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PH.D. IN POOL BOILING HEAT TRANSFER ENHANCEMENT

This Ph.D. position is hosted by the Heat & Mass Transfer (HMT) group of the Division of Applied Mechanics and Energy Conversion (TME) at the Department of Mechanical Engineering and under the supervision of Prof. Maria Rosaria Vetrano. Fan of multidisciplinary approaches, her research group focuses on studying heat and mass transfer phenomena in single- and two-phase flows at the micro and nanoscale using advanced optical techniques. The Heat & Mass transfer group possesses two laboratories:

- The nanofluids laboratory @ Campus Arenberg Nanocenter was inaugurated in 2019 as a common platform for investigating nanofluids' behavior during heat transfer processes.
- The TME laboratory @ Campus Arenberg WTK. The HMT group possesses more than 150 m2 laboratories equipped with state-of-the-art infrastructures such as a Tomographic High-Speed and low-speed PIV system, Phase and Laser Doppler Velocimetry, Micro-PIV system, high-speed cameras, vacuum chambers, optical tables, …

Currently, the HMT group hosts 5 Ph.D. researchers and 2 Postdoctoral researchers and is in continuous expansion. The current project is proposed in partnership with the Laser Micromachining group of the Manufacturing Processes and Systems (MaPS) division of KU Leuven and the Laboratory for Heating Technology of the University of Ljubljana and is funded by the Research Foundation – Flanders (FWO) and the Slovenian Research Agency (ARRS). The position is available immediately at Campus Arenberg (Leuven).

Website unit

Project

Designing efficient cooling-heating devices is crucial in several applications, such as microelectronics and aerospace engineering. The efficiency of these cooling-heating systems impacts our environment and the energy consumption of devices we daily use (e.g., mobile phones, tablets, computers). Although new cooling technologies have been developed for decades, high-power-density devices today and future miniaturization of mechanical and electronic components are still coupled to a lack of efficient heat dissipation methods, leading to an enormous technological bottleneck. One of the most effective ways to remove heat from a surface is boiling. The enhancement of heat removal can be obtained by functionalizing the surface through tailoring the roughness, chemical properties, and wettability and creating particular

geometrical micro-and nano-features like fins, channels, or cavities. In this context, the project will address studying the impact of surface textures on heat transfer during pool boiling and develop physical models supported by the experimental investigations. The experimental research includes using fluorescent/phosphorescent techniques to measure the liquid temperature during boiling and the heat flux and the characterization of the boiling regimes and dynamics.

Profile

We are looking for a motivated researcher, with preferably:

- skills in two-phase heat transfer and, in particular, pool boiling
- experience in experimental fluid dynamics
- experience in the use of optical advanced measurement techniques (Particle Image Velocimetry, Laser-Induced Fluorescence, Schlieren Imaging, Interferometry, Infrared Imaging,....)

Offer

- A doctoral scholarship (fully funded) for four years at the Department of Mechanical Engineering.
- A remuneration package competitive with industry standards in Belgium, a country with a high quality of life and an excellent healthcare system.
- A highly specialized doctoral training (see Arenberg Doctoral School) in an international environment at a top European university to allow you to gain the skills required to complete your Ph.D., as well as develop yourself as an independent researcher.
- Multiple benefits (health insurance, university infrastructure, sports facilities, self-development through skills training courses, etc.).
- The opportunity to participate in research collaborations and international conferences.
- An international, highly motivated, and friendly group of colleagues with an excellent group dynamic.

Interested?

For more information, please contact Prof. dr. Maria Rosaria Vetrano, mail:
rosaria.vetrano@kuleuven.be.

You can apply for this job no later than April 28, 2022.