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Contemporary Arts Practice and Outer Space: A Multi-Disciplinary Approach (3)

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CHOREOGRAPHIC TECHNIQUES FOR HUMAN BODIES IN WEIGHTLESSNESS

Abstract

As more humans become capable of reaching microgravity environments, somatic technologies developed through dance can inform our embodiment in these new settings. Movement in weightlessness is surprisingly counter-intuitive, since our sense of spatial orientation depends so strongly on gravity. My research has focused on understanding strategies for planning and executing movement including rotations in several planes and manipulating the body's center of mass. I've been on zero gravity flights and will discuss as well as show video of these movements.

I will complete my PhD in particle and astrophysics (at Arizona State University) in spring 2019. Additionally, since 2002, I have made a career as a professional circus performer, specializing in object manipulation and equilibristics. My skill sets include standing in front of 100s or 1000s of people while juggling, fire spinning, standing on a ball while balancing a ball on my head while juggling, and doing partner acrobatics on stilts.

The history of microgravity movement explorations include many accounts of individuals or groups planning specific movement patterns which they were unable to accomplish when the moment arrived. To begin to find solutions this problem, I engaged in a study of the physical dynamics of the body by writing computer simulations of an articulated human body to calculate the center of mass and moment of inertia tensor in a range of positions. I was able to compare the results of the simulation to measurements on these properties to validate the accuracy of my modeling, and I can demonstrate how the computer modeling supported my ability to execute movement with success in microgravity environments.

Specifically, my research is focused on developing an understanding of how the interaction between angular momentum and body's moment of inertia tensor can be planned and utilized for choreographic purposes. The video from my flights demonstrates that it is possible to plan and execute motion in weightlessness with proper training. My training has included acrobatics, dancing, aerial harness work, tunnel flight/indoor skydiving, sensory deprivation chambers, and unique exercises I've developed through a lifetime of professional movement experience.

My talk will outline the techniques I've used to develop these series of successes and show video of pre-planned dynamic movement, explained starting from the physical model, and progressing to the actual execution of the movements.