

# BI-CO MATHEMATICS COLLOQUIUM

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## **“Fluid Models with Sharp Interfaces - Clouds and Plumes”**

**Monday, October 28, 2019**

**Talk at 4:00 – Hilles 109**

**Tea at 3:30 – Hilles 208, Math Lounge**

### **Abstract:**

In this talk, I will discuss two models describing the interaction of fluids across sharp interfaces. The first model is a simplified system of ODEs describing the mixing of jets and plumes with the ambient fluid. With the ambient density profile being sharply stratified, we established a criterion for a plume to be trapped underwater or rise to the top surface and also showed that this profile is the optimal mixer. This theory has been applied to the Gulf of Mexico oil spill incident and also compared with the data we collected through hands-on experiments in the fluids lab. I will briefly introduce a second model, which is a discontinuous Poisson equation where interfacial discontinuity arises from phase changes such as the interior and exterior of a cloud. A simple second-order numerical scheme aiming at solving this type of equations is proposed and tested.

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