Environmental and Water Resources Engineering, and Center for Water and the Environment Seminar Series Presents:

TEXAS

Thursday, January 15th 2026, 3:30-4:30 pm, ECJ 1.324

Zoom Link: *https://utexas.zoom.us/j/84820581097*

Meet Your EWRE Spring 2026 Seminar Committee!

Hi! We are the Spring 2026 EWRE Seminar Committee! We hope to be able to organize exciting and informative seminars this semester that will foster innovative discussion and help students better find their next steps after graduate school.

During this seminar, we will introduce ourselves and give an introduction of EWRE and Seminar, including:
- What seminar is
- Upcoming events
- How to get involved in EWRE
- A Q&A session where you can ask any and all questions about seminar and EWRE as a whole

Spring 2026 Members
Ana Lăcău
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Turbulent Mixing Across Sharp Density Interfaces Without Mean Shear

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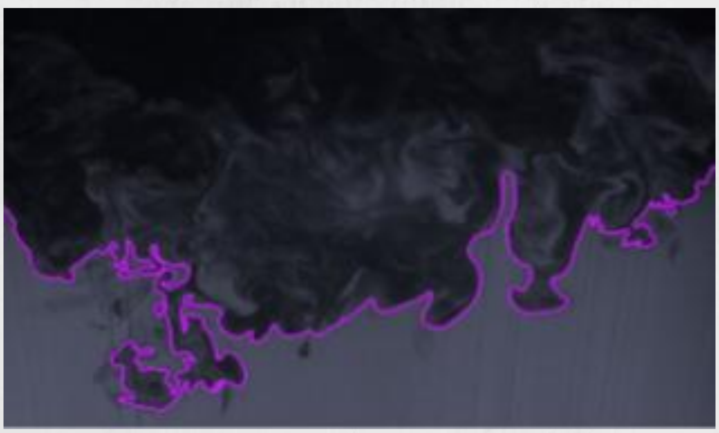

When turbulent eddies encounter a sharp density interface in the absence of significant mean shear, how efficiently does mixing occur? This question is central to our understanding of ocean stratification, atmospheric layering, and a wide range of industrial processes, yet key aspects of the underlying dynamics remain unresolved. We address this problem using laboratory experiments in which a turbulent layer overlies a quiescent, denser layer in a water tank. Turbulence is generated by a random jet array that produces vigorous fluctuations with no mean flow, enabling the study of pure turbulent mixing. The upper layer consists of an alcohol–water mixture and is lighter than the lower sugar–water layer. We systematically vary both the density difference across the interface and the turbulence intensity. Velocity and density fields are measured simultaneously using particle image velocimetry (PIV) and laser-induced fluorescence (LIF), allowing us to capture the fully coupled dynamics as turbulent eddies interact with the density interface. We quantify the mixing efficiency—the fraction of turbulent kinetic energy that irreversibly mixes the fluids rather than being dissipated as heat—and relate it to two key nondimensional parameters: the Richardson number, which compares stratification to turbulent forcing, and the buoyancy Reynolds number, which characterizes the ability of turbulence to overcome buoyancy at small scales. Our results reveal distinct mixing regimes. Weak turbulence maintains a sharp interface punctuated by intermittent mixing events, whereas strong turbulence produces vigorous interfacial deformation, wave breaking, and sustained entrainment of dense fluid into the upper layer. These findings provide quantitative relationships for predicting mixing rates in stratified turbulent flows relevant to both environmental and industrial applications.

Spring 2026 Seminar Committee Members: Ana Lăcău, Ella Junker, Hani Ghamkhar, Julia Barkelew, Tzu-Ann Lee
EWRE Seminar Advisor: Dr. Ben Hodges