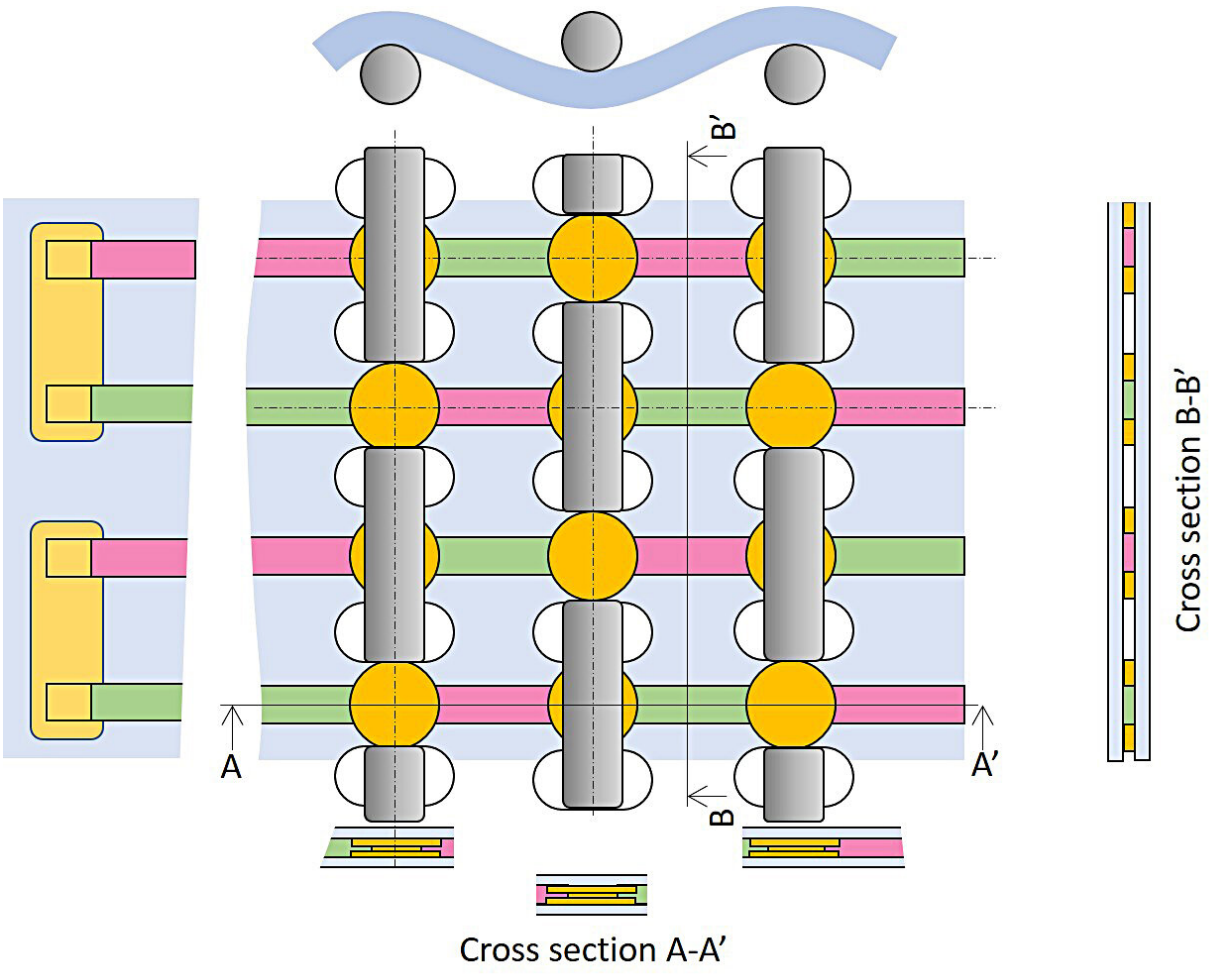
# Body heat through flexible fabric could power IoT devices for health monitoring for people, pets, machinery

January 23 2020, by Chris Adam




Researchers at Purdue University have created a technology to address the thickness issue for wearable power generation. Credit: Purdue University

Wearable electronics and other Internet of Things (IoT) devices are rapidly growing in popularity, but their need for consistent power can place a high burden on users. One recently proposed solution is to generate electricity using heat from the human body, animals or other ambient sources, but typical emerging devices need to be up to an inch thick to harvest maximum results.

Researchers at Purdue University have created a technology to address the thickness issue for wearable power generation. They developed a woven, thermoelectric flexible fabric that is potentially thinner than a millimeter.

"This wearable power generator is well-suited for body or other heat recovery while also offering great mechanical flexibility and comfort," said Kazuaki Yazawa, a research associate professor at Birck Nanotechnology Center in Purdue's Discovery Park. "Furthermore, this film-based product is easier to manufacture compared to current manufacturing of thermoelectric modules."

The flexible thermoelectric generator technology uses a polymer or a variety of yarns woven into a polymer film or fabric sheet with a printable pattern of thermoelectric materials. The generator takes heat from any curved surface it meets and converts it into a small amount of electricity.

Punched holes incorporated with the printed pattern allow an electric insulated thread to pass over between the two sides to properly connect the hot and cold side surfaces. The 3-D structure then becomes similar to conventional rigid or solid thermoelectric power generator modules.

"There are several potential areas of application for this technology for both humans and animals," Yazawa said. "It can be used for biomonitoring humans or animals, along with applications for industrial

machining where the unreachable curved surface can be used for sensing and machine health monitoring."

Provided by Purdue University

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