

OPTICAL SOCIETY OF AMERICA 1992 Annual Meeting

TECHNICAL DIGEST

September 20-25, 1992
Albuquerque Convention Center
Albuquerque, New Mexico

156

FB**8:30 am**

Taos

**Symposium on What is
Intermediate-Level Vision**

Michael S. Landy, *New York
University, Presider*

FB1 (Invited)**8:30 am**

Why do you have edge detectors? H. B. Barlow and D. J. Tolhurst, *Physiology, Cambridge CB2 3EG, England, United Kingdom*. If information overload is an important problem in vision, the following tactic would be useful: Define clusters of sensory events that occur more often than expected by chance, and use these as the primitives or coding elements for the next stage of representation. This approach has several merits: the non-chance occurrence of the clusters implies a causative factor in the environment that is recognized and captured, the clusters exploit correlated activity to reduce redundancy, and the clusters are representative elements that correspond to substantial amounts of signal energy. We know that bars and edges are used as primitives, so do they really occur more often than expected by chance in natural images? To answer this we have determined the distributions of (i) pixel intensities, (ii) average values of circular or square patches of pixels, (iii) averages for elongated patches of pixels, and (iv) averages for randomly selected pixels using natural images, pre-whitened images, random dot patterns, and Glass figures made with paired random dots.