

## Title: Exoskeletons for Gait Assistance and Training of the Motor Impaired

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Abstract: Robotics is emerging as a promising tool for training of human functional movement. The current research in this area is focused primarily on upper extremity movements. This talk describes novel designs of three lower extremity exoskeletons, intended for gait assistance and training of motor-impaired patients. The design of each of these exoskeletons is novel and different. Force and position sensors on the exoskeleton provide feedback to the user during training. The exoskeletons have undergone tests on healthy and stroke survivors to assess their potential for treadmill training. These results will be presented. GBO is a Gravity Balancing un-motorized Orthosis which can alter the gravity acting at the hip and knee joints during swing. ALEX is an Actively driven Leg Exoskeleton which can modulate the foot trajectory using motors at the joints. SUE is a bilateral Swing-assist Un-motorized Exoskeleton to propel the leg during gait. Videos of the training using these exoskeletons are available on the website.

### Biography:

Sunil K. Agrawal received a Ph.D. degree in Mechanical Engineering from Stanford University in 1990. He is currently the Director of Mechanical Systems Laboratory. He has published close to 200 journal and conference papers and 2 books in the areas of controlled mechanical systems, dynamic optimization, and robotics. Dr. Agrawal is a Fellow of the ASME and his other honors include a Presidential Faculty Fellowship from the White House in 1994, a Bessel Prize from Germany in 2003, and a Humboldt US Senior Scientist Award in 2007. He has served on editorial boards on numerous journals published by ASME and IEEE.

### References:

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