

## Quantum Machine Learning for Healthcare

### Quantum Computing Basics

- Qubits and superposition
- Quantum entanglement
- Exponential state space

### Quantum Algorithms

- Quantum variational circuits
- Quantum annealing
- QAOA for optimization

### Medical Applications

- Drug discovery (molecular simulation)
- Protein folding
- Genomic sequence analysis

### Current Status

- Noisy Intermediate-Scale Quantum (NISQ)
- Limited qubits (~100-1000)
- 5-10 years to practical advantage

### Future Potential

Quantum ML promises exponential speedups for specific problems like molecular simulation and optimization, potentially revolutionizing drug discovery, though practical healthcare applications remain 5-10 years away.