Abstract:
Recent experimental results [1,2] have shown that injection of polymer particles along with water enhances oil recovery after initial waterflood. The recovery mechanism is believed to be microscopic diversion of the flow, where injected particles can accumulate in narrow pore throats and clog it, in a process known as log-jamming. The blockage of pore channels causes a redistribution of the local pressure, which can lead to mobilization of trapped oil, enhancing its recovery. Our objective is to develop a core-scale model that is consistent with the observed production profiles. We show that a simple two-phase flow model with and additional transport equation for the particles is able to reproduce qualitatively previous experimental results. A key aspect of the formulation is that the microscopic heterogeneity of the rock and a dynamic alteration of the permeability must be taken into account in the rate equations [3]. This is joint work with F.A. Radu, E. Keilegavlen, K. Kumar and K. Spildo.

References:
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[3] M.A. Endo Kokubun, F.A. Radu, E. Keilegavlen, K. Kumar, K. Spildo, Transport of polymer particles in a oil-water flow in porous media: enhancing oil recovery, submitted to Transport in Porous Media (2018)