



Colloquium

Wednesday, September 25, 2019, 4:05 p.m. (9th Period)
(in the Atrium)

Speaker: Dr. Philip Boyland

Title: Topology, Tangling and Fluid Mixing

Abstract: The lecture will begin with a description of some of the morphology and mathematics of basic fluid structures followed by their application to fluid mixing. Ideas and theorems from Topology and chaotic Dynamical Systems will yield principles to design efficient mixers. The main mathematical idea is that the topological constraints described by braids give rise to the exponential growth of material lines at a predicted rate and thus of the gradients of transported quantities. The lecture will conclude with a discussion of how the same collection of topological/dynamical ideas can be used to quantify the entangling of such diverse entities as hair, ocean floats, bird flocking and individual motion in crowds.