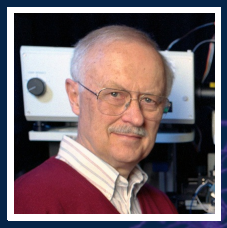
# Decoding Smell



Gordon Shepherd
Professor, Neurobiology

## CURRENT RESEARCH

### Using state-of-the-art computational models to gain insight into the neural basis of smell

Most of food flavor is due to retronasal smell, not when we sniff in but when we breathe out with food in our mouths. This retronasal smell, in fact, is a main determinant of choices for healthy and unhealthy eating. Studying olfactory perception, therefore, will help elucidate the principles of the nervous system on which other sensory perceptions are built. Dr. Gordon Shepherd, Professor of Neurobiology at Yale School of Medicine, uses state-of-the-art computational models based on experimental data to understand the dynamics of odor processing. Building the first full three-dimensional models of neurons and microcircuits, Dr. Shepherd hopes to use the olfactory system as a model to understand how neural circuits as a whole process information.

When we smell the air, odor molecules are represented in the olfactory bulb by spatial patterns as "smell images," which are processed by neuronal interactions called "microcircuits." This first step of smelling sharpens the images and passes them to the next stage for higher processing and perception. A pioneer in neuroinformatics who has created an entire database system for neuroscience, Dr. Shepherd hopes to expand his initial model of the olfactory bulb to the next critical stage, the olfactory cortex. Modeling this process should give direct insight into the neural basis of smell perception, and a deeper understanding of how the brain creates the perception of flavor. Currently, there is active research around the world showing that retronasal smell and flavor play a big role in today's obesity epidemic. A published author of many books, including *Neurogastronomy: How the Brain Creates Flavor, and Why It Matters*, Dr. Shepherd further hopes to...

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## AFFILIATION

Yale University

## EDUCATION

- D.Phil. in 1962,Oxford University
- M.D. in Medicine 1959,Harvard Medical School
- B.S. in Zoology 1955,Iowa State University

## RESEARCH AREAS

Life Science, Neurological / Cognitive, Neurological / Cognitive

## FUNDING REQUEST

Donations of $120K/year for the next 2-3 years will help Dr. Shepherd's team at Yale University pursue research on the neural basis of smell perception, and $150K/year will help them continue the work on microconnectome. Your contributions will support expert personnel, local computers, supercomputer time, and postdoc trainees for building computational models and neuroinformatics databases. Partner with Dr. Shepherd's team to continue their pioneering work on understanding olfactory perception.