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# Wireless Biomechanical Power Harvesting via Flexible Magnetostrictive Ribbons

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Huai-An Chin,[a] Tian Liang,[b] Shiyou Xu,[c] Gerald R. Poirier,[c] Nan Yao,[c] Sigurd Wagner,[a] and Michael C. McAlpine[d*]

## Supplementary Information

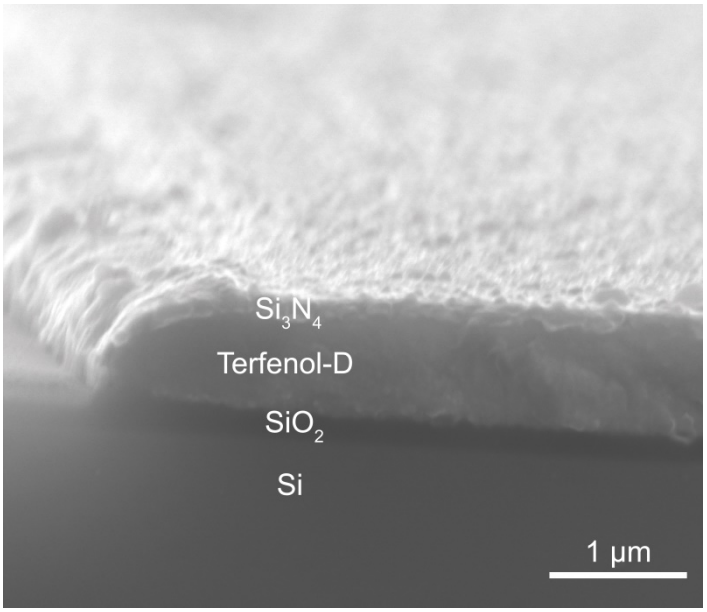


**Figure S1.** Cross sectional SEM of $Si_3N_4$/Terfenol-D/$SiO_2$/Si (from top to bottom) after annealing. The ribbon thickness is ~650 nm.

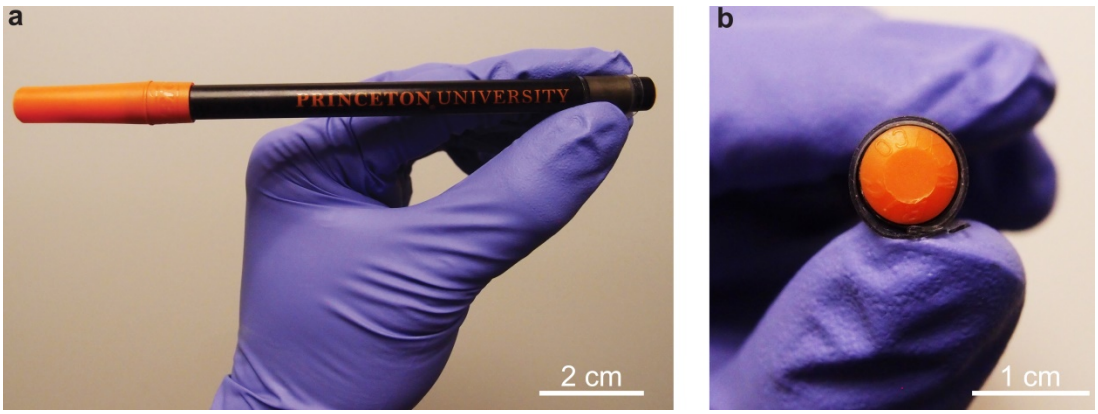


**Figure S2.** Flexible magnetostrictive ribbon / PDMS composite wrapped around a pen (diameter 8.1 mm). (a) Viewed from the side, and (b) viewed from the end.

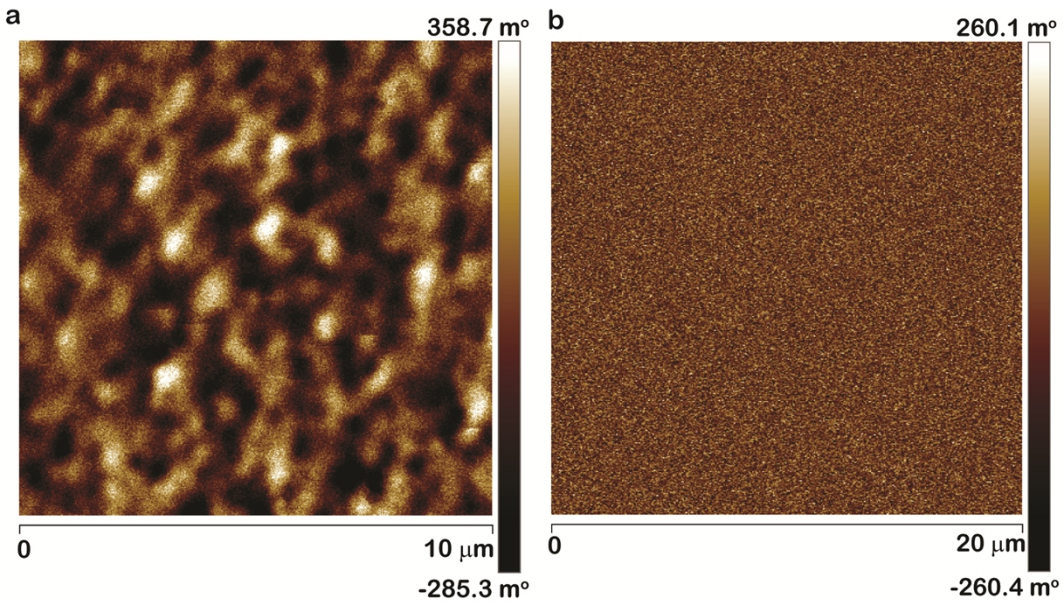


**Figure S3.** Magnetic Force Microscopy (MFM) scans of (a) a magnetostrictive Terfenol-D ribbon, and (b) a non-magnetic $SiO_2$ sample.

 

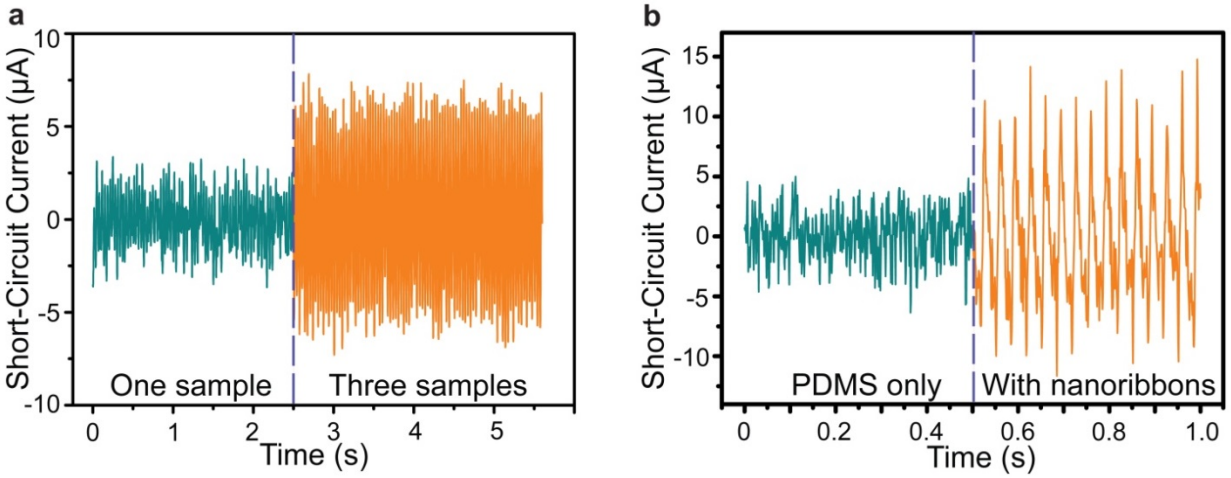


**Figure S4.** Comparisons of output short-circuit current from (a) one sample vs. three samples of harvesters, and (b) a PDMS only device vs. a composite containing ribbons. The Villari effect is an extensive effect and therefore the output signal should be proportional to the quantity of samples. From (a), it is clear that a larger quantity of samples results in higher output currents. From (b), it is clear that without the Terfenol-D ribbons, a pure PDMS sample only results in background noise without a distinguishable period, in contrast to the sample with Terfenol-D ribbons which has a period corresponding to the deformation period. Both (a) and (b) verify that the origin of the output signal originates from the Terfenol-D ribbons.

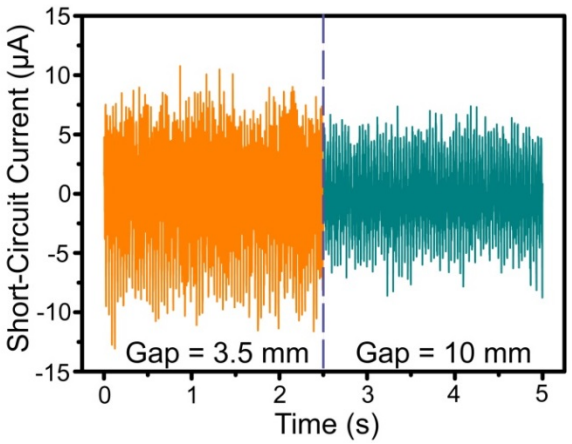


**Figure S5.** Output current at different distances between the sample and coils. The root-mean-square magnitudes of the current are 3.9 μA for a distance of 3.5 mm, and 1.32 μA for a gap of 10 mm, corresponding to average powers of 130 pW and 35 pW respectively.

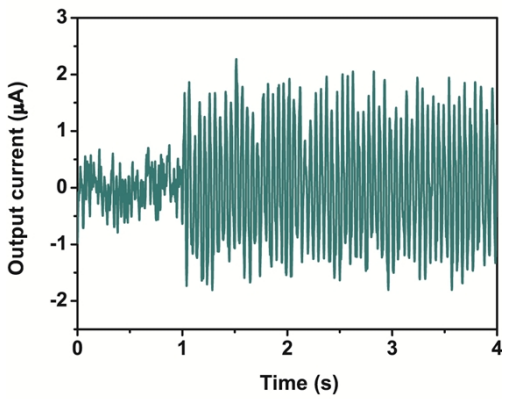


**Figure S6.** Output current of a flexible Terfenol-D ribbon sample under mechanical flapping deformations. The flapping did not start until 1 s, showing the higher output relative to the noise background signal. Figure 5c is the recording between 3-4 s in this figure.