Lots of the time we aim to determine global optimizers via convex relaxation for an optimization problem. However, convex relaxation is usually slow. We can sometimes speed up the optimization via a multiscale divide-and-conquer approach exploiting physical structures.

In this talk I will present one application of this method to a specific problem: Ferromagnetic Ising model with local defect. Ultimately if possible, we try to determine molecule structures using similar techniques.