1036-76-37 **Yuan N. Young*** (yyoung@oak.njit.edu), Cullimore Hall 519, Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07102. *Novel dynamics in Stokes flows due to fluid-structure or fluid-interface interaction.*

Stokes flows are laminar fluid motions that are dominated by high dissipation, and due to its simple nature, chaotic dynamics is often not expected in Stokes flow. In this talk we report interesting dynamics due to fluid-structure interaction and fluid-interface interaction in Stokes flow.

When an elastic fiber is moving in a Stokesian fluid, it may become susceptible to buckling instability when moving in the neighborhood of a hyperbolic point of the flow. When the stagnation point is part of a spatially-extended cellular flow, it is found that fibers can move as random walers across time-independent closed-streamline flow. It is also found that the flow is segregated into transport regions around hyperbolic stagnation points and their manifolds, and closed entrapment regions around elliptic points.

Another example is a viscous drop immersed in Stokes flow with time-varying rotation. Due to the fluid-interface interaction, the drop dynamics becomes chaotic even in the Stokesian regime. The chaotic dynamics is found to arise from a cascade of period-doubling bifurcations. We will further discuss how this findings can be useful in designing micro-fluidic mixers.

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