Matthew Tresch is a professor and chair of Biomedical Engineering and professor of Physical Medicine and Rehabilitation at Northwestern University. He is also a principle investigator at the Shirley Ryan AbilityLab and has a secondary appointment in Physiology at Northwestern. He received his B.A. in Psychology from Wesleyan University and his Ph.D. in Neuroscience from MIT. He was a postdoctoral fellow at the University of Copenhagen and a research scientist at MIT, before joining the faculty at Northwestern.

**ABSTRACT**

In order to produce movements, muscles must act through joints. The translation from muscle force to limb movement is mediated by internal joint structures that permit movement in some directions but constrain it in others. Although muscle forces acting against constrained directions will not affect limb movements, such forces can cause excess stresses and strains in joint structures, leading to pain or injury. I will present recent results from our group demonstrating the importance of joint stresses and strains in the neural control of movement. These results can help guide future experiments investigating neural control strategies and approaches for neurorehabilitation.