

and four others – Sumit the six accused.

# A battery powered by human sweat

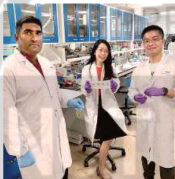
## Indian scientist among creators of battery that does not contain toxic chemicals

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In a first, scientists from the Nanyang Technological University (NTU), Singapore, have introduced a stretchable battery that is powered by human perspiration.

Gurunathan Thangavel, a native of Archampatti in Karur district, Tamil Nadu, is among the three scientists who designed and developed the battery that can discharge about 20 hours of electricity derived from just 2 ml of sweat.

The soft stretchable battery comprises printed silver flake electrodes that generate electricity in the presence of sweat. The battery looks like a paper bandage that can be affixed to a flexible sweat-absorbent textile which draws power from sweat and transfers it to



Gurunathan Thangavel and others of the team who developed the battery.

wearable devices, including smart watches and arm straps, via Bluetooth.

To demonstrate its potential use when it becomes incorporated in wearable biosensors and other electronic devices, the scientists tested their device with artificial human sweat. “The battery does not contain heavy metals or toxic chemicals unlike

conventional batteries, which are often built using unsustainable materials that are harmful to the environment and at times pose a threat of explosion. We have applied to patent this technology,” says Dr. Thangavel, a Senior Research Fellow in NTU’s School of Material Science and Engineering.

“Conventional batteries use organic electrolyte, thereby limiting their application in skin-interfering electronics. Our battery conforms to the skin of users by our well-synthesised hydrophilic elastomeric binder. This device will help to do away with toxic materials used in batteries,” he said.

In a separate trial, the team reported that an individual wearing the sweat-powered battery around the wrist and cycling on a sta-

tionary bicycle for 30 minutes was able to generate a voltage of 4.2 V and output power of 3.9 mW that was sufficient to power a commercial temperature sensor device and send the data to a smartphone via Bluetooth.

“By capitalising on perspiration, we could be looking at a more environmentally friendly way of powering wearable devices that does not rely on conventional batteries. It is a near-guaranteed source of energy produced by our bodies,” he quoted Lee Pooi See, Dean of NTU Graduate College, who led the study, as saying.

Adding that the third member of the team is Lyu Jian, Research Fellow, Materials Science and Engineering, NTU, Dr. Thangavel said the stretchable textile retained a lot of sweat.