

Something's in the Wind

| by Courtney Dabney |

Looking like the buzzing of a hummingbird's wing, UTA researchers are working on micro-windmills that have many practical applications.

The most common examples of windmill technology are the iconic structures that began dotting the landscape all over Western Europe as early as the 13th century (especially in Germany and Holland). Windmills were a game-changer in the settling of Texas as well. Beginning in the 1850s through the 1930s, wooden wind pumps did a lot of the heavy lifting on farms and ranches, becoming synonymous with the landscape of Texas.

Wind energy is in vogue once again on an enormous scale. Wind farms packed with giant turbines are now a normal sight all over West Texas, slowly turning like moving sculptures on our horizon.

UTA is researching the applications of miniature windmills. Associate Professor J.C. Chiao is the prin-

cipal investigator on the research but gives major credit to his former student Dr. Smitha Rao, whom he said "is the real brains behind the operation. She is my right hand and works on all my research." He said, "My job is to shrink everything. My lab has a catchy name: i-MEMS, which stands for micro-electro-mechanical systems."


The Taiwanese fabrication foundry called WinMEMS is helping to fund the project, but the University of Texas system owns all the licensing and patenting for both design and application of this technology.

By "micro," we mean that you could fit about 10 of these windmills on one tiny grain of rice. The delicate-looking prototypes measure a mere 1.8 millimeters wide and are made of nickel alloy components, which are flexible enough to withstand strong winds.

Chiao said, "Although it has been reported that our research could be used to charge cellphones...I think cellphones are actually a much lower priority for me. It is rare that people are far enough away from a charging station these days

to even need it."

"The major application will be in charging wireless sensors, like those used to safeguard our decaying infrastructure. For example, when sensors are placed on bridges to monitor for cracks or strength detection, their batteries need to constantly be replaced," he said. "With the combination of both solar and micro-windmill technology, sensors could be left on those structures forever and provide the power needed to keep them up and running."

While one micro-windmill doesn't produce much energy by itself, the thought is to produce panels with thousands of them that could be mounted on walls. Chiao said, "Having a lot of tiny windmills lessens the likelihood that they would all be damaged in the event of something catastrophic. There would be a greater survivability, and so too, better reliability from this power source." 

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