Abstract
Berkeley Robotics and Human Engineering Laboratory at UC, Berkeley is the birthplace of the exoskeleton systems being adopted by industry. During the last 20 years, this laboratory has been devoted to uncovering all basic issues associated with the control, design and power of exoskeleton systems. This talk is specific to exoskeletons specific to people with mobility disorders. Patients who have difficulty walking often use wheelchairs for mobility. It is a common and well-respected opinion in the field that postponing the use of wheelchairs retards the onset of other types of secondary disabilities and diseases. The ramifications of long-term wheelchair use are secondary injuries including: hip, knee, and ankle contractures; heterotopic ossification of lower extremity joints; frequent urinary tract infection; spasticity; and reduced heart and circulatory function. The objective of our research is to develop smart, powered exoskeleton orthotic systems to be used for individuals with otherwise limited mobility. These exoskeletons are powered and allow their wearers to walk upright without the energetic drain associated with existing orthotic devices. These smart exoskeletons will replace wheelchairs and enable many individuals who cannot walk due to neurological disorders, muscular disorders or aging to walk again.

Biosketch
One of the world’s leading experts in Robotics Human Augmentation, Dr. Kazerooni conducts research on robotics, control sciences, exoskeletons, human-machine systems and augmentation, bioengineering, mechatronics design, artificial locomotion, intelligent assist devices, and power and propulsion. Dr. Kazerooni directs the Berkeley Robotics and Human Engineering Laboratory whose mission is to develop fundamental scientific and engineering principles for robotic systems that augment human capability. He is also the founder and Chief Scientist of Berkeley Bionics. Dr. Kazerooni holds a Doctorate in Mechanical Engineering from MIT and has over 30 years of mechanical engineering experience. He has published more than two hundred articles, delivered over 70 plenary lectures in the U.S. and internationally, and holds seventeen pertinent patents. He has served in a variety of leadership roles in the robotics community notably editor of two journals: ASME Journal of Dynamics Systems and Control and IEEE Transaction on Mechatronics. Dr. Kazerooni’s latest work focuses on the control of human-machine systems specific to lower human extremities, but has previously led his team to successfully develop robotics systems that enhance human upper extremity strength.