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Indian-origin researcher develops tiny windmills to charge cell phones

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An Indian origin researcher Smitha Rao, working with her Taiwanese professor at the University of Arlington, Texas, may have found a solution to batteries dying out in cell phones. (AP Photos)

NEW DELHI: An Indian origin researcher Smitha Rao, working with her Taiwanese professor at the [University of Arlington](#), Texas, may have found a solution to batteries dying out in cell phones. The duo has designed a tiny windmill hundreds of which can be embedded in a sleeve for a cell phone. By waving the cell phone in air or holding it up to an open window on a windy day, the array would generate enough electricity to recharge a cell phone's battery.

Rao's designs blend origami concepts into conventional wafer-scale semiconductor device layouts, a university statement said. A special nickel alloy is used to make the windmills. A single grain of rice could hold about 10 of these tiny windmills. Hundreds of the windmills could be.

The micro-windmills can be made in an array using the batch processes. 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. The windmills operate under strong artificial winds without any fracture in the material because of the durable nickel alloy and smart aerodynamic design. They were tested successfully in September 2013 in the lab of Rao's guide professor Jung-Chih Chiao.

A Taiwanese [micro-electro mechanical system](#) (MEMS) company has shown interest in this invention and is exploring commercialization possibilities. UT Arlington has applied for a provisional patent.

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

UT Arlington has developed various micro-mechanical systems including micro-windmills, gears, inductors, pop-up switches and grippers, according to a statement. All of those parts are as tiny as a fraction of the diameter of a human hair. These inventions are essential to build micro-robots that can be used as surgical tools, sensing machines to explore disaster zones or manufacturing tools to assemble micro-machines.

""I think we've only scratched the surface on how these micro-windmills might be used,"" said Rao, who earned her Ph.D in 2009 at UT Arlington.

Chiao said because of the small sizes, flat panels with thousand of windmills could be made and mounted on the walls of houses or building to harvest energy for lighting, security or environmental sensing and wireless communication.

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