Main Ideas

- PRGs used to derandomize streaming algorithms ⇒ slow update times
- A new PRG with a symmetry property and space-time tradeoff
- Carefully analyze which parts of existing algorithms need to be derandomized
    - Symmetry of the PRG lets us derandomize CountSketch with small space
    - Space-vs-time tradeoff lets us get fast update times!

Next Steps : Streaming

- Streaming algorithms to approximate top singular vector in the row arrival model
- [Price ’23] shows that if $\sigma_1(A)/\sigma_2(A) \leq O(1)$, then need $\Omega(d^2)$ space to approximate top singular vector
- Price also shows that if $\sigma_1(A)/\sigma_2(A) \geq C\sqrt{\log n \cdot \log d}$, then can approximate top singular vector in $O(d)$ space
- Can we relax the gap assumption?
- Can we assume random order or some conditions on A to obtain better algorithms?