Insights from simulating gait dynamics and disorders

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The outcomes of treatments performed to correct movement abnormalities are variable. This problem exists, in part, because the biomechanical causes of the abnormal movement patterns are unclear, and the effects of common treatments are not understood. I believe that the design of treatments will improve if computer simulations are developed that elucidate the causes of movement abnormalities and predict the functional consequences of interventions. This presentation will describe a range of computer simulations that provide insights into the dynamics of human walking and running and the mechanics of common gait abnormalities.

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Scott Delp graduated *Summa Cum Laude* with a B.S in Mechanical Engineering from Colorado State University. He worked in Hewlett Packard's computer graphics group before beginning graduate school at Stanford University. Delp received the M.S. and Ph.D. degrees from Stanford and in 1990 joined the faculty of Northwestern University and the Rehabilitation Institute of Chicago. He returned to Stanford in 1999, and in 2002 became the Founding Chairman of Stanford's Bioengineering Department. Professor Delp's work draws on computational mechanics, biomedical imaging, and neuromuscular biology to improve treatments for individuals with physical disabilities. He has led the development of software systems (SIMM and OpenSim) that enable simulation of human and animal movements; these software systems have become the platform for an international collaboration involving hundreds of research centers. Delp has invented technologies for surgical navigation, microendoscopy, and optogenetics. Delp has received numerous awards for his work, including a National Young Investigator Award from NSF and a Technology Reinvestment Award for which he was honored by President Clinton. He is currently the James H. Clark Professor of Bioengineering, Mechanical Engineering, and Orthopaedic Surgery at Stanford.