Supplementary Figure Legends

Figure S1: Scheme and photograph of the experimental setup. The experiments were performed in a flow-through glass cell (100 µl) in which the cantilevers were immersed in LB solution. The temperature was controlled by means of a Peltier cell placed below the cantilever and a temperature sensor close to it. The liquid flow was controlled using a syringe pump (Cole Parmer) equipped with a low-pressure injector valve and injection loop. Cantilever deflection measurements were carried out with a homemade optical deflection system. The beam reflected off the chip was collected by a two-dimensional linear position detector (PD) (On-Trak Photonics, Inc.). The signal was converted and recorded with a home-made LabVIEW program to extract the value of deflection and power spectral density.

Figure S2: AFM topographic images of *E. coli* on the poly-L-lysine modified silicon nitride surface of the cantilever, with their corresponding scanning section on the right: **(a)** *E. coli* prior to interaction with bacteriophage T7 showed cylindrical particles 2 µm in length, 500 nm in diameter with a roughness on the order of 1 nm. **(b)** *E. coli* after interaction with bacteriophage T7 at a concentration of 10^9 PFU/ml. *E. coli* morphology changed to flattened particles 1 µm in length and 300 nm in diameter, surrounded by 50-nm protuberances suggesting the presence of phage T7 particles bound to the *E. coli* cell wall. **(c)** Histograms of slopes of the indentation curves showing rigidity values (spring constant, *k*) for individual *E. coli* membranes. Gaussian fit of the data show a value of k = 0.073 ±0.016 N/m.

Figure S3: (a) Snapshot of the deflection signal measured in **Figs. 3a and 4a** for 75 min<t< 80 min show the fluctuation amplitude of the cantilever functionalized with *E. coli* (sky-blue curve) and after interaction with phage T7 at concentrations of 10^9 PFU/ml (red curve), 10^7 PFU/ml (purple curve), 10^5 PFU/ml (navy blue curve), 10^3 PFU/ml (green curve), and 10 PFU/ml (orange curve), respectively. Cantilever signal before (black curve) and after *E.coli* immobilization (blue curve) were added for comparison. **(b)** The histogram of the deflection distribution measured from theses curves and **(c)** their corresponding Gaussian fittings show a normal distribution of the fluctuation signal. **(d)** Snapshot of the deflection signal measured for the cantilever after injection of phage T7 at 10 PFU/ml (**Fig. 4a, orange curve)** for 40 min<t< 120 min showed successive upward and downward bending response due to conformational changes of the bacteria during exposure to the phage.

Figure S4: Analysis of the results for three different measurements of **(a)** deflection signal z and **(b)** mechanical energy (W), for cantilevers functionalized with *E. coli* and exposed to phage T7 at 10^3 PFU/ml. **(c)** Calculated values of Variance (z), Mean (z), Slope (W) and Var (W) for the three experiments.

Fig. S1

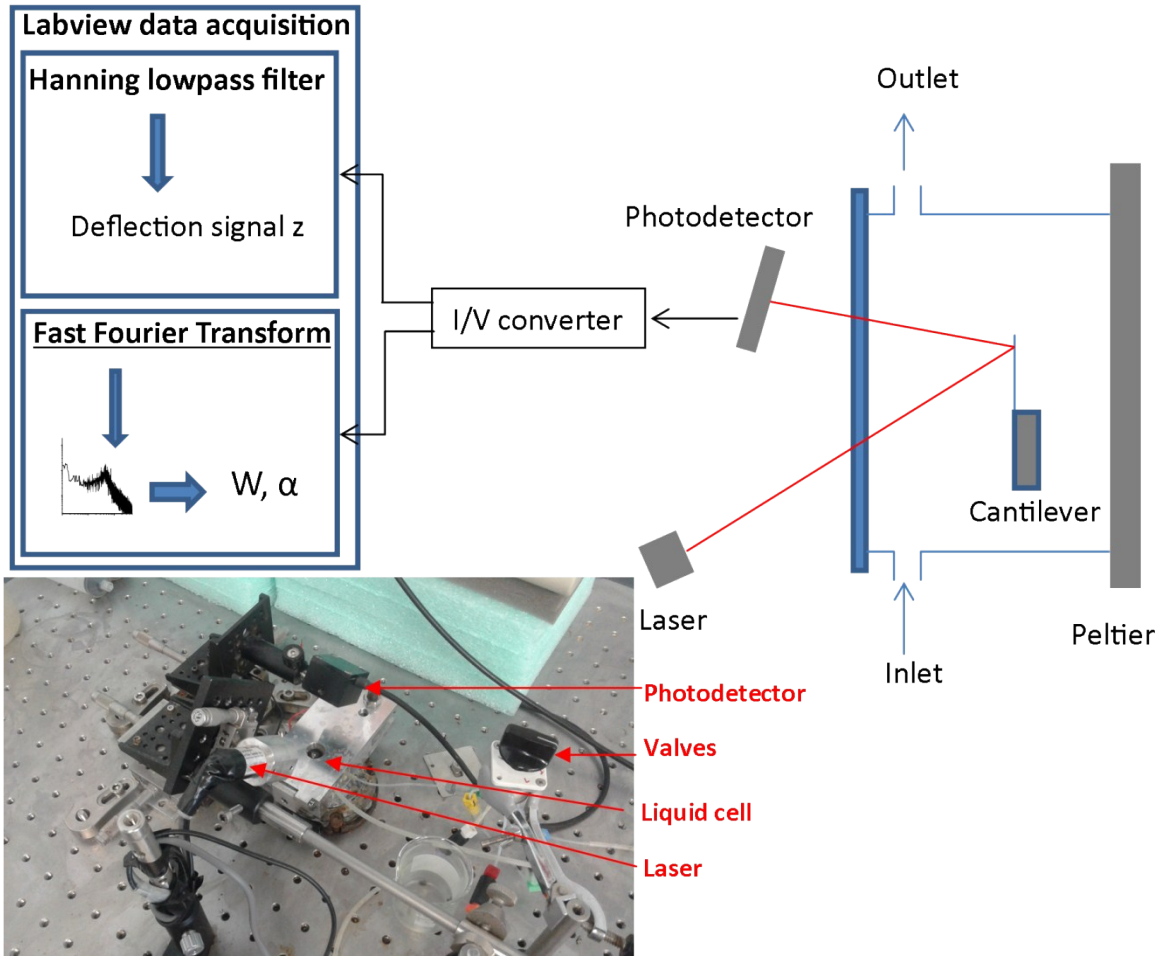
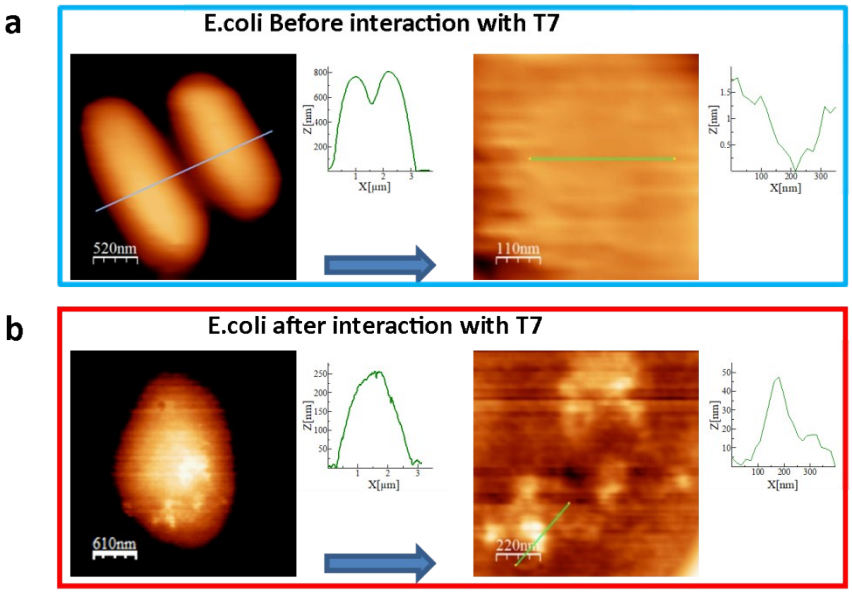

Labview data acquisition
Hanning lowpass filter
Deflection signal z
Fast Fourier Transform
W, α
I/V converter
Photodetector
Outlet
Cantilever
Laser
Peltier
Inlet
Photodetector
Valves
Liquid cell
Laser

Fig. S2


a
E.coli Before interaction with T7
520nm
Z[nm]
X[μm]
110nm
Z[nm]
X[nm]
b
E.coli after interaction with T7
610nm
Z[nm]
X[μm]
220nm
Z[nm]
X[nm]

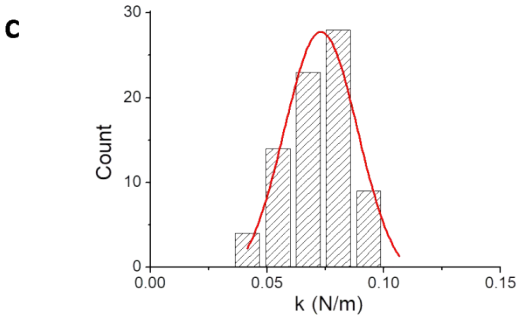

c
Count
k (N/m)
0
10
20
30
0.00
0.05
0.10
0.15

Fig. S3

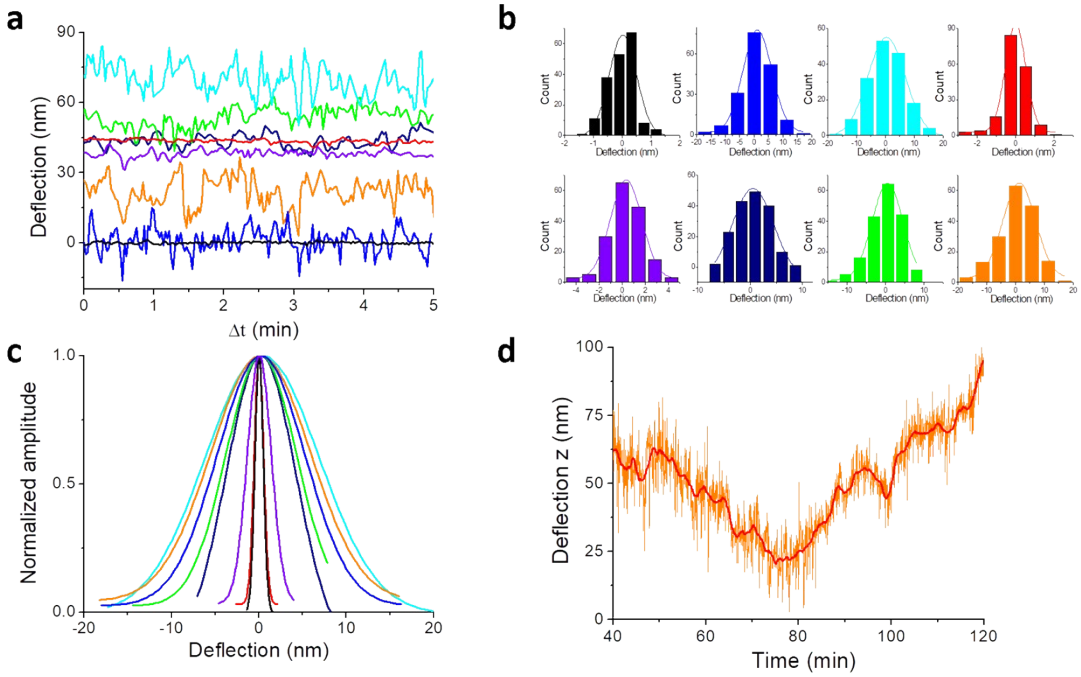
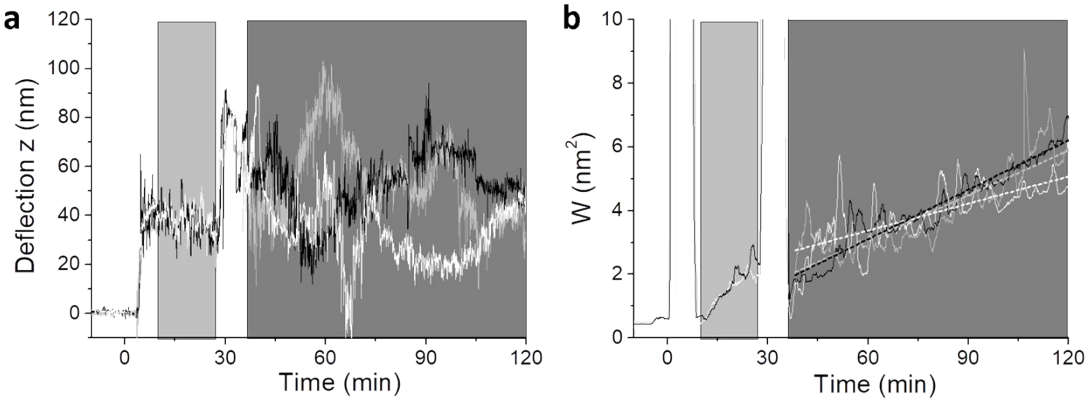

a
Deflection (nm)
Δt (min)
b
Count
Deflection (nm)
c
Normalized amplitude
Deflection (nm)
d
Deflection z (nm)
Time (min)

Fig. S4



c

	Variance z (nm^2)	Mean z (nm)	Slope W (nm^2/ h)	Variance W (nm^4)
#1	19.88	54.4	2.8	0.527
#2	25.25	48.6	3.09	0.307
#3	15.32	35.2	1.71	0.152
Mean value	20.15 ± 4.97	46.1 ± 9.8	2.54 ± 0.74	0.316 ± 0.205