

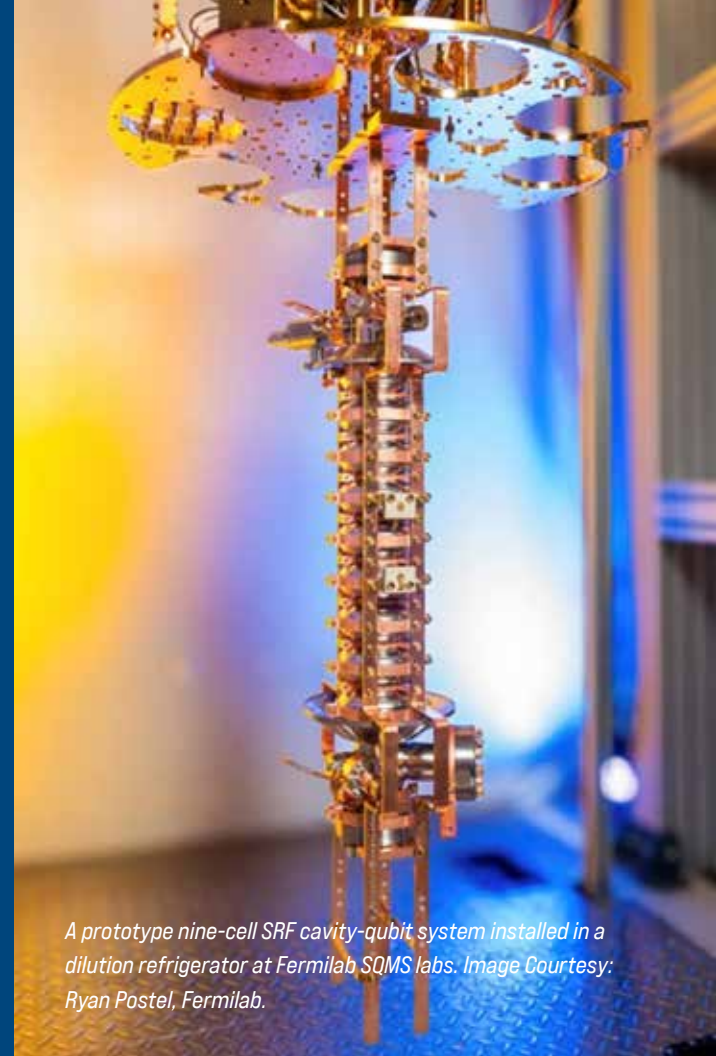


Universities  
Space Research  
Association

# QUANTUM COMPUTING AND SENSING

## Leadership in National Quantum Research

Quantum technologies are essential to national competitiveness in computing, energy, and security. The Universities Space Research Association plays a significant role as part of a NASA team and has been a core partner of the Superconducting Quantum Materials and Systems (SQMS) since its inception, contributing to the development of novel algorithmic techniques and hardware design. SQMS is one of the five Department of Energy National Quantum Information Science Research Centers. USRA's expertise in quantum simulation and quantum error correction provides two foundational capabilities essential for enabling practical, scalable quantum computing. USRA's work continues to shape the tools and techniques that will define the next era of quantum advantage.



*A prototype nine-cell SRF cavity-qubit system installed in a dilution refrigerator at Fermilab SQMS labs. Image Courtesy: Ryan Postel, Fermilab.*

### **High Impact Collaboration**

USRA maintains a long standing and influential partnership with NASA and Google, originating with the creation of the Quantum Artificial Intelligence Lab in 2012.

### **Expanding Global Industry Engagement**

USRA's engagement with the global quantum industry continues to grow through partnerships with leading European startups such as Pasqal and Oxford Ionics.

### **Advancing Quantum Optimization for Real World Impact**

USRA's work in quantum optimization, under DARPA's Optimization with Noisy Intermediate-Scale Quantum (ONISQ) program, is progressing through major new initiatives.

### **Real-world Applications for Quantum Algorithms Include:**

- Air/Space Traffic Management
- Surface Operations
- Flight Safety
- Flight Anomaly Detection
- Generative Machine Learning
- Scheduling and Planning
- Satellite Image Analysis
- Parallel Tempering
- Quantum Chemistry
- Quantum Sensing



## Training the Next Generation: The Feynman Quantum Academy

Over 50 Intern  
Projects

Over 25  
Universities

Over 81 Percent  
Completed or  
Enrolled in a  
Doctoral Program

AI 55+ Years of  
Trusted Impact

25,000+ Students  
Supported

6,000+ Faculty  
Partners



*Richard Feynman*