



## INVITED SESSION

### Fundamentals of DEM and CFD-DEM: Recent Advances and Challenges

#### ORGANIZERS

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#### ABSTRACT

In this session we would like to showcase recent developments regarding fundamentals of DEM and CFD-DEM modelling. The vision motivating such fundamental developments in DEM are usually (i) faster predictions, (ii) increased resolution or (iii) predictive power. This often includes aspects of heat and mass transfer to an ambient phase, e.g., drying or processes in energy applications. Recent studies also harness machine learning (ML) technology to increase the speed and fidelity of the DEM. Such an advanced DEM could be key to develop, optimize, and trouble shoot many processes ranging from food and pharma to energy applications.

This session invites all contributions related to DEM and CFD-DEM fundamentals, especially:

- development of new and existing approaches, models and numerical methods for temporal and spatial scale-bridging
- linking and connecting DEM models with Low-Order-Models (LOM), as well as related models
- use and uptake of ML-based methods to enhance or complement DEM modelling
- analysis of simulated or experimental data (e.g., via spatial filtering) to support development of models and novel approaches
- predictions of flow, temperature, and concentration in granular only, as well as gas-particle flows in lab- and pilot-scale equipment
- applications of advanced DEM especially in the energy, food, and pharma sector at the production scale
- software aspects relevant for the implementation of novel approaches and methods, including latest developments of software products