

## Eco-friendly wearable could replace aircon



We have already seen [clothing with inbuilt air conditioning](#), and [sports bras 3D printed with cooling vents](#). Now, a device developed by a team from [Penn State's Department of Materials Science and Engineering](#), which is lightweight enough to be incorporated into clothing and capable of cooling by more than five degrees Fahrenheit, could be the source of relief for millions of people toiling in extreme heat conditions.

Currently run by an iPad-sized battery pack, the device works for up to two hours. Researchers envision it being integrated into uniforms for firefighters and clothing for factory workers and athletes.

Working on a molecular level, the scientists developed a flexible, lightweight array of wires that work without using environmentally damaging coolants. The wires are electrocaloric, which means they reverse temperature change when electricity is applied to them. A tiny sheet of silver added to the wires acts as an electrode, and when power from a battery pack is applied, generates 36 volts of electricity, a level safe for human use.

Previous cooling materials have either relied on dangerous levels of electricity or were too heavy and rigid to be used by individuals at work. This new composition is little and flexible enough to be transferred from the laboratory to just about any material. And by using a small battery pack, the device is far more sustainable than current systems used for cooling large areas. Future development of the device will focus on designing a full-body cooling system.

Are there other macro-level systems that could be personalized for individual use?

Website: [www.matse.psu.edu](http://www.matse.psu.edu)

Contact: [aem1@psu.edu](mailto:aem1@psu.edu)