

Flow-induced deformation of kirigami sheets

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Fluid structures interaction ...

... with architected surface

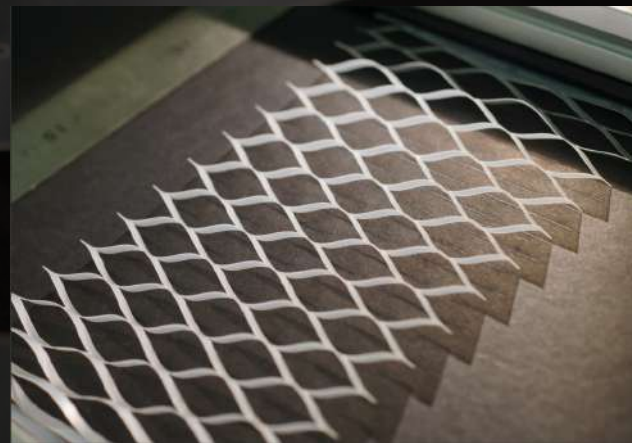
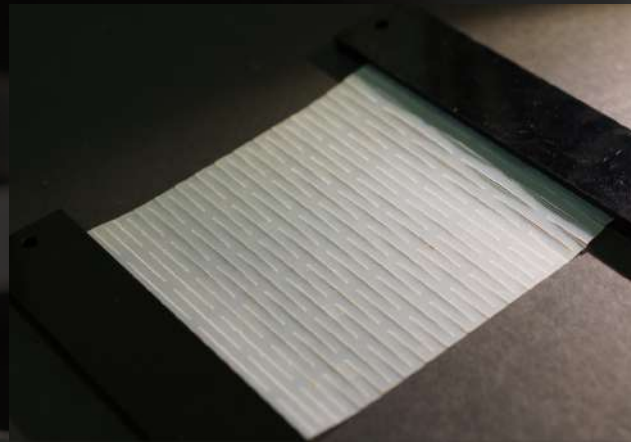


Kirigami = cutting patterned structures

Engineered elasticity by cuts

Ultra-stretchable & non linear behavior

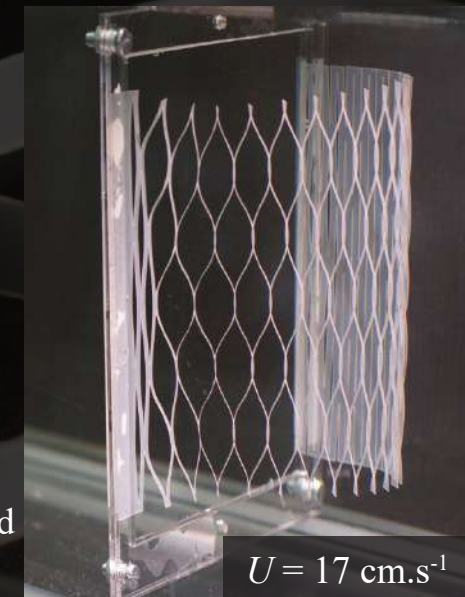
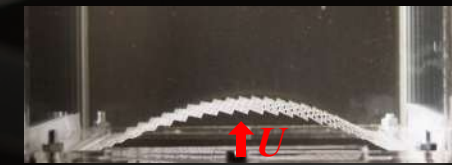
Meso-textures produce through opening of the pores



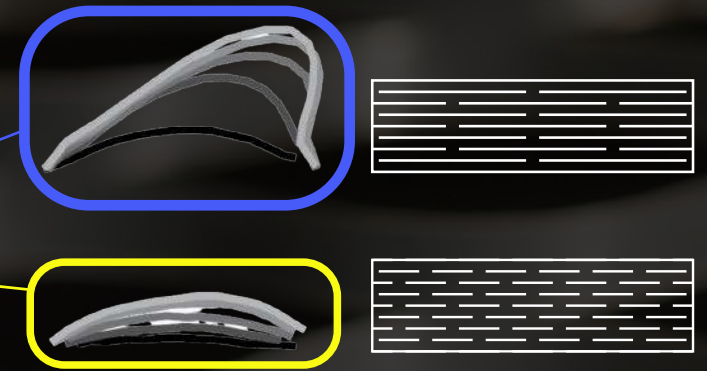
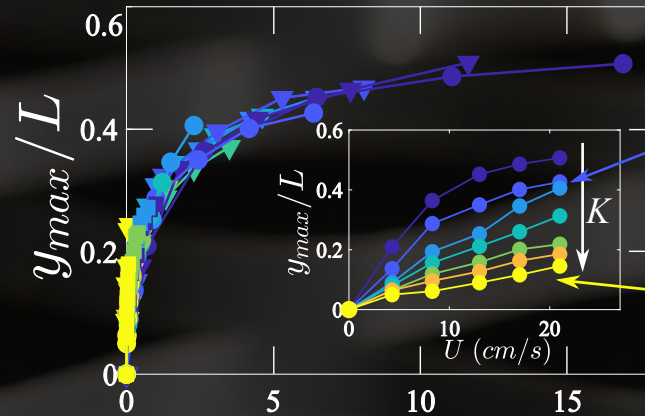
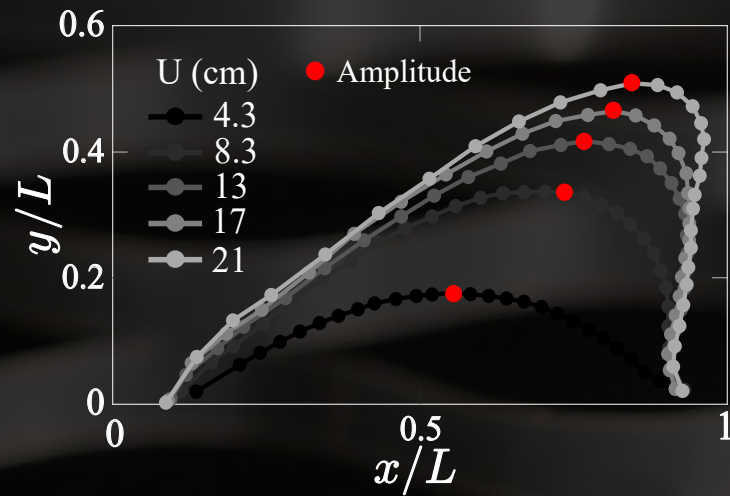
Deformation in water flow

Elasto-porous plate

Complex interplay of pore opening, sheet deformation and fluid loading

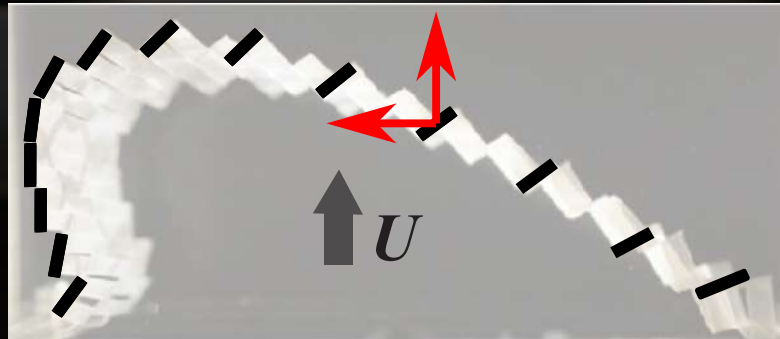


Elasticity & fluid force balance deformations

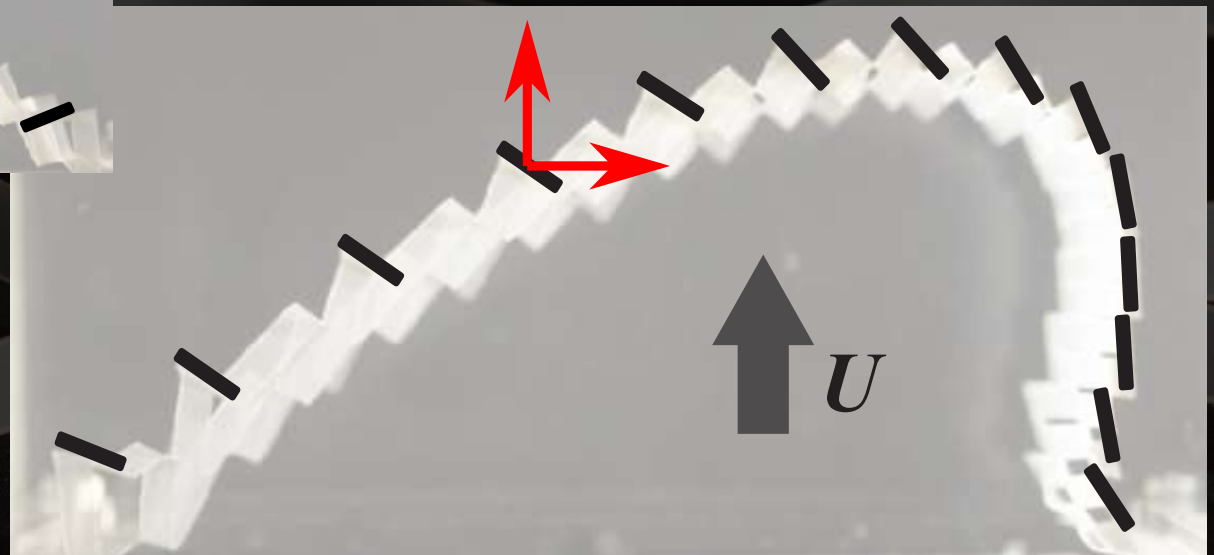


$$C_y = \frac{\rho U^2 H}{K}$$

← fluid loading
← elastic restoring force



Asymmetric shapes



Meso-blades orientations induce lift force and asymmetric global shape