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Particle dispersion and deposition in porous media: a computational perspective GIANLUCA BOCCARDO, ELEONORA CREVACORE, RAJANDREA SETHI, DANIELE MARCHISIO, Politecnico di Torino — This work investigates particle dispersion in porous media, which is of central relevance in a number of applications ranging from groundwater remediation tochemical engineering. The challenge lies in studying the complex fluid dynamics behavior arising at the microscale (very difficult to observe experimentally) and obtaining transport models to be employed at the macroscopic scale of interest. While a wealth of studies have approached this problem, the case of particle transport with a concurrent heterogeneous chemical reaction (e.g.: particle deposition) still lacks a satisfactory description, especially when considering a polydisperse population of solid particles. Moreover, the oft-used simplified descriptions of the porous medium (via array of spheres or similar strategies) fail to fully take into account the effect of the packing structure. Our novel approach relies on an "in-silico" procedure where many 3-D realistic porous media models are constructed via rigid-body simulations and fluid flowand particle transport are then investigated through computational fluid dynamics. The results evidence the need for a deeper look, afforded by these methodology, into the influence of the features of realistic porous media on particle transport and deposition.

Gianluca Boccardo
Politecnico di Torino

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