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**Pressure-driven flow in a channel with porous walls**[1] QIANLONG LIU, Johns Hopkins University, ANDREA PROSPERETTI, Johns Hopkins University and University of Twente, The Netherlands — The finite-Reynolds-number three-dimensional flow in a channel bounded by one and two parallel porous walls is studied numerically. The porous medium is modelled by spheres in a simple cubic arrangement. The results for the slip velocity at the surface of the porous layers are compared with the phenomenological Beavers-Joseph model. It is found that the value of the slip coefficient is different for pressure-driven and shear-driven flow. A modification of the relation is suggested to deal with this feature. Furthermore, detailed results on the flow structure and the hydrodynamic forces and couple acting on the sphere layer bounding the porous medium are reported and their dependence on the Reynolds number illustrated. It is shown that, at finite Reynolds numbers, a lift force acts on the spheres, which may be expected to contribute to the the mobilization of bottom sediments.

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Qianlong Liu
Johns Hopkins University

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