

Track 5: Fluid Measurement and Instrumentation

Sponsors: Fluids Engineering Division

Topic 5-1: Advanced Thermal-Flow Diagnostic Techniques in Multiphase Flow (FMITC & MFTC)

Organizers:

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Descriptions:

The Advanced Thermal-Flow Diagnostic Techniques in Multiphase Flow Phenomena seeks to explore the latest advancements in analyzing and understanding complex multiphase flows. This topic focuses on experimental methods for detecting, visualizing, and measuring multiphase flow behavior, including state-of-the-art techniques leveraging sensor technology, imaging methods, and data analysis. The goal is to foster interdisciplinary dialogue, exchange ideas, and collaborate on developing innovative diagnostic methods for both fundamental research and industrial applications.

Topic 5-2: Fabrication Techniques, Sensors, Transducers and Experimental Methods in Micro and Nano Fluid Mechanics (MNFDTTC, FMITC)

Organizers:

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Descriptions:

This topic will provide presenters with opportunities to introduce their innovative fabrication methods of micro/nanofluidic devices and creative integration of sensors and transducers in such devices. The topic also focuses on bringing together researchers and industry practitioners to explore and discuss the recent experimental-based observations on fluidic phenomenon, the corresponding fundamental theories on small-scale fluid mechanics, and the potential relevance of these findings to industrial applications. Fluidic motions, such as droplets, fluid-fluid interfaces, and jet streams, occur in daily life and industrial processes. These phenomena are accompanied by intricate processes like heat transfer, rheological behavior, and phase change, which may reduce the performance of working processes involving fluids. A wide range of applications can be affected, from additive manufacturing technology to nucleic acid detection or drug delivery in medical fields. In order to gain a deeper understanding of such fluid phenomena during industrial processes, the scope under this topic covers a broad spectrum of sub-topics related to fluid phenomena in micro- and nanoscale. Participants will have the opportunity to introduce their newest experimental observations, share the results of their research analysis, and discuss the potential importance of their research in upscaled industrial problems, thereby emphasizing the real-world impact of their works.

Topic 5-3: Novel Measurement Techniques (FMITC)

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Descriptions:

Fluid measurement is a critical aspect of fluid mechanics, encompassing the quantification of flow rates, pressures, temperatures, and other fluid properties in various applications ranging from industrial processes to environmental monitoring and biomedical engineering. Accurate measurement techniques are fundamental to advancing our understanding of fluid behavior, optimizing engineering designs, and solving practical problems in industry. This topic will cover a wide range of sub-topics related to novel and emerging measurement techniques in fluid mechanics, aiming to showcase innovative approaches that enhance the precision, reliability, and applicability of fluid measurements across different scales and environments and convene researchers, engineers, and industry professionals. Participants will have the opportunity to discuss the challenges and opportunities associated with these new techniques, as well as their potential impact on the future of fluid mechanics research and applications.