24th MSS-Seminar

Wednesday, December 14th, 15:30, Nägelsbachstr. 49b

Mixing and segregation in granular materials

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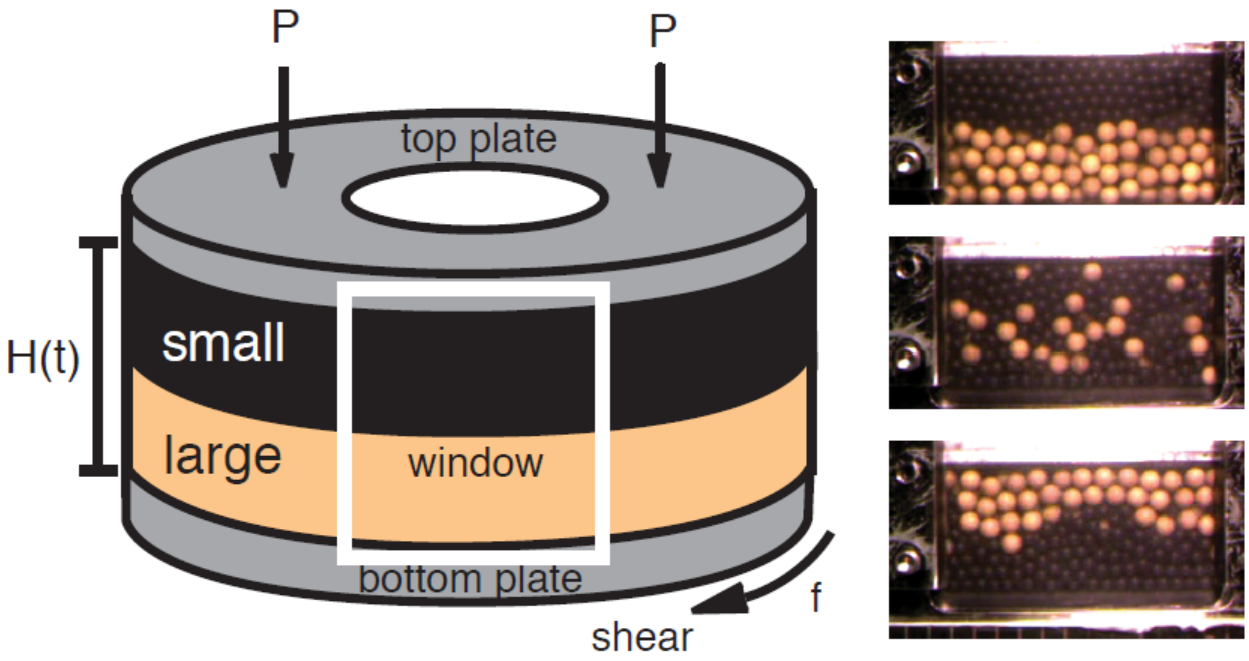

Granular materials typically segregate by size under various driving conditions, with the smaller particles moving in the direction of gravity and the larger particles accumulating at the top. I will present experiments which investigate granular materials initially prepared in the opposite configuration, and then allowed to evolve under shear or boundary-agitation. In experiments on sheared glass spheres, we study the mixing and segregation rates as a function of particle size ratio and confining pressure. Intriguingly, we find that while the mixing rate at low confining pressure behaves as expected from percolation-based arguments, we observe an anomalous effect for the re-segregation rates, wherein the segregation rate is a non-monotonic function of the particle size ratio. Combined with the fact that increasing the confining pressure significantly suppresses both mixing and segregation rates of particles of sufficiently dissimilar size, we propose that the anomalous behavior may be attributed to a species-dependent distribution of forces within the system.