

Alex O. Holcombe
Postdoctoral fellow
Department of Psychology
University of California, San Diego
research interests: Visual psychophysics
email: holcombe@post.harvard.edu
dietary restrictions: vegetarian

Spatiotemporal conditions for the perception of occlusion and transparency
Alex O. Holcombe, University of California, San Diego

Previous researchers have intensively investigated the spatial configurations in images which yield percepts of occlusion and transparency. Computer scientists have used the results of such investigations into spatial image cues to design artificial vision systems, and neurophysiologists hunt for the neurons which respond to cues. *Spatiotemporal* cues have received less attention. In addition, previous studies of spatiotemporal cues have usually confined themselves to investigating the role of motion. Here, I document spatiotemporal cues which do not contain motion yet nevertheless yield percepts of occlusion and transparency. In static images, when uniform regions meet in such a way that they form a 'T' junction, occlusion is often inferred. Here, a demonstration shows that *spatiotemporal* T junctions also yield a percept of occlusion. Moreover, this cue affects other perceptual processes, in one case vetoing the perception of motion. A similar relation between spatial and spatiotemporal junctions holds for transparency. Spatial X junctions signal transparency, and so do spatiotemporal X junctions, even without motion. Motion can have a role, but classification of movies by their spatiotemporal T and X junctions actually subsumes motion cues that have been documented previously. For example, the motion cue sometimes called "progressive accretion and deletion" is a special case of a spatiotemporal T junction. One implication is that previous researchers may have overemphasized the role of motion *per se* in recovering occlusion and transparency. Animations will be available at <http://psy.ucsd.edu/~aholcombe>

