

Non-Linear Dynamics of Structures in the Self-Sustained Turbulence of a Couette-Poiseuille Flow

José Eduardo Wesfreid

PMMH ESPCI (FR),
wesfreid@pmmh.espci.fr

Thursday, September 10th (2026), 16:30 Paris Time
[LMFL Fluid Mechanics Webinar Link](#)

Abstract

The transition to turbulence in confined shear flows is characterised by the emergence of coherent structures such as vortices and streaks. These structures interact within a self-sustaining process (SSP) leading to turbulence.

We are studying the dynamics of this process using physical experiments and direct numerical simulations. We are interested in the waviness of the streaks, which is a key element of the non-linear SSP process.

References:

- [1] Liu, T., Semin, B., Godoy-Diana, R., & Wesfreid, J. E. (2024). Lift-up and streak waviness drive the self-sustained process in wall-bounded transition to turbulence. *Physical Review Fluids*, 9(3), 033901.
- [2] Etchevest, M., Dmitruk, P., Karmakar, S., Semin, B., Godoy-Diana, R., & Wesfreid, J. E. (2026). Waviness and self-sustained turbulence in plane Couette-Poiseuille flow. *Physical Review Fluids*, 11(4), 044603.

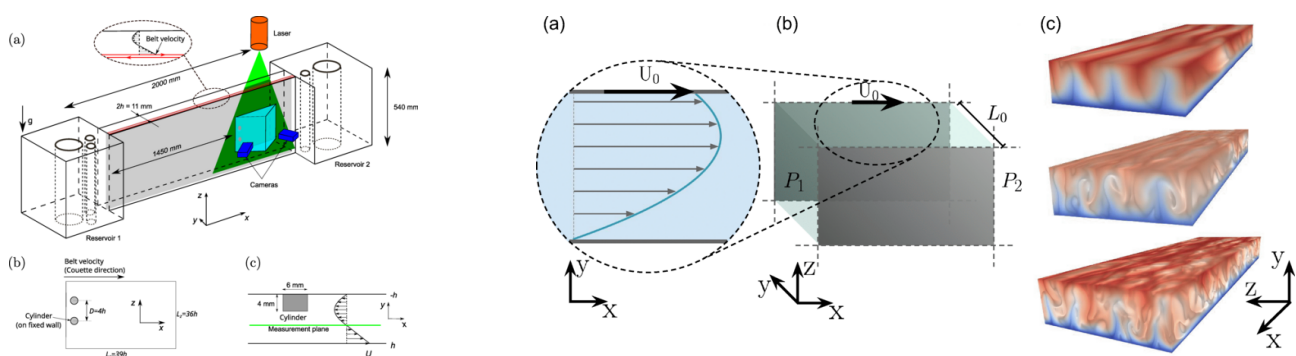


Figure 1: illustrations from Refs [1] & [2], left & right respectively

Scientific contact: [Benjamin Luce](#)