

## **The Sensory World** – Seminar for Spring 2025

Larry Ambs and Gordon Wyse, moderators

Wednesday, 1:30-3:30; Applewood

One approach to understanding human existence is by examining how our senses work to produce our perception of the world around us. The route from light, sound waves, odorant molecules, small molecules that induce taste, and other “outer world” phenomena to what we perceive in our brains makes for a fascinating story about our existence in the natural world. Over the past decade, neuroscience has provided novel ways for us to look at our senses and to make sense out of them. From innovative imaging technologies to important genome discoveries to the emergence of incredibly clever cognitive psychology experiments, neurobiology has forged a clearer understanding of what it means to see, hear, smell, touch, maintain balance, and taste—not only mechanically but also in how these senses shape our perception of the world aesthetically, artistically, and musically.  
--after R. DeSalle, *Our Senses: An Immersive Experience*

In this seminar we will approach the senses of humans and other animals from several perspectives. How do the various sensory receptors work? How do these receptors encode information about the world and convey information to the brain? How do brains process this sensory information so that our brain can perceive the outside world? Is the perception process developed in more than one part of the brain? What do sensory illusions tell us about how we perceive the world? How do sensory inputs control spatial behaviors such as locomotion, homing, and migration? Can the senses bypass the brain? What happens when sensory receptors age or cease to function? As we will come to understand, the process of sensing and perceiving our world is a complex process.

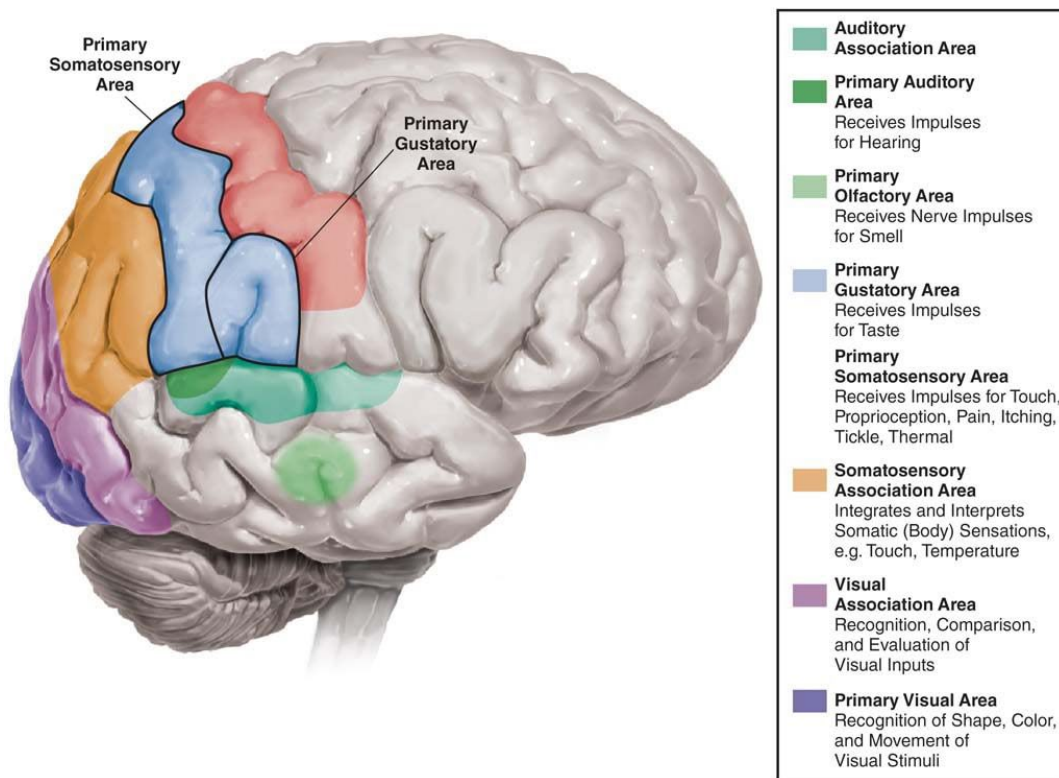
We are recommending you read one of two books: *An Immense World* by Ed Yong or *Our Senses: An Immersive Experience*, by Rob DeSalle. We will suggest other articles, websites, and other resources in the seminar.

Each participant will present and lead discussion on a topic and will also contribute to other discussion. This sheet lists some potential topics; other topics are possible but should be approved by the moderators.

### **Sensory and perception topics**

The physiological hardware of your senses  
Neuroimaging: the sensory brain  
Eye image formation; evolution of eyes  
Seeing light and color  
Perceiving a world in motion  
Seeing location, distance, and depth  
Visual pattern recognition of objects and faces  
Hearing of pitch, music  
Auditory localization in owls, people, and crickets  
Bat echolocation, moths, porpoises  
Speech and language perception

Touch in insects, humans, and moles  
 Olfaction  
 Taste and supertasters  
 Thermoreceptors and pain  
 Balance and aging  
 Synesthesia  
 Navigation stories: turtles, terns, homing pigeons, monarchs  
 Senses in ants: trail following, path integration, polarized light  
 Magnetoreception in orientation  
 Orientation mapping in the hippocampus: place cells, grid cells  
 Vision and Art or Color Perceptions in Art  
 Attention: The Invisible Gorilla  
 Shape perception with tactile touch  
 What the nose knows  
 Early Learning in the crib  
 Development of perception in infancy  
 Motion extrapolation in catching and batting  
 Dyslexia



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