coxlab @ Harvard University

SUMMARY:

Our group studies the computational underpinnings of high-level vision through a multi-pronged approach spanning both systems neuroscience and computer vision

CAPABILITIES:

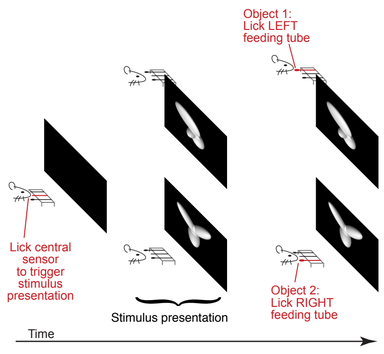
Study Natural System	**Build** Artificial Systems
high-throughput visual behavior / psychophysics	deep neural network architectures for vision
electrophysiology	biologically-inspired machine learning
2-photon calcium imaging	face and object recognition

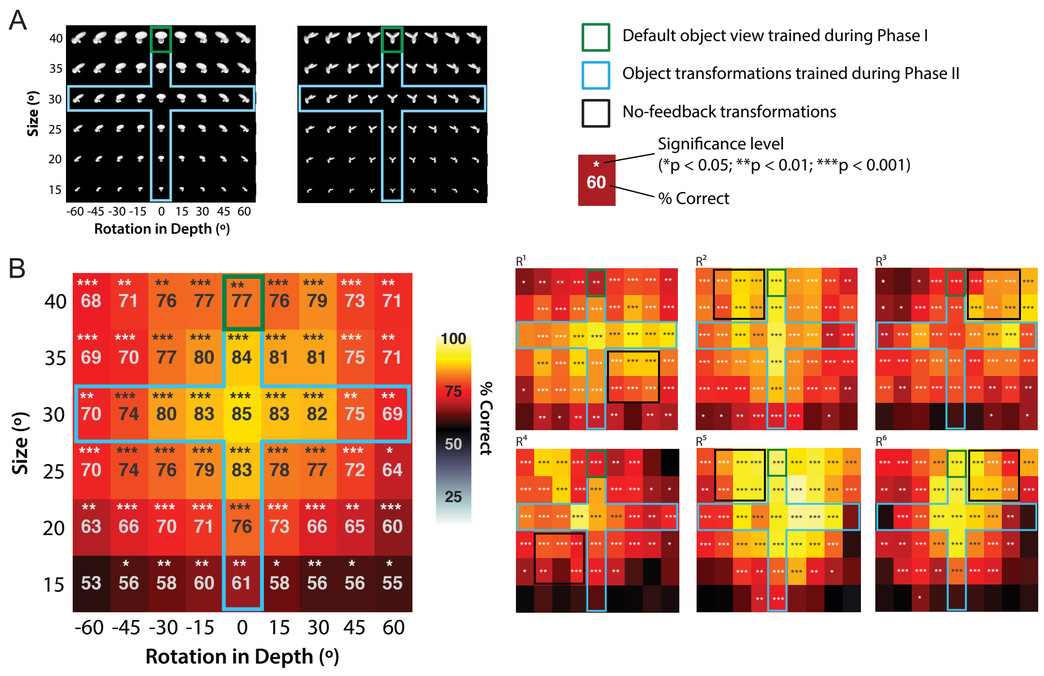
RESEARCH INTERESTS:

Rodents as a Tractable Model System for Studying Object Recognition

High-Throughput Behavioral Training

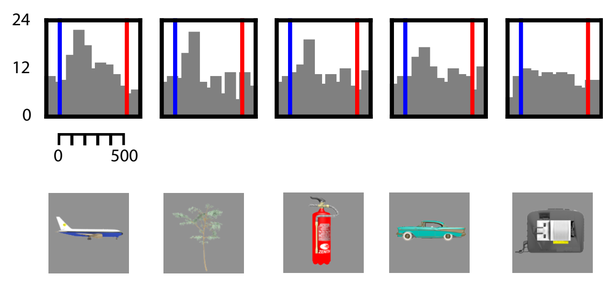
Rats possess surprisingly sophisticated visual recognition abilities and can be trained to perform reasonably complex tasks in a high-throughput manner. Our lab was the first to demonstrate these abilities in rodents (Zoccolan et al. 2009)

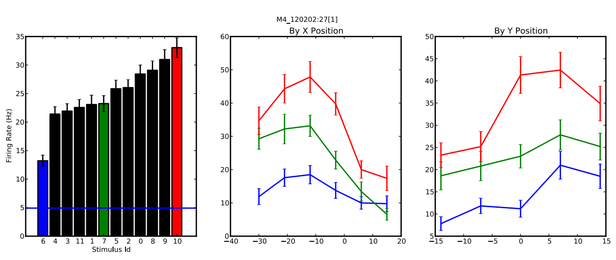




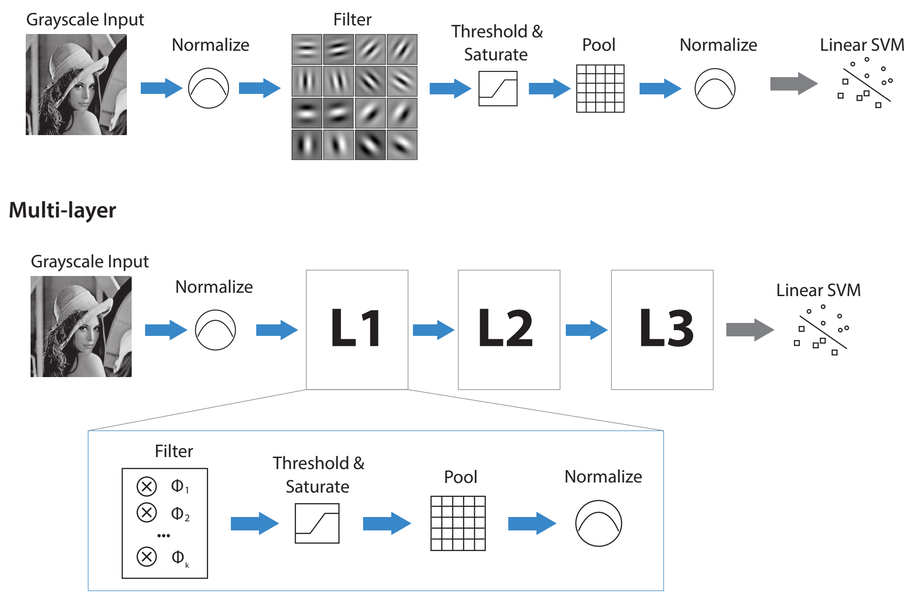
Awake, behaving visual neurophysiology

Rat extrastriate cortical neurons display many of the key properities found in primates, making these areas an interesting test ground for exploring cortical primitives.



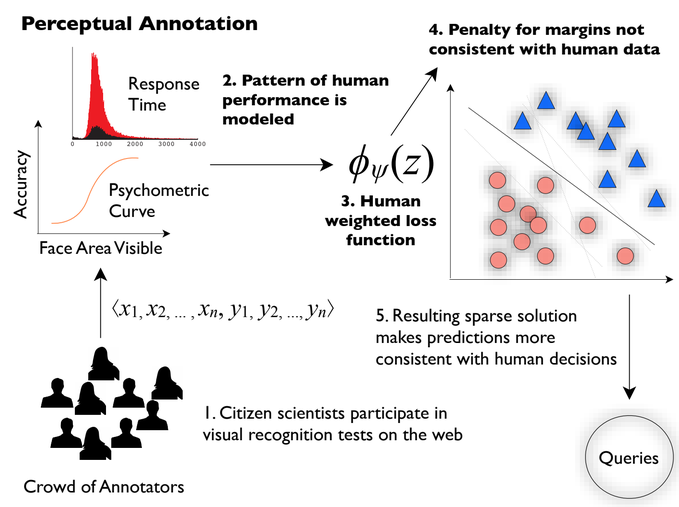


Large-Scale Biologically-Inspired Machine Vision



Our group has a track record of building large-scale biologically-inspired neural models applied to a variety of practical application areas, including face/object recognition (Pinto et al. 2009, Pinto et al. 2011), saliency (Vig et al. 2014), and robotics (Milford et al. 2014). We're currently especially interested in exploring recurrent architectures.

Hybrid "Biologically-Informed" Machine Learning



Our group has recently begun to explore hybrid "biologically-informed" algorithms for incorporating biological data as a constraint in a machine learning process. We have demonstrated proof-of-concept using human psychometric data (Scheirer et al. 2014), but are expanding to other forms of biological data.

Interested in supporting teams working on visual object recognition/detection, drawing on capabilities from either the experimental or computational sides of the lab, or both.

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