Supplemental Information

Sliced Graphene Foam films for Dual-Functional Wearable Strain Sensors and Switches

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Table S1. Strain sensing and switching performance and potential applications of GF/PDMS composites with different thicknesses.

Thickness of GF (μm)	Strain (%)	Gauge factor/Switch	Applications
1600	5	0.4	Flexible, foldable and stretchable conductors
	10	0.6	
	30	2.3	
	70	6.0	
800	5	3.3	Highly stretchable strain sensors
	10	4.8	
	30	5.7	
	70	10.6	
400	5	11.8	Highly sensitive strain sensors
	10	11.9	
	30	18.9	
	>36	Switch	Electromechanical switches
200	5	18.4	Highly sensitive and transparent strain sensors
	10	24.1	
	>8	Switch	Electromechanical switches

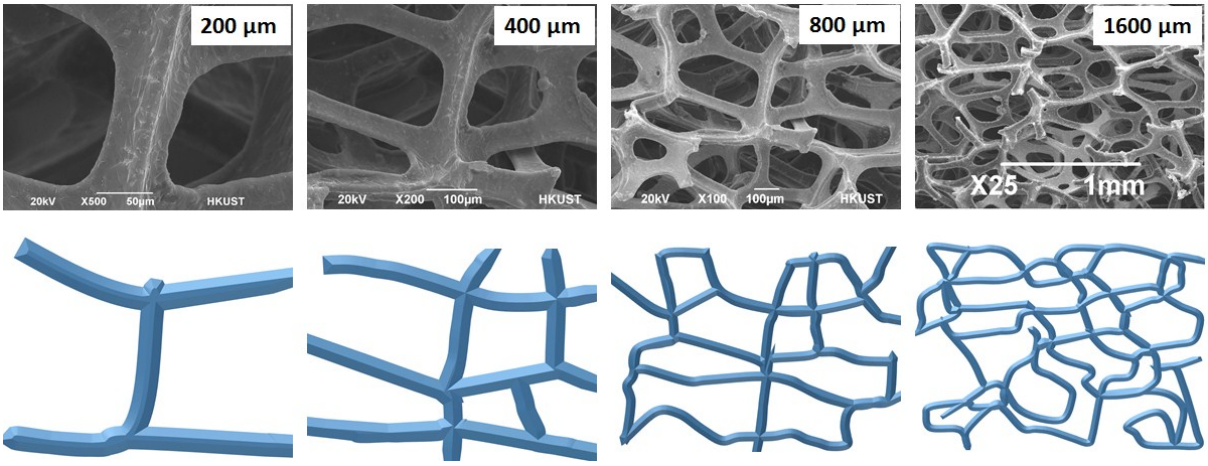

Figure S1. Cross-section SEM images and schematics of the corresponding sliced GFs with thicknesses of 200µm (a), 400µm (b), 800 µm (c), and 1600 µm (d).

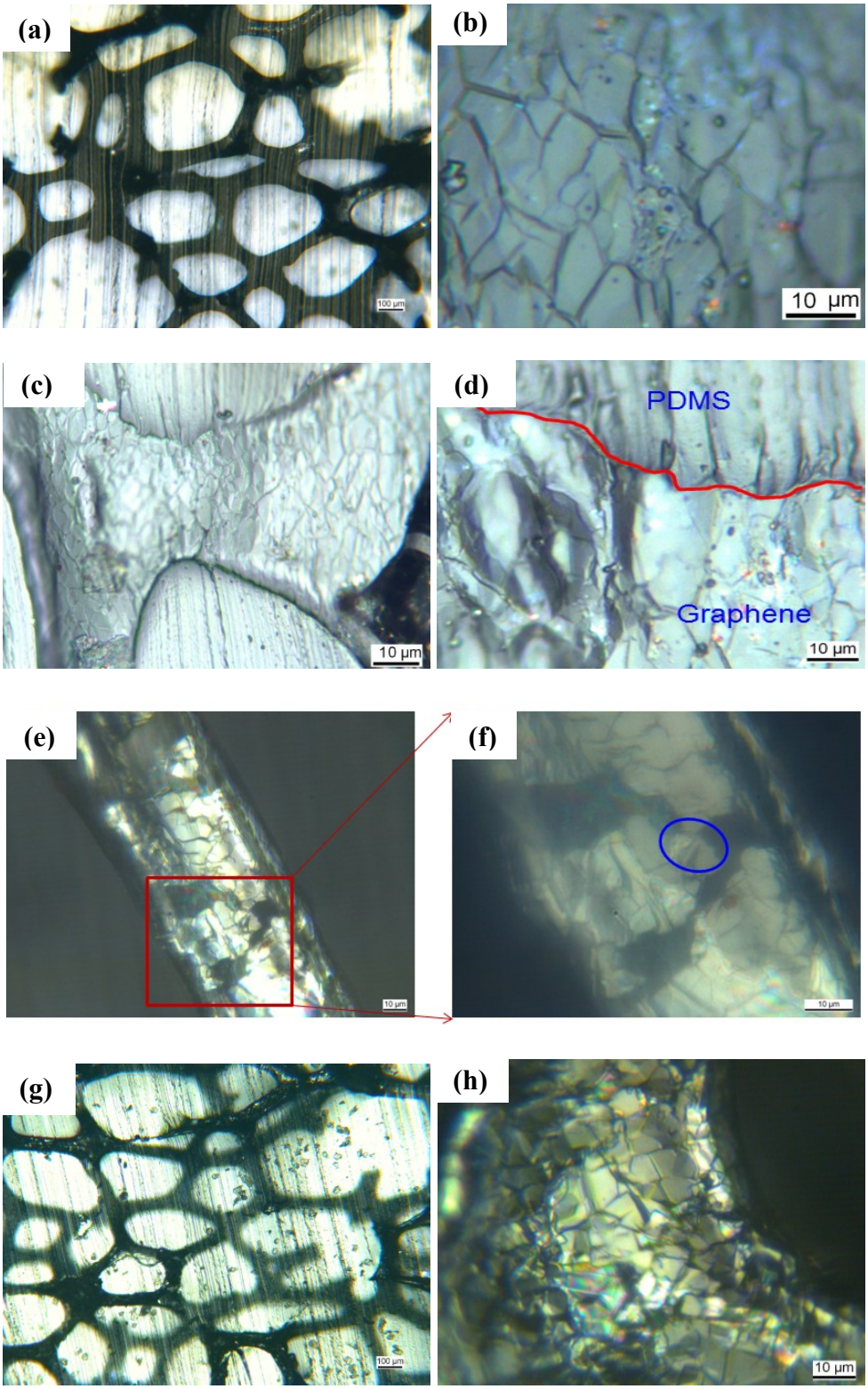

Figure S2. Optical images display the morphologies of initial graphene network (a-b), at 10% stain (c-d), at 30% strain (e-f), and after releasing strain (g-h).

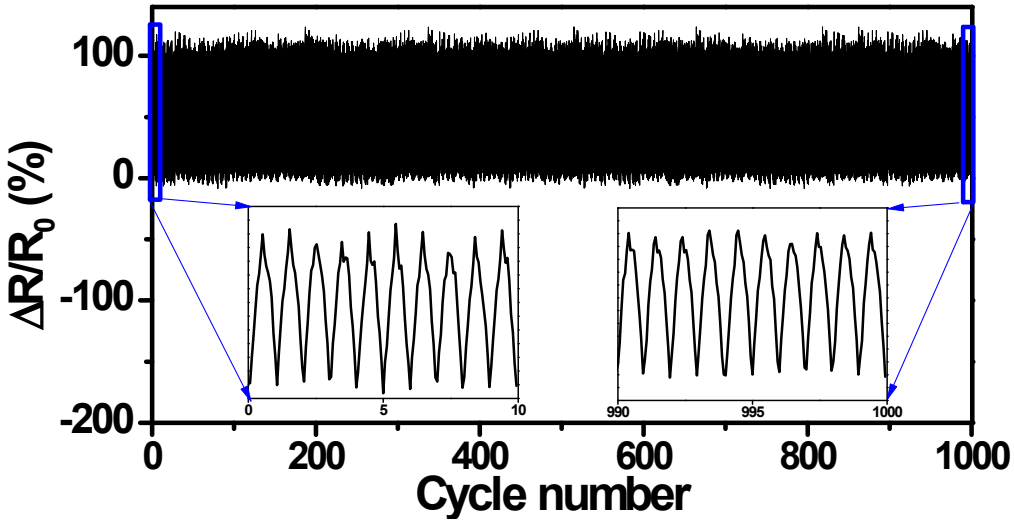

Figure S3 Normalized resistance changes of GF/PDMS composites (~400 μm thick) for 1000 cycles at 10% strain.

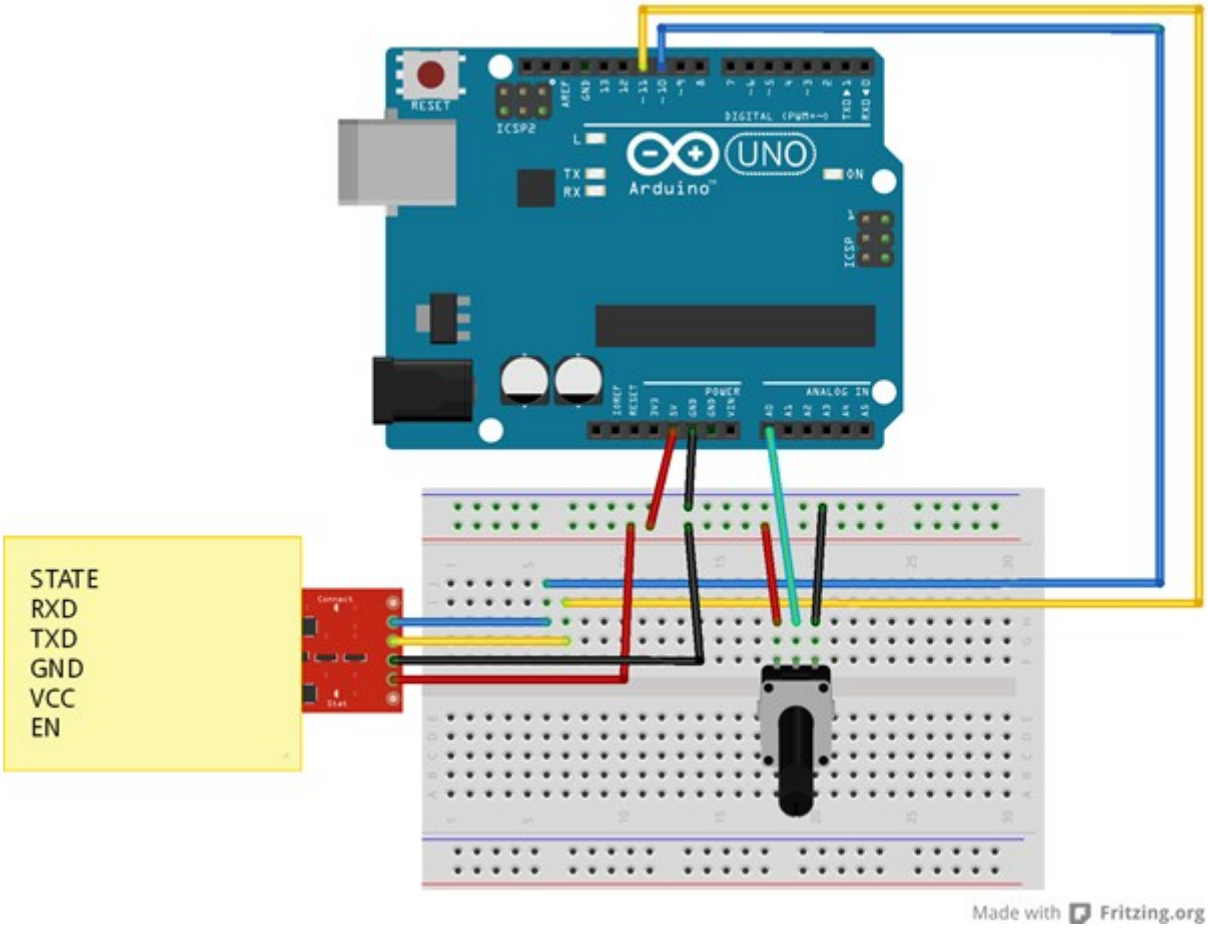

Figure S4. Circuit diagram for wireless communication between a strain sensor/switch and a smartphone.

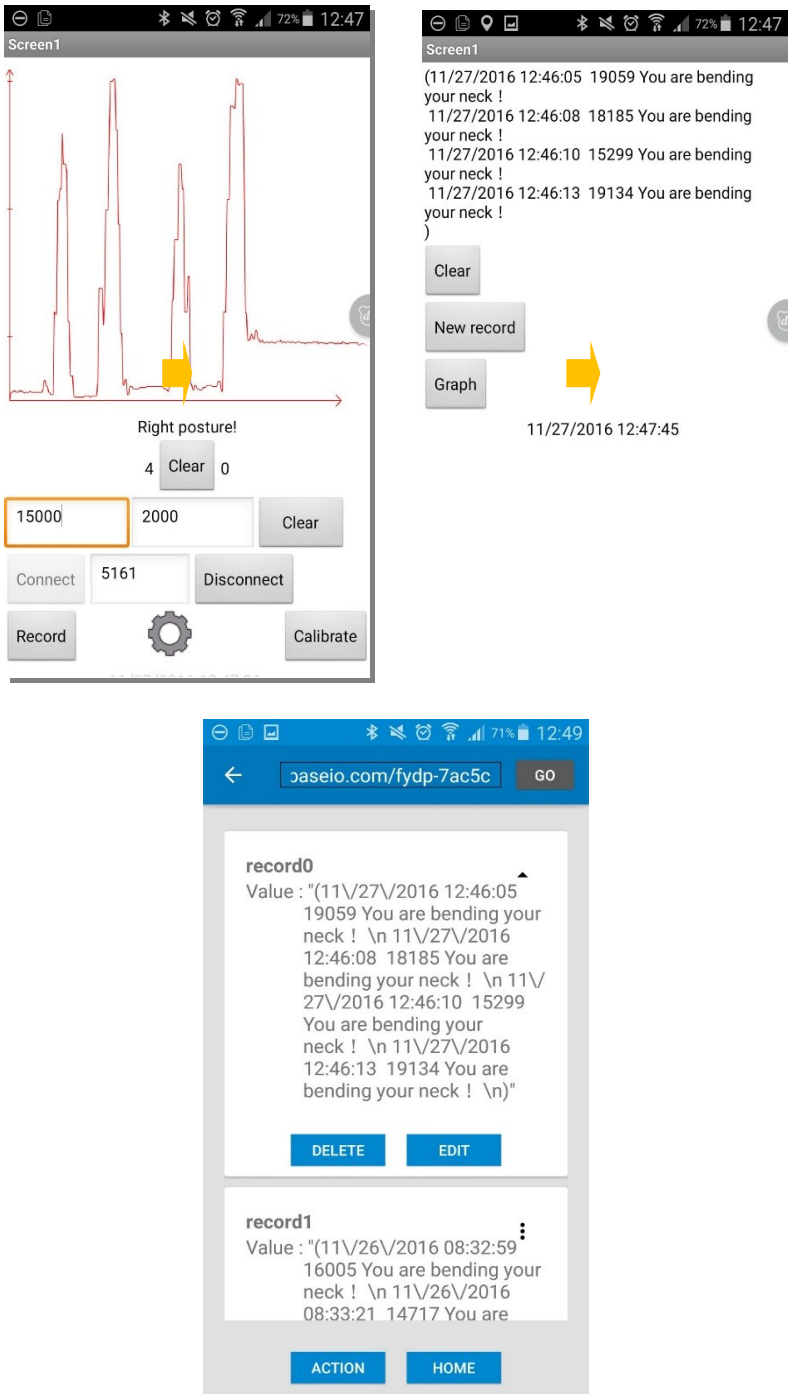

Figure S5. Photograph of smartphone running the Android app, which can display, analyze and upload the monitored data.

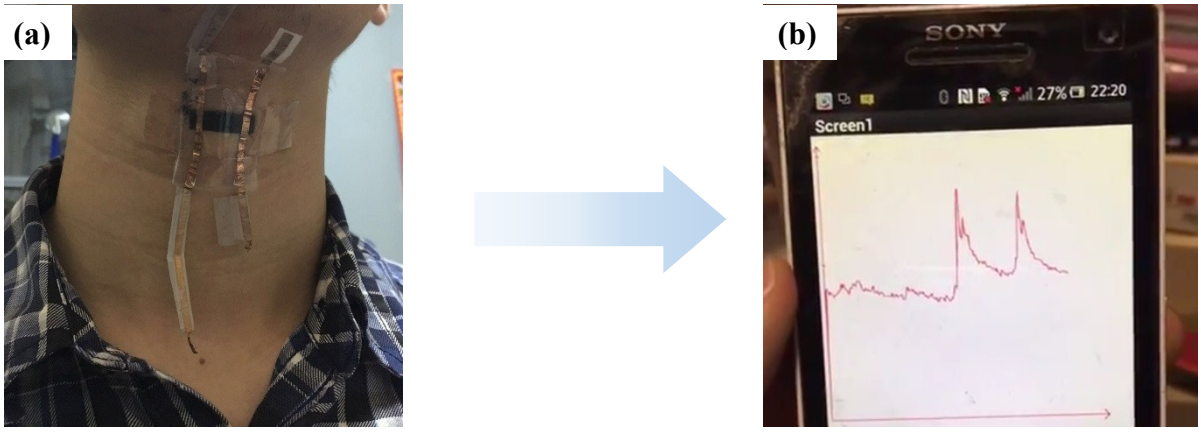

Figure S6. The custom-developed mobile app for data display and aggregation. (a) Photograph of wireless and real-time sensing using GF/PDMS sensors integrated with Bluetooth system. (b) Real-time data display of responsive curves for repeatedly spoken words.

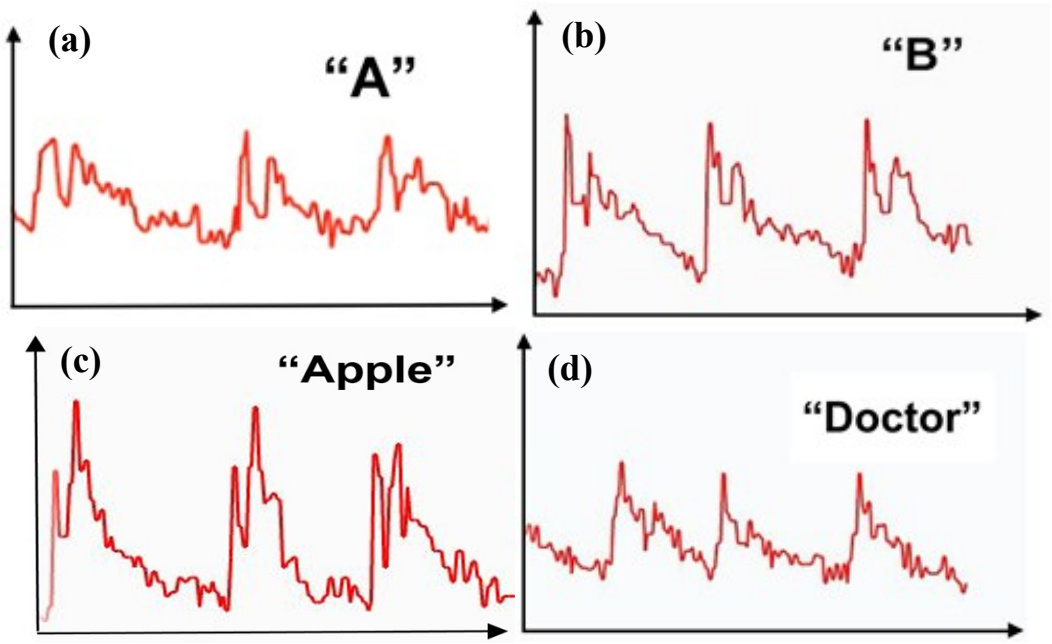

Figure S7. Recognition of words and phrases. Relative resistance changes due to throat muscle motions when the tester said (a) “A”; (b) “B”; (c) “Apple”; and (d) “Doctor”.

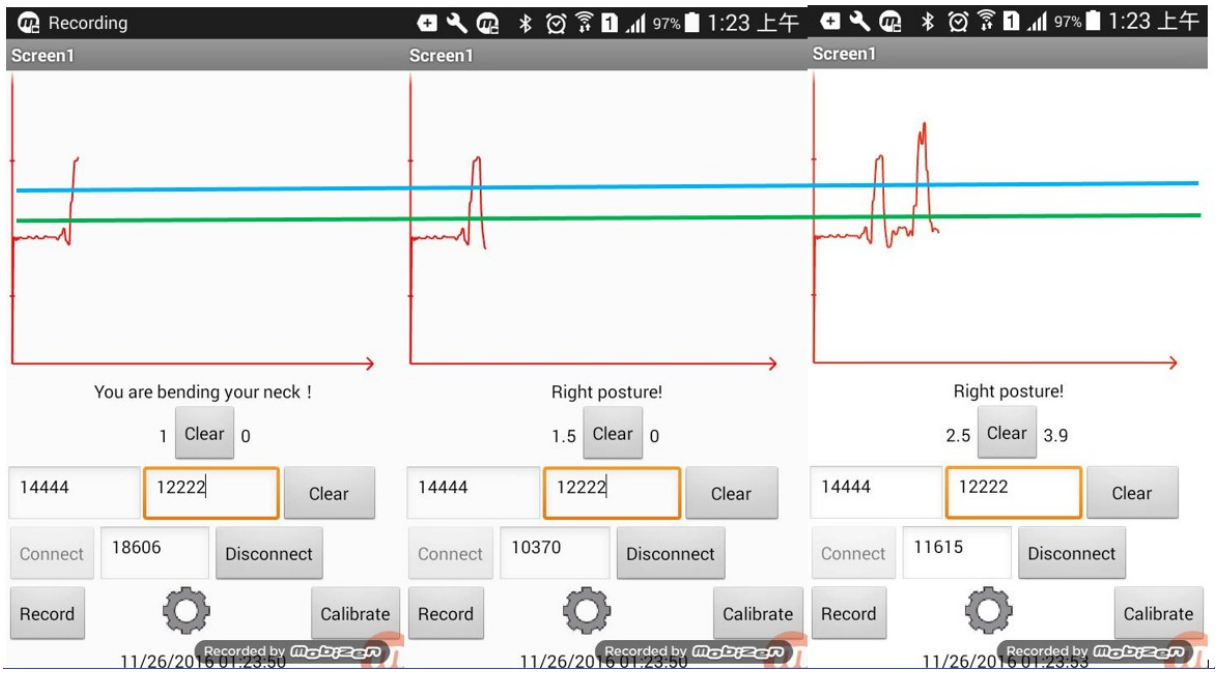

Figure S8. The logic of counting waves. A “high threshold” and a “low threshold” are set to count the number of waves. For example, the number of waves will be added by 0.5 when relative resistance rises from “low threshold” to “high threshold” or drops from “high threshold” to “low threshold”.

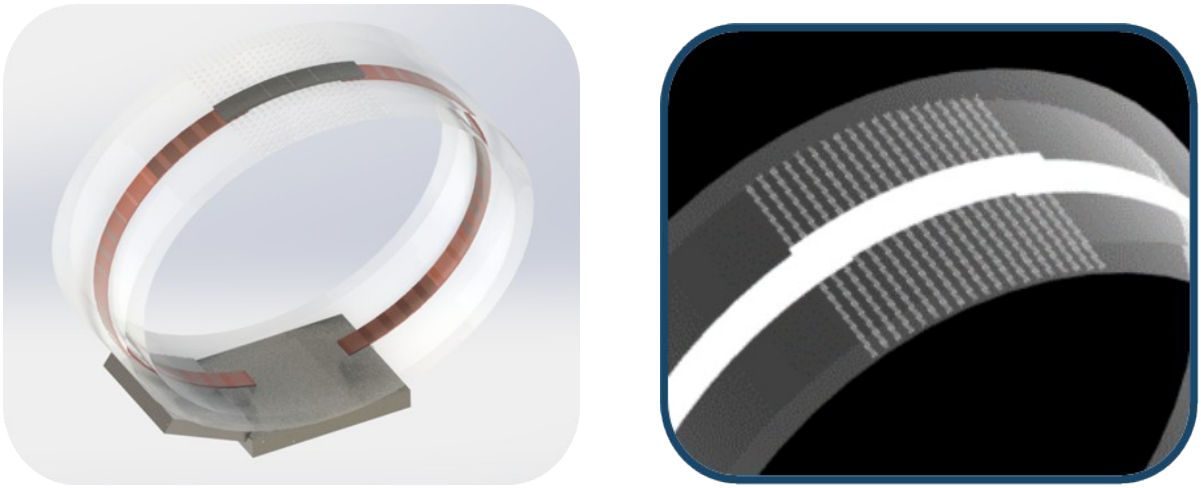

Figure S9. Structure of a fall detector made from GF pressure sensor.