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Robo Power Walking

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Forget fishnets and cargo pants. Fashion's next big thing in legware could be bionic. In March, members of UC Berkeley's engineering department showcased the Berkeley Lower Extremity Exoskeleton (BLEEX), one of the first advanced exoskeletons to provide muscular assistance to humans for otherwise arduous tasks.

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BLEEX, which consists of metal leg braces, a power unit, and a large frame resembling a backpack, attaches to modified Army boots worn by the human pilot. Fueled by gasoline, BLEEX is controlled by a computer (currently a PC104 platform) that measures information provided by dozens of sensors gauging pressure, speed, torque, and the like. While communicating with the sensors over what the Berkeley team calls a "body LAN," the computer determines how to move the exoskeleton without impeding the pilot.

Currently, a BLEEX wearer can carry 90 pounds up stairs or slopes—as well as squat, twist, and walk—with the load-sharing exoskeleton supporting all but 5 pounds. Within two years BLEEX should be available for soldiers and firefighters. Eventually, it could help disabled people walk.

By summer 2005, project lead Homayoon Kazerooni is committed to finishing a quieter, more robust machine that can be used by civilians—like the one who e-mailed him asking to use it for a North Pole expedition. "Most mobile robotic systems are made for a laboratory environment, but this design works in rain and harsh environments, using the same building blocks as cars," Kazerooni says. "It's the foundation for another mobile platform."

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