

# 'BIONIC' LEG WILL TAKE AMPUTEE TO NEW HEIGHTS



Having to walk up a flight of stairs is a nearly impossible task for anyone with a leg amputation. It's tiring and dangerous.

That is unless your name is Zac Vawter, who had his leg amputated above the knee after a motorcycle accident 3 years ago. Soon, he will use a new bionic leg to climb 2,109 stairs (103 flights) during the Rehabilitation Institute of Chicago's fourth annual SkyRise stair climb.



“Other artificial limbs are passive and have to be dragged behind you when you climb stairs,” says Levi Hargrove, the director of neural engineering at RIC’s Center for Bionic Medicine. “This leg allows the patient to walk normally.”

Zac Vawter, 31, has been involved in research at RIC since shortly after his accident with this leg, which has an “actively powered” knee and ankle and is controlled by neural signals from his brain, he can take two stairs at a time if he wants to and walk at a faster pace than his regular prosthetic leg allows. “It’s not built for running fast, but you could get across a street quickly to get out of the way of a bus.” says Hargrove.

“It’s an amazing piece of equipment,” says Vawter. “This is a major improvement on going up and down stairs. With my other prosthesis, I have to be aware of what it’s doing and where it is at any given moment. This one is more natural, closer to a normal leg.”

The Department of Defense is behind the push to improve prosthetic devices in an effort to improve the lives of wounded soldiers. The DOD donated \$ 8 million in research money for the development of the leg Vawter is testing. It could be available commercially in several years. Possibly sooner, says Hargrove.



The developmental role undertaken by Hargrove is to improve the neural interface between “what Zac is thinking and how the leg responds. Our group is developing a better steering system so he doesn’t have to do anything unintuitive to control the leg. There’s no remote involved.”

What’s at work in the neuroscience: When Vawter’s surgeon removed his leg, he transplanted nerve cells from the lower leg to his hamstring. Sensors attached on the skin near those nerves communicate information to the bionic leg’s microprocessor.

Vawter will make the climb with his father and a longtime friend. “We’ll have a good time,” he says. “This is going to be a lot of fun.”