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Computational Vision

One of the grand challenges of neuroscience lies in understanding how the brain recognizes objects in the visual world. Tremendous progress has been made in determining the sites in the brain that may be involved in recognition. However, not much is known about how recognition proceeds. What are the computational principles that underlie our impressive recognition abilities? Research in the Sinha laboratory focuses on this issue using a combination of experimental and computational modeling techniques.

The two specific questions that the lab is currently exploring are:

1. What is the nature of the object representations in the brain?
2. How can object representations be learned from visual experience?

The Sinha lab is addressing the first question by examining the nature of information that the brain uses for recognizing important classes of objects such as faces. Especially interesting in this regard are impoverished images such as highly blurred photographs and minimalistic caricatures. Analyzing such stimuli promises to provide insights about what aspects of image information may be critical and/or sufficient for recognition. The lab's research on object learning involves work with a unique population of children in India who have gained sight after several years of congenital blindness. Studies of the time-course of visual skill development in these children provide valuable clues for the lab's ongoing efforts to computationally model the acquisition of object concepts by the human brain.

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Additional Publications



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