

The Sensory World – Seminar for Spring 2021

Larry Ambs and Gordon Wyse, moderators

Wednesday 10 AM-Noon, Zoom Sessions

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 will use a recent book by Rob DeSalle, *Our Senses: An Immersive Experience*, as well as 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. Below are 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

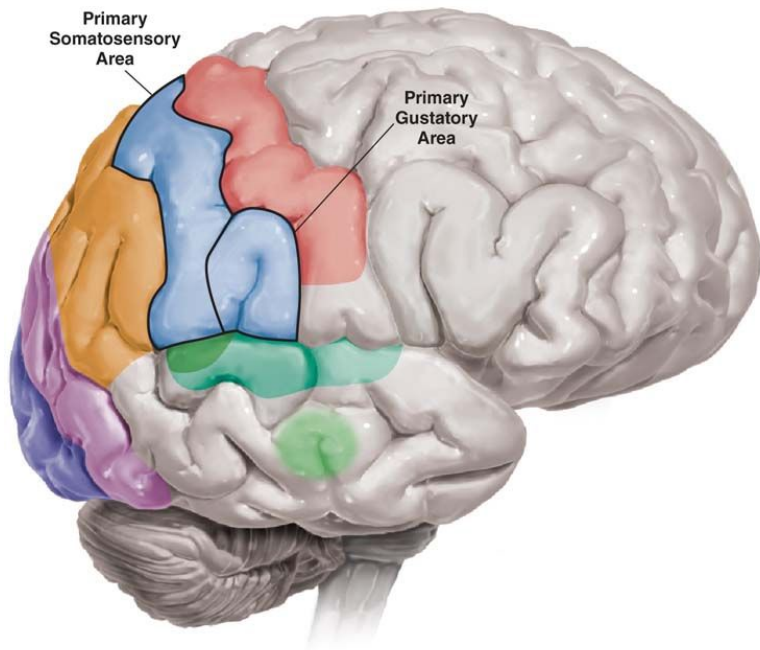
Eye image formation; evolution of eyes

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
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
Autism
How the mind works
What does our mind actually see, hear, and smell and what does it make up?



■	Auditory Association Area
■	Primary Auditory Area Receives Impulses for Hearing
■	Primary Olfactory Area Receives Nerve Impulses for Smell
■	Primary Gustatory Area Receives Impulses for Taste
■	Primary Somatosensory Area Receives Impulses for Touch, Proprioception, Pain, Itching, Tickle, Thermal
■	Somatosensory Association Area Integrates and Interprets Somatic (Body) Sensations, e.g. Touch, Temperature
■	Visual Association Area Recognition, Comparison, and Evaluation of Visual Inputs
■	Primary Visual Area Recognition of Shape, Color, and Movement of Visual Stimuli

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