We describe methods for estimating population receptive fields (pRFs) from fMRI data based on reverse correlation. We demonstrate the application of the method to investigate the effects of contrast and visual field position on surround suppression in human visual cortex.

**Motivation**
Most studies characterizing human visual area functions by functional magnetic resonance imaging (fMRI) use phase encoded retinotopic mapping techniques to identify visual areas. Because these methods ignore much of the information in the time-series, they have increasingly been replaced by methods to model population receptive fields (pRFs) from fMRI data. pRF modelling techniques involve fitting a Gaussian (or Difference of Gaussians) model of the pRF to individual voxel time series, allowing reconstructing a visual field map and yielding estimates of average receptive field size and suppressive surrounds. However, a limitation of pRF methods is that they require specific assumptions about the pRF structure.

To overcome this limitation, we propose a new model-agnostic data-driven approach that estimates the structure of the pRF and the hemodynamic response function (HRF).

**Methods**

We describe methods for estimating population receptive fields (pRFs) from fMRI data based on reverse correlation. We demonstrate the application of the method to investigate the effects of contrast and visual field position on surround suppression in human visual cortex.