Primates excel at object recognition: For decades, the speed and accuracy of their visual system have remained unmatched by computer algorithms. But recent advances in Deep Convolutional Networks (DCNs) have led to vision systems that are starting to rival human decisions. A growing body of work also suggests that this recent surge in accuracy is accompanied by a concomitant improvement in our ability to account for neural data in higher areas of the primate visual cortex. Overall, DCNs have become de facto computational models of visual recognition.

In this talk, I will review recent work by our group which brings into relief limitations of DCNs as computational models of primate vision. I will show that visual features learned by DCNs from large-scale object recognition databases differ markedly from those used by human observers during visual recognition. I will further provide suggestive evidence that the depth of visual processing achieved by modern DCN architectures is greater than that achieved by human observers. Finally, I will demonstrate that DCNs are limited in their ability to solve seemingly simple visual reasoning problems involving similarity and spatial relation judgments suggesting the need for additional neural computations beyond those implemented in modern visual architectures.