

## **Pfaffian Circuits**

Jason Morton, Penn State

Pfaffian circuits are a geometrically motivated, and simplified construction of Valiant's holographic algorithms. These algorithms exploit dual Spinor varieties to simulate certain quantum computations (fermionic linear optics) classically. Combinatorial problems addressed include planar NAE-SAT, lattice path problems and evaluation of certain Tutte polynomials. Basis change is one route to superposition-like effects, and some of the geometric considerations in analyzing Pfaffian circuits under arbitrary basis change will be discussed. Connections are made to the sum-product algorithm, SLOCC equivalent entangled states, and monoidal categories.