1128-92-313 **Gabriel Barello** and **Yashar Ahmadian*** (yashar@uoregon.edu), Eugene, OR 97403.
Noise-limited Inference Predicts Facilitatory Normalization in the Visual Cortex. Preliminary report.

Visual cortical neurons integrate information across the visual field to support global perception, manifesting in the modulation of neurons' responses by the surrounding context of their receptive fields, as in surround suppression. Contextual modulations are canonical brain computations iterated across cortical areas; they are typically suppressive and sub-additive, with suppression weakening with diminishing stimulus strength. We have formerly shown that a parsimonious model of cortical circuitry mechanistically explains this weakening, and predicts a transition to facilitative or super-additive summation for weak stimuli. Here we show that a normative analysis based on principles of efficient coding of natural scenes, robustly leads to a similar prediction in the primary visual cortex (V1). When we take into account the trial-to-trial noise in the thalamic inputs to V1 neurons, we find that optimal responses exhibit weakening of suppressive normalization and a transition to facilitative stimulus summation as contrast is lowered. Our results provide an explanation based on optimal Bayesian inference for why the cortex should switch from suppressive to facilitative summation as stimulus strength is lowered, and corroborate the previous mechanistic prediction of this transition. (Received February 28, 2017)