

## SYMPOSIUM ON COMPUTATIONAL MULTI-FLUID DYNAMICS MODELS FOR MULTISCALE AND MULTIPHYSICS PROBLEMS: METHODS, ALGORITHMS, CHALLENGES AND PERSPECTIVES

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### ABSTRACT

Computational multi-fluid models have become major tools in the design and optimisation of materials, equipment and processes, and in risk assessment for environmental and industrial flows. Challenges on developing accurate and reliable models are often associated with the complexity of the flow dynamics and domain geometry, multiplicity of length- and time-scales of physical phenomena, inherent heterogeneous nature of multiphase fluids, anisotropy of properties and communication and computational overhead for detailed simulations.

The main aim of this Symposium is to foster discussion and collaboration among environmental and industrial scientists and professionals on cutting-edge technologies for multiscale and multiphysics methods currently embedded in computational multi-fluid dynamics (CMFD) models. In particular, it will cover fundamental research areas on advanced subgrid-scale FEM/FVM models and meshless methods for multiphysics problems.

Emphasis will be on the implementation and optimisation of computational methods and algorithms used in large scale simulations of multiscale and multiphysics flow problems. All application areas ranging from compositional non-isothermal flow dynamics in pore-scale to thermo-hydraulics in nuclear systems are welcome.

Contributions are welcome on, but not limited to the following topics:

- Computational multi-fluid dynamics (CMFD and CFD) models;
- Finite element / volume methods (FEM / FVM);
- Discrete element and Lattice-Boltzmann methods (DEM / LBM);
- Molecular dynamics (MD) models;
- Multiscale methods;
- Coupling models for multiphysics problems;
- Parallel numerical algorithms for large scale flow simulations;
- LES and SGS models for turbulent flows.