uncertainty quantification, control, design and long-time evolution is often prohibitive. In this talk, we first present data-driven reduced-order modeling as a class of methods to approximate high-dimensional dynamical systems with low-dimensional systems, often characterized by the dynamically relevant solution spaces. In particular, we will discuss the operator inference framework and illustrate how one can learn reduced-order models non-intrusively from high-dimensional data, and how additional knowledge—which is often present about fluid dynamical and other mechanical systems—can be embedded as constraints for the resulting optimization problem. We also present several extensions that focus on preserving interesting structures in the dynamics, such as symmetries, conservation principles, symplecticity. We will illustrate the results on a 2d rocket combustion application as well as some energy-preserving systems where we leverage the Hamiltonian structure in the model learning framework. This guarantees that the learned models are long-term stable and energy-conserving. Several fluid flows are shown as example applications.

Bio: Boris Kramer is an Assistant Professor in Mechanical and Aerospace Engineering at the University of California San Diego. Prior to joining UC San Diego, he spent four years as a Postdoctoral Associate in the department of Aeronautics and Astronautics and the Aerospace Computational Design Lab (ACDL) at the Massachusetts Institute of Technology (MIT).

He received his M.Sc. (2011) and Ph.D. (2015) in Mathematics from Virginia Tech. Prior to that, he studied Mathematics in Technology and Mechanical Engineering at the University of Karlsruhe (now KIT), Germany. He is a member of the Society for Industrial and Applied Mathematics (SIAM), and a Senior Member of AIAA where he also serves on the Multidisciplinary Design Optimization and Nondeterministic Approaches Technical Committees. He is a 2022 NSF CAREER Awardee and won a DoD Newton Award in 2020. His research is funded by the Office of Naval Research (ONR), the Defense Advanced Research Projects Agency (DARPA) and the National Science Foundation. His research interests are to develop computational methods and numerical analysis for control, optimization, design and uncertainty quantification of complex and large-scale systems.

Monday — April 22, 2024
3:00 PM - 3:45 PM

Keynote Session in Parallel at LaSells Stewart Center
Construction & Engineering Hall

RENATO MACHADO COTTA

Affiliation: Federal University of Rio de Janeiro

Title: Computational-Analytical Integral Transform and CPU-Intensive Simulations in Heat and Fluid Flow

Abstract: Computational fluid dynamics and heat transfer has been advanced since the second half of the 20th century, in parallel to computer hardware evolution, offering simulation tools for modern thermal and fluids engineering design. Nevertheless, classical analytical approaches for partial differential equations remained in use, along this same period, due to benchmarking and preliminary conceptual design needs. Analytical methods offer evident advantages in precision, robustness, and computational speed, but are very restricted by the complexity of the mathematical formulations. To narrow this gap, hybrid numerical-analytical methodologies have been proposed along the way to benefit from both the accuracy and robustness of an analytic-based solution path and the flexibility of numerical methods. One such hybrid approach is the so called Generalized Integral Transform Technique (GITT), which is a generalization of the classical integral transform method. The immediate gain was the expansion of the benchmarks database for the verification of numerical codes and the expansion on the classes of problems that can be dealt with in preliminary design. However, the GITT was progressively extended for about forty years, leading to a widely applicable computational-analytical approach that deals with nonlinear formulations, irregular domains, heterogeneous media, coupled problems, moving boundaries, boundary layer and Navier-Stokes equations. Also, in CPU-intensive simulations that require numerous evaluations of a partial differential system solution, which may include optimization, inverse problem analysis, simulation under uncertainty, and physically informed neural networks, the analytic nature behind the hybrid methodology leads to more evident advantages. The GITT is here reviewed and illustrated, emphasizing recent methodological developments, for two selected transport phenomena forward-inverse problem solutions.

Bio: Prof. Renato M. Cotta was born in Niterói, Brazil, on March 5th, 1960. He obtained his B.Sc. in Mechanical-Nuclear Engineering, at the Federal University of Rio de Janeiro, UFRJ, Brazil, in 1981, and his PhD in Mechanical-Aerospace Eng. from North Carolina State Univ., NCSU, USA, in 1985. He became Assistant Professor at the Aeronautics Technological Institute, ITA, Brazil, 1985-1987, then Associate Prof., at UFRJ, in 1987, and Professor, at COPPE-UFRJ in 1994, and at POLI-UFRJ in 1997, until the present. Author of around 600 articles, 10 books, and supervisor of 49 MSc, 39 PhD, and 18 PosDocs. He is member of 15 Editorial Boards, including Int. J. Heat & Mass Transfer, Int. Comm. Heat & Mass Transfer, Int. J. Thermal Sciences, and Editor of the Annals Braz. Academy of Sciences. Served as President of the Braz. Association of Mechanical Sciences & Engineering, ABCM, from 2000-2001, as member of the Scientific Council, International Centre for Heat & Mass Transfer, ICHMT, since 1993, of the Executive Comm. ICHMT, 2006-2022, ICHMT EC Chairman, 2017-2018, and Congress Comm., Int. Union of Theoretical & Applied Mechanics, IUTAM, 2012-2018. Served as Exec. Director for the Brazilian Academy of Sciences, 2012-2015. He received the ICHMT Hartnett-Irvine Award, 2009 and 2015, the ICHMT Fellowship Award, 2019, the National Order of Scientific Merit, Brazil, in 2009 (Comendador) and 2018 (Grã-Cruz), and the National Order of Naval Merit, Brazil, 2018. He was awarded the prestigious Luikov Medal of the ICHMT, 2022. Member of the Brazilian Academy of Sciences, since 2009, National Engineering Academy, since 2011, and The World Academy of Sciences, TWAS, since 2012. Holds the Doctor Honoris Causa title from Université de Reims, URCA, France, 2018. President of the National Commission of Nuclear Energy, CNEN, both regulatory body and science promoter in nuclear energy in Brazil, 2015-2017. Adjunct Professor at the University of Miami, 1993-2005, and Leverhulme Trust Visiting Prof. at Univ. College London, UCL, UK. Member of the National Council of Energy Policy, CNPE, Ministry of Mines and Energy, Brazil, 2020-2022. Member of Technical Working Group (TWG) in Nuclear Desalination, IAEA, 2021-2024. Since 2017, Senior Technical Consultant (Amazul Defense Tecnologies), in Nuclear and Technological Development, for the Brazilian Navy.

Monday — April 22, 2024
2:15 PM - 3:00 PM

Keynote Session in Parallel at CH2M Hill Alumni Center, Cascade Ballroom

ALI KOŞAR

Affiliation: Sabanci University

Title: New generation functional surfaces for manipulation of phase change phenomena

Abstract: Boiling, cavitation, droplet condensation and freezing are basic phase change phenomena. Performance enhancements and energy efficiency can be achieved with surface modification for these phase change phenomena. As a result, many surface modification techniques have been proposed and investigated in the literature. One of the most promising approaches include the use of modified surfaces with mixed wettability along the surface, which are capable of manipulating the phase change phenomena and pay way to energy and biomedical applications. The optimization efforts for various modified surfaces in boiling, cavitation, dropwise condensation and freezing could be made so that with the optimum configurations of surfaces with mixed wettability depending on the application and phase change phenomenon it will then be possible to have significant energy saving and efficiency in thermal-fluids systems involving phase change. In this talk, research efforts and recent developments in this field will be discussed.

The second part of the talk will focus on an effective and practical method for having the same effect of modified surfaces with surface enhancements via next generation bio-coatings based on hyperthermophilic archaea and antifreeze proteins, which are durable, environmentally friendly, inexpensive, have unique structures and offer surface modification without the use of any cleanroom fabrication techniques. The results of fundamental studies on these surfaces will be presented for boiling, dropwise condensation and freezing.

Bio: 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, freezing and cavitation. He co-authored over 170 research articles in top journals and 80 conference papers in prestigious international conferences. He has also a co-inventor on 8 granted patents and 10 pending patent applications. He received numerous national and international honors, including the μFIP Prominent Researcher Award" in the 2021 micro Flow and Interfacial Phenomena (μFIP) 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 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 and is a Member of Turkish Academy of Sciences (TÜBA).

Monday — April 22, 2024
3:00 PM - 3:45 PM

Keynote Session in Parallel at CH2M Hill Alumni Center, Cascade Ballroom

SARA S. MCALLISTER

Affiliation: U.S. Department of Agriculture

Title: Wildland fire: how did we get here and the thermo-fluid research needed

Abstract: Impacts from wildland fires have seemingly only increased as wildfires now routinely make headlines, pump smoke across the continent, and burn more structures and area every year. This talk will begin by introducing the causes of the current “wildfire problem” in the U.S.: the growth of the Wildland-Urban Interface (WUI), climate change, and the more than one hundred years of fire exclusion from the landscape. Our history of wildland fire relates to both the cause and the cure for the current “wildfire problem”. The path forward requires accepting that wildland fires will, and should, happen, but it needs to be the right kind of fire under the right conditions. Unfortunately, fundamental understanding of the processes controlling wildland fire behavior is lacking and this limits our ability to safely train our firefighters, predict fire behavior, and understand how to mitigate its effects. An overview of the current work at the Missoula Fire Sciences Lab to address this lack of understanding will be given, highlighting the important role of thermal and fluid dynamics in wildfire behavior. However, much more work needs to be done before we have confidence in our prediction capabilities and be able to reduce the impact of wildland fire on our communities. The talk will conclude with a discussion of these outstanding research needs.

Bio: Sara McAllister earned her Ph.D. in Mechanical Engineering in 2008 from the University of California, Berkeley. Her Ph.D. dissertation, sponsored by NASA, focused on material flammability in spacecraft. Since 2009, she has been a Research Mechanical Engineer with the U.S. Forest Service at the Missoula Fire Sciences Laboratory in Missoula, Montana. As part of the National Fire Decision Support Center, Sara’s research focuses on the fundamental governing mechanisms of wildland fire spread. Specifically, her research includes understanding the critical conditions for solid fuel ignition, flammability of live forest fuels, ignition due to convective heating, and fuel bed property effects on burning rate. She has authored two textbooks, one on combustion fundamentals and one on wildland fire behavior, as well as over 80 peer-reviewed publications and conference papers. In her spare time, Sara enjoys cycling, running, and racing in triathlons.

Tuesday — April 23, 2024
1:00 PM - 1:45 PM

Keynote Luncheon Talk at CH2M Hill Alumni Center, Cascade Ballroom

DORTHE WILDENSCHILD

Affiliation: Oregon State University

Title: Mission Impossible: 3D imaging, quantification and visualization of microbial biofilms in fluid-filled opaque porous media

Abstract: Exploring biofilms in three dimensions in porous media is a long-standing challenge. X-ray tomography allows for visualization of a variety of porous materials and associated processes, but because of the absence of a significant photon cross-section for biofilms (it rather closely resembles the aqueous phase in porous media), getting at the three-dimensional architecture of biofilms in porous media is challenging. However, by innovative use of contrast agents, it is possible to separate the biofilm from porous medium and aqueous phase, and to make a variety of quantitative measurements in support of the overall objective of better understanding of biofilm growth and function. This allows for applications in a variety of fields such as groundwater remediation, microbial fuel cells, enhanced oil recovery, clogging of trickling filters, and fouling of medical implants.

In this work, we use micro-imaging to study the effects of flow rate on three-dimensional growth of biofilm in porous media. The images allow us to gain a better understanding of how biofilms grow and interact with the pore geometry, nutrients, and the fluid flow environment in the subsurface. In this particular study, three flow rates were applied to evolving biofilms, and observed after a growth period of 11 days. At the end of the growth period, all columns were scanned using x-ray computed microtomography and a barium sulfate-based contrast agent to distinguish the biofilm. Reduction in permeability due to biofilm growth was studied using both transducer-based pressure drop measurements and image-based calculations.

A combination of results from these different measurements suggest that biofilm growth was oxygen limited at the lowest flow rate, and affected by shear stresses at the highest flow rate. We hypothesize that the interplay between these two factors drives the spatial distribution and quantity of biofilm growth in the class of porous media studied here. Our approach opens the way to more systematic studies of the structure-function relationships involved in biofilm growth in porous media.

Bio: Dr. Wildenschild is a Professor of Environmental Engineering in the School of Chemical, Biological, and Environmental Engineering at Oregon State University, and the Jon and Stephanie DeVaan Chair and Executive Director for Clean Water Initiatives at OSU.

Her research focuses on flow and transport in porous media, with the goal of answering questions of relevance to subsurface water pollution and energy-related storage challenges. Recent work includes optimization of geologic storage of anthropogenic carbon dioxide; colloid-facilitated transport of contaminants in groundwater; exploration of biofilms in porous media using high-resolution 3D imaging, and fundamental investigations in support of more effective groundwater remediation techniques. She is the recipient of the 2023 Interpore Society's Honorary Lifetime Award, and was the 2014 Henry Darcy Distinguished Lecturer in Groundwater Science.

Tuesday — April 23, 2024
3:45 PM - 4:30 PM

Keynote Session in Parallel at LaSells Stewart Center
Construction & Engineering Hall

BRIAN M. FRONK

Affiliation: Pennsylvania State University

Title: System and Component Level Challenges in Thermochemical Energy Storage

Abstract: Thermochemical storage systems can enable high energy density, long duration storage at temperatures spanning from building space heating to utility scale power generation. Significant effort has been focused on the development of new material systems. However, there has been less attention on the practical system- and component-level issues of integrating these materials into energy storage technologies. Thus, the objective of this talk is to present research on the thermal engineering challenges of implementing these materials in energy storage systems. We will focus on (1) the use of redox-active metal oxide particles for enabling high temperature thermal storage coupled to closed power cycles, and (2) the use of salt hydrate materials in closed and open systems for providing thermal storage and thermal amplification when integrated with heat pump systems. Our initial results show opportunity for the collaborative co-design and optimization of thermochemical energy storage technology from the material to system scale to maximize efficiency and minimize costs.

Bio: Dr. Brian Fronk is an Associate Professor in the Department of Mechanical Engineering at The Pennsylvania State University. From 2014-2022 he was an Assistant and then Associate Professor of Mechanical Engineering at Oregon State University. He received his Ph.D. and M.S. in Mechanical Engineering from the Georgia Institute of Technology, and his B.S. from the Pennsylvania State University.

His research interests include solar thermal power generation and chemical processing, energy storage, building energy systems, application of advanced manufacturing to novel heat and mass transfer devices, and the experimental investigation of multiphase and supercritical heat transfer. He has held a prior position at Carrier Corp., where he worked in the areas of CO2 compression and transport refrigeration. He is the recipient of an NSF CAREER award, the 2017 ASHRAE New Investigator Award, and the Oregon State University International Service Award. He is a registered professional engineer in the State of Oregon.

Tuesday — April 23, 2024
3:45 PM - 4:30 PM

Keynote Session at CH2M Hill Alumni Center, Cascade Ballroom

TEC Talk Speakers

TECHNOLOGY I ENTREPRENEURSHIP I COMMUNICATION
FROM IDEA TO TECHNOLOGY TO PRODUCT

BAHMAN ABBASI

Affiliation: Oregon State University

Title: Production of Lithium Salts by Thermal and Cyclonic Desalination

Abstract: Our technology addresses a vital national security need by producing Li salts from domestic sources with a cost-effective and environmentally benign containerized process. It displaces the environmentally damaging solar evaporation ponds used today. We project that our technology will reduce the cost of Li2CO3 by over 80% compared with today's spot market price and by almost half compared with today's production cost. In addition to this cost reduction, our transformational impact is in turning U.S. brine deposits into valuable resources for environmentally benign Li production, thereby enhancing our national energy security in an era marked by rapid electrification of the transportation sector and grid scale electricity storage.

Bio: Dr. Bahman Abbasi is Founder of Espiku Inc. and an Associate Professor of Mechanical and Energy Systems Engineering at Oregon State University. His research is supported by over $8.5M in external funding from US DOE, US DOD, State of Oregon, and the private sector.

His research spans water desalination, wastewater treatment, extraction of minerals from brine, low-grade heat recovery, transport phenomena, and application of machine learning in thermal-fluid processes.

Tuesday — April 23, 2024
2:30 PM - 3:30 PM

TEC Talk Session at CH2M Hill Alumni Center, Cascade Ballroom

JONATHAN HURST

Affiliation: Oregon State University

Title: Human-Centric Robots: Creating Embodied AI

Abstract: Humans have dreamt of robot helpers forever. What's new is that this dream is about to become real. There is not a single silver bullet that is enabling this development; it's a broad array of new actuation, sensors, control algorithms, and a regulatory environment focused on enabling safe deployments. This talk will share an overview of modern control concepts generally described under the umbrella of Artificial Intelligence, and considerations beyond the technical aspects, including human-robot interaction and safety.

Bio: Jonathan W. Hurst is Chief Robot Officer and co-founder of Agility Robotics, and Professor and co-founder of the Oregon State University Robotics Institute. He holds a B.S. in mechanical engineering and an M.S. and Ph.D. in robotics, all from Carnegie Mellon University. Throughout his career, his research has focused on understanding the fundamental science and engineering best practices for robotic legged locomotion and physical interaction. At OSU, he led the team that developed ATRIAS, the first robot to reproduce human walking gait dynamics, and Cassie, which holds the world record for the fastest 100 meter dash by a bipedal robot. Working with the excellent engineering team at Agility Robotics, Jonathan is building upon this R&D foundation to develop human-centric, multi-purpose robots such as Digit, the first commercially available bipedal robot made for real-world logistics work. Jonathan spends every day working to realize his lifelong vision of robots going where people.

Tuesday — April 23, 2024
2:30 PM - 3:30 PM

TEC Talk Session at CH2M Hill Alumni Center, Cascade Ballroom

ASHWANI GUPTA

Affiliation: University of Maryland

Title: Near-Critical CO2-Assisted Liquefaction-Extraction of Biomass and Wastes to Fuels and Value-Added Products

Abstract: With growing need for sustainable carbon neutral liquid fuels, low-grade feedstocks such as lignocellulosic biomass, and municipal solid wastes offer sufficient potential via thermochemical conversion. The existing thermochemical conversion offer limited feed flexibility, and scalability, and require significant processing (energy and costs) of the intermediates. Bio-oil/biocrude intermediate from fast-pyrolysis and hydrothermal techniques is impeded with issues of stability and oxygen content, along with hydro-treating viability. A novel pathway will be presented of near-critical CO2-assisted integrated liquefaction-extraction (NILE) technology for conversion of various biomass and municipal solid wastes into high-quality biocrude with high compatibility for co-hydrotreating with traditional fossil crude for liquid fuel needs in power and transportation sectors. Using supercritical CO2 for dewatering of wet feedstocks, and for liquefaction and extraction of lighter biocrude has produced biocrude with lower oxygen content (by 50%), lowered metal content (by 90%), and good stable viscosity, low acidity, and good aging stability compared to that produced from hydrothermal liquefaction along with higher hydrotreating and co-hydrotreating compatibility.

Bio: Professor Ashwani K. Gupta has been a faculty member in the Mechanical Engineering Department at the University of Maryland, College Park since 1983, following six years at MIT as a member of the research staff in the Energy Laboratory and Department of Chemical Engineering, and three years at Sheffield University as an independent research worker and research fellow in the Department of Chemical Engineering and Fuel Technology. He has 45+ years of experience in Combustion engineering since his graduation from Southampton University in 1970, and is the author of over 825 technical papers, three books, 18 edited books, and 19 book chapters. In 2023, Gupta was elected to Fellowship of the Royal Academy of Engineering (FREng). In 2020, he was elected to Honrary Fellowship of the Royal Aeronautical Society (RAeS), UK, the highest professional recognition bestowed by the RAeS. He is currently Honorary Fellow of American Society of Mechanical Engineers (ASME), and Fellow of American Institute of Aeronautics and Astronautics AIAA), Society of Automotive Engineers (SAE) and the American Association for the Advancement of Science (AAAS), and Member of the European Academy of Sciences and Arts (EASA). In 2022, Gupta was included in the top 2% of the scientists in the world by Stanford University which includes the researchers who receive the most citations across all academic fields.

Tuesday — April 23, 2024
2:30 PM - 3:30 PM

TEC Talk Session at CH2M Hill Alumni Center, Cascade Ballroom

JOSHUA GESS

Affiliation: Oregon State University

Title: Building a Holistic Portfolio of Electronics Cooling Solutions to Address Climate Change

Abstract: Climate change is real and electronics cooling can help. High GWP and ODP coolants were slated to handle the energy densities of future electronics, but it is imperative that we limit and/or phase out these chemicals to protect our environment for future generations. Thermal resistance is a fundamental thermodynamic irreversibility, and it is incumbent on the thermal management community to exploit new breakthroughs in manufacturing, energy systems, and chemistry to minimize these resource-robbing thermal resistances in order to be good stewards of the precious and dwindling energy sources we have here on Earth. In this talk, we will highlight the work that the Enhanced Heat Transfer Laboratory (EHTL) at Oregon State University (OSU) and others are doing on these fronts in order to effectively and efficiently design for high heat flux electronics components that are slated for the coming years. Performance augmenting features only made possible through additive manufacturing will feature prominently in the talk. Performance and design considerations of replacement coolants for the PFAS family of fluids currently under scrutiny will be discussed. While there is no single solution to this problem for any specific geographic region, there is a holistic portfolio of solutions that can be constructed from current technology that can make an impact now. Those possibilities will be highlighted throughout the work presented in this talk.

Bio: Joshua Gess's research interests lie in the advancement of thermal management solutions for near and far-term high performance microelectronic equipment. To accomplish this, we must look at new ways to model and experimentally capture the characteristics of single and two-phase heat transfer occurring on the macro-scale with passive and active liquid immersion techniques as well as on the micro and nano scale for more complex embedded thermal management solutions. Using fundamental knowledge of heat transfer along with novel experimental methods such as two-phase PIV and high-speed image capture, predictive methods can be used to ensure that reliable and energy efficient thermal management solutions are applied to tomorrow's demanding electronics systems.

At Oregon State since 2015.

Tuesday — April 23, 2024
2:30 PM - 3:30 PM

TEC Talk Session at CH2M Hill Alumni Center, Cascade Ballroom

Invited Special Talk Speaker

ORONZIO MANCA

Affiliation: University of Campania "Luigi Vanvitelli"

Title: A numerical study of the metal foam thickness effect on impinging round jets in channel partially filled with metal foam

Abstract: A parallel-plate channel filled partially with a high permeability metal foam and a single round jet impinging on the foam is investigated numerically. The opposite wall to the air round jet is partially heated at uniform heat flux. The fluid flow in the channel is assumed two dimensional and the porous medium is modeled using the Brinkman–Forchheimer-extended Darcy model. The structure of the porous medium is homogenous and isotropic, the thermophysical properties of the air and the porous medium are temperature independent, and the fluid flow is steady state, laminar and incompressible. The analysis in the porous medium is accomplished under local thermal equilibrium conditions and a two-dimensional numerical axial symmetric model is developed to evaluate the hydrodynamic and heat transfer characteristics within the channel. The problem is solved employing the Ansys-Fluent code. The analysis is accomplished for different ratio between the heated plate distance from the jet exit section and metal foam thickness for different Reynolds jet numbers, and wall heat flux. Results in terms of stream function and fluid and solid matrix temperature fields, wall temperature profiles, air velocity and temperature as well as solid profiles along the transversal section of porous medium are given in the Peclet number range from 1 to 1000 and four Rayleigh number values are examined, from 10 to 1000. Nusselt numbers and pressure drops are estimated. Results indicate that for the channel with a porous medium thickness equal to the channel gap the highest Nusselt number is detected.

Bio: Oronzio Manca currently works at the Dipartimento di Ingegneria, Università degli Studi della Campania "Luigi Vanvitelli". Oronzio does research in Engineering Education and Mechanical Engineering. Their current project is 'Nanouptake_ COST action'. Skills and Expertise: Computational Fluid Dynamics, Engineering Thermodynamics, Numerical Simulation, Numerical Modeling, Aerodynamics, Numerical Analysis, Fluid Mechanics, CFD Simulation, Thermal Engineering, Modeling and Simulation.

Wednesday — April 24, 2024
12:45 PM - 1:45 PM

Invited Luncheon Talk at CH2M Hill Alumni Center, Cascade Ballroom

First Annual ASTFE Nuclear Thermal Hydraulics CFD Competition

Blind data will be collected from a forced/natural convection scenario at University of Michigan's multi-jet Gas-mixture Dome (MiGaDome) facility. We invite all CFD'ers to attempt to replicate those data. All teams' results will be presented and compared with the blind data during a session at the conference. **An award of 5,000 USD will be given to the team with results closest to the blind data**.

Chair: Wayne Strasser, Liberty University

Speakers: Keith Walters, University of Arkansas; Ivana Barley, Southern University and A&M College; Trevor Howard, Oregon State University; Mahyar Pourghasemi, Western New England University; Abdallah Sofiane Berrouk, Khalifa University of Science and Technology

Monday — April 22, 2024
11:15 AM - 12:45 PM at session 1G

LaSells Stewart Center, Agriculture Leaders Room

ASTFE-NSF IRES Project Student Poster Session (Oral Presentation)

This session showcases student presenters who participated in the NSF-funded IRES Track III project focused on International Research Experience and Professional Development in Built Environment Sustainability. Administered by Louisiana State University in collaboration with ASTFE and the National University of Singapore, the project offers students the opportunity to conduct research in Singapore on various topics related to built environment sustainability after receiving training through the Center of Leadership Development in Built Environment Sustainability. The session will highlight the experiences of these students and their research findings.

Chairs: Yimin Zhu, Louisiana State University; Yong Tao, Cleveland State University

Co-Chairs: Tyree Mitchell, Louisiana State University; Tracey Rizzuto, Louisiana State University

Speakers: Amanda Worthy, University of Washington; Bethany Hager, Louisiana State University; Maya Mueller, Drexel University; Caleb Calfa, Texas A&M University; Nathaniel Smith, Texas A&M University; Rachel Gray, George Washington University; Jennifer L Gil Acevedo, University of Puerto Rico; Di Wu (Lyla), Florida International University; Eliza Searles, Michigan State University

Monday — April 22, 2024
4:00 PM - 5:30 PM at session 2G

LaSells Stewart Center, Agriculture Leaders Room

National Science Foundation

Generous financial support from

National Science Foundation (NSF)

is gratefully acknowledged.

This funding provided support for many students and early career faculty/ researchers to attend the conference.

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INTRODUCTION TO MODERN COMPUTATIONAL FLUID DYNAMICS

WORKSHOP OUTLINE

Module 1: Background & Brief History

Module 2: The Governing Equations

Module 3: The Finite Volume Method

Module 4: Essential Numerical Concepts

Module 5: Turbulence

Module 6: Promises & Pitfalls

Module 7: Emerging Trends and CFD of the Future

APRIL 21, 2024

Oregon State University, Corvallis, OR, USA (from 10 AM to 4 PM)

CH2M Hill Alumni Center, Elle/Burlingham Room 111 A/B

Dr. Akshai Runchal

President and Founding Partner, ACRi

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MESHLESS METHODS FOR FLUID FLOW SIMULATIONS IN COMPLEX DOMAINS

WORKSHOP OUTLINE

Module 1: Interpolation of scattered data, global and cloud-based methods. Accuracy and stability

Module 2: Solution of heat conduction equation, multidomain methods

Module 3: Explicit and Semi-implicit fractional step methods for fluid flows

Module 4: Multilevel meshless method

APRIL 21, 2024

Oregon State University, Corvallis, OR, USA (from 9 AM to 4 PM)

CH2M Hill Alumni Center, Trysting Tree Room 114 A/B

Pratap Vanka

Department of Mechanical Science and Engineering, UIUC

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- Experience Collaborative Learning

Eligible applicants must be a U.S. citizen or permanent resident.

Monday at 4:00 PM - 5:30 PM

at session 2G: ASTFE-NSF IRES Project Student Poster session
at LaSells Stewart Center, Agriculture Leaders Room

Sunday — April 21, 2024

Time	Session	Room	Author
12:00 PM - 6:00 PM	**Conference Registration**	**CH2M Hill Alumni Center** Foyer	
12:00 PM - 2:00 PM	**ASTFE Board of Directors Meeting (Closed Door)**	**CH2M Hill Alumni Center** Willamette Room 115 A/B	
9:00 AM - 4:00 PM	**Course on Meshless Methods for Fluid Flow Simulations in Complex Domains**	**CH2M Hill Alumni Center** Trysting Tree Room 114 A/B	**Pratap Vanka** Department of Mechanical Science and Engineering, UIUC
10:00 AM - 4:00 PM	**Course on Intro to Modern CFD**	**CH2M Hill Alumni Center** Elle/Burlingham Room 111 A/B	**Akshai Runchal** President and Founding Partner, ACRi
3:00 PM - 4:00 PM	**ASTFE Executive Committee Meeting (Closed Door)**	**CH2M Hill Alumni Center** Willamette Room 115 A/B	
4:00 PM - 5:00 PM	**ASTFE Board of Directors Meeting and Executive Committee Meeting (Open Door)**	**CH2M Hill Alumni Center** Willamette Room 115 A/B	
5:00 PM - 7:00 PM	**Welcome Reception** (Associate Dean David Blunck, *Oregon State University*; Yong Tao, *Past President of ASTFE*; Lorenzo Cremaschi, *Chair of ASTFE Executive Committee*, Hamidreza Najafi, *Technical Program, Conference Tools, Venue, Events Overview*; David Blunck *on NSF funding*; Akshai Runchal: *Brief on the Course on Into to Modern CFD*; Pratap Vanka: *Brief on the Course on Meshless Methods*, Ashwani Gupta: *Into on IJECE journal*; Wilson Chiu: *Into on CTS journal*; Exhibitors and Sponsors: *Begell House, publishers, NSF, OSU*)	**CH2M Hill Alumni Center** Cascade Ballroom & Foyer	

Monday — April 22, 2024

Time	Session	Room	Title	Author
8:00 AM - 10:00 AM	**Breakfast and coffee**	**CH2M Hill Alumni Center** Foyer & South Hall		
8:00 AM - 8:30 AM	**Welcome Address Opening Remarks**	**CH2M Hill Alumni Center** Cascade Ballroom	Dean Scott Ashford, *College of Engineering at OSU*; Yogesh Jaluria, *Past President of ASTFE*; Hamidreza Najafi, *Technical Program overview*; Nesrin Ozalp: *Conference Tools, Venue and Events Overview*	
8:30 AM - 9:30 AM	**Plenary Lecture 1**	**CH2M Hill Alumni Center** Cascade Ballroom	**Thermal and Optical Evaporation**	**Gang Chen** Massachusetts Institute of Technology **Moderator: Nesrin Ozalp** Illinois State University
9:30 AM - 9:45 AM	**Break**			
9:45 AM - 11:00 AM	**PANEL 1** **Moderator: Hamidreza Najafi** Florida Institute of Technology	**CH2M Hill Alumni Center** Foyer & South Hall	**Funding Opportunity for Advancements in Thermal and Fluids Engineering**	**Yogendra Joshi** Defense Advanced Research Projects Agency (DARPA) **Sumanta Acharya** National Science Foundation **Philseok Kim** Advanced Research Projects Agency–Energy **Yaroslav Chudnovsky** U.S. Department of Energy
11:00 AM - 11:15 AM	**Break**			
	One to one meeting with Program Directors of Funding panel	**CH2M Hill Alumni Center** Johnson Library 101 & Stevenson Conference Room 201	**Sumanta Acharya:** Monday 11:15 AM - 12:45 PM; Tuesday 11:00 AM - 12:30 PM **Yogendra Joshi:** Monday 11:45 AM -12:45 PM **Yaroslav Chudnovsky:** Monday 4:00 PM - 5:30 PM **Phil Kim:** Monday 4:00 PM - 5:30 PM	
Technical Session 1				
Morning SESSIONS				
11:15 AM - 12:45 PM	**SESSION 1A** **FD-TS: Fundamentals in Fluid Flow and Heat/Mass Transfer** **Chair: Kishan Bellur** University of Cincinnati	**CH2M Hill Alumni Center** Willamette Room 115A	50530 - The Role of Aspect Ratio on Rayleigh-Bénard Cell Formation for the Planetary Cloud Aerosol Research Facility	Ivana Barley Southern University and A&M College
			50844 - A High-Efficiency GPU-Optimized Algorithm for Conjugate Heat Transfer Simulations	Arthur Mendonca de Azevedo Aeronautics Insitute of Technology
			51008 - Numerical investigation of the thermal turbulent flow in a square channel rib-roughened by detached V-shaped ribs	Isaac Lorenzo Mercado Karlsruhe Institute of Technology
			50259 - Investigation of a Self-Adaptive Hybrid Passive Radiative Cooling System for Building Energy-Saving Performance	Siru Chen Chi Yan Tso School of Energy and Environment

Time	Session	Room	Title	Author
11:15 AM - 12:45 PM	**SESSION 1B** **ES: Advanced Energy Systems-01** **Chair:** **Ethan Languri** Tennessee Tech University	**CH2M Hill Alumni Center** Willamette Room 115B	50390 - High Efficiency Air Delivery System for Solid Oxide Fuel Cell Power Generation	Lars Mitchel Colorado State University
			50561 - A Thermal-Hydraulic Analysis Of The INL Boiling Water Reactor Test Facility Using RELAP5-3D	Andrew Prince Oregon State University
			50724 - Metal Hydride Hydrogen Compressor with Improved Heat and Mass Transfer	Ketan Karkare Michigan Technological University
			50878 - On Single- and Two-Phase Thermal Osmosis in PEM Fuel Cell Membranes	Chris Kobus Nicholas Ingarra Oakland University
			51161 - The Effect of Latitude on Wind Farms Power Generation	Reza Nouri University of Memphis
11:15 AM - 12:45 PM	**SESSION 1C** **FD-TS: Computational Methods/ Tools in Thermal-Fluid Systems** **Chair:** **Maryam Shafahi** California State Polytechnic University	**CH2M Hill Alumni Center** Trysting Tree Room 114 A/B	50746 - Impact of Leidenfrost Drops on Spherical Targets: Experimental and Computation Studies	John Allen University of Hawaii
			51932 - Volumetric Energy Deposition Driven Rayleigh-Taylor Instability Experiments	Adam Wachtor Los Alamos National Laboratory
			50437 - Quantum-Inspired Tensor Networks for PDF-FDF Simulations	Peyman Givi University of Pittsburgh
			50458 - Effects of Impeller Vane Count and Casing Type on Slurry Pump Performance Instability	Mohamed Garman GIW Industries Inc.
11:15 AM - 12:45 PM	**SESSION 1D** **TS: Electronics Cooling-01** **Chair:** **Huseyin Bostanci** University of North Texas	**CH2M Hill Alumni Center** Elle/Burlingham Room 111 A/B	50987 - The Effect of Interconnected Microchannels On-Chip Cooling Via Flow Boiling of Water	Titan Paul University of South Carolina Aiken
			52541 - Modeling Heat Flow Across a Compression Bonded GaNDiamond Interface for Vertical Power Devices	Esteban Cook Sandia National Laboratories
			52579 - Fiber Reinforced Polymer Composite Fabricated by Five-Axis 3D Printing System for Enhanced Space Electronics Thermal Management	Yue Xiao Advanced Cooling Technologies, Inc.
			50691 - Numerical and Experimental Analysis on the Effect of Coolant Conditions of WFSM-Inverter Unit with Dual Cooling Passage	Sungjin Yang Korea Electronics Technology Institute
			50926 - Manufacturing of a Cost-Effective Flat Copper Water LHP	Tayyab Mamtaz Newcastle University
11:15 AM - 12:45 PM	**SESSION 1E** **FD: Multiphase Flows and Heat Transfer-01** **Chair:** **Patrick Mensah** Southern University and A&M College	**CH2M Hill Alumni Center** Johnson Lounge 102	49667 - Numerical Analysis of Solar-Driven Water Harvesting from Saturated Vapor Using Electrospray Water Droplet Injection	Lorenzo Cremaschi Ahmet Topcuoglu Auburn University
			50097 - Evaluation of the fluid-particle interaction effect on the axial and radial velocity profiles of a laminar boundary layer in a pipe	Orlando Ayala Old Dominion University
			50098 - Numerical analysis of the coefficients of friction of a particle-laden incompressible fluid flow in a laminar regime between two parallel plates	Orlando Ayala Old Dominion University
			50610 - Development and Validation of Acoustic Measurement Techniques for Void Fraction in Concentric Annular Geometries	Brian Tost The Pennsylvania State University
			50633 - Fluid Dynamics of Double Flow-Focusing Nozzles: a Numerical Study	Rizwan Zahoor Laboratory for Fluid Dynamics and Thermodynamics
11:15 AM - 12:45 PM	**SESSION 1F** **FD-TS: Machine Learning and Artificial Intelligence in Thermo-Fluid Engineering** **Chairs:** **Akshai Runchal** President and Founding Partner, ACRi **Shima Hajimirza** Stevens Institute of Technology	**LaSells Stewart Center** Agriculture Production Room	50466 - Optimization and Sensitivity Analysis of Data-Driven Surrogate Model of a Condenser in a Direct-Contact Packed-Bed Water Desalination System	Mahyar Abedi Michigan State University
			50490 - Machine Learning-Aided Prediction of Thermo-Fluidic Transport Phenomena in Porous Cavity Filled with Hybrid Nanofluid	Abdallah Sofiane Berrouk Khalifa University of Science and Technology
			50655 - Digitization of Water-Energy Systems: A Framework to Optimize Water-Energy Systems and Guide Technology Development	Mohammed A. Elhashimi Khalifa Energy Recovery Inc
			50701 - Curvature Estimation in Context of Interface Capturing Using Machine Learning	Nikhil Kumar Singh Indian Institute of Technology Roorkee
			50849 - Physics-Informed Hybrid Deep Learning Approach in Radiative Transport of Micro-Nanoscale Porous Medium	Farhin Tabassum Stevens Institute of Technology
11:15 AM - 12:45 PM	**SESSION 1G** **FD: CFD Competition** **Chair:** **Wayne Strasser** Liberty University	**LaSells Stewart Center** Agriculture Leaders Room	50997 - RANS and LES Simulation of Mixed Convection in the MiGaDome Test Facility	Keith Walters University of Arkansas
			51140 - Nuclear Thermal-Hydraulics Simulation Using ANSYS: A MiGaDome Benchmark Study	Ivana Barley Southern University and A&M College
			50563 - Star-CCM+ Oregon State Nuclear Engineering Thermal Hydraulics Team	Trevor Howard Oregon State University
			50518-First Annual ASTFE Nuclear Thermal Hydraulics CFD Competition, WNEU CFD group	Mahyar Pourghasemi Western New England University
			50491-Annual ASTFE Nuclear Thermal Hydraulics CFD Competition	Abdallah Sofiane Berrouk Khalifa University of Science and Technology
12:45 PM - 1:00 PM	**Break**			

Time	Session	Room	Title	Author
1:00 PM - 2:00 PM	**Luncheon (ASTFE Technical Committee Meetings)**	**CH2M Hill Alumni Center** Cascade Ballroom & South Hall		
2:00 PM - 2:15 PM	**Break**			
2:15 PM - 3:00 PM	**Keynote Sessions in Parallel**	**LaSells Stewart Center** Construction & Engineering Hall	**Recent progress of radiation modeling in combustion environment**	**Xinyu Zhao** University of Connecticut **Moderator: Ethan Languri** Tennessee Tech University
3:00 PM - 3:45 PM		**LaSells Stewart Center** Construction & Engineering Hall	**Data-driven Reduced-order Modeling for Large-scale Fluid Models**	**Boris Kramer** University of California **Moderator: Ethan Languri** Tennessee Tech University
2:15 PM - 3:00 PM		**CH2M Hill Alumni Center** Cascade Ballroom	**Computational-Analytical Integral Transform and CPU-Intensive Simulations in Heat and Fluid Flow**	**Renato M. Cotta** Federal University of Rio de Janeiro **Moderator: Nesrin Ozalp** Illinois State University
3:00 PM - 3:45 PM		**CH2M Hill Alumni Center** Cascade Ballroom	**New generation functional surfaces for manipulation of phase change phenomena**	**Ali Koşar** Sabanci University **Moderator: Nesrin Ozalp** Illinois State University
3:45 PM - 4:00 PM	**Break**			
		Technical Session 2		
		Afternoon SESSIONS		
4:00 PM - 5:30 PM	**SESSION 2A** **ES:Innovation in Energy Research and Carbon Capture** **Chair:** **Hamidreza Najafi** Florida Institute of Technology	**CH2M Hill Alumni Center** Willamette Room 115A	50298 - Levelized cost of MEA based CO2 capture for W-t-E plant – a case study for Poland	Jaroslaw Zuwala Institute of Energy and Fuels Processing Technology
			50606 - Modeling Deep Bed Drying of Citra Hops Using a Lumped Reaction Engineering Approach with Specific Surface Area	Brian Fronk The Pennsylvania State University
			50607 - Thermodynamic Investigation of Integrating Indirect Thermal Energy Storage System with A Low-Temperature Thermal Desalination Unit	Tihamer Engel Reza Lakeh California State Polytechnic University
			50659 - Opportunities for using nuclear microreactors for wastewater treatment, hydrogen production, and ammonia production	Jack Pakkebier Kansas State University
4:00 PM - 5:30 PM	**SESSION 2B** **ES: Advanced Energy Systems-02** **Chair:** **Maryam Shafahi** California State Polytechnic University	**CH2M Hill Alumni Center** Willamette Room 115B	50756 - Simulation of Combined Cycle and Supercritical Rankine Cycle Using Liquid and Gaseous Ammonia as Fuel	Aaron Hock Ting Wang University of New Orlans
			50924 - Tannery Wastewater Treatment System Design and Modeling	Maryam Shafahi California State Polytechnic University
			50995 - The Design, Optimisation, and Control Strategy of a Micro-CHP System Employing a Two-Phase Power Cycle	Christopher Belfiore Federation University Australia
			52435 - Graduate Student Perceptions of a Leadership Development Program in Built Environment Sustainability: A Qualitative Investigation	Tyree Mitchell Tracey Rizzuto Louisiana State University
			53216 - CFD and Thermodynamic Analyses of OTM In Case of the Negative CO2 Power Plant	Paweł Ziółkowski Gdańsk University of Technology
4:00 PM - 5:30 PM	**SESSION 2C** **FD: Atomization** **Chair:** **Kishan Bellur** University of Cincinnati	**CH2M Hill Alumni Center** Trysting Tree Room 114 A/B	50605 - Interfacial fluid instability driven by MHz-order acoustic waves sufficient for atomization is strongly turbulent	James Friend University of California San Diego
			50802 - 'Smart' Geometry Modulation for Better Atomization	Oluwafemi Dada Liberty University
			50803 - Flow-Focusing and Flow-Blurring Biofuel Atomization	Wayne Strasser Liberty University
			52570 - High-fidelity simulation and data-driven modeling of drop aerodynamic breakup and vaporization	Yue Ling University of South Carolina
4:00 PM - 5:30 PM	**SESSION 2D** **TS: Electronics Cooling-02** **Chair:** **Huseyin Bostanci** University of North Texas	**CH2M Hill Alumni Center** Elle/Burlingham Room 111 A/B	50204 - Thermal-hydraulic analysis of fractal miniature heat sinks for heat management of sensors and electronics	Mahyar Pourghasemi Western New England University
			50681 - Numerical Studies for Heat Dissipation Enhancement to Design a High-Efficient Induction Motor	Jongrak Choi Korea Electronics Technology Institute
			50851 - Numerical Modeling of Thermal Management in Lithium Ion Battery with three novel configurations of separator plate	Mohsen Pourfallah Tennessee Tech University
			50996 - Heatlines and Thermal Contact Conductance	Andallib Tariq IIT Roorkee

Time	Session	Room	Title	Author
4:00 PM - 5:30 PM	**SESSION 2E** **FD: Multiphase Flows and Heat Transfer-02** **Chair:** **Patrick Mensah** Southern University and A&M College	**CH2M Hill Alumni Center** Johnson Lounge 102	51019 - Enhanced Psychrometric Chart for Modeling Processes with Complex Gaseous Mixtures with VOCs, Moisture, and Non-Condensable Gases	Mohammed A. Elhashimi Khalifa Energy Recovery Inc
			52311 - Thermodynamic Delimitation of Anomalous Region from Subcritical Liquid to Supercritical State	Laura Almara University of North Texas
			51312 - Experimental study of phase change material integrated into firefighters' gloves in moisture conditions	Weihuan Zhao Xun Wang University of North Texas
			50730 - Measuring Residence Time Distribution Inside a Fluidized Bed and Improving Data Collection Using Video Processing	Justin Carkner Oregon State University
4:00 PM - 5:30 PM	**SESSION 2F** **FD-TS: Fluid Flow and Heat Transfer in Industrial and Commercial Processes** **Chair:** **Ethan Languri** Tennessee Tech University	**LaSells Stewart Center** Agriculture Production Room	50978 - 3-D and 2-D Non-isothermal Fluid Flow Analysis of a Slot Jet Reattachment Nozzle Array	Elif Asar Electrified Thermal Solutions, Inc
			52465 - Numerical Simulation of Melt Pool Physics in Metal Additive Manufacturing Processes	Craig Weeks Carnegie Mellon University
			52585 - Modeling Steam Generation in the Free-Falling Zone in Direct-Chill Casting of Aluminum	Jacob Tjards Srinivas Garimella Georgia Institute of Technology
			52357 - Performance of a Single Stage Corona Wind Generator	A K M Monayem Mazumder Saginaw Valley State University
			50755 - Applicability Assessment of Rooftop Photovoltaic (PV) Solar System for Hajee Mohammad Danesh Science & Technology University in Bangladesh: A Case Study	Titan Paul University of South Carolina Aiken
4:00 PM - 5:30 PM	This session showcases student presenters who participated in the NSF-funded IRES Track III project focused on International Research Experience and Professional Development in Built Environment Sustainability. Administered by Louisiana State University in collaboration with ASTFE and the National University of Singapore, the project offers students the opportunity to conduct research in Singapore on various topics related to built environment sustainability after receiving training through the Center of Leadership Development in Built Environment Sustainability. The session will highlight the experiences of these students and their research findings.			
	SESSION 2G **NSF Poster Session: Oral Presentations** **Chairs:** **Yimin Zhu** Louisiana State University **Yongxin Tao** Cleveland State University **Co-Chairs:** **Tyree Mitchell** Louisiana State University **Tracey Rizzuto** Louisiana State University	**LaSells Stewart Center** Agriculture Leaders Room	52527 - Investigating the application of a transportation energy consumption prediction model for urban planning scenarios	Maya Mueller Drexel University
			52510 - Financial Feasibility of Solar Power and Electric Vehicle Chargers in the Residential Market	Eliza Searles Michigan State University
			52029 - The Impact of Green Spaces on Job Satisfaction for City Employees in Japan	Bethany Hager Louisiana State University
			52558 - Materials Atlas-knowledge sharing platform for sustainable coastal construction	Di Wu (Lyla) Florida International University
			52568 - Urban Energy Master Planning Methodology for District Energy Systems	Rachel Gray George Washington University
			52562 - Assessing the impact of microclimates on Urban Building Energy Models (UBEMs) and their implications with equity: A data-driven case study in Seattle, Washington	Amanda Worthy University of Washington
			52506 - Photobioreactor for Indoor Air Purification	Jennifer L Gil Acevedo University of Puerto Rico
			52323 - My Japanese Experience… and some Model Predictive Control	Caleb Calfa Texas A&M University
			52571 - Comparison of Solid and Liquid Desiccant Effectiveness in Drying Processes	Nathaniel Smith Texas A&M University
5:30 PM - 5:45 PM	**Break**			
5:40 PM - 6:10 PM	**Technical Committee and Executive Committee meeting**	**CH2M Hill Alumni Center** Stevenson Conference Room 201 & Austin/Parrish Boardroom 203	**EC: Ting Wang, Wilson Chiu, Lorenzo Cremaschi, Jon Longtin, Nesrin Ozalp** **TC: Huseyin Bostanci, Like Li, Kevin R. Anderson, Aarthi Sekaran, Sylvie Lorente, Sean Orchuk, Shima Hajimirza, Bengisu Sisik**	

Networking Session + Poster Session				
5:45 PM - 6:45 PM	**Poster Session** **Chairs:** **Yong Tao** Cleveland State University **Shima Hajimirza** Stevens Institute of Technology	**CH2M Hill Alumni Center** Foyer	52238 - A study on the Joule-Thomson effect in the internal heat flow of a check valve for hydrogen charging system	Oh Seung Hun Kongju National University
			52242 - Analysis of Recovery Rate according to the Shape Change of the Vortex Accelerator of Condenser Tube Cleaning System for Power Plants	Chungwon Seo Kongju National University
			52323 - My Japanese Experience… and some Model Predictive Control	Caleb Calfa Texas A&M University
			52480 - Scaled Acoustic Modeling for High Explosive Experimentation	Nathanael Breed Liberty University
			52506 - Photobioreactor for Indoor Air Purification	Jennifer L Gil Acevedo University of Puerto Rico
			52510 - Financial Feasibility of Solar Power and Electric Vehicle Chargers in the Residential Market	Eliza Searles Michigan State University
			52547 - Effect of Nozzle Length and Diameter on Plume Stability and Noise in Steam Direct Contact Condensation in a Subcooled Crossflow of Water	Eli Gaeta University of Wisconsin Madison
			52562 - Assessing the impact of microclimates on Urban Building Energy Models (UBEMs) and their implications with equity: A data-driven case study in Seattle, Washington	Amanda Worthy University of Washington
			52568 - Urban Energy Master Planning Methodology for District Energy Systems	Rachel Gray George Washington University
			52571 - Comparison of Solid and Liquid Desiccant Effectiveness in Drying Processes	Nathaniel Smith Texas A&M University
			52707 - Additive Manufacturing for Enhancing Heat Transfer in Space Application: An Educational Apparatus	Alex Larrivee Florida Institute of Technology
			52029 - The Impact of Green Spaces on Job Satisfaction for City Employees in Japan	Bethany Hager Louisiana State University
			52527 - Investigating the application of a transportation energy consumption prediction model for urban planning scenarios	Maya Mueller Drexel University
			52558 - Materials Atlas-knowledge sharing platform for sustainable coastal construction	Di Wu (Lyla) Florida International University
			52563 - Comparative Study of Pressure Drop of Nanoparticle Enhanced Ionic Liquids (NEILs) with Traditional Heat Transfer Fluids (HTFs)	Truman Brabham University of South Carolina Aiken
			52277 - Thermal Management in Lithium-Ion Battery - A CFD Study	Mohsen Pourfallah Tennessee Tech University
			53272 - Computationally Predicting the Microstructure Formation of Bulk Bismuth Telluride (Bi2Te3) Parts	Bengisu Sisik The George Washington University
			51235 - Understanding heat transfer in wearable devices using numerical simulations	Richard Sanchez University of Puerto Rico

Tuesday — April 23, 2024

Time	Session	Room	Title	Author
8:00 AM - 10:00 AM	**Breakfast and coffee**	**CH2M Hill Alumni Center** Foyer & South Hall		
8:00 AM - 8:15 AM	**Day 2 Announcements**	**CH2M Hill Alumni Center** Cascade Ballroom	Opening by President **Jayathi Murthy,** *Oregon State University* **Hamidreza Najafi:** Overview of Day 1 and Day 2 plan. **Nesrin Ozalp:** Conference Tools, Venue and Events Announcements	
8:15 AM - 9:15 AM	**Plenary Lecture 2**	**CH2M Hill Alumni Center** Cascade Ballroom	**Directions, Challenges and Opportunities in Heterogeneous Integration**	**Ravi Mahajan** Intel Corporation **Moderator: Jayathi Murthy** Oregon State University
9:15 AM - 9:30 AM	**Break**			
9:30 AM - 10:45 AM	**PANEL 2** **Moderator: Nesrin Ozalp** Illinois State University	**CH2M Hill Alumni Center** Cascade Ballroom	**Challenges and Innovations in Thermal Fluids Education**	**Yogesh Jaluria** The State University of New Jersey **Patrick Oosthuizen** Queen's University **Shima Hajimirza** Stevens Institute of Technology **Hohyun Lee** Santa Clara University
10:45 AM - 11:00 AM	**Break**			
Technical Session 3				
Morning SESSIONS				
11:00 AM - 12:30 PM	**SESSION 3A** **FD: Turbulent Flows, Rheology of Nonlinear Materials and Complex Fluids** **Chair:** **Ethan Languri** Tennessee Tech University	**CH2M Hill Alumni Center** Willamette Room 115A	50548 - GPU-Accelerated RANS Simulations in Computational Fluid Dynamics: Algorithmic Advancements and Validation	Elisan Magalhaes Aeronautical Technology Institute
			50616 - Comparative assessment of RANS and SAS turbulence models for simulation of a sinusoidally flapping airfoil at 7k, 70k, 350k Re.	Gleb Sazonov Graduate Student at OSU
			50931 - Numerical simulation and experimental investigation of 3D non-isothermal tread co-extrusion	Chen-Wei Huang National Chin-Yi University of Technology
			51012 - Confinement Effects on the Thermodynamics and Fluid Flow in Porous Media	Jiaoyan Li University at Buffalo
			50591 - Development of a reaction mechanism for liquid-phase decomposition of guanidinium nitrate	Jay Patel IIT Bombay
11:00 AM - 12:30 PM	**SESSION 3B** **FD: Nano and Micro Fluids Applications** **Chair:** **Yue Xiao** Advanced Cooling Technologies, Inc.	**CH2M Hill Alumni Center** Willamette Room 115B	50373 - Universal droplet steering through charge deposition wave	Sang W. Joo Wuhan University
			50603 - Acoustogeometric streaming as a method to drive fluid and droplet flows in nanochannels	James Friend University of California San Diego
			50794 - Numerical Investigation on Laminar Forced Convection in Triangular Cross Section Mini Ducts with Nanofluids and Metal Foam	Oronzio Manca Universita' degli Studi della Campania
			50984 - Modelling Thermophoresis in Nanofluids	Udit Sharma Michigan Technological University
11:00 AM - 12:30 PM	**SESSION 3C** **TS: Combustion, Fire and Fuels-01** **Chair:** **Patrick Mensah** Southern University and A&M College	**CH2M Hill Alumni Center** Trysting Tree Room 114 A/B	50510 - Detailed computational analysis of ammonia borane as an additive to gasoline and ethanol based fuels	Aboli Pingle IIT Bombay
			50622 - Development of a novel methodology to acquire heat flux of firebrands generated from burning structures	Deepak Sharma Oregon State University
			50662 - Staged Air Injection in Pellet Room Heaters: Reduction in Particulate Matter, Black Carbon, and Carbon Monoxide Emissions	David Evitt Oregon State University
			50698 - Analysis of Droplet Ejection and Burning From Live Salal Leaves During Convective Heating	Ajay Singh Oregon State University
11:00 AM - 12:30 PM	**SESSION 3D** **FD: Multiphase Flows and Heat Transfer-03** **Chair:** **Kishan Bellur** University of Cincinnati	**CH2M Hill Alumni Center** Elle/Burlingham Room 111 A/B	50713 - Improved Thermocavitation through Instabilities Induced by an Exceptionally High Temperature Gradient	Ahmad Vasel-Be-Hagh University of South Florida
			50737 - Thermal-Flow Analysis of Steam Condensation and Condensate Rimming in a Rotating Paper Dryer	Ting Wang University of New Orleans
			50741 - Derivation and Evaluation of Flow and Temperature Equations for Pipeline Transport of Supercritical Fluids	Vish Prasad University of North Texas
			52559 - A cryogenic neutron imaging experiment to address long standing discrepancies in evaporation modeling	Kishan Bellur University of Cincinnati

Time	Session	Room	Title	Author
11:00 AM - 12:30 PM	**SESSION 3E** **ES: Solar Energy Equipment and Processes-01** **Chair:** **Marcelo de Lemos** Instituto Tecnológico de Aeronáutica	**CH2M Hill Alumni Center** Johnson Lounge 102	50129 - Performance enhancement of a high-concentration ratio parabolic trough solar collector using supercritical CO2 with a modified twisted tape insert	Temitayo Oketola University of Calgary
			50423 - Thermal Characterization of Porous structures and Interfaces using Modulated Photothermal Radiometry	Javier Corona Oregon State University
			50611 - Techno-Economic Comparison of Particle and Gas-Based Central Solar Thermal Receiver Systems for the Cogeneration of Electricity and Hydrogen	Nader Khormi The Pennsylvania State University
			52546 - Picosecond laser scribing of thin film photovoltaic solar cells	David Hwang State University of New York
11:00 AM - 12:30 PM	**SESSION 3F** **FD-TS: Flow and Heat Transfer in Biological Systems-01** **Chair:** **Saeed Tiari** Gannon University	**LaSells Stewart Center** Agriculture Production Room	50438 - The Impact of Pressure Gradients on Vortex Ring Formation in Radially Confined Spaces	Caroline Wild The George Washington University
			50579 - Influence of the occupant's height on cough dispersion and infection risk within an indoor environment: A numerical study	Mei Yan Chong Singapore Institute of Technology
			50974 - The Effect of Patient Mouth Opening on CO2 Flush During Non-Invasive Respiratory Therapy	Robert Kacinski Liberty University
			50583 - The effect of different UV-C lamp configurations on the inactivation of SARS-CoV-2 particles in internal duct system: A numerical investigation based on Computational Fluid D	Sivamoorthy Kanagalingam Singapore Institute of Technology
			51419 - Utilizing a Deep Learning-Computational Fluid Dynamics Surrogate to Identify Aneurysm-Prone Locations in Human Arteries	Chung Hyun Goh University of Texas at Tyler
11:00 AM - 12:30 PM	**SESSION 3G** **Innovations in Energy and Water Nexus and Thermal and Fluids Education** **Chair:** **Carolina Mira-Hernandez** University of Padova	**LaSells Stewart Center** Agriculture Leaders Room	52601 - Opportunities in Thermal Science and Engineering for Clean Energy and Water	Akanksha Menon Georgia Institute of Technology
			50684 - Grey-box modelling of melting inside a rectangular enclosure for predictive control strategies of latent thermal energy storages	Carolina Mira-Hernandez University of Padova
			51611 - Assessment and Optimization of an Innovative Radon Mitigation Technique for Residential Buildings	Christian Ramos University of Puerto Rico
			50687 - Characterization of the Deformation of a MgO LiCl-KCl Seperator Pellet Over a Range of Particle Sizes and Temperatures	Ken Blecker CCDC-AC
			48808 - Importance of Dimensions, Units, and Unit Convention in Thermal and Fluids Engineering	Yongjian Gu US Merchant Marine Academy
12:30 PM - 2:30 PM	**Buffet Luncheon**	**CH2M Hill Alumni Center** Cascade Ballroom & South Hall		
1:00 PM - 1:45 PM	**Keynote Luncheon Talk**	**CH2M Hill Alumni Center** Cascade Ballroom	**Wildland fire: how did we get here and the thermo-fluid research needed**	**Sara McAllister** U.S. Department of Agriculture **Moderator:** **Wilson Chiu** University of Connecticut
1:45 PM - 2:15 PM	**Awards**	**CH2M Hill Alumni Center** Cascade Ballroom	**TFE Award, The ASTFE Fellows – moderator: Michael Plesniak,** The George Washington University **TFEC2024 Conference Chairs and Session Chairs – moderator: Lorenzo Cremaschi,** Auburn University **Best Papers and Best Reviewers – moderator: Jon Longtin,** Stony Brook University	
2:15 PM - 2:30 PM	**Break**			
2:30 PM - 3:30 PM	**TEC Talks** **Moderator:** **David Blunck** Oregon State University	**CH2M Hill Alumni Center** Cascade Ballroom	**Near-Critical CO2-Assisted Liquefaction-Extraction of Biomass and Wastes to Fuels and Value-Added Products**	**Ashwani K. Gupta** University of Maryland
			Human-Centric Robots: Creating Embodied AI	**Jonathan W. Hurst** Oregon State University
			Production of Lithium Salts by Thermal and Cyclonic Desalination	**Bahman Abbasi** Oregon State University
			Building a Holistic Portfolio of Electronics Cooling Solutions to Address Climate Change	**Joshua Gess** Oregon State University
3:30 PM - 3:45 PM	**Break**			
3:45 PM - 4:30 PM	**Keynote Session**	**LaSells Stewart Center** Construction & Engineering Hall	**Mission Impossible: 3D imaging, quantification and visualization of microbial biofilms in fluid-filled opaque porous media**	**Dorthe Wildenschild** Oregon State University **Moderator:** **Ting Wang** University of New Orlans
		CH2M Hill Alumni Center Cascade Ballroom	**System and Component Level Challenges in Thermochemical Energy Storage**	**Brian M. Fronk** Pennsylvania State University **Moderator:** **Patrick Mensah** Southern University and A&M College
4:30 PM - 4:45 PM	**Break**			

Time	Session	Room	Title	Author
			Technical Session 4	
			Afternoon SESSIONS	
5:00 PM - 6:30 PM	**SESSION 4A** **TS: Flow and Heat Transfer in Materials Processing Science and Manufacturing** **Chair:** **Jae Hyun Kim** National Institute of Standards and Technology	**CH2M Hill Alumni Center** Willamette Room 115A	50905 - Thermal Management System Based on Nano-Enhanced Phase Change Materials to Enhance Li-ion Battery Life and Performance Capacity	Ghulam Rasool Beijing University of Technology
			50744 - Analysis of parameters influencing thermal conductivities of expanded polystyrene boards using Heat-Flow-Meter and Transient Plane Source measurements	Jae Hyun Kim National Institute of Standards and Technology
			51557 - Optimization of the Chemical Vapor Deposition Process for Thin Film Fabrication	Yogesh Jaluria Rutgers University
			52498 - Computational fluid dynamics study of particle distribution in devolatilization processes in steam contactors	Abhilash Chandy IIT Bombay
			50742 - Directional Neutron Detector Using Anisotropic Acoustically Tensioned Metastable Fluid Systems	William Rios University of Puerto Rico at Mayaguez
5:00 PM - 6:30 PM	**SESSION 4B** **ES: Energy Storage Systems** **Chair:** **Saeed Tiari** Gannon University	**CH2M Hill Alumni Center** Willamette Room 115B	50750 - Experimental Analysis of a Sensible Heat Thermal Energy Storage Unit Assisted with Fins	Saeed Tiari Gannon University
			50976 - Conjugate Heat Transfer Analysis of Discharging Joule Hive Thermal Battery	Elif Asar Electrified Thermal Solutions, Inc
			51273 - Battery Thermal Management Systems: Analyzing Today's Landscape and Tomorrow's Technology	Mahdieh Nasiri Stevens Institute of Technology
			51987 - Understanding Internal Short Circuit Caused Thermal Runaway of Li-ion Battery Cells through In Situ Diagnosis	Guangsheng Zhang University of Alabama in Huntsville
5:00 PM - 6:30 PM	**SESSION 4C** **TS: Combustion, Fire and Fuels-02** **Chair:** **Patrick Mensah** Southern University and A&M College	**CH2M Hill Alumni Center** Trysting Tree Room 114 A/B	50721 - A Numerical Study of Heat Transfer in the Fuel Cells of a Solid Oxide Fuel Cell-Combustor	Mingkan Zhang Oak Ridge National Laboratory
			50726 - Combustion diagnostics in a heating stove using a multi-spectral infrared camera	Prabin Shrestha Oregon State University
			50736 - Numerical Multi Zone Modeling for Consumption of Live Forest Fuels	Michelle Gee Oregon State University
			50783 - Simulation of Pipe Wall Heating using an Ablative Paste as Insulation	Carlton Adam US Army ARDEC
			53285 - Development of an Innovative Thermal Technology for Plug and Abandonment of Oil Wells	Marcelo de Lemos Instituto Tecnológico de Aeronáutica
5:00 PM - 6:30 PM	**SESSION 4D** **ES: Innovative Refrigeration Systems** **Chairs:** **Yue Xiao** Advanced Cooling Technologies, Inc. **Bryce Cox** University of Wisconsin Platteville	**CH2M Hill Alumni Center** Elle/Burlingham Room 111 A/B	49666 - Experimental Investigation of Electrically-Charged Water Droplets Two-Phase Cross-Flow Interactions with Humid Air	Gerard Muteba Lorenzo Cremaschi Auburn University
			50656 - Numerical Investigation of Optimum PCM volume for High-Efficiency Refrigerator	Samuel Amoafo-Yeboah Southern University and A&M
			50669 - Model-based development framework for air conditioning systems with model predictive control and multi-objective optimization	Hajime Ikeda Mitsubishi Electric Co., Ltd.
			50573 - World's Pioneering Vapor Chamber Technology in Peltier Cooled Refrigerators	Junwoo Suh Samsung Electronics
			50311 - Analysis of desiccant based evaporative cooling system performance in varying climates and building types	Bryce Cox University of Wisconsin Platteville
5:00 PM - 6:30 PM	**SESSION 4E** **ES: Solar Energy Equipment and Processes-02** **Chair:** **Ahmad Vasel-Be-Hagh** University of South Florida	**CH2M Hill Alumni Center** Johnson Lounge 102	50718 - Improving Heat Flux Measurement Accuracy in Solar Farm Environmental Studies: A Corrective Equation Approach	Ahmad Vasel-Be-Hagh University of South Florida
			50977 - Thermal Performance Analysis of Solar Assisted Double U-Loop Heat Exchanger in Helical Steel Pile as Thermo-Active Foundations for Cold Climates	Jordan Gruenes University of Minnesota Duluth
			52567 - Multiphysics Numerical Modelling of a Porous Lattice for Concentrated Solar Thermal Applications	Aidan McConnehey Boise State University
5:00 PM - 6:30 PM	**SESSION 4F** **FD-TS: Flow and Heat Transfer in Biological Systems-02** **Chair:** **Paweł Ziółkowski** Gdansk University of Technology	**LaSells Stewart Center** Agriculture Production Room	51018 - Dolphin Skin CFD Analysis for Biomimetic and Hydrodynamic Applications	Joseph Krahn Liberty University
			51260 - Bacterial Inactivation Via Laser-Driven Gold Nanoparticle Heating: Simulation and Analysis	Paweł Ziółkowski Gdansk University of Technology
			50739 - Noninvasive material characterization of biomaterials: measuring viscosity and elasticity using ultrasound	Kausik Sarkar George Washington University
5:00 PM - 6:30 PM	**SESSION 4G** **FD-TS: Experimental Methods/ Tools in Fluid Mechanics and Heat/Mass Transfer-01** **Chair:** **Ryan Anderson** Montana State University	**LaSells Stewart Center** Agriculture Leaders Room	49418 - Heat transfer visualization by MRI using 3D printed phase change materials	Ryan Anderson Montana State University
			50729 - Scaling and Numerical Verification of Use of Capillaries for Experimental Surface Temperature Measurements	Trevor Howard Oregon State University
			50731 - Flow Measurements via Thermal Pulsing and Fiber Optic Sensors	Trevor Howard Oregon State University
			50623 - Desalination system of sweeping gas membrane distillation combined with jet impingement condensation	Mohanad Abualkhair King Fahd University of Petroleum and Minerals
6:30 PM - 7:00 PM	**Networking**	**CH2M Hill Alumni Center** Cascade Ballroom		

Wednesday — April 24, 2024

Time	Session	Room	Title	Author
8:00 AM - 10:00 AM	**Breakfast and coffee**	**CH2M Hill Alumni Center** Foyer & South Hall		
8:00 AM - 8:15 AM	**Day 3 Announcements**	**CH2M Hill Alumni Center** Cascade Ballroom	Welcome and Opening - **Senior Associate Dean Wade Marcum,** *Oregon State University* **Hamidreza Najafi:** Overview of Day 1, 2, and plan for Day 3 **Nesrin Ozalp:** Conference Tools, Venue and Events Announcement	
8:15 AM - 9:15 AM	**Plenary Lecture 3**	**CH2M Hill Alumni Center** Cascade Ballroom	**The Role of Thermal and Fluid Engineering in Meeting 21st Century Climate Goals**	**José N. Reyes** NuScale Power **Moderator:** **Wade Marcum** Oregon State University
9:15 AM - 9:30 AM	**Break**			
9:30 AM - 10:45 AM	**PANEL 3** **Moderator:** **Kashif Nawaz** Oak Ridge National Laboratory	**CH2M Hill Alumni Center** Cascade Ballroom	**Heat Pumps for the Decarbonization of Buildings and Industry**	**Payam Delgoshaei** U.S. Department of Energy **Antonio Bouza** U.S. Department of Energy **Yunho Hwang** University of Maryland **Zachary Pritchard** U.S. Department of Energy
10:45 AM - 11:00 AM	**Break**			
Technical Session 5				
Morning SESSIONS				
11:00 AM - 12:30 PM	**SESSION 5A** **ES: Heat Pumps and Innovative Cooling and Heating Systems** **Chair:** M P Maiya IIT Madras	**CH2M Hill Alumni Center** Willamette Room 115A	50144 - Performance Enhancement of a Cold Climate Residential Scale Ground Source Heat Pump System with Solar Thermal Energy	Philip Adebayo University of Calgary
			50699 - Using a Single Natural Refrigerant as a Better GWP Alternative To R23 Family: Design of Ultralow-temperature Multi-stage Flash Intercooling Transcritical Refrigeration Cycle	Mojtaba Purjam Kyushu University
			50722 - Economic and Environmental Assessment of Heat Pump Technology for Greenhouse Gas Emissions Reduction in Steam Production	Madeleine Siegel Colorado State University
			51272 - A Techno-Economic Analysis of a Chemical- Absorption Heat Pump for Upgrading Nuclear Process Heat in an Integrated Energy System	Paul Armatis The Pennsylvania State University
			51287 - CO2 heat pump for Indian hospitals	M P Maiya IIT Madras
11:00 AM - 12:30 PM	**SESSION 5B** **ES: Sustainable Buildings and Communities** **Chair:** **Anthony Adeyanju** University of the West Indies	**CH2M Hill Alumni Center** Willamette Room 115B	49008 - A Residential Building's Cooling Load Analysis Using the CLTD and RTS Method	Anthony Adeyanju University of the West Indies
			50484 - Fuzzy Controller Response to Internal and External Disturbances in a Multi-Room Building Testbed	Anayely Saguilan California State University
			50519 - Exploration of a Shape Factor to Increase Passive Radiative Cooling Rate	Spencer Jones Tennessee Tech University
11:00 AM - 12:30 PM	**SESSION 5C** **FD-TS: Experimental Methods/ Tools in Fluid Mechanics and Heat/Mass Transfer-02** **Chair:** **Carolina Mira-Hernandez** University of Padova	**CH2M Hill Alumni Center** Trysting Tree Room 114 A/B	50642 - Mechanically Enhanced and Optically Compatible Hydrogels for Particle Image Velocimetry in Porous Flow	Luke Cornwell-Arquitt Oregon State University
			50738 - Non Standard Materials for Cryogenic Current Leads – Departures From The Wiedmann-Franz Approximation	Sean Orchuk The University of Toronto
			50988 - Experimental Investigation of the Overall and Individual Heat Transfer Coefficient between Particle Cloud and a Heating Surface	Muhammad Umer The Pennsylvania State University
			52474 - Test section design for heat transfer measurements in a turbulent molten salt HITEC pipe flow	Björn Brenneis Karlsruhe Institute of Technology
11:00 AM - 12:30 PM	**SESSION 5D** **FD-TS: Fluid Flow and Heat Transfer in Industrial and Commercial Processes** **Chair:** **Ryan Anderson** Montana State University	**CH2M Hill Alumni Center** Elle/ Burlingham Room 111 A/B	49769 - Numerical Approach to Study The Deviation of Ejector Nozzle Position on the Flow Rate of an Ejector Stack	Gerald Schneider Sharif University of Technology
			49770 - Enhancing Thermal Performance Of Two Side-By-Side Air Cooled Condenser Units In Critical Wind Conditions Using Walkways	Gerald Schneider Sharif University of Technology
			50652 - Verification of a Rigorous CFD Reactor Model for Statistical Reconstruction of a Polymer Molecular Weight Distribution	Elijah Yoder Liberty University
			50692 - Effect of Rotation Rate on the Meltwater Plume Below Melting Ice	Kari Perry Montana State University
			49861 - Radial Flow Packed Beds with Internal Segmentation for Thermal Energy Storage	Ryan Anderson Montana State University

Time	Session	Room	Title	Author
11:00 AM - 12:30 PM	**SESSION 5E** **TS: Innovations in Heat Exchangers** **Chair:** **Marcelo de Lemos** Instituto Tecnológico de Aeronáutica	**CH2M Hill Alumni Center** Johnson Lounge 102	49605 - Effectiveness of Water-to-Water Heat Exchangers in Combined Waste Heat Recovery for District Energy Systems	Olamide Opadokun Cleveland State University
			50521 - Laser-Processed Condensing Heat Exchanger for Space Applications	Tyler Hatch NASA GRC
			50751 - Machine-Learned Turbulence Model for Topology Optimization-Based Heat Exchanger Design Framework	Mitansh Tripathi University of Cincinnati
			50596 - Development of an Anti-Fouling Rotating Polymer based Heat Exchanger for a Zero Liquid Discharge Humidification-Dehumidification Desalination System	Deepak Sharma University of Michigan
11:00 AM - 12:30 PM	**SESSION 5F** **TS: Heat/Mass Transfer Enhancement Techniques** **Chairs:** **Patrick Mensah** Southern University and A&M College **Ting Wang** The University of New Orleans	**LaSells Stewart Center** Agriculture Production Room	50487 - Vacuum bubbling - an energy efficient approach for industrial deaeration processes	Yong Du Jun Kongju National University
			50549 - Autonomous Melting Probe for Icy Worlds Exploration	Brett Leitherer Advanced Cooling Technologies
			50723 - Parametric Study of Simulating Passive Sweeping Mist Jet Film Cooling with Different Droplet Wall Boundary Conditions and Droplet Sizes	Ting Wang The University of New Orleans
			52522 - The use of Oscillatory Baffled Flows for heat transfer enhancement	James Hockaday Newcastle University
11:00 AM - 12:30 PM	**SESSION 5G** **ES: Solar Energy Equipment and Processes-03** **Chair:** **Ethan Languri** Tennessee Tech University	**LaSells Stewart Center** Agriculture Leaders Room	52528 - Thermal Management System Based on Nano-Enhanced Phase Change Materials to Enhance Li-ion Battery Life and Performance Capacity	Juan Daniel Rengifo Guzman Ian Pena Boise State University
			52530 - Analysis of parameters influencing thermal conductivities of expanded polystyrene boards using Heat-Flow-Meter and Transient Plane Source measurements	Koda Boldt Boise State University
			52549 - Optimization of the Chemical Vapor Deposition Process for Thin Film Fabrication	Jadyn Hart Boise State University
12:30 PM - 12:45 PM	**Break**			
12:45 PM - 1:45 PM	**Lunch and Invited Luncheon Talk**	**CH2M Hill Alumni Center** Cascade Ballroom & South Hall	**A Numerical Study of the Metal Foam Thickness Effect on Impinging Round Jets in Channel Partially Filled with Metal Foam**	**Oronzio Manca** University of Campania "Luigi Vanvitelli" **Moderator:** **Hamidreza Najafi** Florida Institute of Technology
1:45 PM - 2:00 PM	**Break**			
2:00 PM - 3:00 PM	**Closing ceremony with conference participants Draw Prize Raffle**	**CH2M Hill Alumni Center** Cascade Ballroom	**Associate Dean David Blunck:** Overview and closure; **Yong Tao,** *ASTFE Past President*: Closure and Draw Prize Raffle; **Nesrin Ozalp:** Closure; **Hamidreza Najafi:** Closure; **Wilson Chiu:** Closure	

THANKS TO OUR EXHIBITORS AND SPONSORS

Friday — April 26, 2024

Time	Session	Title	Author
10:00 AM - 10:30 AM	**Day 4 Announcements**		
Virtual Session 1			
Morning SESSIONS			
10:30 AM - 12:30 PM	**SESSION V-1A** **ES: Advanced Energy Systems** **Chair:** **Yousef Haseli** Central Michigan University	50531 - Prospects for the Use of Synthesized Gas Hydrates in the National Economy	Anatoliy Pavlenko Kielce University of Technology
		50619 - Techno-Economic Analysis of Oscillating Surge Wave Energy Converters	Cole Dickerson North Carolina State University
		50787 - Energy and Exergy Optimization of a Double-Stage Kalina Cycle with a Bottoming Goswami Cycle	Adityabir Singh IIT Ropar
		50788 - Integration of Biomass Gasification with a Gas Turbine Cycle and a Triple-Pressure Cogeneration Cycle	Adityabir Singh IIT Ropar
		51271 - Autonomous Mobile Renewable Energy Capture & Storage at Sea (MREs): Batteries and Green-Hydrogen	Nesrin Sarigul-Klijn University of California Davis
		52555 - Experimental Development of Various Types of Expanders for Small Scale Organic Rankine Cycle Power Systems	Jan Spale Czech Technical University in Prague
10:30 AM - 12:30 PM	**SESSION V-1B** **ES-Innovative Technologies for Cooling and Sustainable Buildings** **Chair:** **Amirhossein Khayyaminejad** University of Windsor	50355 - Modeling and Miniaturization of a Thermoacoustic Refrigerator	Mahdi Lavari Worcester Polytechnic Institute
		50422 - A New Renewable-Energy Strategy to Combat Global Warming	Yiding Cao Florida International University
		50463 - Optimization of Earth-to-Air Heat Exchangers with Twisted Tapes for Passive Cooling	Amirhossein Khayyaminejad University of Windsor
		51160 - Techno-economic performance of a large air-conditioned classroom complex with energy recovery	Deen Bandhu IIT Kharagpur
		51242 - Conceptual Design of a Hybrid Seawater Desalination System Combining Reverse Osmosis with Freeze Desalination and Evaporative Crystallization	Aly Elhefny University of Oklahoma
		51243 - Technoeconomic Analysis of a Direct Freeze Desalting System for Treating High Salinity Brines Utilizing an Intermediate Cooling Liquid	Aly Elhefny University of Oklahoma
10:30 AM - 12:30 PM	**SESSION V-1C** **FD-TS: Computational Methods/ Tools in Thermal-Fluid Systems-01** **Chair:** **Laurie Florio** US ARMY DEVCOM-AC	50252 - Overset mesh considerations for computational fluid dynamics models through flow over a fixed cylinder example	Laurie Florio US ARMY DEVCOM-AC
		50253 - Computational fluid dynamics-based techniques for modeling agglomerates near surfaces	Laurie Florio US ARMY DEVCOM-AC
		50544 - A spatial discretization method for compressible flows over complex geometries using the gradient adaptive transfinite elements	Nesrin Sarigul-Klijn University of California Davis
		50565 - A data-efficient method for multi-objective optimization of expensive evaluation functions: An application in water-energy systems	Elnaz Nikooei Oregon State University
		50572 - Moving Contact Line Dynamics in Droplet Impact on Curved Substrates	Sunil Khan IIT Roorkee
		50575 - Higher-Order Transport Equations for Control Volumes of Finite Sizes	John Chai UAE University
10:30 AM - 12:30 PM	**SESSION V-1D** **FD-TS: Electronics Cooling** **Chair:** **Esmail Lakzian** Andong National University	49946 - EHD Gas Pump for Electronics Cooling in a Horizontal Channel	Feng Lai University of Oklahoma
		50090 - Challenges in Fabricating Capillary-Driven Cold Plates Used in Hybrid Two-Phase Cooling Systems	Mohammad Reza Shaeri Advanced Cooling Technologies, Inc.
		50468 - High-Speed Visualization of Flow Boiling Regimes and Bubble Dynamics in a Microchannel	Rohan Kokate University of Missouri
		50759 - Microprocessor Cooling: Numerical Studies on the Flow and Temperature Maldistribution in Microchannel Heat Sinks with Substrate Conduction	Sateesh Gedupudi IIT Madras
		52532 - Cooling of Non-Water Cooled Resistive Magnet and Current Limit Simulations	Zhuoqun Wu Michigan State University
		50663 - Numerical Analysis of the Location of Wet Gas Outlet Effects on the Removing CO2	Esmail Lakzian Andong National University

Time	Session	Title	Author
10:30 AM - 12:30 PM	**SESSION V-1E** **FD: Multiphase Flows-01** **Chair:** **Graham Thorpe** Victoria University	50569 - Bubble dynamics Properties and Heat Flux Prediction of Novec7100, 7200 Using 2D Axisymmetric Single bubble rising Numerical Simulation	Hyeon Seok Jang Kyungpook National University
		50677 - Heat and mass transfer in hygroscopic porous media: The significance of the form of the sorption isotherm	Graham Thorpe Victoria University
		50725 - Heat Transfer Analysis in Phase Changing Material Heat Exchanger by Hybrid Finite Difference Method	Vaibhav Dhar Dwivedi IIT Hyderabad
		51221 - A stable numerical method with a preconditioned dissipation term for unsteady gas-liquid two-phase flows	Tianmu Zhao University of Miyazaki
		52543 - Investigation of the droplet dynamics in a bearing chamber	Ahmad Attia UWE Bristol
		50675 - Investigation of Coupling Mechanism of Heat Transfer Process in Porous Medium Based on Entransy Analysis Model	Yong Yang Dalian University of Technology
10:30 AM - 12:30 PM	**SESSION V-1F** **FD-TS: Machine Learning and Artificial Intelligence in Thermo-Fluid Engineering** **Chair:** **Hongtao Qiao** Mitsubishi Electric Research Labs	50269 - Physically-constrained hybrid modeling for vapor compression systems	Hongtao Qiao Mitsubishi Electric Research Labs
		50624 - Machine Learning Study of Thermal Management of a Battery Pack in a Converged Channel	Ahmed Saeed King Fahd University of Petroleum and Minerals
		50649 - Harnessing Multiple Time-Series Sensor Data: Evaluating the Efficacy of Various Machine Learning Models in Predicting Gas-Water Two-Phase Flow	Minghan Bao University of Leeds
		50781 - Machine Learning Based Modeling of Nucleate Pool Boiling Heat Transfer Coefficient on Plain and Roughened Surfaces	Vijay K IIT Madras
		51021 - Classifying Road Debris Using Deep Learning Technique in Artificial Intelligence	Narainkarthigeyan Singaram Balamurugan Kennesaw State University
		51216 - Modelling of Solubility of Sulfur Product in Ionic Liquids Using Artificial Intelligence	Manel Gueciouer USTHB
10:30 AM - 12:30 PM	**SESSION V-1G** **FD-TS: Fundamentals in Fluid Flow and Heat/Mass Transfer** **Chair:** **Patrick Mensah** Southern University and A&M College	50554 - PCM Melting in a Bottom-Heated Enclosure	Claudia Naldi University of Bologna
		50567 - Study of chaos transition changes according to temperature gradient conditions and Prandtl number inside a rectangular cavity	Jin Ho Oh Kyungpook National University
		50896 - Optimizing Drag Reduction for a Two-Dimensional Ahmed Body	Amine Agriss Mohammed V University in Rabat
		51061 - Investigation on the transient heat transfer characteristics of spray impingement on a high temperature wall	Zhenyao Guo Beijing Institute Of Technology
		51257 - An Experimental Study on the Effect of the Aspect Ratio of Square Prism on the Wake	Jingxian Han University of Miyazaki
		52553 - Numerical Studies of Froth Flotation	Gretar Tryggvason Johns Hopkins University
10:30 AM - 12:30 PM	**SESSION V-1H** **FD: Flow Instability,Rheology of Nonlinear Materials and Complex Fluids** **Chair:** **Ahmadreza Vasel-Be-Hagh** University of South Florida	50497 - Effect of heat loss to ambient gas on thermocapillary-driven convection beyond hydrothermal-wave instability in high-aspect-ratio cylindrical liquid bridges	Kazuma Ninomiya Tokyo University of Science
		50661 - Linear hydrodynamic instabilities spatial analysis procedure using spectral methods	Diego Armando Landinez Capacho Correo Electrónico Institucional
		51041 - Effect of Magnetic Field on Natural Convection Heat Transfer in a Cross-Shaped Enclosure	Emel Selamet OSU
		52466 - Thermcapillary stability of a thin viscoelastic film flowing down above or below a thick wall with slip	Luis Antonio Davalos Orozco Universidad Nacional Autónoma De México
		52482 - Control of natural convection by a principal flow	Ildebrando Perez-Reyes Universidad Autónoma de Chihuahua
		51246 - Numerical Investigation of Droplet Deformation Under Pulsating Flow	Robin Kumar IIT Jodhpur
10:30 AM - 12:30 PM	**SESSION V-1I** **FD: Turbulent Flows-01** **Chair:** **Ethan Languri** Tennessee Tech University	50235 - Turbulent Airflow Over a Sports Car Equipped with a Rear Shark-Fin Spoiler and a Wing	Arman Molki University of Toronto
		50236 - Effect of Spoiler Angle on Reducing Wing Drag in a High-Speed Sports Car	Arman Molki University of Toronto
		50613 - Turbulence-Shock-Combustion Interaction Under Extreme Conditions	Ibrahem Alshybani Michigan State University
		50654 - Direction Numerical Simulation of Turbulent Flow Across a Wavy Boundary: Validation of ANSYS Fluent	Reid Prichard Liberty University
		50657 - Direct Numerical Simulation of Cylindrical Particle Resuspension	Rae Riddle Portland State University
		50665 - Analysis of Turbulent Wake Flows Downstream of a Subsonic Airfoil: An Experimental Approach	Fahimeh Salmani Andong National University

Time	Session	Title	Author
10:30 AM - 12:30 PM	**SESSION V-1J** **TS: Combustion, Fire and Fuels** **Chair:** **Ahmed Abdelhafez** King Fahd University of Petroleum and Minerals	50508 - Rans and Les-Based FPV Approaches for Modelling Nonpremixed Turbulent CH4/H2 Flame	Rudra Narayan Roy Indian Institute Of Technology Goa
		50752 - Development of Clean Condensing Furnace Using Advanced Catalyst	Zhiming Gao Oak Ridge National Laboratory
		50975 - Effect of flow field on glycerol combustion in a swirl stabilized combustor employing Flow Blurring atomizer	Mebougna Drabo IIT Hyderabad
		50981 - Hydrogen Enrichment in Oxy-Fuel Combustors: Premixed or Stratified?	Ahmed Abdelhafez King Fahd University of Petroleum and Minerals
		52504 - A Discussion on Simulating Big Post-flashover Room Fires Using Computational Fluid Dynamics	Zhen Ni City University of Hong Kong
		50704 - Subgrid modeling of reaction-rate using a multi-scale strategy for large-eddy simulation of turbulent combustion	Robert Smith University of Tennessee at Chattanooga
10:30 AM - 12:30 PM	**SESSION V-1K** **FD: Aerodynamic Design and Analysis-01** **Chair:** **Mohammed Istafaul Haque Ansari** IIT Kanpur	49781 - Aerodynamic Drag on Electric Open-Cargo Vans at Highway Speeds	Vamsi Krishna Atmudi SIU - Edwardsville
		50168 - Enhancing Aerodynamic Performance and Vehicle Stability by Comparative Analysis of Turbulence Models?	Hashir Siddiqi University of Tsukuba
		50720 - Analysis of Aerodynamic Performance of Car Spoilers Using Computational Fluid Dynamics	Weihan Zhang Winchester College
		52572 - Aerodynamic Investigations of a 65B° Slender Delta Wing at Elevated Angles of Attack: A Comprehensive Analysis of Flow Physics	Mohammed Istafaul Haque Ansari IIT Kanpur
		52573 - Exploring Segregation-Induced Patterns in Binary Granular Mixtures under Vertical Vibration: A Comprehensive Analysis of Phase Diagrams	Mohammed Istafaul Haque Ansari IIT Kanpur
10:30 AM - 12:30 PM	**SESSION V-1L** **FD-TS: Modeling and Simulation of Thermo-Fluid Phenomena** **Chair:** **Nima Nadim** Curtin University	50953 - Fokker-Planck based Central Moment LBM for Simulations of Thermal Convective Flows using Orthogonal Curvilinear Coordinates Article Type: Presentation only	William Schupbach University of Colorado Denver
		51247 - Numerical study of the impact of apparent slip on fluid friction and heat transfer for the laminar bulk flow of a Newtonian liquid between parallel plates	Prasanna Jayaramu New Mexico State University
		50992 - Multi-objective optimization for an active air-cooling thermal management system	Obaidallah Munteshari, KFUPM Mohamed Soultan, KFUPM
		50424 - Numerical Modeling of Residual Stress and Deformation during the Laser Powder Bed Fusion (LPBF) Process	Ibrahim Tansel Florida International University
		50648 - Oxidation Reactor for Effective High-Temperature Discharge of Thermochemical Energy Storage Particles: Development, Construction and Testing	Juve Ortiz-Ulloa Oregon State University
		51258 - CFD Coupling of Vof Model With Arrhenius Equation for Analysis of Laser-Induced Thermal Deactivation of E. Coli	Aimad Koulali Maja Kaszuba Gdansk University of Technology
12:30 PM - 1:00 PM	Break		
Afternoon SESSIONS			
1:00 PM - 3:00 PM	**SESSION V-2A** **ES-Energy Storage** **Chair:** **Khalil Khanafer** University of Michigan	50412 - A Novel, Compact and Lightweight Design of a Vanadium Redox Flow Battery Stack	Laxman Kumar Kundarapu IIT Madras
		50465 - Thermal Characterization of 316L Stainless Steel 3D Printed Parts using Bound Metal Deposition Process	Khalil Khanafer University of Michigan
		50545 - Analysis of the Plant-Level Reversibility of a Solid Oxide Cell-Based Electrolyser/Fuel Cell Coupled System	Adil Muhammed IIT Madras
		50679 - Direct Measurement of Energy Storage Capacity of Vanadium Redox Flow Battery Using Uv-Vis Spectra	Shiv Shankar Kumar IIT Madras
		51225 - Revolutionizing Micromobility: A Comprehensive Review of Battery Technologies	Mohamed Krichi Hassan First University of Settat
		51176 - Performance Improvement of a Thermoelectric Water Distiller	Dia' Afaneh King Fahd University of Petroleum and Minerals
1:00 PM - 3:00 PM	**SESSION V-2B** **ES-Solar Energy Equipment and Processes** **Chair:** **Ahmadreza Vasel-Be-Hagh** University of South Florida	49459 - Second Law Analysis of a Direct-Expansion Solar Assisted Heat Pump with a Bare Absorber Plate as the Evaporator	Bardia Abbasi University of Calgary
		50628 - Net-Zero Assessment of Solar Energy-Driven Absorption-Radiant Air Conditioning System	Ranjan Das IIT Ropar
		50635 - The Investigation of Heat Sink and Fins Using CFD for PVT Panels	Tanmay Thombare Savitribai Phule Pune University
		50651 - Experimental Performance of a novel solar Indoor cooktop using Thermosyphon Heat Transport Device (THTD)	Swati Gangwar IIT Jammu
		51233 - Performance Enhancement of PV Panels Using an Adaptable Heat Exchanger with Phase Change Materials (PCM)	Carlos Iván Rivera Solorio Tecnologico de Monterrey
		51845 - Identifying optimal operating conditions of volumetric air receivers in concentrated solar power systems through conjugate heat transfer study and structural analysis	Masoud Behzad Universidad de Santiago de Chile

Time	Session	Title	Author
1:00 PM - 3:00 PM	**SESSION V-2C** **FD-TS: Computational Methods/Tools in Thermal-Fluid Systems-02** **Chair:** **Hossain Ahmed** University of Michigan	50700 - Numerical analysis of the effect of Fin on circular microchannel Heat exchanger's thermal performance	Hossain Ahmed Austin Peay State University
		51435 - Investigations on the Applicability of Forced Flow Friction and Heat Transfer Correlations to Analyze Single-Phase Natural Circulation Performance	Dev Banitia IIT Jammu
		52560 - Modification of the Moller-Trumbore Algorithm for Partial Occlusion	Eliana Crew University of Pittsburgh
		52561 - Modeling analysis of thermal runaway confinement during internal short circuit of Li-ion cells	Siyi Liu University of Alabama in Huntsville
		52583 - Resolution of Radiation View Factors for GPHS RTG Hot Shoes with Robust and Expedited Methodologies	Natan Herzog University of Pittsburgh
		50881 - Stability and Convergence Analysis of Time Dependent Fe3O4/Blood Flow and Heat Transfer Over a Stretching Cylinder	Jahangir Alam University of Dhaka
1:00 PM - 3:00 PM	**SESSION V-2D** **TS: Innovations in Heat Exchangers** **Chair:** **Hamidreza Najafi** Florida Institute of Technology	50621 - Manifold-Microchannel Heat Exchanger's Pressure Drop Prediction with Porous Medium Approach	Brayden Morse Oregon State University
		50637 - Comprehensive Evaluation of the Thermodynamic and Economic Performance of the Shell-and-Tube Heat Exchanger by Coupling Life-Cycle Cost and Exergy Analysis	Jiayuan Zhao Xi'an Jiaotong University
		50644 - Heat pipe design and analysis with Heat Pipe Analysis Toolbox (H-PAT)	Vahit Çorumlu Manisa Celal Bayar University
		50685 - Heat transport characteristics of the vapor chamber with meandering flow channel fabricated within sintered metal porous layer	Natsuki Kimura Tokyo University of Science
		50786 - Measuring Geometrical-Induced Effects In A TPMS-UHTC Heat Exchanger With A Multi-Fluid, Single Phase Thermal Flow Simulation Using An Indirect Approach To Corrosion Modeling	Guillermo Feliciano Morales University of Puerto Rico Mayaguez
		50954 - Effect of Chevron Angle and Plate Length on Heat Transfer Performance of Plate Heat Exchangers	Mahmoud Hamoda Technical College Of Civil Aviation and Meteorology
1:00 PM - 3:00 PM	**SESSION V-2E** **FD: Multiphase Flows-02** **Chair:** **Parimah Kazemi** Heat Transfer Research, Inc.	50352 - Numerical and experimental modeling of two leaks behavior for water-air multiphase flow through a pipeline	Mohammad Azizur Rahman Texas A&M University at Qatar
		50708 - Parametric Study of Spray Flash Vacuum Distillation Systems with a focus on Multi-Objective Optimization using Genetic Algorithm	Mohammad Mohammadzadeh Moghanjooghi New Jersey Institute of Technology
		50712 - Advancing Spray Flash Vacuum Distillation System: a Comprehensive Two-Stage System Model	Mohammad Mohammadzadeh Moghanjooghi New Jersey Institute of Technology
		50945 - Experimental study and numerical simulation of gas-liquid two-phase flow pattern in micro-channels	Dongyao Liu Nanjing Unversity of Science and Technology
		50964 - Observations on the stability of the multiphase lattice Boltzmann method with a conventional equation of state	Parimah Kazemi Heat Transfer Research, Inc.
		50990 - Numerical Investigation of Thermocapillary Flows in Self-Rewetting Fluid Layers and Drops using Lattice Boltzmann method	Bashir Elbousefi University of Colorado Denver
1:00 PM - 3:00 PM	**SESSION V-2F** **TS: Aerospace Applications** **Chair:** **Yevhenii Shkvar** Zhejiang Normal University	50576 - Transient Supercritical-Pressure Heat Transfer of Kerosene with Thermal Oxidation Coking Accumulation	Yuan Yuan Zhejiang University
		51694 - Methodological approaches to improve the applicability of near-wall turbulent flow control methods for high-speed vehicles	Yevhenii Shkvar Zhejiang Normal University
		52580 - Mathematical Modeling of an Electrically-coupled Radioisotope Thermoelectric Generator Converter Subjected to Varying Hot-side Temperatures	Joseph Kearney University of Pittsburgh
		52581 - Investigation of Lateral Insulation Heat Losses of a Thermoelectric Generator Through Mixed-methods Modeling	Carter Gassler University of Pittsburgh
		50674 - The effect of radiative heat transfer due to inhomogeneities on the onset of convection	Sarath Babu IIT GOA
		50743 - CFD Validation of Flow Characteristics of Aircraft in Wind Tunnel	Jobaidur Khan University at Buffalo
1:00 PM - 3:00 PM	**SESSION V-2G** **FD-TS: Fluid Flow and Heat Transfer in Industrial and Commercial Processes** **Chair:** **Helfried Steiner** Graz University of Technology	50586 - Effect of near wall variation of fluid properties on the Nusselt number in forced turbulent convection at high molecular Prandtl number	Christoph Irrenfried Helfried Steiner Graz University of Technology
		50717 - 3D body scan, airflow modelling, and heat transfer around a standing human body by computational fluid dynamics	Zubieda Alali Kansas State University
		50956 - Effect of Plate Length and Chevron Angle on Pressure Drop in Plate Heat Exchangers	Mahmoud Hamoda Technical College Of Civil Aviation and Meteorology
		50415 - Solar Energy Integration In Direct Contact Membrane Distillation For Clean Water Production	Himanshu Tyagi IIT Ropar
		50532 - A Verification of Energy Savings in Air Compressors Via Reductions in Inlet Temperature and Relative Humidity	Miles Nevills Tennessee Tech University
		50620 - Experimental and Numerical Investigation of Residential Furnace Performance with Blends of Natural Gas and Green Hydrogen	Behzad Zeinolabedini East Carolina University

Time	Session	Title	Author
1:00 PM - 3:00 PM	**SESSION V-2H** **ES: Innovations in Energy Systems and Equipment-Thermofluids Education** **Chair:** **Muzammil Arshad** Higher Colleges of Technology	50600 - Flow Behavior and Design Implications of Tapered Header Plate Heat Exchangers for Enhanced Performance	Mohammed Mizanur Rahman Michigan State University
		50636 - Parametric Study on Thermal Compressor	Jobaidur Khan University at Buffalo
		50918 - Assessing the Viability of Small Wind Turbines for Power Generation in Cirebon Indonesia	Rachmadian Wulandana State University of New York (SUNY) at New Paltz
		51275 - Methane pyrolysis in a molten metal bubble column reactor: separation of carbon and metal	Michael Bichnevicius Massachusetts Institute of Technology
		51222 - Numerical Investigation on the Effect of Winglet Cant Angle on the Performance of Wind Turbine Blade	Bayu Kusuma Wardhana University of Miyazaki
		51496 - Is a Mandatory Attendance Policy Required Post-COVID?	Muzammil Arshad Higher Colleges of Technology
1:00 PM - 3:00 PM	**SESSION V-2I** **FD: Turbulent Flows-02** **Chair:** **Mustafa Usta** Cleveland State University	50673 - Similarity Characteritics of Constant Capacity of Transonic Jetting Turbunet Flows in Ejector	Ning Wang Dalian University of Technology
		50710 - The Characterization Of A Propeller Slipstream At Low Reynolds Number	Bipin Kumar Mishra IIT Kanpur
		52544 - Compressibility effects on the budget of the momentum & energy equations in turbulent boundary layers	Odai Natsheh University of Texas at San Antonio
		50694 - Investigating Mixing and Laminarization in Coaxial Jets with Disparate Viscosity Conditions	Mustafa Usta Cleveland State University
		50686 - Hydrodynamic effects on tidal turbine performance in proximity to a downstream centrifugal reverse osmosis module	Mustafa Usta Cleveland State University
1:00 PM - 3:00 PM	**SESSION V-2J** **FD: Nano and Micro Fluids Applications-Thermo-Fluid Education** **Chair:** **FNU Sunil Kumar** Texas A&M University	50498 - Low Reynolds Number Flow Through Microchannels	Melvin C Joshy SCMS SSET
		50845 - Heat Transfer Enhancement in Nanodiamond/Water Nanofluids	Abraham Malyne Bradley University
		50863 - Enhancing Heat Transfer Efficiency: An Experimental Study on Silver-Water Nanofluid	Gabriel Herrera Bradley University
		50917 - Experimentally Measuring the Heat Transfer Coefficient of Hybrid Nanofluid in Microchannel	Tom Kendall Bradley University
		52545 - Flame Synthesis of Silica Nanoparticles under the Influence of an Electric Field	FNU Akash Jerome North Carolina State University
		49908 - Computational analysis of combined novel pin-fin heat sink and a green nanofluid containing graphene nanoplatelets for cooling enhancement of IGBT modules in electric vehicles	Nima Mazaheri University of Calgary
1:00 PM - 3:00 PM	**SESSION V-2K** **FD: Aerodynamic Design and Analysis-02** **Chair:** **Kevin R. Anderson** Calif State Polytechnic Univ, Pomona	49215 - Aerodynamic Heating of a Slender Body Flying at Subsonic Speeds	Sujit Kumar Singh Southern Illinois University Edwardsville
		49323 - Aerodynamics of a Sports Car	Venkata Sandeep Gunnapu SIU - Edwardsville
		49324 - Aerodynamics of an Electric Closed-Cargo Van	Vamsi Krishna Atmudi SIU - Edwardsville
		49582 - Aerodynamic Downforce of a Flat Wing Mounted at the Rear of a Sports Car	Venkata Sandeep Gunnapu SIU - Edwardsville
		50732 - Exploring the Influence of Relative Humidity and Temperature on CO2 Laser Beams	Devin Roland University of South Florida
		50735 - Exploring the Thermal Effects of Utility-Scale Photovoltaic Integration on Atmospheric Boundary Layer: Insights from a Field Campaign	Devin Roland University of South Florida
1:00 PM - 3:00 PM	**SESSION V-2L** **FD-TS: Modeling and Simulation of Thermo-Fluid Phenomena-02** **Chair:** **Nima Nadim** Curtin University	50697 - Reduced Order Modeling of Dynamics Of Droplet Impact on a Solid Surface	Arnab Chakraborty TCS Research
		50680 - Thermo-Flow Disparity of Turbulent Boundary Layer in Presence of Secondary Bubbly Phase	Nima Nadim Curtin University
		51015 - Optimizing the Placement of Wind Turbines near Isolated High-Rise Buildings using Computational Fluid Dynamics	Sayed Javad Mortazavian Najafabadi Cleveland State University
		50557 - Pinch Point Analysis of Gas Coolers in Transcritical R1366mzz(Z) HTHPs	Pengtao Wang Oak Ridge National Laboratory
		51016 - Towards Improving High Spatiotemporal Weather Forecast Accuracy with Data-Driven Modeling	Navid Goudarzi Cleveland State University
		51017 - Efficient Urban Airflow Analysis: Leveraging Reduced Order Models for Computational Cost Reduction	Navid Goudarzi Cleveland State University
3:00 PM - 3:30 PM	**Closing**		

ASTFE

American Society of Thermal and Fluids Engineers

10TH THERMAL AND FLUIDS ENGINEERING CONFERENCE (Hybrid)

Partially online virtual and in person
at George Washington University, Washington, DC, USA

9-12 MARCH 2025

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The American Society of Thermal and Fluids Engineers (ASTFE), TFEC2025 Conference (Hybrid) will be held on March 9-12, 2025 partially online virtual and in person at George Washington University, Washington, DC, USA. ASTFE is the premier international society by and for professionals within the thermal and fluids science and engineering community. The 10th ASTFE conference, TFEC2025 provides an international forum for the dissemination of the latest research and knowledge in the thermal and fluid sciences. Authors are invited to submit abstracts covering, but not limited to, the following areas:

- Advanced Energy Systems
- Aerospace Applications
- Atomization
- Combustion, Fire and Fuels
- Computational Methods/Tools in Thermal-Fluid Systems
- Cryogenics
- Electric, Magnetic, Flow and Thermal Phenomena in Micro and Nano-Scale Systems
- Electronics Cooling
- Energy and Sustainability
- Energy Storage Systems
- Energy-Water-Food Nexus
- Engineering Equipment and Environmental Systems
- Engineering Fundamentals and Methodology
- Experimental Methods/Tools and Instrumentation in Fluid Mechanics and Heat/Mass Transfer
- Flow and Heat Transfer in Biological Systems
- Flow and Heat Transfer in Materials Processing Science and Manufacturing
- Flow in Internal Multiphase Flows
- Flow Instability
- Fluid Flow and Heat Transfer in Industrial and Commercial Processes
- Fluid Flow and Heat Transfer Multiphase Phenomena
- Fluid Measurements and Instrumentation
- Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids
- Fuel Cells
- Fundamentals in Fluid Flow and Heat/Mass and Momentum Transfer
- Heat Exchangers: Compact, Novel, Networks
- Heat Pipes
- Heat Pumps
- Heat/Mass Transfer Enhancement Techniques
- Industry Problems: CO2 Capture
- Machine Learning and AI
- Material Issues, Ceramics, Low Thermal Conductivity
- Measurement and Modeling of Environmental Flows
- Multiphase Flows
- Nano and Micro Fluids Applications
- Natural and Built Environments
- Nuclear Energy and Systems
- Ocean and Climate Science
- Plasma Physics and Engineering
- Refrigeration, Air Conditioning Systems, and Refrigerants
- Solar Energy Equipment and Processes
- Thermo-economic Analysis of Energy Systems
- Thermo-Fluid Education
- Transportation
- Turbulent Flows
- Wind Turbines Aerodynamics and Control

Authors will have options to present their research work as presentation only, extended abstract (maximum of 4 pages), or full-length paper (5-10 pages). The conference proceedings will contain both peer-reviewed extended abstracts and papers, and will be distributed in a digital form, the ASTFE Digital Library. Authors will also have the option to submit their full conference papers to a technical journal of their choice after the conference. The full conference papers should have significant changes made before submitting to any journals. The same full conference papers cannot be submitted to any journal publications. Authors may share their original manuscripts with the public but must include a citation and a link to the published paper (conference paper or journal paper).

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DEADLINES

September 6, 2024
Abstract Due

September 13, 2024
Notification of Abstract Accept / Decline

October 11, 2024
Draft Paper / Extended Abstract Due

November 8, 2024
Draft Paper / Extended Abstract Reviews Completed

November 15, 2024
Authors Notified of Paper / Abstract Status

November 22, 2024
Revised Manuscript Due

December 6, 2024
Presentations Only Abstracts Deadline / Final Paper / Extended Abstract Due

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April 21–24, 2024

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UPCOMING CONFERENCES

9th International Symposium on Advances in Computational Heat Transfer

Istanbul, Turkiye
May 26 – 30, 2024

15th International Conference on Thermal Engineering Theory and Applications

Tashkent, Uzbekistan
May 29, 2024 – June 1, 2024

10th Thermal and Fluids Engineering Conference (Hybrid)

George Washington University, Washington, DC, USA
March 9-12, 2025

18th International Heat Transfer Conference

Rio de Janeiro, Brazil
August 10 – 15, 2026

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