

# Convexity, Bayesianism, and the Quest Towards Optimal Algorithms

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## Abstract

In this high level and accessible talk I will describe a recent line of works aimed at trying to understand the intrinsic complexity of computational problems by finding *optimal* algorithms for large classes of such problems. In particular, I will talk about efforts centered on convex programming as a source for such candidate algorithms. As we will see, a byproduct of this effort is a computational analog of *Bayesian probability* that is of its own interest.

I will demonstrate the approach using the example of the *planted clique* (also known as *hidden clique*) problem – a central problem in average case complexity with connections to machine learning, community detection, compressed sensing, finding Nash equilibrium and more. While the complexity of the planted clique problem is still wide open, this line of works has led to interesting insights on it.

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