THE BUSINESS PARTNER
FOR YOUR IDEAS

LOW-FREQUENCY ENERGY HARVESTER

ENERGY

Novel dynamic design with high power density that harvests energy from low-frequency motion.

TECHNOLOGY TYPE

Devices
Energy Harvesting
Wearables
Power Generation

STAGE OF DEVELOPMENT

- Beta prototype developed.

- Ready for form factor optimization.

- Demonstrated 170 μW/2cm^3 power density.

IP PROTECTION

PCT filed.

LEARN MORE

Reference Number: U-6123

Nick Wilkes
Technology Manager
nick.wilkes@tvc.utah.edu
801-587-0515

TECHNOLOGY SUMMARY

Self-powered wearables, such as watches, have existed for approximately 30 years. These wearables generate power using an eccentric rotor that rotates with movement. Certain types of motion facilitate energy generation better than others. However, harvesting energy from low-frequency motion, such as walking, has proven difficult, limiting the applications of low-frequency energy harvesters.

A new eccentric rotor design that includes a well-tuned rotational spring improves the amount of power generated by low-frequency motion up to 300 percent. Electricity is harvested from an optimized array of copper coils and magnets. Potential applications include low-power draw sensors, wearables, and communication systems.

FEATURES AND BENEFITS

- Offers high power density.
- Eliminates the need for batteries.
- Provides optimized low-frequency motion energy harvesting.
- Holds potential to increase applications for self-powered wearables.

RECENT PUBLICATIONS

Xue, T., Yeo, H. G., Trolier-McKinstry, S., Roundy, S., 2018. "Wearable inertial energy harvester with sputtered bimorph lead zirconate titanate (PZT) thin-film beams", *Smart Materials and Structures*, 27, 085026 doi: 10.1088/1361-665X/aad037
Halim, M.A. Rantz, R. Zhang, Q. Gu, L., Yang, K., Roundy, S. 2018. "An electromagnetic rotational energy harvester using sprung eccentric rotor, driven by pseudo-walking motion", *Applied Energy*, vol., 1 (2018), pp 66–74, doi: 10.1016/j.apenergy.2018.02.093

INVENTOR PROFILE

Shad Roundy, Ph.D., Assistant Professor - Mechanical Engineering
Tiancheng Xue, Graduate Research Assistant
Robert Rantz, Graduate Research Assistant

DATE UPDATED: 11/9/2018