Bacteria swam over the sea, Swim, Bacteria, swim

From the human eyes a drop of water in the ocean is a well-mixed medium, and so previous studies of events that happen at smaller scales, such as the study of nutrient consumption by bacteria, are based on homogeneous background flows (shear flow at best). However, forcing near the thermocline can drive turbulence down to the scale of a drop of water, making the background homogeneity a questionable assumption. In this talk, I will present some of the pioneering efforts on trying to bring ecological modeling, fluid dynamics and dynamical systems methods together to understand the effect that turbulence brings to the problem of nutrient consumption by bacteria, whether it will give a competitive edge to certain species (swimmers), whether co-existence can be supported due to the heterogeneity of the flow, etc. The implication of turbulence for larger species remains an open... and interesting... and important question.