UNIVERSITY OF MARYLAND

THE BURGERS PROGRAM FOR FLUID DYNAMICS
THE FLUID DYNAMICS REVIEWS SEMINAR SERIES

TURBULENCE, INTERMITTENCY, AND FLIGHT

Friday, February 18, 2022 | 11am

DeWalt Seminar Room
2164 Glenn L. Martin Hall

Speaker

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ABSTRACT

Turbulent flows whip up energetic activity that is concentrated into small regions rather than being evenly distributed throughout the flow. This intriguing phenomenon, called intermittency, is part of the reason that turbulence is difficult to model and to predict. I will discuss recent measurements that reveal, due to the great control and resolution of the experiments, subtle and persistent oscillatory features not yet captured by our theories. We find that these features display a remarkable persistence up to higher turbulence intensities than have ever been observed, as measured by both the Reynolds and Mach numbers — that is, in strong turbulence relative to both the viscosity of the fluid and the speed of sound in the fluid. Finally, we find the intermittency of turbulence imprinted into the motions of freely flying eagles, and I will discuss simple theoretical and computer models that show how, in principle, we might draw useful energy from a phenomenon so stubbornly unpredictable.

BIO

Professor Bewley studies turbulence and its effects on the environment and engineered devices by performing laboratory and field experiments. Bewley developed interests in superfluid turbulence while earning his PhD from Yale University, and in turbulent atmospheric clouds while working at the Max Planck Institute for Dynamics and Self-Organization in Germany. At Cornell, he is pursuing new opportunities in discovering the way turbulence behaves differently at high speeds than at low ones, and in the way we can engineer strategies to navigate turbulent flows while in flight.

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