# Meandering instabilities of rivulets between plates

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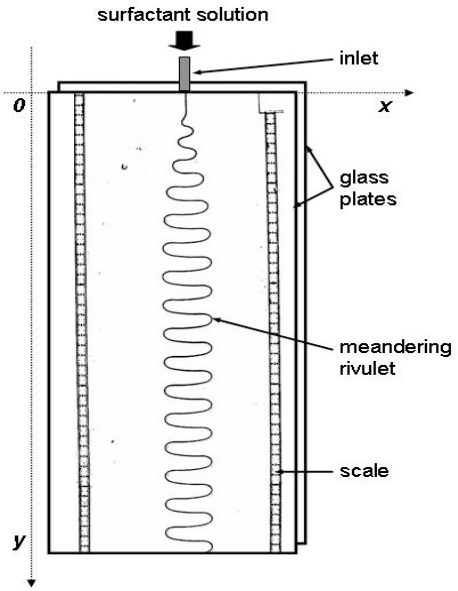
Injecting liquid in a controlled manner between two narrowly spaced, vertical plates can be anything but a trivial task.

Descending under gravity, the liquid forms a narrow stream ("rivulet"), which connects both plates. At low flow rates, this rivulet is straight and vertical. Above a critical flow rate, however, it becomes unstable and displays a number of flow rate dependent meandering regimes, which range from upward-travelling, small-amplitude waves to downward-travelling, large amplitude waves[1]. The latter include oddities, such as beating patterns.

Unlike rivulet meanders on hydrophobic surfaces, those between plates can form perfectly regular wave patterns, especially when surfactant solutions are used. These display elegant and reproducible relationships between wavelength, amplitude and plate spacing in some regimes. But as of now, it is not clear by exactly which physical mechanisms these are governed. In particular, the role of the wetting film remains a mysterious one.




[1] Drenckhan, W., Gatz, S. and Weaire, D., Wave patterns of a rivulet of surfactant solution in a Hele-Shaw cell. *Physics of Fluids*, 2004. 16(8): p. 3115-3121.