1108-65-535 **Tianran Chen** (`chentia1@msu.edu`) and **Tien-Yien Li*** (`li@math.msu.edu`). *Parallel algorithms for computing the degree of the solution sets of systems of binomial equations.*

The problem of solving a system of polynomial equations numerically is one of the most fundamental problems in applied mathematics. Among them, the problem of solving a system of binomial equations form an important subclass for which specialized techniques exist. For both theoretic and applied purposes, the degree of the solution set of a system of binomial equations often play an important role in understanding the geometric structure of the solution set. It, however, can be computationally intensive. This talk discusses the recent developments in the parallel algorithms for computing the degree of the solution set of large scale systems of binomial equations on a variety of parallel computing architectures including a specialized parallel algorithm for GPU devices that takes advantage of their massively parallel nature. The preliminary implementation shows remarkable efficiency and scalability when compared to its closest CPU-based counterpart. In certain cases, 30 to 50 fold speedup ratios have been achieved, enabling the discovery of previously unknown results. (Received January 20, 2015)