

Advance college essay



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Recent advances in robotics technology make it possible to create prosthetics that can duplicate the natural movement of human legs.

This capability promises to dramatically improve the mobility of lower-limb amputees, allowing them to negotiate stairs and slopes and uneven ground, significantly reducing their risk of falling as well as reducing stress on the rest of their bodies. That is the view of Michael Goldfarb, the H. Fort Flowers Professor of Mechanical Engineering, and his colleagues at Vanderbilt University's Center for Intelligent Mechatronics expressed in a perspective's article in the Nov. 6 issue of the journal Science Translational Medicine.

For the last decade, Goldfarb's team has been doing pioneering research in lower-limb prosthetics. It developed the first robotic prosthesis with both powered knee and ankle joints. And the design became the first artificial leg controlled by thought when researchers at the Rehabilitation Institute of Chicago created a neural interface for it. In the article, Goldfarb and graduate students Brian Lawson and Amanda Shultz describe the technological advances that have made robotic prostheses viable. These include lithium-ion batteries that can store more electricity, powerful brushless electric motors with rare-Earth magnets, miniaturized sensors built into semiconductor chips, particularly accelerometers and gyroscopes, and low-power computer chips.

The size and weight of these components is small enough so that they can be combined into a package comparable to that of a biological leg and they can duplicate all of its basic functions. The electric motors play the role of muscles. The batteries store enough power so the robot legs can operate for

a full day on a single charge. The sensors serve the function of the nerves in the peripheral nervous system, providing vital information such as the angle between the thigh and lower leg and the force being exerted on the bottom of the foot, etc. The microprocessor..

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