Karl Zelik

Associate Professor of Mechanical Engineering at Vanderbilt University

Nashville, TN, US

Expert on exoskeletons, human movement, biomechanics and prosthetic limbs

Biography

Zelik's goal is to improve health, mobility and independence for individuals with physical disabilities, and to enhance human capabilities beyond natural biological limits, through advances in movement science and assistive technology. His lab perform research on a range of topics, from investigating fundamental mechanisms underlying legged locomotion to translating biomechanical principles into improvements in technologies such as prosthetic limbs, exoskeletons, wearables and smart clothing. They strive to develop devices that better integrate with the human body and better augment human capabilities and performance. We also seek to develop new measurement tools and analysis methods to deepen our understanding of human movement biomechanics. The Zelik Lab is housed within Vanderbilt CREATE (Center for Rehabilitation Engineering and Assistive Technology). They perform experimental and computational research on human locomotion by combining techniques and knowledge from engineering, biomechanics, bio-signal analysis, neuromotor control and clinical practice. Their interdisciplinary research is performed directly alongside clinical doctors ? many of whom have offices within short walking distance of our lab ? and in collaboration with other engineers and scientists. To study human movement we use state-of-the-art measurement equipment, including an infrared motion capture system, force-instrumented treadmill, portable respirometry system, ultrasound imaging and an electromyographic (muscle activity) measurement system. Research projects in their lab range from designing, building and testing wearable assistive devices to developing new experimental approaches for assessing the biomechanics of human performance to conducting computational simulations to better elucidate fundamental principles underlying locomotion.

Areas of Expertise

Assistive Devices, Assistive Technology, Mechanical Engineering, Biomechanics, Exoskeletons, Human Movement, Prosthetic Limbs

Education

University of Michigan

Ph.D. Mechanical Engineering

Washington University

M.S. Biomedical Engineering

Washington University

B.S. Biomedical Engineering