



# MeitY Quantum Computing Applications Lab

*In Collaboration with AWS*

19 January, 2021



# Speakers



**Ajay Prakash  
Sawhney**  
Secretary, MeitY



**Rajendra Kumar**  
Additional  
Secretary, MeitY



**Abhishek Singh**  
President & CEO  
NEGD



**Max Peterson**  
Vice President -  
International Sales,  
Worldwide Public Sector,  
AWS, Inc.



**Rahul Sharma**  
Regional Head - AISPL  
Public Sector, AWS India  
and South Asia



**Simone Severini**  
Director, Quantum  
Computing, AWS



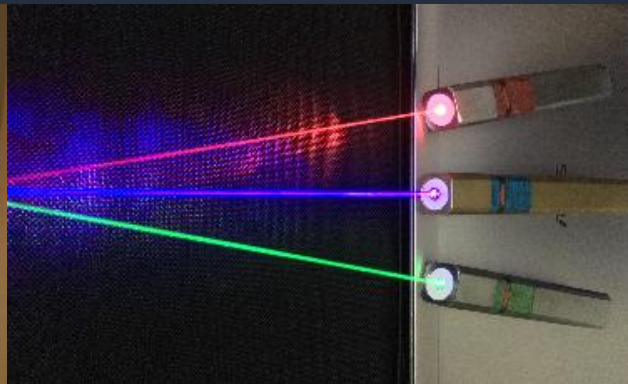
**Kanishka Agiwal**  
Head, Service Lines, AISPL  
Public Sector, AWS India  
and South Asia

# Quantum Principles have been in use for decades

By using the laws of **quantum physics** to perform computation in novel and improved ways



Medical Imaging

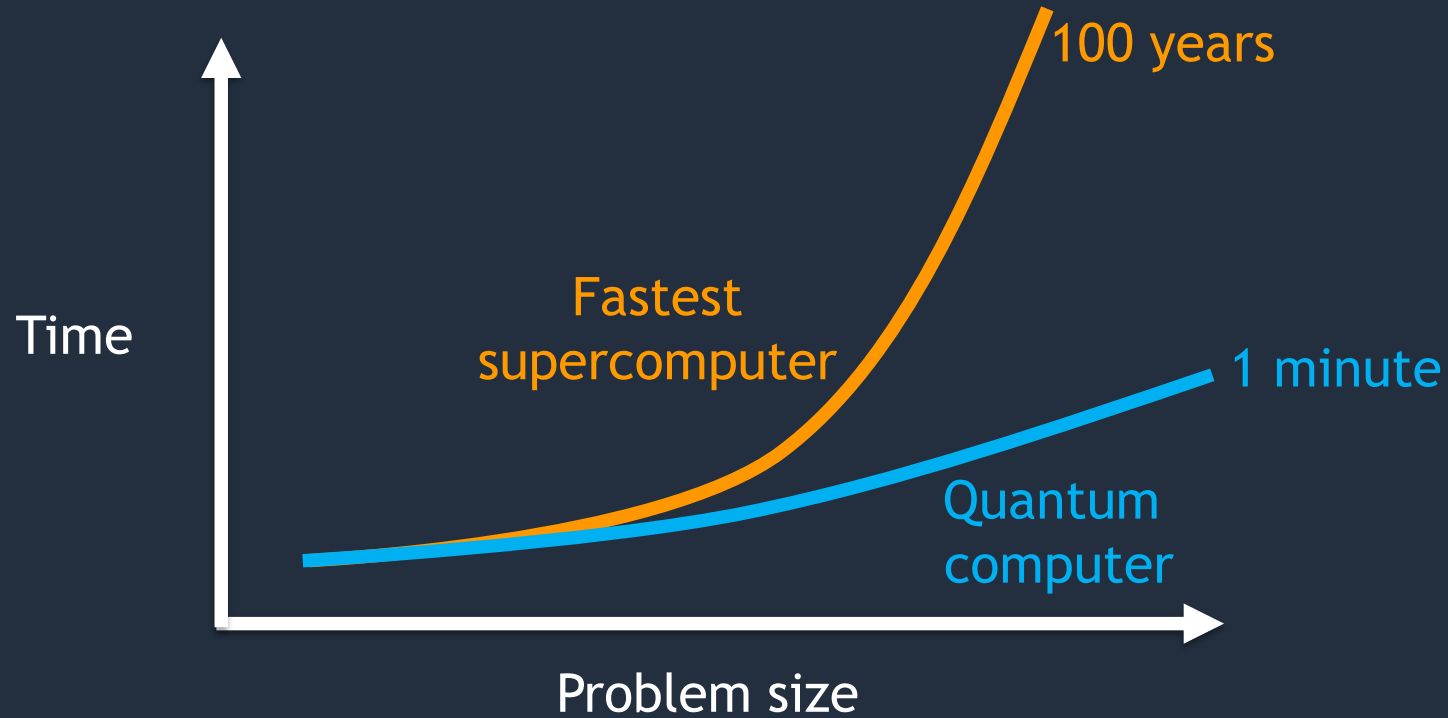


Laser



Transistor

# Why quantum computers?



Not **10x** speedup but possibly  **$10^x$**   
(for some problems only)

# Future applications for quantum computing



## Supply Chain

Optimize scheduling and routing

Quadratic speedup in quantum algorithms compared to classical computing (time to the solution reduced from e.g. 3 hrs. to 13 mins.), reducing financial costs



## Agriculture

Production of fertilizers is inefficient

Modeling of Ammonia synthesis via QC is significantly faster than classical methods

Achieve energy efficiency



## Sustainability

Reduce carbon footprint

Design adsorbents nanoporous materials. Simulation using classical computers is impossible



## Pharma

Reduce time-to-market of new drugs

Molecular simulation to find compound's most stable configurations; impossible for traditional supercomputers



## Energy

Solar cells are inefficient

Model natural light harvesters in photosynthesis; impossible for traditional supercomputers

Reduce financial cost of solar energy production



# Introducing Amazon Braket

Fully managed service that makes it easy for scientists and developers to explore and experiment with quantum computing.



Single secure environment to design, test, and run quantum algorithms



Experiment with a variety of quantum hardware technologies



Run hybrid quantum and classical algorithms

Fully integrated on the AWS cloud



Get Expert Help

# Announcing the MeitY Quantum Computing Applications Lab, in collaboration with AWS

**World's first quantum computing lab on AWS aligned to govt. mission**

On cloud, accessible to all

---

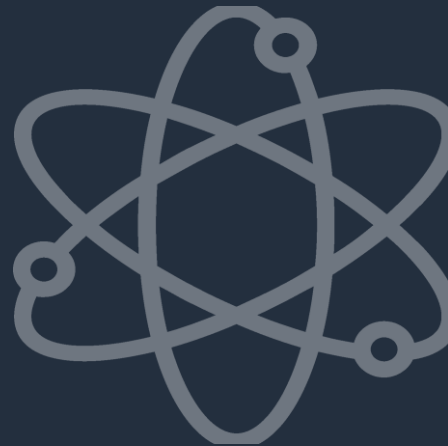
**Build for the world**

Focussed on national initiatives and priorities

---

**Skilling of resources**

Quantum Computing & Applications



**~167,000 hrs of Simulation**

Per year

---

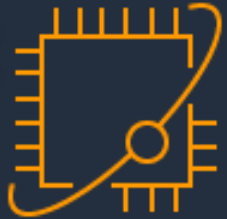
**~200,000 Quantum Tasks**

Per year

---

# Enabling the scientific and developer community with access to quantum computing on cloud

## Exploration



### Democratize Quantum Computing

Access to state-of-art technologies

Low Cost, On Demand,  
Scalable and Accessible  
to all

## Expertise



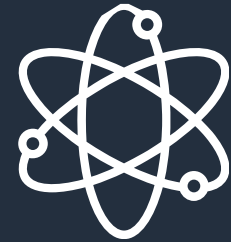
### Provide Expert Guidance

Cross-discipline support

State-of-the-art  
algorithms

Domain and technical  
expertise

## Technology Development



### Push the Boundaries

Research quantum  
algorithms and hardware

Build for the world



# Engagement approach



## Launch

- 19th Jan 2021
- Steering Committee formed between MeitY and AWS



## Call for Proposals

- Feb - Early Mar
- Call for use case/solution proposals from the developer and scientific community



## Proposal Evaluation

- Steering Committee evaluates the proposals based on alignment to national priorities
- Approves AWS credits and defines goals for success



## Development

- Developers /scientists build experiments and prototypes on Amazon Braket
- AWS provides technical support on Amazon Braket



## Review & Enhance

- Results of proposals are shared with the Steering Committee for evaluation
- Successful proposals are selected for further enhancements and encouraged for production