Deep Learning at the Computational Limit

Abstract:
What problems can be solved with Deep Learning? In recent years, theoretical works on Deep Learning have presented many positive results, showing cases where neural networks provably work, along with various negative results, emphasizing the limitations of Deep Learning. However, most of the positive results study problems that are seemingly very simple, while negative results are given for problems that are extraordinarily hard. In this talk, I will focus on studying "borderline" problems - tasks for which there are known computational limitations, but at the same can be solved "efficiently" using neural networks trained with gradient descent. Investigating the behavior of neural networks at the computational limit allows us to study the "optimality" of Deep Learning, and reveals some interesting emergent phenomena.