# Walking tall: UH student working on space suit redesign for NASA

February 12 2007

Space suits for astronauts may get a new and better design following a University of Houston doctoral student's locomotion stability research. Melissa Scott-Pandorf is a Fellow of the Texas Space Grant Consortium.

"NASA's mission to send humans back to the Moon is closer to a reality every day," Scott-Pandorf, a doctoral student in the UH Department of Health and Human Performance, said. "Astronauts will need to travel easily over the planet's terrain, meaning their mobility will be important for overall mission success."

To begin her study, Scott-Pandorf looked at hours and hours of lunar moon-walk video to determine how fast and how far astronauts traveled wearing all of the needed equipment. That information, combined with metabolic indicators collected while the astronauts worked on the lunar surface, was used to calculate the amount of energy expelled while walking on the moon. Scott-Pandorf said this is valuable information that will help NASA officials decide how much is too much to include on an astronaut's space suit.

"I can't tell you how many times I watched the astronauts fall down on the lunar videos," she joked. "Obviously, it isn't meant to be funny. But it's difficult for them to get up with the survival pack on their back and those bulky suits. We're hoping our new research projects will lead to a streamlined space suit that makes it easy to navigate the terrain."

As part of her new work, Scott-Pandorf uses a weight suspension system

in the UH Laboratory of Integrated Physiology (LIP). The apparatus is used as a reduced gravity simulator that helps to evaluate locomotion stability. A subject is buckled into the suspension system and simply walks as Scott-Pandorf records data about the person's gait. With this system, she can investigate how mass distribution and pressure levels of the space suit may influence the ease in which astronauts travel a planet's terrain.

"For one thing, it's clear that the placement of the life support pack is too high on the astronaut," Scott-Pandorf said. "Possible redesign ideas are to alter the pack to fit the front and back of the space suit evenly or create a pack that attaches closer to the waist, which would lower the astronaut's center of gravity. It's the same idea as if you were balancing on a surf board bending your knees and staying low. This lowers your center of mass and allows you more stability."

Scott-Pandorf is also considering research to investigate the mobility needed at the joints of the space suit that would allow an astronaut to move more naturally, making it easier to recover from a fall or to keep from falling at all.

"In addition, the space suspension system we are using is similar to what has been used as therapy tools for persons with spinal cord injuries or the elderly. Conceivably using the system for our research could usher in new ideas for new therapies for those populations," Scott-Pandorf said.

Source: University of Houston