



## TECHNOLOGY

# Compact Biomechanical Energy Harvester as a Battery Replacement

## OVERVIEW

Modern portable electronics rely exclusively on batteries for power. Obviously, batteries only have a limited duration before it is required to either recharge or replace them. For many users, recharging infrastructure is not readily available (nor the time necessary to fully recharge a battery) and carrying extra batteries is an incredible burden. Consider the case of the modern US military infantryman that typically carries over 80 lbs. of gear, almost 27 lbs. of which is batteries. Reducing this weight while indefinitely maintaining charge would be a tremendous operational improvement. Similarly, mobile professionals require constant power for cell phones and notebooks, and healthcare patients' medical devices used in electrocardiography, insulin administration, and weight distribution recording need reliable power in all situations.

University of Maryland researchers have designed a body motion energy harvester, or portable generator, that can reduce the weight of batteries while improving the power generation of current body motion generators. Similarly, in another design, UMD researchers have miniaturized the motion generator to no more than the size of a current portable battery, allowing for the displacement of typical batteries with a hybrid battery/generator that has the ability to retain charge much longer than a battery alone. Imagine a phone or other portable electronic device that charges itself as you walk!

Furthermore, this new design (in the case of a backpack) has the ability to improve human walking efficiency by compensating for the ground force imposed by the mass of generator and backpack. Such a system can reduce the weight of batteries, provide longer power-on time, and reduce the stresses imposed on the body, improving the overall operational capacity of a military serviceman in the field.

### Advantages:

- Reduced battery weight
- Can be made in the same form factor as current batteries
- Continuous recharging (while in motion)
- Improved walking efficiency on all terrain
- Generates power through all forms of linear motion, such as center of mass up-down motion, foot horizontal motion, arm swing, upper leg motion

### Applications:

- Military infantry
- Law enforcement
- Hiking or other outdoor activities
- Personal and mobile electronic device charging
- Portable medical equipment and implants

## CONTACT INFO

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## **Additional Information**

### **INSTITUTION**

University of Maryland, College Park

### **LICENSE STATUS**

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### **CATEGORIES**

- Bioengineering
- Microelectronics

### **EXTERNAL RESOURCES**

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