Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Particle migration of a Brownian suspension in simple and chaotic pressure-driven microchannel flows JAMES GILCHRIST, CHANGBAO GAO, Department of Chemical Engineering, Lehigh University — We investigate the flow and concentration profiles of particle suspensions in microfluidic channels. In steady pressure-driven flows, self-organization occurs due to particle migration, typically driving particles away from the walls toward the center of the channel despite the diffusive Brownian motion of the particles. In channels whose geometry induces flow in the transverse direction to the pressure gradient, competition between particle self-organization and mixing due to advection results in concentration profiles where the underlying 3D flow templates pattern formation. Using confocal laser scanning microscopy, we directly image monosized microspheres flowing through 50 x 50 micron 40 mm long straight channels with both smooth and herringbone-ridged boundary conditions and measure the 3D spatial concentration profile.

James Gilchrist
Department of Chemical Engineering, Lehigh University

Date submitted: 12 Sep 2005 Electronic form version 1.4