Understanding Inner Space in Outer Space

An Interview with **Laurence Harris**, Neuroscientist, York University
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Our perceptions of the world, our perceptions of our body, our perception of time and our movement through the world, is a multi-sensory construct that we make in our brains. It's at the core of what I'm interested in.

A central feature of my research is through the vestibular system. That's the balance organs in the inner ear that enable us to orient relative to gravity. And it turns out that orientation relative to gravity underlies not just our ability to stand up, but also our ability to do any visual task. For example, you need to know that everything is upright. If you were taking it for granted that everybody around here is standing upright in a certain orientation, there's many many senses that are telling you about that information, and that's the job of the vestibular system.

How does your work impact astronauts?

The experiments that I'm doing in space are based on the International Space Station, and we're looking at the sensation of self-motion and orientation: how far astronauts feel that they're moving. Because of the involvement of the vestibular system in our sense of orientation and its function with gravity, when it has no gravity, it's basically released. This makes it more sensitive. And so what we want to know is whether this translates into a problem of self-motion in astronauts: whether they feel they are moving further than they really are, faster than they really are, and so forth.

There's also been some anecdotal evidence that astronauts feel that space is compressed, that the distances are not so far as they are really. But those

experiments will also be very beneficial here on Earth. Many of the phenomena that astronauts experience correspond to some of the same sorts of things that we get here on Earth as a result of aging. So we're hoping that our experiments will not only benefit the space community directly, but also here on Earth - buildings, cars, or anything of that kind - can use this sort of information for optimal design and safety, and also for clinical applications as well. So this space-based research will have many applications here on Earth.

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