

## Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: The oscillation amplitude of the ciliary array is visualized when acoustic was switched on and off at excitation frequency and amplitude of **68.5 kHz** and **20 V<sub>pp</sub>**, respectively.

File Name: Supplementary Movie 2

Description: Tangential streaming along an angled oscillating ciliary array at excitation frequency and amplitude of **33.7 kHz** and **5 V<sub>pp</sub>**, respectively

File Name: Supplementary Movie 3

Description: Acoustic streaming induced by uniformly arranged cilia. A single ciliary array produces a clockwise motion of microparticles at an acoustic excitation of  $f = \mathbf{68.5\ kHz}$  and **20.0 V<sub>pp</sub>**.

File Name: Supplementary Movie 4

Description: Acoustic streaming of a + and – ciliary band at excitation frequency and amplitude of **68.5 kHz** and **20 V<sub>pp</sub>**, respectively.

File Name: Supplementary Movie 5

Description: Acoustic steaming of a straight (non-angulated) ciliary band at excitation frequency and amplitude of **68.5 kHz** and **20 V<sub>pp</sub>**, respectively.

File Name: Supplementary Movie 6

Description: A bioinspired microrobot is developed by arranging + and – ciliary bands opposite to each other. The microrobot executing translational motion with a mean velocity of  $\mathbf{v \approx 2.6\ mm/s}$  at excitation frequency and amplitude of **68.8 kHz** and **20 V<sub>pp</sub>**, respectively.

File Name: Supplementary Movie 7

Description: Acoustic streaming profile of the bioinspired microrobot at excitation frequency and amplitude of **68.8 kHz** and **20 V<sub>pp</sub>**, respectively.

File Name: Supplementary Movie 8

Description: A bioinspired trapping mechanism is developed based on a combinatorial arrangement of a + and – configuration of ciliary bands at excitation frequency and amplitude of **68.5 kHz** and **20 V<sub>pp</sub>**, respectively. This configuration exhibits the capability to trap and transport neighboring **10 μm** microparticles.

File Name: Supplementary Movie 9

Description: Power-dependent particle transport efficacy. The transport efficacy is highest at 12-18 **V<sub>pp</sub>**, where 56 and 46 tracked 10-μm particle trajectories indicate transport. At 24 **V<sub>pp</sub>** no particles are transported.

File Name: Supplementary Movie 10

Description: Weak acoustic streaming of high-resolution ciliary bands without web-like structure at excitation frequency and amplitude of **68.5 kHz** and **20 V<sub>pp</sub>**, respectively.

File Name: Supplementary Movie 11

Description: Ciliary array arranged on a curved surface excited at frequency and amplitude of **68.4 kHz** and **22.5 V<sub>pp</sub>**. The 6-μm particles tangentially hop from one ciliary tip to the adjacent one as long as the inter-tip distance remains approximately the same.

**File Name: Supplementary Software 1**

**Description:** MATLAB code processing Source Data 1 for the representation of the tangential velocity plot in Fig. 2b.

**File Name: Supplementary Software 2**

**Description:** MATLAB codes processing Source Data 2 for the representation of the vertical velocity of a plus and a minus ciliary band in Fig. 3c and 3d.

**File Name: Supplementary Software 3**

**Description:** MATLAB code processing Source Data 3 for the representation of the trapping characteristics of a trapping ciliary band in Fig. 5c and 5d.

**File Name: Supplementary Software 4**

**Description:** MATLAB code tracking the trapped flow tracers seen in videos of Supplementary Movie 9. Results are demonstrated in Fig. 6.