Hyperbolic geometry of the olfactory space

Prof. Tatyana Sharpee
The Salk Institute
The Computational Neurobiology Laboratory
La Jolla, CA 92037 USA

"Using the sense of smell as an example, I will describe both theoretical reasons and experimental evidence that natural stimuli and human perception can be mapped onto a low dimensional curved surface. This surface turns out to have a negative curvature, corresponding to a hyperbolic metric. Although this map was derived purely from the statistics of co-occurrence between mono-molecular odorants in the natural environment it revealed topography in the organization of human perception of smell. I will conclude with arguments for why hyperbolic metric should be generally applicable elsewhere in the nervous system."