Karlsruhe Institute of Technology

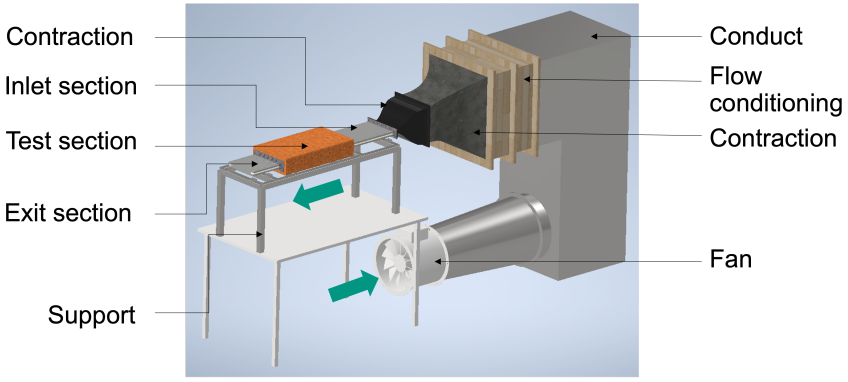
Institute of Fluid Mechanics
Building 10.23, 6th floor, Kaiserstraße 10, D-76131 Karlsruhe, Germany
http://www.istm.kit.edu

Master thesis – Experimental

An experimental study on thermal performance in additively manufactured structured channel flows

Fluid flow and heat transfer through conduits of regular shapes (cylindrical/rectangular) are topics of great interest to the heat transfer community due to their wide range of engineering applications, such as micro evaporators and heat exchangers. However, in most real-world applications conduits are of irregular shapes with purposely incorporated wall structuring to achieve enhanced heat transfer. Optimizing such wall structuring is a non-trivial task and researchers usually rely on numerical simulations. Once optimized using suitable optimization techniques these geometries need to be validated experimentally. At ISTM, our team is actively developing a measurement system specifically tailored to address this task.

Hence, in this thesis study, the aim is to extend the existing experimental setup that can validate the flow and heat transfer characteristics, specifically skin-friction drag C_D and heat transfer rate St, of structured channel geometries. The thesis will involve metal 3D printing of the geometries, extending the existing measurement system, performing measurements, and post-processing of the obtained data.



Experimental Setup - General view

Requirements
Basic knowledge of fluid mechanics

Beneficial Skills
Experimental techniques

Start: immediately

Contact:
Dr. Arjun John K

Institute of Fluid Mechanics (ISTM)
Kaiserstraße 10,
Building 10.23, Room 603
☎ +49 721 608-45880
✉ arjun.kaithakkal@kit.edu