

## **Observational Seminar, SIO 219 Syllabus**

**Professor Jennifer MacKinnon**

**Winter Quarter 2016**

I'll be leading SIO 219, the "observational seminar" this winter, the broad theme of which will be Ocean Mixing, and in particular diapycnal mixing primarily driven by turbulence. The class will meet once a week for an hour. Each week the first half of class will consist of student-led presentations of 1-2 key papers in the field, followed by a hopefully broad and energetic discussion by all present. A tentative syllabus is given below. Pending conflicts, the class will meet Friday from 12-1.

Week 1: Overview by Jen. From Fickian diffusion to Reynolds averaging to the basics of stratified turbulence and a global perspective of why we care.

Week 2: Boundary mixing driven by friction or buoyancy fluxes, air-sea exchange.

Week 3: Buoyancy driven plumes - from hydrothermal vents to North-Atlantic Deep-water formation.

Week 4: Internal-wave driven mixing I: the "linear" problem

Week 5: Internal-wave driven mixing II: nonlinear waves, solitons

Week 6: Hydraulically controlled features.

Week 7: Double diffusion and other peculiarities of the equation of state

Week 8: Coastal mixing, from shelf-break to surf zone.

Week 9: Biological implications and causes of mixing

Week 10: Mixing and the MOC, energetics, scaling, past and future climates.

Grading: Students will be assessed based on assigned paper presentation and participation discussion. All students should expect to come to class with at least one well thought out question to ask each week.