

# The Path Forward

- **Research Needed to Achieve Exascale Performance**
- Extreme voltage scaling to reduce core power
- More parallelism 10x – 100x to achieve target speed
- Re-architecting DRAM to reduce memory power
- New interconnect for lower power at distance
- NVM to reduce disk power and accesses
- Resilient design to manage unreliable transistors
- New programming models for extreme parallelism
- Applications built for extreme (billion way) parallelism