The network inference problem consists in reconstructing the structure or wiring diagram of a dynamic network from time-series data. Even though this problem has been studied in the past, there is no algorithm that guarantees perfect reconstruction of the structure of a dynamic network. In this talk I will present a framework and algorithm to solve the network inference problem for discrete-time networks that, given enough data, is guaranteed to reconstruct the structure with zero errors. The framework uses tools from algebraic geometry.