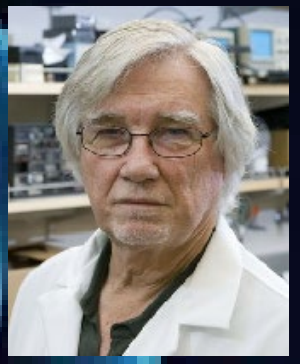
How can neuromodulation immediately transform the physiological state of the spinal cord from complete to incomplete paralysis?

Friday, February 15th, 12:30 pm
Bowen Hall Rm 222



Professor V. Reggie Edgerton
UCLA

Individuals with a chronic motor complete spinal cord injury and completely paralyzed for years can be transformed to incomplete paralysis that enables them to regain voluntary movement immediately with the application of appropriate methods of neuromodulation of spinal networks below the spinal lesion. In the presence of this stimulation they can stand, move their lower limbs on command and generate a rhythmic stepping motion in a gravity neutral position. These movements can be enhanced or modulated further by auditory and visual input. With training these improvements can be performed with stimulation strengths well below motor threshold. These results suggest that our presumed mechanism of a spinally complete lesion is in need of a serious and urgent reassessment. In this lecture I will present hypotheses as to the underlying mechanisms that might enable these highly significant degrees of recovery of individuals, years after being injured severely.

Dr. Edgerton received his Ph.D. in Exercise Physiology from Michigan State University, Masters from University of Iowa and BS from East Carolina University. He is currently the Director of the Neuromuscular Research Laboratory and a Distinguished Professor of the Departments of Integrative Biology and Physiology, Neurobiology and Neurosurgery. He has been teaching and conducting research at UCLA for over 40 years. His research is focused on how the neural networks in the lumbar spinal cord of mammals, including humans, regain control of standing, stepping and voluntary control of fine movements after paralysis, and how can these motor functions be modified by chronically imposing activity-dependent interventions after spinal cord injury.

PRINCETON
Mechanical & Aerospace Engineering