Challenges Future

- We are in the early stages as an industry
- Need is not only cryogenic systems; cryogenic hardware like components, I/O too.
- Must address now or problem will get worse

Left: First commercial digital computer.

Right: Early commercial quantum computer
How to Make Progress?

- Strengthen quantum supply chain.
- If scarcity is the issue, how do we create abundance?
- Simplify cryogenics
- Think long-term and short-term

**Long-term:**
- 6th-12th grade exposure/involvement (Q12)
- What is a Quantum Engineer

**Short-term:**
- Apprenticeship model as a starting place
- One-year and two-year programs
Opportunities

- High-tech apprenticeships
  - Highly mentored, highly advanced, not offered in education experience
  - Giving back to community
  - “Farming” and growing talent locally
Opportunities

◦ Partnership with QIST-NET

◦ Purpose to foster industry and national lab interaction with academia

◦ Montana State University - Triplet

1. Alpha test: new 1.7K low vibration optical product.
2. How to measure and optimize performance of cryocoolers for our research? How to apply this information to other fields?