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Electrical engineering professor J.C. Chiao and his research associate Smitha Rao have demonstrated their invention for WinMEMS, a Taiwanese manufacturing company, who showed immediate interest in its potential. Mass production will be the key to affordability, and Rao’s ingenious minimalistic approach uses semiconductors that can self-assemble into their 3 dimensional conformation, due to principles of origami. The windmills themselves are made of a flexible nickel alloy, and the fans are a mere 1.8 mm wide. Using this alloy has produced fans that are incredibly durable and do not become brittle and break after prolonged exposure to wind. A chief complaint about wind energy is that nobody wants to look at the turbines. A lab out of University of Texas – Arlington is revolutionizing the concept by creating windmills so tiny, ten can fit on a single grain of rice. When hundreds of these are put together, they generate enough electricity to charge a cell phone.

The potential for this technology is huge, which led UT Arlington to file for a patent. However, WinMEMS has a vested interest will proceed with developing the windmill commercially, though the intellectual rights lie solely with the university. In the short term, the team believes that these windmills can be assembled into a cell phone case to charge the phone without the need for an outlet. If a phone is needed in an emergency but it has a dead battery, the phone can be placed into the case so the wind (either from outside or generated by waving it or blowing on it) can recharge the battery. On a larger scale, panels covered with the fans can be placed on exterior walls or rooftops for a dedicated power source for larger applications in the home. The potential doesn't end in the realm of generating electricity. In the future, the components of these windmills could also be used to guide micro-robots through surgical procedures, or a wide variety of other micro-tools and machines.

Since the discovery of Tiktaalik roseae a decade ago, it has been hailed as an important link in the evolution of terrestrial animals. New analysis of the Tiktaalik fossils explains how animals were able to make the transition from water to land hundreds of millions of years ago. The study was led by Neil Shubin of the University of Chicago and was published in the Proceedings of the National Academy of
Sciences. The latest report comes from analysis of the pelvic girdle and fin. Because early vertebrates with limbs (known as tetrapods) had relatively large hind limbs, the team focused on trying to understand how this trait emerged. The analysis revealed that Tiktaalik had a widened pelvic girdle, which would have allowed the pelvic fins to be strong enough to push around muddy riverbeds, not just swim through water.

*Tiktaalik roseae* was a fish which resembled a crocodile and lived 417-354 million years ago. It was discovered in 2004 by Shubin and his team during an expedition to Ellesmere Island, Canada. Despite the age, the specimen was very well preserved. The researchers were able to determine that *Tiktaalik* had many features that resembled an intermediate between fish and land animals and represents the transition from aquatic to terrestrial life. A true transitory animal, *Tiktaalik* was able to breathe using a combination of gills and lungs that were even protected by a rib cage, and the head resembled a crocodile more than a fish. The size of the pelvic girdle was unexpected, as it was believed that powerhouse hind limbs would have evolved later when animals were spending more time on land, as a response to the new environment. The findings indicate that the morphological changes actually predated the actual transition from water to land. Despite their relative width, the pelvis was still more like a fish than a tetrapod, though it does represent a very important start. Even with all of the amazing discoveries surrounding *Tiktaalik* to date, the researchers are not done yet. There are still bones missing from the skeleton, including the bones of the pelvic fin. These bones could give clues about features of modern feet, such as toes. If and when these fossils are discovered, researchers will get yet another piece of the puzzle for one of the most amazing evolutionary feats of all time.