Fig. S1

Including an additional parameter (spatial frequency) along with orientation in a single-feature map development process driven by a Spatial learning rule.

(A) Four examples are shown of the single feature, 2-parameter stimulus. (B) Learned receptive fields of some sample cells show the micro-organization of the parameters (spatial frequency and orientation). RFs are shown in retinal space. (C) Mature orientation (OR) map after 210K stimulation steps. Arrows show gradient direction and magnitude. White dots mark locations where OR gradient is roughly orthogonal to gradient in the spatial frequency (SF) map shown in (C). (D) Spatial frequency map corresponding to the orientation map in (B). Here arrows indicate SF map gradients. White dots are same as in (C). (E) Gradient arrows from (C) and (D) are shown together wherever both lie within the 20th to 80th percentile range of gradient magnitudes (gradients outside that range were sometimes unreliable). Green dots mark sites where gradient directions in the OR and SF maps are close to orthogonal (90 ± 30°). (F) Histogram of the angles between OR and SF gradients from (E) shows peaks near +90° and -90°, indicating the two gradients tend to be orthogonal.
Fig. S2
Developing a map under Hybrid learning when stimulated by a more complex multi-bar stimulus.

(A) Four examples are shown of the more complex stimulus. Different random locations/orientations were generated for each stimulus. (B) Learned receptive fields of some sample cells show the RF is dominated by a single oriented feature, surrounded by low contrast noise resulting from the extraneous stimuli. (C, D) Orientation map and combined orientation/RF center (“Contortion”) plot are comparable to the single-feature Hybrid outcomes using a simple stimulus (see Fig. 4).