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Go with the Flow: How Boundaries of Uniform Concentration Zones are Made JESSE REIJTENBAGH, JERRY WESTERWEEL, WILLEM VAN DE WATER, Laboratory for Aero and Hydrodynamics, Delft University of Technology, The Netherlands — Turbulent mixing leaves large distinct regions of poorly mixed scalar: uniform concentration zones. Lagrangian Coherent Structures most probably construct the boundaries of these zones. These structures are formed by maxima of the separation rate of nearby fluid parcels. In our experimental setup, we simultaneously measure the scalar concentration and the velocity field of a turbulent jet in water, using one camera for the velocity field (PIV), and one camera for the concentration (LIF); both move together with the mean flow. This greatly extends the observation time, so that the measurement of long-time separation of fluid elements, both in the future and in the past, becomes accessible and Lagrangian Coherent Structures become much more apparent.

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