

Using Tiny Windmills To Power Portable Electronics

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Cellphones powered by tiny micro-windmills covering their surface? Almost sounds like a joke right? Well, apparently it's not 😊 — researchers Smitha Rao and JC Chiao from UT Arlington, have, in fact, already created and tested just such a concept.

The research team created the micro-windmill concept as a potential solution to the “problem” of finding a way to harness “wind energy” in regions not suited to the deployment of large wind turbines/farms.



The new micro windmills measure about 1.8 mm at their widest point, that miniature sizing means that roughly ten or so of them can be fitted onto something the size of a single grain of rice – thereby potentially providing a notable fraction of the energy used by portable electronics. The windmills are turned simply by the force of the air as the device that they are installed on is moved around during everyday usage.

The [University of Texas at Arlington](http://www.utexas.edu) provides more:

Rao's previous work in micro-robotic devices initially heightened a Taiwanese company's interest in having Rao and Chiao brainstorm over novel device designs and applications for the company's unique fabrication techniques, which are known in the semiconductor industry for their reliability.

Rao's designs blend origami concepts into conventional wafer-scale semiconductor device layouts so complex 3-D moveable mechanical structures can be self-assembled from two-dimensional metal pieces utilizing planar multilayer electroplating techniques that have been optimized by WinMEMS Technologies Co, the Taiwanese fabrication foundry that took an initial interest in Rao's work.

"The company was quite surprised with the micro-windmill idea when we showed the demo video of working devices," Rao stated. "It was something completely out of the blue for them and their investors."

"It's very gratifying to first be noticed by an international company and second to work on something like

this where you can see immediately how it might be used,” Rao continued. “However, I think we’ve only scratched the surface on how these micro-windmills might be used.”

The micro-windmills are apparently (and fortunately) relatively easy to create — the fabrication cost of making “one device is the same as making hundreds or thousands on a single wafer, which enables for mass production of very inexpensive systems.”

“Imagine that they can be cheaply made on the surfaces of portable electronics,” Chiao stated, “so you can place them on a sleeve for your smart phone. When the phone is out of battery power, all you need to do is to put on the sleeve, wave the phone in the air for a few minutes and you can use the phone again.”

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