

Surfactant dynamics in confined domains

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[LMFL Fluid Mechanics Webinar Link](#)

Abstract

Surfactants are common contaminants of gas-liquid interfaces and they play important roles in numerous industrial and natural processes. I will illustrate their effect through three problems. The first illustrates the capacity of surfactant to solve a maze; the second connects the Japanese artistic method of Suminagashi to the Monge-Ampère equation of optimal transport; and the third (more practical) application addresses the way surfactant contamination disrupts the drag-reducing properties of superhydrophobic surfaces. In this last example, I will show how soluble surfactant can form a quasi-stagnant cap that has an intricate structure regulated by weak bulk diffusion, adsorption/desorption processes and interfacial stresses.

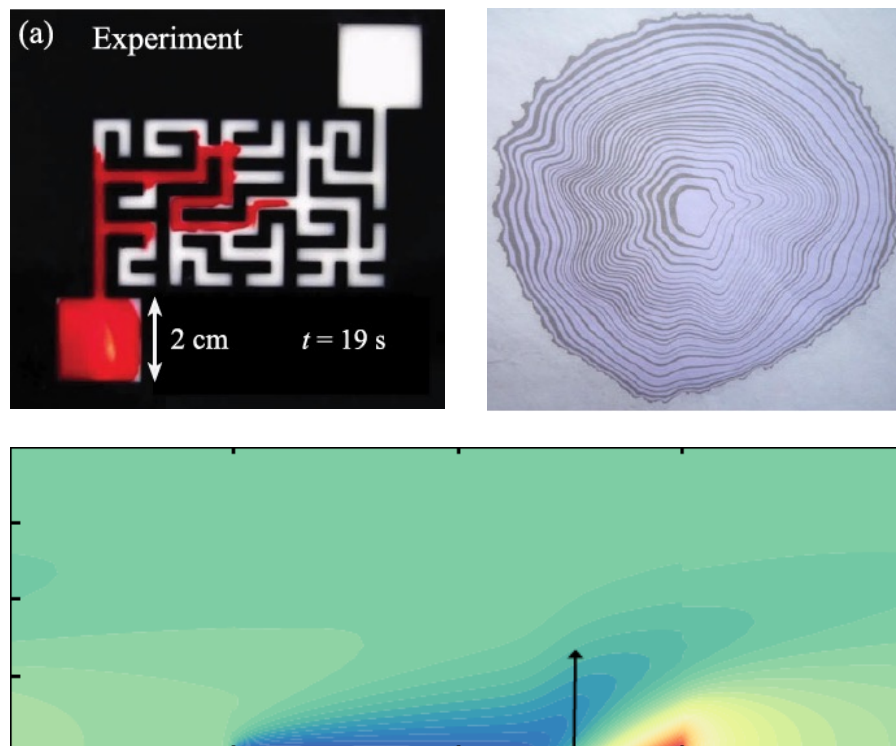


Figure 1: illustrations from McNair et al. (2025) Phys. Rev. Lett. 134, 034001; McNair et al. (2024) J. Fluid Mech. 986, A5; Tomlinson et al. (2025) J. Fluid Mech. 1010, A58

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