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Passive and active mixing in vortex chain flows[1] TOM SOLOMON, Bucknell University — In 1988[2], Jerry Gollub and I published an article that first identified chaotic mixing in an oscillating chain of alternating vortices, a model developed to describe transport in time-dependent Rayleigh- Bénard convection. In the thirty years since, the vortex chain flow (and the similar double-gyre flow) have become paradigm flows for studying fluid mixing in closed flows. In this talk, I'll review studies that have demonstrated both enhanced diffusion and superdiffusion in this system, as well as extensions to vortex arrays and three-dimensional, time-independent flows, which also show chaotic mixing. We will also discuss recent studies of active mixing – both of propagating reaction fronts and of swimming microbes – in vortex chain flows.

[1]Supported by NSF Grants DMR-1361881 and DMR-1806355.
[2]T.H. Solomon and J.P. Gollub, Phys. Rev. A **38**, 6280-6286 (1988)

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