*Student project in visual cognition*

The Optimal Stimulus for Stereo Vision

Background. Stereoscopic depth perception is based on the differences between the two "half-images" perceived in two-eyed (binocular) viewing. These image differences come in different types including geometric "point disparities", higher-order shape disparities, intensity disparities, monocular occlusion etc. While it is clear that point disparities suffice to generate depth perception (Julesz random dot stereograms), cortical neurons seem to be tuned to other types of image differences based on both positional offset and intensity differences between the two eyes.
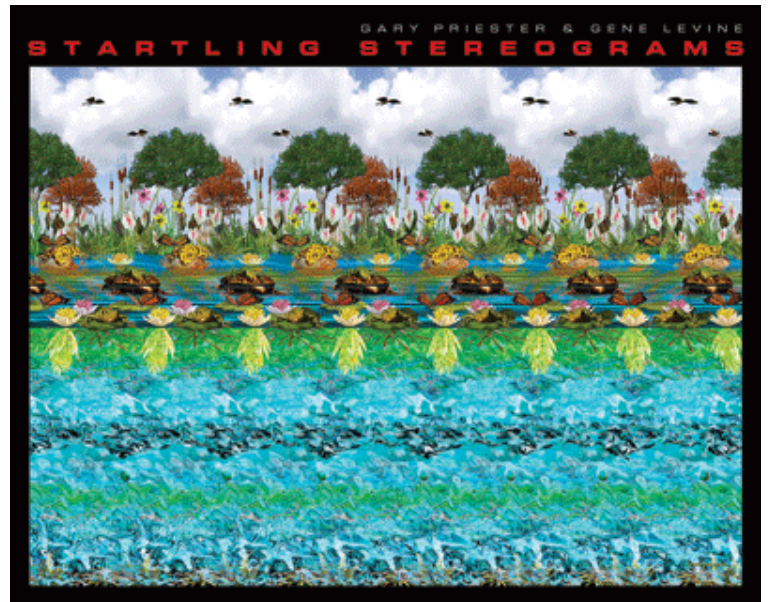
Project. In this project, psychophysical measurements of stereo-acuity will be carried out with stimuli combining positional- and intensity-based stereo information. Stimuli will be designed to match receptive field profiles of disparity tuned neurons, for which two major models exist. In two separate conditions we will address these models using Gabor patches with constant offset or with phase difference as stimuli. As a further parameter, scale will be varied. We expect that the resulting tuning curves will allow conclusions about the type of disparity actually evaluated by the visual system.

Methods. MatLab programing, psychophysics, statistical analysis.

Level. The project is currently planned as a BSc-project. Extension to a MSc-project is possible.

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References

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