



Fig. S1 Examples of flow-culture dynamics at two different rotational speeds for the low viscosity medium ($\mu = 1 \text{ mPa} \cdot \text{s}$). (A) Heat maps of fluid layer thickness H . (B) Heat maps of surface velocity U . (C) Heat maps of bed shear stress fields τ . (D) Waveform of bed shear stress at a radius of 12 mm (corresponding to dashed circular line in A, B, C).