

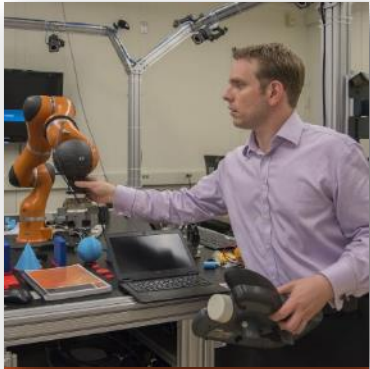
# NIST and Quantum Science

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**Acting Associate Director for Laboratory Programs**

June 5, 2018

# Programmatic Priorities



Advanced  
Manufacturing



Cybersecurity



Disaster  
Resilience



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Engineering  
Biology



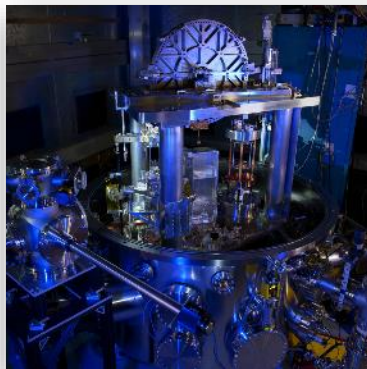
Internet of  
Things



Documentary  
Standards



Technology  
Transfer



Measurement  
Dissemination



Quantum  
Science



Artificial  
Intelligence

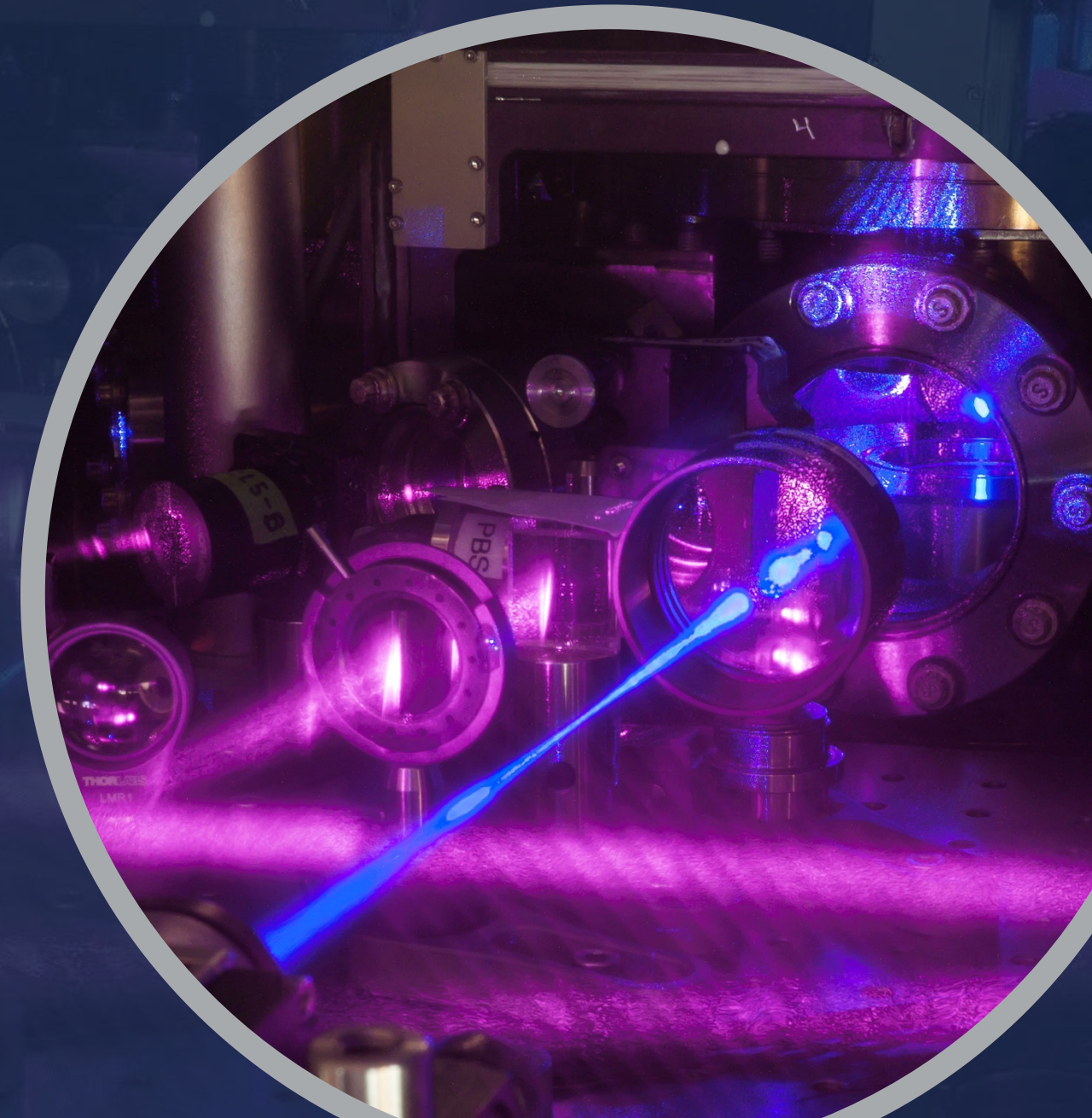
# Quantum Science as Strategic Priority

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Critical to metrology

Critical to national  
priorities

Unique NIST capabilities



# Why Quantum Now?

## 1900's

Understanding quantum science leads to lasers, transistors, semiconductors

## Today

Control and measurement of quantum states will lead to new technologies

In today's landscape, quantum science is essential to our national security and economic health

TECHNOLOGY QUARTERLY  
HERE, THERE AND EVERYWHERE

Quantum technology is beginning to come into its own

TOM SIMONITE BUSINESS 05.19.18 07:00 AM

GOOGLE, ALIBABA SPAR OVER  
TIMELINE FOR 'QUANTUM  
SUPREMACY'

Chinese satellite uses quantum cryptography for secure video conference between continents

DIGIBYTE | 17 May 2016

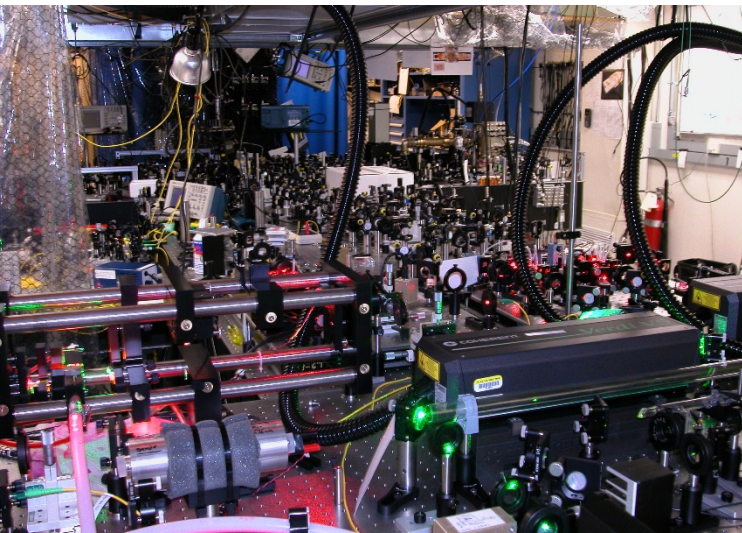
European Commission will launch €1 billion quantum technologies flagship

Quantum Cryptography Market will have Potential Applications in Sectors like Aerospace and Defence, Cybersecurity, Finance and Healthcare

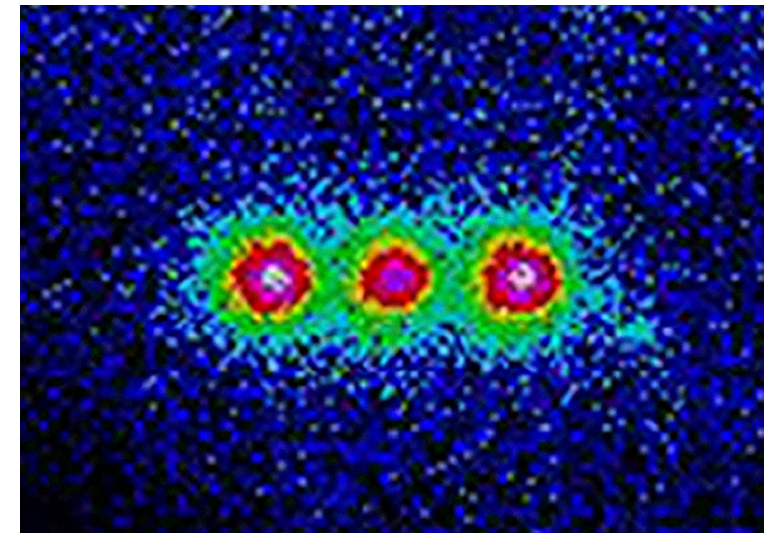
Thu Oct 26, 2017 - 14:45pm UTC

# Why NIST?

NIST has a world-leading capability and reputation in quantum  
Excellence in quantum is critical to NIST's metrology mission  
Quantum supremacy impossible without measurements



Credit: J. Consoli, University of Maryland



# NIST has long history in Quantum

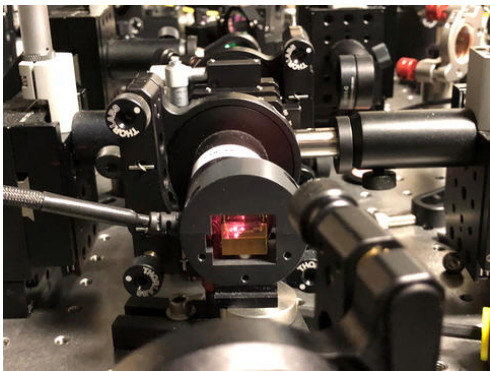
NIST



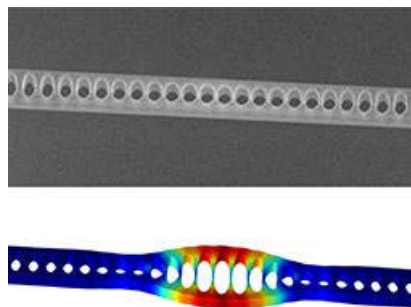
**NIST's work in atomic clocks led way for quantum information science**

# Quantum Across NIST

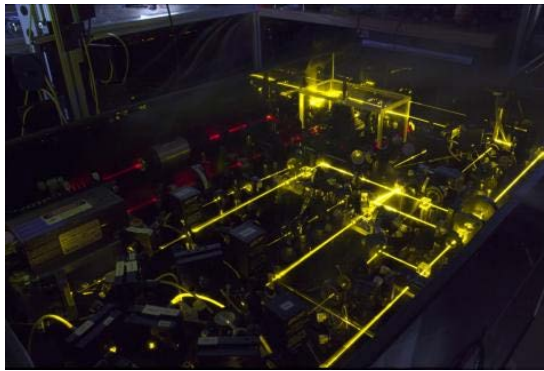
Laboratories across NIST are leading and preparing for the second quantum revolution through basic research, applied research and engineering, and measurement mission delivery.



Quantum-based  
Random Number  
Generator



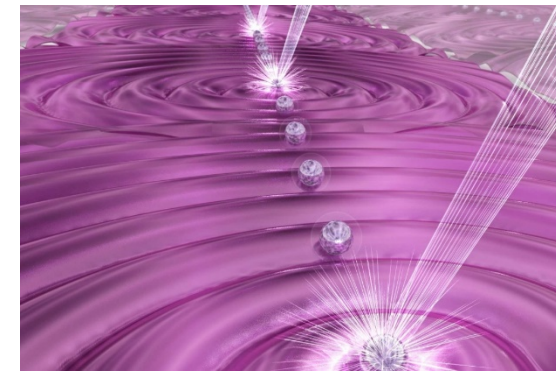
Quantum photonics



Stable Atomic  
Clocks



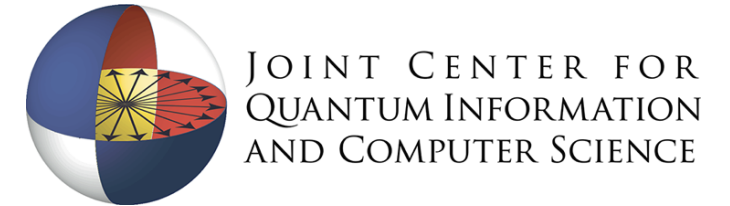
Post-Quantum  
Cryptography



Quantum Simulators

# Extending Quantum Capabilities

NIST





# NIST Quantum Science Strategic Vision



NIST will accelerate the application of quantum information science, leverage advances in quantum technology for standards and measurements, and provide U.S. leadership in fundamental research into quantum phenomena to establish the foundation for the future quantum infrastructure of the U.S.

Quantum SI

Quantum  
Engineering

Foundational  
Quantum  
Metrology

# Speakers



**Jacob Taylor**

Assistant Director for Quantum Information Science, White House Office of Science and Technology Policy



**Carl Williams**

Acting Director, NIST Physical Measurement Laboratory



**Gretchen Campbell**

Co-Director, Joint Quantum Institute