Enhancing Brain Implants to Power Artificial Limbs

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Approximately 270,000 Americans suffer from spinal cord injuries, according to the National Spinal Cord Injury Statistical Center. These injuries can cause paralysis, loss of sensation, and more, according to the World Health Organization. These injuries diminish patients' quality of life and make it difficult to move, feel, and live independently - and there is no treatment that can repair a damaged spinal cord.

UChicago's Sliman Bensmaia, PhD, and University of Pittsburgh's Michael Boninger, MD, are working to help give these paralyzed patients control over their natural or artificial limbs with the use of sophisticated brain implants.

They will create the future of brain-computer interfaces, or devices that turn commands from the brain into impulses that allow a patient to control and feel touch with their prosthetic limb. This will build on Bensmaia's leading work in sensory encoding and Boninger's team's breakthroughs with motor control.

Using advanced imaging techniques, Bensmaia, Boninger and teams from UChicago and Pitt will map brain activity to better understand how the brain controls movement and uses sensation. These insights will help them develop a brain implant that better allows patients to control and receive sensory feedback through their artificial limbs, regaining movement and touch.

And the technology has the potential to move beyond people with spinal cord injuries.

The more than 400,000 people who suffer from multiple sclerosis (MS), more than 15,000 people with amyotrophic lateral sclerosis (ALS), and the thousands of others with amputations, muscular dystrophy, and more could take advantage of their findings.

Project title: Developing a Collaboration to Advance Brain Computer Interface Science

Learn more and connect with Sliman Bensmaia and Michael Boninger at sliman@uchicago.edu and boninger@pitt.edu.