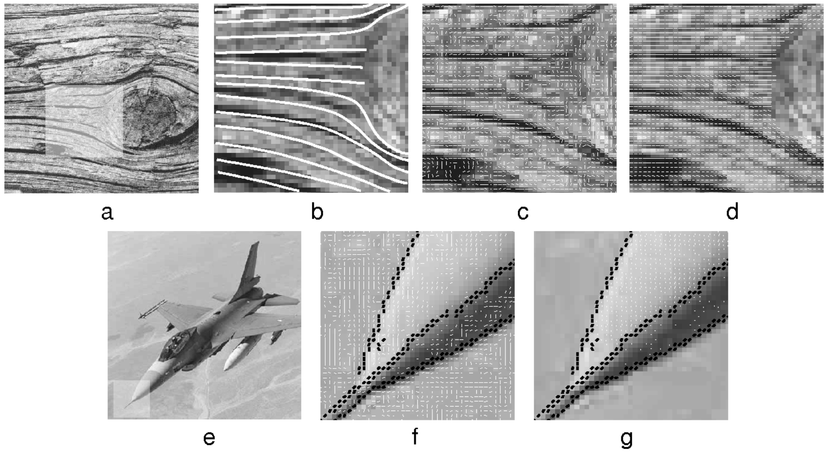

Figure 9: Example of coherent texture (a–d) and shading (e–g) flow computation based on contextual facilitation with right helicoidal connectivity patterns (Ben-Shahar & Zucker, 2003b). (a) Natural image of a tree stump with perceptual texture flow. (b) A manually drawn flow structure as perceived by a typical observer. (c) Noisy orientation field reminiscent of RF responses. The computed measurements are based on the direction of the image intensity gradient. (d) The outcome of applying a contextual and distributed computation (Ben-Shahar & Zucker, 2003b) which facilitates the response of individual cells based on their interaction with nearby cells through the connectivity structures in Figure 8. Compare to *b* and note how the measurements in the area of the knot, where no RF is embedded in a coherent context, were rejected altogether. (e) An image of a plane. (f) Measured shading flow field (white) and edges (black). In biological terms, edges are measured by RFs of particular orientation preferences tuned to high spatial frequencies. The shading field may be measured by cells tuned to low frequencies. (g) Applying the right helicoidal-based computation on the shading informaiton results in a coherent shading field on the plan's nose and a complete rejection of the incoherent shading information on the textured background. Such an outcome can be used to segment smoothly curved surfaces in the scene (Ben-Shahar & Zucker, 2003b), to resolve their shape (Lehky & Sejnowski, 1988), to identify shadows (Breton & Zucker, 1996), and to determine occlusion relationship underlying edge classification (Huggins et al., 2001).

11% for orientation resolution of 10 degrees) and a similar orientation offset at which it crosses the uniform distribution (approximately ±40 degrees). Unlike collinearity and association field models, however, ours predict qualitative differences between distributions of individual neurons, or injection sites, similar to findings in the literature (see Figure 10c). Most important, our model predicts the consistently nonmonotonic standard deviation. At orientation resolution of 10 degrees, both the anatomical data and the com-