# Development of Flexible and Stretchable Thermoelectric Personal Wearable Devices

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## BACKGROUND

Currently available wearable thermoelectric devices have the drawback of requiring a rigid heat sink (e.g., metal pin fin structures, or a fan), or the device performance is usually very low in the absence of such a heat sink.

## TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a mechanically flexible and stretchable thermoelectric devices for wearable personalized thermo-regulation (cooling and heating) and power generation by harvesting body heat. The invention achieves active cooling without the need of a heat sink by using novel designs that enhance thermal performance. It can find broad applications in personalized thermoregulation for special occupations like law enforcement, military, firefighting, and for outdoor sports such as running, cycling, golfing, hiking, etc. When used in indoor environments, it can be used as a personalized air conditioner to reduce energy consumption.

## APPLICATIONS

It has potential broad applications in personalized thermoregulation for special occupations like law enforcement, military, firefighting, and for outdoor sports such as running, cycling, golfing, hiking, etc. When used in indoor environments, it can be used as a personalized air conditioner to reduce energy consumption.

## ADVANTAGES

This invention is a flexible thermoelectric device that enable cooling and heating with the need of a heat sink.

## STATE OF DEVELOPMENT

A prototype has been developed and is in testing.

## INTELLECTUAL PROPERTY INFO

This technology is patent pending and available for licensing and/or research sponsorship.

## PATENT STATUS

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| Patent Cooperation Treaty | Published Application | WO 2020/106883 | 05/28/2020 | 2018-129 |

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## OTHER INFORMATION

### KEYWORDS

Thermoelectric, Peltier cooling,

flexible, stretchable, wearable devices

### CATEGORIZED AS

- **Energy**
  - Other
- **Materials & Chemicals**
  - Other

### RELATED CASES

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