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Micro-FloTec - Microscale enabled advanced flow and heat transfer technologies featuring high performance and low power consumption

With the emergence of Industry 4.0, electronic and digital devices are incorporated into almost all high tech applications. There has also been a notable shift towards compact electronic devices, which requires more intense operating powers — leading to enormous heat dissipation. Thus, whilst devices are increasingly becoming portable and powerful, thermal management techniques are arguably not catching up at the same rate. Hence, continuous improvement and innovative approaches are needed. In this regard, microchannel-based techniques present innovative possibilities to tackle thermal management and cooling issues in modern appliances across various industries, aligning with the trend to adopt more sustainable approaches and the EU 2016 legislation for heating and cooling. Consequently, our 'Micro-FloTec' project adapts an international, multidisciplinary, and collaborative approach to exchange expertise from 17 research institutions and two industrial partners to trigger significant advancements and agile development for heat transfer and thermal management solutions. The consortium shares robust experience and skills related to heat transfer enhancement, large-scale electrical energy storage via thermal processes, new generation materials science, multi-phase flow, flow and heat transfer of high-temperature rotating parts, design and modelling for energy-efficient control systems, marketing and entrepreneurship skills, amongst others. Based on the appraisal of the current state-of-the-art literature and technologies, we aim to tackle problems within morphological optimization of multiphase heat transfer performance and flow resistance reduction, surface modification techniques, and application of multi-phase physics for performance prompting. Our project will hopefully achieve cost-effective and sustainable solutions, initiate future advancements and investigations, and contribute towards the EU's 2050 long-term strategy for climate and energy saving goals.

Coordinator: Sabanci Universitesi

Beneficiary: Università degli Studi di Padova

UNIPD Supervisor: Simone Mancin

Department: Department of Management and Engineering

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Project Duration in months: 48



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