

Friday, August 23 | 11 AM

Interweaving The Senses To Create A Mental Map



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Our sense of space depends on a mix of perceptions of the world immediately around us combined with an expectation of what ought to be around us, given what we know. This is a complicated problem for our brains to solve, and failure to solve it results in disorientation, which can evoke negative emotions from unease to frank anxiety. As neurobiologists, we have spent the last several decades studying the neural circuits in the brain to try and understand how the senses combine to enable this orientation, which we often call mental or cognitive mapping. This lecture will describe these experiments, which have been conducted in both human and non-human animals using various different methodologies. It will particularly show how vision combined with movement signals is particularly important for orientation. These movement signals depend heavily on inertial sensors in the inner ear, which can be thought of as a sixth sense and one that is often overlooked when we think about the senses. The lecture will show how these signals are thought to combine and then offer speculations as to how this new understanding of sensory integration (interweaving) might inform architectural design.