

# IGSN - SYMPOSIUM

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## Brain Dynamics in Behavior and Stimulation

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### The more the merrier: Nature-inspired broadband visual stimuli improve sensory perception

Natural scenes are composed of complex distributions of visual features that drive neural response patterns and shape visual perception. However, most stimuli that are commonly used in vision research only reveal neural responses to single features, such as a specific stimulus orientation. How larger feature distributions affect neural responses and visual perception is therefore poorly understood. To address this question, we presented broadband visual stimuli with parametrically-controlled bandwidth of stimulus orientations and spatial frequencies to awake mice while recording the activity of neural populations in the primary visual cortex with two-photon imaging. Matching the orientation bandwidth of broadband stimuli to naturalistic images strongly increased neural responses and improved neuronal feature discrimination performance. Correspondingly, expanding orientation bandwidth also improved the performance of mice in a visual discrimination task. Our results strongly suggest that the visual system is tuned to the feature distributions of naturalistic visual inputs, with broader feature distributions driving more robust neural responses and enhanced visual perception.

**Host:**

DIRK JANCKE, FATMA KARAMA

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