

Body Energy as a Power Source

Mobile Devices, such as Smartphones, Trackers, or Tonometers Are not only Helpful, but also Consume Lots of Power. KIT Researchers Satisfy the Need for Electricity by Kinetic Energy.



Systems converting energy of the body into electricity, such as this foot prosthesis, are to be used by KIT scientists to power portable electric devices, such as smartphones or pacemakers of the heart. (Photo: KIT/Andreas Keller, courtesy KUNZBERG GmbH)

Smartphones, MP3 players, sports electronics devices such as pulse meters or trackers, medical equipment such as tonometers, pacemakers of the heart, or insulin pumps: An increasing number of electronic companions make daily life easier for us. But as useful these smart helpers may be: Their constant hunger for electricity is a problem. The solution: power supply by means of energy produced by body movements. This is the research subject of scientists at the Karlsruhe Institute of Technology (KIT).

"If you want to harvest the energy produced by movements of the body, the challenge lies in the requirement that this power generation must not demand any additional power input by the user," says Christian Pylatiuk of the Institute for Applied Informatics (IAI). The physician and his team have developed two systems that meet this requirement: One design for the lower extremity uses body weight during walking. One small cushion each filled with a liquid is installed under the heel and the ball of a walker. Impact on the ground and rolling off

Monika Landgraf
Chief Press Officer,
Head of Corp. Communications

Kaiserstraße 12
76131 Karlsruhe, Germany
Phone: +49 721 608-47414
Fax: +49 721 608-43658
Email: presse@kit.edu

**For further information,
please contact:**

Dr. Felix Mescoli
Press Officer
Phone: +49 721 608-48120
Fax: +49 721 608-43658
Email: felix.mescoli@kit.edu

Further materials:

Animation

causes oil to be pumped back and forth through a hose connection, in this way, very much like a miniaturized tidal power plant, driving a piston which, in turn, drives a generator. This miniature power plant was installed by Pylatiuk in a foot prosthesis equipped with sensors actively supporting the movements of the wearer. "However, the mechanism could just as well be installed in a sports shoe to operate a speed trainer or a performance diagnosing system," says Pylatiuk.

A different generator can be worn on the wrist like a wristwatch. The special difficulty in this case: To operate a generator, the highly discontinuous movements of the arm must be converted into a continuous movement. For this purpose, Pylatiuk fell back on proven technologies: The mode of operation is similar to that of an automatic watch." Unlike a clockwork, where energy is stored by a gyrating mass cocking a spring, an induction motor is used in this case in which an eccentric element moves a magnet back and forth in a coil. The maximum power of 2.2 milliwatt is not yet sufficient for instance to run a hearing aid or charge a smartphone. However, "we are currently working on a more powerful consumer version," says Pylatiuk. He expects results to come forth by the end of the year.

Explanation of the animation: Below the heel and the ball of the walker there are cushions filled with a liquid. The impact and the heel-to-toe motion of the foot causes oil to be pumped through a hose connecting the two elements, in this way, like a miniaturized tidal power plant, operating a piston which, in turn, drives a generator generating power. (Animation: KIT/KUNZBERG GmbH).

Being „The Research University in the Helmholtz Association“, KIT creates and imparts knowledge for the society and the environment. It is the objective to make significant contributions to the global challenges in the fields of energy, mobility and information. For this, about 9,300 employees cooperate in a broad range of disciplines in natural sciences, engineering sciences, economics, and the humanities and social sciences. KIT prepares its 26,000 students for responsible tasks in society, industry, and science by offering research-based study programs. Innovation efforts at KIT build a bridge between important scientific findings and their application for the benefit of society, economic prosperity, and the preservation of our natural basis of life.

Since 2010, the KIT has been certified as a family-friendly university.

This press release is available on the internet at
<http://www.sek.kit.edu/presse.php>

The photo in the best quality available to us may be downloaded under www.kit.edu or requested by mail to presse@kit.edu or phone +49 721 608-47414. The photo may be used in the context given above exclusively.