

Running hamsters, tapping fingers tapped for energy

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Courtesy Georgia Tech and [World Science](#) staff

Could hamsters solve the world's energy crisis? Probably not, but a hamster wearing a power-generating jacket may be doing its own small part to provide a new and renewable source of electricity.

Georgia Institute of Technology researchers report that they have generated electrical current from the hamster's movements as well as from a tapping finger. Both setups rely on nanotechnology, or molecular-scale machinery, to generate tiny amounts of current.



Although thousands of these single-wire generators would have to be combined to power even one handheld electronic device, the developers say their work moves users of BlackBerries, cell phones and other gadgets closer to powering them with their own typing.

"We have demonstrated ways to convert even irregular biomechanical energy into electricity," said Zhong Lin Wang, of Georgia Tech's School of Materials Science and Engineering. "This technology can convert any mechanical disturbance into electrical energy." The findings were reported Feb. 11 online in the research journal *Nano Letters*.

Scavenging energy from irregular motion is important because much biomechanical energy is variable, unlike the regular mechanical motion used to generate most large-scale electricity today, Wang said.

The nanogenerator power is produced by the piezoelectric effect, a phenomenon in which certain materials produce electrical charges when they are bent and then relaxed. The wires are no more than eight hundred-millionths of a millimeter wide, and half a millimeter long.

To make their generators, Wang's research team encapsulated single zinc oxide wires in a flexible material. The wires were anchored at each end with an electrical contact, and a device to control current flow placed at one end.

The developers attached one of these single-wire generators to the joint area of an index finger, or combined four of the single-wire devices on a small jacket worn by the hamster. The rodent's running and scratching – and the finger-tapping – flexed the material encapsulating the tiny wires, producing alternating electrical current, the group reported.

At the suggestion of Wang's daughter, the researchers found that hamsters are more active creatures – but only after 11 p.m. They had to experiment with a jacket configuration that was tight enough to stay on and to wrinkle the nanogenerator substrate – but not so tight as to make the hamster uncomfortable. "This study shows that we really can harness human or animal motion to generate current," Wang said.

Image: A hamster wearing a jacket attached to nano generator that produces electricity as the animal runs and scratches. (Courtesy Zhong Lin Wang)