Supplementary Video Captions

Video S1: In-plane bend instability of an aligned suspension of microtubules, crosslinkers and molecular motor clusters.
Widefield fluorescent microscope, 10X objective, [ATP]= 50 µM, [motor clusters]= 20nM, [PRC1]= 100 nM.

Video S2: In-plane bend instability of an aligned suspension of microtubules, depletant, and molecular motor clusters.
Widefield fluorescent microscope, 4X magnification, [ATP]= 1 mM, [motor clusters]= 20 nM, [PEG 20kDa]=0.8 % (vol/vol).

Video S3: Out-of-plane buckling of an aligned suspension of microtubules, crosslinkers and molecular motor clusters.
Widefield fluorescent microscope, [ATP]= 10 μM, [motor clusters]= 10 nM, [PRC1]= 200 nM.

Video S4: Out-of-plane buckling of an aligned suspension of microtubules, depletant, and molecular motor clusters.
Widefield fluorescent microscope, 10X magnification, [ATP]= 10 μM, [motor clusters]= 20 nM, [PEG 20kDa]= 0.8 % (vol/vol).

Video S5: Confocal time-lapse imaging of the in-plane bend instability.
[ATP]= 130 μM, [motor cluster]= 15 nM, [PRC1]= 50 nM. Microtubule Length= 1.5 μm, Zstep size: 2.5 μm, 1 min 23 sec deltaT, 20x

Video S6: Confocal time-lapse imaging of the out-of-plane buckling.
[ATP]= 4 μM, [motor cluster]= 3 nM, [PRC1]= 100 nM, Microtubule Length= 2.3 μm, Zstep size: 2 μm, deltaT 4 min, 20X.

Video S7: Segmentation of the out-of-focus regions of interest.
First row: in-plane instability, second row: superposition of in-plan and out-of-plane deformations, third row: out-of-plane buckling. The red areas correspond to the parts of the network that are out-of-focus.

Video S8: turning off motor activity only allow a partial relaxation of the deformations.
Fluorescent timelapse imaging of the microtubule bundles 30 sec after blue light is turned off.