Quantum Science & Technology

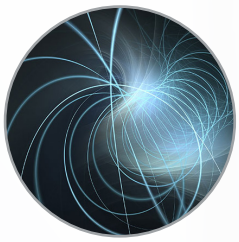
World-class interdisciplinary research and education

University of Colorado Boulder

Quantum science and engineering will be a driving force for future economic development for the U.S. and the world. CU Boulder has an exceptional history of accomplishment in quantum, including **four quantum-based Nobel Prizes**, the **CUbit Quantum Initiative** and new investments like quantum seed grants. Situated within the incredible Front Range ecosystem of national labs, corporations and startup companies, CU Boulder is ideally positioned to have even greater impact on our nation's economic and security future.

Quantum Sensing and Metrology

CU Boulder is advancing the frontiers of quantum sensing by applying quantum sensors to searches for new fundamental physics, developing probes of quantum many-body systems, and translating frontier quantum sensor technologies into advanced metrological capabilities in deployable systems.

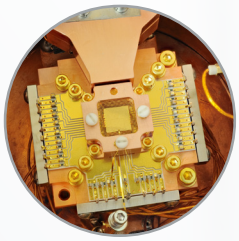


Quantum Networks and Communications

Many quantum companies in Colorado are working directly on quantum networks/communications and/or providing crucial supporting technologies. The topic is unified by the drive to establish entanglement between well-controlled quantum systems that are remote from one another.

Quantum Matter and Dynamics

Materials-related challenges in quantum technology are a natural common ground for collaboration. **CU Boulder** facilitates partnerships that span disciplines to address these challenges, from solid-state chemistry and quantum condensed matter physics to materials fabrication and characterization.

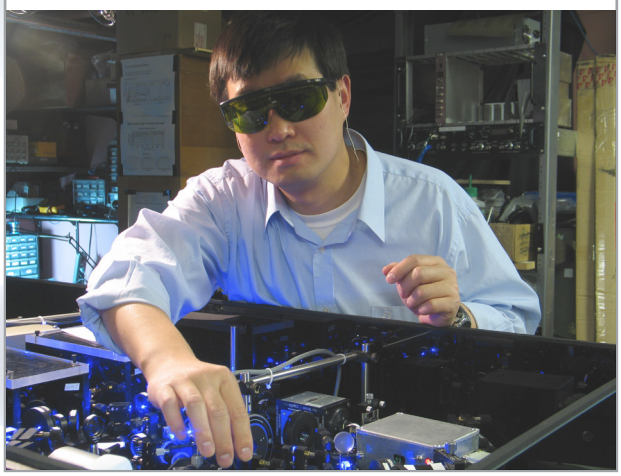


Quantum Computing and Simulation

CU Boulder harnesses highly controllable large-scale quantum systems to solve problems that are computationally inaccessible for even the largest classical supercomputers. Our approach includes methods from quantum computing and quantum simulation, as well as techniques that bridge the two.

CUbit
QUANTUM INITIATIVE

Established in 2018, the **CUbit Quantum Initiative** reinforces Colorado's prominence in quantum information science and technology (QIST), partners with regional universities and laboratories, links closely with quantum-intensive companies, and serves a spectrum of local, regional and national interests, including workforce development.



Industry Partnerships

CU Boulder stays at the forefront of revolutionary commercial applications for QIST by:

- **Seeking guidance from companies** on research and training needs
- **Fostering industry research partnerships**
- **Establishing an internship channel** through which students enage in QIST projects at host companies

Education & Workforce Training

CU Boulder accelerates implementation of its own innovations and those from other sources by producing the next generation of researchers through a cross-disciplinary, multi-tiered education and training program, including professonal **Masters**, **Bachelor** and **Certificate** programs, as well as **PhD** and **Postdoctoral** programs.

Be Boulder.

A storied history in quantum

CU Boulder has an exceptional history of accomplishment in quantum, including **four quantum-based Nobel Prizes**. The College of Arts and Sciences and the College of Engineering and Applied Science are significantly expanding faculty capacity in quantum science and engineering, adding to an already world-class roster of talent including:

Jun Ye
Director, CUbit
Professor Adjoint, Physics
JILA Fellow, NIST Fellow

Juliet Gopinath
Associate Director, CUbit
Associate Professor, Electrical, Computer & Energy Engineering

Dana Anderson
Professor, Physics; Electrical, Computer & Energy Engineering
JILA Fellow

New investments in quantum

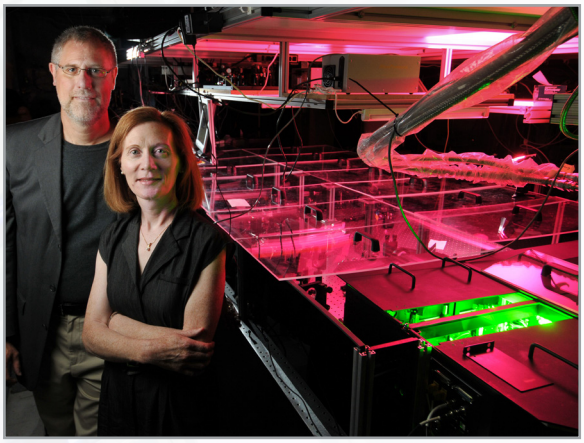
In January 2019, CU Boulder, JILA and NIST announced the **Quantum Explorations in Science and Technology (QuEST)** seed grant awards.

Targeting interdisciplinary, multi-institutional research projects focused on quantum science and technology challenges with transformative potential, **19 collaborative quantum projects received a total of $780K**, positioning awardees to compete for current and future funding opportunities through the National Quantum Initiative Act and other federal solicitations.

JILA

A joint institute of CU Boulder and the National Institute of Standards & Technology (NIST)

JILA, one of the nation's leading research institutes in the physical sciences, boasts two **Nobel laureates** (Eric Cornell and John Hall) and two **John D. and Catherine T. MacArthur Fellows** (Margaret Murnane and Ana Maria Rey). CU Boulder members hold faculty appointments in Physics; Astrophysical and Planetary Science; Chemistry and Biochemistry; and Molecular, Cellular, and Developmental Biology as well as Engineering. NIST members in the **Quantum Physics Division** hold joint faculty appointments at CU Boulder.



Colorado's Quantum Ecosystem

The Colorado Front Range hosts a vibrant ecosystem of quantum-intensive companies and is widely regarded as a top entrepreneurial region in the nation. This positions **CU Boulder to** place its research advances into appropriate business channels for further development and delivery as goods and services to benefit the economy and the nation.

University of Colorado **Boulder**