Colloquium Series

An introduction to passive tracers

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Abstract: Suppose you drop some dye into a calm river. What will happen? One thing you may say is that the dye will go downstream. Another thing you might say is that it will disperse. In a more quantitative fashion: can you predict the distribution of dye along the span of the river over time? What if this scenario is in a circular tube, or a rectangular channel of a different size or shape? What's different, and what stays the same?

I will give a gentle introduction of how these questions are often answered by analyzing corresponding partial differential equations, show one approach to numerical simulation, and highlight a couple of the results from my PhD thesis work.

Keywords: partial differential equations, passive tracer, effective diffusivity

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