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Message from the Guest Editor of the 16th Multiphase Flow Conference Special Issue

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Dear readers,

It is my great pleasure that we have the opportunity to publish 10 selected contributions of the 16th Multiphase Flow Workshop after a rigorous review process in the newly established journal "*Experimental and Computational Multiphase Flow*".

Since 2003, the Multiphase Flow Conference and Short Course takes place annually in Dresden (Germany) and is jointly organized by Helmholtz-Zentrum Dresden-Rossendorf and ANSYS. It aims to bring together experts on numerics and CFD-modelling with experimentalists and specialists on two-phase flow measuring techniques as well as to cover a wide range from the basics of multiphase flows to multifaceted industrial applications. At the 16th edition of this event in November 2018, 1½ day short course was followed by a two-day conference. A total of 65 contributions were presented at the conference part, 2 of them as invited keynote lectures, 26 as oral presentations, and 37 as posters. In general, the papers were of a very high quality, so that the selection of the papers to be invited for the special issue was not an easy task. Therefore, in addition to the 6 contributions in this special issue, 4 contributions are arranged in regular issues of the journal.

Two of them concern Large Eddy Simulations (LES) of multiphase flows. While LES is already frequently used for single-phase flows, many questions remain open regarding the interactions between turbulence and interface dynamics. In the paper "Large eddy simulation of multiphase flows using the volume of fluid method: Part 1—Governing equations and a priori analysis" (https://doi.org/10.1007/s42757-019-0019-9), different ways of filtering to derive the governing equations are discussed and an a priori analysis to check the order of magnitude of different model expressions is presented. In the paper "Large eddy simulation of multiphase flows using the volume of fluid method: Part 2—A-posteriori analysis of liquid jet atomization" (https://doi.org/10.1007/s42757-019-0026-x), the corresponding effects in primary jet breakup are discussed in detail.

A new optical probe for two-phase flow measurements was tested and the results were compared to particle image velocimetry and high-speed imaging measurements as reported in the paper "Simultaneous measurements of two phases using an optical probe" (https://doi.org/10.1007/s42757-019-0025-y). The paper "Laser-induced vapour bubble as a means for crystal nucleation in supersaturated solutions—Formulation of a numerical framework" (https://doi.org/10.1007/s42757-019-0024-z) presents a modelling framework and corresponding simulations on the formation, growth, and collapse of a vapour bubble induced by a laser. Bubble dynamics are mainly controlled by inertia and thermal effects. To assess the interfacial forces implemented in the ANSYS codes FLUENT and CFX for the multi-fluid approach, different experimental databases are used for the validation as presented in the paper "On the assessment, implementation, validation, and verification of drag and lift forces for the CFD codes FLUENT and CFX" (https://doi.org/10.1007/s42757-019-0032-z).

The capabilities and accuracy of new algorithms for compressible interfacial flows as shock wave–bubble interactions in the Volume of Fluid approach are investigated in the paper "Numerical modelling of shock–bubble interactions using a pressure-based algorithm without Riemann solvers" (https://doi.org/10.1007/s42757-019-0021-2) which is part of this special issue. With the background of a passive containment cooling system for nuclear reactors, the paper "Experimental and theoretical investigation of the boiling heat transfer in a low pressure natural circulation system" (https://doi.org/10.1007/s42757-019-0023-0) presents an experimental facility and corresponding investigations on boiling in a slightly inclined tube. Another application of the one-fluid approach is presented in the paper "Three-dimensional simulations of liquid waves in isothermal

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vertical churn flow with OpenFOAM" (https://doi.org/10.1007/s42757-019-0029-7). Beside others the influence of the grid size and the interface compression scheme on the wave frequency is analysed.

The paper "Visualization and measurement of two-phase flows in horizontal pipelines" (https://doi.org/10.1007/s42757-019-0022-1) presents an experimental setup and corresponding measurements on plug and slug flow regimes for air–water flow in horizontal pipes. The data are used to assess the suitability of different correlations for pressure loss and gas volume fraction. Another experimental work is presented in the paper "Experimental study of the influence of cross-overflow on the decay heat removal from spent fuel pools" (https://doi.org/10.1007/s42757-019-0034-x). A specific facility was designed to investigate the effect of air cross flow above a nuclear reactor fuel assembly head on its cooling in a storage pool under different conditions as water blockage caused by a drop of the water level in the storage pool below the fuel assembly head.

These 10 papers reflect well the range of topics of the previous workshop. Starting from 2019, the Multiphase Flow Conference and Short Course will be held at Helmholtz-Zentrum Dresden-Rossendorf with an extended number of partners. In 2019, these partners are ANSYS, Siemens PLM, The OpenFOAM Foundation, ISimQ, and the Virtual International Research Institute of Two-Phase Flow and Heat Transfer. I am looking forward to a fruitful continuation of this workshop!

Sincerely,

Dirk Lucas