

Space: Spatial Hierarchy

*"To see a World in a Grain of Sand
And a Heaven in a Wild Flower..."*

— *Auguries of Innocence* [[@blake1803auguries](#)]

Spatial Scale Invariance

The grain contains the world through *hierarchical evidence accumulation*. At each level of the generative model, increasingly abstract regularities are extracted from observations: texture gives way to form, form to spatial relations, spatial relations to universal principles. A sufficiently deep hierarchy finds the cosmos in the particular because the abstract structure encoded at its highest levels applies universally. The predictive brain finds universal structure in particular observations:

"By formulating Helmholtz's original ideas on perception in terms of modern-day statistical theories, one arrives at a model of perceptual inference and learning that can explain a remarkable range of neurobiological facts."

— [[@friston2005theory](#)]

Model complexity: